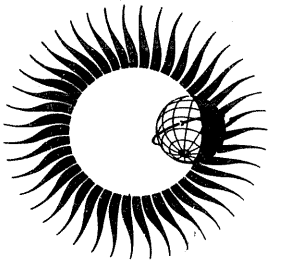
REPORT UAG - 30
Supersedes Report UAG - 20, September 1972

WORLD DATA CENTER A
for
Solar-Terrestrial Physics

CATALOGUE OF DATA

ON

SOLAR-TERRESTRIAL PHYSICS



OCTOBER 1973

WORLD DATA CENTER A

National Academy of Sciences

2101 Constitution Avenue, N. W. Washington, D. C., U.S.A., 20418

World Data Center A consists of the Coordination Office and eight subcenters:

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Coordination Office
National Academy of Sciences
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Washington, D. C., U.S.A. 20418
Telephone (202) 389-6478

Solar and Interplanetary Phenomena, Ionospheric Phenomena, Flare-Associated Events, Geomagnetic Variations, Magnetospheric and Interplanetary Magnetic Phenomena, Aurora, Cosmic Rays, Airglow:
World Data Center A
for Solar-Terrestrial Physics
National Oceanic and Atmospheric Administration
Boulder, Colorado, U.S.A. 80302
Telephone (303) 499-1000 Ext. 6467

Geomagnetism, Seismology, Gravity (and Upper Mantle Project Archives):
World Data Center A:
Geomagnetism, Seismology and Gravity
Environmental Data Service, NOAA
Boulder, Colorado, U.S.A. 80302
Telephone (303) 499-1000 Ext. 6311

Glaciology:
World Data Center A:
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U.S. Geological Survey
1305 Tacoma Avenue South
Tacoma, Washington, U.S.A. 98402
Telephone (206) 593-6502

Longitude and Latitude:
World Data Center A:
Longitude and Latitude
U. S. Naval Observatory
Washington, D. C., U.S.A. 20390
Telephone (202) 254-4547

Meteorology (and Nuclear Radiation):
World Data Center A:
Meteorology
National Climatic Center
Federal Building
Asheville, North Carolina, U.S.A. 28801
Telephone (704) 254-0683

Oceanography:
World Data Center A:
Oceanography
National Oceanic and Atmospheric Administration
Rockville, Maryland, U.S.A. 20852
Telephone (202) 426-9052

Rockets and Satellites:
World Data Center A:
Rockets and Satellites
Goddard Space Flight Center
Code 601
Greenbelt, Maryland, U.S.A. 20771
Telephone (301) 982-6695

Tsunami:
World Data Center A:
Tsunami
National Oceanic and Atmospheric Administration
2525 Korrea Road
Honolulu, Hawaii, U.S.A. 96822
Telephone (808) 948-8083

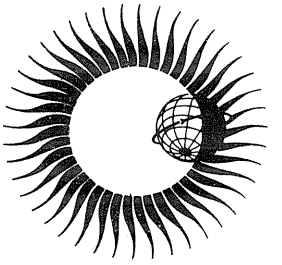
Notes:

(1) World Data Centers conduct international exchange of geophysical observations in accordance with the principles set forth by the International Council of Scientific Unions. WDC-A is established in the United States under the auspices of the National Academy of Sciences.
(2) Communications regarding data interchange matters in general and World Data Center A as a whole should be addressed to: World Data Center A, Coordination Office (see address above).
(3) Inquiries and communications concerning data in specific disciplines should be addressed to the appropriate subcenter listed above.

WORLD DATA CENTER A
for
Solar-Terrestrial Physics

CATALOGUE OF DATA
ON
SOLAR-TERRESTRIAL PHYSICS
IN WORLD DATA CENTER A SUBCENTERS

Solar and Interplanetary Phenomena
Ionospheric Phenomena
Flare-Associated Events
Geomagnetic Phenomena
Aurora
Cosmic Rays
Airglow



Prepared by World Data Center A for
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U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

ENVIRONMENTAL DATA SERVICE
Asheville, North Carolina, USA 28801

October 1973

SUBSCRIPTION PRICE: $9.00 a year; $2.50 additional for foreign mailing; single copy price varies.* Checks and money orders should be made payable to the Department of Commerce, NOAA. Remittance and correspondence regarding subscriptions should be sent to the National Climatic Center, Federal Building, Asheville, NC 28801, Attn: Publications.

*PRICE THIS ISSUE $1.75.

Price List

Master Station List

Solar and Interplanetary Phenomena

Ionospheric Phenomena

Flare-Associated Events

Geomagnetic Phenomena

Aurora

Cosmic Rays

Airglow

Miscellany

INTRODUCTION

World Data Centers conduct international exchange of geophysical observations in accordance with the principles set forth by the International Council of Scientific Unions (ICSU). They were established in 1957 by the International IGY Committee (CSAGI) as part of the fundamental international planning for the International Geophysical Year program to collect data from the numerous and widespread IGY observational programs and to make such data readily accessible to interested scientists and scholars for an indefinite period of time. WDC-A was established in the U.S.A.; WDC-B, in the U.S.S.R.; and WDC-C, in Western Europe, Australia and Japan. This new system for exchanging geophysical data was found to be very effective, and the operations of the World Data Centers were extended by ICSU on a continuing basis to other international programs; the WDC's were under the supervision of the Comité International de Géophysique (CIG) for the period 1960 to 1967 and are now supervised by the ICSU Panel on World Data Centers.

The current plans for continued international exchange of solar-terrestrial data through the World Data Centers are set forth in the STP NOTES No. 6 "Guide for International Exchange of Data in Solar-Terrestrial Physics" which was adopted by the Inter-Union Commission on Solar-Terrestrial Physics in 1969. These plans are broadly similar to those adopted under ICSU auspices for the IGY and IQSY.

Functions and Responsibilities of WDC's

The World Data Centers collect data and publications for the following disciplines: Glaciology; Gravimetry; Longitude and Latitude; Meteorology; Oceanography; Rockets and Satellites; Seismology; Solar-Terrestrial Physics disciplines (Solar and Interplanetary Phenomena, Ionospheric Phenomena, Flare-Associated Events, Geomagnetic Phenomena, Aurora, Cosmic Rays, Airglow); Tsunami; UMP disciplines (Recent Movements of the Earth's Crust, Paleomagnetism, Volcanology; Geochemistry, Properties of rocks under high pressure and temperatures, Geothermics, Deep drilling). In planning for the various scientific programs, decisions on data exchange were made by the scientific community through the international scientific unions and committees. In each discipline the specialists themselves determined the nature and form of data exchange, based on their needs as research workers. Thus the type and amount of data in the WDC's differ from discipline to discipline.

The objects of establishing several World Data Centers for collecting observational data were: (1) to insure against loss of data by the catastrophic destruction of a single center, (2) to meet the geographical convenience of, and provide easy communication for, workers in different parts of the world. Each WDC is responsible for: (1) endeavoring to collect a complete set of data in the field or discipline for which it is responsible, (2) safekeeping of the incoming data, (3) correct copying and reproduction of data, maintaining adequate standards of clarity and durability, (4) supplying copies to other WDC's of data not received directly, (5) preparation of catalogues of all data in its charge, (6) making data in the WDC's available to the scientific community. The WDC's conduct their operation at no expense to ICSU or to the ICSU family of unions and committees.

World Data Center A

World Data Center A, for which the National Academy of Sciences through the Geophysics Research Board and its Committee on Data Interchange and Data Centers has over-all responsibility, consists of the WDC-A Coordination Office and eight subcenters at scientific institutions in various parts of the United States. The GRB periodically reviews the activities of WDC-A and has conducted several studies on the effectiveness of the WDC system. As a result of these reviews and studies some of the subcenters of WDC-A have been relocated so that they could more effectively serve the scientific community. Several of the discipline centers of WDC-A dealing with solar-terrestrial physics were consolidated in the WDC-A for Upper Atmosphere Geophysics during the period 1 July 1966 to 1 July 1968. The WDC-A concerned with geomagnetic variations was combined with WDC-A for Upper Atmosphere Geophysics in 1971. Early in 1972 the WDC-A for Upper Atmosphere Geophysics was renamed WDC-A for Solar-Terrestrial Physics to more accurately reflect the scientific data disciplines involved. The WDC-A for Rockets and Satellites was moved from the National Academy of Sciences to a location adjacent to the National Space Science Data Center at NASA Goddard Space Flight Center on 1 January 1969. The World Data Center A for Tsunamis was moved from NOAA-Rockville to NOAA-Honolulu in May 1969. The WDC-A for Glaciology was moved from the American Geographical Society in New York to the U. S. Geological Survey Project Office for Glaciology in Tacoma, Washington on 1 October 1970. The Upper Mantle Project archives were transferred to WDC-A Geomagnetism, Seismology and Gravity in June 1972. The addresses of several subcenters were changed when the National Oceanic and Atmospheric Administration (NOAA) was established in October 1970. The addresses of the WDC-A subcenters and Coordination Office are given inside the front cover. There are very close connections between WDC-A for Solar-Terrestrial Physics, and WDC-A for Rockets and Satellites, which exchange solar-terrestrial geophysical data; if it is more convenient, data may be sent to one WDC-A subcenter through the other one.

The data received by WDC-A have been made available to the scientific community in various ways: (1) reports containing data and results of experiments have been compiled, published and widely distributed; (2) synoptic type data on cards, microfilm or tables are available for use at the subcenters and for loan to scientists; (3) copies of data and reports are provided upon request.

Catalogue of Data

All the data associated with the various disciplines of solar-terrestrial physics received by WDC-A, or known to be available are listed in this catalogue which supersedes all previous WDC-A catalogues for these disciplines. The geographical location of the holdings is specified in each section.

World Data Center A Coordination Office
October 1973

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GENERAL EXPLANATORY NOTES

This Catalogue presents the holdings in Solar-Terrestrial Physics at the two World Data Center A subcenters concerned with these disciplines: WDC-A for Solar-Terrestrial Physics, Boulder, Colorado; and WDC-A, Rockets and Satellites, Greenbelt, Md. Their complete mailing addresses are on the inside cover of this Catalogue.

The Catalogue is arranged by the classification scheme (see Table of Contents, p. 2) of the "Guide for International Exchange of Data in Solar-Terrestrial Physics", issued as STP Notes No. 6 under the auspices of the Special Committee on Solar-Terrestrial Physics (SCOSTEP)*. The main sections are separated by thumb prints. A detailed table of contents heads each section, accompanied by additional explanatory text or maps indicating the location of stations currently reporting, when appropriate.

On the lefthand pages are presented samples of the data and special information on data holdings. The recommended standardized computerized formats are specified. On the facing righthand pages are given holdings at each geographic location under the headings: At Boulder, and At Greenbelt. Under the station lists further information is given when appropriate concerning holdings in Computer Format, Publications, Photographs, or Microfilm.

To present the data in as concise a format as possible for the user, the holdings at Boulder are given by symbols on the catalogue pages which are defined as follows:

A = complete (12 months)
B = moderately complete (6 to 11 months)
C = some data (1 to 5 months)
W = World Days only
Q = data exist but not held at WDC-A; query WDC-A to assist in obtaining these data
P = data presumed to exist but not held at WDC-A; WDC-A will attempt to ascertain availability of these data upon request
S = Program stopped operations (See MASTER STATION LIST for actual date).

Since operating dates are not known for all stations, there can be errors in the "P" entries. "Blanks" in the yearly columns not preceded by an "S" indicate the operating status of the program is not known.

DATA SERVICES

At Boulder - Solar-Terrestrial Physics

World Data Center A for Solar-Terrestrial Physics collects and exchanges the types of data listed in the "Contents", except for those catalog entries shown as being held "At Greenbelt".

Data are made available to users through three basic mechanisms:

1. Publications: Many of the data which experience has shown are most frequently requested are provided through this medium. In this way they can be presented to the broadest audience at the least expense to the user.

   The publications of this center are of two types:

   (a) Regular (monthly) - *Solar-Geophysical Data* and *Ionospheric Data*. Publication entries are made throughout this catalog for appropriate data sets directing users to the published data.

   (b) Irregular (as required) - *Reports UAG*. These publications are issued to report special data collections, whether held in WDC-A for STP or elsewhere, compilations of data and reports covering significant events, and for other data related purposes. See the list of "Report UAG" publications at the end of the "PRICE LIST" section.

   Subscription information for *Solar-Geophysical Data*, *Ionospheric Data*, and *Reports UAG* is given under "PRICE LIST" section.

* Copies of STP Notes No. 6 are available from the IUCSTP Secretariat, c/o National Academy of Sciences, 2101 Constitution Ave., N.W., Washington, D. C., U.S.A. 20418, or from World Data Center A for Solar-Terrestrial Physics, NOAA, Boulder, Colorado, U.S.A. 80302.

2. Response to individual requests: Requests can be made by letters, telephone calls, or visits to the WDC. Orders may be directly from individual scientists or through their institutions or national organizations. In some cases data will be supplied at no charge on a data exchange basis to scientists or institutions which supply data to the WDC. In general, however, data will be supplied at a cost not to exceed the cost of copying and transmittal. If duplicate copies already exist of requested data, scientists may make arrangements to borrow these copies. If asked to reimburse the WDC for the cost of copying data, the requester must send a purchase order or authorizing letter stating:

Type of data and format of output
Stations involved
Dates and time (be sure to specify whether UT or Local Time desired)
Parameters required or other specific information
For magnetic tape:
1) Specify whether providing blank tape or paying WDC for supplying tape.
2) Indicate type of computer on which tape is to be used. WDC can provide BCD tapes at 200, 556, or 800 BPI on 7 track and 800 BPI on 9 track.

The requests should be sent to:

World Data Center A for
Solar-Terrestrial Physics
NOAA
Boulder, Colorado, U.S.A. 80302

with remittances payable in U.S. dollars to:

Department of Commerce, NOAA

mailed to above address.

Please allow at least three weeks for duplication of data.

3. Working visits to the World Data Center A for Solar-Terrestrial Physics: Many data users find it advantageous to arrange for extended working visits to this data center. Such visits are strongly encouraged. In this way they have total access to all the archives of the center, usually at no cost unless copying or computer expenses are incurred.

Space is available for scientists to work with the data and records on the premises. However, arrangements for such visits should be made in advance since space is limited. Available equipment are desk calculators, microfilm readers and reader-printers and scaling tables for reading ionograms or solar flare patrol film. Special arrangements can be made for the use of an XDS Time-Sharing Computer or the CDC 3800 Computer.

Scientists are urged to keep the Data Center informed of the observational and experimental programs of their laboratories, whether in progress or planned, in accordance with recommendations in STP Notes No. 6.

At Greenbelt - Rockets and Satellites

World Data Center A for Rockets and Satellites, Code 601, Goddard Space Flight Center, Greenbelt, Maryland, U.S.A. 20771, collects and exchanges the following types of information and data:

Reports of sounding rocket launches
Reports of satellite and space probe launchings
Detailed descriptive information on spacecraft experiments
Scientific reports on results of experiments which receive a limited distribution
Data supporting conclusions when not included in the published reports
Precise positional observations, orbital elements, and ephemerides which are of great scientific interest and value.

The WDC-A for rockets and satellites will attempt to acquire original (raw) data or calibrated (reduced or analyzed) data from other sources to satisfy requests for scientific study. The center endeavors to maintain contact with space science investigators and, in some cases, may obtain data on an individual request basis directly from an investigator. The center can acquire data from other rocket and satellite data centers and from U.S. National archives, e.g., the National Space Science Data Center. Because of its location contiguous to the National Space Science Data Center, the WDC-A can effectively cooperate with this institution in obtaining reduced and analyzed data to satisfy scientific requests.

The data center provides facilities for scientists who wish to participate in on-site study of data. Advance notice of such a visit enables the staff to provide better services to the user.

For details of obtaining data see "Data Catalog of Satellite Experiments" of the National Space Science Data Center, NASA, Goddard Space Flight Center, Greenbelt, Md., U.S.A. 20771. The World Data Center A for Rockets and Satellites periodically prepares and distributes catalogues and reports. The publications contain up-to-date listings of information on rockets and satellites and the data and/or reports received during the publication period. The publications are distributed to scientists, institutions, other WDC, and to the Committee on Space Research (COSPAR). They include:

1. Summaries of sounding rocket launches (including meteorological research and development launches)
2. Listings of scientists and institutions conducting sounding rocket experiments
3. Launch sites for sounding rockets
4. Listings of artificial earth satellites and space probes (including launch, experiments, and orbit information)
5. Bibliographical listings of reports and reprints (by author and subject).

Scientists may borrow materials from the center whenever duplicate copies are available. Otherwise, duplicate copies are made for the requester at a cost not to exceed the cost of copying and transmittal.

The "Directory of Satellite Data Coverage" which begins on page 10 provides time coverage information for satellite data sets held at Greenbelt and at Boulder.

PRICE LIST

(at Boulder)

The *costs quoted below are subject to change.* Mailing and shipping charges may be added to the costs shown. *There is a minimum charge for data copies of $10.00. Standing orders for data (normally filled on a monthly basis) can be arranged.* When computer processing time is involved the cost can be furnished only upon completion of the order. If ordering film copies, there is a charge of $4.00 per interval for cutting and splicing film if the request is for other than the standard length.

GENERAL (Applies to all disciplines)

35 mm film copies of 35 mm microfilm copies of original recordings or tabulations	$5.15 per 100 ft. roll
35 mm preparation of microfilm of data sheets (camera negative) .	0.15 per frame
Microfiche copy of existing microfiche	0.45 per microfiche
Electrostatic copies of data sheets - letter size (8" x 10½") . . (reproduced from original size or larger)	0.25 per sheet
Full-size electrostatic copy of data sheets longer than 11", or of strip charts up to 10' lengths - 8½" up to 10' long	0.30 per ft.
Electrostatic copy prepared from 35 mm microfilm - 8½" x 11" . .	0.45 per sheet
Photographic Negative - 8" x 10" size	5.00 per negative
Glossy prints of existing negative in 8" x 10" size	2.00 per print
Magnetic tapes (new blanks) - 2400 ft. half inch	7.00 (or less, depending on current costs)
Tape-to-tape copy of magnetic tape (if blank tape supplied and no computer processing time)	50.00 per tape
Duplicates of punched cards on file	10.00 per thousand
Duplicates of interpreted punched cards on file	13.00 per thousand

GEOMAGNETIC DATA

35 mm film copies of magnetograms on 35 mm microfilm	1.60 per station-month 5.15 per station-year
Full-size electrostatic copy of magnetograms 8½" x 24" (magnetogram size)	0.60 per sheet
or, (copyflow process)	9.00 per station-month
Half-size paper copy of magnetograms	0.30 each
or,	7.50 per station-month
Electrostatic copies of data sheets Individual station indices (K, q, etc.)	0.25 per station-month
Universal indices (Kp, AE, Dst, etc.)	0.25 per month
Magnetic hourly values (per element)	0.25 per station-month
Digitization of magnetograms at 2.5 minute intervals	360.00 per station month

PRICE LIST (continued)
(at Boulder)

IONOSPHERIC DATA

35 mm film copies of bottomside ionograms on 35 mm film normally supplied in 500 to 1000 ft. lengths	$0.05 per ft.
35 mm film copies of topside ionograms, vertical incidence hourly values, and riometer strip charts on 35 mm microfilm in 100 ft. lengths	5.15 per 100 ft. roll
Ionospheric electron density, N(h), from ionograms	see page 130
Microfiche copy of existing microfiche	0.45 per microfiche
Electrostatic copies of data sheets	0.25 per sheet

SOLAR DATA

35 mm film copies of original 35 mm Hα flare film (not sprocketed)	0.25 per ft.

Special arrangements can be made to provide sprocketed film.

AURORAL DATA (Images)

35 mm film copies of satellite auroral images

For data June 18, 1972 - June 10, 1973	21.00 per month 143.00 per year
For data after June 10, 1973	40.00 per month 400.00 per year

8" x 10" paper prints of satellite auroral images

Standard quality	1.00 per print
Custom quality (glossy)	2.00 per print

Additional charges will be made to cover film search time as well as handling costs for superpositon of coordinate grid or other reference to ephemeris information, if required.

16 mm film copies of all-sky camera film sprocketed for movie projection	12.50 per 100 ft. roll

The requests should be sent to:

World Data Center A for
Solar-Terrestrial Physics
NOAA
Boulder, Colorado, U.S.A. 80302

with remittances payable in U.S. dollars to:

Department of Commerce, NOAA

mailed to above address.

PUBLICATION CHARGES

1. *Solar-Geophysical Data* (SGD monthly): This booklet provides the most commonly required data in the Solar-Terrestrial Physics disciplines, excluding the ionosphere monthly median data which are provided in *Ionospheric Data*. SGD is published in two parts each month, the "Prompt Reports" (Part I) giving the available data for one and two months prior to month of issue, and the "Comprehensive Reports" (Part II) presenting data for six and seven months prior to issue month. The current contents are shown below:

A. Solar and Interplanetary Phenomena
A.1 Sunspot Drawings
A.2a Zürich Provisional Relative Sunspot Numbers R_Z
A.2b Zürich Final Sunspot Numbers R_Z
A.2c American Relative Sunspot Numbers R_A'
A.3a Mt. Wilson Magnetograms
A.3b Mt. Wilson Magnetic Characteristics of Sunspots
A.4 Hα Spectroheliograms
A.5 Calcium Plage Drawings - McMath (or Catania)
A.5a Calcium Plage (McMath) and Sunspot Regions
A.5b McMath Daily Calcium Plage Index
A.6 Hα Synoptic Charts
A.7b Coronal Line Emission
A.7c White-Light Corona (NRL OSO-7, 1971-083A)
A.7d Solar EUV Spectroheliogram Fe XV 284 Å (GSFC OSO-7, 1971-083A)
A.7e Solar XUV Coronograms (NRL OSO-7, 1971-083A)
A.8aa 2800 MHz - Daily Values of Solar Flux (ARO-Ottawa)
A.8ac 2800 MHz - Daily Values of Adjusted Solar Flux (ARO-Ottawa)
A.8g 15400, 8800, 4995, 2695, 1415, 606, 410, 245 MHz Adj. Solar Flux (AFCRL
A.9a 9.1 cm Radio Maps of the Sun (Stanford)
A.9b 21 cm Radio Maps of the Sun (Fleurs)
A.9c 8.6 mm Radio Maps of the Sun (Prospect Hill)
A.10a 169 MHz - Interferometric Observations (Nançay)
A.10c 21 cm East-West Solar Scans (Fleurs)
A.10d 43 cm East-West Solar Scans (Fleurs)
A.10e 10.7 cm East-West Solar Scans (Ottawa-ARO)
A.11aa Solar X-ray Radiation (Explorer 37 or 44)
A.11ab Solar X-ray Radiation (Explorer 37 or 44) Graphs
A.11e Solar X-ray Spectroheliograms (OSO-5)
A.11f Solar X-ray Spectroheliograms (GSFC OSO-7, 1971-083A)
A.12aa Solar Protons (Explorer 41 or 43) Daily hourly values
A.12ab Solar Protons (Explorer 41 or 43) Graphs
A.12ba Cosmic Ray Protons (Pioneers 6 & 7)
A.12bb Cosmic Ray Protons (Pioneers 8 & 9)
A.12c Cosmic Ray Protons (ATS-1)
A.13a Solar Wind (Pioneers 6 & 7)
A.13c Solar Wind (Vela 6B)
A.17 Interplanetary Magnetic Field (Pioneer 8)
A.17 Interplanetary Magnetic Field (Pioneer 9)
A.17c Inferred IP Magnetic Field
A.18 Interplanetary Electric Field (Pioneer 8)
A.18 Interplanetary Electric Field (Pioneer 9)

B. Ionospheric (and Radio Wave Propagation) Phenomena
B.51ca High Latitude Quality Figures and Forecasts
B.51cb High Latitude Comparison Graphs
B.52 Graphs of Transmission Frequency Range
B.53 Quality Figures based on Frequency Ranges
C. Flare-Associated Events
C.1a Optical Observations Flares
C.1ba Optical Observations Flares (Including Standardized Data)
C.1d Flare Patrol Observations
C.1e Flare Indices (by day)
C.1f Flare Index by Region
C.3 Solar Radio Waves - Fixed Frequencies - Outstanding Occurrences
Solar Radio Waves - Fixed Frequencies - Selected
C.3t 43.25, 80 and 180 MHz Selected Bursts (Culgoora)
C.4aa 10-2000 MHz - (Fort Davis)
C.4b 7.6-80 MHz - (University of Colorado)
C.4d 8-8000 MHz - (Culgoora)
C.4e 30-1000 MHz - (Weissenau, G.F.R.)
C.4f 24-48 MHz - (AFCRL, Sagamore Hill)
C.5b Solar X-ray Radiation (Explorer 35)
C.5c Solar X-ray Radiation (Explorer 44)
C.6 Sudden Ionospheric Distrubances
D. Geomagnetic and Magnetospheric Phenomena
D.1a Geomagnetic Indices Ci, Cp, Kp, Ap - Selected Days
D.1b 27-Day Chart of Kp Indices for Year
D.1c 27-Day Chart of C9 for Year
D.1d Principal Magnetic Storms
D.1e Reduced Magnetograms
D.1f Sudden Commencement and Solar Flare Effects
D.1g Equatorial Indices Dst
F. Cosmic Rays
F.1a Cosmic Ray Neutron Counts (Deep River)
F.1b Cosmic Ray Neutron Counts (Climax)
F.1c Cosmic Ray Neutron Counts (Dallas)
F.1d Cosmic Ray Neutron Counts (Churchill)
F.1e Cosmic Ray Neutron Counts (Alert)
F.1f Cosmic Ray Neutron Counts (Calgary)
F.1g Cosmic Ray Neutron Counts (Sulphur Mountain)
F.1h Cosmic Ray Neutron Counts (Thule)
H. Miscellaneous
H.60 IUWDS Alert Decisions
H.62 Abbreviated Calendar Record

Solar-Geophysical Data may be purchased through the National Climatic Center, Federal Building, Asheville, NC 28801, Attn: Publications. Annual subscription price as below, checks or money orders in U.S. Currency made payable to the Department of Commerce, NOAA, should accompany the request.

	Annual	Add for Foreign Mailing	Single Copy
Parts I and II	$30.50	$8.00	
Part I (Prompt) only	$15.50	$4.00	$1.25
Part II (Comprehensive) only	$15.50	$4.00	$1.25

Back issues on paper are available only at single issue price, from Asheville. In general, the stocks of back issues more than three years old are severely depleted. Copies on microfilm are available for all years from 1956 up to the current year from WDC-A for Solar-Terrestrial Physics, NOAA, Boulder, CO 80302 U.S.A.

1956 through 1966 . . . . . $ 5.00 per year
1967 onward . . . . . $10.00 per year

Checks or money orders in U.S. Currency, payable to the Department of Commerce, NOAA, should accompany requests for back issues on microfilm.

A limited free distribution is made on a data exchange basis.

2. *Ionospheric Data* (Monthly): This booklet provides monthly median data, by hour, of the ionospheric characteristics reported by the worldwide network of ionospheric vertical sounding stations. Also included are detailed monthly data from a single representative station including daily-hourly values of all measured characteristics, f-plots for Regular World Days, and an N(h) contour graph. When appropriate, selected ionospheric data for a period of major ionospheric disturbance (Retrospective World Interval) are also included.

   Ionospheric Data may be purchased through the National Climatic Center, Federal Building, Asheville, NC 28801, Attn: Publications, beginning with the issue for January 1971. Checks or money orders in U.S. currency made payable to the Department of Commerce, NOAA, should accompany the request.

Annual	Add for Foreign Mailing	Add for Domestic Airmail	Foreign Airmail	Single Copy
$10.00	$2.50	$9.60	Quote on request	$1.00

   Back issues on 35 mm microfilm from WDC-A for Solar-Terrestrial Physics, Boulder Co. 80302, U.S.A., 1944 onward $5.00 per year.

   A limited free distribution is made on a data exchange basis.

3. World Data Center A for Solar-Terrestrial Physics, *Reports UAG* (irregular publication schedule). These cover a variety of subjects. They may be purchased through the National Climatic Center, Federal Building, Asheville, NC 28801, Attn: Publications. Checks or money orders in U.S. currency, payable to: Department of Commerce, NOAA, should accompany the request.

Annual	Add for Foreign Mailing	Single Issue
$9.00	$2.50	Price varies

   The *Reports UAG* that have been published to date are listed below, by category. Those which are still available in paper booklet form should be ordered from Asheville at the cost shown. Several of the *Reports UAG* are now out of print and are available only on microfiche; these are indicated and the microfiche costs are shown. Microfiche copies are to be purchased through WDC-A for Solar-Terrestrial Physics, NOAA, Boulder, CO 80302 U.S.A. Checks or money orders in U.S. Currency, payable to Department of Commerce, NOAA, should accompany the request.

Catalogs:

UAG-30 "Catalog of Data on Solar-Terrestrial Physics", prepared by Environmental Data Service, NOAA, Boulder, Colorado, October 1973, price $1.50. UAG-11, 15, 20 earlier catalogs, now obsolete.

Data Reports on Solar-Terrestrial Events:

UAG-5 "Data on Solar Event of May 23, 1967 and its Geophysical Effects" compiled by J. Virginia Lincoln, World Data Center A, Upper Atmosphere Geophysics, ESSA, February 1969, 120 pages, microfiche only, price 90 cents.

UAG-8 "Data on Solar-Geophysical Activity October 24-November 6, 1968", Parts 1 and 2, compiled by J. Virginia Lincoln, World Data Center A, Upper Atmosphere Geophysics, ESSA, March 1970, 312 pages, price (includes Parts 1 and 2) $1.75.

UAG-9 "Data on Cosmic Ray Event of November 18, 1968 and Associated Phenomena" compiled by J. Virginia Lincoln, World Data Center A, Upper Atmosphere Geophysics, ESSA, April 1970, 109 pages, price 55 cents.

UAG-12 "Solar-Geophysical Activity Associated with the Major Geomagnetic Storm of March 8, 1970", Parts 1, 2 and 3, compiled by J. Virginia Lincoln and Dale B. Bucknam, World Data Center A, Upper Atmosphere Geophysics, NOAA, April 1971, 466 pages, price (includes Parts 1-3) $3.00.

UAG-13 "Data on the Solar Proton Event of November 2, 1969 through the Geomagnetic Storm of November 8-10, 1969", compiled by Dale B. Bucknam and J. Virginia Lincoln, World Data Center A, Upper Atmosphere Geophysics, NOAA, May 1971, 76 pages, microfiche only, price 90 cents.

UAG-21 "Preliminary Compilation of Data for Retrospective World Interval July 26 - August 14, 1972", compiled by J. Virginia Lincoln and Hope I. Leighton, World Data Center A for Solar-Terrestrial Physics, November 1972, 128 pages, price 70 cents.

UAG-24 "Data on Solar-Geophysical Activity Associated with the Major Ground Level Cosmic Ray Events of 24 January and 1 September 1971", Parts 1 and 2, compiled by Helen E. Coffey and J. Virginia Lincoln, World Data Center A for Solar-Terrestrial Physics, December 1972, 462 pages, price (includes Parts 1 and 2) $2.00.

UAG-26 "Data Compilation for the Magnetospherically Quiet Periods February 19-23 and November 29 - December 3, 1970", compiled by Helen E. Coffey and J. Virginia Lincoln, World Data Center A for Solar-Terrestrial Physics, May 1973, 129 pages, price 70 cents.

UAG-28 "Collected Data Reports on August 1972 Solar-Terrestrial Events", Parts 1, 2 and 3, edited by Helen E. Coffey, World Data Center A for Solar-Terrestrial Physics, July 1973, 932 pages, price (includes Parts 1-3) $4.50.

Specialized Data Collections:

UAG-1 "IQSY Night Airglow Data" by L. L. Smith, F. E. Roach and J. M. McKennan of Aeronomy Laboratory, ESSA Research Laboratories, July 1968, 305 pages, price $1.75.

UAG-2 "A Reevaluation of Solar Flares, 1964-1966", by Helen W. Dodson and E. Ruth Hedeman of McMath-Hulbert Observatory, The University of Michigan, August 1968, 28 pages, microfiche only, price 45 cents.

UAG-3 "Observations of Jupiter's Sporadic Radio Emission in the Range 7.6-41 MHz, 6 July 1966 through 8 September 1968" by James W. Warwick and George A. Dulk, Department of Astro-Geophysics, University of Colorado, October 1968, 35 pages, microfiche only, price 45 cents.

UAG-7 "Observations of the Solar Electron Corona: February 1964-January 1968", by Richard T. Hansen, High Altitude Observatory, Boulder, Colorado and Kamuela, Hawaii, October 1969, 12 pages, price 15 cents.

UAG-16 "Temporal Development of the Geographical Distribution of Auroral Absorption for 30 Substorm Events in each of IQSY (1964-65) and IASY (1969)", by F. T. Berkey, V. M. Driatskiy, K. Henriksen, D. H. Jelly, T. I. Shchuka, A. Theander and J. Yliniemi, September 1971, 131 pages, price 70 cents.

UAG-17 "Ionospheric Drift Velocity Measurements at Jicamarca, Peru (July 1967-March 1970)", by Ben B. Balsley, Aeronomy Laboratory, National Oceanic and Atmospheric Administration, Boulder, Colorado, and Ronald F. Woodman, Jicamarca Radar Observatory, Instituto Geofisico del Perú, Lima, Peru, October 1971, 45 pages, microfiche only, price 45 cents.

UAG-19 "Reevaluation of Solar Flares 1967", by Helen W. Dodson and E. Ruth Hedeman, McMath-Hulbert Observatory, The University of Michigan, and Marta Rovira de Miceli, San Miguel Observatory, Argentina, June 1972, 15 pages, price 15 cents.

UAG-22 "Auroral Electrojet Magnetic Activity Indices (AE) for 1970", by Joe Haskell Allen, National Geophysical and Solar-Terrestrial Data Center, Environmental Data Service, November 1972, 146 pages, price 75 cents.

UAG-25 "Observations of Jupiter's Sporadic Radio Emission in the Range 7.6-41 MHz, 9 September 1968 through 9 December 1971", by James W. Warwick, George A. Dulk and David G. Swann, Department of Astro-Geophysics, University of Colorado, February 1973, 35 pages, price 35 cents.

UAG-27 "High Speed Streams in the Solar Wind", by D. S. Intriligator, University of Southern California, Department of Physics, Los Angeles, California, 90007, June 1973, 16 pages, price 15 cents.

UAG-29 "Auroral Electrojet Magnetic Activity Indices AE (11) for 1968", by Joe Haskell Allen, Carl C. Abston and Leslie D. Morris, National Geophysical and Solar-Terrestrial Data Center, Environmental Data Service, October 1973, 148 pages.

UAG-31 "Auroral Electrojet Magnetic Activity Indices AE (11) for 1969", by Joe Haskell Allen, Carl C. Abston and Leslie D. Morris, National Geophysical and Solar-Terrestrial Data Center, Environmental Data Service, November 1973, 138 pages.

Miscellaneous:

UAG-4 "Abbreviated Calendar Record 1966-1967", by J. Virginia Lincoln, Hope I. Leighton and Dorothy K. Kropp of Aeronomy and Space Data Center, Space Disturbances Laboratory, ESSA Research Laboratories, January 1969, 170 pages, price $1.25.

UAG-6 "International Geophysical Calendars 1957-1969", by A. H. Shapley and J. Virginia Lincoln, ESSA Research Laboratories, March 1969, 25 pages, microfiche only, price 45 cents.

UAG-10 "Atlas of Ionograms", edited by A. H. Shapley, ESSA Research Laboratories, May 1970, 243 pages, price $1.50.

UAG-14 "An Experimental, Comprehensive Flare Index and Its Derivation for 'Major' Flares, 1955-1969", compiled by Helen W. Dodson and E. Ruth Hedeman, McMath-Hulbert Observatory, The University of Michigan, July 1971, 25 pages, price 30 cents.

UAG-18 "A Study of Polar Cap and Auroral Zone Magnetic Variations", by K. Kawasaki and S. -I. Akasofu, Geophysical Institute, University of Alaska, June 1972, 21 pages, price 20 cents.

UAG-23 "U.R.S.I. Handbook of Ionogram Interpretation and Reduction", Second Edition, November 1972, edited by W. R. Piggott, Radio and Space Research Station, Slough U.K., and K. Rawer, Arbeitsgruppe für Physikalische Weltraumforschung, Freiburg, G.F.R., November 1972, 324 pages, price $1.75.

DIRECTORY OF SATELLITE DATA COVERAGE

The time coverages for data sets from satellites are presented in a table for WDC-A for Solar-Terrestrial Physics at Boulder and in a series of bar graphs on pages 12 - 20 for WDC-A for Rockets and Satellites at Goddard. The table is self explanatory.

The plots are for charged particle and field experiments only. They allow the user to determine quickly what data sets are available in a given energy range and/or in a given time interval. A title at the top of each plot indicates the type of observation made and the region of observation indexed.

The *charged particle experiments* are divided into three groups based on the region in which the observations were made:

1. Near-earth (65- to 3000-km altitude)
2. Magnetosphere (above 3000 km altitude, including magnetosheath and magnetotail)
3. Interplanetary.

For these plots, the threshold energy (eV/nucleon) of the energy channel of observation of an experiment is plotted as a function of the data coverage time (years). The data coverage time is that time interval that starts with the earliest start time of any data set and ends with the latest stop time of any data set associated with a specific experiment. A given experiment may measure one or more particle species over one or more energy channels. Note that although this scheme for indicating the data coverage time provides the widest possible data coverage, it may erroneously show a longer coverage for a given energy channel than exists at NSSDC. The energy tick marks are merely approximate indicators of threshold energy.

The caption above each plotted time period for a given charged particle experiment threshold energy channel shows the spacecraft common name (sometimes abbreviated, e.g., APOL = Apollo, EXPL = Explorer, MARIN = Mariner, and PION = Pioneer), the experiment number in parentheses, the energy threshold of the energy channel in FORTRAN E format, e.g., 200. = 2.E2, and the species measured. The following code is used to describe the species measured:

A = alpha particle
E = electron
P = proton
Z = other particles including deuterons, tritons, positrons, Z=2 nuclei (not alpha particles), particles with Z>2, and ions.

For example, the caption "EXPL34(3) 9.6E6, PZ" means that spacecraft Explorer 34, experiment number 3, has a proton and higher Z energy channel with threshold of 9.6 MeV/nucleon.

The *magnetic field experiments* are divided into two groups based on the region in which the observations were made:

1. Near-earth - magnetosphere (a combination of one and two above)
2. Interplanetary.

The *electric field experiments* are given on one plot. These plots are similar to those of the charged particles except that the experiments are ordered alphabetically along the vertical axis by spacecraft common name. Also, the caption above each plotted time period for a given experiment indicates only the spacecraft common name and experiment number. Note that the magnetic field plots include VLF experiments which measured the magnetic field component of electromagnetic radiation. Similarly, for the electric field plot, VLF experiments which measured the electric field component of electromagnetic radiation are included.

Satellite Data at Boulder

(all but topside ionograms and auroral images as published in *Solar-Geophysical Data*)

White-light Corona, daily maps (OSO-7, 1971-83A)	2/72 - present
Solar EUV Spectroheliograms, FeXV 284A daily whole sun (OSO-7, 1971-83A	5/72 - present
Solar XUV Coronagrams, daily whole sun (OSO-7, 1971-83A)	10/72 - present
Solar X-rays, background levels, hourly values and events, tables and graphs	
SOLRAD 7A, 1964-1D	1/64-10/64
SOLRAD 7B, 1965-16D	3/65-12/65
SOLRAD 8 (Explorer 30), 1965-93A	1/66-12/67
OGO-4, 1967-73A OSO-4, 1967-100A	1/68-3/68
SOLRAD 9 (Explorer 37), 1968-17A	3/68-7/72 6/73 - present
SOLRAD 10 (Explorer 44), 1971-58A	8/72-6/73

Solar X-rays, background levels, tables

Injun 1/SOLRAD 3, 1961-2	6/61-12/61
Vela 1, 2; 1963-39A, C	10/63
OSO-3, 1967-20A	3/67-8/67

Solar X-rays, events, tables

Vela 1, 2; 1963-39A, C	10/63
Explorer 33, 1966-58A	7/66-10/71
Explorer 35, 1967-70A	12/67-7/72
OSO-3, 1967-20A	3/67-8/67

Solar X-ray Spectroheliograms, whole sun

OSO-5, 1969-6A	7/69-11/72
OSO-7, 1971-83A	12/72 - present

Solar Protons, hourly values, tables and graphs (Ep >10, >30, >60 Mev)

Explorer 34, 1967-51A	5/67-8/69
Explorer 41, 1969-53A	9/69-12/72
Explorer 43, 1971-19A	11/71 - present

Solar Protons, hourly values, tables (Ep 5-21, 21-70 Mev)

ATS-1, 1966-110A	1/70-8/72

Solar Protons, intermittent values, tables

(Ep 0.6-13, 13-175, >175 Mev)

Pioneer 6, 1965-105A	3/69 - present
Pioneer 7, 1966-75A	3/69 - present

(Ep >13.9, >64 Mev)

Pioneer 8, 1967-123A	12/69 - present

(Ep >13.9, >40 Mev)

Pioneer 9, 1968-100A	12/69 - present

Solar Wind, tables

Pioneer 6, 1965-105A	3/69-2/70
Pioneer 7, 1966-75A	6/69-12/69
Vela 3, 1964-40A	1/69-4/72
Vela 5, 1965-58A	1/69-6/72
Vela 4, 1964-40B	1/69-10/69

Interplanetary Magnetic Field, tables

Pioneer 8, 1967-123A	10/72 - present
Pioneer 9, 1968-100A	4/72 - present

Interplanetary Electric Field, tables

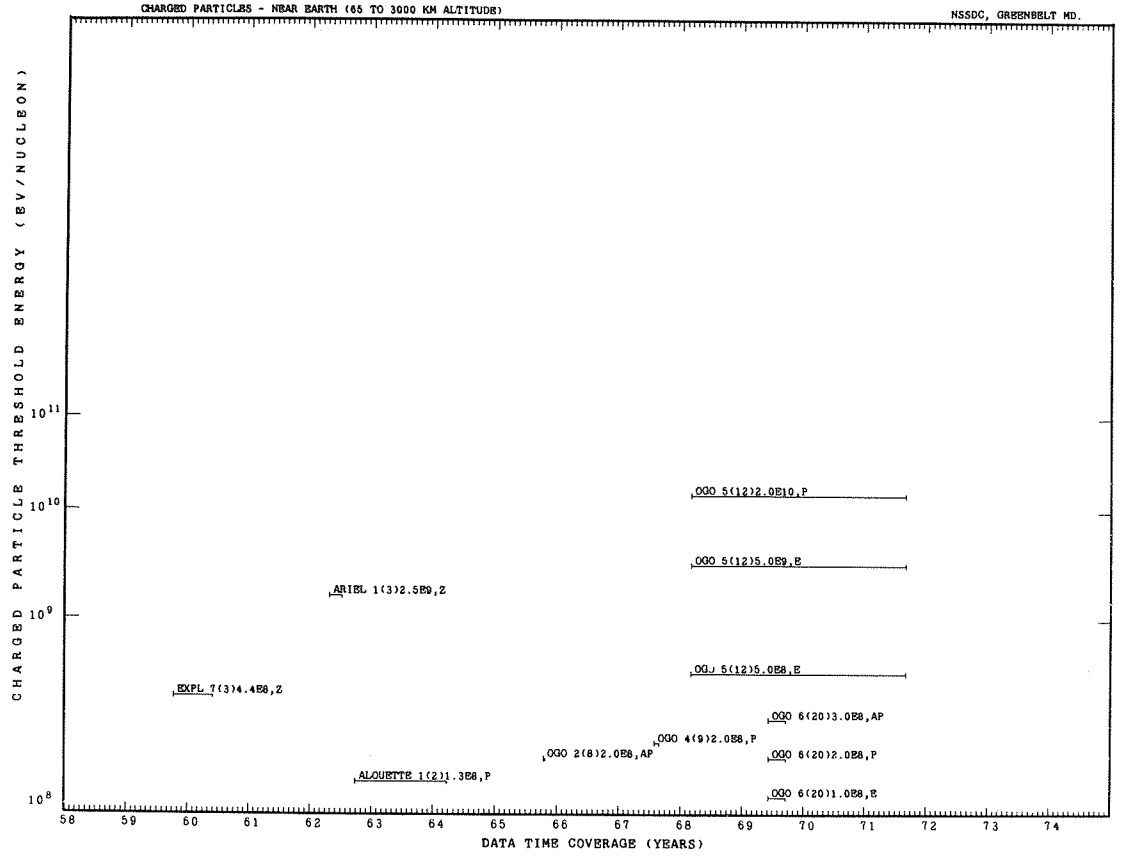
Pioneer 8, 1967-123A	5/72 - present
Pioneer 9, 1968-100A	4/72 - present

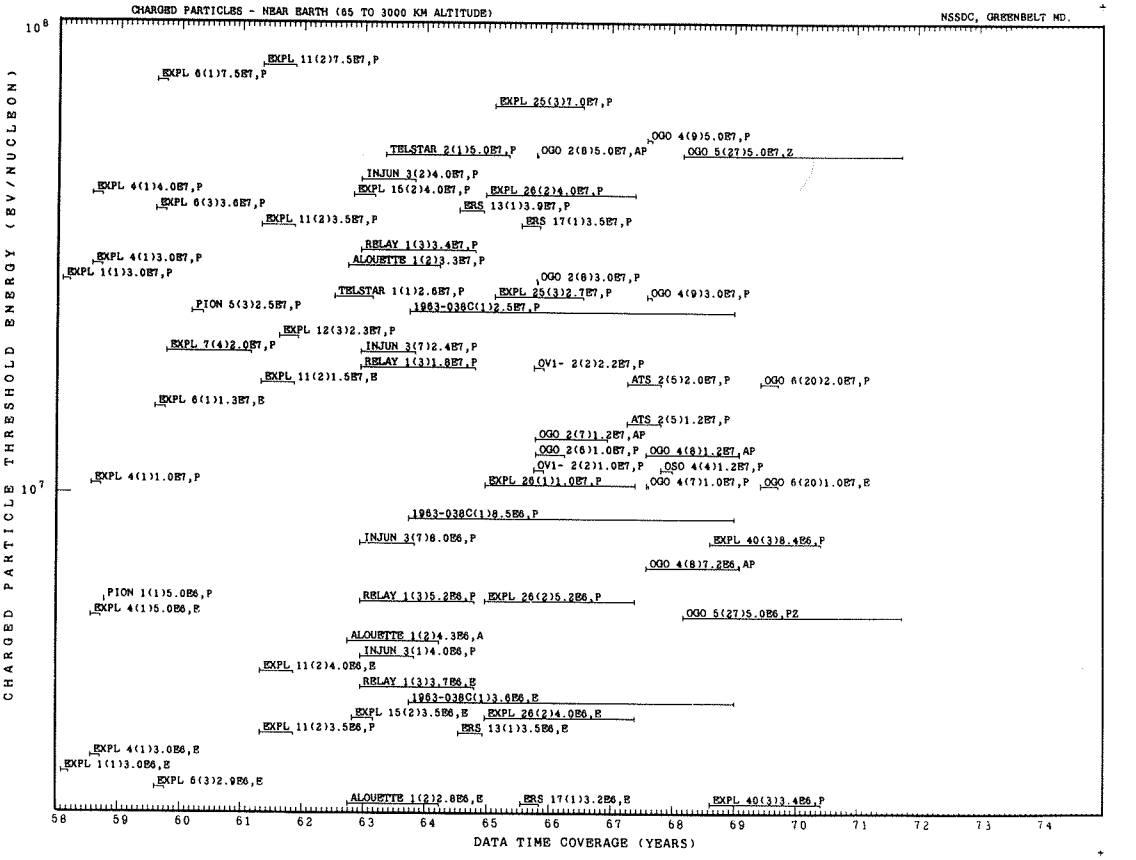
Auroral images from DAPP satellites — 6/72 - present

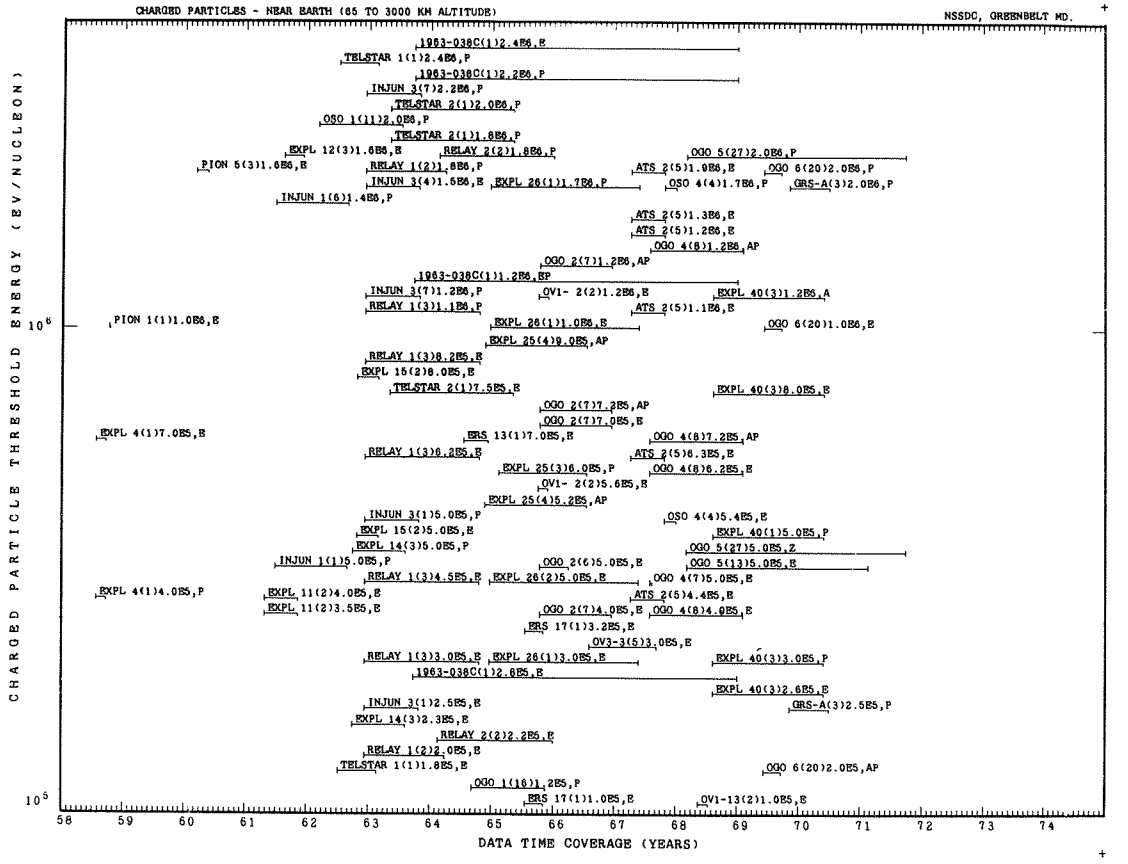
Topside ionograms (these are data recorded at many ground tracking stations)

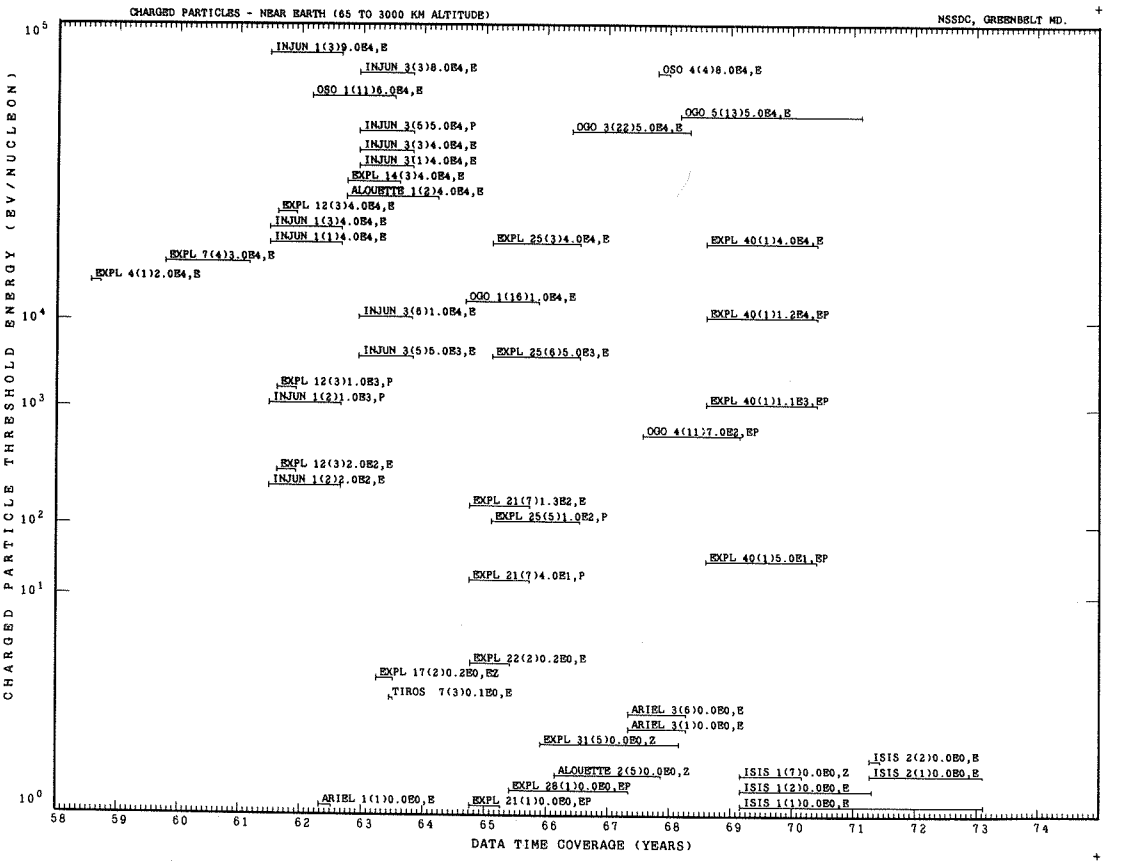
	see page	data coverage
Alouette 1, 1962-βα1	135	9/62-9/72
Alouette 2, 1965-98A	137	11/65 - present
Explorer 20, 1964-51A	139	8/64-12/65
ISIS 1, 1969-9A	139	1/69 - present
ISIS 2, 1971-24A	139	4/71 - present

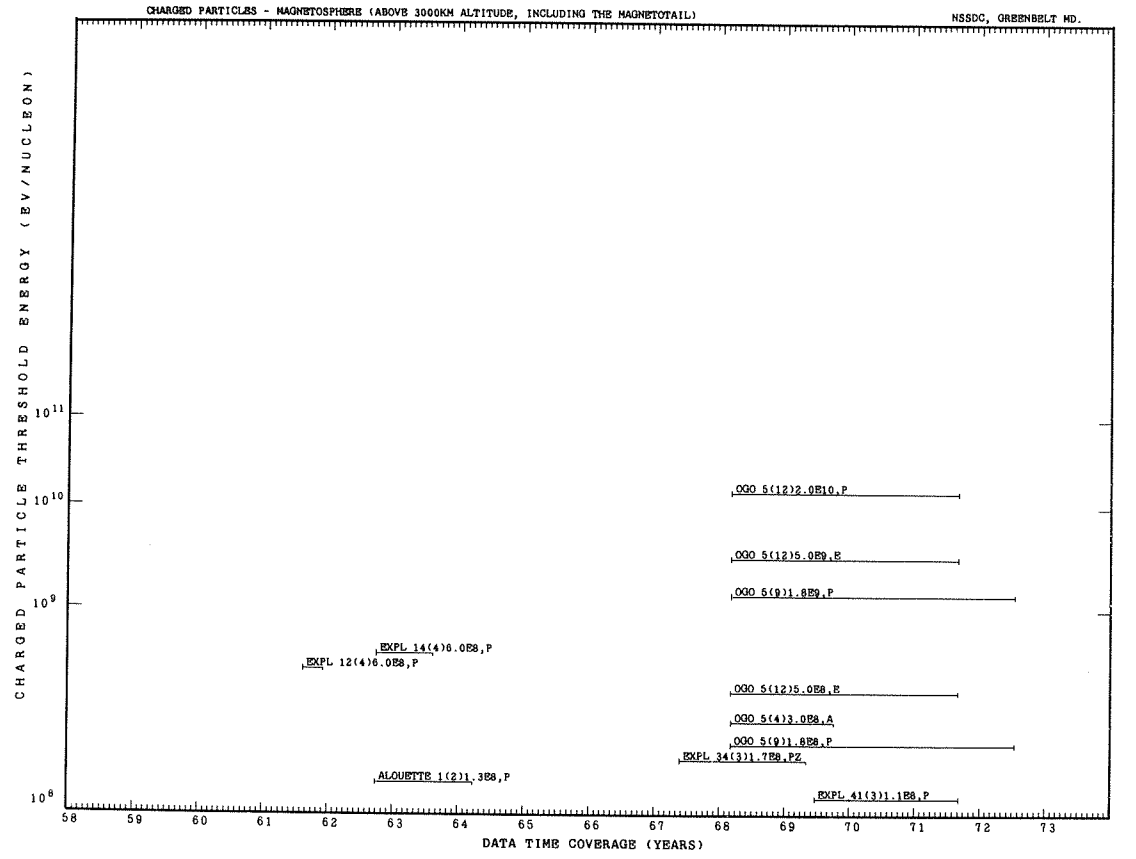
Solar particle data from NOAA-2, 1971-91A, will be available in March 1974.

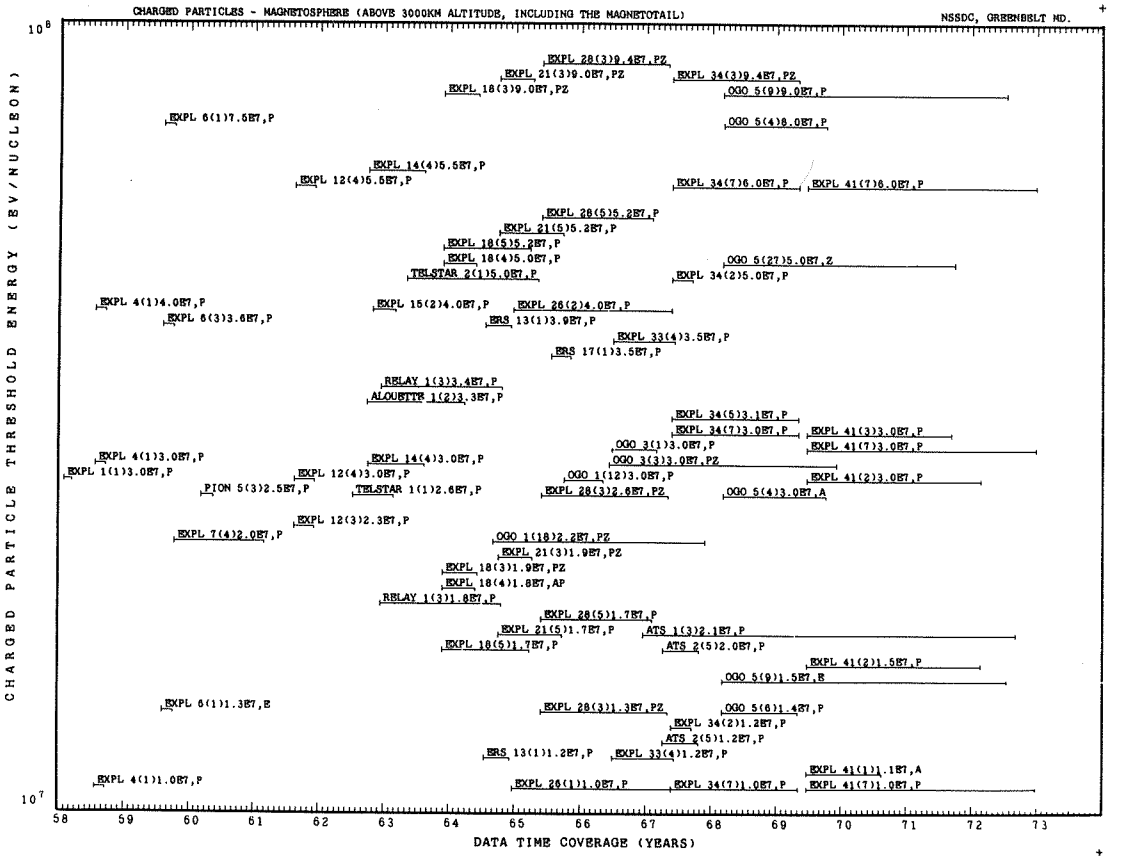

CHARGED PARTICLES - NEAR EARTH (65 TO 3000 KM ALTITUDE)
NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
DATA TIME COVERAGE (YEARS)
OGO 5(12)2.0E10,P
OGO 5(12)5.0E9,E
ARIEL 1(3)2.5E9,Z
OGO 5(12)5.0E8,E
EXPL 7(3)4.4E8,Z
OGO 6(20)3.0E8,AP
OGO 4(9)2.0E8,P
OGO 2(8)2.0E8,AP
OGO 6(20)2.0E8,P
ALOUETTE 1(2)1.3E8,P
OGO 6(20)1.0E8,E

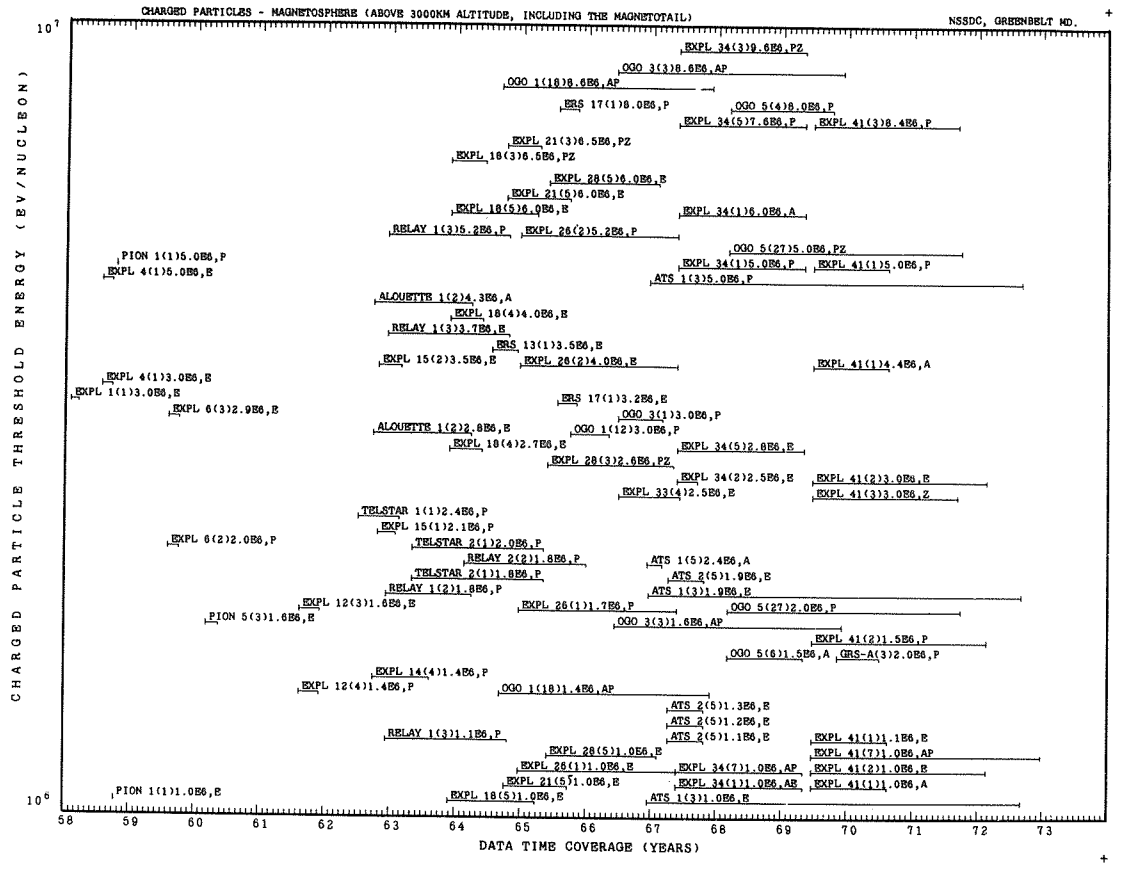

CHARGED PARTICLES - NEAR EARTH (65 TO 3000 KM ALTITUDE)
NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
DATA TIME COVERAGE (YEARS)
EXPL 11(2)7.5E7,P
EXPL 6(1)7.5E7,P
EXPL 25(3)7.0E7,P
OGO 4(9)5.0E7,P
TELSTAR 2(1)5.0E7,P
OGO 2(8)5.0E7,AP
OGO 5(27)5.0E7,Z
INJUN 3(2)4.0E7,P
EXPL 4(1)4.0E7,P
EXPL 15(2)4.0E7,P
EXPL 26(2)4.0E7,P
EXPL 6(3)3.6E7,P
ERS 13(1)3.9E7,P
EXPL 11(2)3.5E7,P
ERS 17(1)3.5E7,P
RELAY 1(3)3.4E7,P
EXPL 4(1)3.0E7,P
ALOUETTE 1(2)3.3E7,P
EXPL 1(1)3.0E7,P
OGO 2(8)3.0E7,P
TELSTAR 1(1)2.6E7,P
EXPL 25(3)2.7E7,P
OGO 4(9)3.0E7,P
PION 5(3)2.5E7,P
1963-038C(1)2.5E7,P
EXPL 12(3)2.3E7,P
EXPL 7(4)2.0E7,P
INJUN 3(7)2.4E7,P
RELAY 1(3)1.8E7,P
OV1- 2(2)2.2E7,P
EXPL 11(2)1.5E7,E
ATS 2(5)2.0E7,P
OGO 6(20)2.0E7,P
EXPL 6(1)1.3E7,E
ATS 2(5)1.2E7,P
OGO 2(7)1.2E7,AP
OGO 2(6)1.0E7,P
OGO 4(8)1.2E7,AP
OV1- 2(2)1.0E7,P
OSO 4(4)1.2E7,P
EXPL 4(1)1.0E7,P
EXPL 26(1)1.0E7,P
OGO 4(7)1.0E7,P
OGO 6(20)1.0E7,E
1963-038C(1)8.5E6,P
INJUN 3(7)8.0E6,P
EXPL 40(3)8.4E6,P
OGO 4(8)7.2E6,AP
PION 1(1)5.0E6,P
RELAY 1(3)5.2E6,P
EXPL 26(2)5.2E6,P
EXPL 4(1)5.0E6,E
OGO 5(27)5.0E6,PZ
ALOUETTE 1(2)4.3E6,A
INJUN 3(1)4.0E6,P
EXPL 11(2)4.0E6,E
RELAY 1(3)3.7E6,E
1963-038C(1)3.6E6,E
EXPL 15(2)3.5E6,E
EXPL 26(2)4.0E6,E
EXPL 11(2)3.5E6,P
ERS 13(1)3.5E6,E
EXPL 4(1)3.0E6,E
EXPL 1(1)3.0E6,E
EXPL 6(3)2.9E6,E
ALOUETTE 1(2)2.8E6,E
ERS 17(1)3.2E6,E
EXPL 40(3)3.4E6,P

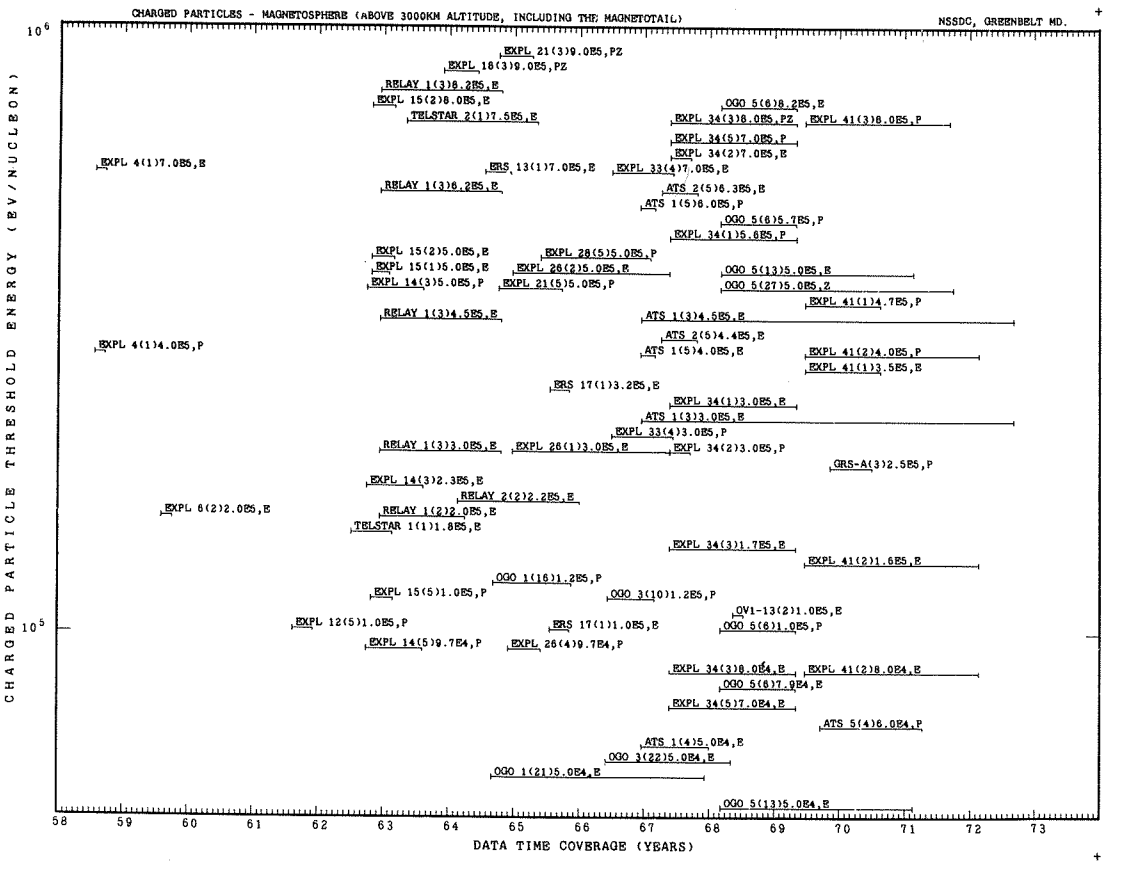

CHARGED PARTICLES - NEAR EARTH (65 TO 3000 KM ALTITUDE)
NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
1963-038C(1)2.4E6,E
TELSTAR 1(1)2.4E6,P
1963-038C(1)2.2E6,P
INJUN 3(7)2.2E6,P
TELSTAR 2(1)2.0E6,P
OSO 1(11)2.0E6,P
TELSTAR 2(1)1.8E6,P
EXPL 12(3)1.6E6,E
RELAY 2(2)1.8E6,P
OGO 5(27)2.0E6,P
PION 5(3)1.6E6,E
RELAY 1(2)1.8E6,P
ATS 2(5)1.9E6,E
OGO 6(20)2.0E6,P
INJUN 3(4)1.5E6,E
EXPL 26(1)1.7E6,P
OSO 4(4)1.7E6,P
GRS-A(3)2.0E6,P
INJUN 1(6)1.4E6,P
ATS 2(5)1.3E6,E
ATS 2(5)1.2E6,E
OGO 4(8)1.2E6,AP
OGO 2(7)1.2E6,AP
1963-038C(1)1.2E6,EP
INJUN 3(7)1.2E6,P
OV1- 2(2)1.2E6,E
EXPL 40(3)1.2E6,A
RELAY 1(3)1.1E6,P
ATS 2(5)1.1E6,E
PION 1(1)1.0E6,E
EXPL 26(1)1.0E6,E
OGO 6(20)1.0E6,E
EXPL 25(4)9.0E5,AP
RELAY 1(3)8.2E5,E
EXPL 15(2)8.0E5,E
TELSTAR 2(1)7.5E5,E
EXPL 40(3)8.0E5,E
OGO 2(7)7.2E5,AP
OGO 2(7)7.0E5,E
EXPL 4(1)7.0E5,E
ERS 13(1)7.0E5,E
OGO 4(8)7.2E5,AP
RELAY 1(3)6.2E5,E
ATS 2(5)6.3E5,E
EXPL 25(3)6.0E5,P
OGO 4(8)6.2E5,E
OV1- 2(2)5.6E5,E
EXPL 25(4)5.2E5,AP
INJUN 3(1)5.0E5,P
OSO 4(4)5.4E5,E
EXPL 15(2)5.0E5,E
EXPL 40(1)5.0E5,P
EXPL 14(3)5.0E5,P
OGO 5(27)5.0E5,Z
INJUN 1(1)5.0E5,P
OGO 2(6)5.0E5,E
OGO 5(13)5.0E5,E
RELAY 1(3)4.5E5,E
EXPL 26(2)5.0E5,E
OGO 4(7)5.0E5,E
EXPL 4(1)4.0E5,P
EXPL 11(2)4.0E5,E
ATS 2(5)4.4E5,E
EXPL 11(2)3.5E5,E
OGO 2(7)4.0E5,E
OGO 4(8)4.0E5,E
ERS 17(1)3.2E5,E
OV3-3(5)3.0E5,E
RELAY 1(3)3.0E5,E
EXPL 26(1)3.0E5,E
EXPL 40(3)3.0E5,P
1963-038C(1)2.6E5,E
EXPL 40(3)2.6E5,E
INJUN 3(1)2.5E5,E
GRS-A(3)2.5E5,P
EXPL 14(3)2.3E5,E
RELAY 2(2)2.2E5,E
RELAY 1(2)2.0E5,E
TELSTAR 1(1)1.8E5,E
OGO 6(20)2.0E5,AP
OGO 1(16)1.2E5,P
ERS 17(1)1.0E5,E
OV1-13(2)1.0E5,E
DATA TIME COVERAGE (YEARS)

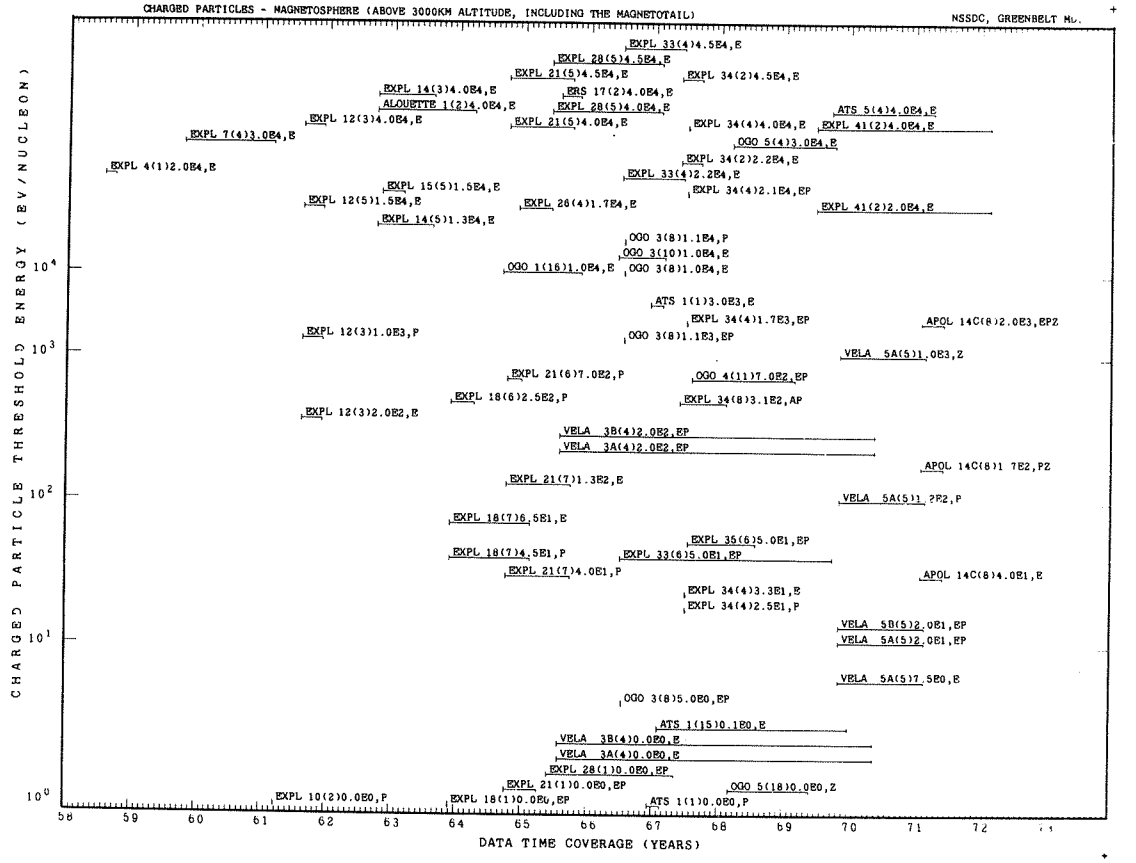

CHARGED PARTICLES - NEAR EARTH (65 TO 3000 KM ALTITUDE)
NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
INJUN 1(3)9.0E4,E
INJUN 3(3)8.0E4,E
OSO 4(4)8.0E4,E
OSO 1(11)6.0E4,E
OGO 5(13)5.0E4,E
INJUN 3(5)5.0E4,P
OGO 3(22)5.0E4,E
INJUN 3(3)4.0E4,E
INJUN 3(1)4.0E4,E
EXPL 14(3)4.0E4,E
ALOUETTE 1(2)4.0E4,E
EXPL 12(3)4.0E4,E
INJUN 1(3)4.0E4,E
INJUN 1(1)4.0E4,E
EXPL 25(3)4.0E4,E
EXPL 40(1)4.0E4,E
EXPL 7(4)3.0E4,E
EXPL 4(1)2.0E4,E
OGO 1(16)1.0E4,E
INJUN 3(6)1.0E4,E
EXPL 40(1)1.2E4,EP
INJUN 3(5)5.0E3,E
EXPL 25(6)5.0E3,E
EXPL 12(3)1.0E3,P
INJUN 1(2)1.0E3,P
EXPL 40(1)1.1E3,EP
OGO 4(11)7.0E2,EP
EXPL 12(3)2.0E2,E
INJUN 1(2)2.0E2,E
EXPL 21(7)1.3E2,E
EXPL 25(5)1.0E2,P
EXPL 40(1)5.0E1,EP
EXPL 21(7)4.0E1,P
EXPL 22(2)0.2E0,E
EXPL 17(2)0.2E0,EZ
TIROS 7(3)0.1E0,E
ARIEL 3(6)0.0E0,E
ARIEL 3(1)0.0E0,E
EXPL 31(5)0.0E0,Z
ISIS 2(2)0.0E0,E
ALOUETTE 2(5)0.0E0,Z
ISIS 2(1)0.0E0,E
ISIS 1(7)0.0E0,Z
EXPL 28(1)0.0E0,EP
ISIS 1(2)0.0E0,E
ARIEL 1(1)0.0E0,E
EXPL 21(1)0.0E0,EP
ISIS 1(1)0.0E0,E
DATA TIME COVERAGE (YEARS)

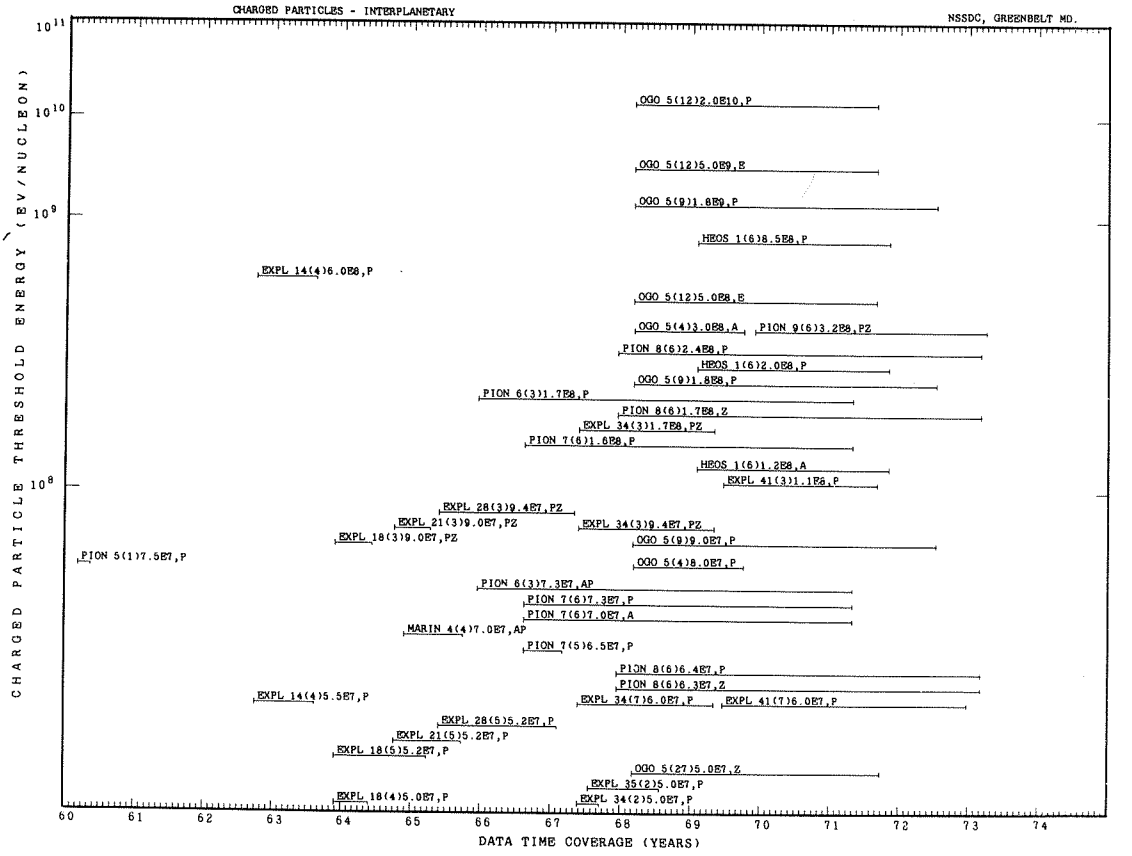

CHARGED PARTICLES - MAGNETOSPHERE (ABOVE 3000KM ALTITUDE, INCLUDING THE MAGNETOTAIL)
NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
DATA TIME COVERAGE (YEARS)
OGO 5(12)2.0E10,P
OGO 5(12)5.0E9,E
OGO 5(9)1.8E9,P
EXPL 14(4)6.0E8,P
EXPL 12(4)6.0E8,P
OGO 5(12)5.0E8,E
OGO 5(4)3.0E8,A
OGO 5(9)1.8E8,P
EXPL 34(3)1.7E8,PZ
ALOUETTE 1(2)1.3E8,P
EXPL 41(3)1.1E8,P

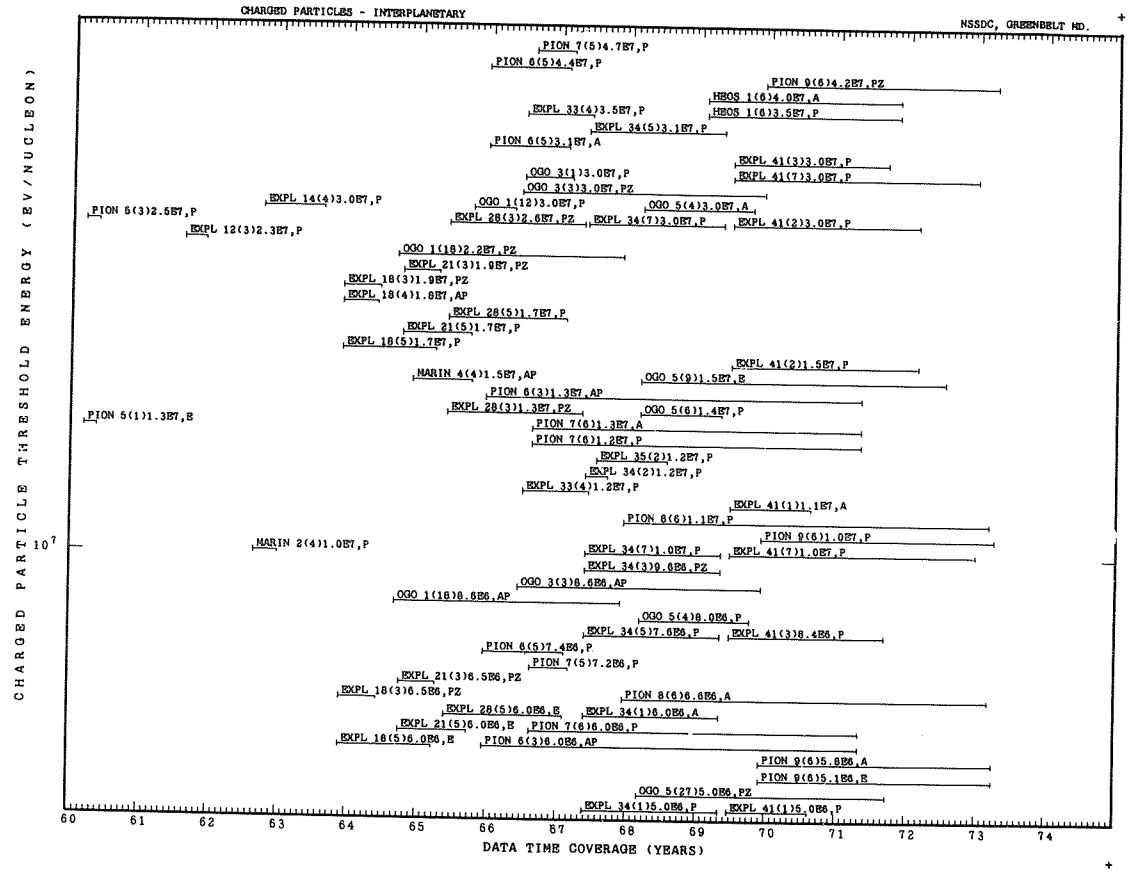

CHARGED PARTICLES - MAGNETOSPHERE (ABOVE 3000KM ALTITUDE, INCLUDING THE MAGNETOTAIL)
NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
DATA TIME COVERAGE (YEARS)
EXPL 28(3)9.4E7,PZ
EXPL 21(3)9.0E7,PZ
EXPL 34(3)9.4E7,PZ
EXPL 18(3)9.0E7,PZ
OGO 5(9)9.0E7,P
EXPL 6(1)7.5E7,P
OGO 5(4)8.0E7,P
EXPL 14(4)5.5E7,P
EXPL 12(4)5.5E7,P
EXPL 34(7)6.0E7,P
EXPL 41(7)6.0E7,P
EXPL 28(5)5.2E7,P
EXPL 21(5)5.2E7,P
EXPL 18(5)5.2E7,P
EXPL 18(4)5.0E7,P
OGO 5(27)5.0E7,Z
TELSTAR 2(1)5.0E7,P
EXPL 34(2)5.0E7,P
EXPL 4(1)4.0E7,P
EXPL 15(2)4.0E7,P
EXPL 26(2)4.0E7,P
EXPL 6(3)3.6E7,P
ERS 13(1)3.9E7,P
EXPL 33(4)3.5E7,P
ERS 17(1)3.5E7,P
RELAY 1(3)3.4E7,P
ALOUETTE 1(2)3.3E7,P
EXPL 34(5)3.1E7,P
EXPL 34(7)3.0E7,P
EXPL 41(3)3.0E7,P
OGO 3(1)3.0E7,P
EXPL 41(7)3.0E7,P
EXPL 4(1)3.0E7,P
EXPL 14(4)3.0E7,P
OGO 3(3)3.0E7,PZ
EXPL 1(1)3.0E7,P
EXPL 12(4)3.0E7,P
OGO 1(12)3.0E7,P
EXPL 41(2)3.0E7,P
PION 5(3)2.5E7,P
TELSTAR 1(1)2.6E7,P
EXPL 28(3)2.6E7,PZ
OGO 5(4)3.0E7,A
EXPL 12(3)2.3E7,P
EXPL 7(4)2.0E7,P
OGO 1(18)2.2E7,PZ
EXPL 21(3)1.9E7,PZ
EXPL 18(3)1.9E7,PZ
EXPL 18(4)1.8E7,AP
RELAY 1(3)1.8E7,P
EXPL 28(5)1.7E7,P
EXPL 21(5)1.7E7,P
ATS 1(3)2.1E7,P
EXPL 18(5)1.7E7,P
ATS 2(5)2.0E7,P
EXPL 41(2)1.5E7,P
OGO 5(9)1.5E7,E
EXPL 6(1)1.3E7,E
EXPL 28(3)1.3E7,PZ
OGO 5(6)1.4E7,P
EXPL 34(2)1.2E7,P
ATS 2(5)1.2E7,P
ERS 13(1)1.2E7,P
EXPL 33(4)1.2E7,P
EXPL 41(1)1.1E7,A
EXPL 4(1)1.0E7,P
EXPL 26(1)1.0E7,P
EXPL 34(7)1.0E7,P
EXPL 41(7)1.0E7,P

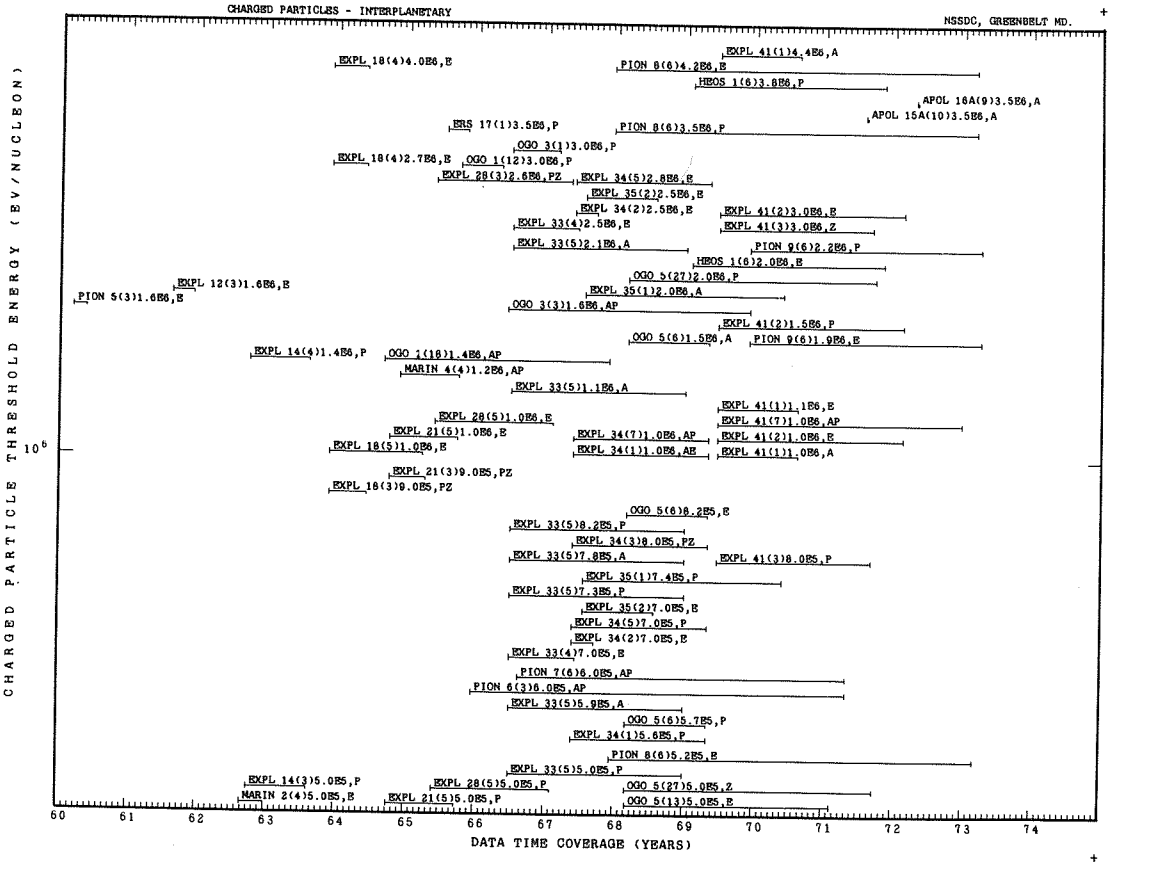

CHARGED PARTICLES - MAGNETOSPHERE (ABOVE 3000KM ALTITUDE, INCLUDING THE MAGNETOTAIL)
NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
DATA TIME COVERAGE (YEARS)
EXPL 34(3)9.6E6,PZ
OGO 3(3)8.6E6,AP
OGO 1(18)8.6E6,AP
ERS 17(1)8.0E6,P
OGO 5(4)8.0E6,P
EXPL 34(5)7.6E6,P
EXPL 41(3)8.4E6,P
EXPL 21(3)6.5E6,PZ
EXPL 18(3)6.5E6,PZ
EXPL 28(5)6.0E6,E
EXPL 21(5)6.0E6,E
EXPL 18(5)6.0E6,E
EXPL 34(1)6.0E6,A
RELAY 1(3)5.2E6,P
EXPL 26(2)5.2E6,P
OGO 5(27)5.0E6,PZ
PION 1(1)5.0E6,P
EXPL 4(1)5.0E6,E
EXPL 34(1)5.0E6,P
EXPL 41(1)5.0E6,P
ATS 1(3)5.0E6,P
ALOUETTE 1(2)4.3E6,A
EXPL 18(4)4.0E6,E
RELAY 1(3)3.7E6,E
ERS 13(1)3.5E6,E
EXPL 15(2)3.5E6,E
EXPL 26(2)4.0E6,E
EXPL 41(1)4.4E6,A
EXPL 4(1)3.0E6,E
EXPL 1(1)3.0E6,E
EXPL 6(3)2.9E6,E
ERS 17(1)3.2E6,E
OGO 3(1)3.0E6,P
ALOUETTE 1(2)2.8E6,E
OGO 1(12)3.0E6,P
EXPL 18(4)2.7E6,E
EXPL 34(5)2.6E6,E
EXPL 28(3)2.6E6,PZ
EXPL 34(2)2.5E6,E
EXPL 41(2)3.0E6,E
EXPL 33(4)2.5E6,E
EXPL 41(3)3.0E6,Z
TELSTAR 1(1)2.4E6,P
EXPL 15(1)2.1E6,P
EXPL 6(2)2.0E6,P
TELSTAR 2(1)2.0E6,P
RELAY 2(2)1.8E6,P
ATS 1(5)2.4E6,A
TELSTAR 2(1)1.8E6,P
ATS 2(5)1.9E6,E
RELAY 1(2)1.8E6,P
ATS 1(3)1.9E6,E
EXPL 12(3)1.6E6,E
EXPL 26(1)1.7E6,P
OGO 5(27)2.0E6,P
PION 5(3)1.6E6,E
OGO 3(3)1.6E6,AP
EXPL 41(2)1.5E6,P
OGO 5(6)1.5E6,A
GRS-A(3)2.0E6,P
EXPL 14(4)1.4E6,P
EXPL 12(4)1.4E6,P
OGO 1(18)1.4E6,AP
ATS 2(5)1.3E6,E
ATS 2(5)1.2E6,E
RELAY 1(3)1.1E6,P
ATS 2(5)1.1E6,E
EXPL 41(1)1.1E6,E
EXPL 28(5)1.0E6,E
EXPL 41(7)1.0E6,AP
EXPL 26(1)1.0E6,E
EXPL 34(7)1.0E6,AP
EXPL 41(2)1.0E6,E
EXPL 21(5)1.0E6,E
EXPL 34(1)1.0E6,AE
EXPL 41(1)1.0E6,A
PION 1(1)1.0E6,E
EXPL 18(5)1.0E6,E
ATS 1(3)1.0E6,E

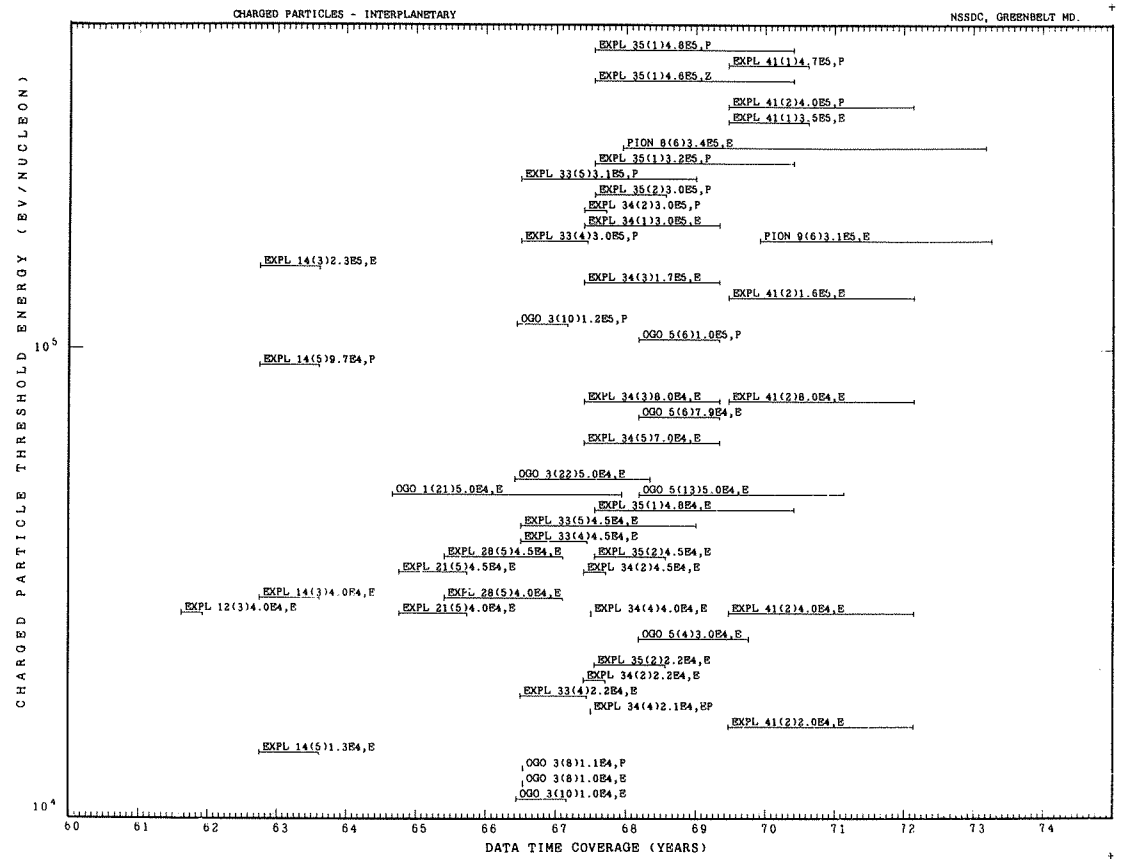

CHARGED PARTICLES - MAGNETOSPHERE (ABOVE 3000KM ALTITUDE, INCLUDING THE MAGNETOTAIL)
NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
DATA TIME COVERAGE (YEARS)
EXPL 21(3)9.0E5,PZ
EXPL 18(3)9.0E5,PZ
RELAY 1(3)8.2E5,E
EXPL 15(2)8.0E5,E
OGO 5(6)8.2E5,E
TELSTAR 2(1)7.5E5,E
EXPL 34(3)8.0E5,PZ
EXPL 41(3)8.0E5,P
EXPL 34(5)7.0E5,P
EXPL 34(2)7.0E5,E
EXPL 4(1)7.0E5,E
ERS 13(1)7.0E5,E
EXPL 33(4)7.0E5,E
RELAY 1(3)6.2E5,E
ATS 2(5)6.3E5,E
ATS 1(5)6.0E5,P
OGO 5(6)5.7E5,P
EXPL 34(1)5.6E5,P
EXPL 15(2)5.0E5,E
EXPL 28(5)5.0E5,P
EXPL 15(1)5.0E5,E
EXPL 26(2)5.0E5,E
OGO 5(13)5.0E5,E
EXPL 14(3)5.0E5,P
EXPL 21(5)5.0E5,P
OGO 5(27)5.0E5,Z
EXPL 41(1)4.7E5,P
RELAY 1(3)4.5E5,E
ATS 1(3)4.5E5,E
ATS 2(5)4.4E5,E
EXPL 4(1)4.0E5,P
ATS 1(5)4.0E5,E
EXPL 41(2)4.0E5,P
EXPL 41(1)3.5E5,E
ERS 17(1)3.2E5,E
EXPL 34(1)3.0E5,E
ATS 1(3)3.0E5,E
EXPL 33(4)3.0E5,P
RELAY 1(3)3.0E5,E
EXPL 26(1)3.0E5,E
EXPL 34(2)3.0E5,P
GRS-A(3)2.5E5,P
EXPL 14(3)2.3E5,E
RELAY 2(2)2.2E5,E
EXPL 6(2)2.0E5,E
RELAY 1(2)2.0E5,E
TELSTAR 1(1)1.8E5,E
EXPL 34(3)1.7E5,E
EXPL 41(2)1.6E5,E
OGO 1(18)1.2E5,P
EXPL 15(5)1.0E5,P
OGO 3(10)1.2E5,P
OV1-13(2)1.0E5,E
EXPL 12(5)1.0E5,P
ERS 17(1)1.0E5,E
OGO 5(6)1.0E5,P
EXPL 14(5)9.7E4,P
EXPL 26(4)9.7E4,P
EXPL 34(3)8.0E4,E
EXPL 41(2)8.0E4,E
OGO 5(6)7.9E4,E
EXPL 34(5)7.0E4,E
ATS 5(4)6.0E4,P
ATS 1(4)5.0E4,E
OGO 3(22)5.0E4,E
OGO 1(21)5.0E4,E
OGO 5(13)5.0E4,E

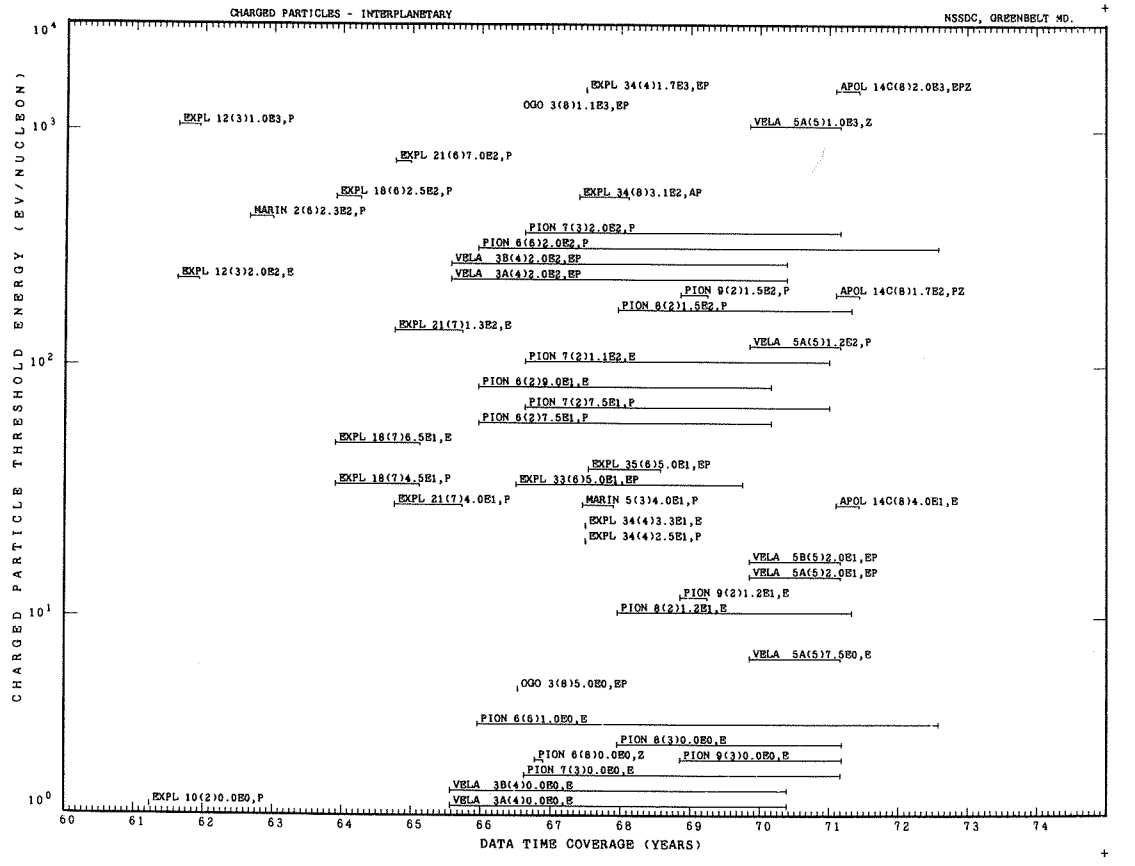

CHARGED PARTICLES - MAGNETOSPHERE (ABOVE 3000KM ALTITUDE, INCLUDING THE MAGNETOTAIL)
NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
DATA TIME COVERAGE (YEARS)
EXPL 33(4)4.5E4,E
EXPL 28(5)4.5E4,E
EXPL 21(5)4.5E4,E
EXPL 34(2)4.5E4,E
EXPL 14(3)4.0E4,E
ERS 17(2)4.0E4,E
ALOUETTE 1(2)4.0E4,E
EXPL 28(5)4.0E4,E
ATS 5(4)4.0E4,E
EXPL 12(3)4.0E4,E
EXPL 21(5)4.0E4,E
EXPL 34(4)4.0E4,E
EXPL 41(2)4.0E4,E
EXPL 7(4)3.0E4,E
OGO 5(4)3.0E4,E
EXPL 34(2)2.2E4,E
EXPL 4(1)2.0E4,E
EXPL 33(4)2.2E4,E
EXPL 15(5)1.5E4,E
EXPL 34(4)2.1E4,EP
EXPL 12(5)1.5E4,E
EXPL 26(4)1.7E4,E
EXPL 41(2)2.0E4,E
EXPL 14(5)1.3E4,E
OGO 3(8)1.1E4,P
OGO 3(10)1.0E4,E
OGO 1(16)1.0E4,E
OGO 3(8)1.0E4,E
ATS 1(1)3.0E3,E
EXPL 34(4)1.7E3,EP
APOL 14C(8)2.0E3,EPZ
EXPL 12(3)1.0E3,P
OGO 3(8)1.1E3,EP
VELA 5A(5)1.0E3,Z
EXPL 21(6)7.0E2,P
OGO 4(11)7.0E2,EP
EXPL 18(6)2.5E2,P
EXPL 34(8)3.1E2,AP
EXPL 12(3)2.0E2,E
VELA 3B(4)2.0E2,EP
VELA 3A(4)2.0E2,EP
APOL 14C(8)1.7E2,PZ
EXPL 21(7)1.3E2,E
VELA 5A(5)1.2E2,P
EXPL 18(7)6.5E1,E
EXPL 35(6)5.0E1,EP
EXPL 18(7)4.5E1,P
EXPL 33(6)5.0E1,EP
EXPL 21(7)4.0E1,P
APOL 14C(8)4.0E1,E
EXPL 34(4)3.3E1,E
EXPL 34(4)2.5E1,P
VELA 5B(5)2.0E1,EP
VELA 5A(5)2.0E1,EP
VELA 5A(5)7.5E0,E
OGO 3(8)5.0E0,EP
ATS 1(15)0.1E0,E
VELA 3B(4)0.0E0,E
VELA 3A(4)0.0E0,E
EXPL 28(1)0.0E0,EP
EXPL 21(1)0.0E0,EP
OGO 5(18)0.0E0,Z
EXPL 10(2)0.0E0,P
EXPL 18(1)0.0E0,EP
ATS 1(1)0.0E0,P

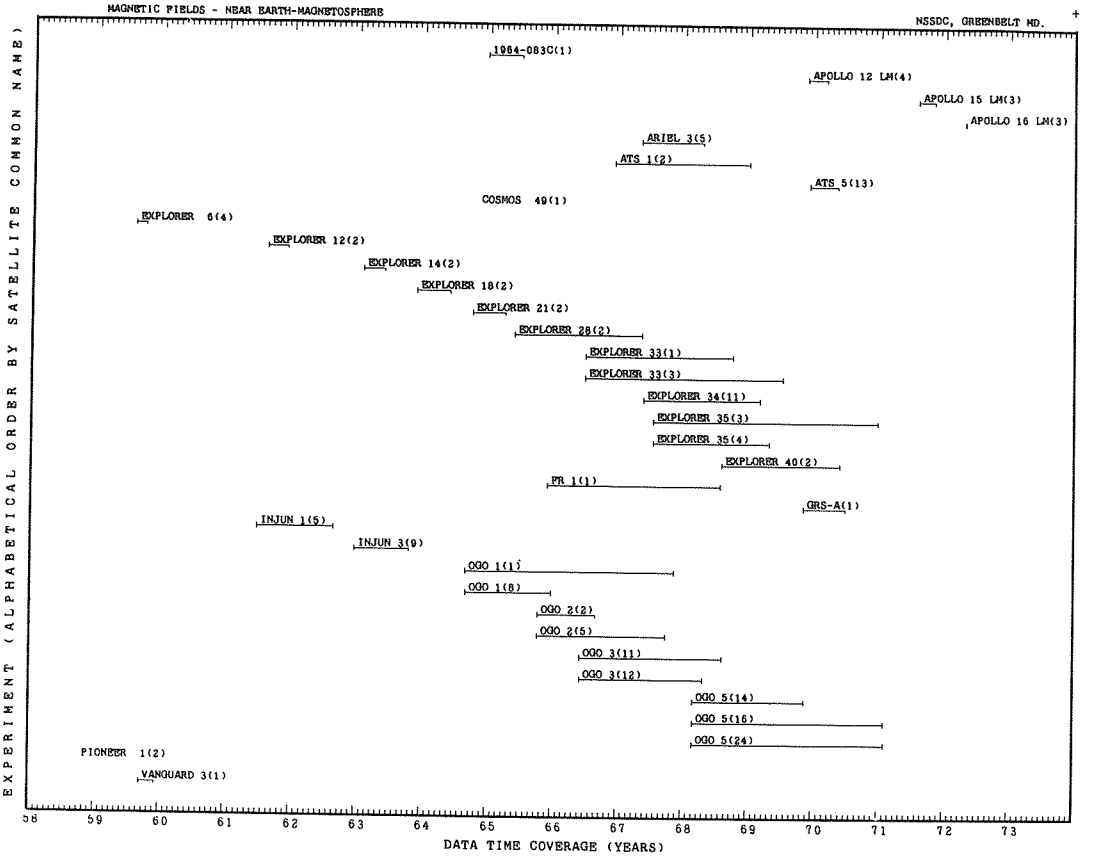

CHARGED PARTICLES - INTERPLANETARY
NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
DATA TIME COVERAGE (YEARS)
OGO 5(12)2.0E10,P
OGO 5(12)5.0E9,E
OGO 5(9)1.8E9,P
HEOS 1(6)8.5E8,P
EXPL 14(4)6.0E8,P
OGO 5(12)5.0E8,E
OGO 5(4)3.0E8,A
PION 9(6)3.2E8,PZ
PION 8(6)2.4E8,P
HEOS 1(6)2.0E8,P
OGO 5(9)1.8E8,P
PION 6(3)1.7E8,P
PION 8(6)1.7E8,Z
EXPL 34(3)1.7E8,PZ
PION 7(6)1.6E8,P
HEOS 1(6)1.2E8,A
EXPL 41(3)1.1E8,P
EXPL 28(3)9.4E7,PZ
EXPL 21(3)9.0E7,PZ
EXPL 34(3)9.4E7,PZ
EXPL 18(3)9.0E7,PZ
OGO 5(9)9.0E7,P
PION 5(1)7.5E7,P
OGO 5(4)8.0E7,P
PION 6(3)7.3E7,AP
PION 7(6)7.3E7,P
PION 7(6)7.0E7,A
MARIN 4(4)7.0E7,AP
PION 7(5)6.5E7,P
PION 8(6)6.4E7,P
PION 8(6)6.3E7,Z
EXPL 14(4)5.5E7,P
EXPL 34(7)6.0E7,P
EXPL 41(7)6.0E7,P
EXPL 28(5)5.2E7,P
EXPL 21(5)5.2E7,P
EXPL 18(5)5.2E7,P
OGO 5(27)5.0E7,Z
EXPL 35(2)5.0E7,P
EXPL 18(4)5.0E7,P
EXPL 34(2)5.0E7,P

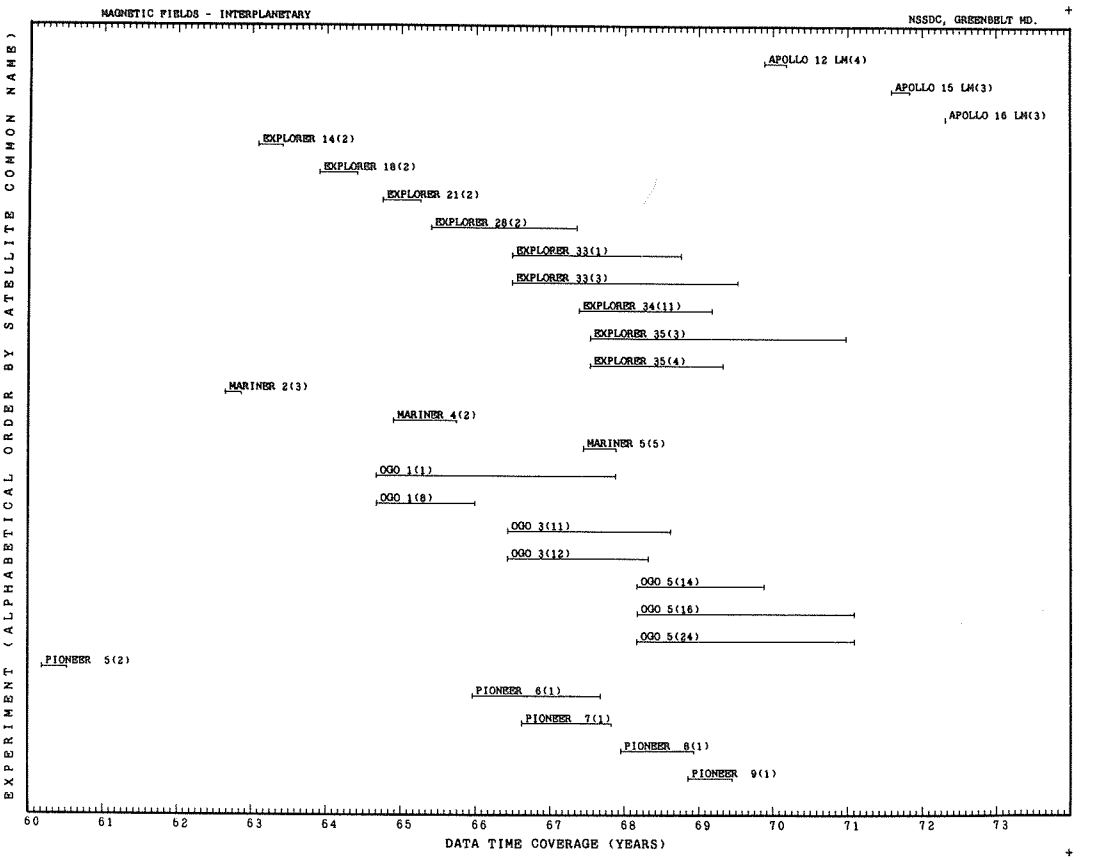

CHARGED PARTICLES - INTERPLANETARY
NSSDC, GREENBELT MD.
PION 7(5)4.7E7,P
PION 6(5)4.4E7,P
PION 9(6)4.2E7,PZ
HEOS 1(6)4.0E7,A
EXPL 33(4)3.5E7,P
HEOS 1(6)3.5E7,P
EXPL 34(5)3.1E7,P
PION 6(5)3.1E7,A
EXPL 41(3)3.0E7,P
OGO 3(1)3.0E7,P
EXPL 41(7)3.0E7,P
OGO 3(3)3.0E7,PZ
EXPL 14(4)3.0E7,P
OGO 1(12)3.0E7,P
OGO 5(4)3.0E7,A
PION 5(3)2.5E7,P
EXPL 28(3)2.6E7,PZ
EXPL 34(7)3.0E7,P
EXPL 41(2)3.0E7,P
EXPL 12(3)2.3E7,P
OGO 1(18)2.2E7,PZ
EXPL 21(3)1.9E7,PZ
EXPL 18(3)1.9E7,PZ
EXPL 18(4)1.8E7,AP
EXPL 28(5)1.7E7,P
EXPL 21(5)1.7E7,P
EXPL 18(5)1.7E7,P
EXPL 41(2)1.5E7,P
MARIN 4(4)1.5E7,AP
OGO 5(9)1.5E7,E
PION 6(3)1.3E7,AP
EXPL 28(3)1.3E7,PZ
OGO 5(6)1.4E7,P
PION 5(1)1.3E7,E
PION 7(6)1.3E7,A
PION 7(6)1.2E7,P
EXPL 35(2)1.2E7,P
EXPL 34(2)1.2E7,P
EXPL 33(4)1.2E7,P
EXPL 41(1)1.1E7,A
PION 8(6)1.1E7,P
PION 9(6)1.0E7,P
MARIN 2(4)1.0E7,P
EXPL 34(7)1.0E7,P
EXPL 41(7)1.0E7,P
EXPL 34(3)9.6E6,PZ
OGO 3(3)8.6E6,AP
OGO 1(18)8.6E6,AP
OGO 5(4)8.0E6,P
EXPL 34(5)7.6E6,P
EXPL 41(3)8.4E6,P
PION 6(5)7.4E6,P
PION 7(5)7.2E6,P
EXPL 21(3)6.5E6,PZ
EXPL 18(3)6.5E6,PZ
PION 8(6)6.6E6,A
EXPL 28(5)6.0E6,E
EXPL 34(1)6.0E6,A
EXPL 21(5)6.0E6,E
PION 7(6)6.0E6,P
EXPL 18(5)6.0E6,E
PION 6(3)6.0E6,AP
PION 9(6)5.8E6,A
PION 9(6)5.1E6,E
OGO 5(27)5.0E6,PZ
EXPL 34(1)5.0E6,P
EXPL 41(1)5.0E6,P
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
10^7
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74
DATA TIME COVERAGE (YEARS)

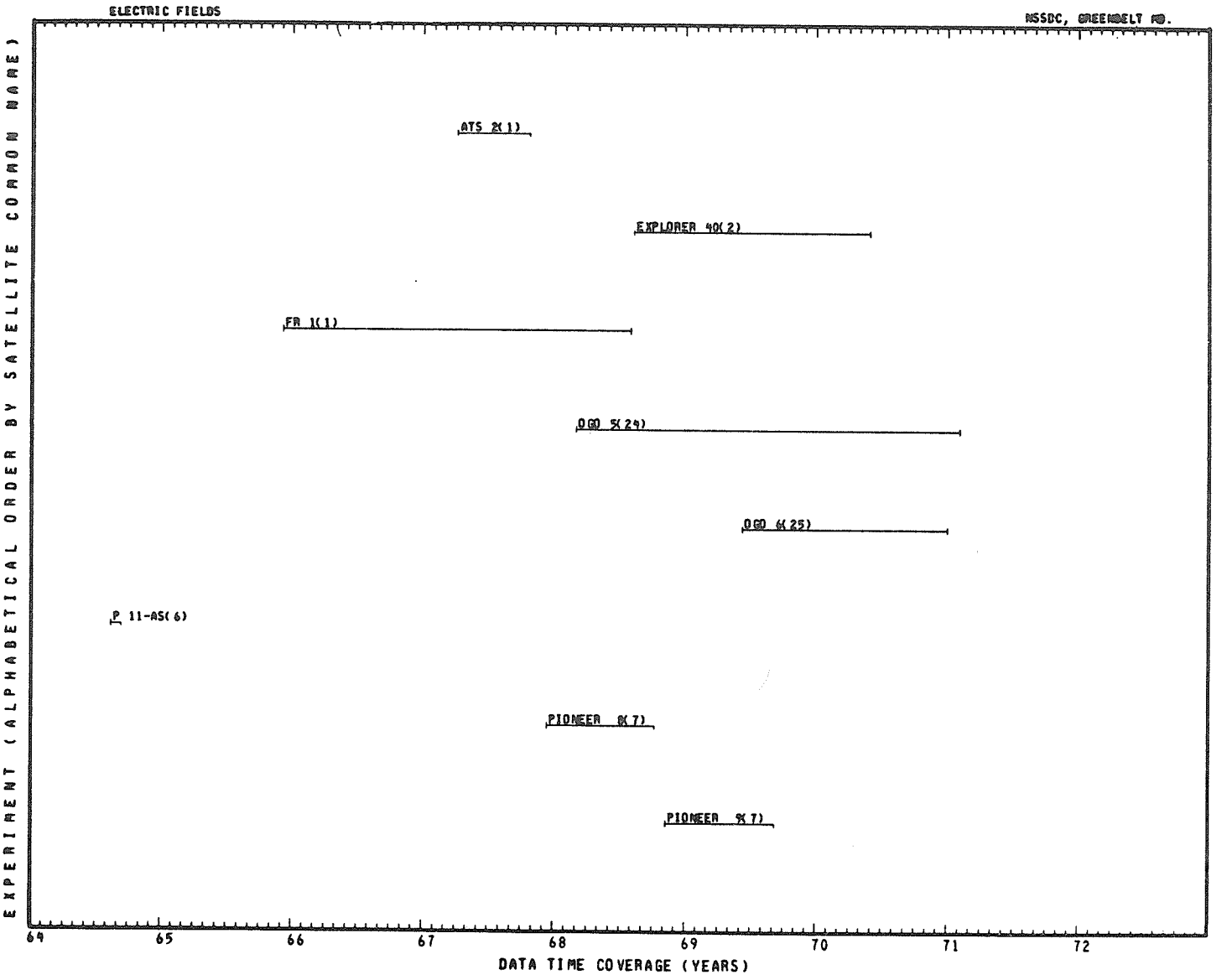

CHARGED PARTICLES - INTERPLANETARY
NSSDC, GREENBELT MD.
EXPL 41(1)4.4E6,A
EXPL 18(4)4.0E6,E
PION 8(6)4.2E6,E
HEOS 1(6)3.8E6,P
APOL 16A(9)3.5E6,A
APOL 15A(10)3.5E6,A
ERS 17(1)3.5E6,P
PION 8(6)3.5E6,P
OGO 3(1)3.0E6,P
EXPL 18(4)2.7E6,E
OGO 1(12)3.0E6,P
EXPL 28(3)2.6E6,PZ
EXPL 34(5)2.8E6,E
EXPL 35(2)2.5E6,E
EXPL 34(2)2.5E6,E
EXPL 41(2)3.0E6,E
EXPL 33(4)2.5E6,E
EXPL 41(3)3.0E6,Z
EXPL 33(5)2.1E6,A
PION 9(6)2.2E6,P
HEOS 1(6)2.0E6,E
EXPL 12(3)1.6E6,E
OGO 5(27)2.0E6,P
PION 5(3)1.6E6,E
EXPL 35(1)2.0E6,A
OGO 3(3)1.6E6,AP
EXPL 41(2)1.5E6,P
OGO 5(6)1.5E6,A
PION 9(6)1.9E6,E
EXPL 14(4)1.4E6,P
OGO 1(18)1.4E6,AP
MARIN 4(4)1.2E6,AP
EXPL 33(5)1.1E6,A
EXPL 41(1)1.1E6,E
EXPL 28(5)1.0E6,E
EXPL 41(7)1.0E6,AP
EXPL 21(5)1.0E6,E
EXPL 34(7)1.0E6,AP
EXPL 41(2)1.0E6,E
EXPL 18(5)1.0E6,E
EXPL 34(1)1.0E6,AP
EXPL 41(1)1.0E6,A
EXPL 21(3)9.0E5,PZ
EXPL 18(3)9.0E5,PZ
OGO 5(6)8.2E5,E
EXPL 33(5)8.2E5,P
EXPL 34(3)8.0E5,PZ
EXPL 33(5)7.8E5,A
EXPL 41(3)8.0E5,P
EXPL 35(1)7.4E5,P
EXPL 33(5)7.3E5,P
EXPL 35(2)7.0E5,E
EXPL 34(5)7.0E5,P
EXPL 34(2)7.0E5,E
EXPL 33(4)7.0E5,E
PION 7(6)6.0E5,AP
PION 6(3)6.0E5,AP
EXPL 33(5)6.9E5,A
OGO 5(6)5.7E5,P
EXPL 34(1)5.6E5,P
PION 8(6)5.2E5,E
EXPL 33(5)5.0E5,P
EXPL 14(3)5.0E5,P
EXPL 28(5)5.0E5,P
OGO 5(27)5.0E5,Z
MARIN 2(4)5.0E5,E
EXPL 21(5)5.0E5,P
OGO 5(13)5.0E5,E
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
10^6
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74
DATA TIME COVERAGE (YEARS)


CHARGED PARTICLES - INTERPLANETARY
NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
DATA TIME COVERAGE (YEARS)
EXPL 35(1)4.8E5,P
EXPL 41(1)4.7E5,P
EXPL 35(1)4.6E5,Z
EXPL 41(2)4.0E5,P
EXPL 41(1)3.5E5,E
PION 8(6)3.4E5,E
EXPL 35(1)3.2E5,P
EXPL 33(5)3.1E5,P
EXPL 35(2)3.0E5,P
EXPL 34(2)3.0E5,P
EXPL 34(1)3.0E5,E
EXPL 33(4)3.0E5,P
PION 9(6)3.1E5,E
EXPL 14(3)2.3E5,E
EXPL 34(3)1.7E5,E
EXPL 41(2)1.6E5,E
OGO 3(10)1.2E5,P
OGO 5(6)1.0E5,P
EXPL 14(5)9.7E4,P
EXPL 34(3)8.0E4,E
EXPL 41(2)8.0E4,E
OGO 5(6)7.9E4,E
EXPL 34(5)7.0E4,E
OGO 3(22)5.0E4,E
OGO 1(21)5.0E4,E
OGO 5(13)5.0E4,E
EXPL 35(1)4.8E4,E
EXPL 33(5)4.5E4,E
EXPL 33(4)4.5E4,E
EXPL 28(5)4.5E4,E
EXPL 35(2)4.5E4,E
EXPL 21(5)4.5E4,E
EXPL 34(2)4.5E4,E
EXPL 14(3)4.0E4,E
EXPL 28(5)4.0E4,E
EXPL 12(3)4.0E4,E
EXPL 21(5)4.0E4,E
EXPL 34(4)4.0E4,E
EXPL 41(2)4.0E4,E
OGO 5(4)3.0E4,E
EXPL 35(2)2.2E4,E
EXPL 34(2)2.2E4,E
EXPL 33(4)2.2E4,E
EXPL 34(4)2.1E4,EP
EXPL 41(2)2.0E4,E
EXPL 14(5)1.3E4,E
OGO 3(8)1.1E4,P
OGO 3(8)1.0E4,E
OGO 3(10)1.0E4,E


CHARGED PARTICLES - INTERPLANETARY
NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
DATA TIME COVERAGE (YEARS)
EXPL 34(4)1.7E3,EP
APOL 14C(8)2.0E3,EPZ
OGO 3(8)1.1E3,EP
EXPL 12(3)1.0E3,P
VELA 5A(5)1.0E3,Z
EXPL 21(6)7.0E2,P
EXPL 18(6)2.5E2,P
EXPL 34(8)3.1E2,AP
MARIN 2(6)2.3E2,P
PION 7(3)2.0E2,P
PION 6(6)2.0E2,P
VELA 3B(4)2.0E2,EP
EXPL 12(3)2.0E2,E
VELA 3A(4)2.0E2,EP
PION 9(2)1.5E2,P
APOL 14C(8)1.7E2,PZ
PION 8(2)1.5E2,P
EXPL 21(7)1.3E2,E
VELA 5A(5)1.2E2,P
PION 7(2)1.1E2,E
PION 6(2)9.0E1,E
PION 7(2)7.5E1,P
PION 6(2)7.5E1,P
EXPL 18(7)6.5E1,E
EXPL 35(6)5.0E1,EP
EXPL 18(7)4.5E1,P
EXPL 33(6)5.0E1,EP
EXPL 21(7)4.0E1,P
MARIN 5(3)4.0E1,P
APOL 14C(8)4.0E1,E
EXPL 34(4)3.3E1,E
EXPL 34(4)2.5E1,P
VELA 5B(5)2.0E1,EP
VELA 5A(5)2.0E1,EP
PION 9(2)1.2E1,E
PION 8(2)1.2E1,E
VELA 5A(5)7.5E0,E
OGO 3(8)5.0E0,EP
PION 6(6)1.0E0,E
PION 8(3)0.0E0,E
PION 6(8)0.0E0,Z
PION 9(3)0.0E0,E
PION 7(3)0.0E0,E
VELA 3B(4)0.0E0,E
EXPL 10(2)0.0E0,P
VELA 3A(4)0.0E0,E


MAGNETIC FIELDS - NEAR EARTH-MAGNETOSPHERE
NSSDC, GREENBELT MD.
EXPERIMENT (ALPHABETICAL ORDER BY SATELLITE COMMON NAME)
1964-083C(1)
APOLLO 12 LM(4)
APOLLO 15 LM(3)
APOLLO 16 LM(3)
ARIEL 3(5)
ATS 1(2)
ATS 5(13)
COSMOS 49(1)
EXPLORER 6(4)
EXPLORER 12(2)
EXPLORER 14(2)
EXPLORER 18(2)
EXPLORER 21(2)
EXPLORER 28(2)
EXPLORER 33(1)
EXPLORER 33(3)
EXPLORER 34(11)
EXPLORER 35(3)
EXPLORER 35(4)
EXPLORER 40(2)
FR 1(1)
GRS-A(1)
INJUN 1(5)
INJUN 3(9)
OGO 1(1)
OGO 1(8)
OGO 2(2)
OGO 2(5)
OGO 3(11)
OGO 3(12)
OGO 5(14)
OGO 5(16)
OGO 5(24)
PIONEER 1(2)
VANGUARD 3(1)
58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73
DATA TIME COVERAGE (YEARS)


MAGNETIC FIELDS - INTERPLANETARY
NSSDC, GREENBELT MD.
EXPERIMENT (ALPHABETICAL ORDER BY SATELLITE COMMON NAME)
APOLLO 12 LM(4)
APOLLO 15 LM(3)
APOLLO 16 LM(3)
EXPLORER 14(2)
EXPLORER 18(2)
EXPLORER 21(2)
EXPLORER 28(2)
EXPLORER 33(1)
EXPLORER 33(3)
EXPLORER 34(11)
EXPLORER 35(3)
EXPLORER 35(4)
MARINER 2(3)
MARINER 4(2)
MARINER 5(5)
OGO 1(1)
OGO 1(8)
OGO 3(11)
OGO 3(12)
OGO 5(14)
OGO 5(16)
OGO 5(24)
PIONEER 5(2)
PIONEER 6(1)
PIONEER 7(1)
PIONEER 8(1)
PIONEER 9(1)
60 61 62 63 64 65 66 67 68 69 70 71 72 73
DATA TIME COVERAGE (YEARS)


ELECTRIC FIELDS
NSSDC, GREENBELT MD.
EXPERIMENT (ALPHABETICAL ORDER BY SATELLITE COMMON NAME)
ATS 2(1)
EXPLORER 40(2)
FR 1(1)
OGO 5(29)
OGO 6(25)
P 11-AS(6)
PIONEER 8(7)
PIONEER 9(7)
64
65
66
67
68
69
70
71
72
DATA TIME COVERAGE (YEARS)

MASTER STATION LIST

All of the stations listed in the catalogue sections to follow are grouped into a master station list, alphabetically by station name. The scientific program or programs at the station (indicated by letter-number as in Table of Contents), geographic coordinates, geomagnetic coordinates, computed magnetic dip, L-shell value, and opening and closing dates are given. For stations with programs in cosmic rays, the cutoff rigidities and station altitudes are also presented.

For all stations the geographic coordinates were converted by an electronic computer program to give geomagnetic coordinates with the value ϕ = 78.5°N and λ = 291.0°E adopted for the geomagnetic north pole. Geomagnetic latitude is measured from this pole, and geomagnetic longitude from the geographic meridian extending from the geographic north pole through the geomagnetic north pole.

Another computer program computed the magnetic dip and L-value at 0 km altitude for each station based upon the Jensen and Cain field, epoch November 1966. The cosmic ray cutoff rigidities in Bv were calculated using the 6-degree quiescent magnetic field coefficients by Finch-Leaton for epoch 1955.0.

For each station an attempt is being made to prepare as complete a data information bank as possible. The facts now tabulated are source of data with addresses of both sponsoring institution and station itself, reporting times used, type of equipment operated, observing schedules, form of original records, method of scaling and data reduction, form of data submitted to WDC's, etc.

Special Notes:

For opening and closing dates:
- \- continuous operation.
- --- intermittent operation.
- ( ) holdings begin or end with these dates, not necessarily dates of program operation.

Preferred name: a single geographic location may appear in the list in two or more places depending upon the name used by the different programs, though an attempt has been made to consolidate all such programs under one preferred name.

Equivalent name: other names used are given in a table which follows the master list.

"Lat" : minus sign represents south latitude.
"Long" : all longitudes are given as east longitudes.
"Altitude" : M = meters
SL = sea level

Note: Since the geographic coordinates have been taken from many different sources, stations are asked to check the entries carefully and to report any inaccuracies promptly to WDC-A for Solar-Terrestrial Physics, NOAA, Boulder, Colorado, 80302 U.S.A.

MASTER STATION LIST

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY		ALTITUDE	OPEN - CLOSE DATES
ABASTUMANI	A6	41.75	42.83	36.67	120.29	60.0	1.54				(1/1970)-
	A8	41.75	42.83	36.67	120.29	60.0	1.54				(12/1957)-
	C1	41.75	42.83	36.67	120.29	60.0	1.54				(7/1957)-
	C3	41.75	42.83	36.67	120.29	60.0	1.54				(12/1957)-
	G	41.90	42.70	36.84	120.22	60.1	1.55				(7/1957)-
ABERDEEN (US)	C5	45.50	261.50	55.14	322.85	74.2	3.23				1/1966---
ABERDEEN(UK)	G	57.17	357.93	59.97	85.34	71.5	3.23				NK
ABERYSTWYTH	B1	52.43	355.93	55.91	80.22	68.4	2.58				NK
	B3	52.43	355.93	55.91	80.22	68.4	2.58				NK
	B6	52.43	355.93	55.91	80.22	68.4	2.58				NK
	B7	52.43	355.93	55.91	80.22	68.4	2.58				1/1964---12/1965
	B10	52.43	355.93	55.91	80.22	68.4	2.58				1/1964 -
	B11	52.43	355.93	55.91	80.22	68.4	2.58				NK
	D1	52.43	355.93	55.91	80.22	68.4	2.58				NK
	D2	52.43	355.93	55.91	80.22	68.4	2.58				NK
ABISKO	D1	68.36	18.82	66.04	115.08	77.1	5.73				1/1921 ---
	E1	68.36	18.82	66.04	115.08	77.1	5.73				(8/1958)-(4/1959)
ACCRA	B1	05.63	359.83	09.66	70.27	-10.2	1.00				8/1961 - 7/1963
	B6	05.63	359.83	09.66	70.27	-10.2	1.00				NK
	B8	05.63	359.83	09.66	70.27	-10.2	1.00				12/1962 -
	B14	05.60	359.83	09.63	70.28	-10.3	1.00				(7/1957)-(3/1958)
	D1	05.63	359.83	09.66	70.27	-10.2	1.00				(3/1963)-(4/1965)
ADAK	B1	51.90	183.40	47.22	239.99	63.1	2.11				10/1945 - 12/1965
	B9	51.90	183.40	47.22	239.99	63.1	2.11				(7/1957)- 12/1965
	B11	51.90	183.40	47.22	239.49	63.1	2.11				10/1960 - 1/1963
	B13	51.90	183.35	47.21	239.95	63.1	2.11				2/1962 - 10/1962
	C6	51.90	183.50	47.24	240.08	63.1	2.11				(7/1957)-(12/1965)
	D1	51.87	183.35	47.18	239.96	63.0	2.10				9/1964 - 1/1966
ADDIS ABABA	B6	09.03	38.77	05.38	109.15	-00.4	0.96				(7/1966)-
	C6	09.03	38.77	05.38	109.15	-00.4	0.96				6/1960 --- 1/1961
	D1	09.03	38.77	05.38	109.15	-00.4	0.96				1/1958 -
	D2	09.03	38.77	05.38	109.15	-00.4	0.96				
ADELAIDE	B10	-34.60	138.40	-44.60	212.14	-66.6	2.00				(1/1968)-
	B13	-34.60	138.40	-44.60	212.14	-66.6	2.00				8/1957 -(12/1958)
ADELAIDE IS	E2	-67.77	295.08	-56.29	2.78	-60.0	2.61				NK
AGINCOURT	D1	43.78	280.73	55.05	347.02	74.3	3.32				9/1898 - 3/1969
AHMEDABAD	B1	23.00	72.60	13.83	143.92	32.2	1.00				2/1953 -
	B2	23.02	72.50	13.86	143.83	32.2	1.01				6/1968 -
	B6	23.00	72.60	13.83	143.92	32.2	1.00				(11/1964)-
	B7	23.00	72.60	13.83	143.92	32.2	1.00				(8/1957)-(12/1959)
	B8	23.00	72.60	13.83	143.92	32.2	1.00				7/1957 ---
	B10	23.00	72.60	13.83	143.92	32.2	1.00				(7/1957)-(12/1958)
	F1	23.01	72.60	13.84	143.93	32.2	1.00	15.94	SL		7/1957 - 6/1964
	F1	23.01	72.60	13.84	143.93	32.2	1.00	15.94	SL		8/1968 -
	F3	23.01	72.60	13.84	143.93	32.2	1.00	15.94	SL		7/1957 -
AKITA	B1	39.70	140.10	29.47	205.45	53.6	1.34				12/1949 -
	B5	39.70	140.10	29.47	205.45	53.6	1.34				NK
	B9	39.73	140.14	29.50	205.48	53.6	1.35				1/1964 - 12/1965
AKLAVIK	E1	68.10	225.00	69.96	263.92	80.9	8.87				(12/1957)-(10/1958)
ALAMOGORDO	B8	32.26	318.40	42.28	31.73	56.2	1.68				11/1962 - 11/1964
	E3	32.26	318.40	42.28	31.73	56.2	1.68				NK
ALASKA ROCKET RA	B5	65.10	212.50	64.90	256.56	76.8	5.53				
ALBUQUERQUE	B5	65.10	212.50	64.90	256.56	76.8	5.53				
ALDAN	E1	58.70	125.40	47.48	191.02	74.7	2.63				(1/1958)---(5/1959)
ALERT	B1	82.50	297.40	85.77	168.77	85.8	311.26				8/1957 - 12/1958
	C9	82.50	297.40	85.77	168.77	85.8	311.26				8/1957 - 12/1958
	D1	82.50	297.50	85.86	168.18	85.8	308.21				10/1961 - 9/1972
	E1	82.50	297.75	85.85	167.75	85.7	302.57				(11/1957)---(2/1959)
	F1	82.50	297.60	85.86	168.00	85.8	305.94	0.00		66M	10/1965 -
	F3	82.50	297.60	85.86	168.00	85.8	305.94	0.00		66M	10/1965 -
ALIBAG	D1	18.63	72.87	09.46	143.62	23.0	0.96				1/1904 -
ALIGARH	F1	27.90	78.07	18.10	149.64	41.0	1.07	14.85		186M	12/1971
ALLAKAKET	E1	66.50	207.40	65.16	250.63	77.0	5.70				(9/1965)-(3/1966)
ALMA ATA	A6	43.20	76.90	33.40	150.69	62.9	1.53				NK
	A7	43.20	76.90	33.40	150.69	62.9	1.53				(8/1957)- 8/1962
	B1	43.20	76.90	33.40	150.69	62.9	1.53				1/1943---
	B7	43.25	76.92	33.45	150.72	62.9	1.53				(7/1957)-
	B8	43.25	76.92	33.45	150.72	62.9	1.53				1/1964 -
	B10	43.25	76.92	33.45	150.72	62.9	1.53				(1/1964)-
	B14	43.50	76.92	33.69	150.76	63.2	1.55				(9/1958)-
	C1	43.20	76.90	33.40	150.69	62.9	1.53				10/1957 - 10/1962
	D1	43.25	76.92	33.45	150.72	62.9	1.53				1/1963 -
	D2	43.25	76.92	33.45	150.72	62.9	1.53				
	F1	43.20	76.90	33.40	150.69	62.9	1.53	6.69		806 M	7/1957---
	F3	43.20	76.90	33.40	150.69	62.9	1.53	6.69		806 M	1/1962---
ALMERIA	D1	36.85	357.53	40.63	75.29	52.5	1.40				1/1955 -
ALOUSHTA	D1	44.58	34.42	41.01	113.58	62.6	1.70				1/1957 -
ALSBJERG	B4	56.58	09.10	57.29	95.91	71.2	0.86				(10/1970)-
	B12	56.68	09.10	57.29	95.91	71.2	0.86				(1/1970)-
AMBERLEY	D1	-43.15	172.72	-47.65	252.52	-68.4	2.37				1/1902 -
AMDERMA	B8	69.76	61.68	60.98	147.26	80.3	5.45				1/1964 - (1965)
AMSTERDAM	F2	52.35	04.90	54.06	89.21	68.3	2.46	2.69		SL	6/1952 - 11/1962
ANCHORAGE	B1	61.20	210.10	60.92	258.12	73.7	4.11				4/1949 - 12/1965
	B8	61.20	210.15	60.93	258.17	73.7	4.11				4/1962 -
	B9	61.20	210.15	60.93	258.17	73.7	4.11				(7/1957)-
	B13	61.17	210.08	60.88	258.13	73.7	4.10				11/1957 - 12/1958
	C6	61.17	210.08	60.88	258.13	73.7	4.10				(7/1957)-
	C10	61.17	210.08	60.88	258.13	73.7	4.10				NK
	D1	61.23	210.13	60.95	258.13	73.8	4.11				7/1957 -
	D2	61.10	210.45								
ANDENES	B5	69.10	16.00	67.17	113.67	77.3	6.15				

MASTER STATION LIST

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
ANDOVER	E3	42.00	289.00	53.49	357.50	72.5	3.03			NK
ANDOYA	34	69.30	16.00	67.34	113.94	77.4	6.24			3/1964 -
	B5	69.30	16.00	67.34	113.94	77.4	6.24			
ANDREWS AFB	D1	38.20	282.63	49.55	349.84	70.2	2.56			7/1972
ANGMAGSSALIK	C8	65.61	322.34	74.32	52.63	78.2	9.29			9/1972 -
ANN ARBOR	C4	42.24	276.27	53.27	341.65	73.2	3.03			10/1958---7/1961
ANNAMALAINAGAR	D1	11.40	79.68	01.53	149.35	5.2	0.92			10/1957 -
ANNETTE IS	B12	55.25	228.39	59.03	280.43	73.8	3.70			1/1964 - 12/1967
	C10	55.25	228.39	59.03	280.43	73.8	3.70			NK
ANTIQUA	B5	17.15	298.21	28.55	7.85	48.7	1.39			NK
ANTOFAGASTA	B2	-23.32	289.72	-12.12	358.80	-17.7	1.08			9/1962 - 7/1963
	B12	-23.62	289.72	-12.12	358.80	-17.7	1.08			12/1957 - 11/1958
APATITY	F1	67.55	33.30	62.80	125.28	77.2	5.04	0.65	182M	1/1962 - 8/1968
	F1	67.55	33.30	62.80	125.28	77.2	5.04	0.65	182M	10/1968 -
	F3	67.55	33.30	62.80	125.28	77.2	5.04	0.65	182M	4/1965 -
	F4	67.55	33.30	62.80	125.28	77.2	5.04	0.65	182M	NK
APIA	D1	-13.80	188.22	-16.06	260.24	-29.4	1.05			1/1905 -
	D2	-13.80	188.22	-16.06	260.24	-29.4	1.05			7/1957 --- 12/1965
ARCETRI	A1	43.75	11.25	44.59	91.45	60.8	1.69			6/1872 ---
	A5	43.75	11.25	44.59	91.45	60.8	1.69			(7/1957)- 12/1959
	A6	43.75	11.25	44.59	91.45	60.8	1.69			1/1965 ---
	A8	43.75	11.25	44.59	91.45	60.8	1.69			1/1972 -
	C1	43.75	11.25	44.59	91.45	60.8	1.69			6/1915 ---
	C3	43.75	11.25	44.59	91.45	60.8	1.69			(7/1965)
	C6	43.75	11.25	44.59	91.45	60.8	1.69			(4/1964)---(5/1967)
ARCTIC ICE FLO	D1	83.52	193.05	DRIFT						7/1957 --- 10/1958
	E1	80.00	195.00	DRIFT						(11/1957)-(3/1958)
	E3	80.00	195.00	DRIFT						
ARCTICA I (NP-6)	B1	82.40	09.50	77.57	142.97	83.1	25.98			7/1957 - 9/1959
	C9	82.40	09.50	77.57	142.97	83.1	25.98			7/1957 - 9/1959
	D1	83.60	09.50	DRIFT						7/1957 - 3/1959
	E1	82.40	09.50	77.57	142.97	83.1	25.98			7/1957 - 9/1959
ARCTICA II (NP-7	B1	86.40	296.60	82.08	177.45	86.5	114.90			7/1957 - 3/1959
	C9	59.40	296.60	82.08	177.45	86.5	114.90			7/1957 - 3/1959
	D1	85.82	268.13	DRIFT						7/1957 - 3/1959
	E1	86.40	296.60	82.08	177.45	86.5	114.90			7/1957 - 3/1959
ARCTICA (NP-12)	D1	79.08	187.22	DRIFT						5/1963 - 4/1964
ARCTICA (NP-16)	B1	78.08	176.48	DRIFT						6/1968 -
ARCTICA (NP-8)	B1	80.00	165.00	DRIFT						6/1960 - 10/1961
	C9	80.00	165.00	DRIFT						6/1960 - 10/1961
	D1	77.32	188.30	DRIFT						5/1959 - 2/1962
ARCTICA(NP-10)	B1	78.00	165.00	DRIFT						12/1962 - 4/1964
	C9	78.00	165.00	DRIFT						
	D1	76.62	166.38	DRIFT						11/1961 - 5/1962
ARCTICA(NP-11)	B1	79.00	165.00	DRIFT						7/1962 - 10/1962
	C9	79.00	165.00	DRIFT						7/1962 - 10/1962
ARCTICA(NP-13)	B1	81.00	165.00	DRIFT						7/1964 - 9/1966
	C9	81.00	165.00	DRIFT						7/1964 - 12/1965
ARECIBO	B1	18.50	293.17	29.99	02.38	51.2	1.43			(5/1963)-
	B3	18.50	293.17	29.99	02.38	51.2	1.43			
	B13	18.50	293.17	29.99	02.38	51.2	1.43			1/1965 - 12/1966
AREQUIPA	B12	-16.73	288.13	-05.24	357.24	-6.3	1.05			12/1957 - 11/1958
	D1	-16.47	288.52	-04.98	357.61	-5.8	1.05			1/1958 -
ARGENTINE IS	B1	-65.20	295.70	-53.73	03.33	-58.1	2.35			5/1948---
	B13	-65.25	295.73	-53.78	03.35	-58.1	2.36			7/1957 - 12/1966
	D1	-65.20	295.70	-53.78	03.25	-58.1	2.36			1/1957 -
	E2	-65.20	295.70	-53.73	03.33	-58.1	2.35			NK
ARKHANGELSK	E1	64.50	40.50	58.94	128.39	76.3	4.08			(3/1958)---(5/1959)
ARLIS III	E1	75.00	210.00	DRIFT						(2/1964)-(3/1964)
ARMIDALE	B6	-30.5	151.5	-38.90	225.98	-60.8	1.66			(5/1967)-
AROSA	A1	46.78	09.68	47.81	91.16	63.7	1.93			(1957)-
	A6	46.78	09.68	47.81	91.16	63.7	1.93			NK
	A7	46.78	09.68	47.81	91.16	63.7	1.93			
	C1	46.78	09.68	47.81	91.16	63.7	1.93			(1/1968) -
ASCENSION IS	B5	-07.98	345.58	-01.24	53.83	-30.4	1.09			
ASHKHABAD	B1	37.90	58.30	30.44	133.28	56.3	1.36			3/1957 -
	B6	37.90	58.30	30.44	133.28	56.3	1.36			(6/1967) -
	B7	37.93	58.37	30.46	133.35	56.3	1.36			(7/1957)-
	B10	37.93	58.37	30.46	133.35	56.3	1.36			1/1958 -
	B14	37.77	58.37	30.30	133.31	56.1	1.36			(3/1959)-5/1962
	D1	37.95	58.10	30.52	133.11	56.3	1.36			9/1958 -
	D2	37.95	58.10	30.52	133.11	56.3	1.36			
	D3	37.95	58.10	30.52	133.11	56.3	1.36			
	G	37.95	58.10	30.52	133.11	56.3	1.36			1/1964 - 2/1966
ASMARA	B4	15.00	39.00	11.19	110.53	14.1	0.97			NK
ASO	D1	32.88	131.02	22.00	198.06	46.3	1.16			1/1940 -
	D2	32.53	131.01							
	G	32.88	131.02	22.00	198.06	46.3	1.16			(8/1957)-
ATHEN2	A2	38.00	23.00	36.71	100.76	54.5	1.39			10/1967 -
ATHENS	A1	37.99	23.75	36.56	101.47	54.5	1.39			(11/1968)-
	A2	37.99	23.75	36.56	101.47	54.5	1.39			NK
	A6	37.99	23.75	36.56	101.47	54.5	1.39			NK
	B1	38.00	23.60	36.60	101.33	54.5	1.39			12/1943 ---
	B8	38.00	23.60	36.60	101.33	54.5	1.39			10/1963 - 8/1964
	B9	38.00	23.60	36.60	101.33	54.5	1.39			(11/1970)-
	C1	37.97	23.72	36.54	101.44	54.5	1.39			(7/1957)---
	C6	38.00	23.81	36.56	101.53	54.6	1.39			(1/1968)---
	D1	38.05	23.87	36.59	101.61	54.6	1.32			1/1959 -
	F1	37.96	23.70	36.38	102.38	54.6	1.39	8.72	40M	8/1969 -
ATTU	C6	52.83	186.83	48.71	242.59	64.1	2.22			
AUCKLAND	B1	-37.00	175.00	-41.26	252.74	-62.8	1.84			1/1967 -
	B6	-37.00	175.00	-41.26	252.74	-62.8	1.84			NK
	B11	-37.00	175.00	-41.26	252.74	-62.8	1.84			(12/1969)-
	D2	-36.51	174.45							

MASTER STATION LIST

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
AVERROES	D1	37.99	14.02	38.48	92.11	54.1	1.40			NK
BAGNEUX	B14	48.80	02.30	51.21	84.79	65.5	2.16			3/1957 -
BAGUIO	A1	16.40	120.60	05.05	189.24	18.1	0.91			(7/1957)---
	A2	16.40	120.60	05.05	189.24	18.1	0.91			(7/1957)---
	B1	16.40	120.60	05.05	189.24	18.1	0.91			3/1952 - 1/1964
	D1	16.42	120.60	05.07	189.24	18.2	0.95			1/1964 -
	D2	16.42	120.60	05.07	189.24	18.2	0.95			
BAIE ST PAUL	B1	47.38	289.45	58.87	357.97	75.8	3.99			11/1961 - 2/1962
	B8	47.38	289.45	58.87	357.97	75.8	3.99			2/1963 - 11/1965
	D2	47.38	289.45	58.85	357.97	75.8	3.99			
	D3	47.38	289.45	58.85	357.97	75.8	3.99			
BAKER LAKE	B1	64.30	264.00	73.74	315.31	86.0	14.79			3/1951 - 2/1959
	B7	64.30	264.00	73.74	315.31	86.0	14.79			(7/1957)- 3/1959
	B11	64.30	264.00	73.74	315.31	86.0	14.79			7/1960 -
	C9	64.30	264.00	73.74	315.31	86.0	14.79			3/1951 - 2/1959
	D1	64.33	263.97	73.77	315.23	86.0	14.84			1/1951 -
	D2	64.33	263.97	73.77	315.23	86.0	14.84			
	E1	64.30	264.00	73.74	315.31	86.0	14.79			(8/1957)---(5/1959)
	E3	64.30	264.00	73.74	315.31	86.0	14.79			NK
BAKOU	A6	40.80	48.60	34.78	125.24	59.2	1.49			(7/1964)---(2/1967)
	C1	40.80	48.60	34.78	125.24	59.2	1.49			(3/1958)---(2/1967)
BANGKOK	A2	13.70	100.60	02.38	169.89	10.4	0.91			5/1968 -
	B1	13.70	100.60	02.38	169.89	10.4	0.91			8/1963 -
	B6	13.70	100.60	02.38	169.89	10.4	0.91			(7/1966)-
	B14	13.55	100.90	02.22	170.18	10.1	0.92			3/1966 - 2/1968
BANGUI	B1	04.60	18.60	04.99	88.57	-14.7	0.99			2/1958 --- 9/1966
	B14	04.36	18.58	04.75	88.50	-15.2	0.99			5/1958 -
	D1	04.43	18.57	04.83	88.50	-15.1	0.98			1/1952 -
	D2	04.43	18.57	04.83	88.50	-15.1	0.98			
BAR I	B8	69.60	219.80	70.20	256.90	80.9	9.16			1/1967 - (6/1972)
	C8	69.80	219.80	70.20	256.90	80.9	9.16			1/1967
	D2	69.90	219.80	70.20	569.90	80.9	9.16			
	E1	69.60	219.80	70.20	256.90	80.9	9.16			(11/1964)---(3/1966)
BARBADOS	B1	13.12	300.40	24.46	10.06	43.1	1.30			1/1957 - 6/1957
	B10	13.12	300.40	24.46	10.06	43.1	1.30			6-1964 - 11/1965
	C6	13.12	300.40	24.46	10.06	43.1	1.30			(1/1960)---
BARCELONA	A2	41.40	02.02	44.16	81.40	58.1	1.60			(7/1957)-(12/1957)
BARENTSBURG	D1	78.63	16.38	74.55	132.47	81.4	15.08			(10/1957)-(6/1959)
BARROW	B1	71.30	203.20	68.54	241.11	79.9	8.02			12/1949 - 11/1965
	B5	71.30	203.20	68.54	241.11	79.9	8.02			
	B8	71.52	203.67	68.80	241.12	80.1	8.25			4/1958 - 12/1958
	B12	71.52	203.67	68.80	241.12	80.1	8.25			4/1964 - 12/1967
	C8	71.52	203.67	68.80	241.12	80.1	8.25			(4/1958)-(12/1958)
	C9	71.30	203.20	68.54	241.11	79.9	8.02			12/1949 - 11/1965
	C10	71.30	203.20	68.54	241.11	79.9	8.02			NK
	D1	71.30	203.25	68.54	241.15	79.9	8.03			1/1949-
	D2	71.30	203.25	68.54	241.15	79.9	8.03			7/1957-
	E1	71.50	203.60	68.86	240.95	80.2	8.30			(10/1957)---(11/1966)
	E4	71.50	203.60	68.86	240.95	80.2	8.30			(1/1957)-(12/1959)
BARTER ISLAND	B5	70.12	216.37	69.97	253.17	80.7	8.99			
	D1	70.13	216.33	69.97	253.12	80.7	8.99			7/1957 - 12/1958
BATTLE CREEK	B13	42.30	274.80	53.24	339.83	73.2	3.01			7/1957 - 12/1958
BAUDOUIN	B1	-70.40	23.30	-67.79	62.48	-64.4	5.20			4/1958 --- 12/1960
	B8	-70.40	23.30	-67.79	62.48	-64.4	5.20			2/1965 -
	D1	-70.43	24.30	-68.00	63.19	-64.5	5.27			7/1957 --- 12/1966
	D2	-70.43	24.30	-68.00	63.19	-64.5	5.27			
	E1	-70.40	23.30	-67.79	62.48	-64.4	5.20			(5/1958)---(4/1960)
	F4	-70.40	23.30	-67.79	62.48	-64.4	5.20			NK
BEAR ISLAND	D1	74.50	19.20	71.08	124.55	79.6	9.54			1/1951 -
BEARLEY	C6	52.00	358.00	55.10	82.10	68.1	2.50			1/1967 ---
BEDFORD	B8	42.48	288.72	53.97	357.13	72.8	3.10			3/1963 -
BEIRUT	A1	33.88	35.50	30.32	111.39	49.7	1.25			(7/1957)---
	A2	33.88	35.50	30.32	111.39	49.7	1.25			(7/1957)---
BELFAST	F1	54.58	354.07	58.31	79.61	70.0	2.90	1.92	16M	3/1966 -
	F3	54.58	354.07	58.31	79.61	70.0	2.90	1.92	16M	3/1966 -
BELGRANO	B1	-77.30	321.40	-67.24	15.91	-65.9	4.57			7/1958 -
	B8	-77.97	321.20	-67.29	15.76	-65.9	4.58			4/1964 -
	E1	-77.97	321.20	-67.29	15.76	-65.9	4.58			(3/1958)---(10/1964)
	E2	-77.97	321.20	-67.29	15.76	-65.9	4.58			(1/1964)---(12/1965)
	F1	-77.97	321.20	-67.29	15.76	-65.9	4.58	0.77	SL	1/1970 -
BELOIT	D1	39.48	261.87	49.24	324.87	69.2	2.27			7/1957 - 1/1959
BELSK	D1	51.83	20.80	50.43	104.05	68.2	2.27			1/1960 -
	F3	51.83	20.78	50.43	104.03	68.2	2.27		180M	1/1966 -
BENNINGTON	C6	42.80	286.80	54.26	354.72	73.3	3.16			4/1963 --- 4/1966
BEOGRAD	A2	44.80	20.51	43.76	100.74	62.1	1.74			NK
	B1	44.80	20.50	43.77	100.73	62.1	0.87			3/1958 -
BERGEN	F1	60.40	05.30	61.48	95.09	73.3	3.69	1.13	SL	4/1958 -
	F3	60.40	05.30	61.48	95.09	73.3	3.69	1.13	SL	12/1956 -
BERKELEY	F1	37.86	237.70	44.07	298.24	62.8	1.88	4.54	SL	7/1957 - 9/1960
	F3	37.86	237.70	44.07	298.24	62.8	1.88	4.54	SL	7/1957 - 9/1960
BERLIN-ADLERSHOF	A1	52.43	13.53	52.42	97.57	68.5	2.39			NK
	A3	52.43	13.53	52.42	97.57	68.5	2.39			(1/1967 ---
	A8	52.43	13.53	52.42	97.57	68.5	2.39			(7/1957)-
	C3	52.43	13.53	52.42	97.57	68.5	2.39			(7/1957)-
BERMUDA	B13	32.37	295.33	43.83	05.07	64.3	2.04			(7/1957)-(2/1963)
BERNE	A8	46.39	06.44	48.08	87.81	63.3	1.92			
	C3	46.39	06.44	48.08	87.81	63.3	1.92			(1/1969 -
BERVERLY HILLS	C6	34.15	241.42	41.08	303.30	60.0	1.70			4/1962 --- 2/1964
BETTLES	E1	66.90	208.40	65.70	251.01	77.4	5.96			(10/1957)---(4/1965)
BIALKOW	G	51.47	16.67	50.89	100.03	67.8	2.27			(9/1958)-(11/1959)
BIG DELTA	D1	64.00	214.27	64.26	259.30	76.4	5.24			7/1957 - 1/1959
	D2	64.00	214.27	64.26	259.30	76.4	5.24			7/1957 - 1/1959

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
BIG PINE	C4	37.50	241.90	44.44	302.88	63.3	1.91			11/1960 - 10/1961
BILL	B14	43.20	254.80	52.01	315.62	71.1	2.69			7/1957 - 8/1965
BILLERICA	B1	42.60	288.70	54.09	357.11	72.9	3.12			11/1965 - 9/1970
BINZA	D1	-04.38	15.26	-03.15	83.50	-34.6	1.07			1/1953 -
BIRD	E1	56.50	265.80	66.45	323.97	82.2	7.04			(7/1957)-(1/1959)
BJURAKAN	C3	40.35	44.28	35.06	121.22	58.5	1.48			(6/1958)---(7/1960)
BLAUVELT	C6	41.07	286.03	52.52	353.84	72.1	2.91			2/1960---(2/1966)
BLOSSOM POINT	B2	38.42	282.90	49.78	350.16	70.3	2.59			9/1962 - 9/1966
BOCHUM	B6	51.42	07.18	52.73	90.93	67.6	2.34			(2/1966)-
BOGOTA	B1	04.50	285.80	15.95	354.61	23.8	0.90			8/1945 - 6/1967
BOLOGNA	A8	44.50	11.30	45.30	91.79	61.6	1.74			(1/1964)---
	F3	44.50	11.30	45.30	91.79	61.6	1.74	5.22	SL	7/1957 -
BOMBAY	B1	19.00	72.80	09.84	143.60	23.8	0.90			8/1945 -
	F4	19.00	72.80	09.84	143.60	23.8	0.90			NK
BONN	A8	50.74	07.10	52.10	90.50	67.1	2.28			(1/1967)-(9/1967)
	C3	50.74	07.10	52.10	90.50	67.1	2.28			(1/1967)-(9/1967)
BORDEAUX	A8	44.85	359.70	47.94	80.40	61.8	1.83			(11/1968)-
	C3	44.85	359.70	47.94	80.40	61.8	1.83			(11/1968)-
BOROK	D1	58.03	38.97	53.01	123.17	72.8	2.87			8/1957 -
	D2	58.03	38.97	53.01	123.17	72.8	2.87			8/1957 -
BOULDER	A1	40.00	254.70	48.85	316.44	68.3	2.32			9/1951 -
	A2	40.00	254.70	48.85	316.44	68.3	2.32			NK
	A4	40.00	254.70	48.85	316.44	68.3	2.32			10/1967 -
	A6	40.00	254.70	48.85	316.44	68.3	2.32			10/1967 -
	A8	40.10	254.90	48.97	316.64	68.4	2.34			(7/1957)-(9/1960)
	A15	40.03	254.70	48.88	316.43	68.3	2.32			(1/1960)---
	B1	40.00	254.70	48.85	316.44	68.3	2.32			7/1958 ---
	B2	40.10	254.87	49.46	316.47	68.4	2.39			10/1964 - 3/1972
	B4	40.10	254.70	48.85	316.44	68.3	2.32			3/1968 - 2/1970
	B6	40.10	254.70	48.85	316.44	68.3	2.32			(1/1970)
	B9	40.60	254.70	48.85	316.44	68.3	2.32			(4/1960) -
	B12	40.03	254.70	48.88	316.43	68.3	2.33			10/1957 - 12/1958
	B13	40.03	254.70	48.88	316.43	68.3	2.33			7/1957 - 12/1959
	B14	40.10	254.90	48.97	316.64	68.4	2.34			6/1957 - 1/1967
	C1	40.00	254.70	48.85	316.44	68.3	2.32			10/1967 -
	C3	40.03	254.70	48.88	316.43	68.3	2.33			(7/1957)-
	C4	40.03	254.70	48.88	316.43	68.3	2.33			7/1959 -
	C5	40.03	254.70	48.88	316.43	68.3	2.33			12/1965 ---
	C6	40.03	254.70	48.88	316.43	68.3	2.33			(7/1957)-
	D1	40.13	254.77	48.99	316.48	68.4	2.34			1/1961 -
	D2	40.13	254.77	48.99	316.48	68.4	2.34			5/1964 -
BRACKNELL	B10	51.43	359.23	54.32	83.04	67.6	2.43			NK
BRAZZAVILLE	B2	-04.20	344.73	02.63	53.60	-23.2	1.06			6/1966 -
BRENTWOOD	C6	51.63	00.30	54.29	84.23	67.8	2.43			3/1960 ---
BREST	B14	48.45	355.58	52.20	77.78	65.3	2.19			3/1957
BRETIGNY	B2	48.60	357.52	51.96	79.84	65.3	2.19			6/1966 -
BRISBANE	B1	-27.50	152.90	-35.74	226.87	-57.4	1.51			6/1943 -
	B6	-27.50	152.90	-35.74	226.87	-54.4	1.51			(10/1964) -
	B7	-27.50	153.00	-35.73	226.98	-57.4	1.51			(7/1957)-(12/1958)
	B10	-27.00	153.00	-35.23	226.88	-56.9	1.49			7/1957 - 12/1958
	B13	-27.30	153.00	-35.53	226.94	-57.2	1.50			7/1957 - 12/1959
	D2	-27.25	152.50							
	F1	-27.53	152.92	-35.77	226.90	-57.5	1.51	7.21	SL	12/1960 -
BROOKLYN PK A35	C6	40.00	287.00	51.47	355.08	71.3	2.77			NK
BUCHAREST	A1	44.41	26.10	42.31	105.83	61.9	0.86			NK
	A2	44.41	26.10	42.31	105.83	61.9	0.86			NK
	A6	44.41	26.10	42.31	105.83	61.9	0.86			7/1958 -
	C1	44.41	26.10	42.31	105.83	61.9	0.86			7/1958 -
BUDAPEST	B1	46.57	21.17	45.43	102.09	63.9	1.88			1/1956 ---
	F3	47.49	18.96	46.67	100.30	64.6	1.96	4.44	410M	2/1958 ---
BUDKOV	D1	49.07	14.02	49.13	96.37	65.8	2.10			
	D2	49.07	14.02	49.13	96.37	65.8	2.10			
BUENOS AIRES	A1	-34.55	301.30	-23.21	09.22	-32.2	1.07			(1/1964)-
	A2	-34.55	301.30	-23.21	09.22	-32.2	1.07			(1/1964)-
	A8	-34.55	301.30	-23.21	09.22	-32.2	1.07			1/1967 -
	B1	-34.50	301.50	-23.17	09.40	-32.2	1.20			2/1950 -
	F1	-34.58	301.50	-23.25	09.40	-32.3	1.20	10.63	SL	7/1957 - 12/1966
	F1	-34.58	301.50	-23.25	09.40	-32.3	1.20	10.63	SL	1/1967 -
	F3	-34.58	301.50	-23.25	09.40	-32.3	1.20	10.63	SL	11/1957 - 12/1961
	F4	-34.58	301.50	-23.25	09.40	-32.3	1.20	10.63	SL	NK
BUNIA	B1	01.50	30.20	-00.36	99.31	-20.6	1.00			10/1957 - 11/1960
	D1	01.53	30.18	-00.32	99.30	-20.5	0.99			1/1959 ---(5/1960)
BURLINGTON	D1	39.28	257.73	48.54	320.11	68.2	2.31			7/1957 - 1/1959
BYRD STATION	B1	-80.00	240.00	-70.60	336.02	-73.9	7.09			7/1957 - 12/1970
	B2	-80.00	240.50	-70.56	336.25	-73.8	7.05			8/1962 -
	B8	-80.02	240.47	-70.58	336.27	-73.8	7.05			12/1962 - 12/1971
	B11	-80.00	240.00	-70.60	336.02	-73.9	7.09			10/1961
	B13	-79.98	239.98	-70.59	335.99	-73.9	7.08			(5/1959)-(12/1961)
	B14	-80.00	240.00	-70.60	336.02	-73.9	7.09			3/1958 - 10/1964
	C8	-80.02	240.47	-70.58	336.27	-73.8	7.06			12/1962-
	C9	-80.00	240.00	-70.60	336.02	-73.9	7.09			7/1957-
	C10	-80.00	240.00	-70.60	336.02	-73.8	7.09			NK
	D1	-80.00	240.50	-70.56	336.25	-73.8	7.05			7/1957 - 10/1971
	D2	-80.00	240.50	-70.56	336.25	-73.8	7.05			1/1958 - 10/1971
	E1	-80.02	240.47	-70.58	336.27	-73.8	7.06			(6/1957)-
	E3	-80.02	240.47	-70.58	336.27	-73.8	7.06			NK
CALCUTTA	B1	23.00	88.60	12.31	158.96	31.1	0.98			5/1936 -
CALGARY	D2	51.08	245.90	58.30	302.13	75.3	3.70			
	F1	51.08	245.90	58.30	302.13	75.3	3.70	1.09	1128M	1/1964 -
CALTECH	A4	34.00	242.00	41.03	303.97	59.9	1.70			NK
CAMBRIDGE	A8	52.17	00.03	54.89	84.35	68.2	2.50			7/1957 - 12/1958
	B6	52.20	00.10	54.87	84.34	68.2	2.50			
	B10	52.20	00.10	54.87	84.34	68.2	2.50			7/1957 - 12/1959
	B13	52.22	00.10	54.89	84.35	68.2	2.50			7/1957 - 10/1957
	C3	52.17	00.03	54.89	84.35	68.2	2.50			7/1957 - 12/1958
	C7	52.17	00.03	54.89	84.35	68.2	2.50			(1/1970)-(12/1970)

MASTER STATION LIST

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
CAMBRIDGE BAY	D1	69.10	255.00	76.65	294.73	87.0	0.80			1/1972 -
CAMBRIDGE TUNNEL	F3	-42.85	147.40	-51.64	224.50	-72.7	2.83	1.89	110M	9/1957 -
CAMDEN	B12	-34.00	150.40	-42.51	225.55	-64.5	1.88			9/1957 - 12/1958
	D2	-32.75	151.50							
	E1	-34.10	150.70	-42.56	225.90	-64.5	1.88			(9/1957)-(2/1958)
	G	-34.07	150.63	-42.54	225.82	-64.5	1.88			7/1957 - 12/1958
CAMPBELL IS	B1	-52.50	169.20	-57.29	253.20	-75.8	4.01			4/1945 -
	B8	-52.50	169.20	-57.29	253.20	-75.8	4.01			(3/1968)-
	B11	-52.50	169.20	-57.29	253.20	-75.8	4.01			2/1970 -
	B13	-52.50	169.20	-57.29	253.20	-75.8	4.01			(1/1968)---
	E1	-52.60	169.20	-57.38	253.26	-75.8	4.03			(10/1957)-(10/1958)
CANARY ISLANDS	A1	28.00	344.70	24.35	59.53	12.9	0.95			(2/1973) -
	A4	28.00	344.70	24.35	59.53	12.9	0.95			(1/1971) -
	A6	28.00	344.70	34.35	59.53	12.9	0.95			5/1967 -
	B2	28.00	344.70	34.35	59.53	12.9	0.95			
	B8	28.00	344.70	34.35	59.53	12.9	0.95			NK
	C1	28.00	344.70	34.35	59.53	12.9	0.95			4/1967 -
	C3	28.00	344.70	34.35	59.53	12.9	0.95			4/1967 -
	G	28.30	344.70	34.35	59.53	12.9	0.95			(1/1970) -
CANBERRA	B1	-35.30	149.00	-43.99	224.29	-65.9	1.99			3/1937 ---
	C6	-35.20	149.10	-43.87	224.38	-65.8	1.98			3/1964 ---
CAPE CHELYUSKIN	D1	77.72	104.28	66.26	176.46	86.5	9.56			1/1935 ---
	D2	77.72	104.28	66.26	176.46	86.5	9.56			
	E1	77.80	104.30	66.34	176.48	86.5	9.63			(12/1957)---(3/1964)
CAPE HALLETT	B1	-72.30	170.20	-74.70	278.15	-84.1	21.23			1/1957 - 2/1964
	B8	-72.30	170.30	-74.68	278.23	-84.1	21.15			(3/1960)- 11/1963
	C8	-72.30	170.30	-74.68	278.23	-84.1	21.15			(3/1960)-(11/1960)
	C9	-72.30	170.20	-74.70	278.15	-84.1	21.23			7/1957 - 2/1964
	D1	-72.32	170.22	-74.71	278.21	-84.1	21.25			7/1957 - 12/1963
	E1	-72.30	170.20	-74.70	278.15	-84.1	21.23			(6/1957)---(10/1958)
	E3	-72.30	170.20	-74.70	278.15	-84.1	21.23			(6/1957)--- 12/1964
	F1	-72.32	170.20	-74.72	278.19	-84.1	21.27	0.04	SL	10/1962 - 12/1962
CAPE JONES	B8	54.70	280.20	65.91	344.62	81.0	6.63			7/1959 - 6/1965
	C8	54.70	280.20	65.91	344.62	81.0	6.63			7/1959 - 6/1965
CAPE KARIKARI	B5	-34.00	173.50	-38.63	250.28	-60.3	1.68			
CAPE KENNEDY	B1	28.40	279.40	39.63	346.72	61.4	1.77			3/1958 - 6/1966
	B5	28.40	279.40	39.63	346.72	61.4	1.77			
CAPE OF GOOD HOPE	A1	-33.00	18.00	-31.67	79.74	-65.6	2.43			NK
	C1	-33.00	18.00	-31.67	79.74	-65.6	2.43			NK
CAPE PARRY	B5	70.17	235.28	73.72	269.94	83.8	14.06			
CAPE RACE	C6	46.67	306.83	57.61	20.45	71.6	3.29			(2/1969)-
CAPE SCHMIDT	B1	68.90	179.50	62.61	226.73	76.8	5.12			1/1960 - 6/1962
	E1	69.00	180.50	62.85	227.36	76.9	5.19			(11/1957)---(4/1964)
	F1	68.87	180.50	62.73	227.48	76.8	5.15	0.60	SL	5/1967 - 5/1969
	F2	68.87	180.50	62.73	227.48	76.8	5.15	0.60	SL	11/1958---5/1969
CAPE SHALAUROV	E1	73.20	143.30	62.80	199.75	82.3	6.37			(2/1958)---(4/1959)
CAPE TOWN	A1	-33.93	18.40	-32.65	79.86	-65.7	1.01			NK
	A6	-33.93	18.40	-32.65	79.86	-65.7	1.01			3/1958 -(12/1965)
	B1	-34.10	18.30	-32.79	79.72	-65.8	1.83			1/1948 - 5/1971
	C1	-33.93	18.40	-32.65	79.86	-65.7	1.01			3/1958 -
	F3	-33.93	18.40	-32.65	79.86	-65.7	1.01	4.96	103M	10/1957 - 11/1958
CAPE WELLEN	A6	66.20	190.10	61.81	237.01	75.0	4.58			NK
	D1	66.17	190.17	61.79	237.10	74.9	4.57			1/1933 -
	D2	66.17	190.17	61.79	237.10	74.9	4.57			
	E1	66.20	190.10	61.81	237.01	75.0	4.58			(2/1958)---(4/1959)
CAPE ZEVGARI	B1	34.60	32.90	31.49	109.23	50.5	1.27			1/1964 -
CAPE ZHELANIA	E1	77.00	66.60	67.17	156.98	83.5	9.53			(11/1957)---(3/1958)
CAPRI F	A2	40.55	14.22	40.92	93.16	57.3	1.51			NK
	A4	40.55	14.22	40.92	93.16	57.3	1.51			NK
	A6	40.55	14.22	40.92	93.16	57.3	1.51			(7/1957)--- 5/1965
	C1	40.55	14.22	40.92	93.16	57.3	1.51			(7/1957)---
	D1	40.55	14.22	40.92	93.16	57.3	1.51			(7/1957)-
CAPRI S	A6	40.55	14.22	40.92	93.16	57.3	1.51			(7/1957)-
	C1	40.55	14.22	40.92	93.16	57.3	1.51			(7/1957)-
CARNARVON	A1	-25.00	114.00	-36.48	183.38	-59.5	1.47			NK
	A6	-25.00	114.00	-36.48	183.38	-59.5	1.47			4/1967 -
	B5	-25.00	114.00	-36.48	183.38	-59.5	1.47			
	B8	-25.00	114.00	-36.48	183.38	-59.5	1.47			(8/1966)-
	C1	-25.00	114.00	-36.48	183.38	-59.5	1.47			6/1966 -
	C3	-25.00	114.00	-36.48	183.38	-59.5	1.47			6/1966 -
CARROLLTON	D1	39.37	266.53	45.71	89.45	69.8	2.49			7/1957 - 1/1959
CARTUJA	A2	37.18	356.40	41.17	74.23	53.0	1.42			(7/1957)-(12/1957)
CASABLANCA	B1	33.60	352.40	38.45	69.02	48.3	1.31			9/1951 - 2/1958
CASEY	B1	-66.17	110.32	-77.67	178.71	-81.7	37.88			2/1969 -
	B8	-66.17	110.32	-77.67	178.71	-81.7	37.88			3/1969 -
	C9	-66.17	110.32	-77.67	178.71	-81.7	37.88			NK
	D2	-66.17	110.32	-77.67	178.71	-81.7	37.88			(1/1968)---
	E1	-66.20	110.35	-77.70	178.77	-81.7	37.88			4/1969 ---
	F1	-66.20	110.35	-77.70	178.77	-81.7	37.08		SL	4/1969 -
CASPER	D1	42.85	253.70	51.51	314.45	70.6	2.62			7/1957 - 1/1959
CASSINO	B5	-32.20	307.83	-21.14	15.23	-31.3	1.19			
CASTELLACCIO	D1	44.43	08.93	45.71	89.45	61.4	1.75			1/1933 -
CASTLE ROCK	D1	37.23	237.87	43.48	298.62	62.2	1.84			1/1963 -
CATANIA	A1	37.50	15.08	37.80	92.99	53.5	1.38			(1/1957) -
	A2	37.50	15.08	37.80	92.99	53.5	1.38			(1/1957) -
	A5	37.50	15.08	37.80	92.99	53.5	1.38			1/1967 -
	A6	37.50	15.08	37.80	92.99	53.5	1.38			(7/1957)---
	C1	37.50	15.08	37.80	92.99	53.5	1.38			1/1962 -
CEBU	D1	10.30	123.90	-00.92	192.69	5.1	0.93			7/1961 -(1/1963)
	D2	10.30	123.90	-00.92	192.69	5.1	0.93			
CEDAR RAPIDS	B12	41.87	269.68	52.43	334.02	72.4	2.87			1/1951 - 6/1958

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
CHACALTAYA	F1	-16.31	291.80	-04.81	00.77	-4.8	1.06	13.10	5220M	7/1963 --- 8/1969
	F1	-16.31	291.80	-04.81	00.77	-4.8	1.06	13.10	5220M	10/1966 -
	F3	-16.31	291.80	-04.81	00.77	-4.8	1.06	13.10	5220M	5/1957 ---
CHA-PA	D1	22.35	103.83	10.93	173.25	29.8	0.98			7/1957 -
CHAMBON-LA-FORET	D1	48.02	02.27	50.47	84.39	64.8	2.11			1/1880 -
	D2	48.02	02.16							(7/1957)-(12/1959)
CHAMICAL	B5	-30.33	293.69	-18.84	02.45	-26.9	1.14			
CHARCOT	D1	-69.38	139.02	-78.27	234.49	-87.6	77.13			7/1957 - 12/1958
CHATANIKA	B3	65.10	212.40	64.88	256.47	76.8	5.51			
CHELTENHAM	D1	38.70	283.20	50.07	350.50	70.6	2.62			1/1937 - 12/1956
CHETIREKHSTOLB	E1	70.70	162.40	62.10	213.50	78.7	5.41			(3/1958)---(12/1959)
CHICAGO	F1	41.83	272.30	52.58	336.85	72.6	2.91	1.72	SL	3/1951 - 7/1971
CHICLAYO	B1	-06.80	280.20	04.50	349.24	9.5	1.04			7/1957 - 5/1959
	D1	-06.80	280.20	04.50	349.24	9.5	1.04			8/1957 - 2/1960
CHILBOTON	B13	51.14	358.17	54.25	81.80	67.4	2.41			NK
	D1	51.14	358.17	54.25	81.80	67.4	2.41			NK
CHIMBOTE	B1	-09.10	281.40	02.24	350.51	5.6	1.04			7/1957 - 5/1959
	D1	-09.10	281.40	02.24	350.51	5.6	1.04			10/1957 - 1/1959
CHINA LAKE	B6	35.50	242.20	42.53	303.78	61.5	1.78			(8/1967)
	C6	35.50	242.20	42.53	303.78	61.5	1.78			(8/1958)---(2/1962)
CHITA	B1	52.00	113.50	40.51	182.02	70.9	2.00			1/1946 ---
CHOTEAU	E1	47.80	247.80	55.44	305.84	73.3	3.16			(7/1957)---
CHRISTCHURCH	B1	-43.60	172.80	-48.07	252.78	-68.7	2.42			12/1953 -
	C6	-43.60	172.80	-48.07	252.78	-68.7	2.42			(2/1962)- 5/1968
	D2	-44.39	170.97							1/1902 - 12/1930
	F2	-43.55	172.60	-48.06	252.55	-68.7	2.42	2.71	8M	1/1947 ---
	F3	-43.55	172.60	-48.06	252.55	-68.7	2.42	2.71	8M	10/1957 - 3/1959
CHURCHILL	B1	58.80	265.80	68.69	322.63	83.4	8.59			8/1943 -
	B5	58.80	265.80	68.69	322.63	83.4	8.60			
	B7	58.80	265.90	68.70	322.77	83.4	8.60			(7/1957)-(6/1960)
	B8	58.02	266.00	67.96	323.39	83.0	8.03			5/1957 -
	C8	58.02	266.00	67.96	323.39	83.0	8.03			6/1957 -
	C9	58.80	265.80	68.69	322.63	83.4	8.59			8/1943 -
	D1	58.80	265.90	68.70	322.77	83.4	8.60			7/1957 -
	E1	58.80	265.90	68.70	322.77	83.4	8.60			(7/1957)-(12/1959)
	E4	58.80	265.90	68.70	322.77	83.4	8.60			(1/1968)-
	F1	58.75	265.90	68.66	322.80	83.4	8.56	0.21	39M	5/1957 - 12/1964
	F1	58.75	265.90	68.66	322.80	83.4	8.56	0.21	39M	4/1964 -
	F3	58.75	265.90	68.66	322.80	83.4	8.56	0.21	39M	5/1957 - 12/1964
	F4	58.75	265.90	68.66	322.80	83.4	8.56	0.21	39M	NK
CLARK LAKE	B6	33.20	243.60	40.50	305.60	59.4	1.67			(1/1971)
	C4	33.20	243.60	40.50	305.60	59.4	1.67			
CLIMAX	A6	39.37	253.82	48.10	315.58	67.5	2.25			1/1942 ---
	A7	39.37	253.82	48.10	315.58	67.5	2.25			1/1941 --- 5/1971
	A7	39.37	253.82	48.10	315.58	67.5	2.25			1/1958 - 7/1963
	C1	39.37	253.82	48.10	315.58	67.5	2.25			7/1957 - 1967
	F1	39.37	253.80	48.10	315.58	67.5	2.25	3.03	3400M	9/1951 -
CLONCURRY	B14	-20.70	140.50	-30.58	212.35	-50.6	1.28			11/1957 - 6/1960
CLYDE	B1	70.50	291.40	82.00	00.96	84.4	38.32			10/1957 - 10/1958
	C9	70.50	291.40	82.00	00.96	84.4	38.32			10/1957 - 10/1958
COCOS IS	B1	-12.20	96.80	-23.33	164.86	-45.2	1.10			12/1961 -
COIMBRA	D1	40.22	351.58	45.03	70.25	57.0	1.60			7/1866 -
COLD BAY	B6	55.20	197.25	52.87	250.62	67.3	2.63			12/1968 -
COLD LAKE	B8	54.50	249.70	62.22	304.68	78.4	4.84			12/1963 - 5/1964
COLLEGE	B1	64.90	212.20	64.66	256.51	76.6	5.42			7/1941 ---
	B2	64.87	212.20	64.60	256.39	76.6	5.39			9/1962 - 10/1966
	B5	64.86	212.15	64.62	256.51	76.6	5.40			NK
	B8	64.86	212.15	64.62	256.51	76.6	5.40			2/1956 -
	B10	64.86	212.15	64.62	256.51	76.6	5.40			(11/1968)-
	B11	64.86	212.15	64.62	256.51	76.6	5.40			NK
	B12	64.85	212.17	64.61	256.54	76.6	5.40			(11/1957)-(3/1958)
	B12	64.85	212.17	64.61	256.54	76.6	5.40			1/1964-12/1967
	B13	64.85	212.17	64.61	256.54	76.6	5.40			1/1956 -(6/1960)
	C8	64.86	212.15	64.62	256.51	76.6	5.40			2/1956 -
	C9	64.90	212.20	64.66	256.51	76.6	5.42			7/1941 -
	C10	64.90	212.20	64.66	256.51	76.6	5.42			NK
	D1	64.87	212.17	64.63	256.52	76.6	5.40			7/1941 -
	D2	64.87	212.17	64.63	256.52	76.6	5.40			7/1957 -
	E1	64.86	212.15	64.62	256.51	76.6	5.40			(9/1957) ---
	E3	64.86	212.15	64.62	256.51	76.6	5.40			NK
	E4	64.86	212.15	64.62	256.51	76.6	5.40			(9/1957)---
	F1	64.85	212.10	64.60	256.48	76.6	5.39	0.54	91M	7/1957 --- 3/1968
	F4	64.85	212.10	64.60	256.48	76.6	5.39	0.54	91M	
COLLEGE STATION	B6	30.60	264.42	40.71	329.46	61.0	1.75			(10/1964) -
	F3	30.63	263.65	40.67	328.59	60.9	1.74	4.95	76M	3/1968 -
COLLM	B9	51.32	13.00	51.47	96.49	67.6	2.28			2/1962 -
	B10	51.31	13.00	51.46	96.48	67.6	2.28			2/1962 -
COLOGNE	B10	50.93	06.92	52.31	90.42	67.2	2.30			7/1957 - 6/1958
COLOMBO	B7	06.90	79.87	-02.96	149.07	-5.9	0.92			(7/1957)--- 12/1970
	F3	06.90	79.80	-02.96	149.01	-5.9	0.92	17.46	SL	7/1957 - 12/1958
COLUMBUS	C6	39.63	272.97	50.45	338.02	70.9	2.63			
CONCEPCION	B1	-36.60	287.00	-25.12	356.15	-35.5	1.21			10/1957 -
COOK	B14	-30.60	130.40	-41.35	202.39	-63.4	1.74			7/1958 - NK
COONAWARRA	B14	-12.40	130.90	-23.17	201.20	-39.3	1.09			3/1956 ---
COPENHAGEN	B6	55.85	12.45	55.85	98.52	70.7	2.79			NK
	B11	55.85	12.45	55.85	98.52	70.7	2.79			NK
	D1	55.85	12.45	55.85	98.52	70.7	2.79			1/1907 -
	D2	55.85	12.45	55.85	98.52	70.7	2.79			(1/1964)-(12/1965)
CORAL HARBOUR	B8	64.20	276.60	75.08	335.14	85.4	16.78			7/1959 - 8/1964
	C8	64.20	276.60	75.08	335.14	85.4	16.78			7-1959 - 8/1964
CORDOBA	A14	-31.50	295.50	-20.03	4.08	-28.3	1.15			
	F1	-31.40	295.80	-19.94	04.36	-28.2	1.15	11.45	434M	7/1964 -
CORNELL	C6	42.00	283.00	53.36	350.02	73.0	3.04			NK

MASTER STATION LIST

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
CORONA	B6	33.52	243.00	40.72	305.17	59.6	1.68			4/1968 - 12/1968
CUBA	B1	23.00	278.00	34.17	345.51	55.4	1.52			8/1964 -
	D1	22.97	277.85	34.14	345.34	55.3	1.52			8/1964 -
CULGOORA	A6	-30.32	149.57	-38.99	223.83	-60.9	1.66			
	C1	-30.32	149.57	-38.99	223.83	-60.9	1.66			1/1965 -
	C4	-30.32	149.57	-38.99	223.83	-60.9	1.66			11/1964 ---
CUZCO	D1	-13.53	288.03	-02.04	357.11	-0.5	1.05			10/1965 - 5/1966
DABROWA GORNIC	A2	50.33	19.22	49.31	101.86	67.0	2.16			(11/1957)-(12/1959)
DACCA	F1	23.70	90.30	12.89	160.61	32.4	0.99	16.22	SL	1/1964 -
	F3	23.70	90.30	12.89	160.61	32.4	0.99	16.22	SL	6/1966 -
DAKAR	B1	14.70	342.60	21.62	54.63	16.9	0.99			5/1949 -
	F4	14.70	342.60	21.62	54.63	16.9	0.99			NK
DALLAS	D1	32.98	263.25	42.96	327.75	63.2	1.88			1/1964
	D2	32.98	263.25	42.96	327.75	63.2	1.88			
	F1	32.78	263.20	42.75	327.72	62.6	1.86	4.35	208M	2/1964 -
DANMARKSHAVN	C8	76.77	341.37	79.43	106.15	81.1	20.92			7/1972
DANVILLE	B11	40.00	272.00	50.74	336.79	71.1	2.66			10/1963 -
DAR ES SALAAM	B6	-06.51	39.18	-09.96	106.59	-36.0	1.06			(7/1966)-
	D1	-06.51	39.18	-09.96	106.59	-36.0	1.06			(1/1972) -
DARJEELING	F3	27.03	88.30	16.35	159.01	39.0	1.04	15.35	2176M	7/1957 - 11/1959
DARMSTADT	C6	49.51	08.41	50.67	91.17	66.1	2.17			(7/1968)-
DAVAO	D1	07.08	125.58	-04.05	194.50	-1.8	0.93			4/1965 -
DAVIS	B8	-68.60	78.00	-76.75	119.89	-72.6	13.87			10/1969 -
	D2	-68.60	78.00	-76.75	119.89	-72.6	13.87			3/1970 -
	E1	-68.60	78.00	-76.75	119.89	-72.6	13.87			(7/1957)---
DE BILT	B1	52.10	05.20	53.76	89.36	68.1	2.43			11/1949 -
	B7	52.10	05.18	53.77	89.34	68.1	2.43			(7/1957)-
	B9	52.10	05.20	53.76	89.36	68.1	2.43			7/1968 -
	B10	52.10	05.20	53.76	89.36	68.1	2.43			1/1967 -
DEBRE ZEIT	C6	08.75	38.96	05.07	109.28	-1.1	0.96			(2/1968)-
	G	08.75	38.97	05.07	109.28	-1.1	0.96			(12/1966)-
DEBRECEN	A1	47.56	21.62	46.20	102.88	64.7	1.94			NK
	A4	47.56	21.62	46.20	102.88	64.7	1.94			NK
	A7	47.56	21.62	46.20	102.88	64.7	1.94			NK
	C1	47.56	21.62	46.20	102.88	64.7	1.94			NK
DECEPCION	B1	-63.00	299.30	-51.59	06.05	-56.1	2.17			1/1951 - 11/1967
DEEP RIVER	F1	46.10	282.50	57.44	349.02	75.8	3.76	1.02	145M	7/1957 - 12/1963
	F1	46.10	282.50	57.44	349.02	75.8	3.76	1.02	145M	4/1962 -
	F2	46.10	282.50	57.44	349.02	75.8	3.76	1.02	145M	7/1957 --- 12/1958
	F3	46.10	282.50	57.44	349.02	75.8	3.76	1.02	145M	7/1957 -
DELAWARE	E1	40.30	276.90	51.38	342.68	71.7	2.76			(7/1957)-(5/1961)
DELHI	A2	28.60	77.10	18.89	148.83	42.3	1.08			(4/1965)-
	A8	28.60	77.10	18.89	148.83	42.3	1.08			NK --- 12/1968
	B1	28.60	77.10	18.89	148.83	42.3	1.08			9/1945 -
	B6	28.60	77.10	18.89	148.83	42.3	1.08			10/1964 -
	B7	28.63	77.22	18.91	148.94	42.3	1.08			(7/1957)---
	B8	28.63	77.22	18.91	148.94	42.3	1.08			(7/1957)-
	B14	28.80	77.30	19.07	149.04	42.6	1.08			6/1958 -
	C6	28.60	77.10	18.89	148.83	42.3	1.08			(1/1964)---
DENVER	F1	39.75	255.00	48.64	316.85	68.1	2.31	2.91	1600M	1/1963 - 1/1971
	F1	39.75	255.00	48.64	316.85	68.1	2.31	2.91	1600M	1/1965 --
	F3	39.75	255.00	48.64	316.85	68.1	2.31	2.91	1600M	5/1965
DERWOOD	C6	39.12	282.85	50.48	350.05	70.9	2.67			3/1958 --- 5/1959
DIXON	B1	73.50	80.40	62.98	161.40	83.6	6.95			7/1957 ---
	B7	73.50	80.40	62.98	161.44	83.6	6.95			7/1957 ---
	B8	73.50	80.40	62.98	161.44	83.6	6.95			7/1964 -
	D1	73.55	80.57	63.02	161.57	83.6	6.98			1/1933 -
	D2	73.55	80.57	63.02	161.57	83.6	6.98			
	E1	73.50	80.40	62.98	161.44	83.6	6.95			(11/1957)---(3/1959)
DJIBOUTI	B1	11.50	42.80	07.05	113.54	6.1	0.95			10/1951-
DODAIRA	G	36.00	139.20	25.71	205.11	49.2	1.24			(4/1964)-
DOMBAS	D1	62.07	09.12	62.25	100.10	74.1	3.98			1/1916 -
DOURBES	A1	50.80	04.35	52.70	87.83	67.1	2.31			(7/1957)-
	A2	50.80	04.35	52.70	87.83	67.1	2.31			(7/1957)-
	A6	50.80	04.35	52.70	87.83	67.1	2.31			(7/1957)-
	A8	50.18	05.25	51.93	88.40	66.6	2.25			(7/1957)-
	B1	50.10	04.60	51.99	87.72	66.6	2.25			6/1957 -
	C1	50.80	04.35	52.70	87.83	67.1	2.31			(7/1957)-
	C3	50.18	05.25	51.93	88.40	66.6	2.25			(7/1957)-
	C6	50.80	04.35	52.70	87.83	67.1	2.31			(1/1964)---
	D1	50.10	04.60	51.99	87.72	66.6	2.25			1/1928 -
	D2	50.10	04.60	51.99	87.72	66.6	2.25			(9/1957)---(11/1965)
	F1	50.10	04.60	51.99	87.72	66.6	2.25	3.24	225M	1/1969 - 2/1970
	F1	50.10	04.60	51.99	87.72	66.6	2.25	3.24	225M	1/1969 -
	F3	50.10	04.60	51.99	87.72	66.6	2.25	3.24	225M	1/1969 -
DUBLIN	A6	53.00	354.00	56.83	78.56	68.9	2.68			NK
DUNEDIN	B13	-45.90	170.60	-50.71	251.41	-70.9	2.74			2/1958 ---
DUNSINK	A6	53.38	353.67	57.26	78.44	69.2	2.74			NK
	C1	53.38	353.67	57.26	78.44	69.2	2.74			(7/1957)--- 9/1964
	C6	53.38	353.67	57.26	78.44	69.2	2.74			(7/1957)- 7/1965
DURBAN	B8	-29.92	30.93	-31.20	93.22	-64.5	1.00			(6/1970)-
	B12	-29.92	30.93	-31.20	93.22	-64.5	1.00			(9/1957)-(12/1958)
	B13	-29.92	30.93	-31.20	93.22	-64.5	1.00			(9/1957)-
	C6	-29.92	30.93	-31.20	93.22	-64.5	1.00			(2/1965)---
	D2	-29.92	30.93	-31.20	93.22	-64.5	1.00			(1/1969)-
DURHAM	F1	43.10	289.10	54.59	357.61	73.2	3.19	1.41	SL	7/1964 -
DUSHANBE	B1	38.57	68.78	29.70	142.78	57.3	1.36			(1/1971)-
DWINGELOO	A8	53.00	6.00	54.45	90.65	68.8	2.52			10/1972
	C3	53.00	6.00	54.45	90.65	68.8	2.52			10/1972
	C4	53.00	6.00	54.45	90.65	68.8	2.52			10/1972
EAGLE	E1	64.00	219.00	65.20	263.64	77.3	5.65			NK
EARLYBURN	D2	55.73	356.77	58.86	83.15	70.7	3.02			NK

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
EAST ANGLIA	D2	52.63	01.30	55.04	85.79	68.5	2.53			NK
EAST GRAND FORK	B2	48.92	262.98	58.68	323.56	76.9	3.99			2/1963 - 7/1966
EAST QUODDY, CAN	B5	44.90	296.60	56.33	7.16	73.0	3.34			
EASTER ISLAND	D1	-27.17	250.58	-18.21	322.61	-37.3	1.14			3/1958 -
EASTERN TEST RAN	B5	28.45	279.47	39.69	346.80	61.4	1.78			NK
EDINBURGH	A6	55.92	356.82	59.02	83.33	70.8	3.05			(7/1957)---(8/1958)
	B8	55.95	356.81	59.03	83.32	70.8	3.05			7/1957 - 12/1965
	C1	55.92	356.82	59.02	83.33	70.8	3.05			(7/1957)- 9/1958
	C6	55.92	356.82	59.02	83.33	70.8	3.05			(7/1957)--- 8/1958
	D2	55.92	356.82	59.02	83.33	70.8	3.05			
	E2	55.92	356.82	59.02	83.33	70.8	3.05			NK
EDMONTON CANADA	B6	47.00	247.00	54.54	305.26	72.5	3.00			(1/1971)
EGILSSTADIR	E1	65.10	245.50	71.38	289.84	83.4	10.72			(1/1966)-
EGLIN AFB	B1	30.38	273.30	41.26	339.58	62.5	1.83			3/1964 - 1/1969
	B5	30.38	273.30	41.26	339.58	62.5	1.83			
	D1	64.66	213.00	64.61	257.48	76.6	0.82			9/1966 -
EIGHTS	B1	-75.23	282.84	-63.80	355.30	-66.4	3.88			12/1961 --- 9/1965
	B8	-75.23	282.84	-63.80	355.30	-66.4	3.88			5/1963 - 10/1965
	D1	-75.23	282.83	-63.80	355.29	-66.4	3.88			6/1963 - 10/1965
	D2	-75.23	282.83	-63.80	355.29	-66.4	3.88			
	D3	-75.23	282.83	-63.80	355.29	-66.4	3.88			
	E1	-75.23	282.83	-63.80	355.29	-66.4	3.88			(3/1963)---(9/1965)
EL ARENOSILLO	A9	29.00	264.00	39.08	329.23	59.2	1.66			NK
	B5	37.10	353.27	41.69	70.98	53.00	1.44			
EL INFIERNILLO	F1	-33.17	289.72	-21.67	358.85	-31.0	1.17	11.45	4343M	1/1968 -
	F3	-33.17	289.72	-21.67	358.85	-31.0	1.17	11.45	4343M	6/1964 --- 5/1967
ELIZABETHVILLE	B1	-11.60	27.50	-12.66	94.03	-47.1	1.16			4/1952 -(6-1960)
	D1	-11.63	27.42	-12.67	93.95	-47.1	1.17			10/1932 -
ELLSWORTH	B1	-77.72	318.90	-66.91	14.73	65.8	4.48			7/1957 - 11/1962
	B13	-77.72	318.83	-66.93	14.68	-65.8	4.48			4/1957 -(12/1962)
	C9	-77.70	318.90	-66.91	14.73	-65.8	4.48			7/1957 -
	E1	-77.80	318.80	-67.00	14.61	-65.8	4.50			(3/1957)---(12/1962)
	E2	-77.80	318.80	-67.00	14.61	-65.8	4.50			1/1960 --- 9/1962
	E3	-77.80	318.80	-67.00	14.61	-65.8	4.50			(7/1957)---(12/1967)
ELTANIN SHIP	B14	-60.00								4/1962 - 4/1965
EMBUDO	F3	35.20	253.32	43.93	316.09	63.4	1.90	4.36	2622M	12/1964 ---
EMMABODA	B1	56.00	15.00	55.49	100.99	70.9	0.86			NK
ENKOPING	B14	59.50	17.30	58.31	105.42	72.9	3.30			4/1958 -NK
	C6	59.50	17.30	58.31	105.42	72.9	3.30			1/1960 -
	D2	59.58	17.13	58.41	105.32	72.9	3.31			NK
	E2	59.58	17.13	58.41	105.32	72.9	3.31			NK
ENNADAI LAKE	E1	61.30	258.80	70.14	311.11	84.0	9.78			(7/1957)---(9/1958)
ESKDALEMUIR	D1	55.32	356.80	58.47	82.90	70.4	2.95			1/1908 -
	D2	55.32	356.80	58.47	82.90	70.4	2.95			(1/1964)---
ESPANOLA	D1	35.82	253.93	44.63	316.62	64.2	1.95			7/1957 - 1/1959
ESRANGE	E1	67.88	21.05	65.19	116.17	76.9	5.45			NK
ESTACION LOS CER	F3	-33.30	289.30	-21.80	358.47	-31.3	1.17		512M	1/1967 -
ESTACION MACUL	F3	-33.27	289.40	-21.77	358.56	-31.2	1.17		570M	2/1958 - 2/1967
EUREKA	B1	80.00	274.10	86.53	236.41	87.6	3346.			7/1957 - 1/1959
	C9	80.00	274.10	86.53	236.41	87.6	3346.			7/1957 - 1/1959
FANNING	B14	03.92	200.62	03.77	268.85	10.0	0.98			(7/1957)-(11/1957)
	D1	03.90	200.62	03.75	268.85	9.9	0.98			8/1957 - 12/1958
FAREWELL	B8	62.50	206.13	61.33	253.48	74.0	4.24			11/1957 - 12/1958
	E1	62.50	206.10	61.33	253.46	74.0	4.24			(8/1957)---(12/1958)
	E4	62.50	206.10	61.33	253.46	74.0	4.24			(9/1957)---(12/1959)
FARGO	E1	46.90	263.20	56.72	324.50	75.5	3.55			(8/1957)-(6/1966)
FLETCHERS ICE	B1	75.90	235.70	77.97	253.99	86.6	29.60			6/1957 - 1/1959
	C9	75.90	235.70	77.97	253.99	86.6	29.60			6/1957 - 1/1959
	E1	80.00	235.70	DRIFT						(11/1957)---(6/1959)
FLIN FLON	E1	54.70	258.00	63.69	314.77	80.1	5.54			(7/1957)-(12/1958)
FLORENCE	B6	43.81	11.20	44.66	91.42	60.8	1.70			(10/1964) -
	B8	43.81	11.20	44.66	91.42	60.8	1.70			4/1963 -
FORESTPORT	C6	43.00	186.00	39.09	245.53	56.4	0.90			NK
FORT ARCHAMBAULT	B1	09.20	18.35	09.54	89.25	-3.3	0.97			1/1969 -
	D2	09.20	18.35	09.54	89.25	-3.3	0.97			
FORT CHIMO	B1	58.10	291.60	69.60	00.91	80.7	8.27			12/1948 --- 12/1958
	C9	58.10	291.60	69.60	00.91	80.7	8.27			12/1948 --- 12/1958
FORT COLLINS	B6	41.00	255.00	49.87	316.50	69.2	2.44			NK
FORT DAVIS	C4	30.63	256.48	39.84	320.58	59.3	1.66			8/1956 -
FORT MONMOUTH	B1	40.40	285.90	51.84	353.71	71.7	2.83			3/1955 - 12/1965
	B9	40.40	285.90	51.84	353.71	71.7	2.83			10/1958 -
	B12	40.25	285.98	51.70	353.81	71.6	2.81			1/1958 - (1965)
	C6	40.40	285.90	51.84	353.71	71.7	2.83			9/1958 -(9/1967)
FORT MYERS	B2	26.53	278.13	37.70	345.41	59.3	1.67			9/1962 -
FORT NORMAN	B1	64.90	234.50	69.08	277.87	81.0	8.17			7/1957 - 3/1958
	C9	64.90	234.50	69.08	277.87	81.0	8.17			7/1957 - 3/1958
FORT SHERMAN (CA	B5	09.33	280.02	20.61	348.42	37.8	0.93			
FORT SMITH	E1	58.00	246.00	64.92	297.87	79.7	2.44			NK
FORT WAINWRIGHT	B5	64.82	212.37	64.63	256.75	76.6	5.40			
FORT YUKON	B8	66.57	214.75	66.63	256.84	78.2	6.41			2/1958 -
	C8	66.57	214.75	66.63	256.84	78.2	6.41			2/1958 -
	D1	66.57	214.70	66.62	256.79	78.1	6.41			7/1957 -
	D2	66.57	214.75	66.63	256.84	78.2	6.41			
	E1	66.57	214.75	66.63	256.84	78.2	6.41			(2/1958)---
FREDERICKSBURG	D1	38.20	282.63	49.55	349.84	70.2	2.56			1/1956 -
	D2	38.20	282.63	49.55	349.84	70.2	2.56			(7/1957)-
	F2	38.30	282.50	49.65	349.68	70.3	2.57	2.18	69M	10/1956 -
FREETOWN	D1	08.46	346.79	14.78	57.77	1.3	1.01			7/1961 - 2/1967
	D2	08.46	346.79	14.78	57.77	1.3	1.01			
FREIBURG/BREISAC	A2	48.00	07.80	49.35	89.86	64.8	2.07			NK
	A6	48.00	07.80	49.35	89.86	64.8	2.07			(1/1956)-
	B1	48.10	07.60	49.48	89.71	64.9	2.08			6/1957 -
	B6	48.10	07.60	49.48	89.71	64.9	2.08			(1/1965) -
	B7	48.10	07.60	49.48	89.71	64.9	2.08			1/1956 -
	B10	48.05	07.59	49.44	89.68	64.9	2.08			7/1957 - 12/1961
	B11	48.10	07.60	49.48	89.71	64.9	2.08			NK
	B13	48.10	07.50	49.50	89.61	64.9	2.08			1/1965 -
	C6	48.10	07.60	49.48	89.71	64.9	2.08			NK
	F1	48.00	07.80	49.35	89.86	64.8	2.07	4.10	1200M	4/1957 - 4/1966
	F2	48.00	07.80	49.35	89.86	64.8	2.07	4.10	1200M	1/1957 -

MASTER STATION LIST

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
FRITZ PEAK	E1	39.90	254.52	48.73	316.26	68.2	2.31			(6/1957)---
	E3	39.90	254.52	48.73	316.26	68.2	2.31			(7/1957)-(12/1958)
	G	39.90	254.52	48.73	316.26	68.2	2.31			8/1955 ---
FROBISHER BAY	B1	63.80	291.40	75.30	00.70	82.7	14.58			9/1957 --- 1/1959
	B8	63.80	291.30	75.30	00.52	82.7	14.60			4/1963 - 6/1965
	B13	63.75	291.43	75.25	00.75	82.7	14.49			8/1957 - 10/1959
	C8	63.80	291.30	75.30	00.52	82.7	14.60			4/1963 - 6/1965
	C10	63.80	291.40	75.30	00.70	82.7	14.49			(1/1964)-
FRONT ROYAL	B14	38.80	281.80	50.12	348.79	70.7	2.63			11/1957 - 8/1965
FT COLLINS	B6	41.00	255.00	43.79	284.21	62.0	1.85			(1/1971)
FT SMITH	E1	59.00	246.00	65.86	297.05	80.3	6.32			NK
FUKUSHIMA	F1	37.75	140.46	27.56	206.02	51.2	1.29	10.55	66.2M	11/1971 -
FUQUENE	D1	05.47	286.27	16.93	355.08	33.3	0.95			10/1954 -
FURSTENFELDBRUCK	D1	48.17	11.28	48.82	93.33	65.0	2.06			1/1841 -
	D2	48.17	11.28	48.82	93.33	65.0	2.06			
GAINESVILLE	B13	29.60	277.70	40.75	344.69	62.3	1.83			7/1957 - 1/1959
GARCHY	B1	47.30	03.10	49.62	84.89	64.2	2.03			10/1959 -
	B10	47.30	03.10	49.62	84.89	64.2	2.03			1/1966 -
	D2	47.30	03.10	49.62	84.89	64.2	2.03			
GDANSK	A2	54.35	18.65	53.23	103.39	69.9	0.86			(10/1957)-(12/1959)
GENOVA	B1	44.50	09.00	45.85	89.58	61.6	1.76			5/1956 -
	B7	44.55	08.95	45.82	89.51	61.6	1.76			1/1958 -
	B13	44.60	09.00	45.85	89.58	61.6	1.76			4/1966 -
	D1	44.55	08.95	45.82	89.51	61.6	1.76			
GESASHI	C6	24.28	153.98	15.66	220.20	31.9	1.05			
GIF SUR YVETTE	F1	48.68	2.12	51.13	84.55	65.4	2.15	3.61	40M	3/1966 -
GIFU	G	35.58	137.08	25.12	203.26	49.0	1.23			(7/1957)-
GILA BEND	B14	32.87	247.29	40.76	309.98	59.8	1.69			11/1967 -
GIZA	C3	30.03	31.22	27.37	106.37	43.4	1.16			(12/1957)-(3/1958)
GLEN ELLYN	C6	41.00	250.00							5/1972 -
GNANGARA	D1	-31.78	115.95	-43.23	185.78	-66.4	1.86			1/1919 -
GODHAVN	B1	69.30	306.50	79.92	32.67	81.6	20.62			11/1951 ---
	B8	69.30	306.17	79.96	32.04	81.7	20.81			11/1963 -
	B10	69.30	306.17	79.96	32.04	81.7	20.81			1/1966 - 12/1969
	B11	69.30	306.17	79.96	32.04	81.7	20.81			5/1970
	B13	69.30	306.50	79.92	32.67	81.6	20.62			(7/1957) - 5/1970
	C8	69.30	306.17	79.96	32.04	81.7	20.81			(11/1963)-
	C9	69.30	306.50	79.92	32.67	81.6	20.62			11/1951 ---
	D1	69.23	306.48	79.86	32.52	81.6	20.44			1/1926 -
	D2	69.23	306.48	79.86	32.52	81.6	20.44			(1/1964)-(12/1965)
	E1	69.30	306.17	79.96	32.04	81.7	20.81			(4/1957)---
	F2	69.33	306.50	79.95	32.73	81.6	20.70	0.03	9M	10/1938 - 9/1971
GODTHAB	C8	64.19	308.27	74.81	29.56	79.7	10.98			9/1970 -
GONZALES VIDELA	D1	-64.82	297.15	-53.37	04.38	-57.6	2.32			(2/1961)-(12/1961)
	E1	-64.80	297.10	-53.35	04.35	-57.6	2.32			(8/1957)---(6/1958)
GOONHILLY	D2	50.33	356.77	53.76	79.94	66.8	2.35			NK
GOOSE BAY	B1	53.33	299.50	64.65	11.90	76.9	5.27			NK
	B8	53.33	299.50	64.65	11.90	76.9	5.27			11/1971 -
	F1	53.33	299.50	64.65	11.90	76.9	5.27	0.52	46M	11/1964 -
	F3	53.33	299.50	64.65	11.90	76.9	5.27	0.52	46M	11/1964 -
GORKY	A8	56.10	44.30	50.30	126.69	72.0	2.60			(7/1957)---
	B1	56.15	44.28	50.36	126.70	72.0	2.61			3/1958 -
	B10	56.15	44.28	50.36	126.70	72.0	2.61			(7/1957)- 3/1960
	C3	56.10	44.30	50.30	126.69	72.0	2.60			(7/1957)---
GOTTINGEN	D1	51.53	09.97	52.27	93.70	67.7	2.33			(7/1957)-(12/1958)
	D2	51.53	09.97	52.27	93.70	67.7	2.33			
	F1	51.52	09.90	52.28	93.62	67.7	2.33	3.00	273M	7/1957 - 2/1959
GRAFTON	C3	42.78	282.55	54.12	349.29	73.6	3.16			7/1957 -(12/1961)
	C6	42.78	282.55	54.12	349.29	73.6	3.16			7/1957 -(12/1961)
GRAHAMSTOWN	B1	-33.30	26.50	-33.64	87.87	-65.6	1.83			3/1958 ---
	C3	-33.30	26.50	-33.64	87.80	-65.6	1.83			(5/1958)-(11/1958)
	C6	-33.30	26.53	-33.64	87.80	-65.6	1.83			6/1972 -
GRAND BAHAMA	B1	26.60	281.80	37.93	349.56	59.8	1.70			6/1957 - 6/1971
GRAZ	B1	47.10	15.50	46.96	96.91	64.2	1.94			8/1947 -
	B6	47.10	15.50	46.96	96.91	64.2	1.94			10/1964
GREAT WHALE	B8	55.28	282.17	66.59	347.29	81.0	6.93			3/1963 -
	B13	55.28	282.17	66.59	347.29	81.0	6.93			(6/1962)-(12/1962)
	C8	55.28	282.17	66.59	347.29	81.0	6.93			3/1963 -
	C10	55.28	282.17	66.59	347.29	81.0	6.93			NK
	D1	55.27	282.22	66.58	347.36	81.0	6.92			1/1965 ---
	D2	55.27	282.22	66.58	347.36	81.0	6.92			1/1965 ---
	E1	55.27	282.22	66.58	347.36	81.0	6.92			(7/1957)-
	E4	55.27	282.22	66.58	347.36	81.0	6.92			(1/1968)-
GREENBELT	C6	39.03	283.17	50.40	350.44	70.8	2.66			(4/1966)-
GROCKA	D1	44.63	20.77	43.55	100.92	62.0	1.73			1/1958 -
	D2	44.63	20.77	43.55	100.92	62.0	1.73			
GUAM	D1	13.58	144.87	03.97	212.89	12.3	0.96			7/1957 -
	D2	13.58	144.87	03.97	212.89	12.3	0.96			7/1957 -
GULMARG	F1	34.07	74.40	24.61	147.10	51.1	1.21	11.91	2743M	2/1968 -
	F3	34.07	74.40	24.61	147.10	51.1	1.21	11.91	2743M	1/1958 - 3/1958
GYULA	A1	46.65	21.25	45.40	102.16	63.9	1.88			NK
HACHIJO	D1	33.13	139.80	22.91	205.98	45.4	1.17			NK
HADDAM	C6	41.47	287.50	52.94	355.65	72.3	2.96			(12/1965)---
HAFELEKAR	F1	47.32	11.30	48.00	92.97	64.3	1.97	4.37	2290M	5/1968 -
	F2	47.32	11.30	48.00	92.97	64.3	1.97	4.37	2290M	1/1932 ---
	F3	47.32	11.30	48.00	92.97	64.3	1.97	4.37	2290M	12/1957 -
HAIFA	B1	32.82	34.98	29.38	110.63	48.1	1.23			1/1960 -
	B6	32.82	34.98	29.38	110.63	48.1	1.23			1/1964 -
	B8	32.82	34.98	29.38	110.63	48.1	1.23			1/1963 - 10/1966
	B11	32.82	34.98	29.38	110.63	48.1	1.23			8/1967
	F3	32.82	34.90	29.40	110.55	48.1	1.23	10.96	SL	(3/1958)-(2/1959)
HALEAKALA	A6	20.75	203.07	20.73	267.70	38.7	1.13			4/1964 -
	A7	20.75	203.07	20.73	267.70	38.7	1.13			2/1964 --- 11/1965
	C1	20.75	203.07	20.73	267.70	38.7	1.13			4/1964 -
	C3	20.75	203.07	20.73	267.70	38.7	1.13			6/1964 ---(6/1966)
	F1	20.71	203.07	20.81	268.32	38.7	1.13	13.30	3052M	6/1963 - 4/1967
	G	20.75	203.07	20.73	267.70	38.7	1.13			1/1961 - 12/1965

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
HALIFAX	B13	44.62	296.50	55.96	10.83	72.1	3.22			(7/1957)-(12/1958)
HALLE	F1	51.48	11.90	51.84	95.52	67.7	2.31	3.07	100M	8/1960 - 3/1971
	F2	51.48	11.90	51.84	95.52	67.7	2.31	3.07	100M	4/1956 -
HALLEY BAY	B1	-75.50	333.40	-65.76	24.28	-64.3	4.19			6/1957 -
	B7	-75.50	333.40	-65.76	24.28	-64.3	4.19			7/1957 ---
	B8	-75.50	333.40	-65.76	24.28	-64.3	4.19			(3/1972)
	B10	-75.52	333.30	-65.77	24.21	-64.3	4.19			7/1957 ---
	B13	-75.5	333.40	-65.76	24.28	-64.3	4.19			NK
	C8	-75.50	333.40	-65.76	24.28	-64.3	4.19			NK
	C9	-75.50	333.40	-65.76	24.28	-64.3	4.19			6/1957 -
	D1	-75.50	333.40	-65.76	24.28	-64.3	4.19			7/1957 -
	D2	-75.50	333.40	-65.76	24.28	-64.3	4.19			NK
	E1	-75.50	333.40	-65.76	24.28	-64.3	4.19			(7/1957)---
HAMMAGUIR	B5	30.85	356.93	34.91	72.92	43.7	1.21			
HANOVER	B1	43.70	287.80	55.18	355.95	73.8	3.30			11/1968 - 2/1971
	B13	43.70	287.70	55.18	355.82	73.8	3.30			(7/1957)-(10/1958)
	E1	43.70	287.80	55.18	355.95	73.8	3.30			(1/1958)-(5/1966)
HARESTUA	C3	60.00	10.00	60.19	99.16	73.1	0.86			NK
HARTEBEESTHOEK	D1	-25.88	27.71	-26.66	91.03	-62.8	1.55			12/1972 -
HARTLAND	D1	50.98	355.52	54.62	79.00	67.3	2.43			7/1841 -
	D2	50.98	355.52	54.62	79.00	67.3	2.43			NK
HAUTE PROVENCE	A6	43.93	05.72	45.86	86.07	60.9	1.73			(1/1962)---
	C1	43.93	05.72	45.86	86.07	60.9	1.73			(1/1962)---
	G	43.93	05.72	45.86	86.07	60.9	1.73			(7/1957)-
HEALY	D1	63.85	211.03	63.50	256.56	75.7	4.95			7/1957 - 12/1958
	E1	64.00	211.00	63.63	256.38	75.8	4.99			(3/1958)---(3/1959)
HEISS IS	B1	80.60	58.00	71.29	156.00	83.8	14.10			7/1957 -
	B8	80.70	56.20	71.53	155.37	83.8	14.37			1/1964
	C8	80.62	58.05	71.31	156.06	83.9	14.13			(1/1964)-(12/1965)
	C9	80.60	58.00	71.29	156.00	83.8	14.10			7/1957 -
	D1	80.62	58.05	71.31	156.06	83.9	14.13			7/1958 -
	D2	80.62	58.05	71.31	156.06	83.9	13.97			
	E1	80.70	58.00	71.38	156.16	83.9	14.26			(12/1957)---(3/1964)
	F1	80.33	57.80	71.07	155.50	83.7	13.71	0.10	20M	1/1958 ---
	F3	80.33	57.80	71.07	155.50	83.7	13.71	0.10	20M	3/1958 ---
HEL	D1	54.60	18.62	53.43	103.68	70.0	2.58			1/1934 ---
HELWAN	D1	29.87	31.33	27.20	106.44	43.2	1.15			1/1903 - 3/1960
HERMANUS	B1	-34.42	19.23	-33.30	80.52	-65.8	1.84			5/1971 -
	B8	-34.43	19.23	-33.30	80.52	-65.8	1.84			12/1963 -
	C8	-34.42	19.23	-33.29	80.52	-65.8	1.84			1/1963 -
	D1	-34.42	19.23	-33.29	80.52	-65.8	1.84			1/1933 -
	D2	-34.42	19.23	-33.29	80.52	-65.8	1.84			(7/1957)-
	F1	-34.42	19.20	-33.28	80.49	-65.8	1.84	4.90	26M	6/1957 - 5/1964
	F1	-34.42	19.33	-33.28	80.49	-65.8	1.84	4.90	26M	8/1964 -
	F3	-34.42	19.20	-33.28	80.49	-65.8	1.84	4.90	26M	6/1957 - 5/1962
HERSTMONCEUX	A2	50.90	00.33	53.60	83.86	67.2	2.35			(7/1957)-
	A6	50.90	00.33	53.60	83.86	67.2	2.35			(7/1957)---
	C1	50.90	00.33	53.60	83.86	67.2	2.35			(7/1957)-
	C6	50.90	00.33	53.60	83.86	67.2	2.35			(1/1964)-(9/1964)
	F1	50.88	00.30	53.58	83.82	67.2	2.35	2.92	23M	4/1957 - 6/1960
	F3	50.88	00.30	53.58	83.82	67.2	2.35	2.92	23M	4/1957 - 12/1959
HIRAISO	A8	36.37	140.63	26.20	206.34	49.5	1.25			(7/1957)-
	C3	36.37	140.63	26.20	206.34	49.5	1.25			(7/1957)-
	C6	36.37	140.63	26.20	206.34	49.5	1.25			(7/1957)-
HOBART	B1	-42.90	147.20	-51.71	224.29	-72.7	2.85			12/1945 ---
	B13	-42.50	147.20	-51.32	224.17	-72.4	2.79			7/1957 - 12/1958
	C6	-42.83	147.55	-51.59	224.67	-72.6	2.83			1/1961 ---
	D2	-42.87	147.33	-51.66	224.43	-72.7	2.84			
	E1	-43.00	147.40	-51.78	224.55	-72.8	2.86			(8/1957)---(12/1958)
	E4	-43.00	147.40	-51.78	224.55	-72.8	2.86			NK
	F1	-42.92	147.20	-51.73	224.29	-72.7	2.85	1.89	SL	3/1967 -
	F2	-42.92	147.20	-51.73	224.29	-72.7	2.85	1.89	SL	7/1955 - 11/1959
	F3	-42.92	147.20	-51.73	224.29	-72.7	2.85	1.89	SL	9/1953 -
HOKKAIDO	C6	42.75	143.71	32.82	208.18	56.4	1.45			(2/1969)-
HOLLANDIA	B1	-02.50	140.80	-12.45	210.56	-20.7	0.98			12/1957 - 2/1959
	C3	-02.50	140.50	-12.48	210.26	-20.7	0.98			1/1957 - 12/1962
	C6	-02.50	140.50	-12.48	210.26	-20.7	0.98			10/1957 - 3/1963
	D1	-02.57	140.52	-12.55	210.28	-20.8	0.98			7/1957 - 8/1962
HONG KONG	B1	22.33	114.20	10.85	183.01	30.0	0.99			3/1969 ---
	B6	22.33	114.20	10.85	183.01	30.0	0.99			(1/1963)---
	C6	22.33	114.20	10.85	183.01	30.0	0.99			(3/1960)---(5/1970)
	F2	22.33	114.20	10.85	183.01	30.0	0.99	16.23	30M	8/1970 -
HONOLULU	A6	21.30	201.93	21.03	266.43	39.2	1.14			NK
	B6	21.30	202.30	21.11	266.82	39.2	1.14			9/1964 -
	C1	21.30	201.90	21.03	266.43	39.2	1.14			7/1957 - 9/1963
	C3	21.30	201.90	21.03	266.43	39.2	1.14			7/1957 - 8/1959
	C6	21.30	201.93	21.03	266.43	39.2	1.14			11/1958 ---
	D1	21.32	202.00	21.07	266.53	39.2	1.14			1/1902 -
	F1	21.30	202.30	21.11	266.82	39.2	1.14	13.23	100M	7/1957 - 6/1963
	F3	21.30	202.30	21.11	266.82	39.2	1.14	13.23	91M	7/1957 - 12/1958
HOUGATON	B11	47.00	271.00	57.61	334.19	76.4	3.80			(10/1961)-
HOUSTON	A6	30.00	265.00	40.18	330.21	60.5	1.72			1/1967 -
	C1	30.00	265.00	40.18	330.21	60.5	1.72			3/1966 -
	C3	30.00	265.00	40.18	330.21	60.5	1.72			3/1966 - 6/1971
HOWRAH	F2	22.58	88.30	11.91	158.64	30.2	0.98	16.43	SL	7/1957 - 12/1958
HUANCAYO	A6	-12.05	284.67	-00.62	353.81	1.3	1.04			(7/1957)-
	A8	-12.05	284.67	-00.62	353.81	1.3	1.04			5/1969 -
	B1	-12.00	284.70	-00.57	353.84	1.4	1.04			11/1937 ---
	B8	-12.01	284.67	-00.58	353.81	1.3	1.04			6/1961 -
	B9	-12.01	284.67	-00.58	353.81	1.3	1.04			7/1957 -
	B12	-12.05	284.67	-00.62	353.81	1.3	1.04			8/1957 - 12/1958
	B12	-12.05	284.67	-00.62	353.81	1.3	1.04			12/1957 - 11/1958
	C1	-12.05	284.67	-00.62	353.81	1.3	1.04			(7/1957)-
	C3	-12.05	284.67	-00.62	353.81	1.3	1.04			5/1969 -
	C6	-12.05	284.67	-00.62	353.81	1.3	1.04			(7/1957)-
	D1	-12.05	284.67	-00.62	353.81	1.3	1.04			1/1922 -
	D2	-12.05	284.67	-00.62	353.81	1.3	1.04			
	F1	-12.05	284.60	-00.62	353.74	1.2	1.04	13.45	3400M	1/1952 -
	F2	-12.05	284.60	-00.62	353.74	1.2	1.04	13.45	3350M	6/1936 -
	G	-12.00	284.70	-00.57	353.84	1.4	1.04			5/1958 - 12/1959

MASTER STATION LIST

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
HURBANOVO	C1	47.87	18.18	47.17	99.78	64.9	1.99			(4/1969)-
	C6	47.87	18.18	47.17	99.78	64.9	1.99			6/1969 ---
	D1	47.87	18.18	47.17	99.78	64.9	1.99			7/1890 -
HYDERABAD	A6	17.43	78.45	07.65	148.81	19.7	0.95			NK
	B1	17.30	78.50	07.52	148.84	19.4	0.94			5/1963 -
	C1	17.43	78.45	07.65	148.81	19.7	0.95			(7/1957)---(5/1965)
	C3	17.43	78.45	07.65	148.81	19.7	0.95			(1/1958)---(1/1960)
	D1	17.42	78.55	07.63	148.90	19.6	0.95			1/1965 -
IBADAN	B1	07.40	03.90	10.62	74.66	-7.0	0.99			12/1951 -
	B7	07.43	03.90	10.65	74.66	-6.9	0.99			1/1957 - 12/1958
	B10	07.43	03.88	10.66	74.64	-6.9	0.99			(8/1957)-(12/1958)
	B14	07.43	03.90	10.65	74.66	-6.9	0.99			3/1958 - 5/1962
	D1	07.43	03.90	10.65	74.66	-6.9	0.99			1/1956 -
	D2	07.43	03.90	10.65	74.66	-6.9	0.99			
IKOMASAN	A1	34.68	135.68	24.12	202.10	48.1	1.21			(7/1957)-
	A2	34.68	135.68	24.12	202.10	48.1	1.21			(7/1957)-
	A5	34.68	135.68	24.12	202.10	48.1	1.21			NK
	A6	34.68	135.68	24.12	202.10	48.1	1.21			(1/1964)-
	C1	34.68	135.68	24.12	202.10	48.1	1.21			(7/1957)-
ILE DU LEVANT	B5	43.05	06.47	44.87	86.48	60.0	1.67			
ILO	B1	-17.40	288.80	-05.91	357.89	-7.4	1.06			2/1959 - 5/1959
INUBO	C6	35.70	140.85	25.56	206.62	48.6	1.23			(2/1970)-
INUVIK	E1	68.35	226.20	70.41	264.63	81.2	9.32			(8/1969)-
	F1	68.35	226.20	70.41	264.63	81.2	9.32	0.18	21M	7/1964 -
	F3	68.35	226.20	70.41	264.63	81.2	9.32	0.18	21M	7/1964 -
INVERCARGILL	B6	-46.40	168.30	-51.72	249.22	-71.7	2.89			1965
	B11	-46.40	168.30	-51.72	249.22	-71.7	2.89			(12/1969)-
	D2	-46.40	168.30	-51.72	249.22	-71.7	2.89			
	E1	-46.60	168.40	-51.79	249.37	-71.8	2.90			(7/1957)-(12/1958)
	E3	-46.60	168.40	-51.79	249.37	-71.8	2.90			NK
	F1	-46.50	168.30	-51.72	249.22	-71.7	2.89	1.86	SL	10/1957 - 3/1960
	F3	-46.50	168.30	-51.72	249.22	-71.7	2.89	1.86	SL	7/1958 - 12/1958
INVERNESS	B1	57.40	355.80	60.61	83.35	71.7	3.32			11/1951 - 6/1963
IRKUTSK	A3	52.27	104.30	40.83	174.59					(1/1964)
	A6	52.27	104.30	40.83	174.59	72.0	2.05			NK
	A8	52.27	104.30	40.83	174.59	72.0	2.05			(12/1958)---
	B1	52.47	104.03	41.04	174.38	72.2	2.06			1/1957 -
	B7	52.47	104.03	41.04	174.38	72.2	2.06			11/1957 - 2/1964
	B10	52.47	104.03	41.04	174.38	72.2	2.06			(4/1958)-
	B14	52.47	104.03	41.04	174.38	72.2	2.06			(11/1958)-(12/1965)
	C1	52.27	104.30	40.83	174.59	72.0	2.05			(9/1963)---
	C3	52.27	104.30	40.83	174.59	72.0	2.05			(12/1958)---
	D1	52.17	104.45	40.73	174.70	71.9				7/1887 -
	D2	52.47	104.03	41.04	174.38	72.2	2.06			
	F1	52.47	104.30	41.04	174.38	72.2	2.06	3.66	433M	12/1957 --- 12/1966
	F1	52.42	104.30	41.04	174.38	72.2	2.06	3.66	433M	4/1967 -
	F2	52.47	104.30	41.04	174.38	72.2	2.06	3.66	433M	6/1953 --- 12/1960
	F3	52.47	104.30	41.04	174.38	72.2	2.06	3.66	433M	11/1957 -
ISTANBUL	A1	41.02	28.97	38.48	107.34	58.5	1.52			(7/1957)---
	A2	41.02	28.97	38.48	107.34	58.5	1.52			(7/1957)---
	A6	41.02	28.97	38.48	107.34	58.5	1.52			NK
	C1	41.02	28.97	38.48	107.34	58.5	1.52			(7/1957)---
ITHACA	C3	42.45	283.48	53.83	350.58	73.3	3.11			(7/1957)- 4/1965
	E1	42.50	283.50	53.88	350.60	73.3	3.12			(6/1957)--- 1/1968
	E3	42.50	283.50	53.88	350.60	73.3	3.12			(6/1957)---(12/1958)
	E4	42.50	283.50	53.88	350.60	73.3	3.12			(6/1957)---(12/1959)
IVALO	D1	68.60	27.48	64.71	121.94	77.4	5.55			8/1957 - 1/1959
	E1	68.60	27.42	64.72	121.89	77.4	5.56			(1/1958)- 12/1970
	F4	68.60	27.42	64.72	121.89	77.4	5.56			NK
JAMAICA	A14	18.00	283.20	29.38	351.48	1.38				(1/1971)- 50.4
	A15	18.00	283.20	29.38	351.48	50.4	1.38			2/1970 ---
	B1	18.00	283.20	29.38	351.48	50.4	1.38			4/1962 -
	B6	18.00	283.20	29.38	351.48	50.4	1.38			(1/1965)-
	B8	18.00	283.20	29.38	351.48	50.4	1.38			10/1965 ---(12/1970)
	B10	18.00	283.20	29.38	35.48	50.4	1.38			6/1965
JARVIS ISLAND	D1	-00.38	199.97	-00.58	269.07	1.0	0.98			8/1957 - 1/1959
JICAMARCA	B1	-11.95	283.14	00.55	352.31	0.9	1.04			(4/1962)-
	B3	-11.95	283.14	00.55	352.31	0.9	1.04			(6/1963)-
	D2	-11.95	283.14	00.55	352.31	0.9	1.04			
JODRELL BANK	A8	53.23	357.70	56.32	82.51	69.0	2.50			(7/1957)-(1/1959)
	C3	53.23	357.70	56.32	82.51	69.0	2.50			(7/1957)-(1/1959)
JOHANNESBURG	B1	-26.10	28.10	-26.95	91.35	-62.9	1.55			5/1964 -
	B2	-25.87	27.70	-26.65	91.02	-62.8	0.99			11/1965 -
	B7	-26.01	28.01	-26.85	91.29	-62.9	1.55			7/1957 - 12/1958
	B10	-26.17	28.08	-27.02	91.32	-63.0	1.55			1/1958 - 12/1958
JOHNSTON ATOLL	B5	16.75	190.48	14.33	256.34	30.2	1.05			
JULIACA	B1	-15.50	289.80	-04.00	358.84	-3.7	1.06			3/1959 - 5/1959
JULIANEHAAB	D1	60.72	313.97	70.82	35.52	-77.4	7.18			9/1959 --- 5/1965
	E1	60.80	314.00	70.90	35.62	77.4	7.22			(10/1957)-(11/1957)
JULIUSRUH/RUGEN	B1	54.50	13.40	54.49	98.66	69.9	2.62			4/1957 -
	B7	54.63	13.38	54.52	98.66	70.0	2.63			8/1957 - 12/1965
JUNGFRAUJOCH	F1	46.55	07.90	47.94	89.32	63.5	1.92	4.48	3550M	10/1958
JUPITER	C6	27.02	279.88	38.28	347.36	60.0	1.71			(1/1969)-
JUPITER	C6	27.00	272.00							1/1971 -
KAKIOKA	D1	36.23	140.18	26.02	205.95	49.4	1.25			1/1913 -
	D2	36.23	140.18	26.02	205.95	49.4	1.25			(7/1957)-(12/1958)
	G	36.23	140.18	26.02	205.95	49.4	1.25			(7/1957)-(5/1964)
KALININGRAD	B1	54.70	20.62	53.18	105.38	70.2	2.57			2/1964
KAMENICE	B13	48.90	22.00	47.40	103.80	65.9	2.03			1/1968 -
KANDILLI	A1	41.07	29.07	38.51	107.45	58.5	1.52			(1/1965)-
	A2	41.07	29.07	38.51	107.45	58.5	1.52			(1/1965)-
	A6	41.07	29.07	38.51	107.45	58.5	1.52			NK
	C1	41.07	29.07	38.51	107.45	58.5	1.52			(1/1965)-
	D1	41.07	29.07	38.52	107.45	58.5	1.52			1/1947 -

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
KANO	B2	11.97	08.52	14.20	80.15	3.6	0.98			9/1964 - 11/1966
KANOYA	D1	31.42	130.88	20.54	198.05	44.2	1.13			7/1957 -
	D2	31.25	130.53							1/1958 -
KANOZAN	D1	35.25	139.97	25.03	205.88	48.2	1.22			NK
KANZELHOHE	A2	46.68	13.90	46.87	95.20	63.7	1.90			(7/1957)-(12/1959)
	A6	46.68	13.90	46.87	95.20	63.7	1.90			NK
	A7	46.68	13.90	46.87	95.20	63.7	1.90			(7/1957)-(9/1964)
	C1	46.68	13.90	46.87	95.20	63.7	1.90			(7/1957)-(7/1966)
KAP TOBIN	C8	70.42	338.02	75.65	81.65	78.7	10.85			8/1972 -
	D1	70.32	338.03	75.57	81.41	78.7	10.74			(10/1957)-8/1959
	E1	70.48	338.04	75.70	81.80	78.7	10.91			
KAPUSTIN YAR	B5	48.52	45.80	42.75	125.04	66.6	1.91			
KARAGANDA USSR	B1	49.82	73.08	40.33	148.66	69.3	1.93			8/1964
KARLSRUHE	A2	49.00	08.40	50.18	90.91	65.7	2.13			(7/1957)-(12/1959)
KARYSTOS	B5	38.02	24.42	36.46	102.12	54.6	1.39			
KASHIMA	B2	35.95	140.65	25.79	206.41	49.0	1.24			12/1966 -
	B6	35.95	140.65	25.79	206.41	49.0	1.24			1/1967 -
KASUGAI	C6	35.27	137.01	24.81	203.23	48.6	1.22			NK
KAUAI	B2	22.13	200.33	21.53	264.71	39.9	1.15			8/1965 - 3/1972
KAZACHIE	E1	70.80	136.30	60.01	196.33	81.5	5.29			(12/1957)---(4/1959)
KAZAN	D1	55.83	48.85	49.33	130.36	72.1	0.84			1/1909 -
KEKAHA	B14	22.00	200.30	21.40	264.71	39.7	1.14			4/1958 - 8/1965
KERGUELEN	B1	-49.40	70.30	-57.39	128.05	-67.4	3.67			2/1953 -
	B8	-49.35	70.27	-57.34	128.03	-67.4	3.66			2/1962 -
	B13	-49.30	70.50	-57.33	128.32	-67.5	3.66			3/1964 -
	B14	-49.30	70.50	-57.33	128.32	-67.5	3.66			6/1957 -(3/1959)
	C6	-49.40	70.30	-57.39	128.05	-67.4	3.67			(1/1968)-
	D1	-49.35	70.20	-57.33	127.95	-67.4	3.66			10/1957 -
	D2	-49.35	70.20	-57.33	127.95	-67.4	3.66			(1/1957)-
	F1	-49.35	70.20	-57.33	127.95	-67.4	3.66	1.19	SL	2/1964 -
	F3	-49.35	70.20	-57.33	127.95	-67.4	3.66	1.19	SL	7/1957 - 6/1962
	F4	-49.35	70.20	-57.33	127.95	-67.4	3.66	1.19	SL	NK
	G	-49.35	70.22	-57.33	127.97	-67.4	3.66			1/1964 -
KERMADEC	B1	-29.20	182.10	-32.31	257.72	-53.3	1.41			4/1943 --- 9/1972
KEVO	B8	69.75	26.48	65.89	122.49	77.8	6.08			1/1970
KEWEENAW, MICHIG	B5	47.42	272.28	58.14	335.71	76.8	3.93			
KHABAROVSK	B1	48.50	135.10	37.83	200.03	63.9	1.72			9/1959 -
	B14	48.52	135.12	37.85	200.05	63.9	1.72			(12/1958)-(12/1965)
	F1	48.50	135.21	37.83	200.03	63.9	1.72	0.71		NK
KHARKOV	A6	49.43	36.92	45.14	117.55	66.9	2.00			NK
	B10	49.43	36.92	45.14	117.55	66.9	2.00			(8/1957)-(1/1960)
	C1	49.43	36.92	45.14	117.55	66.9	2.00			(7/1967)-
KHARTOUM	B6	15.55	32.58	12.95	104.44	14.2	0.98			NK
KHEYSA IS	B5	80.62	58.05	71.31	156.06	83.9	14.13			
KIEL	A8	54.30	10.10	54.86	95.36	69.7	2.62			NK
	C3	54.30	10.10	54.86	95.36	69.7	2.62			5/1967 -
	C4	54.30	10.10	54.86	95.36	69.7	2.62			NK
	F1	54.33	10.10	54.89	95.38	69.7	2.63	2.29	54M	7/1957 - 12/1964
	F1	54.33	10.10	54.89	95.38	69.7	2.63	2.29	54M	9/1964 -
	F3	54.33	10.10	54.89	95.38	69.7	2.63	2.29	54M	7/1957 - 1/1970
KIEV	A2	50.45	30.50	47.28	112.17	67.4	2.11			NK
	A6	50.45	30.50	47.28	112.23	67.4	2.11			(1/1964)---
	A8	50.45	30.50	47.28	112.17	67.4	2.11			(7/1964)---
	B1	50.72	30.30	47.28	112.23	67.4	2.11			1/1964 -
	B14	50.45	30.50	47.28	112.23	67.4	2.11			(8/1960)-(12/1965)
	C1	50.45	30.50	47.28	112.23	67.4	2.11			(7/1957)-
	C3	50.45	30.50	47.28	112.23	67.4	2.11			(7/1964)---
	D1	50.72	30.30	47.57	112.17	67.6	2.13			7/1958 -
	D2	50.72	30.30	47.57	112.17	67.6	2.13			5/1959 -
	F1	50.72	30.30	47.57	112.17	67.6	2.13	3.62	120M	9/1969 -
KING SALMON	B8	58.38	203.39	57.01	254.19	70.6	3.24			9/1957 - 12/1958
	E4	58.38	203.39	57.01	254.19	70.6	3.24			NK
KINSHASA-BINZA	B1	-04.50	15.20	-03.16	83.44	-34.7	1.07			2/1952 -
	D1	-04.27	15.37	-03.06	83.63	-34.4	0.99			1/1953 -
KIRUNA	B1	67.84	20.42	65.27	115.60	76.9	5.45			3/1949 ---
	B5	67.90	20.50	65.31	115.76	76.9	5.47			
	B6	67.80	20.40	65.24	115.56	76.8	5.44			(10/1964) -
	B8	67.84	20.42	65.27	115.60	76.9	5.45			6/1958 -
	C8	67.80	20.40	65.24	115.56	76.8	5.44			(6/1958)-
	C9	67.80	20.40	65.24	115.56	76.8	5.44			3/1949 ---
	D1	67.83	20.42	65.26	115.61	76.9	5.45			7/1950 -
	D2	67.83	20.42	65.26	115.61	76.9	5.45			(7/1957)-
	E1	67.84	20.42	65.26	115.61	76.9	5.45			(3/1957)---
	F1	67.84	20.42	65.27	115.60	76.9	5.45	0.54	400M	1/1970 -
	F3	67.84	20.42	65.27	115.60	76.9	5.45	0.54	390M	11/1956 ---
	F4	67.84	20.42	65.27	115.60	76.9	5.45	0.54	390M	NK
KISLOVODSK	A2	43.73	42.52	38.65	120.60	62.0	1.64			(1/1957)---(9/1962)
	A3	43.73	42.52	38.65	120.60	62.0	1.64			(1/1964)-
	A6	43.73	42.52	38.65	120.60	62.0	1.64			(1/1964)-
	A7	43.73	42.52	38.65	120.60	62.0	1.64			(7/1957)-
	A8	43.73	42.52	38.65	120.60	62.0	1.64			(7/1957)---
	C3	43.73	42.52	38.65	120.60	62.0	1.64			(7/1957)---
KJELLER	A8	60.22	10.75	60.24	100.03	73.2	3.54			(7/1967)-
	B1	60.00	11.10	59.97	100.18	73.1	3.49			4/1942 --- 1/1959
	B6	60.00	11.10	59.97	100.18	73.1	3.49			(10/1964) -
	B7	60.00	11.10	59.97	100.18	73.1	3.49			7/1957 - 1/1959
	C3	60.22	10.75	60.24	100.03	73.2	3.54			(7/1967)-
KNOB LAKE	B12	54.80	293.18	66.29	03.13	79.0	6.27			(3/1958)-(7/1958)
	B13	54.80	293.18	66.29	03.13	79.0	6.27			5/1958 - 2/1966
	E1	54.80	293.18	66.29	03.13	79.0	6.27			(6/1958)---(5/1966)
KODAIKANAL	A2	10.20	77.50	00.57	147.10	2.5	0.92			(7/1957)-
	A5	10.20	77.50	00.57	147.10	2.5	0.92			NK
	A6	10.20	77.50	00.57	147.10	2.5	0.92			(7/1957)-
	A8	10.20	77.50	00.57	147.10	2.5	0.92			(1/1966)---(7/1967)
	B1	10.20	77.50	00.57	147.10	2.5	0.92			7/1952 ---
	C1	10.20	77.50	00.57	147.10	2.5	0.92			(7/1957)-
	C3	10.20	77.50	00.57	147.10	2.5	0.92			(1/1966)---(7/1967)
	D1	10.23	77.47	00.60	147.07	2.6	0.92			1/1902 ---
	F1	10.23	77.40	00.61	147.00	2.6	0.92	17.47	2443M	7/1957 - 6/1964
	F3	10.23	77.40	00.61	147.00	2.6	0.92	17.47	2443M	7/1957 - 12/1963

MASTER STATION LIST

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
KOENJI	F2	35.71	139.60	25.46	205.50	48.8	1.23	11.58	42M	5/1959 ---
KOLBERG	B9	52.23	13.82	52.17	97.74	68.3	2.36			1/1964 - 12/1965
KONTAGORA	D1	10.40	05.45	13.27	76.97	0.1	0.98			12/1964 -(12/1965)
KOOTWIJK	B10	55.15	05.83	56.51	91.77	70.2	2.78			(7/1957)-(12/1958)
KORETS	D1	50.60	61.07	42.51	138.78	69.2	2.03			(1/1968) -
KORONI BEACH	B5	36.77	21.95	35.73	99.38	52.8	1.34			
KOROR	D1	07.33	134.50	-03.23	203.54	-0.8	0.92			7/1957 --- 3/1966
	D2	07.33	134.50	-03.28	203.54	-0.8	0.92			7/1957 --- 12/1958
KOTELNY IS	E1	76.00	137.90	65.20	195.13	84.5	8.09			(12/1958)-(2/1959)
KOTZEBUE	B13	66.88	197.40	63.68	242.10	76.1	5.17			11/1957 -(12/1958)
	D1	66.88	197.40	63.68	242.10	76.1	5.17			7/1957 - 12/1958
	D2	66.90	197.50	63.71	242.16	76.1	5.17			
	E1	66.90	197.50	63.71	242.16	76.1	5.17			(8/1957)---
	E4	66.90	197.50	63.71	242.16	76.1	5.17			(8/1957)-
KOUROU	B2	05.00	307.00	16.04	16.60	28.5	1.16			NK
	B5	05.00	307.00	16.04	16.60	28.5	1.16			
KRAKOW	C3	50.05	19.95	48.90	102.41	66.8	2.13			(10/1957)-(3/1960)
KRISTINEBERG	E1	65.10	18.60	63.17	111.25	75.6	4.56			(8/1957)---(4/1959)
KRONOGARD	B5	66.22	19.78	69.95	113.95	76.2	4.89			
KSARA	D1	33.82	35.88	30.19	111.73	49.7	1.25			10/1930 -
KUHLUNGSBORN	B6	55.00	12.70	55.01	98.24	70.2	2.68			(11/1964) -
	B9	55.00	12.70	55.01	98.24	70.2	2.68			(7/1957)-
	B10	53.40	12.60	53.52	97.22	69.1	2.49			(7/1957)-
	B12	54.12	11.77	54.36	96.84	69.6	2.58			(7/1957)-
	B13	54.12	11.77	54.36	96.84	69.6	2.58			(7/1957)-
	B14	54.12	11.77	54.36	96.84	69.6	2.58			(7/1957)-
	C6	54.12	11.77	54.36	96.84	69.6	2.58			(7/1957)-
	E4	54.12	11.77	54.36	96.84	69.9	2.58			NK
	F1	54.12	11.70	54.38	96.78	69.6	2.58	2.43	70M	1/1964 - 12/1967
	F2	54.12	11.70	54.38	96.78	69.6	2.58	2.43	70M	1/1957 - 12/1967
	F3	54.12	11.70	54.38	96.78	69.6	2.58	2.43	70M	7/1957 - 12/1967
KULA	F1	20.73	203.60	20.81	268.22	38.7	1.13	13.30	915M	7/1966 -
	F3	20.73	203.60	20.81	268.22	38.7	1.13	13.30	930M	7/1966 -
KURE	C6	28.22	182.63	24.08	246.34	42.7	0.95			(2/1969)-
KUYPER	D1	-06.03	106.73	-17.50	175.55	-32.8	1.00			7/1899 - 12/1961
LA PAZ	B1	-16.50	291.90	-05.00	00.87	-5.2	1.06			10/1957 ---
LA PLATA	B4	-34.90	303.00	-23.62	10.73	-32.9	1.07			NK
LA QUIACA	B1	-22.10	294.40	-10.62	03.20	-14.7	1.07			6/1958 - 1/1959
	D1	-22.10	294.40	-10.62	03.20	-14.7	1.07			1/1920 ---
LAE	D2	-06.73	147.00	-15.96	217.38	-28.1	1.02			
	F1	-06.73	147.00	-15.96	217.38	-28.1	1.02	15.52	SL	7/1957 --- 11/1969
	F3	-06.73	147.00	-15.96	217.38	-28.1	1.02	15.52	SL	7/1957 --- 11/1969
LAKE TRAVERSE	E1	45.96	281.95	57.28	348.33	75.7	3.73			(4/1966)---
LANCASTER	B1	53.00	358.00	56.05	82.68	68.8	0.87			NK
	B6	53.00	358.00	56.05	82.68	68.8	0.87			NK
	B7	53.00	358.00	56.05	82.68	68.8	0.87			NK
	B10	53.00	358.00	56.05	82.68	68.8	0.87			NK
LANDES TEST CENT	B5	44.27	356.40	48.03	76.78	61.3	1.82			
LANNION	B1	48.45	356.73	51.97	78.96	65.2	2.18			1/1971
LAS ACACIAS	D1	-35.00	302.32	-23.70	10.11	-32.9	1.21			1/1964 -
LATROBE	A2	40.30	280.62	51.57	347.23	71.8	2.80			NK
	C6	40.30	280.62	51.57	347.23	71.8	2.80			(4/1966)---
LAUDER	B2	-45.05	169.67	-50.06	250.06	-70.4	2.65			NK
	B13	-45.05	169.67	-50.06	250.06	-70.4	2.65			(1/1962)-
	E1	-45.05	169.67	-50.06	250.06	-70.4	2.65			(12/1969)---
	G	-45.05	169.67	-50.06	250.06	-70.4	2.65			NK
LAZAREV	D1	69.97	12.90	-65.65	55.32	-63.5	4.54			1/1960 - 2/1961
LEADVILLE	D1	39.28	253.72	48.00	315.51	67.4	2.24			7/1957 - 1/1959
LEEDS	F1	53.82	358.40	56.74	83.57	69.4	2.72	2.20	100M	1/1955 --- 12/1966
	F1	53.82	358.40	56.74	83.57	69.4	2.72	2.20	70M	1/1965 -
LEICESTER	B9	52.00	359.00	54.90	83.12	68.1	0.87			NK
	C6	52.00	359.00	54.90	83.12	68.1	0.87			NK
LEIRVOGUR	B8	64.18	338.30	70.22	71.04	76.0	6.23			3/1966 -
	C8	64.18	338.30	70.22	71.04	76.0	6.23			NK
	D1	64.18	338.30	70.22	71.04	76.0	6.23			8/1957 -
	D2	64.18	338.30	70.22	71.04	76.0	6.23			8/1957 -
LENINGRAD	B1	59.95	30.70	56.29	117.38	73.5	3.23			1/1939 ---
	D1	59.95	30.70	56.29	117.38	73.5	3.23			1/1869 -
LERWICK	D1	60.13	358.82	62.53	88.59	73.2	3.79			1/1923 -
	D2	60.13	358.82	62.53	88.59	73.2	3.79			(1/1964)---
	E1	60.13	358.82	62.53	88.59	73.2	3.79			NK
LEXINGTON A29	C6	42.00	289.00	53.49	357.50	72.5	3.03			NK
LIMA	B2	-11.77	282.83	-00.38	352.00	1.1	1.04			11/1966 -
	B11	-11.77	282.83	-00.38	352.00	1.1	1.04			1/1966 -
LINCOLN	F1	40.82	263.30	50.73	326.24	70.6	2.59	2.22	350M	5/1957 - 5/1962
	F3	40.82	263.30	50.73	326.24	70.6	2.59	2.22	350M	5/1957 - 5/1962
LINDAU	B1	51.60	10.10	52.31	93.86	67.8	2.33			12/1947 -
	B4	51.65	10.13	52.36	93.91	67.8	2.34			9/1957 -
	B6	51.60	10.10	52.31	93.86	67.8	2.34			10/1964-
	B7	51.65	10.13	52.36	93.91	67.8	2.34			9/1957 - 12/1959
	B9	51.65	10.13	52.36	93.91	67.8	2.34			9/1957 -
	B12	51.65	10.13	52.36	93.91	67.8	2.34			
	C6	51.65	10.13	52.36	93.91	67.8	2.34			(7/1957) ---
	F1	51.60	10.10	52.31	93.86	67.8	2.33	3.00	140M	5/1959 -
	F1	51.60	10.10	52.31	93.86	67.8	2.33	3.00	140M	11/1964 -
	F3	51.60	10.10	52.31	93.86	67.8	2.33	3.00	140M	5/1959 ---
	F4	51.60	10.10	52.31	93.86	67.8	2.33	3.00	140M	NK
LISBON	F3	38.73	350.80	43.74	68.93	55.3	1.53	6.65	81M	1/1958 - 4/1961
LITTLE AMERICA	B1	-78.20	197.80	-74.04	312.02	-79.2	12.71			7/1957 - 12/1958
	C9	-78.20	197.80	-74.05	312.02	-79.2	12.71			7/1957 - 12/1958
	D1	-78.18	197.80	-74.03	311.97	-79.2	12.70			7/1957 - 12/1958
	E1	-78.20	197.80	-74.05	312.00	-79.2	12.71			3/1957 --- 9/1958
	E3	-78.20	197.80	-74.05	312.00	-79.2	12.71			3/1957 --- 9/1958

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
LITTLETON	C6	60.10	358.80	62.50	88.54	73.2	3.79			(7/1967)-
L-AQUILA	D1	42.38	13.32	42.86	92.94	59.4	1.61			5/1958 -
LJUBLJANA	A2	46.03	13.18	46.39	94.23	63.1	1.85			(7/1957)-(12/1959)
LOCARNO	A1	46.17	08.80	47.40	90.04	63.2	1.88			NK
	A2	46.17	08.80	47.40	90.04	63.2	1.88			(7/1957)-(7/1962)
	A6	46.17	08.80	47.40	90.04	63.2	1.88			(1/1964)-(7/1966)
	C1	46.17	08.80	47.40	90.04	63.2	1.88			(5/1968)-
LOCKHEED	A6	33.93	241.62	40.89	303.58	59.8	1.69			1/1959 -
	C1	33.93	241.62	40.89	303.58	59.8	1.69			1/1959 -
	C6	33.93	241.62	40.89	303.58	59.8	1.69			7/1958 - 2/1961
LOGRONO	D1	42.45	357.50	46.06	77.20	59.3	0.88			7/1957 -
LOMNICKY STIT	A7	49.20	20.22	48.04	102.28	66.1	2.06			(7/1965)-
	F1	49.20	20.20	48.04	102.26	66.1	2.06	4.00	2634M	1/1958 ---
	F3	49.20	20.20	49.04	102.26	66.1	2.06	4.00	2634M	1/1968 -
	G	49.60	20.22	48.42	102.46	66.4	2.09			(7/1957)-(12/1959)
LONDON	A9	51.50	359.90	54.28	83.77	67.7	2.43			NK
	B13	51.50	359.90	54.28	83.77	67.7	2.43			NK
	F1	51.53	359.90	54.28	83.77	67.7	2.43	2.73	45M	7/1960 --- 5/1965
	F3	51.53	359.90	54.28	83.77	67.7	2.43	2.73	45M	7/1957 - 6/1959
LONGYEARBYEN	B1	78.20	15.70	74.36	130.94	85.4	169.92			6/1956 - 8/1959
LOPARSKAYA	G	68.25	33.08	63.47	125.78	77.5	5.29			10/1957 ---(12/1965)
LORING AFB	D1	46.95	292.12	58.45	01.46	75.1	3.84			10/1966 -
LOUISVILLE A26	C6	38.00	274.00	48.90	339.48	69.6	2.46			NK
LOURENCO MARQUES	D1	-25.92	32.58	-27.67	95.82	-62.4	1.55			1/1957 -
LOVO	D1	59.35	17.83	58.06	105.78	72.8	3.26			1/1928 -
LOVOZERO	D1	67.97	35.02	62.91	126.96	77.4	5.15			
	D2	67.97	35.02	62.91	126.96	77.4	5.15			8/1957 -
LOWER HUTT	B10	-41.23	174.92	-45.38	254.09	-66.4	2.15			(7/1957)-(12/1958)
LUANDA	D1	-08.92	13.17	-07.19	80.56	-42.8	1.13			1/1956 -
LULEA	B1	65.60	22.10	62.98	114.63	75.9	4.64			9/1947 - 1969
LUNPING	A1	25.18	121.17	13.85	189.47	35.2	1.03			6/1967 -
	A2	25.18	121.17	13.85	189.47	35.2	1.03			6/1967 -
	D1	25.00	121.17	13.67	189.48	34.8	1.03			1/1919 -
LVOV	A6	49.82	24.02	47.89	106.07	66.7	2.09			NK
	C1	49.82	24.02	47.89	106.07	66.7	2.09			(4/1964)---
	D1	49.90	23.75	42.02	105.86	66.8	2.09			7/1929 -
LWIRO	A8	-02.25	28.60	-03.72	97.00	-29.3	0.98			NK
	B1	-02.30	28.80	-03.81	97.19	-29.4	1.55			2/1952 - 8/1967
	B7	-02.30	28.80	-03.81	97.19	-29.4	1.55			1/1959 - 12/1959
	C3	-02.25	28.60	-03.72	97.00	-29.3	0.98			(7/1957)-(5/1959)
	D1	-02.25	28.80	-03.76	97.20	-29.3	1.03			7/1958 -
	G	-02.25	28.80	-03.76	97.20	-29.3	1.03			12/1957 - 12/1959
LYCKSELE	B1	64.62	18.67	62.73	111.84	75.4	4.42			3/1957 -
	B8	64.62	18.67	62.73	111.84	75.4	4.42			NK
	D1	64.62	18.67	62.73	111.84	75.4	4.42			NK
	E1	64.62	18.67	62.73	111.84	75.4	4.42			(9/1957)---(4/1959)
M BOUR	D1	14.40	343.02	21.26	55.00	16.0	1.03			(7/1957)-
MACAU	B1	22.20	113.60	10.71	182.45	29.7	0.99			5/1958 - 6/1961
	B14	22.20	113.55	10.71	182.40	29.7	0.98			(4/1959)-(8/1959)
	C3	22.20	113.55	10.71	182.40	29.7	0.98			5/1958 - 3/1960
	F3	22.22	113.60	10.73	182.45	29.8	0.99	16.28	65M	7/1959 - 10/1964
MACQUARIE IS	B1	-54.50	159.00	-61.07	243.15	-79.0	5.31			5/1950 - 11/1958
	B8	-54.50	159.00	-61.07	243.15	-79.0	5.31			1/1968 -
	B13	-54.50	158.90	-61.09	243.04	-79.1	5.32			7/1957 - 12/1970
	D1	-54.50	158.95	-61.08	243.09	-79.1	5.32			1/1951 -
	D2	-54.50	158.95	-61.08	243.09	-79.1	5.32			1/1967 -
	E1	-54.50	159.00	-61.07	243.15	-79.0	5.31			(3/1958)---
	F3	-54.50	159.00	-61.07	243.15	-79.0	5.31	0.55	SL	7/1957 - 6/1963
MACUL	F3	-33.45	289.40	-21.95	358.56	-31.4	1.17	11.41	570M	2/1958 - 2/1967
MADISON	B11	43.00	271.00	53.64	335.04	73.4	3.06			1/1961 -
MADRAS	B1	13.10	80.30	03.16	150.13	9.3	0.91			9/1945 -
MADRID	A2	40.40	356.32	44.31	75.23	57.0	1.58			(7/1957)---(3/1959)
MAGADAN	F1	60.00	151.00	50.56	210.39	71.3	2.73			(1/1971)-
MAJURO	D1	07.08	171.38	01.32	239.65	5.7	0.97			9/1964 - 2/1966
MAKATEA	G	-16.20	211.98	-13.71	283.99	-27.3	1.05			(5/1963)-(12/1965)
MAKERERE	D2	00.33	32.50	-01.95	101.34	-22.9	0.97			
	F1	00.33	32.50	-01.95	101.34	-22.9	0.97	14.98	1196M	10/1957 ---
	F3	00.33	32.50	-01.95	101.34	-22.9	0.97	14.84	1500M	2/1965 --- 10/1969
MALVERN	B3	52.13	357.67	55.28	81.84	68.2	2.52			(8/1966)---
MANHAY	D1	50.30	05.68	51.96	88.89	66.7	2.25			1/1932 -
MANILA	A1	14.70	121.10	03.37	189.78	14.5	0.94			(7/1957)-
	A2	14.70	121.10	03.37	189.78	14.5	0.94			6/1963 -
	A6	14.70	121.10	03.37	189.78	14.5	0.94			(1/1964)-
	A8	14.70	121.10	03.37	189.78	14.5	0.94			3/1962 -
	B1	14.70	121.10	03.37	189.78	14.5	0.92			1/1964 -
	B8	14.70	121.10	03.37	189.78	14.5	0.94			4/1963 -
	C1	14.70	121.10	03.37	189.78	14.5	0.94			5/1963 -
	C3	14.70	121.10	03.37	189.78	14.5	0.94			3/1962 -
	C6	14.70	121.10	03.37	189.78	14.5	0.94			2/1962 -
	D2	14.70	121.10	03.37	189.78	14.5	0.94			
MAR CHIQUITA	B5	-37.77	302.58	-26.48	10.21	-35.8	4.89			
MAR DEL PLATA	B5	-38.00	302.00	-26.68	9.69	-35.9	1.25			
MARCUS	C5	26.51	128.15	15.48	195.89	36.9	1.05			(5/1968)-
	C6	26.51	128.15	15.48	195.89	36.9	1.05			(5/1968)-
MARION IS	B1	-46.85	37.87	-48.98	94.28	-63.3	2.69			7/1957 ---
	D1	-46.85	37.87	-48.98	94.28	-63.3	2.69			6/1972 -
MARUYAMA	G	35.02	139.97	24.80	205.91	47.9	1.22			(7/1957)-(2/1964)
MATSUMOTO	F3	36.22	138.00	25.83	204.01	49.7	1.24	11.31	630M	8/1971 -
MAUI	B1	20.80	203.50	20.86	268.11	38.8	1.13			7/1944 -
	B8	20.80	203.50	20.86	268.11	38.8	1.13			11/1962 - 11/1965
	D2	21.71	203.74							7/1957 -
MAUNA LOA	A7	19.51	204.42	19.78	269.30	37.3	1.12			12/1965 -

MASTER STATION LIST

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
MAWSON	B1	-67.60	62.90	-73.08	102.92	-68.8	8.67			2/1958 ---
	B8	-67.60	62.90	-73.08	102.92	-68.8	8.67			
	C9	-67.60	62.90	-73.08	102.92	-68.8	8.67			2/1958 ---
	D1	-67.60	62.88	-73.08	102.90	-68.8	8.67			7/1955 -
	D2	-67.60	62.88	-73.08	102.90	-68.8	8.67			1/1967 ---
	E1	-67.60	62.90	-73.08	102.92	-68.8	8.67			(7/1957)---
	F1	-67.60	62.80	-73.06	102.81	-68.8	8.65	0.22	SL	4/1957 -
	F3	-67.60	62.80	-73.06	102.81	-68.8	8.65	0.22	SL	5/1955 -
MAYFIELD VILLAGE	C6	40.00	82.00	29.76	154.67	59.1	1.38			NK
MAYNARD	B1	42.43	288.55	53.93	358.43	72.7	3.08			10/1970 -
	B4	42.43	288.55	53.93	358.43	72.7	3.08			7/1964 -
MCMATH-HULBERT	A4	42.67	276.70	53.73	342.12	73.5	3.10			NK
	A5	42.67	276.70	53.73	342.12	73.5	3.10			1/1945 -
	C1	42.67	276.70	53.73	342.12	73.5	3.10			2/1958 -
	C3	42.67	276.70	53.73	342.12	73.5	3.10			(7/1957)-
	C6	42.67	276.70	53.73	342.12	73.5	3.10			(1/1955)-
MCMURDO	B8	-77.85	166.70	-79.00	294.35	-82.3	32.74			2/1962 -
	C8	-77.85	166.70	-79.00	294.35	-82.3	32.74			2/1962 -
	C10	-77.85	166.70	-79.00	294.35	-82.3	32.74			NK
	D2	-77.85	166.70	-79.00	294.35	-82.3	32.74			
	F1	-77.85	166.70	-79.00	294.35	-82.3	32.74	0.01	48M	5/1960 - 6/1964
	F1	-77.85	166.70	-79.00	294.35	-82.3	32.74	0.01	48M	1/1964 -
	F3	-77.85	166.70	-79.00	294.35	-82.3	32.74	0.01	48M	3/1961 -
	G	-77.85	166.70	-79.00	294.35	-82.3	32.74			2/1967 -
MEANOOK	B1	54.60	246.70	61.81	301.07	77.8	4.66			7/1957 - 1/1959
	B8	54.60	246.70	61.81	301.07	77.8	4.66			3/1958 - 12/1959
	B12	54.62	246.67	61.83	301.02	77.8	4.67			(5/1958)-(12/1958)
	D1	54.62	246.67	61.83	301.02	77.8	4.67			1/1916 -
	D2	54.62	246.67	61.83	301.02	77.8	4.67			
	E1	54.62	246.67	61.83	301.02	77.8	4.67			(8-1957)-(11/1970)
	E3	54.62	246.67	61.83	301.02	77.8	4.67			(8/1957)-(12/1959)
MELBOURNE	B8	-37.45	144.60	-46.69	219.83	-68.5	2.21			3/1967 -
	E1	-37.90	145.10	-47.07	220.51	-68.8	2.25			(7/1957)---(7/1958)
MELVILLE AFB	D1	53.28	299.47	64.61	11.85	76.9	5.25			11/1966 -
MEMAMBETSU	D1	43.90	144.20	34.01	208.42	57.5	1.05			7/1950 -
	D2	43.58	144.20	33.69	208.47	57.2	1.48			(7/1957)-
	G	43.58	144.20	33.69	208.47	57.2	1.48			(8/1957)-
MEMPHIS	C6	35.00	270.00							
MEUDON	A2	49.33	02.50	51.67	02.50	65.9	2.20			NK
	A5	49.33	02.50	51.67	02.50	65.9	2.20			(7/1957)-(12/1957)
	A6	49.33	02.50	51.67	02.50	65.9	2.20			(7/1957)-
	C1	49.33	02.50	51.67	02.50	65.9	2.20			(7/1957)---
	F3	48.81	2.25	51.23	84.74	65.5	2.16	3.60	110M	2/1961 - 3/1964
MEXICO CITY	B1	19.40	260.30	29.16	326.54	46.3	1.27			4/1958 -
	F1	19.33	260.80	29.14	327.08	46.4	1.28	9.53	2274M	7/1954 -
	F1	19.33	260.80	29.14	327.08	46.4	1.28	9.53	2274M	11/1970
	F2	19.33	260.82	29.14	327.08	46.4	1.28	9.53	2274M	7/1957 -
	F3	19.33	260.82	29.14	327.08	46.4	1.28	9.53	2274M	4/1971 -
MIAHUATLAN MEX	B6	18.22	263.40	26.32	330.24	42.7	1.22			3/1970 - 3/1970
MIDWAY	D1	28.22	182.63	24.08	246.34	42.7	1.15			5/1964 - 1/1966
MIEDZESZYN	B1	52.20	21.20	50.70	104.60	68.5	2.31			7/1958 -
MILLSTONE HILL	B1	42.60	288.50	54.09	356.86	72.9	3.12			4/1963 ---
	B3	42.60	288.50	54.09	356.86	72.9	3.12			(4/1960)-
	B12	42.60	288.50	54.09	356.86	72.9	3.12			NK
MINA AGUILAR	F1	-23.10	294.30	-11.62	03.10	-16.3	1.09	12.51	4000M	7/1957 -
MINSK	D1	54.10	26.52	51.49	110.38	69.9	2.47			1/1961 -
MIRNY	B1	-66.50	93.00	-76.97	146.87	-76.5	19.64			2/1957 -
	B7	-66.55	93.02	-77.02	146.84	-76.5	19.81			1/1966 -
	B8	-66.55	93.02	-77.02	146.84	-76.5	19.81			3/1961 -
	C9	-66.50	93.00	-76.97	146.87	-76.5	19.64			2/1957 -
	D1	-66.55	93.02	-77.02	146.84	-76.5	19.81			7/1956 -
	D2	-66.55	93.02	-77.02	146.84	-76.5	19.81			(8/1957)-(12/1958)
	E1	-66.55	93.02	-77.02	146.84	-76.5	19.81			(3/1957)---(10/1958)
	E3	-66.55	93.02	-77.02	146.84	-76.5	19.81			NK
	E4	-66.55	93.02	-77.02	146.84	-76.5	19.81			NK
	F1	-66.55	93.00	-77.02	146.81	-76.5	19.79	0.04	22M	4/1958 -
	F2	-66.55	93.00	-77.02	146.81	-76.5	19.79	0.04	22M	7/1957 - 1/1967
	G	-66.55	93.00	-77.02	146.81	-76.5	19.79			(3/1958)-(10/1958)
MISALLAT	D1	29.52	30.90	26.94	105.94	42.5	1.15			1/1960 -
MISENO	B13	40.80	15.10	40.98	94.10	57.6	1.52			2/1960 - 3/1963
MISSOULA	C6	47.00	246.00							7/1971 -
MIZUSAWA	D1	39.01	141.08	28.87	206.40	52.6	1.32			1/1972 -
MOCA	D1	03.35	08.67	05.73	78.57	-17.3	1.00			10/1958 -
	D2	03.35	08.67	05.73	78.57	-17.3	1.00			(1/1964)---
MOISIE	B13	50.18	293.90	61.66	03.91	76.6	4.57			7/1960 - 12/1963
MOLODEZHNAYA	B5	-67.67	45.85	-69.76	85.36	-65.9	6.31			
MONT BLANC TUNNEL	F3	45.80	4.51	47.90	85.64	62.8	1.88	4.65	1300M	9/1968 -
MONT JOLI	B13	48.60	291.80	60.10	01.06	76.1	4.22			2/1958 -3/1960
MONTE DEI CAPPUC	F3	45.05	07.75	46.54	88.54	62.1	1.80			10/1967 -
MONTEVIDEO	B4	-35.00	304.00	-23.76	11.62	-33.2	1.21			9/1963 -
MOOSE RIVER	B11	51.00	279.00	62.16	343.73	79.0	5.07			10/1963
MOOSONEE	B8	51.50	279.33	62.68	344.08	79.3	5.24			9/1963 -
	E1	51.50	279.33	62.68	334.08	79.3	5.24			1/1968 -
MORIOKA	F1	39.42	141.01	29.27	206.29	53.1	1.34	10.16	135M	8/1970 -
MOSCOW	A3	55.47	37.32	50.85	120.49	71.2	2.56			(1/1964)-
	A6	55.47	37.32	50.85	120.49	71.2	2.56			NK
	A8	55.47	37.32	50.85	120.49	71.2	2.56			(7/1957)---
	B1	55.50	37.30	50.89	120.49	71.2	2.56			3/1944 ---
	B7	55.47	37.32	50.85	120.49	71.2	2.56			7/1957 - 12/1958
	B10	55.47	37.32	50.85	120.49	71.2	2.56			(7/1957)---(12/1965)
	B13	55.47	37.32	50.85	120.49	71.2	2.56			(2/1958)-(12/1960)
	B14	55.47	37.32	50.85	120.49	71.2	2.56			(3/1958)-(12/1964)
	C1	55.47	37.32	50.85	120.49	71.2	2.56			(7/1957)---
	C3	55.47	37.32	50.85	120.49	71.2	2.56			(7/1957)---
	D1	55.48	37.32	50.86	120.50	71.2	2.56			7/1919 -
	F1	55.47	37.30	50.86	120.47	71.2	2.56	2.46	200M	7/1957 --- 6/1966
	F1	55.47	37.30	50.86	120.47	71.2	2.56	2.46	200M	2/1966 ---
	F2	55.47	37.30	50.86	120.47	71.2	2.56	2.46	200M	1/1952 ---
	F3	55.47	37.30	50.86	120.47	71.2	2.56	2.39	200M	6/1957 ---

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
MOSCOW UNIVERSITA	6	55.47	37.32	50.85	120.49	71.2	2.56			NK
	C1	55.47	37.32	50.85	120.49	71.2	2.56			NK
	F3	55.47	37.32	50.85	120.49	71.2	2.56	2.46	200M	6/1957 - 7/1966
MOSHIRI	B13	44.37	142.27	34.29	206.69	58.3	1.52			11/1962 -
MOULD BAY	D1	76.30	240.60	79.16	255.92	87.4	38.05			1/1962 -
	E1	76.30	240.60	79.16	255.92	87.4	38.05			(10/1965)-(4/1966)
MOUNT KOBAU	E1	49.11	119.50	37.71	187.03	67.3	1.78			(1/1967)-
MOUSSALLA	F1	42.18	25.58	40.25	104.56	59.6	1.58	6.45	2925M	3/1964 -
MT ABU	G	24.60	72.70	15.41	144.23	35.3	1.02			(11/1957)---
MT NORIKURA	A7	36.10	137.55	25.69	203.58	49.7	1.24			(7/1957)-
	A7	36.10	137.55	25.69	203.58	49.7	1.24			(1/1964)-
	F1	36.12	137.50	25.69	203.58	49.7	1.24	11.39	2770M	11/1956 - 8/1968
	F1	36.12	137.50	25.69	203.58	49.7	1.24	11.39	2770M	9/1968 -
	F2	36.12	137.50	25.69	203.58	49.7	1.24	11.39	2770M	8/1955 -
	F3	36.12	137.50	25.69	203.58	49.7	1.24	11.39	2770M	12/1968 -
MT WASHINGTON	F1	44.30	288.70	55.79	357.07	74.0	3.39	1.24	1900M	7/1954 -
MT WELLINGTON	F1	-42.92	147.20	-51.73	224.29	-72.7	2.85	1.89	725M	7/1956 - 1/1967
	F1	-42.92	147.20	-51.73	224.29	-72.7	2.85	1.89	725M	6/1970 -
MT WILSON	A1	34.23	241.91	41.24	303.86	60.1	1.71			(1/1957)-
	A3	34.23	241.91	41.24	303.86	60.1	1.71			NK
	A6	34.23	241.94	41.24	303.84	60.1	1.71			NK
	C1	34.23	241.94	41.24	303.84	60.1	1.71			NK
	D1	34.23	241.94	41.24	303.86	60.1	1.71			7/1926 - 6/1958
MUNDARING	B1	-32.00	116.20	-43.45	186.08	-66.6	1.88			(7/1957)-
	D1	-30.32	115.88	-41.77	185.65	-65.0	1.76			
	D2	-32.00	116.20	-43.45	186.08	-66.6	1.88			
MUNICH	F1	48.20	11.60	48.78	93.65	65.1	2.06	4.14	500M	1/1957 --- 1/1970
MUNTINLUPA	D1	14.37	121.02	03.04	189.72	13.8	0.94			7/1888 ---
MUOSTAKH	E1	71.60	130.10	60.50	192.11	82.8	5.63			(2/1958)---(4/1960)
MURCHISON BAY	D1	80.05	18.25	75.20	137.48	82.0	17.45			8/1957 - 7/1959
	E1	80.10	18.30	75.23	137.66	82.1	17.54			(9/1957)-(3/1958)
	F1	80.05	18.20	75.21	137.46	82.0	17.46	0.06	SL	8/1957 - 4/1959
	F3	80.05	18.20	75.21	137.46	82.0	17.46	0.06	SL	8/1957 - 4/1959
MURMANSK	B1	69.00	33.00	64.16	126.47	77.8	5.57			3/1956 -
	B7	68.95	33.05	64.10	126.46	77.8	5.56			1/1959 -
	B8	68.97	33.08	64.12	126.50	77.8	5.57			6/1964 -
	B10	68.95	33.05	64.10	126.46	77.8	5.56			11/1958 ---1/1966
	B14	68.97	33.08	64.12	126.50	77.8	5.57			(5/1959)-(12/1965)
	D1	68.25	33.08	63.47	125.78	77.5	5.29			7/1957 -
	E1	68.97	33.08	64.12	126.50	77.8	5.57			(9/1957)---(12/1963)
	E3	68.97	33.08	64.12	126.50	77.8	5.57			NK
	E4	68.97	33.08	64.12	126.50	77.8	5.57			NK
	F1	68.97	33.00	64.13	126.44	77.8	5.57	0.50	90M	12/1958 - 12/1961
NAGOYA	F3	35.15	136.97	24.68	203.21	48.5	1.22		4.9M	
NAGYCENK	B9	47.63	16.72	47.22	98.30	64.7	1.98			1/1967 -
	D1	47.63	16.72	47.22	98.30	64.7	1.98			1/1961 -
	D2	47.63	16.72	47.22	98.30	64.7	1.98			
NAINITAL	G	29.40	79.45	19.45	151.09					(1/1965)-
NAIROBI	B1	-01.28	36.83	-04.39	105.25	-25.6	1.01			2/1952 -
	B6	-01.28	36.83	-04.39	105.25	-25.6	1.01			(10/1964)-
	B10	-01.28	36.83	-04.39	105.25	-25.6	1.01			3/1965
	B11	-01.28	36.83	-04.39	105.25	-25.6				
	B12	-01.30	36.80	-04.39	105.25	-25.6	1.01			9/1969 ---
	D1	-01.28	36.83	-04.39	105.25	-25.6	1.01			2/1964 -
NANCAY	A10	44.40	02.20	47.01	82.74	61.4	1.78			(7/1957)---
	C3	44.40	02.20	47.01	82.74	61.4	1.78			(1/1958)-
NANTUCKET ISLAND	C6	41.27	289.90	52.77	358.63	71.9	2.92			(2/1969)-
NARSSARSSUAQ	B1	61.20	314.60	71.21	36.79	77.5	7.38			12/1950 -
	B8	61.20	314.60	71.21	36.79	77.5	7.38			11/1966 -
	B11	61.20	314.60	71.21	36.79	77.5	7.38			NK
	B12	61.20	314.60	71.21	36.79	77.5	7.38			8/1969 -
	B13	61.20	314.60	71.21	36.79	77.5	7.38			1/1963 -(12/1964)
	C5	61.20	314.60	71.21	36.79	77.5	7.38			NK
	C9	61.20	314.60	71.21	36.79	77.5	7.38			12/1950 -
	D1	61.20	314.60	71.21	36.79	77.5	7.38			1/1968 -
	E1	61.20	315.00	71.17	37.37	77.4	7.32			
NARYAN MAR	E1	67.60	53.10	59.95	139.86	78.5	4.79			(10/1958)-(4/1959)
NATAL	B1	-05.70	324.80	03.87	33.70	-6.6	1.05			8/1957 -
	B5	-05.70	324.80	03.87	33.70	-6.6	1.05			
NEDERHORST DEN	BA8	53.96	05.00	53.96	89.26	68.2	2.45			(7/1957)-
	A10	52.27	05.00	52.27	89.26	68.2	2.45			NK
	B10	52.23	05.08	53.91	89.32	68.2	2.45			7/1957 - 12/1958
	C1	52.27	05.00	53.96	89.26	68.2	2.45			(8/1957)---
	C3	52.27	05.00	53.96	89.26	68.2	2.45			(7/1957)-
	C4	52.27	05.00	53.96	89.29	68.2	2.45			NK
	C6	52.27	05.00	53.96	89.29	68.2	2.45			NK
	F1	52.27	05.00	53.96	89.26	68.2	2.45	2.76	-2M	2/1959 - 1/1965
NELC	C6	33.00	243.00	40.21	305.30	59.1	1.65			NK
NEUSTRELITZ	A8	53.28	13.08	53.31	97.61	69.0	2.48			1/1960 -
	B8	53.28	13.01	53.33	97.54	69.0	2.48			2/1959 -
	B9	53.90	13.01	53.91	97.89	69.5	2.55			1/1964 -
	B13	53.28	13.08	53.31	97.61	69.0	2.48			6/1968 -
	C3	53.28	13.08	53.31	97.61	69.0	2.48			1/1957 -
	C6	53.28	13.08	53.31	97.61	69.0	2.48			(7/1957)-
NEW ORLEANS	C6	29.00	270.00	39.63	335.98	60.4	1.72			NK
NEWPORT	D1	48.26	243.01	55.09	300.20	72.6	3.06			3/1966 -
	D2	48.26	243.01	55.09	300.20	72.6	3.06			
NGOYA	D2	-28.83	31.88	-30.36	94.38	-64.0	1.66			NK
NICOSIA	B14	35.17	33.28	31.99	109.65	51.4	1.29			(7/1957)-(11/1957)
NIEMEGK	D1	52.07	12.68	52.25	96.57	68.2	2.36			7/1890 -
	D2	52.07	12.68	52.25	96.57	68.2	2.36			
NIIGATA	G	37.70	138.82	27.37	204.57	51.4	1.28			(7/1957)-

MASTER STATION LIST

STATION NAME	OBS PRJG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
NITSANIM	D1	31.73	34.60	28.39	110.00	46.4	1.20			1/1963 -
NORD	B13	81.67	343.33	80.84	133.94	83.1	38.17			1/1964 -
	E1	81.67	343.33	80.84	133.94	83.1	38.17			(9/1957)---(12/1965)
NORFOLK IS	B1	-29.00	168.00	-34.75	243.22	-56.4	1.50			2/1964 -
NORILSK	B1	69.40	88.10	58.50	164.81	83.0	5.12			1/1968 -
	B8	69.40	88.10	58.50	164.81	83.0	5.12			3/1964 -
	E1	69.40	88.10	58.50	164.81	83.0	5.12			1/1969 -
	F1	69.40	88.10	58.50	164.81	83.0	5.12		SL	1/1971 -
NORTH LIBERTY	A8	41.77	268.43							7/1957 - 3/1970
NORTHFIELD	F1	44.47	266.80	54.71	329.58	74.1	3.20	1.43	300M	9/1957 - 8/1959
NORTHWAY	B11	62.97	218.05	64.09	263.82	76.4	5.16			10/1963 -
	D1	62.97	218.05	64.09	263.82	76.4	5.16			7/1957 - 12/1958
	E1	63.00	218.00	64.10	263.75	76.4	5.17			(3/1958)---(4/1959)
NORWAY STATION	D1	-70.50	357.47	-63.79	43.86	-62.7	3.98			1/1961 - 2/1962
NORWICH	B13	43.70	287.67	55.18	355.78	73.8	3.30			8/1957 - 1/1966
NOVOKAZALINSK	B1	45.77	62.12	37.64	138.42	65.0	1.70			NK
	D1	45.77	62.12	37.64	138.42	65.0	1.70			7/1965 -
NOVOLAZARREVSKAY	D1	-70.77	11.82	-66.17	53.60	-63.7	4.63			1/1960 -
	D2	-70.77	11.82	-66.17	53.60	-63.7	4.63			
	E1	-70.77	11.82	-66.17	53.60	-63.7	4.63			(4/1965)-(10/1965)
NOVOSIBIRSK USSR	B1	55.03	82.90	44.60	157.72	74.2	2.36			1/1969
NOWY SACZ	A2	49.53	22.72	47.96	104.79	66.5	2.08			(10/1957)-(12/1959)
NURMIJARVI	B1	60.50	24.60	57.86	112.53	73.6	3.39			1/1957 -
	B8	60.52	24.65	57.87	112.58	73.6	3.39			(1/1967)-
	D1	60.52	24.65	57.87	112.58	73.6	3.39			1/1953 -
	D2	60.52	24.65	57.87	112.58	73.6	3.39			(7/1957)-
NY-ALESUND	C8	78.92	348.08	79.26	120.04	81.7	23.89			9/1972 -
	E1	78.92	348.08	79.26	120.04	81.5	16.52			(1/1969)-
O DAY	E1	57.60	265.80	67.52	323.36	82.8	7.72			(10/1957)-(4/1958)
O HIGGINS	E1	-63.30	302.10	-51.96	08.07	-56.2	2.20			(4/1957)-(7/1958)
OAKLAND	C6	37.78	237.80	44.01	298.37	62.7	1.87			4/1959 --- 9/1963
OASIS	D1	-66.30	100.72	-77.46	160.71	-78.8	25.95			7/1957 - 11/1958
	E1	-66.30	100.80	-77.46	160.86	-78.8	26.11			(7/1957)-(11/1957)
OBACHI	B5	40.70	141.73	30.60	206.75	54.4	1.38			
ODESSA	D1	46.78	30.88	43.68	111.11	64.4	1.84			1/1896 ---
	D2	46.78	30.88	43.68	111.11	64.4	1.84			
OGASAWARA	D1	27.15	142.30	17.19	208.94	36.5	1.07			
OHIRA	B14	35.60	140.50	25.43	206.32	48.5	1.23			6/1958 - 1971
OKINAWA	B1	26.30	127.80	15.25	195.58	36.6	1.05			5/1946 -
	B4	26.30	127.80	15.25	195.58	36.6	1.05			2/1964 -
	B9	26.30	127.80	15.25	195.58	36.6	1.05			
	B12	26.50	128.00	15.46	195.75	36.9	1.05			(1/1958)-(4/1958)
	C6	26.50	128.00	15.46	195.75	36.9	1.05			(7/1957)-
OLENEK	E1	68.50	112.50	57.00	181.01	82.9	4.65			(11/1957)---
ONAGAWA	D1	38.43	141.47	28.32	206.82	51.9	1.31			
	D2	38.26	142.28							(7/1957)-(12/1958)
ONDREJOV	A2	49.92	14.98	49.75	97.68	66.6	2.15			NK
	A6	49.92	14.98	49.75	97.68	66.6	2.15			NK
	A8	49.92	14.98	49.75	97.68	66.6	2.15			(10/1958)-
	C1	49.92	14.98	49.75	97.68	66.6	2.15			(7/1957)-
	C3	49.92	14.98	49.75	97.68	66.6	2.15			(10/1957)-
	C4	49.92	14.98	49.75	97.68	66.6	2.15			
	C6	49.92	14.98	49.75	97.68	66.6	2.15			(2/1964)---(5/1965)
	G	49.92	14.98	49.75	97.68	66.6	2.15			(7/1957)-(12/1959)
ONSALA	C3	57.40	11.92	57.40	99.04	71.7	3.02			(7/1957)-(9/1959)
ORCADAS	D1	-61.00	315.22	-50.26	18.12	-54.7	2.12			NK
ORLANDO	B4	28.55	272.67	39.39	339.06	60.5	1.72			3/1968 - 2/1970
ORMOND BEACH	C6	26.00	270.00	36.65	336.33	57.1	1.57			3/1973
ORRORAL	B2	-35.62	148.95	-44.31	224.31	-66.2	0.80			11/1965 -
OSHKOSH	C6	44.02	270.47	54.61	334.19	74.1	0.81			7/1958 -
OTTAWA	A6	45.40	284.58	56.80	351.52	75.2	3.62			NK
	A8	45.40	284.58	56.80	351.52	75.2	3.62			(7/1957)-
	A10	45.40	284.58	56.80	351.52	75.2	3.62			6/1968 -
	B1	45.40	284.10	56.79	351.14	75.2	3.62			1/1942 -
	B2	45.35	284.12	56.74	351.17	75.2	3.61			9/1962 -
	B4	45.40	284.10	56.79	351.14	75.2	3.61			10/1959 -
	B7	45.40	284.30	56.80	351.40	75.2	3.62			7/1957 - 12/1958
	B8	45.40	284.30	56.80	351.40	75.2	3.62			2/1956 -
	B10	45.40	284.30	56.80	351.40	75.2	3.62			8/1957 - 10/1957
	B13	45.40	284.20	56.79	351.14	75.2	3.62			7/1957 - 12/1958
	C1	45.40	284.58	56.80	351.52	75.2	3.62			(7/1957)-(6/1966)
	C3	45.40	284.58	56.80	351.52	75.2	3.62			(7/1957)-
	D1	45.40	284.40	56.80	351.52	75.2	3.62			7/1968 -
	D2	45.20	284.50	56.61	351.61	75.1	3.58			
	E1	45.20	284.50	56.61	351.61	75.1	3.58			(7/1957)-1/1970
	E4	45.20	284.50	56.61	351.61	75.1	3.58			(7/1957)-
	F1	45.40	284.40	56.80	351.52	75.2	3.62	1.08	57M	4/1954 -
	F3	45.40	284.40	56.80	351.52	75.2	3.62	1.08	57M	12/1954 -
OUAGADOUGOU	B1	12.40	358.50	16.56	70.28	6.0	0.99			5/1966 -
	B2	13.42	358.50	17.56	70.49	8.4	1.00			6/1966 -
OULU	B6	65.08	25.87	61.83	117.21	75.8	4.41			1/1967 - 12/1968
	B8	65.00	25.40	61.84	116.76	75.8	4.39			(10/1967)-
	B11	65.08	25.87	61.83	117.21	75.8	4.41			NK
	E1	65.08	25.87	61.83	117.21	75.8	4.41			(1/1968)- 1/1971
	F1	65.00	25.40	61.84	116.76	75.8	4.39	0.81	15M	5/1964 -
	F3	65.00	25.40	61.84	116.76	75.8	4.39	0.81	15M	4/1964 ---
PAEONIAN SPGS	C6	38.00	282.00							5/1972 -
PALEHUA	A1	20.71	203.70	20.81	268.32	38.7	1.13			NK
	A6	20.71	203.70	20.81	268.32	38.7	1.13			
	C1	20.71	203.70	20.81	268.32	38.7	1.13			(1969 ---
PALMYRA ISLAND	D1	05.88	197.82	05.15	265.81	13.2	0.99			10/1957 - 8/1958
PALO ALTO	B6	37.50	242.00	44.45	302.99	63.3	1.91			(1/1964)

MASTER STATION LIST

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
PANAGYURISHTE	D1	42.52	24.18	40.85	103.36	59.9	1.60			1/1948 -
PANAMA	B1	09.40	280.10	20.68	348.50	37.9	1.18			6/1951 - 12/1958
	B12	09.40	280.10	20.68	348.50	37.9	1.18			(8/1957)-(11/1958)
	B12	09.40	280.10	20.68	348.50	37.9	1.18			4/1958 - 11/1958
	B14	09.00	280.50	20.30	348.94	37.4	1.18			1/1958 - 2/1967
PANSKA VES	B9	50.53	14.57	50.41	97.59	67.0	2.20			1/1961 -
	B14	50.52	14.57	50.40	97.58	67.0	2.20			(7/1957)-
	C6	50.53	14.57	50.41	97.59	67.0	2.20			(3/1953)---
	F1	50.07	14.40	50.01	97.20	66.7	2.17	3.53	SL	2/1959 - 9/1962
	F3	50.07	14.40	50.01	97.20	66.7	2.17	3.53	SL	1/1958 - 12/1961
PARAMARIBO	B1	05.80	304.80	16.96	14.37	31.0	0.97			7/1957 -
	B10	05.80	304.80	16.96	14.37	31.0	0.97			1/1971 -
	C3	05.80	304.80	16.96	14.37	31.0	0.97			(7/1957)-(5/1967)
	C6	05.80	304.80	16.96	14.37	31.0	0.97			(1/1960)---(12/1966)
	D1	05.82	304.78	16.98	14.35	31.0	1.18			7/1957 -
	D2	05.82	304.78	16.98	14.35	31.0	1.18			
PARIS-SACLAY	B1	48.10	02.30	50.54	84.45	64.9	2.11			6/1960 -
PAXSON	B8	63.04	214.50	63.45	260.47	75.8	4.92			3/1967 -
PEARCE	B14	-31.70	116.00	-43.15	185.83	-66.3	1.86			2/1954 - 8/1957
PENDELI	D1	38.03	23.52	36.64	101.27	54.6	0.88			1/1899---
PENN STATE U	B6	40.82	282.13	52.15	349.04	72.2	2.88			(10/1964)-
	B7	40.82	282.13	52.15	349.04	72.2	2.88			7/1957 - 12/1960
	C3	41.00	282.00	52.33	348.86	72.3	2.90			1/1965 -
PENTICTON	A8	48.30	240.40	55.63	296.79	72.7	3.13			8/1964 -
	C3	49.30	240.40	55.63	296.79	72.7	3.13			8/1964 -
PETROPAVLOVSK	D1	53.10	158.63	44.66	218.59	64.3	2.03			
	D2	53.10	158.63	44.66	218.59	64.3	2.03			8/1957 -
PIC DU MIDI	A7	43.00	00.10	46.08	80.06	59.9	0.88			(7/1957)-
	A7	43.00	00.10	46.08	80.06	59.9	0.88			7/1967 ---
	F1	42.93	00.20	45.99	80.14	59.8	1.70	5.36	2860M	8/1957 - 9/1964
	F1	42.93	00.20	45.99	80.14	59.8	1.70	5.36	2860M	11/1964 -
	F3	42.93	00.20	45.99	80.14	59.8	1.70	5.36	2860M	12/1957 - 12/1965
PILAR	D1	-31.67	296.12	-20.21	04.64	-28.5	1.16			1/1905 -
PIONERSKAYA	D1	-69.73	95.50	-80.33	146.55	-77.2	31.15			7/1957 - 12/1958
PIRKULI	C3	40.80	48.60	34.78	125.24	59.2	1.49			(12/1959)-(2/1962)
PITTSBURG	C6	40.50	279.78	51.73	346.18	72.0	2.82			(2/1958)-
PLAISANCE	D1	-20.43	57.67	-26.98	122.50	-54.7	1.33			1/1896 -
PLATEAU	D1	-79.25	40.50	-77.20	52.51	-69.9	9.93			2/1966 - 11/1968
	D2	-79.47	40.58	-77.33	51.70	-70.0	10.03			
	E1	-79.25	40.50	-77.20	52.51	-69.9	9.93			1/1966 - 1/1969
PLEASANT UNITY	C6	41.00	280.00							7/1971 -
PLUM IS	B12	43.00	289.00	54.49	357.48	73.1	3.18			8/1964 - 12/1965
POCATELLO	E1	42.80	247.60	50.54	307.51	69.3	2.47			(7/1957)-(6/1963)
POINT ARGUELLO	B1	35.60	239.40	42.15	300.73	61.0	1.76			7/1963 -
	B5	35.60	239.40	42.15	300.73	61.0	1.76			
POINT MUGU	B5	34.12	240.88	40.96	302.73	59.8	1.69			
POITIERS	B1	46.60	00.30	49.50	81.75	63.5	1.99			7/1948 -
	B13	46.57	00.35	49.46	81.79	63.5	1.98			1/1963 -
	C6	46.57	00.35	49.46	81.79	63.5	1.98			(9/1968)-
POMPTON PLAINS	C6	41.00	286.00							5/1972 -
POONA	G	18.52	73.87	09.24	144.56	22.6	0.96			1/1958 ---
POPAYAN	B1	2.45	283.38	13.85	352.16	27.6	1.11			5/1970 -
PORT CLARENCE	C6	64.50	194.57	61.03	242.03	74.0	4.25			(2/1969)-
PORT LOCKROY	B1	-64.80	296.50	-53.34	03.92	-57.7	2.32			5/1948 - 12/1961
PORT MORESBY	B1	-09.40	147.10	-18.60	217.83	-32.8	1.05			5/1961 - 10/1972
	D1	-09.40	147.15	-18.59	217.88	-32.8	1.05			7/1957 -
	D2	-09.40	147.15	-18.59	217.88	-32.8	1.05			10/1959 -
PORT STANLEY	B1	-51.70	302.20	-40.38	09.09	-47.5	1.58			12/1945 -
	B6	-51.70	302.20	-40.38	09.09	-47.5	1.58			9/1962 -
	B7	-51.70	302.20	-40.38	09.09	-47.5	1.58			7/1957 - 12/1959
	B14	-51.70	302.15	-40.38	09.05	-47.5	1.58			(7/1957)-(11/1957)
POTCHEFSTROOM	F1	-26.70	27.10	-27.34	90.22	-63.4	1.58	7.30	1351M	5/1971 -
	F4	-26.70	27.10	-27.34	90.22	-63.4	1.58	7.30	1351M	NK
POTSDAM	A2	52.55	13.07	52.62	97.20	68.5	2.40			(7/1957)-(12/1959)
	A8	52.55	13.07	52.62	97.20	68.5	2.40			(7/1957)-
	C3	52.55	13.07	52.62	97.20	68.5	2.40			(7/1957)-
POWELL	C6	40.06	277.00	51.14	342.83	71.5	2.74			1/1958 - 9/1958
PREDIGTSTUHL	F1	47.70	12.88	18.10	149.64	41.0	1.07	4.30	1614M	5/1969 -
	F3	47.70	12.88	18.10	149.64	41.0	1.07	4.30	1614M	11/1966 -
PREOBRAZHENIE	E1	74.70	112.90	63.20	181.11	85.7	7.30			(3/1958)-(3/1958)
PRESQUE ISLE	E1	46.58	291.98	58.08	01.27	74.9	3.76			(5/1964)-(6/1966)
PRESTON	A1	53.77	357.30	56.91	82.42	69.4	2.73			NK
	C6	53.77	357.30	56.91	82.42	69.4	2.73			(5/1957)-
PRETORIA	B2	-25.80	28.30	-26.70	91.62	-62.7	1.54			NK
	B14	-25.80	28.30	-26.70	91.62	-62.7	1.54			2/1958 -
PRICE	D1	39.62	249.22	47.68	310.33	66.8	2.18			7/1957 - 1/1959
PRINCE ALBERT	B2	53.22	254.07	61.68	310.69	78.5	4.73			9/1962 - 8/1963
	B3	53.22	254.07	61.68	310.69	78.5	4.73			(3/1964)-
	B8	53.20	254.30	61.69	310.98	78.5	4.74			1/1963 - 6/1967
PROSPECT HILL	A9	42.38	288.75	53.87	357.18	72.8	3.08			1/1967 -
PROVIDENYA	B1	64.40	186.60	59.58	235.74	73.3	3.95			3/1957 -
PRUHONICE	B1	50.00	14.60	49.90	97.36	66.6	2.16			4/1958 -
	B9	49.98	14.55	49.89	97.30	66.6	2.16			(5/1964)-
	B13	49.99	14.55	49.90	97.31	66.6	2.16			1/1959 - 2/1960
	D1	49.98	14.55	49.89	97.30	66.6	2.16			1/1946 -
PUERTO RICO	A1	18.12	293.85	29.60	03.12	50.7	1.42			NK
	B1	18.50	292.80	29.99	01.97	51.3	1.43			12/1950 - 6/1963
	B4	18.50	292.80	29.99	01.97	51.3	1.43			9/1963 -
	B8	18.50	292.80	29.99	01.97	51.3	1.43			1/1959 - 12/1959
	B9	18.50	292.80	29.99	01.97	51.3	1.43			NK
	B10	18.50	292.80	29.99	01.97	51.3	1.43			1/1957 - 8/1960
	C1	18.12	293.85	29.60	03.12	50.7	1.42			(1/1969-
	C6	18.12	293.85	29.60	03.12	50.7	1.42			NK
	D1	18.12	293.85	29.60	03.12	50.7	1.42			1/1903 -
	D2	18.12	293.85	29.60	03.12	50.7	1.42			

MASTER STATION LIST

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
PULKOVO	A3	59.77	30.32	56.14	116.91	73.4	3.20			(2/1964) ---
	C3	59.77	30.32	56.14	116.91	73.4	3.20			(9/1957)-(1/1958)
	C7	59.77	30.32	56.14	116.91	73.4	3.20			
PULLMAN	B4	46.72	242.83	53.57	300.67	71.4	2.83			3/1964 -
	B8	46.72	242.83	53.57	300.67	71.4	2.83			1/1958 -(12/1959)
	B12	46.72	242.83	53.57	300.67	71.4	2.83			10/1957 -
	C3	46.72	242.83	53.57	300.67	71.4	2.83			12/1965 ---
	E1	46.72	242.83	53.57	300.67	71.4	2.83			(8/1957)-(11/1966)
PYONG YANG	A1	39.07	125.78	27.90	192.95	55.3	1.32			(5/1958)-(1/1959)
	A2	39.07	125.78	27.90	192.95	55.3	1.32			(5/1958)-(1/1959)
PYRAMID ROCK	C6	21.00	203.00	20.96	267.57	39.0	1.14			NK
PYRAMIDA	E1	78.20	15.20	74.44	130.69	81.2	14.54			(11/1957)---(1/1959)
QUETTA	B1	30.20	67.00	21.65	139.76	45.4	1.13			10/1957 - 12/1964
	D1	30.18	66.95	21.64	139.71	45.4	1.13			10/1953 -
QUITO	B2	-00.62	281.42	10.72	350.25	21.6	0.99			9/1962 -
RABAT	B1	33.90	353.20	38.59	69.94	48.6	1.32			2/1958 ---
	B14	33.90	353.20	38.59	69.94	48.6	1.32			3/1958 -
	C6	33.90	353.20	38.59	69.94	48.6	1.32			(7/1957)---(6/1959)
RACIBORZ	D1	50.00	18.20	49.19	100.76	66.7	2.14			NK
RAMSEY	C6	41.05	285.85	52.49	353.62	72.1	2.91			(7/1958)---(5/1968)
RAPID CITY	E1	44.03	256.95	53.12	317.88	72.2	2.86			(8/1957)-(12/1958)
	E3	44.03	256.95	53.12	317.88	72.2	2.86			NK
	E4	44.03	256.95	53.12	317.88	72.2	2.86			NK
	G	44.03	256.95	53.12	317.88	72.2	2.86			(9/1957)-(12/1958)
RAROTONGA	B1	-21.20	200.20	-20.91	273.64	-38.2	1.13			2/1945 -
REDMOND	E1	44.30	238.70	50.50	297.09	68.5	2.43			(8/1957)-(6/1963)
REGGANE	B5	26.72	00.17	30.26	75.13	36.4	0.93			
REGINA	E1	50.40	255.50	59.15	313.80	76.8	4.02			(7/1957)-(12/1958)
RESOLUTE BAY	B1	74.70	265.10	82.99	289.27	89.0	93.98			1/1949 -
	B2	74.68	265.12	82.98	289.42	89.0	93.69			3/1962 -
	B4	74.70	265.10	82.99	289.27	89.0	93.98			9/1959 -
	B5	74.70	265.10	82.99	289.27	89.0	93.98			
	B7	74.70	265.10	82.99	289.27	89.0	94.10			7/1957 - 5/1961
	B8	75.20	265.98	83.50	287.51	88.90	113.10			9/1959 -
	C8	75.20	265.98	83.50	287.51	88.90	163.10			9/1959 -
	C9	74.70	265.10	82.99	289.27	89.0	93.98			1/1949 -
	D1	74.70	265.10	82.99	289.27	89.0	94.10			11/1953 -
	D2	74.70	265.10	82.99	289.27	89.0	94.10			
	E1	74.70	265.10	82.99	289.27	89.0	94.10			(9/1957)---(3/1959)
	E3	74.70	265.10	82.99	289.27	89.0	94.10			NK
	F1	74.69	265.00	82.96	289.18	89.1	93.39	0.00	17M	10/1956 - 7/1966
	F1	74.69	265.00	82.96	289.18	89.1	93.39	0.00	17M	3/1966 - 11/1972
	F3	74.69	265.00	82.96	289.18	89.1	93.39	0.00	17M	10/1956 - 7/1966
REYKJAVIK	B1	64.10	338.20	70.16	70.82	76.0	6.20			7/1944 - 12/1964
	B8	64.13	338.22	70.19	70.88	76.0	6.21			4/1965 -(3/1970)
	C8	64.13	338.22	70.19	70.88	76.0	6.21			(4/1965)-
	C9	64.10	338.20	70.16	70.82	76.0	6.20			7/1944 - 12/1964
	E1	64.10	338.10	70.18	70.70	76.0	6.21			(11/1958)---
	F4	64.10	338.10	70.18	70.18	76.0	6.21			NK
RICHLAND	G1	46.4	240.4	52.8	298.1		2.7			9/1967
RIGA	A8	56.95	24.07	54.64	109.77	71.6	2.83			(11/1959)---(5/1966)
	C3	56.95	24.07	54.64	109.77	71.6	2.83			(11/1959)---(5/1966)
RIO DE JANEIRO	F1	-22.90	316.70	-12.46	24.15	-25.3	1.13	11.73	SL	9/1957 - 12/1962
ROBURENT	B13	44.30	07.88	45.79	88.36	61.3	1.74			4/1966 -
	D1	44.30	07.88	45.79	88.36	61.3	1.74			9/1964 -
	D2	44.30	07.88	45.79	88.36	61.3	1.74			7/1964 -
ROCHESTER	B13	43.30	282.70	54.65	349.54	73.9	3.25			12/1961 -
ROCK BANK	B14	-37.70	144.60	-46.94	219.89	-68.7	2.24			1/1955 -(12/1958)
ROME	A1	41.90	12.50	42.56	91.97	58.8	1.58			(7/1957)-
	A2	41.90	12.50	42.56	91.97	58.8	1.58			(7/1957)-
	A3	41.90	12.50	42.56	91.97	58.8	1.58			(1/1967)---
	A4	41.90	12.50	42.56	91.97	58.8	1.58			(7/1957)-
	A5	41.90	12.50	42.56	91.97	58.8	1.58			NK
	A6	41.90	12.50	42.56	91.97	58.8	1.58			NK
	B1	41.80	12.50	42.46	91.93	58.7	1.58			1/1951 -
	B12	42.03	11.83	42.82	91.37	58.9	1.59			8/1957 - 8/1958
	C1	41.90	12.50	42.56	91.97	58.8	1.58			(6/1965)---
	C3	41.90	12.50	42.56	91.97	58.8	1.58			NK
	C6	41.90	12.50	42.56	91.97	58.8	1.58			(1/1964)-
	F1	41.90	12.50	42.56	91.97	58.8	1.58	6.32	60M	7/1957 - 1/1967
	F1	41.90	12.50	42.56	91.97	58.8	1.58	6.32	60M	4/1966 -
	F3	41.90	12.50	42.56	91.97	58.8	1.58	6.32	60M	1/1958 - 11/1964
ROSARIO	A1	-32.92	300.63	-21.57	08.68	-30.3	7.32			7/1970 -
	A2	-32.92	300.63	-21.57	08.68	-30.3	7.32			10/1967 -
	A4	-32.92	300.63	-21.57	08.68	-30.3	7.32			NK
ROSCHINO	E1	60.20	29.60	56.67	116.58	73.6	3.28			(2/1958)---(4/1959)
ROSMAN NC	B6	35.20	277.51	46.33	343.98	67.5	2.23			(1/1969)
ROSTOV	B1	47.20	39.68	42.50	119.20	65.1	1.84			1/1957 -
	B7	47.22	39.68	42.52	119.19	65.2	1.84			6/1958 -
	B10	47.22	39.68	42.52	119.19	65.2	1.84			7/1958 -
SABHAWALA	D1	30.33	77.80	20.54	149.69	45.2	1.11			1903---
SACHS HARBOR	E1	72.00	235.00	75.11	265.47	84.7	17.26			NK
SACRAMENTO PEAK	A1	32.72	254.25	41.61	317.68	61.1	1.75			1/1951 -
	A2	32.72	254.25	41.61	317.68	61.1	1.75			1/1951 -
	A4	32.72	254.25	41.61	317.68	61.1	1.75			(7/1957)---
	A6	32.72	254.25	41.61	317.68	61.1	1.75			(7/1957)-
	A7	32.72	254.25	41.61	317.68	61.1	1.75			10/1957 -
	C1	32.72	254.25	41.61	317.68	61.1	1.75			(7/1957)-
	C2	32.72	254.25	41.61	317.68	61.1	1.75			NK
	C3	32.72	254.25	41.61	317.68	61.1	1.75			(7/1957)--- 8/1961
	C6	32.72	254.25	41.61	317.68	61.1	1.75			(7/1957)--- 8/1961
	G	32.72	254.20	41.60	317.62	61.1	1.75			(7/1957)-(12/1964)
SAGAMORE HILL	A8	42.61	289.20	54.10	357.14	72.9	3.11			10/1965 -
	B6	42.61	289.20	54.10	357.14	72.9	3.11			
	B11	42.61	289.20	54.10	357.14	72.9	3.11			1/1965 -
	C3	42.38	289.11							10/1965 -
	C4	42.38	289.11							1/1966 -

MASTER STATION LIST

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
SAINT KILDA	B4	-37.70	138.50	-44.69	212.27	-66.7	2.00			2/1964 -
SAINT MAUR	B4	-37.70	138.50	-44.69	212.27	-66.7	2.00			2/1964 -
SAINT SANTIN	B3	44.11	02.03	46.77	82.45	61.1	1.76			(11/1965)-
SAKUSHIMA	B13	34.72	137.03	24.26	203.31	47.9	0.87			1972
SALEKHARD	B1	66.50	66.70	57.33	148.95	79.4	4.38			7/1957 -
	E1	66.50	66.70	57.33	148.95	79.4	4.38			(3/1958)---(4/1959)
SALISBURY	B1	-37.70	138.60	-44.68	212.39	-66.7	2.00			6/1960 -
SALISBURY (RHODE	B1	-17.80	31.00	-19.42	96.15	-55.2	1.30			1/1958 - 12/1958
SALTHOLM	B13	55.62	12.80	55.57	98.71	70.6	2.76			5/1960 - 12/1961
SALTSJOBADEN	C1	59.27	18.25	57.91	106.10	72.8	3.24			(7/1957)---
SAN FERNANDO	D1	36.47	353.80	40.98	71.33	52.2	1.41			1/1891 -
SAN FERNANDO OBS	A1	34.05	241.51	40.99	303.43	59.9	1.69			(7/1965)-
	A3	34.05	241.51	40.99	303.43	59.9	1.69			(2/1969)-
	A4	34.05	241.51	40.99	303.43	59.9	1.69			(2/1966)-
	A5	34.05	241.51	40.99	303.43	59.9	1.69			(2/1971)-
	A8	34.05	241.51	40.99	303.43	59.9	1.69			(7/1968)-
	A9	33.91	241.62	40.88	303.65	59.8	1.69			(1/1967)-
	C3	34.05	241.51	40.99	303.43	59.9	1.69			(2/1968)-
	C6	34.05	251.77	41.04	303.71	59.9	1.70			NK
SAN JOSE	B6	-23.32	314.14	-12.57	21.72	-23.7	1.09			(12/1964)-
	B8	-23.21	314.14	-12.57	21.72	-23.7	1.09			3/1963 -
	B14	-23.22	314.15	-12.58	21.73	-23.7	1.12			3/1958 -
	D2	-23.22	314.15	-12.58	21.73	-23.7	1.12			
SAN JUAN (ARG)	B1	-31.50	294.50	-20.02	3.18	-28.3	1.15			
SAN MARCO PLATFO	B5	-02.93	40.21	-06.64	108.30	-28.4	1.02			NK
SAN MIGUEL	D1	37.77	334.35	45.63	50.89	56.6	1.68			1/1911 -
SAN MIGUEL (ARG)	A1	-34.50	301.30							
	A2	-34.50	301.30							
	A8	-34.50	301.30							
	C1	-34.50	301.30							
	C3	-34.50	301.30							(1/1967 -
SAN NICOLAS IS	B5	33.23	240.58	40.04	302.64	58.8	1.64			
SAN SALVADOR	B1	24.10	285.50	35.54	353.83	57.5	1.61			11/1958 - 2/1965
SANAE	B1	-70.30	357.60	-63.62	44.13	-62.6	3.95			6/1962 -
	B8	-70.30	357.60	-63.63	44.17	-62.6	3.95			4/1964 -
	B13	-70.30	357.65	-63.63	44.17	-62.6	3.95			(6/1970)-
	C6	-70.30	357.65	-63.63	44.17	-62.6	3.95			6/1962 -
	D1	-70.30	357.65	-63.63	44.17	-62.6	3.95			6/1962 -
	D2	-70.30	357.65	-63.63	44.17	-62.6	3.95			4/1970 -
	E1	-70.30	357.65	-63.63	44.17	-62.6	3.95			1/1960 -
	E3	-70.30	357.60	-63.62	44.13	-62.6	3.95			NK
	F1	-70.30	357.60	-63.62	43.13	-62.6	3.95	1.06	53M	2/1964 -
	G	-70.30	357.60	-63.62	44.13	-62.6	3.95			6/1967 -
SANTA BARBARA	F3	34.00	241.00	40.86	302.89	59.7	1.69			NK
SANTIAGO	A2	-33.57	289.32	-22.07	358.49	-31.6	1.17			(7/1957)---(8/1961)
	B2	-33.13	289.32	-21.63	358.49	-31.0	0.91			8/1963 -
	F3	-33.50	289.34	-22.00	358.51	-31.5	1.17	11.44	512M	(2/1958)---
SAO PAULO	A8	-22.55	313.37	-11.86	21.05	-22.2	1.09			10/1967 ---
	B1	-23.50	313.50	-12.82	21.09	-23.6	1.09			5/1953 - 5/1965
	B12	-23.50	313.50	-12.82	21.09	-23.6	1.09			4/1958 - 11/1958
	C3	-22.55	313.37	-11.86	21.05	-22.2	1.09			10/1967 ---
	C6	-22.55	313.37	-11.86	21.05	-22.2	1.09			4/1963 ---
SAPPORO	F2	43.02	141.35	32.87	206.09	57.1	1.46	8.22	54M	7/1957 -
SARDINIA	B5	39.56	09.24	40.95	87.95	56.0	1.48			
SASKATOON	E1	52.10	253.40	60.49	310.45	77.6	4.35			(7/1957)-
	E3	52.10	253.40	60.49	310.45	77.6	4.35			(7/1957)-(12/1959)
SCHAUINSLAND	C1	47.92	07.92	49.25	89.94	64.8	2.06			(7/1957)---(5/1963)
	F3	47.92	07.92	49.25	89.94	64.8	2.06			NK
SCHWARZENBURG	B1	46.60	06.70	48.23	88.15	63.5	1.93			12/1950 -
SCITUATE	C6	42.20	287.28	53.67	355.35	72.8	3.07			3/1965 ---
SCOTT BASE	B1	-77.90	166.80	-79.01	294.63	-82.2	32.60			3/1957 -
	B11	-77.90	166.80	-79.01	294.63	-82.2	32.60			(12/1969)-
	B13	-77.90	166.80	-79.01	294.63	-82.2	32.60			(12/1969)-
	C9	-77.80	166.80	-78.95	294.18	-82.3	32.61			3/1957 -
	D1	-77.85	166.78	-78.98	294.39	-82.3	32.63			7/1957 -
	E1	-77.90	166.80	-79.01	294.63	-82.2	32.60			(3/1957)---(9/1958)
	E3	-77.90	166.80	-79.01	294.63	-82.2	32.60			NK
SDR STROMFJORD	B8	67.00	310.00	77.34	35.47	80.4	14.18			2/1970 -
	C8	67.02	309.28	77.44	34.27	80.5	14.47			11/1970 -
	D1	67.02	309.28	77.44	34.27	80.5	14.47			1972-
SEATTLE	A8	47.75	237.58	53.63	294.41	70.9	2.81			NK
	B1	47.75	237.58	53.63	294.41	70.9	2.81			1/1958 - 10/1960
	B13	47.75	237.58	53.63	294.41	70.9	2.81			7/1957 -(7/1961)
	C3	47.75	237.58	53.63	294.41	70.9	2.81			4/1962 --- 11/1965
	D2	47.63	237.65	53.33	294.54	70.9	2.79			
SENDAI	G	38.09	140.56	27.91	206.06	51.6	1.30			(7/1957)-
SEOUL	A1	35.58	127.00	26.47	194.12	53.2	1.28			(11/1964)-(2/1967)
	A2	35.58	127.00	26.47	194.12	53.2	1.28			(11/1964)-(2/1967)
	B1	37.39	126.95	26.28	194.09	53.0	1.27			10/1966 ---
	D1	37.58	127.05	26.47	194.17	53.2	1.28			
	F3	37.32	126.56	26.39	194.13	53.1	1.28	10.79	45M	2/1964 --- 12/1965
SHATSK	D1	53.38	41.85	48.66	123.69	70.5	1.28			(7/1957)-
SHEEP MOUNTAIN	B8	61.82	212.50	61.95	259.77	74.6	4.41			3/1967 -
SHEFFIELD	B10	53.43	358.12	56.43	83.05	69.1	0.87			7/1964
	B13	53.43	358.12	56.43	83.05	69.1	0.87			NK
	E1	53.43	358.12	56.43	83.05	69.1	0.87			NK
SHEMAKHA	A3	40.77	48.58	34.75	125.21	59.2	1.49			NK
SHEPHERD BAY	B8	68.82	266.57	78.33	312.40	87.8	29.01			8/1963 -
	D1	68.82	266.57	78.33	312.40	87.8	29.01			7/1966 -
	G	68.82	266.57	78.33	312.40	87.8	29.01			8/1963 -
SHINGLETON	E1	46.40	273.50	57.22	337.48	76.1	3.73			(6/1957)-(6/1959)
	E3	46.40	273.50	57.22	337.48	76.1	3.73			NK

MASTER STATION LIST

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
SHODA JIMA	G	34.55	134.27	23.88	200.85	48.1	1.20			(9/1957)-(3/1959)
SIBERIA	A6	52.00	104.00	40.57	174.33	71.8	2.03			NK
SIDMOUTH	B9	50.67	356.75	54.08	80.10	67.1	2.38			NK
	D1	50.67	356.75	54.08	80.10	67.1	2.38			NK
	D2	50.67	356.75	54.08	80.10	67.1	2.38			NK
SIKTIVKAR	E1	61.80	50.80	54.76	134.70	75.6	3.41			(1/1958)---(4/1964)
SIMFEROPOL	A3	44.40	33.98	40.81	113.10	62.3	1.69			(1/1964)---
	A5	44.40	33.98	40.81	113.10	62.3	1.69			
	A6	44.40	33.98	40.81	113.10	62.3	1.69			NK
	A8	44.40	33.98	40.81	113.10	62.3	1.69			(11/1957)---
	B1	44.80	34.10	41.18	113.33	62.7	1.71			1/1957 --- 12/1959
	B10	44.40	34.00	40.81	113.10	62.3	1.69			12/1957 - 12/1958
	B14	44.83	34.07	41.21	113.31	62.7	1.71			(5/1959)-(12/1965)
	C1	44.40	33.98	40.81	113.10	62.3	1.69			(7/1957)-
	C3	44.40	33.98	40.81	113.10	62.3	1.69			(11/1957)---
	D1	44.83	34.07	41.21	113.31	62.7	1.71			(7/1957)-(12/1959)
	F1	44.73	34.00	40.81	113.10	62.3	1.69	5.51	570M	1/1961 --- 1/1965
	F3	44.73	34.00	40.81	113.10	62.3	1.69	5.51	570M	2/1958 --- 1/1965
	G	44.40	34.00	40.81	113.10	62.3	1.69			(7/1957)-(12/1959)
SIMOSATO	D1	33.57	135.93	23.03	202.43	46.6	1.18			9/1954 -
	D2	33.57	135.93	23.03	202.43	46.6	1.18			(7/1957)-(12/1958)
SINGAPORE	B1	01.30	103.80	-10.11	172.69	-18.3	0.91			11/1948 - 7/1971
	B2	01.42	103.82	-9.99	172.71	-18.0	0.91			9/1962 -
	B6	01.30	103.80	-10.11	172.69	-18.3	0.91			9/1962 -
	B7	01.30	103.80	-10.11	172.69	-18.3	0.91			1/1964 - 12/1965
	B10	01.32	103.82	-10.09	172.71	-18.3	0.91			7/1964 - 12/1965
	B14	01.30	103.80	-10.11	172.69	-18.3	0.91			7/1958 - 12/1968
	C6	01.30	103.80	-10.11	172.69	-18.3	0.91			
SITKA	D1	57.07	224.67	60.00	275.34	74.1	3.91			1/1902 -
	D2	57.07	224.67	60.00	275.34	74.1	3.91			7/1957 -
SITKINAK	C6	56.58	205.83	55.81	257.57	69.7	3.03			(2/1969)-
SKALNATE PLESO	A2	49.00	20.00	47.89	101.98	65.9	0.87			NK
SKAULO	E1	67.41	21.09	64.77	115.67	76.7	5.27			NK
SKIBOTN	E1	69.37	20.32	66.62	117.38	77.5	0.85			NK
SLOUGH	A8	51.48	359.43	54.32	83.27	67.7	2.43			(7/1967)-
	B1	54.48	359.43	54.32	83.27	67.7	2.43			1/1931 -
	B2	51.45	359.28	54.30	83.11	67.6	2.43			9/1962 -
	B9	51.48	359.43	54.32	83.27	67.7	2.43			NK
	B14	51.48	359.43	54.32	83.27	67.7	2.43			(7/1957)-(3/1959)
	C3	51.48	359.43	54.32	83.27	67.7	2.43			(7/1967)-
	C6	51.48	359.43	54.32	83.27	67.7	2.43			(1/1964)---
SOCORRO	F3	34.04	253.07	42.75	316.08	62.2	1.82	4.73	1677M	3/1968 -
SODANKYLA	B1	67.40	26.60	63.79	120.00	76.8	5.12			8/1957 -
	B6	67.40	26.60	63.79	120.00	76.8	5.12			7/1965 - 11/1966
	B8	67.40	26.60	63.79	120.00	76.8	5.12			1/1970 -
	D1	67.37	26.63	63.76	119.99	76.8	5.11			1/1914 -
	D2	67.37	26.63	63.76	119.99	76.8	5.11			(7/1957)-
	E1	67.40	26.60	63.79	120.00	76.8	5.12			(1/1957)---(1/1971)
	F4	67.40	26.60	63.79	120.00	76.8	5.12			NK
SOFIA	B1	42.67	23.30	41.17	102.59	60.0	1.60			
	B6	42.65	23.44	41.12	102.71	60.0	1.60			NK
	B9	42.65	23.44	41.12	102.71	60.0	1.60			1/1964 - 12/1965
	C6	42.65	23.44	41.12	102.71	60.0	1.60			NK
SOGRA	B13	62.80	46.25	56.38	131.70	75.8	3.63			(3/1964)-
	D2	62.80	46.25	56.38	131.70	75.8	3.63			(1/1964)-
SOLANT	B2	-52.00	302.00	-40.67	08.91	-47.8	1.59			NK
SOMERTON	C6	51.05	357.27	54.34	80.83	67.4	2.41			(5/1960)---
SONDRE STROMFJORE	1	67.00	310.00	77.34	35.47	80.4	14.18			
SONMIANI	B5	25.20	66.75	16.74	138.75	36.8	1.04			
SONNEBERG	A2	50.37	11.18	50.93	94.27	66.9	2.22			
SOUTH GEORGIA	B1	-54.28	323.50	-44.22	25.96	-52.2	1.85			(7/1957)-(12/1959)
	D1	-54.28	323.50	-44.22	25.96	-52.2	1.85			7/1970 -
	D2	-54.28	323.50	-44.22	25.96	-52.2	1.85			NK
SOUTH HADLEY	A2	42.25	287.42	53.72	355.52	72.8	3.07			NK
SOUTH POINT	B2	18.93	204.30	19.19	269.31	36.4	1.11			(10/1957)---(3/1959)
SOUTH POLE	B1	-90.00	00.00	-78.50	360.00	-74.2	13.48			11/1962 - 6/1965
	B8	-90.00	00.00	-78.50	360.00	-74.2	13.48			7/1957 -(3/1968)
	C8	-90.00	00.00	-78.50	360.00	-74.2	13.48			1/1963 -
	C9	-90.00	00.00	-78.50	360.00	-74.2	13.48			1/1963 -
	C10	-90.00	00.00	-78.50	360.00	-74.2	13.48			7/1957 -
	D1	-90.00	00.00	-78.50	360.00	-74.2	13.48			NK
	D2	-90.00	00.00	-78.50	360.00	-74.2	13.48			1/1959 -
	F1	-89.98	00.00	-78.49	00.09	-74.1	12.72	0.11	2820M	2/1964 -
	F3	-89.98	00.00	-78.49	00.09	-74.1	12.72	0.11	2820M	5/1964 -
SOUTH UIST	B1	57.20	352.86	61.00	80.17	71.7	3.36			NK
	B5	57.20	352.86	61.00	80.17	71.7	3.36			
	B7	57.20	352.86	61.00	80.17	71.7	3.36			NK
	B13	57.20	352.86	61.00	80.17	71.7	3.36			NK
	D1	57.20	352.86	61.00	80.17	71.7	3.36			NK
	D2	57.20	352.86	61.00	80.17	71.7	3.36			NK
SOYA SHIP	B1	-60.00								(11/1958)---(4/1962)
	G	-60.00								11/1956 - 4/1962
SP - 16	B1	76.00	183.35	69.42	220.99	82.4	1.07			6/1970 - 10/1972
SREDNIKAN	D1	62.43	152.32	53.07	210.57	73.1	3.10			1/1936 -
ST JOHNS	B1	47.60	307.30	58.50	21.24	72.0	3.43			5/1945---
	B2	47.73	307.27	58.63	21.23	72.1	3.45			9/1962 -
	D1	47.60	307.30	58.50	21.24	72.0	3.43			8/1968 -
ST JOSEPH	C6	39.80	265.00							
STANFORD	A9	37.43	237.83	43.67	298.51	62.4	1.85			(4/1960)---
	B1	37.40	237.80	43.63	298.49	62.4	1.85			1/1943 ---
	B3	37.43	237.83	43.67	298.51	62.4	1.85			
	B4	37.43	237.83	43.67	298.51	62.4	1.85			7/1964
	B6	37.40	237.80	43.63	298.49	62.4	1.85			
	B8	37.43	237.83	43.67	298.51	62.4	1.85			1/1958 --- 12/1959
	B12	37.43	237.83	43.67	298.51	62.4	1.85			8/1957 - 12/1958
	B13	37.43	237.83	43.67	298.51	62.4	1.85			7/1957 -(2/1963)
	D2	37.26	237.90			62.4	1.85			

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
STAR HILL	B14	43.34	284.75	54.75	352.11	73.8	3.25			1/1967 - 7/1969
STEVENS VILLAGE	E1	66.00	212.00	65.60	255.12	77.3	5.87			NK
STOCKHOLM	C6	59.15	18.05	57.84	105.84	72.7	3.23			8/1968 -
STONNINGTON ISLA	E2	-68.54	293.00	-57.04	1.34	-60.8	2.70			NK
STONYHURST	D1	53.85	357.53	56.94	82.71	69.4	2.73			7/1865 ---
	D2	53.85	357.53	56.94	82.71	69.4	2.73			NK
STORNOWAY	B10	58.20	353.67	61.77	81.78	72.2	3.53			NK
SUFFIELD	B13	50.22	248.83	57.95	305.95	75.3	3.66			(6/1962)-(12/1962)
SUKKERTOPPEN	D1	65.42	307.10	76.12	28.74	80.3	12.79			1/1964 - 12/1965
	D2	65.42	307.10	76.12	28.74	80.3	12.79			1/1964 - 12/1965
SULPHUR MOUNTAIN	F1	51.20	244.39	51.20	244.39	75.0	3.65	1.14	2283M	7/1957 -
	F1	51.20	244.39	51.20	244.39	75.0	3.65	1.14	2283M	3/1963 -
	F3	51.20	244.39	51.20	244.39	75.0	3.65	1.14	2283M	7/1957 ---
SUNNYVALE	C6	37.00	238.00							(1/1971)-
SURINAM	B5	05.83	303.69	17.06	13.21	31.6	0.97			
SURLARI	D1	44.68	26.25	42.54	106.07	62.2	1.72			1/1949 -
SVERDLOVSK	B1	56.70	61.10	48.46	140.70	73.6	2.61			5/1944 ---
	B7	56.70	61.10	48.46	140.70	73.6	2.61			NK
	B14	56.73	61.07	48.50	140.69	73.6	2.62			(3/1959)-(12/1965)
	D1	56.73	61.07	48.50	140.69	73.6	2.62			1/1929 -
	F2	56.80	60.63	48.62	140.36	73.6	2.63	2.30	290M	3/1952 ---
SWANSEA	B7	51.63	356.00	55.14	79.85	67.8	2.49			10/1957 - 12/1958
	B10	51.63	356.00	55.14	79.85	67.8	2.49			(7/1957)-(6/1958)
SWARTHMORE	F1	39.90	284.65	51.31	352.20	71.4	2.76	1.92	80M	9/1963 -
	F3	39.90	284.65	51.31	352.20	71.4	2.76	1.92	80M	6/1964 -
SWIDER	D1	52.12	21.25	50.62	104.60	68.4	2.30			1/1921 -
SYDNEY/FLEURS	A6	-33.87	150.77	-42.33	225.93	-64.3	1.87			NK
	A9	-33.87	150.77	-42.33	225.93	-64.3	1.87			(7/1957)---
	A10	-33.87	150.77	-42.33	225.93	-64.3	1.87			(7/1957)---
	C1	-33.87	150.77	-42.33	225.93	-64.3	1.87			(7/1957)--- 12/1964
	C4	-33.87	150.77	-42.33	225.93	-64.3	1.87			(7/1957)---(12/1966)
	F1	-33.60	151.10	-42.01	226.23	-64.0	1.85	4.69	43M	1/1958 - 12/1959
SYLT	C6	54.75	08.02	55.70	93.64	70.0	2.70			(1/1969)-
SYOWA BASE	B1	-69.00	39.60	-69.66	77.69	-65.5	6.09			2/1959 -
	B5	-69.00	39.60	-69.66	77.69	-65.5	6.09			
	B8	-69.00	39.60	-69.66	77.69	-65.5	6.09			2/1967
	C8	-69.00	39.60	-69.66	77.69	-65.5	6.09			2/1966
	C9	-69.00	39.60	-69.66	77.69	-65.5	6.09			2/1959 -
	D1	-69.00	39.58	-69.65	77.67	-65.5	6.09			1/1958 -
	D2	-69.00	39.58	-69.65	77.67	-65.5	6.09			
	E1	-69.03	39.60	-69.68	77.64	-65.5	6.10			(2/1959)-(4/1962)
	E4	-69.03	39.60	-69.68	77.64	-65.5	6.10			2/1967 -
	F1	-69.03	39.60	-69.68	77.64	-65.5	6.10	0.42	15M	3/1960 - 12/1961
	F1	-69.03	39.60	-69.68	77.64	-65.5	6.10	0.42	15M	3/1967 -
	F2	-69.03	39.60	-69.68	77.64	-65.5	6.10	0.42	15M	(7/1957)-(1/1958)
	F3	-69.03	39.60	-69.68	77.64	-65.5	6.10	0.42	15M	3/1959 ---
	G	-69.03	39.60	-69.68	77.64	-65.5	6.10			(2/1959)-(4/1962)
TAHITI	B1	-17.70	210.70	-15.42	283.06	-30.2	1.07			12/1957 -
	D1	-17.55	210.38	-15.34	282.72	-30.0	1.06			4/1958 -
	D2	-17.55	210.38	-15.34	282.72	-30.0	1.06			
TAIPEI	A1	24.95	121.23	13.67	189.51	34.7	1.02			(1/1964)-
	A2	24.95	121.23	13.67	189.51	34.7	1.02			(1/1964)-
	B1	25.00	121.20	12.67	189.51	34.8	1.03			3/1960 -
	B6	25.00	121.20	12.67	189.51	34.8	1.03			3/1967 - 6/1970
	B7	24.95	121.23	12.67	189.51	34.7	1.02			1/1965 - 12/1965
	B11	25.00	121.20	12.67	189.51	34.8	1.03			3/1969 -
	B14	24.95	121.23	12.67	189.51	34.7	1.02			6/1967 -
TAKEYAMA	F3	35.22	139.62	24.97	205.57	48.2	1.22	11.84	SL	3/1968 -
TALARA	B1	-04.60	278.70	06.64	347.66	13.1	1.04			2/1955 - 12/1965
	D1	-04.53	278.70	06.61	347.66	13.0	1.00			7/1957 - 1/1960
TALKEETNA	E1	62.30	209.90	61.88	257.00	74.5	4.39			(8/1964)---(5/1966)
TAMANRASSET	B1	22.80	05.53	25.39	79.53	28.5	1.05			12/1955 -
	D1	22.80	05.53	25.39	79.56	28.5	1.05			4/1932 -
	D2	22.80	05.53	25.39	79.56	28.5	1.05			
	G	22.78	05.53	25.37	79.56	28.4	1.05			(7/1957)-(12/1959)
TANANARIVE	B1	-18.80	47.50	-23.58	112.43	-53.8	1.29			11/1951 - 4/1972
	D1	-18.92	47.55	-23.71	112.42	-53.9	1.30			1/1902 -
TANGERANG	D1	-06.17	106.63	-17.64	175.44	-33.0	0.89			1/1964 -
TARTAGUL	B5	-22.77	296.18	-11.31	04.87	-15.7	0.97			
TASHKENT	A2	41.33	69.30	32.37	143.74	60.6	1.47			NK
	A6	41.33	69.30	32.37	143.74	60.6	1.47			NK
	C1	41.33	69.30	32.37	143.74	60.6	1.47			(7/1957)-
	D1	41.33	69.62	32.33	144.02	60.6	1.47			1/1900 -
TATSFIELD	B14	51.28	00.01	54.02	83.74	67.5	2.40			(7/1957)-(11/1957)
	C6	51.50	00.00	54.23	83.85	67.7	2.42			(7/1957)---
TATUOCA	D1	-01.20	311.48	09.57	20.78	15.0	1.02			8/1957 -
TBILISI	B1	41.70	44.80	36.29	122.06	60.0	1.54			6/1963 -
	B14	41.72	44.82	36.30	122.08	60.1	1.54			(11/1959)-(12/1965)
	D1	42.08	44.70	36.67	122.08	60.4	1.55			1/1905 -
	D2	42.08	44.70	36.67	122.08	60.4	1.55			(7/1957)---
	F1	42.08	44.70	36.67	122.08	60.4	1.55	6.91	510M	1/1958 ---
	F2	42.08	44.70	36.67	122.08	60.4	1.55	6.91	510M	4/1953 --- 3/1968
	F3	42.08	44.70	36.67	122.08	60.4	1.55	6.91	510M	2/1960 ---
TEHRAN	A1	35.70	51.40	29.33	126.54	53.2	1.30			NK
	A4	35.70	51.40	29.33	126.54	53.2	1.30			6/1965 -
	B1	35.70	51.40	29.33	126.54	53.2	1.30			4/1963 -
	C1	35.70	51.40	29.33	126.54	53.2	1.30			6/1965 -
	D1	35.73	51.38	29.37	126.53	53.2	1.30			7/1957 -
	F1	35.67	51.43	29.30	126.56	53.2	1.30	10.56	1400M	12/1969 -
TEL AVIV	C1	32.10	34.50	28.77	110.00	47.0	1.21			10/1969 -
TENERIFE	D1	28.48	343.72	34.99	58.62	41.8	1.22			1/1959 -
TEOLOYUCAN	D1	19.75	260.82	29.56	327.05	47.0	1.29			1/1914 -

MASTER STATION LIST

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
TERRE ADELIE	B1	-66.70	140.00	-75.69	230.89	-89.5	38.06			2/1951 ---
	B2	-66.70	140.00	-75.69	230.89	-89.5	38.06			NK
	B5	-66.40	140.01	-75.41	230.44	-89.7	35.74			
	C9	-66.70	140.00	-75.69	230.89	-89.5	38.08			2/1951 ---
	D1	-66.67	140.00	-75.66	230.84	-89.5	37.84			7/1957 -
	D2	-66.67	140.00	-75.66	230.84	-89.5	37.84			
	F1	-66.40	140.01	-75.41	230.44	-89.7	35.74	0.01	45M	9/1967 - 3/1968
	F1	-66.40	140.01	-75.41	230.44	-89.7	35.74	0.01	45M	NK
	F2	-66.40	140.01	-75.41	230.44	-89.7	35.74	0.01	45M	4/1968 -
THE HAGUE	B4	52.10	04.40	53.92	88.57	68.1	2.44			10/1959 -
THESSALONIKA	A2	40.35	23.00	39.57	101.71	58.1	1.52			NK
	A6	40.95	23.00	39.57	101.71	58.1	1.52			NK
	C1	40.35	23.00	39.57	101.71	58.1	1.52			(1/1964)---(10/1967)
THOMPSON	E4	55.00	263.00	64.65	321.04	81.0	0.80			NK
THULE/CAMP TUTO	B1	76.40	291.30	87.90	01.92	85.4	169.92			7/1955 - 6/1966
	B4	76.40	291.30	87.90	01.92	85.4	169.92			3/1964 -
	B8	76.55	291.18	88.05	01.23	85.4	179.47			5/1958 -
	B13	76.60	291.30	88.10	02.10	85.4	181.17			NK
	B14	76.60	291.30	88.10	02.10	85.4	181.17			4/1958 - 11/1962
	C8	76.55	291.18	88.05	01.23	85.4	179.47			(5/1958)-
	C9	76.40	291.30	87.90	01.92	85.4	169.92			2/1956 - 6/1966
	D1	76.55	291.17	88.05	01.16	85.4	180.51			7/1932 -
	D2	76.50	291.30	88.10	02.10	85.4	181.17			
	E1	76.55	291.17	88.05	01.16	85.4	180.51			(11/1957)---
	E3	76.55	291.17	88.05	01.16	85.4	180.51			NK
	F1	76.55	291.17	88.05	01.16	85.4	180.51	0.00	260M	8/1957 - 9/1964
	F1	76.55	291.17	88.05	01.16	85.4	180.51	0.00	260M	2/1964 -
	F3	76.55	291.17	88.05	01.16	85.4	180.51	0.00	260M	1/1962 -
	G	76.55	291.17	88.05	01.16	85.4	180.51			10/1958 - 3/1959
THULE/QANAQ	B1	77.50	290.80	89.00	357.52	85.6	264.41			9/1968 -
	B13	77.50	290.80	89.00	357.52	85.6	264.41			9/1964 - 12/1971
	C9	77.50	290.80	89.00	357.52	85.6	264.41			9/1968 -
	D1	77.48	290.83	88.98	357.93	85.6	263.45			1/1956 -
	D2	77.48	290.83	88.98	357.93	85.6	263.45			12/1966 -
	E1	77.48	290.83	88.98	357.93	85.6	263.45			NK
THUMBA	B1	08.60	76.90	-00.96	146.33	-1.3	0.92			10/1964 -
	B5	08.60	76.90	-00.96	146.33	-1.3	0.92			
TIHANY	D1	46.90	17.90	46.29	99.11	64.0	1.91			1/1949 -
TIRUCHIRAPALLI	B1	10.80	78.70	01.04	148.33	3.8	0.92			2/1949 -
TIXIE BAY	B1	71.60	128.90	60.45	191.35	82.9	5.64			7/1957 -
	B8	71.60	128.90	60.45	191.35	82.9	5.64			1/1964 -
	D1	71.58	129.00	60.44	191.41	82.9	5.63			1/1944 -
	D2	71.58	129.00	60.44	191.41	82.9	5.63			
	E1	71.60	128.90	60.45	191.35	82.9	5.64			(12/1957)---
	E4	71.60	128.90	60.45	191.35	82.9	5.64			(1/1969)-
	F1	71.55	128.90	60.40	191.36	82.9	5.62	0.53	SL	8/1966 -
	F2	71.55	128.90	60.40	191.36	82.9	5.62	0.53	SL	12/1957 -
T-3	E1	80.00		DRIFT						(11/1964)--- 10/1965
TOGO	B1	10.80	00.00	14.70	71.46	1.9	0.99			7/1965 - 2/1967
	B10	10.80	00.00	14.70	71.46	1.9	0.99			6/1965 -
TOKYO	A1	35.67	139.55	25.41	205.46	48.8	1.23			(7/1957)-
	A2	35.67	139.55	25.41	205.46	48.8	1.23			(7/1957)-
	A6	35.67	139.55	25.41	205.46	48.8	1.23			(7/1957)-
	A8	35.67	139.55	25.41	205.46	48.8	1.23			(7/1957)-
	B1	35.70	139.50	25.44	205.41	48.8	1.23			8/1943 -
	B6	35.70	139.50	25.44	205.41	48.8	1.23			
	B7	35.71	139.50	25.45	205.41	48.8	1.23			7/1957 -
	B12	35.70	139.48	25.44	205.39	48.8	1.23			7/1957 - 1/1959
	C1	35.67	139.55	25.41	205.46	48.8	1.23			(7/1957)-
	C3	35.67	139.55	25.41	205.46	48.8	1.23			(7/1957)-
	C6	35.75	139.61							
TOKYO/ITABASHI	F1	35.75	139.72	25.51	205.60	48.8	1.23	11.61	20M	11/1969 -
	F2	35.75	139.72	25.51	205.60	48.8	1.23	11.61	20M	1/1948 -
	F3	35.75	139.72	25.51	205.60	48.8	1.23	11.61	20M	7/1957 -
TOKYO/MABASHI	F2	35.71	139.65	25.46	205.54	48.7	1.23	11.61	42M	(1/1959)---(12/1964)
	F3	35.71	139.65	25.46	205.54	48.7	1.23	11.61	42M	(5/1958)---(10/1959)
TOLEDO	B8	39.88	355.98	43.98	74.67	56.4	1.55			1/1970
	D1	39.88	355.95	43.88	74.67	56.4	1.55			1/1947 -
	D2	39.88	355.95	43.88	74.67	56.4	1.55			(1/1964)---(9/1967)
TOMSK	B1	56.50	84.90	45.92	159.57	75.4	2.52			1/1949-
	B7	56.47	84.93	45.88	159.59	75.4	2.52			12/1957 -
	B10	56.47	84.93	45.88	159.59	75.4	2.52			9/1957 -
	D1	56.47	84.93	45.88	159.59	75.4	2.52			1/1958 -
TONANZINTLA	C1	19.03	261.70	28.94	328.09	46.2	1.28			(7/1957)-(12/1957)
TONOPAH	B5	38.00	243.50	45.19	304.48	64.1	1.96			
TOOLANGI	D1	-37.53	145.47	-46.66	220.84	-68.4	2.21			1/1919 -
	D2	-37.53	145.47	-46.66	220.84	-68.4	2.21			
TORINO	F3	45.05	7.75	46.54	88.54	62.1	1.80			
TORONTO	C3	43.90	280.60	55.16	346.84	74.4	3.34			(7/1957)-(12/1959)
TORSHAVN	C8	62.03	353.24	65.37	84.77	74.3	4.48			11/1971 -
TORTOSA	A2	40.82	00.50	43.90	79.66	57.4	1.57			NK
	B1	40.80	00.30	43.92	79.45	57.4	1.58			5/1957 -
	B6	40.80	00.30	43.92	79.45	57.4	1.58			(10/1964)-
	C1	40.82	00.50	43.90	79.66	57.4	1.57			(11/1964)-(1/1967)
	C6	40.82	00.50	43.90	79.66	57.4	1.57			(1/1962)---(9/1965)
	D1	40.82	00.50	43.90	79.66	57.4	1.57			1/1905 -
TORUN	C3	53.08	18.55	52.05	102.61	69.0	2.41			10/1960---12/1961
TOTTORI	B14	35.53	134.22	24.86	200.71	49.4	1.23			(4/1965)-(8/1965)
TOWNSVILLE	B1	-19.30	146.70	-28.47	218.79	-48.1	1.24			6/1946 -
	B4	-19.30	146.70	-28.47	218.79	-48.1	1.24			10/1966 -
	D2	-19.30	146.70	-28.47	218.79	-48.1	1.24			
	G	-19.30	146.70	-28.47	218.79	-48.1	1.24			(7/1964)-(9/1964)

MASTER STATION LIST

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY		ALT-ITUDE	OPEN - CLOSE DATES
TOYOKAWA	A8	34.83	137.37	24.40	203.60	48.0	1.21				(7/1957)-
	B13	34.83	137.37	24.40	203.60	48.0	1.21				(7/1957)-
	B14	34.83	137.37	24.40	203.60	48.0	1.21				(7/1957)-(12/1965)
	C3	34.83	137.37	24.40	203.60	48.0	1.21				(7/1957)-
	C6	34.83	137.37	24.40	203.60	48.0	1.21				(10/1960)---
TRAPPES	B14	48.77	02.01	51.24	84.48	65.5	2.16				7/1957 -(12/1958)
TRELEW	B1	-43.20	294.70	-31.72	03.17	-40.7	1.33				4/1958 -
	D1	-43.25	294.68	-31.71	03.15	-40.8	1.33				7/1957 -
TRIESTE	A1	45.65	13.75	45.92	94.63	62.8	1.82				(1/1966)-
	A2	45.65	13.75	45.92	94.63	62.8	1.82				(1/1966)-
	A8	45.65	13.75	45.92	94.63	62.8	1.82				3/1966 -
	C3	45.65	13.75	45.92	94.63	62.8	1.82				3/1966 -
TRINIDAD	B3	10.75	298.43	22.15	07.88	40.6	1.26				(3/1961)-
	B9	10.75	298.43	22.15	07.88	40.6	1.26				NK
	C6	10.75	298.43	22.15	07.88	40.6	1.26				5/1964 -
	D2	10.42	298.62	21.81	08.08	40.7	1.26				
TRIVANDRUM	B1	08.50	77.00	-01.07	146.42	-1.6	1.43				1/1957 - 10/1964
	D1	08.48	76.95	-01.08	146.37	-1.6	0.92				10/1957 -
TROMSO	B1	69.70	19.00	67.14	116.80	77.6	6.32				8/1932 ---
	B2	69.65	18.93	67.11	116.68	77.6	6.30				8/1966 -
	B7	69.70	19.00	67.14	116.80	77.6	6.32				7/1957 - 12/1958
	B8	69.70	19.00	67.14	116.80	77.6	6.32				(1/1965) - (12/1970)
	B13	69.50	19.20	66.94	116.69	77.5	6.21				(1/1963)-(12/1963)
	C9	69.70	19.00	67.14	116.80	77.6	6.32				8/1932 ---
	D1	69.67	18.95	67.13	116.72	77.6	6.31				1/1930 -
	D2	69.67	18.95	67.13	116.72	77.6	6.31				
	E1	69.70	19.00	67.14	116.80	77.6	6.32				(9/1957)---
TSUMEB	B1	-19.20	17.70	-18.15	82.82	-57.3	1.34				7/1957 -
	B4	-19.20	17.70	-18.15	82.82	-57.3	1.34				(10/1970)-
	B6	-19.20	17.70	-18.15	82.82	-57.3	1.34				10/1967 - 5/1969
	B7	-19.23	17.72	-18.18	82.83	-57.3	1.34				7/1957 - 12/1958
	B12	-19.23	17.72	-18.18	82.83						7/1957-12/1958
	D1	-19.22	17.70	-18.16	82.81	-57.3	1.34				8/1964 -
	G	-19.22	17.70	-18.16	82.81	-57.3	1.34				(7/1965)---6/1966
TUCSON	A3	31.36	248.40	40.03	311.41	59.1	1.65				(1/1970)---
	C2	31.96	248.40	40.03	311.41	59.1	1.65				NK
	D1	32.25	249.17	40.43	312.18	59.5	1.67				1/1910 -
	D2	32.25	249.17	40.43	312.18	59.5	1.67				1/1957 -
	G	32.23	249.05	40.39	312.06	59.5	1.67				4/1964 - 12/1965
TUCUMAN	A2	-26.90	294.60	-15.42	03.33	-22.1	1.11				NK
	B1	-26.90	294.60	-15.42	03.33	-22.1	1.11				7/1957 ---
	B6	-26.90	294.60	-15.42	03.33	-22.1	1.11				NK
	B13	-26.30	294.60	-15.42	03.33	-22.1	1.11				(4/1963)-(3/1964)
TULSA	B8	35.91	264.21	45.96	328.32	66.3	2.11				11/1962 -
	D1	35.92	264.22	45.97	328.33	66.3	0.83				7/1961 -
TUNGSTEN	D2	62.00	231.85								
	E1	61.00	232.00	65.07	279.60	78.2	5.68				(7/1969)-
TUNGUSKA USSR	B1	61.36	90.00	50.43	164.36	79.1	3.18				NK
UCHINOURA	B5	31.25	131.07	20.38	198.24	44.0	1.13				
UCLA	B6	34.07	241.56	41.02	303.47	59.9	1.70				3/1969 - 2/1971
UEDINENIE IS	E1	77.50	82.30	66.76	164.73	84.9	9.68				(12/1957)---(3/1959)
ULAN BATOR	D1	47.85	106.75	36.38	176.46	67.6	1.73				1/1966 -
	D2	47.85	106.75	36.38	176.46	67.6	1.73				
ULASKA	B2	64.97	212.48	64.78	256.68	76.7	5.47				11/1965 -
UNALASKA	B8	53.88	193.47	50.91	247.95	65.7	2.42				10/1957 - 12/1958
	B13	53.88	193.47	50.91	247.95	65.7	2.42				7/1957 -(5/1959)
UNIV OF NEW YORK	G6	41.00	286.00	52.45	353.80	72.1	2.90				NK
UPICE	A8	50.30	16.01								1/1972 -
	C1	50.30	16.01								1/1972 -
	C3	50.30	16.01								1/1966 -
	C6	50.30	16.01								1/1972 -
UPPSALA	B1	59.80	17.60	58.53	105.90	73.1	3.36				1/1952 -
	B8	59.80	17.60	58.53	105.90	73.1	3.36				NK
	E1	59.85	17.60	58.57	105.94	73.1	3.36				(7/1957)-
	F1	59.85	17.60	58.51	106.23	73.1	3.35	1.43	SL		9/1956---9/1972
	F3	59.85	17.60	58.51	106.23	73.1	3.35	1.43	SL		9/1956---9/1972
URAL	A3	55.00	37.00	50.46	119.99	70.9	2.51				(2/1964)---
URBANA	B6	40.00	272.00	50.74	336.79	71.1	2.66				(11/1965)-
	B11	40.00	272.00	50.74	336.79	71.1	2.66				7/1958 -
USHUAIA	B1	-54.80	291.70	-43.30	00.55	-50.6	1.69				11/1957 -
	B14	-54.80	291.70	-43.30	00.55	-50.6	1.69				1/1969 -
	F1	-54.80	291.70	-43.30	00.50	-50.6	1.69	5.68	SL		7/1957 ---
USSURISK	A2	43.00	132.00	32.15	198.03	58.8	1.46				NK
	A3	43.00	132.00	32.15	198.03	58.8	1.46				(3/1966)---
	A6	43.00	132.00	32.15	198.03	58.8	1.46				NK
	A8	43.00	132.00	32.15	198.03	58.8	1.46				(6/1959)---
	C1	43.00	132.00	32.15	198.03	58.8	1.46				(11/1957)-
	C3	43.00	132.00	32.15	198.03	58.8	1.46				(6/1959)---
	D1	43.68	132.17	32.84	198.11	59.5	1.49				1/1936 ---
UTRECHT	C1	52.08	05.13	53.76	89.28	68.1	2.43				(7/1957)-(10/1959)
	F1	52.08	05.13	53.76	89.28	68.1	2.43	2.76	1M		2/1967 -
	F3	52.08	05.13	53.76	89.28	68.1	2.43	2.76	1M		2/1967 -
	F4	52.08	05.13	53.76	89.28	68.1	2.43	2.76	1M		NK
UTSJOKI	B8	69.75	27.00	65.80	122.88						(1/1967)-
	E1	69.75	27.00	65.80	122.88						(1/1965)- 12/1970
VAL D OR	B8	48.00	282.20	59.32	348.43	77.0	4.20				8/1959 -
VALENTIA	D1	51.93	349.75	56.64	73.46	68.2	2.63				1/1900 -
	D2	51.93	349.75	56.64	73.46	68.2	2.63				NK
VAL-JOYEUX	B6	48.82	02.02	51.28	84.51	65.5	2.17				10/1964 -
VALLEY COTTAGE	C6	40.67	286.22	52.12	354.09	71.8	2.86				1/1958 ---
VANIMO	B1	-02.70	141.30	-12.60	211.09	-21.0	0.98				7/1964 -

MASTER STATION LIST

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
VASSOURAS	D1	-22.40	316.35	-11.94	23.87	-24.3	1.12			7/1915 -
VEGA BAJA	B5	18.47	293.58	29.96	02.82	51.1	1.43			
	D2	18.29	293.75	29.78	3.01	50.9	1.43			
VERKHOYANSK	E1	67.60	133.40	56.69	195.33	79.8	4.25			(1/1958)---
VERMILLION	E1	42.80	263.10	52.66	325.52	72.2	2.85			(7/1957)---(5/1963)
VICTORIA	B1	48.40	236.60	54.08	293.04	71.2	2.86			7/1957 - 1/1959
	D1	48.52	236.58	54.19	292.97	71.3	2.88			7/1957 -
	D2	48.52	236.58	54.19	292.97	71.3	2.88			
	E1	48.50	236.60	54.18	293.00	71.3	2.88			(8/1957)---(4/1959)
	F1	48.50	236.60	54.18	293.00	71.3	2.88	1.86	71M	8/1964 - 12/1971
VIK	B5	63.42	341.00	69.02	73.19	75.5	5.66			
VILLA ELISA	A8	-34.00	302.00	-22.69	09.87	-31.7	1.07			NK
	C4	-34.00	302.00	-22.69	09.87	-31.7	1.07			NK
VOLGOGRAD	B5	48.68	44.35	43.14	123.82	66.6	1.93			
VOSTOK	B1	-78.45	106.87	-89.17	94.93	-78.4	74.27			3/1958 -
	B8	-78.45	106.87	-89.17	94.93	-78.4	74.27			12/1964 -
	C8	-78.28	106.50	-89.07	101.44	-78.3	74.20			(12/1964)-
	C9	-78.40	106.90	-89.17	94.93	-78.4	74.27			3/1958 -
	C10	-78.40	106.90	-89.17	94.93	-78.4	74.27			NK
	D1	-78.45	106.87	-89.17	91.44	-78.4	73.54			1/1958 ---
	D2	-78.45	106.87	-89.17	91.44	-78.4	73.54			
	E1	-78.50	106.90	-89.18	87.99	-78.3	73.03			(5/1958)---
	F1	-78.50	106.90	-89.18	87.99	-78.3	73.03	0.00	3488M	7/1963-
	F4	-78.50	106.90	-89.18	87.99	-78.3	73.03	0.00	3488M	NK
WAKE ISLAND	B11	20.00	166.00	13.16	232.23	27.2	0.96			10/1960 -
WAKKANAI	B1	45.40	141.70	35.27	206.04	59.5	1.56			3/1947 -
	B13	45.40	141.70	35.27	206.04	59.5	1.56			(7/1957)-(12/1962)
WALLOPS IS	B1	37.90	284.50	49.31	352.12	69.9	2.54			7/1963 -
	B5	37.90	284.50	49.31	352.12	69.9	2.54			
WALTAIR	B10	17.72	83.30	07.48	153.48	19.9	0.94			(7/1957)-(12/1959)
WARRENSBURG	B14	38.77	266.27	49.01	330.18	69.3	2.42			3/1961 - 5/1965
WASHINGTON	A1	38.67	282.98	50.03	350.24	70.5	2.61			(7/1957)-(3/1968)
	A6	38.67	282.98	50.03	350.24	70.5	2.61			NK
	B1	38.70	282.90	50.06	350.14	70.6	2.62			6/1931 - 9/1968
	B8	38.70	282.90	50.06	350.14	70.6	2.61			1/1963 - 2/1965
	B9	38.70	282.90	50.06	350.14	70.6	2.62			NK
	B13	38.67	282.98	50.03	350.24	70.5	2.61			10/1957 - 6/1959
	C1	38.67	282.98	50.03	350.24	70.5	2.61			7/1957 - 2/1959
	C3	38.67	282.98	50.03	350.24	70.5	2.61			2/1958 - 4/1959
	C6	38.67	282.98	50.03	350.24	70.5	2.61			NK
WEISSENAU	C3	47.80	09.50	48.82	91.43	64.7	2.03			NK
	C4	47.80	09.50	48.82	91.43	64.7	2.03			(8/1966)-
	F1	47.80	09.50	48.82	91.43	64.7	2.03	4.16	427M	10/1956 - 3/1959
	F3	47.80	09.50	48.82	91.43	64.7	2.03	4.16	427M	6/1957 -
WELLESLEY	C6	42.28	288.70	53.77	357.12	72.7	3.07			4/1968 -
WELLINGTON	A2	-41.23	174.92	-45.38	254.09	-66.4	2.15			(7/1957)-(3/1960)
	B11	-41.20	175.00	-45.38	254.09	-66.4	2.15			(12/1969)-
	B13	-41.23	174.92	-45.38	254.09	-66.4	2.15			8/1957 ---
	C1	-41.23	174.92	-45.38	254.09	-66.4	2.15			NK
	F1	-41.28	174.77	-45.46	253.95	-66.5	2.16	3.42	125M	(7/1957)---(6/1965)
	F3	-41.28	174.77	-45.46	253.95	-66.5	2.16	3.42	125M	(11/1964)---(6/1965)
WENDELSTEIN	A6	47.70	12.00	48.23	93.81	64.6	2.01			(7/1957)-
	A7	47.70	12.00	48.23	93.81	64.6	2.01			(7/1957)-
	C1	47.70	12.00	48.23	93.81	64.6	2.01			(7/1957)-
WEST NYACK	C6	41.08	286.07	52.53	353.89	72.2	2.92			7/1967 -
WESTON	D1	42.38	288.68	53.87	357.09	72.8	3.08			7/1960 -
WETASKIWIN	B13	52.97	246.55	60.23	301.86	76.7	4.19			(10/1957)-(12/1958)
WHITE HORSE	E1	60.70	224.90	63.39	272.61	76.4	4.93			(9/1966)-(12/1966)
WHITE MOUNTAIN	F1	37.58	241.75	44.49	302.69	63.4	1.91	4.48	3800M	8/1965 - 11/1970
WHITE SANDS	B1	32.30	253.50	41.10	316.94	60.5	1.72			6/1946 -
	B5	32.30	253.50	41.10	316.64	60.5	1.72			
	B9	32.30	253.50	41.10	316.64	60.5	1.72			NK
	C6	32.40	253.13	41.14	316.51	60.5	1.72			(7/1957)-
WIEN-KOBENZL	D1	48.27	16.32	47.91	98.20	65.2	2.03			1/1929 -
WIESE IS	E1	79.90	77.00	69.35	163.85	85.0	12.33			(11/1957)---(12/1959)
WILDWOOD	B8	60.56	208.75	60.07	257.42	73.1	3.89			3/1967 - 1/1972
WILKES	B1	-66.30	110.50	-78.40	179.02	-81.6	37.27			7/1957 - 1/1969
	C9	-66.30	110.50	-78.40	179.02	-81.6	37.27			7/1957 - 4/1969
	D1	-66.25	110.58	-77.75	179.20	-81.7	37.73			7/1957 - 1/1967
	D2	-66.25	110.58	-77.75	179.20	-81.7	37.73			7/1957 - 1/1967
	E1	-66.28	111.53	-77.78	181.01	-82.0	39.20			(4/1957)--- 3/1969
	E3	-66.28	111.53	-77.78	181.01	-82.0	39.20			NK
	F1	-66.28	111.53	-77.78	181.01	-82.0	39.20	0.01	SL	3/1962 - 4/1969
	F3	-66.28	111.53	-77.78	181.01	-82.0	39.20	0.01	SL	(8/1957)-(12/1958)
WILLIAMS BAY	E1	42.60	271.50	53.29	335.73	73.1	3.00			(7/1957)-(3/1962)
	E3	42.60	271.50	53.29	335.73	73.1	3.00			NK
WINGST	D1	53.75	09.07	54.55	94.05	69.3	2.57			1/1939 -
	D2	53.75	09.07	54.55	94.05	69.3	2.57			(1/1964)---
WINNIPEG	B1	49.80	265.60	59.85	326.55	77.9	4.32			5/1951 -
	B4	49.80	265.60	59.85	326.55	77.9	4.32			9/1959 -
	B7	49.30	262.80	59.63	322.99	77.6	4.23			12/1957 - 12/1958
WITTEVEEN	D1	52.82	06.67	54.15	91.20	68.7	2.49			7/1891 -
	D2	52.82	06.67	54.15	91.20	68.7	2.49			(9/1957)-
WOOMERA	B1	-31.00	136.30	-41.24	209.15	-63.2	1.74			5/1961 - 12/1969
	B2	-31.38	136.87	-41.56	209.86	-63.5	1.77			10/1962 - 10/1965
	B5	-31.10	136.78	-41.29	209.71	-63.2	1.75			
	C6	-31.10	136.78	-41.29	209.71	-63.2	1.75			(2/1968)-
WORTHINGTON	C6	42.80	287.00	53.47	355.00	72.7	3.04			10/1972
WRANGEL ISLAND	E1	71.00	181.40	64.79	226.06	78.5	6.14			(12/1957)---(3/1959)
WROCLAW	A1	51.10	17.08	50.46	100.23	67.5	2.24			(10/1957)---(3/1967)
	A2	51.10	17.08	50.46	100.23	67.5	2.24			(10/1957)---(3/1967)
	A6	51.10	17.08	50.46	100.23	67.5	2.24			NK
	C1	51.10	17.08	50.46	100.23	67.5	2.24			(3/1964)---(11/1965)

MASTER STATION LIST

STATION NAME	OBS PROG	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	GEOMAGNETIC LAT	GEOMAGNETIC LONG	COMPUTED DIP	L-VALUE	CUT-OFF RIGIDITY	ALT-ITUDE	OPEN - CLOSE DATES
YAKIMA	C6	47.00	240.00	53.34	297.40	70.9	2.78			10/1972
YAKUTSK	B1	62.00	129.60	50.94	193.75	76.5	3.08			2/1957 -
	B8	62.00	129.60	50.94	193.75	76.5	3.08			(8/1971)-
	B12	62.00	129.60	50.94	193.75	76.5	3.08			(1/1956)-
	D1	62.02	129.72	50.97	193.83	76.5	3.08			1/1931 -
	D2	62.02	129.72	50.97	193.83	76.5	3.08			(1/1963)-
	E1	62.10	129.70	51.05	193.81	76.6	3.09			(1/1957)-
	E3	62.10	129.70	51.05	193.81	76.6	3.09			(1/1959)---
	E4	62.10	129.70	51.05	193.81	76.6	3.09			(1/1969)---
	F1	62.02	129.72	50.97	193.83	76.5	3.08	1.70	105M	7/1957 --- 11/1969
	F2	62.02	129.72	50.97	193.83	76.5	3.08	1.70	105M	7/1953 ---
	F3	62.02	129.72	50.97	193.83	76.5	3.08	1.70	105M	7/1957 ---
	G	62.10	129.70	51.05	193.81	76.6	3.09			(7/1957)-
YAMAGAWA	B1	31.20	130.60	20.30	197.81	44.0	1.13			12/1946 -
	B4	31.20	130.60	20.30	197.81					6/1970 -
	B10	31.20	130.62	20.30	197.83	44.0	1.13			7/1957 -
YAP ISLAND	C6	09.53	138.17	-00.73	206.77	3.9	0.94			(2/1969)-
YAUCA	D1	-15.53	285.33	-04.08	354.52	-5.0	1.05			9/1957 - 1/1960
YELLOWKNIFE	B1	62.40	245.60	68.95	293.30	82.1	8.33			11/1957 - 1/1959
	C9	62.40	245.60	68.5	293.30	82.1	8.33			11/1957 - 1/1969
	D1	62.43	245.60	68.98	293.27	82.1	8.35			7/1957 - 7/1958
	E1	62.40	245.60	68.95	293.30	82.1	8.33			(7/1957)---(10/1958)
YOKOSHIBA	B14	35.63	140.50	25.46	206.31	48.6	1.23			(9/1957)-(12/1958)
YORK	D2	53.97	358.92	56.78	84.19	69.5	2.73			NK
YUMA,ARIZONA	B5	32.87	245.68	40.51	308.23	59.5	1.67			
YUZHNO SAKHALI	B1	47.00	143.00	36.97	206.89	60.9	1.54			3/1957 -
	D1	46.95	142.72	36.89	206.66	60.9	1.63			1/1942 -
ZAMBOANGA	G	06.90	122.07	-04.39	191.02	-2.5	0.93			(5/1959)-(11/1959)
ZARIA	B14	11.85	07.65	13.57	79.12	1.7	0.98			10/1968 - (1971)
	D1	11.15	07.65	13.57	79.12	1.7	0.98			1/1964 -
	D2	11.15	07.65	13.57	79.12	1.7	0.98			
ZARYA SHIP	B1	SHIP.								(8/1959)-(11/1964)
ZUGSPITZE	F1	47.42	10.98	48.16	92.70	64.4	0.87	4.24	2960M	1/1957 ---
	F3	47.42	10.98	48.16	92.70	64.4	0.87	4.24	2960M	10/1957 - 2/1960
ZURICH	A2	47.38	08.57	48.60	90.34	64.3	1.99			1/1949 -
	C1	47.38	08.57	48.60	90.34	64.3	1.99			(7/1957)-
ZVENIGOROD	E1	55.72	36.85	51.17	120.21	71.4	2.59			(7/1957)---(12/1959)
	G	55.72	36.85	51.17	120.21	71.4	2.59			(8/1957)-(12/1959)

EQUIVALENT NAME AND PROGRAMS	PREFERRED NAME
A-12	ADDIS ABABA
AAVSO	MISSOULA
AAVSO	GLEN ELLYN
AAVSO	PAEONIAN SPGS
AAVSO	PLEASANT UNITY
AAVSO	POMPTON PLAINS
ABINGER-D1	HARTLAND
AEROSPACE SOLAR OBS	SAN FERNANDO OBS
AFCRL SAGAMORE HILL-C3	SAGAMORE HILL
AGIA PARASKEVI-C6,B9	ATHENS
AGINCOURT-D1	OTTAWA
AKITA-KEN-B1	AKITA
AKITA-SHI-B1	AKITA
AMUNDSEN-SCOTT-E,B1	SOUTH POLE
ANACAPRI-C1	CAPRI S
ANACAPRI-C1	CAPRI F
APATITY-F1	MURMANSK
AWARUA-E1,F1,F3	INVERCARGILL
AZORES D1	SAN MIGUEL
BAD REICHENHALL	PREDIGTSTUHL
BAFFIN-B1	CLYDE
BALBOA-B14	PANAMA
BANDA-D2	FORT ARCHAMBAULT
BANFF-F1	SULPHUR MOUNTAIN
BARKING SANDS-B5	KAUAI
BASE GENERAL BELGRANO	BELGRANO
BASE RO	BAUDOUIN
BAURU-D2	SAO PAULO
BEKESCABA	BUDAPEST
BELGRADE	BEOGRAD
BELGRANO	ELLSWORTH
BERN	BERNE
BISDEE-C6	HOBART
BLINDERN	KJELLER
BOEING-C3	SEATTLE
BOSTON-B1	BILLERICA
BOSTON-B8	BEDFORD
BREISACH-B6	FREIBURG/BREISACH
BUKHTA TIKHAYA	HEISS IS
BUKHTA TUKSY	TIXIE BAY
CAMP TORUGUERO	VEGA BAJA
CANBERRA-B2	ORRORAL
CAPE CANAVERAL-B1	CAPE KENNEDY
CASEY	WILKES
CENTRO GEOFISICO-B1	CUBA
CHABOT OBS.-C6	OAKLAND
CHALATS MEUDON	MEUDON
CHICLAYO	ILO
CHRISTCHURCH-D1	AMBERLEY
CHUNG-LI	TAIPEI
COUGAR MT-D2	SEATTLE
CRACOW	KRAKOW
CRIMEE-A3,A8	SIMFEROPOL
CU BOULDER-C4,C6	BOULDER
CUIDAD UNIVERSITY-F2	MEXICO CITY
DAPANGO-B1	TOGO
DAVAD-D2	CEBU
DEHRA DUN	SABHAWALA
DIXON ISLAND-E,D1(DICKSON)	DIXON
DOMINION ASTRO. OBS D2	PENTICTON
DRAO-C3	PENTICTON
DRUZHNAYA-D1	HEISS IS
DUMONT D URVILLE-F1,B1	TERRE ADELIE
DUSHETI-D1	TBILISI
EBRO-C1	TORTOSA
EL CERRILLO	MEXICO CITY
EL SEGUNDO-A9	SAN FERNANDO OBS
ESK-D2	BRISBANE
ESSA BOULDER-A8,B1,C3	BOULDER
EUGENIDES PLANETARIUM-A2	ATHENS
EYVINDORA-E	EGILSSTADIR
FAIRBANKS-B1,B2,B5	COLLEGE
FALKLAND IS. B1,B2	PORT STANLEY
FANNING IS-D1	FANNING
FIRENZE	FLORENCE
FLEURS	SYDNEY/FLEURS
FLOIRAC	BORDEAUX
FORMOSA	TAIPEI
FORT BELVOIR-B9,C6	WASHINGTON
FORT CHURCHILL-D1	CHURCHILL

EQUIVALENT NAME AND PROGRAMS	PREFERRED NAME
FRAUNHOFER	FREIBURG/BREISACH
FREIBURG-F2	SCHAUINSLAND
GENERAL BELGRANO	ELLSWORTH
GENERAL BELGRANO-F1	BELGRANO
GEOPOLE STATION-F1	THULE/CAMP TUTO
GODLEY HEAD-B1,C6	CHRISTCHURCH
GORNOTAYEZHNAYA-D1	USSURISK
GRANADA-A2	CARTUJA
GREENWICH	HERSTMONCEUX
GREENWICH-D1	HARTLAND
HALLE/SAALE-F2	HALLE
HALLETT STATION-E	CAPE HALLETT
HANDS-C6	BOULDER
HAO BOULDER-C1,C6,C4	BOULDER
HARESTUA-C3,A8	KJELLER
HARINGHATA	CALCUTTA
HARVARD-C4	FORT DAVIS
HAVANA-D1	CUBA
HAWAII-A6,A7,C1,C3,C6,F1,G	HALEAKALA
HAWAII-B6,C1,C3,C6,D1,F1,F3	HONOLULU
HELWAN-D1	MISALLAT
HOBART	CAMBRIDGE TUNNEL
ICAROS ATHENS-A2	ATHENS
ILO	CHICLAYO
IZMIRAN-F3	MOSCOW
JAKUTSK	YAKUTSK
JOROA-D2	CUBA
KAMPALA-F1,F3	MAKERERE
KARAVIA-B1	ELIZABETHVILLE
KENORA-B1	WINNIPEG
KILEMBE-F3	MAKERERE
KITT PEAK	TUCSON
KOBENHA	COPENHAGEN
KOBENHA	COPENHAGEN
KOKUBUNJI-B1,B7,B12	TOKYO
KOLN	COLOGNE
KONTINKANGAS-F1,F3	OULU
KRASNAYA PAKHRA-B1	MOSCOW
KUYPER-D1	TANGERANG
LAEM CHABANG-B14	BANGKOK
LEGON-D2,B14,B8,D1	ACCRA
LEIRVOGUR	REYKJAVIK
LEOPOLDVILLE-B1,D1	KINSHASA-BINZA
LOS ANGELES-C6	LOCKHEED
LOS CERRILLOS STATION-F3	SANTIAGO
MABASHI	KOENJI
MACAO	MACAU
MAKAPUU PT-C3,F1,F3	HONOLULU
MAURITIUS-D1	PLAISANCE
MAX PLANCK INST-F1	ZUGSPITZE
MITAKA-A1,A6,C1,C3	TOKYO
MONTE CAPELLINO-D1	GENOVA
MONTE DE CAPPUCCINI	TORINO
MONTE MARIO-C1	ROME
MOOR PARK-C6	PRESTON
MOSCOW UNIV.-F1,C1	MOSCOW
MURMANSK-F1,F3	APATITY
MUSSALA	MOUSSALLA
N.A.I.C.	ARECIBO
NANCAY	SAINT SANTIN
NARSARSSUAK	NARSSARSSUAQ
NASA-GSFC	GREENBELT
NBS BOULDER-A8,B1,C3	BOULDER
NERA-UTRECHT-C1,F1	NEDERHORST DEN BERG
NEW DELHI	DELHI
NEWCASTLE	CAMDEN
NIZAMIAH	HYDERABAD
NOME-C6	PORT CLARENCE
NORTH POLE 10-D1	ARCTICA(NP-10)
NORTH POLE 6-D1	ARCTICA I (NP-6)
NORTH POLE 7-D1	ARCTICA II (NP-7)
NORTH POLE 8-D1	ARCTICA (NP-8)
NORWAY STATION-F1	SANAE
OAHU-C6	HONOLULU
OSLO	KJELLER
PALO ALTO-D2	STANFORD
PAMATAI	TAHITI
PARIS	BAGNEUX
PATRONY-D1	IRKUTSK
PEAK MOUSALLA	MOUSSALLA

EQUIVALENT NAME AND PROGRAMS	PREFERRED NAME
PENDELI-D1	ATHENS
POINT BARROW-E, B1	BARROW
POLE STATION-B1	SOUTH POLE
PONTIAC-C6	MCMATH-HULBERT
PORT AUX FRANCAIS-B2,F1,F3,D1	KERGUELEN
PORT LOCKROY	ARGENTINE IS
PRAGUE	PRUHONICE
PRAGUE-F1,F3	PANSKA VES
PRAHA-C6	PANSKA VES
PRETORIA	JOHANNESBURG
PROVIDENIE BAY	PROVIDENYA
QUEBEC	BAIE ST PAUL
QUEZON CITY	MANILA
RAMEY AFB-A1,B1,C1	PUERTO RICO
RAOUL ISLAND-B1	KERMADEC
RATTLESNAKE MTN.-GI	RICHLAND
RESIPATRON	O HIGGINS
ROI BAUDOUIN-D1,E1	BAUDOUIN
ROMA-B1	ROME
ROSTOV-ON-DON	ROSTOV
RUDE SKOV-C5,D1,D2	COPENHAGEN
SALONIQUE	THESSALONIKA
SAN FRANCISCO-B1,B8,B12,B13	STANFORD
SAN JUAN-D1	PUERTO RICO
SAN MIGUEL-C1,C3,A1,A8	BUENOS AIRES
SANAE STATION-D1	SANAE
SANTIAGO	ANTOFAGASTA
SAO JOSE DOS CAMPOS	SAN JOSE
SCARAMANGA STATION-B1	ATHENS
SCHAUINSLAND-F1,F2,F3	FREIBURG/BREISACH
SHOWA	SYOWA BASE
SIMEIS-A8,C1,C3	SIMFEROPOL
SKY-H1	EIGHTS
SOROA-D1	CORDOBA
SOTTENS	SCHWARZENBURG
SOUTH ATLANTIC	SOLANT
SOUTH ATLANTIC-B2	PORT STANLEY
SPAIN SC-04-C6	SAN FERNANDO
STATION SVIRCO-F1	ROME
STAZIONE DE CAPPUCCINI	TORINO
STEPANOVKA-D2	ODESSA
STOCKHOLM-B14,C6,D2	ENKOPING
STOCKHOLM-C1	SALTSJOBADEN
SVALBARD	LONGYEARBYEN
SYOWA BAY	SYOWA BASE
TARAVAO	TAHITI
TIKHAYA BAY-F1,F3,D1	HEISS IS
TIKSY BAY(TIKSI)	TIXIE BAY
TOKYO-KOENJI-F2	KOENJI
TREMSDORF-C3,A8	POTSDAM
TROY	GRAFTON
TUBINGEN-C4	WEISSENAU
UCCLE-A1,A6,A8,C1,C3,C6	DOURBES
UELEN-D1	CAPE WELLEN
UNIV OF CANTERBURY-D2	CHRISTCHURCH
UNIV OF MICH-C4	ANN ARBOR
UNIV OF OULU-F3	OULU
UNIVERSIDADE MACKENZIE-C3 A8	SAO PAULO
UNIVERSITY PARK-B6	PENN STATE U
UPPER VAN NORMAN	SAN FERNANDO OBS
USNO-A1,A2	WASHINGTON
USNRL-A8	WASHINGTON
VANNOVSKAYA-G	ASHKHABAD
VIEQUES-D1	PUERTO RICO
VLADIVOSTOK-D1	USSURISK
VOROSHILOV-A2,C1	USSURISK
VOYEYKOVO-D1	LENINGRAD
VYSSOKAYA DUBRAVA-D1	SVERDLOVSK
WARSAW	MIEDZESZYN
WASHINGTON STATE U-C3	PULLMAN
WATHEROO-B1,D1	MUNDARING
WATHEROO-D1	GNANGARA
WEDDELL SEA-B1	ELLSWORTH
WELLINGTON	LOWER HUTT
WILKES-B1	CASEY
WILLFORD HALL OBS-C6A	PRESTON
WINKFIELD-B2,B6	SLOUGH
YANGI-BAZAR-D1	TASHKENT
YUZHNO SAKHALINSK	YUZHNO SAKHALI
ZAYMISHCHE-D1	KAZAN
ZIMENKI-C3,A8	GORKY
ZUGSPITZE LABORATORY	ZUGSPITZE

A. SOLAR AND INTERPLANETARY PHENOMENA

(other than flare - associated events)

In the catalogue lists for these subsections the stations are arranged by geographic longitude from east to west to permit the user to estimate the adequacy of 24-hour coverage of the various solar phenomena in the WDC-A holdings. For section A.8 "Total Radio Flux Measurements" (and also in C.3 "Solar Radio Events, Fixed Frequency") the data are also listed in order of radio frequency.

For the appropriate sections the availability of data in computerized format is indicated.

Many of these data are found in standard publications. Some of these will be given under the catalogue holdings. Lists of publications can be found in:

Annals of the IQSY, Vol. 1, pp. 308, 309, M.K.T. Press, 1968
AFCRL Geophysics and Space Data Bulletin, Vol. IV, No. 2, Second Quarter 1967
World Data Center A for Solar Terrestrial Physics Report UAG-4, Abbreviated Calendar Record 1966-1967, pp. 164-169, December 1968: see p. 4.

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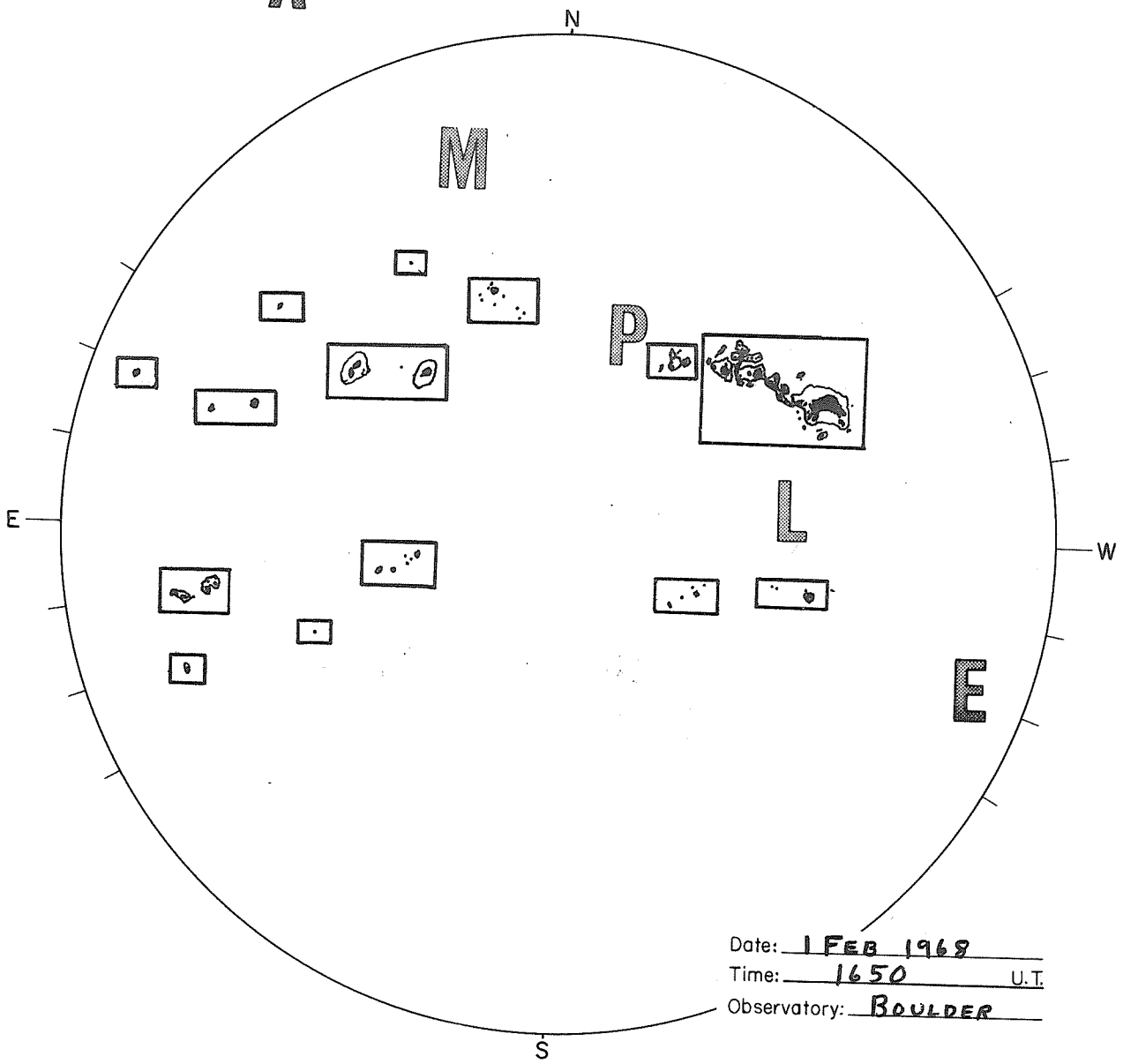
A.1

CATANIA POSITIONS AND CLASSIFICATIONS OF SUNSPOT-GROUPS

Date	Universal Time	Image quality	b	l	Type	f	R	h	A_p	A_c
9-7-1968	0515	2-3	+11°	185°	D	13		22	318	171
			+10	160	E	21		46	1378	985
			-16	184	J	1		29	106	61



Date: 1 FEB 1968
Time: 1650 U.T.
Observatory: BOULDER

A.1 SUNSPOT POSITIONS, AREAS, AND CLASSIFICATIONS AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
UCCLE	50N	4	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
LOCARNO	46N	9	B	A	A	A	A	A	A	A	A	A							
AROSA	47N	10	B	A	A	A	A	A	A	A	A	A							
ARCETRI	43N	11	B	A	A	A	A	A	A	A	A	A	A	A	B	B	A	A	B
ROME	41N	12	C	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	C
BERLIN	52N	13												A	A	B			
TRIESTE	45N	13										A	A	A	B				
CATANIA	37N	15	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
WROCLAW	51N	17	C	A	A		B	A	A	A	A	B	C						
ATHENS	37N	23																	C
BUCHAREST	44N	26			A	A	A	A	A	A									
ISTANBUL	41N	28	B	A	A						A	A	A	A	A	A	A	C	Q
KANDILLI	41N	29									A	A	A	A	A	A	B	B	B
BEIRUT	33N	35	B	A	A	A	A	B	C	B	A	A	A	B	B	A	A	B	C
TEHERAN	35N	51														Q	Q	Q	Q
CARNARVON	25S	114																	C
BAGUIO	16N	120	B	A	A	A	A	A	A	A	A	A	A	A	A	B	B	A	C
MANILA	14N	121												A	A	A	A	B	C
TAIPEI	25N	121	B	A	A					A	A	A	A	A	A	A	A	A	Q
LUNPING	25N	121											B	A	A	A	A	A	B
SEOUL	37N	127								C	A	A	B	B	C	C	P	P	P
IKOMASAN	35N	135	B	B	A	A	A	A	A	A	A	A	A	C					
MITAKA	35N	139	B	A	A	A	A	A	B	A	A	A	B	B	C				
TOKYO	36N	140							B	A	A	A	B	B	A	Q	Q	P	P
PALEHUA	20N	204														Q	Q	Q	Q
MT WILSON	34N	242	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
UPPER VAN NORMAN	35N	242									Q	Q	Q	Q	Q	Q	Q		
BOULDER	40N	255									C	A	A	A	A	A	A	A	C
SACRAMENTO PK	32N	255							B	A	B	A	A	A	B				
WASHINGTON	38N	283	B	A	A	A	A	A	A	A	A	A	B	A	A	A	A	S	
RAMEY	19N	293														A	C	Q	Q
ROSARIO	33S	300														C	A	A	C
SAN MIGUEL	34S	302								A	A	A	A	A	A	A	A	A	C
CANARY ISLAND	28N	345																	C

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

COMPUTER FORMAT:

1. Mt. Wilson - (one card/sunspot/day) January 1967 to date.
2. Sacramento Peak - (one card/sunspot/day) January 1968 - October 1969.
3. Solar Active Regions (as published in *Solar-Geophysical Data*) January 1969 to date.

A.1

REPUBLIC OF THE PHILIPPINES
Department of Commerce and Industry
WEATHER BUREAU
Manila
- 0 -

SUNSPOT OBSERVATIONS MADE AT THE WEATHER BUREAU ASTRONOMICAL OBSERVATORY AT DILIMAN, QUEZON CITY DURING THE MONTH OF DECEMBER, 1970.

Instrument used: 6'' Refractor
2500mm fl

Method: Projection, 20 cm image
64.5 X eyepiece

a	*c d*	*e*	*f*	*g*	*R*	*j*	*k*	*l*	*m*	*REMARKS*
Day	Vis	U.T.	Gr	Sp		N-Gr.	S-Gr	N-s	S-s	
02	F	0520	9	30	120	5	4	17	13	
02	F	2350	8	26	106	4	4	13	13	
04	F	0112	6	30	90	3	3	7	23	
05	F	0510	7	39	109	3	4	10	29	
05	G	2348	8	60	140	4	4	16	44	
06	G	2345	8	38	118	4	4	12	26	
08	F	0036	8	41	121	4	4	20	21	
09	F	0116	6	51	111	4	2	34	17	
10	F	0030	6	49	109	3	3	35	14	
10	G	2354	8	80	160	4	4	51	29	
15	F	0104	9	28	118	7	2	21	7	
16	F	0120	9	37	127	6	3	23	9	
20	F	0019	7	46	116	4	3	24	22	
21	G	0000	7	58	128	4	3	35	23	
23	F	0040	7	32	102	5	2	15	17	
24	G	0012	7	36	106	6	1	25	11	
24	F	2350	6	34	94	5	1	24	10	
26	F	0051	7	21	91	6	1	11	10	
27	F	0114	5	12	62	5	0	12	00	
28	G	0006	5	10	60	4	1	8	2	
29	G	0015	6	14	74	5	1	9	5	
30	F	0018	5	19	69	4	1	10	9	
-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-										
22 days										
SUM			154	791	2331	99	55	437	354	
MEAN					106.0					

c – *Solar image:* E, G, F, P, VP

e – *Universal Time*
f – *No. of groups*

g – *No. of Spots*
j – *No. of Groups N hemisphere*
k – *No. of groups S hemisphere*

l – *No. of spots N hemisphere*
m – *No. of spots S hemisphere*
R – *10f + g*

AT BOULDER

P U B L I C A T I O N S:

1. *Solar-Geophysical Data*, National Oceanic and Atmospheric Administration, Boulder, Colorado.
2. СОЛНЕЧНЫЕ ДАННЫЕ (Solar Data), USSR Academy of Science.
3. *Photoheliographic Results*, Greenwich Royal Observatory Bulletin, (1951-1961 in WDC):

   Positions and areas of sunspots for each day in the year.
   General catalogue of groups of sunspots for the year including CMP, duration, first seen and last seen dates, corrected mean area and mean position.
   Total areas of sunspots and faculae by west and east hemispheres for each day.
   Mean areas and mean heliographic latitude of sunspots and faculae for each solar rotation.

4. *Heliographic Maps of the Photosphere for the Year*, by M. Waldmeier, Publikationen der Eidgenossischen Sternwarte Zurich, (1938-1971 in WDC):

   Heliographic maps of the photosphere by solar synodic rotation periods to ±50° latitude; sunspot group at state of its highest evolution and faculae.
   Evolution tables of sunspot-groups day by day by Zürich classification A, B, C, etc.

5. *Sunspot Areas 1907-1970*, by R. S. Harrington and M. Miranian, United States Naval Observatory Circular No. 133, U. S. Naval Observatory, Washington, D. C. 20390, June 18, 1971. (Monthly means).

P H O T O G R A P H S:

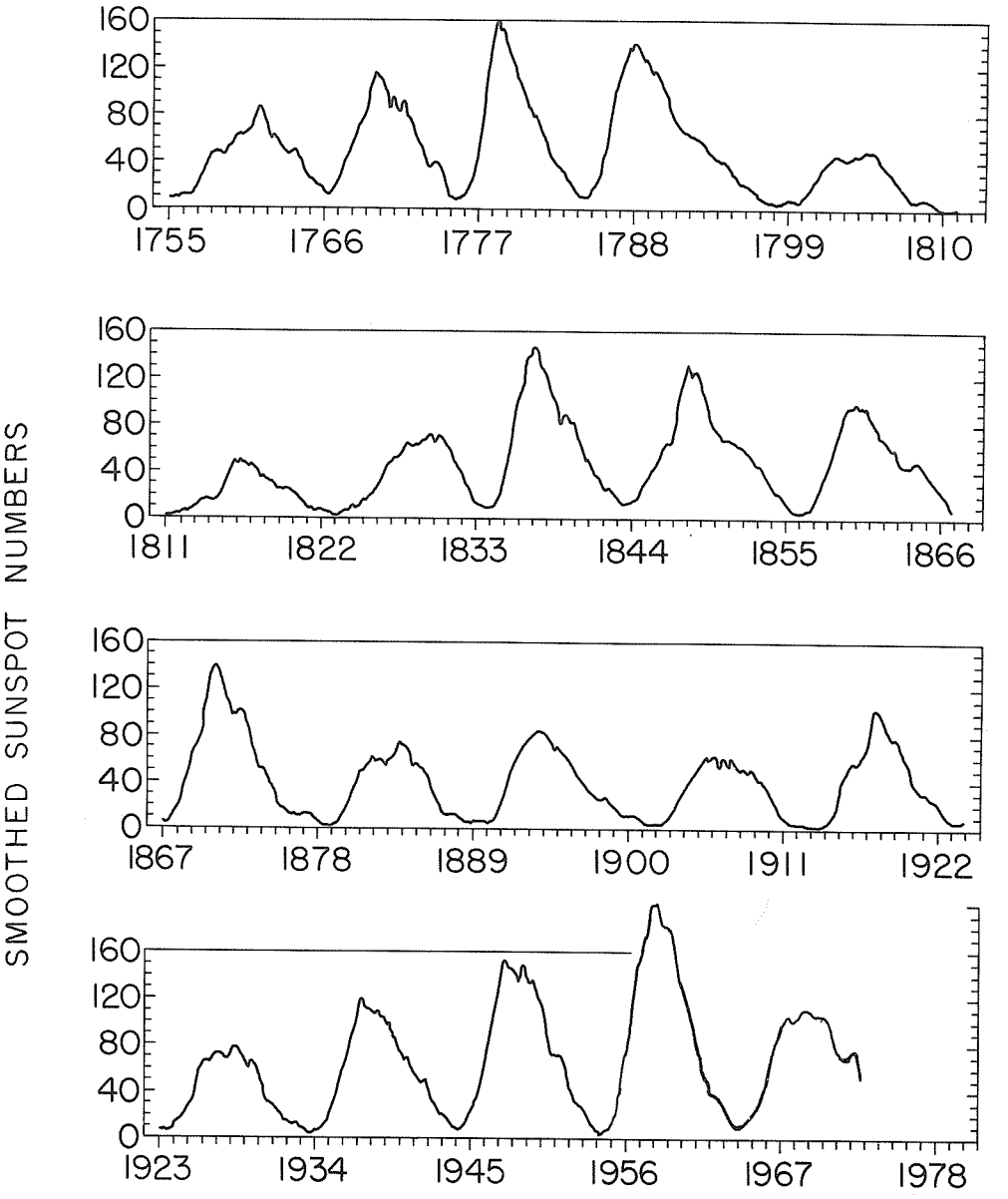
1. Prints - Upper Van Norman 6/1966 - 4/1969.
2. Prints and drawings - Culgoora 4/1967 to date.
3. Prints - Sacramento Peak 9/1963 - 9/1965.

M O V I E S:

"The Sun in Action" - Time-lapse techniques are used to show continuous changes and motions of features on the sun. 16mm B/W Silent print - 400' reel can be purchased or lent.

Solar activity photographed at Big Bear Solar Observatory - 400 ft. 16mm film - Dr. Harold Zirin, California Institute of Technology, Pasadena, California 91109, $40. U.S. payable to California Institute of Technology.

VARIATIONS


SMOOTHED SUNSPOT NUMBERS
160
120
80
40
0
1755
1766
1777
1788
1799
1810
1811
1822
1833
1844
1855
1866
1867
1878
1889
1900
1911
1922
1923
1934
1945
1956
1967
1978
ZURICH SUNSPOT NUMBERS

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
HERSTMONCEUX	51N	0	B	A	A	A	A								C	B	A	A	C
TORTOSA	40N	0	B	A	A	A			A	A	A	A	A	Q	Q	Q	Q		
BARCELONA	41N	2	B																
MEUDON	49N	2	B	A	A														
UCCLE	50N	4	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
FREIBURG	48N	8	B	A	A														
KARLSRUHE	49N	8	B	A	A														
ZURICH	47N	8	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
SONNEBERG	50N	11	B	A	A														
ROME	41N	12	C	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	C
POTSDAM	52N	13	B	A	A														
TRIESTE	55N	13										A	A	A	B				
KANZELHOHE	46N	14	B	A	A														
LJUBLJANA	46N	15	B	A	A														
ONDREJOV	50N	15	B	A	A														
CATANIA	37N	15	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
DABROWA GORNIC	50N	19	C	A	A														
GDANSK	54N	19	C	A	A														
BEOGRAD	44N	20	B	A	A	C													
SKALNATE PLESO	49N	20	C	B	A														
NOWY SACZ	50N	21	C	A	A														
WARSAW	52N	21	B	A	A		B		C										
ATHENS-1	37N	23	B	C						A	A	B	B	C	B	B	A	A	B
ATHENS-2	38N	23				C							C	B	B	B	B	B	C
THESSALONIKA	40N	23								C	B	C	B						
BUCHAREST	44N	26	B	A	A	A	A	A	A	A									
ISTANBUL	41N	28	B	A	A						A	A	A	A	A	A	A	C	Q
KANDILLI	41N	29									A	A	A	A	A	A	A	B	C
KIEV	50N	30	B	A	A	A	C	C											
BEIRUT	33N	35	B	A	A	A	A	B	C	B	A	A	A	B	B	A	A	B	C
KISLOVODSK	43N	42	B	A	A	A	C	C											
WROCLAW	51N	57	C	A	A		B	A	A	A	A	B	C						
TASHKENT	41N	69	B	A	A	A	C	C											
DELHI	28N	77								C	B	B	B	A	A	B	A	A	C
KODAIKANAL	10N	77	B	A	C							B	B	C	B	C	B	Q	
BANGKOK	30N	100												C		B	C	P	P
BAGUIO	16N	120										A	A	A	A	B	B	A	C
TAIPEI	25N	121	B	B	A					A	A	A	A	A	A	A	A	A	Q
LUNPING	25N	121											B	A	A	A	A	A	C
MANILA	14N	121												A	A	A	A	A	C
PYONGYANG	39N	125		B	C														
SEOUL	37N	127								C	A	A	B	B	C	C	P	P	P
VOROSHILOV	43N	132	C	A	A	A	C	C											
IKOMASAN	34N	135	B	B	A	A	A	A	A	A	A	A	A	C					
TOKYO	36N	140							B	A	A	A	B	B	A				
WELLINGTON	41S	174	B	A	A	C													
SACRAMENTO PK	33N	254													A				
BOULDER	40N	255									C	A	A	A	A	A	A	A	B
LATROBE	40N	281									C	C							
AAVSO R-A			B	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	B
SOUTH HADLEY	42N	287	C	B	C														
SANTIAGO	34S	290	B	B	B	B	B												
TUCUMAN	26S	295							C										
ROSARIO	33S	300														C	A	A	C
SAN MIGUEL	34S	302			B					A	A	A	A	A	A	A	A	A	C
CARTUJA	37N	357	B																
MADRID	40N	357	B	B	C														

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

Swiss Federal Observatory, Zürich (Switzerland)

SUNSPOT-BULLETIN

1973, No. 8

Provisional Sunspot-Numbers for August 1973

Dependent on observations at Zürich Observatory and its stations in Locarno and Arosa.

Day	R	Day	R
1	36	16	0
2	28	17	0
3	21	18	7
4	28	19	7
5	34	20	7
6	40	21	15
7	42	22	10
8	40	23	17
9	38	24	22
10	27	25	28
11	23	26	38
12	0	27	37
13	0	28	47
14	0	29	56
15	0	30	64
		31	82

Mean = 25.6

C O M P U T E R F O R M A T:

Zürich (Rz) numbers on magnetic tape from 1932 to date.
R_A' and Rz on punched cards from October 1965 to date.

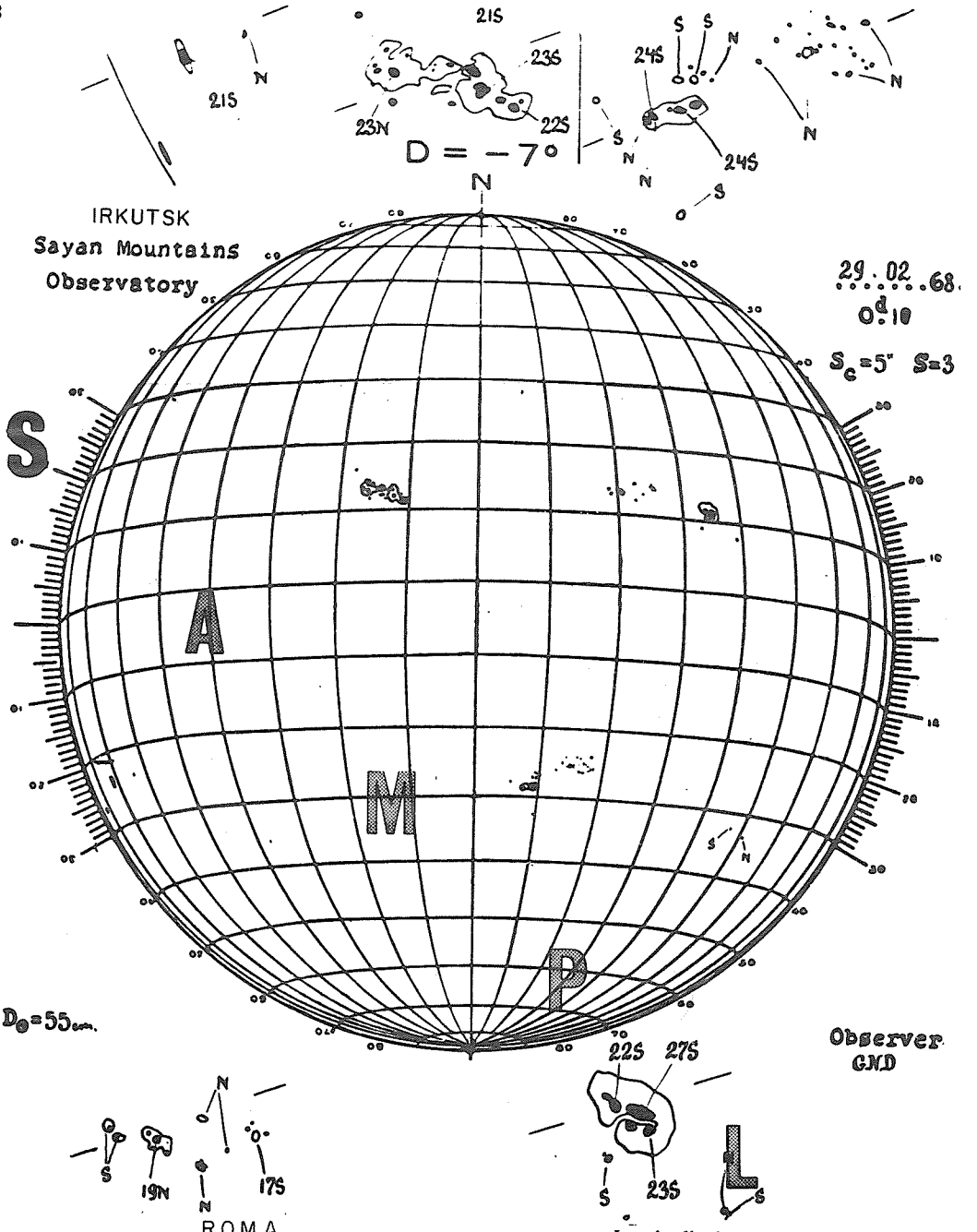
P U B L I C A T I O N S:

IAU Quarterly Bulletin on Solar Activity - Zürich (Rz) numbers.
Solar-Geophysical Data - Rz and R_A' numbers.

M I C R O F I L M:

IAU Quarterly Bulletin on Solar Activity on 35 mm microfilm from 1/1917 through 6/1972.

A.3



Longitudinal sunspot magnetic fields

4754 10 IX 0745 80	12 IX 1110 43	18 IX 1020 82	19 IX 0845 92
4755 10 IX 0710 55	12 IX 1050 83	13 IX 0825 93	4756 12 IX 1115 95

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
ROME	41N	12									A	A	A	A	A	A	A	Q	
BERLIN	52N	13											A	A	B	P	P	P	
PULKOVO	59N	30								B	B	B	C	C	B	C	C	C	C
CRIMEA	44N	34								B	A	A	C	A	B	A	A	B	C
MOSCOW IZMIRAN	55N	37								B	B	B	B	B	B	C	P	C	Q
URAL	55N	37														B	B	C	Q
KISLOVODSK	43N	42								B	A	A	B	A	B	A	A	C	C
SHEMAKAH	40N	48										C		B	B	A	B	C	C
IRKUTSK	52N	104								A	A	A	C	A	B	B	A	B	C
USSURISK	43N	132										B	B	A	B	A	A	B	C
MT WILSON	34N	242	A	A	B	A	A	A	A	A	A	B	A	A	A	A	A	A	C
SAN FERNANDO OBS	35N	242													Q	Q	Q	P	
KITT PEAK	32N	248														Q	Q		

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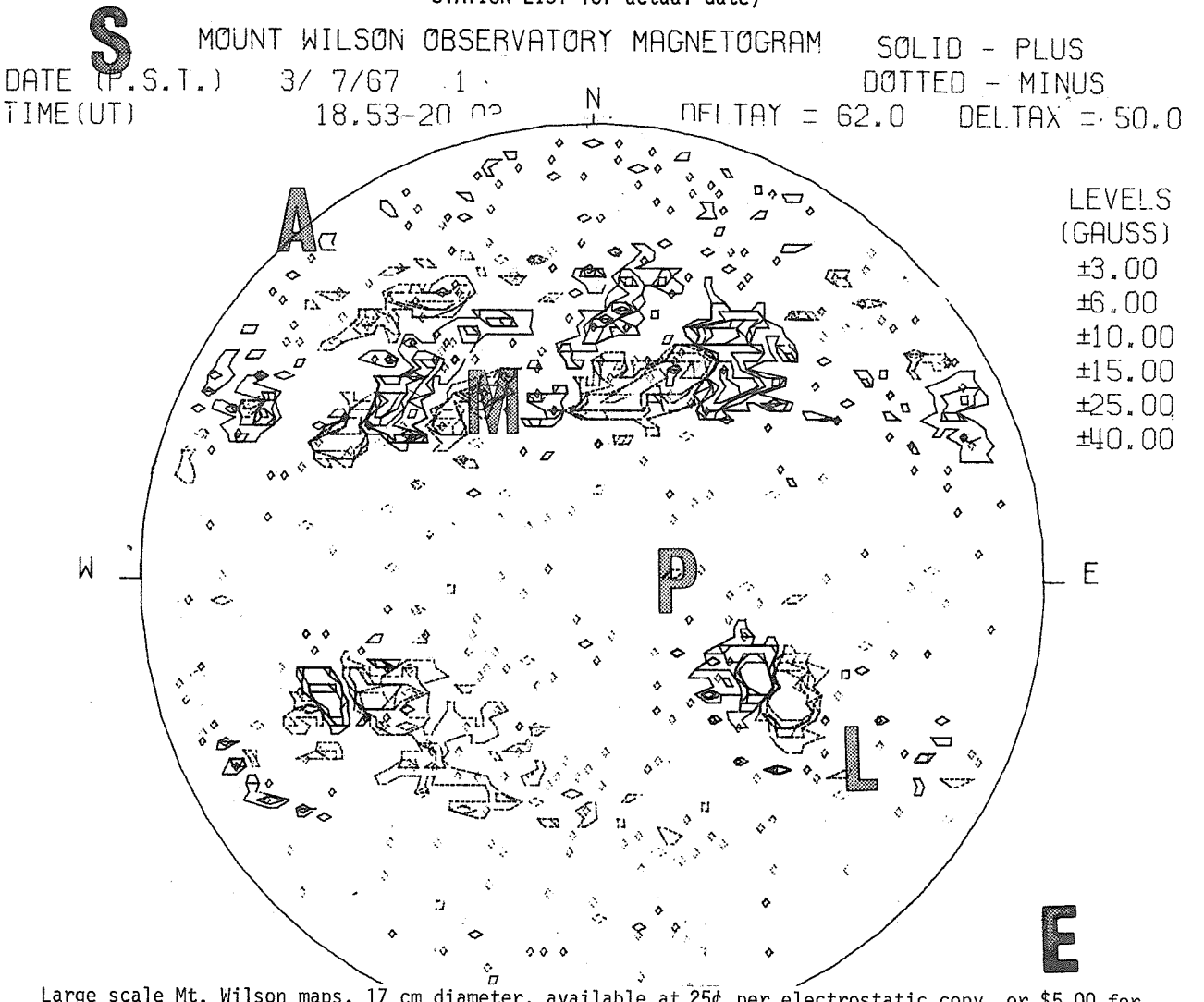
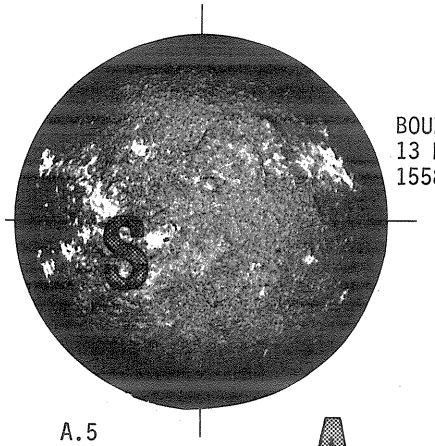
S = Program STOPPED operations (see MASTER STATION LIST for actual date)



Large scale Mt. Wilson maps, 17 cm diameter, available at 25¢ per electrostatic copy, or $5.00 for negative, and $2.00 for glossy print of negative.

A.4



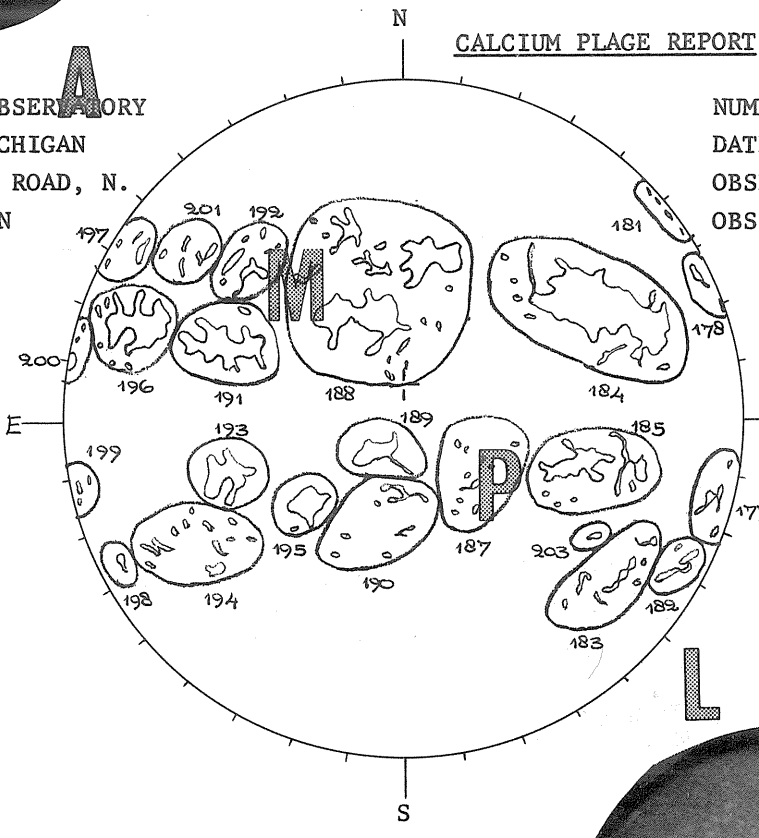
BOULDER Hα
13 MAY 1970
1558 UT

A.5

McMATH-HULBERT OBSERVATORY
UNIVERSITY OF MICHIGAN
895 LAKE ANGELUS ROAD, N.
PONTIAC, MICHIGAN

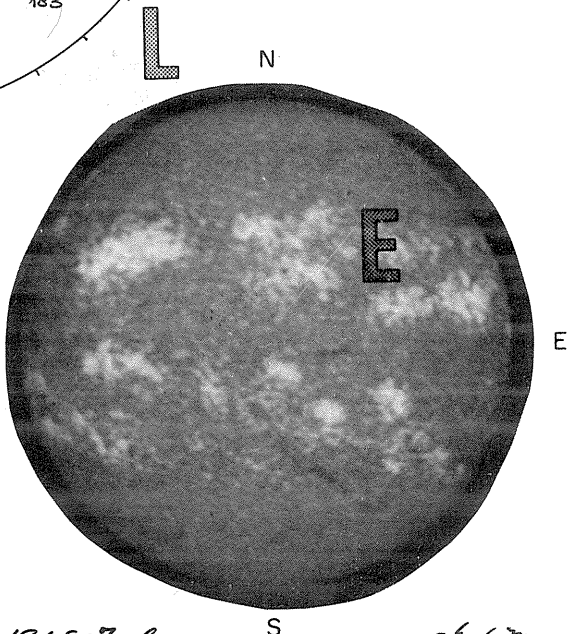
CALCIUM PLAGE REPORT

NUMBER 6575
DATE 1968 FEB. 09D 18H 40M UT
OBSERVER OLSON
OBS. QUALITY POOR



WAVELENGTH K232 3933.7 Å

Number	Act.	Lat.	Mer. Dist.	Area	Int.
9 177	1	S 15	W 75	13 00	2
178	1	N 20	W 77	10 00	2.5
181	1	N 35	W 77	08 00	1.5



1968 Feb. 2 18h40m

A.4 H-ALPHA OBSERVATIONS (OTHER THAN FLARES)

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
ROME	41N	12										B	A	A	A	A	B	C	Q
CALTECH	34N	242														Q	Q	Q	Q
UPPER VAN NORMAN	35N	242										Q	Q	Q	Q	Q	Q		
BOULDER	40N	255												B	A	A	A	A	C
SACRAMENTO PEAK	32N	255									C	A	A	A	A	C			
MCMATH-HULBERT	42N	277	A	A	A	A	A	A	A			A	A	A	A	C			
ROSARIO	33S	300															C	P	P
TEHRAN	35N	309													C	B	C	P	

Solar Patrol film from Canary Islands for 5/1967 to date, Carnarvon for 9/1966 to date, Houston for 2/1966 to 4/1970, Culgoora for 6/1968 to 12/1969, and Boulder for 8/1967 to date.

Note: (1) H-alpha plage positions, areas and compactness data from Catania available at Boulder for 1967-1971.

PHOTOGRAPHS:

Daily scout film, 35 mm, in *Photographic Journal of the Sun*, Rome, 1968 to 12/1972.
Tehran daily scout film, 35 mm, 10/1969 to 12/1971.

A.5 CALCIUM PLAGES, POSITIONS, AREAS, MAXIMUM INTENSITIES

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
MEUDON	49N	2	B																
ARCETRI	43N	11	B	A	A														
ROME	41N	12									B	A	B						
CATANIA	37N	15											A	A	A	A	A	A	C
SIMEIS	44N	34	B	A	B														
KODAIKANAL	10N	77	B	A	A														
IKOMASAN	34N	135				A	A	A		A	A	A	B						
UPPER VAN NORMAN	35N	242															Q	P	
MCMATH-HULBERT	42N	277	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B

COMPUTER FORMAT:

1. Daily McMath plages (one card/plage/day) 1962 to date.
2. Monthly summary McMath plages (one card/plage region) 1962-1968.
3. Region data as published in *Solar-Geophysical Data* on magnetic tape Jan. 1969 to date

PUBLICATIONS:

1. *Solar-Geophysical Data* - Daily plage for McMath or Catania.
2. Pennsylvania State University, Ionosphere Research Lab., *Scientific Report 373 (E)*, The *Solar CA II plage Index* for Jan. 1958 - Jan. 1971, by Wesley E. Swartz and Regan Overbeck.

PHOTOGRAPHS:

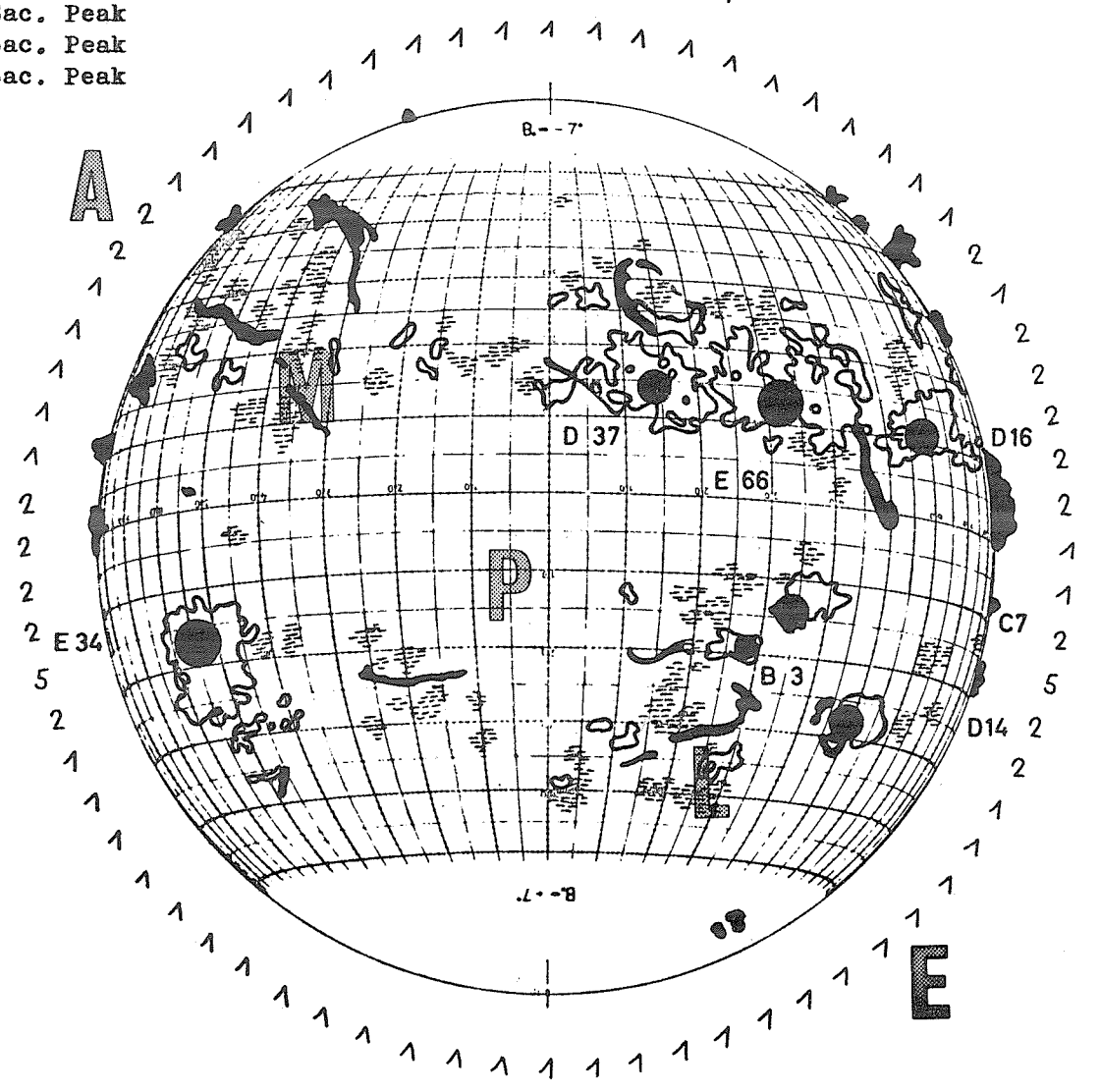
1. McMath daily scout pictures, 15 cm diameter, 1955 to date.
2. Daily scout film, 35 mm, in *Photographic Journal of the Sun*, Rome, 1968 to 12/1972.

Plages S 2.46 Anacapri
Filam. 16.07 Sac. Peak
Promin. 16.07 Sac. Peak
Corona 17 Sac. Peak

FRAUNHOFER INSTITUT

1969 Feb. 25 R= 1

Map of the Sun



McMath Plages

936	15S87W	5
937	18N81W	8
941	11N62W	29
943	25N53W	14
945	27S49W	11
946	18N26W	87
951	35S27W	4
952	19S23W	6
953	13S35W	11
955	14N 0	3
957	17S57E	53
958	31S 9W	4
959	2S 7W	1
960	39N 3E	1
961	28S49E	5

A.6 COMBINED AND SPECIAL OPTICAL OBSERVATIONS

AT BOULDER

SOLAR MAPS

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
FREIBURG	48N	7	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
WENDELSTEIN	47N	12	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
CAPRI S	40N	14				B	A	A	A	A	A	A	A						
ISTANBUL	41N	28								C									
MITAKA	35N	139	B	A	A				A	A	A	A	A	B					
MANILA	14N	239							C	A	A	A	A	A	A	B	A	A	C

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P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

PUBLICATIONS:

1. *Carte Synoptiques de la Chromosphere Solaire, etc.*, by Observatoire de Paris, Meudon, (1931-1937 in WDC) and (1945-1967 in WDC) contains:

   Tables of centers of activity by mean position, age at CM, importance.
   Tables of filaments by mean position, importance, height, events and rotations of visibility.
   Chart of positions of filaments to ± 60° latitude.

2. *Photographic Journal of the Sun*, Rome, contains:

   Hα chromosphere pictures; daily K232 chromosphere pictures on 35 mm film by solar rotation, 1/1968 to date.

3. *Solar-Geophysical Data*, NOAA, (monthly), contains daily photographs or map contours for selected optical and radio data.

4. *Solar Activity Catalogues*, by Fred C. Jonah, LTV Astronautics Div., H. Dodson-Prince and E. Ruth Hedeman, McMath-Hulbert Obs., Univ. of Michigan, published by NASA, MSC, Houston, Texas.

   Data for 1954-1963 contain:

Major flares	Geomagnetic Storms
Important Sunspot Groups	Solar Terrestrial Effects
Plages	Important Balloon Flights
Important Solar Radio Emission	Chronological Catalogue of Major Solar Events

5. *Annals of the IGY*, Vol. XVI, Part I, IGY Calendar Record, Part III Calendar Record for IGC 1959, Pergamon Press, London, 1962-1963.

6. *Annals of IQSY*, Vol. 2, Solar and Geophysical Events 1960-1965, M.I.T. Press, Cambridge, Mass. and London, England, 1968.

7. *IQSY NOTES*, *STP NOTES* and *Solar-Geophysical Data*. The Solar and Geophysical Calendar Record continued with provisional data ad "Abbreviated Calendar Record".

   IQSY NOTES, Nos. 17-21 Data for 1966.
   STP NOTES, Nos. 1-5, 7 Data for Jan. 1967 - Nov. 1969.
   Solar-Geophysical Data, Data for Dec. 1969 to date.

   A "Condensed Calendar Record" appears in *STP NOTES*, Nos. 7 onwards, Data for Dec. 1969 to date.

8. *World Data Center A, Report UAG-4*, NOAA, January 1969, Abbreviated Calendar Record 1966-1967. See p. 3.

9. *Preliminary Report and Forecast of Solar-Geophysical Activity*, weekly, published by Space Environment Services Center, NOAA, Boulder, Colorado, U.S.A. 80302.

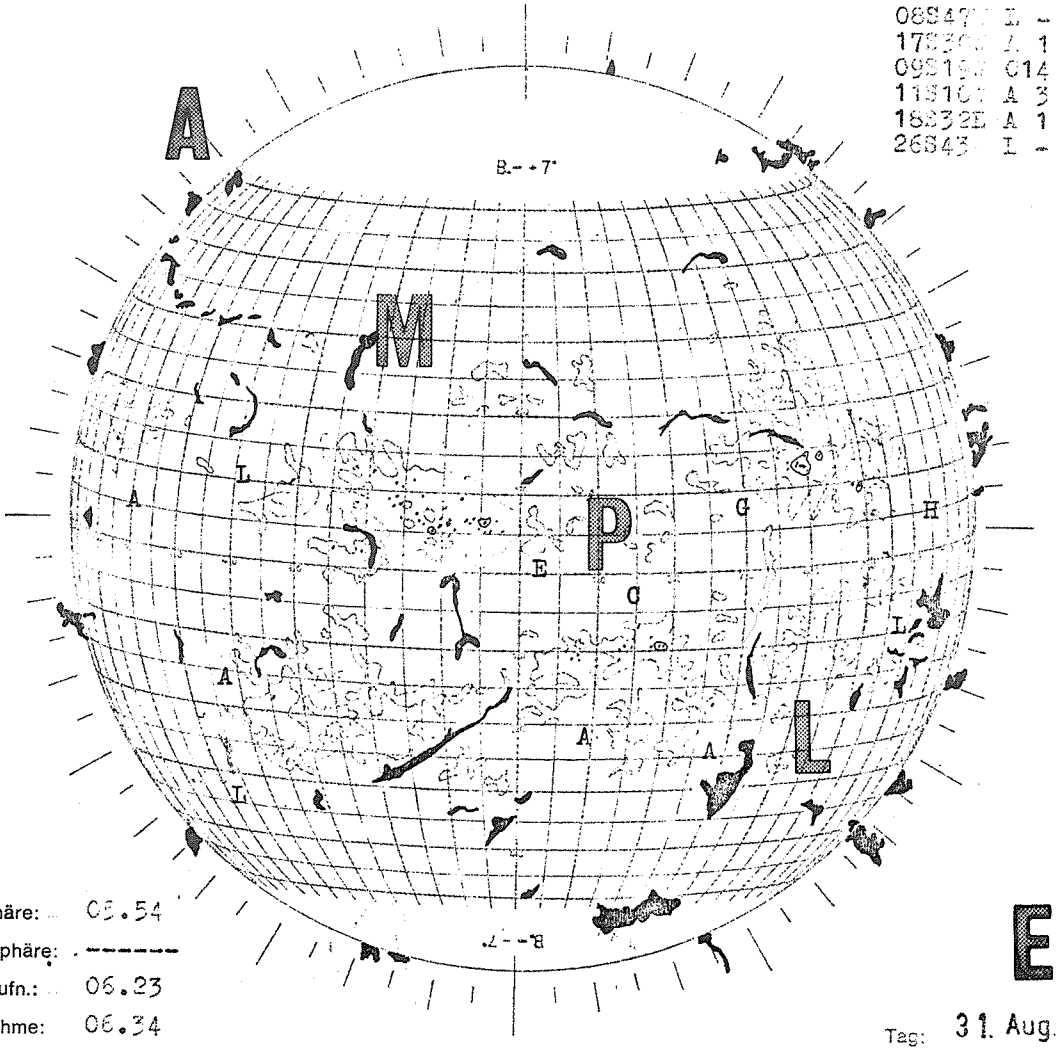
A.6

[illegible] 2 2

R = 161 / R.int := 104

$B_o = +7°$ $P_o =$

09N52W	H	2	436
13N42W	C1[illegible]		-[illegible]
07N06E	[illegible]		-[illegible]
03N19E	A	3	-34
09N30E	L	-	-24
12N65E	A	1	959
08S47W	L	-	-79
17S30W	A	1	-13
09S19W	C14		-45
11S10W	A	3	-35
18S32E	A	1	448
26S43W	L	-	848



Photosphäre: 05.54

Chromosphäre: -------

Integralaufn.: 06.23

Hα-Aufnahme: 06.34

K_3-Aufnahme: 06.40

Protub.-Aufn.:

Korona 5303:

Korona 6374:

Tag: 31. Aug. 19[illegible]

Station: [illegible]

Beobachter: [illegible]

A.6 COMBINED AND SPECIAL OPTICAL OBSERVATIONS

AT BOULDER

PROMINENCES AND FILAMENTS

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
HERSTMONCEUX	50N	0	B	A	A					C									
MEUDON	49N	2	B	A	A	A	A	A	A	A	A	A	A	B	B	B	C	C	C
UCCLE	50N	4	B	A	B	A	A	A	A	A	A	A	B	C	A	A	C	Q	Q
HAUTE PROVENCE	44N	5						A	A					B	B	A	C	Q	Q
LOCARNO	46N	8								A	A	B							
ZURICH	47N	8	B	A	A	C				A	A	B							
AROSA	46N	9								B	C	C							
ARCETRI	34N	11									A	B	B	B		C	B	A	C
ROME	41N	12									C	B	C						
WENDELSTEIN	47N	12	B	A	A	A	C			B	B	A	A	A	B	A	B	B	C
KANZELHOHE	46N	13	B	A	A	A	A			C	A	B							
CAPRI F	40N	14								C	C								
CAPRI S	40N	14	B	A	A	A	A	A	A	A	A	A	A	A	A	B	B	B	C
CATANIA	37N	15	C		A					A	A	A	A	A	A	A	A	A	C
ONDREJOV	50N	15	B	A	C														
WROCLAW	51N	17								B	B								
CAPETOWN	33S	18		B	A	A	A	B	A	A	A								
ATHENS	37N	23	B	A	C			B	B	B	B	A	B				B	A	C
THESSALONIKA	40N	23									C	C	C						
LVOV	49N	24								C	C	A	C		C				
BUCHAREST	44N	26								A	A	B	A	A	A	B	B	B	C
KANDILLI	41N	29									B	B							
KIEV	50N	30								C	C	B	C		C	A	A	C	Q
SIMEIS	44N	34	B	A	A														
KHARKOV	50N	36	C	B	B		C	C	C	C	C	B	C		C		C	C	Q
MOSCOW (UNIV)	55N	37	B	A	A	B	C	C											
MOSCOW IZMIRAN	55N	37	C	B	A	B	B	B	B	C	C		C			A	A	C	Q
ABASTUMANI	41N	42	C	B	B	B	C	C	C	C	C	B	C		B	A	A	C	P
KISLOVODSK	43N	42								B	A	A	A	A	A	A	B	A	C
TASHKENT	41N	44	B	A	A											A	A	C	Q
BAKOU	40N	48								B	C	A	C						
ALMA ATA	43N	77	C	C															
KODAIKANAL	10N	77	B	A	A	B	A	B	A	A	A	A	A	A	A	A	A	A	C
HYDERABAD	17N	78	B	A	A	B				B	C								
IRKUTSK	52N	104									C								
SIBERIA	52N	104														A	A	C	Q
CARNARVON	25S	114											B	A	A	C			
MANILA	14N	121								A	A	A	A	A	A	A	A	A	C
USSURISK	43N	132								B	B	B			B	A	A	C	Q
IKOMASAN	34N	135								A	A	A	A						
MITAKA	35N	139	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
CULGOORA	30S	147									A	A	B	C		C	B	B	C
SYDNEY	36S	151	B	A	A					A									
CAPE WELLEN	66N	190													B				
HONOLULU	21N	202	B	B	A	A	A	A	C										
HALEAKALA	20N	204								B	A	A	A	A	B	S			
LOCKHEED	33N	242			B	A	B	A	A	A	A	A	A	C					
MT WILSON	31N	242	B	A															
CLIMAX	39N	254	B	A	A	B	A	A	A	A	B	B							
BOULDER	40N	255											C	B	A	C			

Continued

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IQSY PROMINENCES AND FILAMENTS

PAGE 1 OF 3 PAGES

STATION	STATION NO.	DATE (Mo and Year)
SACRAMENTO PEAK OBSERVATORY		DECEMBER 1968

WAVE LENGTH	BAND PASS	CINEMATOGRAPHIC	VISUAL
6563.8	0.4 Å	X	X

HOURS OF PATROL: DISC SEE FLARE PATROL LIMB

DAY	PHENOMENON	IMPORTANCE	TIME U.T. BEGIN	TIME U.T. END	POSITION (Heliographic) LATITUDE	POSITION (Heliographic) MERIDIAN DISTANCE	REMARKS
1	NO OBSERVATIONS-WX						
2	NO OBSERVATIONS-WX						
3	DSD	0	2228	2301	S 21	E 55	Flare Associated
4	NO PHENOMENA OBSERVED						
5	APR	1	1408	2353	S 15	E Limb	
5	APR	1	1408	2353	N 16	E Limb	
5	APR	1	1408	2353	S 32	W Limb	
6	APR	1	1409	2355	N 37	E Limb	
6	APR	1	2050	2355	S 19	W Limb	
6	---	1	2100	2355	S 06	E Limb	Region of BSLs
7	NO PHENOMENA OBSERVED						
8	APR	1	1530	2329	N 45	E Limb	
8	DSD	1	2243	2319	S 30	E 61	
9	NO PHENOMENA OBSERVED						
10	BSL	1	1710	1820	N 05	W Limb	
10	APR	0	1410	2320	N 27	W Limb	
11	---	0	<1459	1644	S 20	E Limb	Faint Loops
11	DSD	1	1553	1625	N 17	W 27	Flare Associated
11	---	0	1459	2330	N 13	W Limb	Region of BSLs

IKOMASAN

Prominence (Hα - Visual)

Quadrants NE No.	NE Area	SE No.	SE Area	SW No.	SW Area	NW No.	NW Area
1	30	1	110	0	0	3	490
0	0	1	60	0	0	4	430
0	0	3	530	1	40	4	550
0	0	1	120	1	40	2	660
1	10	2	60	1	40	1	100
0	0	2	1020	1	800	1	640
0	0	1	1840	1	1040	2	490
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
0	0	1	30	1	800	1	50
1	120	3	490	2	680	1	80
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

A.6 COMBINED AND SPECIAL OPTICAL OBSERVATIONS

AT BOULDER

PROMINENCES AND FILAMENTS Cont'd.

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
SACRAMENTO PK	32N	255	B	A	A	A	A	A	A	A	A	A	A	A	B	S			
HOUSTON	30N	265											B	B	B	C			
PALEHUA	21S	268													C				
WASHINGTON	38N	283	B	A	C														
HUANCAYO	12S	285	B	A	A	A	A	B	A	A	A	A	A	A	A	B	Q	Q	
OTTAWA	54N	285	B	A	B		B	C	A	B	A	B							
CANARY ISLANDS	28N	345											B	A	A	C			
DUBLIN	53N	354	C																
DUNSINK	53N	354								B									
EDINBURGH	56N	357	B	B															

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(1) Catania H-alpha quiescent prominences on disc: daily activity for yrs. 1967-present.
(2) Catania H-alpha quiescent prominences at limb: position, height and area for yrs. 1957-present.
(3) Catania K-line quiescent prominences at limb: position, height and area for yrs. 1968 (2nd half), 1969-present.

PUBLICATIONS:

IGY SOLAR ACTIVITY REPORTS No. 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 19, 20, 22, 26 and 31, World Data Center A, Intermediate Report of Surges and Active Prominence Regions (combines data by each day for all stations), Data for July - Sept. 1957, April 1958 - Dec. 1964.

IQSY CORONAL INTENSITIES

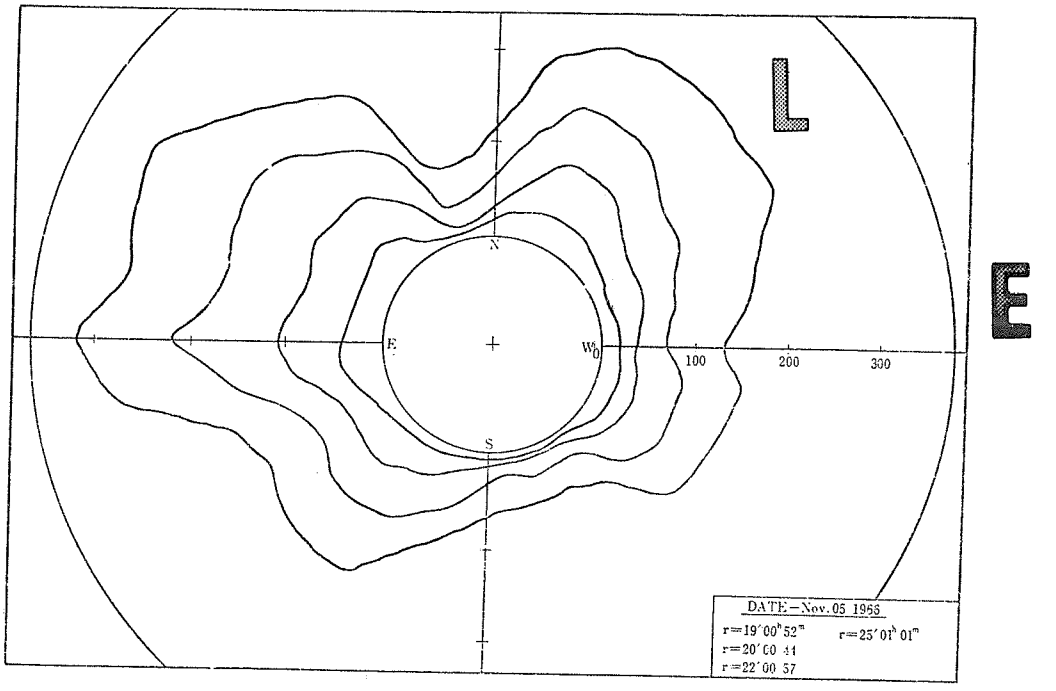
(absolute values in millionths of the brightness of one angstrom at the same wave length at the center of the solar disk)

Station PIC DU MIDI Month Juin Yr. 1968

	Date	0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
2I	5h44	I7	I9	I6	I2	I4	I5	I6	I8	2I	22	24	28	8I	86	I54
2I	6h5I	7	6	7	7	8	8	9	8	9	8	9	I2	24	32	I8
22	7h54	I8	I4	I2	I0	9	II	II	I5	2I	I9	25	34	69	85	I42
22	8h05	4	4	5	6	3	6	5	4	4	6	4	3	9	I7	I2
24	6h00	x	x	x	x	I7	I9	22	22	25	27	30	58	I03	I70	I24
24	I4h00	3	4	4	7	5	5	4	4	6	5	6	I3	2I	I8	35
25	5h44	I6	I7	I8	I6	I8	I9	2I	23	27	29	35	59	76	I28	95
25	7h00	4	4	5	6	5	6	5	5	4	5	7	9	I5	I7	I4
26	9h40	x	x	x	x	I7	20	24	29	34	46	54	59	69	76	8I
27	8h45	2I	I8	2I	24	26	28	24	23	27	32	34	36	48	65	73
28	9h04	20	22	24	23	26	22	28	33	38	43	48	54	60	78	93

Give date to nearest tenth of day. Give intensities in λ5303 (green line) emission on first line of date; intensities in λ6374 (red line) emission on second line of date. Use x when no observations were obtained; use a - when intensity was below threshold of visibility.

MT. NORIKURA WHITE LIGHT CORONA



A.7 OPTICAL OBSERVATIONS OF THE CORONA

AT BOULDER

λ 5303

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
PIC-DU-MIDI	43N	0	B	A	A	B	A	A	A	A	A	A	A	A	A	A	B	A	C
AROSA	47N	10	C	B	B	B	B	B	B	B	B	B	B	S					
WENDELSTEIN	47N	12	B	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	B
KANZELHOHE	46N	13	B	A	A	A	A	A	B	C	S								
LOMNICKI STIT	49N	20									B	A	A	A	A	A	A	A	C
KISLOVODSK	43N	42	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
ALMA ATA	43N	77	C	B	A	A	A	B	S										
MT NORIKURA	36N	137	B	A	A	A	B	B	A	A	A	A	A	A	A	B	A	A	C
CLIMAX	39N	254	B	A	A	A	A	A	A	A	A	C	Q	Q	Q	Q	S		
SACRAMENTO PK	32N	255	C	A	A	A	A	A	A	A	A	C	Q	B	A	A	A	A	C

Note: Many of the above observatories also report red line (λ6374).

PUBLICATIONS:

1. *IAU Quarterly Bulletin on Solar Activity,* Zürich, contains daily intensities and coronal isophotes.
2. *IGY Solar Activity Report #13,* World Data Center A - Indices of solar corona 7/1957 - 12/1959.
3. *Solar-Geophysical Data,* NOAA - three intensity levels on daily charts, 1/1969 to date.
4. *IGY Solar Activity Report #27,* World Data Center A - Occurrences of the Yellow Coronal Line, May 1, 1957 - May 31, 1964.

WHITE LIGHT CORONA

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
PIC DU MIDI	43N	0											B	B	B	B	B	C	
MT NORIKURA	36N	137							B	A	A	A			Q	Q	Q	Q	C
MAUNA LOA	21N	203										Q	Q	Q	Q	Q	Q	Q	Q
HALEAKALA	20N	204								Q	Q								
CLIMAX	39N	254	A	A	A	A	Q	Q	Q						Q	Q			

PUBLICATIONS:

1. *IGY Solar Activity Report Series,* #4 and 16, World Data Center A - data from Climax 9/1956 - 12/1960.
2. *Tokyo Astronomical Obs. Bulletin of Solar Phenomena* - data from Mt. Norikura 1964 - 1966.
3. *World Data Center A, Report UAG-7,* ESSA - data from Haleakala and Mauna Loa, 2/1964 - 1/1968. See p. 4.
4. *Solar-Geophysical Data,* NOAA - OSO-7 daily photos of white light corona from USNRL, February, 1972 to date.

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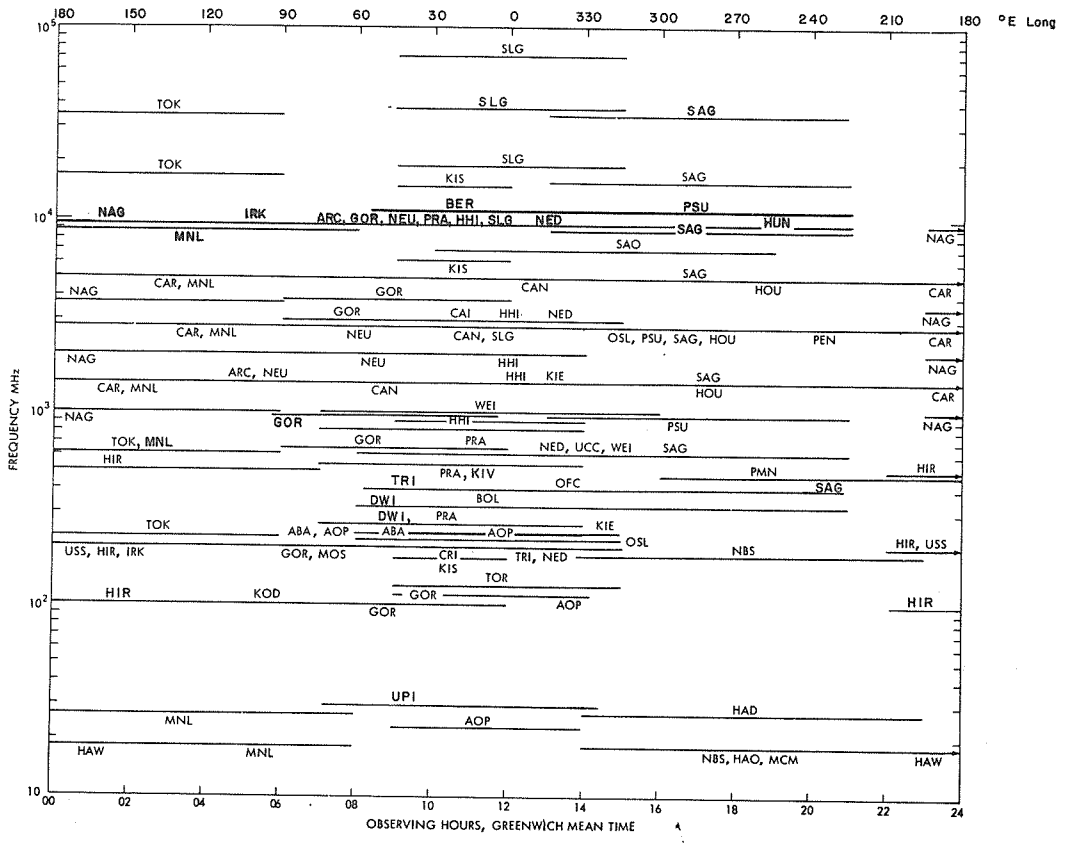
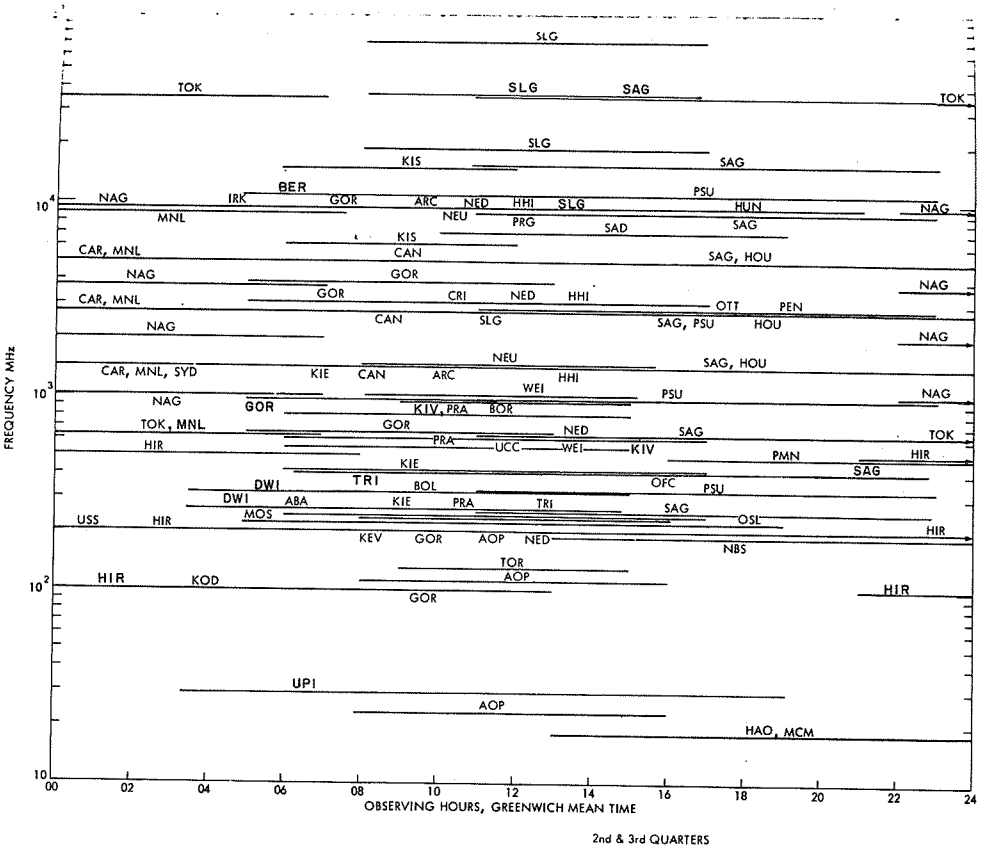
AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
OGO 6, LYMAN-ALPHA PHOTOMETER CLARK (69-051A-12)	060859	060869 ,	060569



FIXED FREQUENCY SOLAR RADIO EVENTS, 1st & 4th QUARTERS



2nd & 3rd QUARTERS

Observing Hours Covered

AT BOULDER

A.8 TOTAL RADIO FLUX MEASUREMENTS

BY LONGITUDE

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	FREQUENCY MHZ
CAMBRIDGE	52N	0	B	A																81
CAMBRIDGE	52N	0	B	A																175
UCCLE	50N	4	B	A	A	A	A	S												169
UCCLE	50N	4	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	C	600
NEDERHORST	52N	5	B	A	A	A	A	A	A	A	A	A	A	A	A	B	Q	Q	Q	200
NEDERHORST	52N	5	B	A	A	A	A	A	A	A	A	A	A	A	A	B	S			600
NEDERHORST	52N	5	B	A	A	A	A	A	A	A	A	A	A	A	A	B	Q	Q	Q	3000
NEDERHORST	52N	5	B	A	A	A	A	A	A	A	A	A	A	A	A	B	S			9500
BONN	50N	7											B							36
BERNE	47N	7													A	A	A	A	C	10500
HARESTUA	60N	10	B	B	B	B	B	B	B	B	B	B	A	A	B	B	B	C	C	225
KIEL	54N	10												C	A	A	A	C	Q	240
KIEL	54N	10												C	A	A	A	C	S	420
KIEL	54N	10												C	A	A	A	C	Q	1420
KIEL	54N	10																C	Q	410
ARCETRI	34N	11							B	A	S									225
ARCETRI	34N	11	B	A	A	A	S													186
BOLOGNA	44N	11								A	A	A	A	A	A	A	A	C	P	327
ARCETRI	34N	11																B	C	1420
ARCETRI	34N	11																B	C	2830
ARCETRI	34N	11																B	C	9285
BERLIN	52N	13	B	A	A	A	A	A	A	A	A	A	A	A	A	S				1470
BERLIN	52N	13	B	A	A	A	A	A	A	A	A	A	A	A	A	S				9490
BERLIN	52N	13														A	A	A	C	1490
BERLIN	52N	13														A	A	A	C	9500
NEUSTRELITZ	53N	13								B	B	A	B	A						2000
NEUSTRELITZ	53N	13					A	A	A	A	A	A	A	A	C					9140
NEUSTRELITZ	53N	13				A	A	A	A	A	A	A	B	A	B					1490
POTSDAM	52N	13							B	A	A	A	A	A	B	B	A	B	P	23
POTSDAM	52N	13	B	A	B	A	A		B	A	A	A	A	A	B	A	A	B	P	234
POTSDAM	52N	13	B	B					B	B	B	A	A	A	B	B	S			111
TRIESTE	45N	13										B	A	A	C	S				239
TRIESTE	45N	13													B	C	S			235
POTSDAM	52N	13														C	A	B	P	113
TRIESTE	45N	13														A	A	B	C	237
TRIESTE	45N	13															A	B	C	408
ONDREJOV	49N	14					B	A				C	B	B	A	A	A	B	C	9400
ONDREJOV	49N	14			B	B	B	A				B	A	A	A	A	A	B	C	808
ONDREJOV	49N	14		C	A	B	B	A	A	A	A	A	A	A	A	A	A	B	C	260
ONDREJOV	49N	14	B	A	A	A	B	A	A	A	A	B	A	A	A	A	A	B	C	536
UPICE	50N	16																A	C	295
RIGA	56N	24	C	C	C	C			C	B	B	C								220
LWIRO	02S	28	B	A	C															169
KIEV	50N	30								B	A	B	B	C	S					210
KIEV	50N	30													B	A	A	A	C	204
KIEV	50N	30																B	C	550
SIMFEROPOL	44N	34										C								1000
SIMFEROPOL	44N	34			B	C				A	B	B	B	B	B					3100
SIMFEROPOL	44N	34	C	A	A	B	C			B	B									220
SIMEIS	44N	34													A	A	C	A	C	3100

Continued

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ASTROPHYSICS BRANCH
NATIONAL RESEARCH COUNCIL
OTTAWA, ONTARIO
CANADA

September 1973

SERIES C & D

DAILY VALUES OF SOLAR FLUX AT 2800 MHZ (OTTAWA-ARO) AT 17:00 U.T.

Series D is the best estimate of absolute value and is obtained by using the multiplier .90 recommended by Commission V of URSI

1973 Sept	Observed Series C	Adj. to 1 AU Series C	Adj. to 1 AU Series D
1	112.9	114.9	103.4
2	126.9#	129.2#	116.3#
3	134.2	136.5	122.9
4	132.7#	135.0#	121.5#
5	133.0#	135.1#	121.6#
6	128.8	130.9	117.8
7	119.9	121.7#	109.5#
8	114.0	115.7	104.1
9	111.5#	113.1#	101.8#
10	105.2#	106.7#	96.0#
11	95.6	96.8	87.1
12	88.4	89.5	80.6
13	83.5	84.6	76.1
14	81.8	82.9	74.6
15	81.7	82.6	74.3
16	83.0	83.9	75.5
17	81.0	81.8	73.6
18	83.8	84.6	76.1
19	85.8	86.6	77.9
20	91.3	92.0	82.8
21	94.1	94.9	85.4
22	98.8	99.5	89.6
23	103.2	103.9	93.5
24	105.6	106.2	95.6
25	112.1	112.7	101.4
26	114.9	115.5	104.0
27	115.4	115.9	104.3
28	117.6	118.1	106.3
29	116.2	116.5	104.9
30	116.2#	116.5#	104.9#
Mean:	105.6	106.8	96.1

#Corrected for burst

A.8 TOTAL RADIO FLUX MEASUREMENTS

BY LONGITUDE Cont'd.

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	FREQUENCY MHZ
MOSCOW IZMIRAN	55N	37	C	A	A	A	A	C		A	A	A	A	A	B	S				202
MOSCOW IZMIRAN	55N	37	C	B	A	B	A	C	S											545
MOSCOW IZMIRAN	55N	37													C	A	A	C	Q	206
ABASTUMANI	41N	42	C	A	A	A	A	C		B	A	A	A	A	B	A	A	B	C	221
KISLOVODSK	43N	42								B	A	B	B	B	C					6100
KISLOVODSK	43N	42								C	B	B	B	B	C					15000
KISLOVODSK	43N	42	C	A	B	A	A	A	C	B										178
GORKY	56N	44											A	A	A	A	A	A	C	650
GORKY	56N	44											B	A	A	A	A	A	C	100
GORKY	56N	44											B	A	B	S				3800
GORKY	56N	44	B	B									A	A	A	A	A	A	C	2950
GORKY	56N	44	C	B	B	B				B	C		A	A	B	A	A	A	C	9100
GORKY	56N	44	C	B	C								B	B	A	B	A	A	C	200
GORKY	56N	44												A	B	B	A	A	C	950
DELHI	28N	77								C	C	C	C	A						2000
DWINGELOO	28N	77																	C	160
DWINGELOO	28N	77																	C	320
KODAIKANAL	10N	78													A	B	A	B	C	100
IRKUTSK	52N	104								C	B	B	B	B	C	S				9570
IRKUTSK	52N	104	C	B	A	C	B	A	C	B	B	C	S							209
IRKUTSK	52N	104														C	B	A	Q	9750
IRKUTSK	52N	104														C	B			9700
IRKUTSK	52N	104														B	S			9620
MANILA	14N	121											C	A	A	A	A	A	C	1415
MANILA	14N	121											C	A	A	A	A	A	C	2695
MANILA	14N	121											C	A	A	A	A	A	C	4995
MANILA	14N	121											C	A	A	A	A	A	C	8800
MANILA	14N	121														A	A	A	C	606
USSURISK	43N	132			B	A	A	C		A	A	B	A	A	A	A	A	B	C	208
TOYOKAWA	34N	137	B	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	1000
TOYOKAWA	34N	137	B	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	2000
TOYOKAWA	34N	137	B	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	3750
TOYOKAWA	34N	137	B	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	9400
MITAKA	35N	139												C	S					35000
MITAKA	35N	139											C	A	B	B	B	B	Q	612
MITAKA	35N	139								B	A	B	A	A	B	B	B	B	Q	17000
MITAKA	35N	139	B	A	B	B	B	A	A	S										3000
MITAKA	35N	139	B	A	B	B	B	A	A	C			C	S						9500
MITAKA	35N	139	B	A	B	B	B	A	A	C	A	B	A	A	S					227
MITAKA	35N	139	B	B	B	B	B	A	B	S										67
MITAKA	35N	139	B	B	B	B	B	A	B	S										100
HIRAISO	36N	140							B	A	A	A	B	A	A	A	A	A	C	500
HIRAISO	36N	140	B	B	A	A	A	A	B	A	A	A	B	A	A	A	A	A	C	200
SEATTLE	47N	238									B									223
PENTICTON	49N	241								C	A	A	A	A	A	A	A	A	B	2700
UPPER VAN NORMAN	35N	242												Q	Q	Q	Q	P	P	3000
BOULDER NBS	40N	255	C	A																467
BOULDER NBS	40N	255	C	A	A	B														167
NORTH LIBERTY	42N	268											Q	Q	Q	Q				15375
HUANCAYO	12S	284													B	A	A	A	B	9400

Continued

KEY TO SYMBOLS

A = 12 Months
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GORKY

FLUX DENSITY AND VARIABILITY

December 1968

Frequency 100 Mc/s

Date	UT	Flux density 10^{-22} Wm^{-2}(c/s)$^{-1}$ 6-8	8-10	10-12	Day	Variability 6-8	8-10	10-12	Remarks
1		5	6	6	6	0	0	0	
2		5	6	6	6	0	1	1	
3		5,5	5,5	7	6	0	1	1	
4		-	6	6	6	-	0	0	
5		19	29	56	35	2	2	2	
6		19	9	9	12	2	2	2	
7		5,5	6,5	7	6	0	0	0	
8		7	6	8	7	0	0	0	
9		7	7	7	7	0	0	0	
10		5	5,5	5	5	0	0	0	
11		9	9	67	28	1	1	2	
12		23	8,	8	13	1	1	1	
13		12,5	13	16	14	1	1	1	
14		16	12	15	14	1	1	1	
15		9	13,5	13	12	0	1	1	
16		9,5	11	-	10	0	0	-	
17		-	-	-	-		-	-	
18		-	-	-	-	-	-	-	
19		6,5	6	6,5	6	0	0	0	
20		6	6	7	6	0	0	0	
21		11	8	8	9	1	0	0	
22		5	9	8	7	0	0	0	
23		7	5	8,5	7	1	1	1	
24		-	-	-	-	-	-	-	
25		-	-	-	-	-	-	-	
26		26	22	34	27	1	1	1	
27		32	16	54	35	1	1	1	
28		-	-	-	-	-	-	-	
29		12	6	6	8	1	1	1	
30		-	-	-	-	-	-	-	
31		-	-	-	-	-	-	-	
				Means:	12				

AT BOULDER

A.8 TOTAL RADIO FLUX MEASUREMENTS

BY LONGITUDE Cont'd.

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	FREQUENCY MHZ
OTTAWA	54N	285	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	2800
SAGAMORE HILL	42N	288												A	A	A	A	A	B	15400
SAGAMORE HILL	42N	288										A	A	A	A	A	A	A	B	8800
SAGAMORE HILL	42N	288										B	A	A	A	A	A	A	B	4995
SAGAMORE HILL	42N	288									C	A	A	A	A	A	A	A	B	606
SAGAMORE HILL	42N	288									C	A	A	A	A	A	A	A	B	1415
SAGAMORE HILL	42N	288									C	A	A	A	A	A	A	A	B	2695
SAGAMORE HILL	42N	288														A	A	A	B	245
SAGAMORE HILL	42N	288																A	B	410
SAN MIGUEL	34S	302											A	A	A	A	A	A	C	408
VILLA ELISA	34S	302											B	C						2695
SAO PAULO	22S	314											C	A	A	C	B	B	C	7000
JODRELL BANK	53N	357	B	A	C															80
JODRELL BANK	53N	357	B	A	C															200
JODRELL BANK	53N	357	B	A	C															2000
BORDEAUX	44N	359												C	A	A	A	B	B	930
SLOUGH	51N	359													A	A	A	A	C	19000
SLOUGH	51N	359													A	A	A	A	C	2800
SLOUGH	51N	359													A	A	A	A	C	71000
SLOUGH	51N	359													C	A	A	A	C	9400
SLOUGH	51N	359													C	A	A	A	C	37000

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SOLAR RADIO EMISSION TOY-69-25

SINGLE-FREQUENCY OBSERVATIONS

Daily Data March 1969

Observing Station: TOYOKAWA, JAPAN. Frequency: 3750 MHz

Flux Density
10^{-22} W M^{-2} (Hz)$^{-1}$

Date	U.T. 0-3	3-6	23-24	Day
1	182	178	172	177
2	172	172	159	168
3	159	159	149	156
4	149	149	149	149
5	149	148	143	147
6	143	143	145	144
7	145	144	146	145
8	146	146	145	146
9	145	145	148	146
10	146	145	146(a)	146
11	146	146	142	145
12	142	142	147	144
13	146	147	144(b)	146
14	144	146	153	148
15	154	153	182	163
16	181	180	194	185
17	194	194	206	198
18	207	211(E)	212	210
19	212	212	213	212
20	212	211	224	216
21	224	224	233	227
22	235	232	224	230
23	223	228	210	220
24	210	209	-	210
25	194	192	-	193
26	191	193	205	196
27	202	195	-	199
28	188	188	-	188
29	189	190	193	191
30	193	193	200	195
31	200	201	201	201

Mean: 178.7

NOTE: (a) 2300-2327, (b) 2300-2330, No observations.
(E) Eclipse.

AT BOULDER

A.8 TOTAL RADIO FLUX MEASUREMENTS

BY FREQUENCY

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	FREQUENCY MHZ
POTSDAM	52N	13							B	A	A	A	A	A	B	B	A	B	P	23
BONN	50N	7											B							36
MITAKA	35N	139	B	B	B	B	B	A	B	S										67
JODRELL BANK	53N	357	B	A	C															80
CAMBRIDGE	52N	0	B	A																81
GORKY	56N	44											B	A	A	A	A	A	C	100
MITAKA	35N	139	B	B	B	B	B	A	B	S										100
KODAIKANAL	10N	78													A	B	A	B	C	100
POTSDAM	52N	13	B	B					B	B	B	A	A	A	B	B	S			111
POTSDAM	52N	13														C	A	B	P	113
DWINGELOO	28N	77																	C	160
BOULDER NBS	40N	255	C	A	A	B														167
LWIRO	02S	28	B	A	C															169
UCCLE	50N	4	B	A	A	A	A	S												169
CAMBRIDGE	52N	0	B	A																175
KISLOVODSK	43N	42	C	A	B	A	A	A	C	B										178
ARCETRI	34N	11	B	A	A	A	S													186
GORKY	56N	44	C	B	C								B	B	A	B	A	A	C	200
HIRAISO	36N	140	B	B	A	A	A	A	B	A	A	A	B	A	A	A	A	A	C	200
JODRELL BANK	53N	357	B	A	C															200
NEDERHORST	52N	5	B	A	A	A	A	A	A	A	A	A	A	A	A	B	Q	Q	Q	200
MOSCOW IZMIRAN	55N	37	C	A	A	A	A	C		A	A	A	A	A	B	S				202
KIEV	50N	30													B	A	A	A	C	204
MOSCOW IZMIRAN	55N	37													C	A	A	C	Q	206
USSURISK	43N	132			B	A	A	C		A	A	B	A	A	A	A	A	B	C	208
IRKUTSK	52N	104	C	B	A	C	B	A	C	B	B	C	S							209
KIEV	50N	30								B	A	B	B	C	S					210
RIGA	56N	24	C	C	C	C			C	B	B	C								220
SIMFEROPOL	44N	34	C	A	A	B	C			B	B									220
ABASTUMANI	41N	42	C	A	A	A	A	C		B	A	A	A	A	B	A	A	B	C	221
SEATTLE	47N	238									B									223
ARCETRI	34N	11							B	A	S									225
HARESTUA	60N	10	B	B	B	B	B	B	B	B	B	B	A	A	B	B	B	C	C	225
MITAKA	35N	139	B	A	B	B	B	A	A	C	A	B	A	A	S					227
POTSDAM	52N	13	B	A	B	A	A		B	A	A	A	A	A	B	A	A	B	P	234
TRIESTE	45N	13													B	C	S			235
TRIESTE	45N	13														A	A	B	C	237
TRIESTE	45N	13										B	A	A	C	S				239
KIEL	54N	10												C	A	A	A	C	Q	240
SAGAMORE HILL	42N	288														A	A	A	B	245
ONDREJOV	49N	14		C	A	B	B	A	A	A	A	A	A	A	A	A	A	B	C	260
UPICE	50N	16																A	C	295
DWINGELOO	28N	77																	C	320
BOLOGNA	44N	11								A	A	A	A	A	A	A	A	C	P	327
SAN MIGUEL	34S	302											A	A	A	A	A	A	C	408
TRIESTE	45N	13															A	B	C	408
SAGAMORE HILL	42N	288																A	B	410
KIEL	54N	10																C	Q	410
KIEL	54N	10												C	A	A	A	C	S	420
BOULDER NBS	40N	255	C	A																467

Continued

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OBSERVATOIRE ROYAL DE BELGIQUE

Département de Radioastronomie et Physique Solaire.

3, avenue Circulaire - Uccle - Bruxelles 18.

DENSITE DE FLUX, VARIABILITE

Fréquence 600 Mlz.

JUILLET 1968.

Date	5 - 9 TU		9 - 12 TU		12 - 15 TU		15 - 19TU		$\bar{f}$	$\bar{v}$
	f	v	f	v	f	v	f	v		
1	--	-	67	0	67	0	66	0	66	0
2	[illegible]	0	65	0	65	0	65	0	65	0
3	[illegible]	0	64	0	66	0	68	0	66	0
4	--	-	65	0	67	0	68	0	67	0
5	63	0	63	0	63	0	64	0	63	0
6	68	0	78	1	65	0	65	0	69	0
7	67	0	65	0	65	0	66	0	66	0
8	68	0	68	0	68	0	90	0	74	0
9	--	-	68	0	68	0	67	0	68	0
10	--	-	--	-	--	-	--	-	--	-
11	74	0	74	0	74	0	74	0	74	0
12	73	0	72	0	91	1	72	0	76	0
13 a	(72)	(0)	(73)	(0)	(76)	(0)	76	0	(74)	(0)
14	68	0	68	0	69	0	69	0	69	0
15	68	0	68	0	68	0	69	0	68	0
16	71	0	68	0	68	0	68	0	69	0
17	68	0	69	0	70	0	71	0	69	0
18	68	0	68	0	68	0	68	0	68	0
19	68	0	68	0	68	0	68	0	68	0
20	68	0	68	0	68	0	68	0	68	0
21	64	0	65	0	67	0	67	0	65	0
22	66	0	65	0	67	0	68	0	66	0
23	67	0	66	0	68	0	68	0	67	0
24	70	0	72	0	73	0	(72)	(0)	(71)	(0)
25	68	0	68	0	69	0	69	0	68	0
26	68	0	67	0	66	0	66	0	67	0
27 b	(67)	(0)	(64)	(0)	64	0	65	0	(65)	(0)
28	(65)	0	65	0	65	0	65	0	(65)	0
29	--	-	65	0	64	0	64	0	64	0
30	65	0	66	0	65	0	64	0	65	0
31	62	0	63	0	63	0	65	0	64	0

f : moyenne tri-horaire de densité de flux en unité $10^{-22} W.m^{-2}.Hz^{-1}$

v : variabilité en échelle 0, 1, 2, 3.

a : les observations débutent à 06 h.
pas d'observations entre 11h46 et 13h12.

b : pas d'observations entre 08 h. et 11h28.

AT BOULDER

A.8 TOTAL RADIO FLUX MEASUREMENTS

BY FREQUENCY Cont'd.

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	FREQUENCY MHZ
HIRAISO	35N	140							B	A	A	A	B	A	A	A	A	A	C	500
ONDREJOV	49N	14	B	A	A	A	B	A	A	A	A	B	A	A	A	A	A	B	C	536
MOSCOW IZMIRAN	55N	37	C	B	A	B	A	C	S											545
KIEV	50N	30																B	C	550
UCCLE	50N	4	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	C	600
NEDERHORST	52N	5	B	A	A	A	A	A	A	A	A	A	A	A	A	B	S			600
SAGAMORE HILL	42N	288									C	A	A	A	A	A	A	A	B	606
MANILA	14N	121														A	A	A	C	606
MITAKA	35N	139											C	A	B	B	B	B	Q	612
GORKY	56N	44											A	A	A	A	A	A	C	650
ONDREJOV	49N	14			B	B	B	A				B	A	A	A	A	A	B	C	808
BORDEAUX	44N	359												C	A	A	A	B	B	930
GORKY	56N	44												A	B	B	A	A	C	950
SIMFEROPOL	44N	34										C								1000
TOYOKAWA	34N	137	B	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	1000
MANILA	14N	121											C	A	A	A	A	A	C	1415
SAGAMORE HILL	42N	288									C	A	A	A	A	A	A	A	B	1415
KIEL	54N	10												C	A	A	A	C	Q	1420
ARCETRI	34N	11																B	C	1420
BERLIN	52N	13	B	A	A	A	A	A	A	A	A	A	A	A	A	S				1470
BERLIN	52N	13														A	A	A	C	1490
NEUSTRELITZ	53N	13				A	A	A	A	A	A	A	B	A	B					1490
DELHI	28N	77								C	C	C	C	A						2000
JODRELL BANK	53N	357	B	A	C															2000
NEUSTRELITZ	53N	13								B	B	A	B	A						2000
TOYOKAWA	34N	137	B	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	2000
MANILA	14N	121											C	A	A	A	A	A	C	2695
SAGAMORE HILL	42N	288									C	A	A	A	A	A	A	A	B	2695
VILLA ELISA	34S	302											B	C						2695
PENTICTON	49N	241								C	A	A	A	A	A	A	A	A	B	2700
OTTAWA	54N	285	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	2800
SLOUGH	51N	359													A	A	A	A	C	2800
ARCETRI	34N	11																B	C	2830
GORKY	56N	44	B	B									A	A	A	A	A	A	C	2950
MITAKA	35N	139	B	A	B	B	B	A	A	S										3000
NEDERHORST	52N	5	B	A	A	A	A	A	A	A	A	A	A	A	A	B	Q	Q	Q	3000
UPPER VAN NORMAN	35N	242												Q	Q	Q	Q	P	P	3000
SIMFEROPOL	44N	34			B	C				A	B	B	B	B	B					3100
SIMEIS	44N	34													A	A	C	A	C	3100
TOYOKAWA	34N	137	B	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	3750
GORKY	56N	44											B	A	B	S				3800
MANILA	14N	121											C	A	A	A	A	A	C	4995
SAGAMORE HILL	42N	288										B	A	A	A	A	A	A	B	4995
KISLOVODSK	43N	42								B	A	B	B	B	C					6100
SAO PAULO	22S	314											C	A	A	C	B	B	C	7000
MANILA	14N	121											C	A	A	A	A	A	C	8800
SAGAMORE HILL	42N	288										A	A	A	A	A	A	A	B	8800
GORKY	56N	44	C	B	B	B				B	C		A	A	B	A	A	A	C	9100
NEUSTRELITZ	53N	13					A	A	A	A	A	A	A	A	C					9140
ARCETRI	34N	11																B	C	9285

Continued

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Daily Flux Density and Polarization

Frequency: 9400 MHz.

Month: January , Year: 1970
Station: Huancayo, Perú

S

Total Flux Density
of
2 Polarizations

Unit: 10^{-22} w.m.$^{-2}$Hz^{-1}

Polarization
Percent and Sense

Date	12-15 UT	15-18 UT	18-21 UT	Daily Mean	12-15 UT		15-18 UT		18-21 UT		Daily Mean	
1	307	306	305	306	0.61	1	0.9	1	0.91	1	0.8	1
2	298	297	294	296	0.4	1	0.6	1	0.9	1	0.6	1
3	295	294	290	293	0.6	1	0.8	1	0.4	1	0.6	1
4	288	288	289	288	0.5	1	0.8	1	0.9	1	0.7	1
5	289	290	286	288	0.2	1	0.2	1	0.4	1	0.3	1
6	-	282	282	282	-		0.5	1	0.6	1	0.6	1
7	284	280	279	281	0.3	1	0.4	1	0.3	1	0.3	1
8	279	284	280	281	0.1	1	0.3	1	0.3	1	0.2	1
9	286	289	288	288	0.1	1	0.2	1	0.3	1	0.2	1
10	298	298	298	298	0.4	1	0.4	1	0.4	1	0.4	1
11	314	314	314	314	0.4	1	0.9	1	0.8	1	0.7	1
12	316	318	315	316	0.2	1	0.3	1	0.4	1	0.3	1
13	316	318	320	318	0.0		0.1	1	0.0		0.0	
14	312	314	314	313	0.3	r	0.1	1	0.2	1	0.0	
15	326	327	324	326	0.2	r	0.2	r	0.1	r	0.2	r
16	-	318	316	317	-		0.2	r	0.1	r	0.2	r
17	322	322	321	322	0.2	r	0.1	r	0.2	1	0.0	
18	318	320	317	318	0.0		0.4	1	0.4	1	0.3	1
19	323	325	322	323	0.2	1	0.4	1	0.5	1	0.4	1
20	-	-	324	-	-		-		0.1	r	-	
21	330	332	330	331	0.0		0.0		0.0		0.0	
22	320	320	320	320	0.3	r	0.1	1	0.1	1	0.0	
23	312	312	312	312	0.1	r	0.1	1	0.3	1	0.0	
24	309	309	305	308	0.2	r	0.2	1	0.1	r	0.2	r
25	307	306	302	305	0.2	r	0.2	1	0.1	1	0.0	
26	300	303	298	300	0.4	1	0.5	1	0.8	1	0.6	1
27	310	312	309	310	0.4	1	0.9	1	0.9	1	0.7	1
28	323	323	323	323	0.9	1	1.2	1	1.7	1	1.3	1
29	316	316	312	315	0.9	1	1.6	1	2.0	1	1.5	1
30	313	310	308	310	1.0	1	1.0	1	1.2	1	1.1	1
31	307	309	309	309	1.4	1	1.7	1	1.6	1	1.[illegible]	1

A M D L E

Monthly Means: 307.0 Units. 0.42 % Left.

AT BOULDER

A.8 TOTAL RADIO FLUX MEASUREMENTS

BY FREQUENCY Cont'd.

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	FREQUENCY MHZ
HUANCAYO	12S	284													B	A	A	A	B	9400
ONDREJOV	49N	14					B	A				C	B	B	A	A	A	B	C	9400
TOYOKAWA	34N	137	B	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	9400
SLOUGH	51N	359													C	A	A	A	C	9400
BERLIN	52N	13	B	A	A	A	A	A	A	A	A	A	A	A	A	S				9490
BERLIN	52N	13														A	A	A	C	9500
MITAKA	35N	139	B	A	B	B	B	A	A	C			C	S						9500
NEDERHORST	52N	5	B	A	A	A	A	A	A	A	A	A	A	A	A	B	S			9500
IRKUTSK	52N	104								C	B	B	B	B	C	S				9570
IRKUTSK	52N	104														B	S			9620
IRKUTSK	52N	104														C	B			9700
IRKUTSK	52N	104														C	B	A	Q	9750
BERNE	47N	7													A	A	A	A	C	10500
KISLOVODSK	43N	42								C	B	B	B	B	C					15000
NORTH LIBERTY	42N	268											Q	Q	Q	Q				15375
SAGAMORE HILL	42N	288												A	A	A	A	A	B	15400
MITAKA	35N	139								B	A	B	A	A	B	B	B	B	Q	17000
SLOUGH	51N	359													A	A	A	A	C	19000
MITAKA	35N	139												C	S					35000
SLOUGH	51N	359													C	A	A	A	C	37000
SLOUGH	51N	359													A	A	A	A	C	71000

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

COMPUTER FORMAT:

1. Ottawa, daily noon flux on magnetic tape, as observed from 2/1947 - 12/1963, adjusted to 1 A.U. from 1/1964 to date.
2. Ottawa, daily noon flux (one card/day), observed and adjusted to 1 A.U., 10/1965 to date.
3. Sagamore Hill noon flux (one card/day), 1/1967 to date.
4. Manila noon flux (one card/day), 12/1967 to date.

PUBLICATIONS:

1. *IAU Quarterly Bulletin on Solar Activity* - Daily averages for many stations.
2. *Solar Activity Chart*, WDC-C2 Toyokawa Observatory, Nagoya University, Toyokawa, Japan (available at Boulder). Compiled data on radio bursts at 3, 8 and 10 cm in chart and tabulated form - for 1969, 70 and 71.
3. *Solar-Terrestrial Activity Chart*, National Committee on Solar Terrestrial Physics, Science Council of Japan. Since IASY, with the help of international cooperation in data supply, the "Solar Terrestrial Activity Chart" (abbreviated to STAC) has been published. This chart illustrates the time-sequence of the activities in 10 cm solar radio flux, solar flare event, solar X-ray and burst, solar proton flux, solar wind velocity and density, interplanetary magnetic field intensity and direction cosmic-ray neutron flux, and geomagnetic field (Dst, Ap, sc and si). The illustration will be given respectively for one-year period, 27-day interval, and 5-day interval. The organization responsible for this service is;

   Interdisciplinary Analysis Center
   Institute of Space and Aeronautical Science
   University of Tokyo
   (Attn: Prof. T. Obayashi)
   Komaba, Meguro-ku, Tokyo, 153 Japan.

   The publication is available on request to this address.

THE 1-3000A SOLAR FLUX AT 1 AU FOR A MODERATE LEVEL OF SOLAR ACTIVITY
RADIO FLUX AT 1 AU AT 10.7 CM WAVELENGTH = 150X10EXP(-22) WATTS PER (HZ, SQUARE M).
SOFT X-RAY FLUX AT 1 AU IN THE 1-8A WAVELENGTH RANGE = 0.0013 ERGS PER (SEC, SQUARE CM).
THIS MODEL IS INTENDED FOR USE IN MODELING THE IONOSPHERE AND UPPER ATMOSPHERE. AS NEW OBSERVATIONS OF SOLAR FLUX BECOME AVAILABLE, THE MODEL WILL BE REVISED. WHENEVER THE MODEL IS REFERENCED, INCLUDE THE DATE OF THE PARTICULAR MODEL USED AND THE LEVEL OF SOFT X-RAY AND 10 CM FLUX.
COPIES OF THE MODEL ON PUNCHED COMPUTER CARDS ARE AVAILABLE AT COST FROM- WORLD DATA CENTER A FOR SOLAR TERRESTIAL PHYSICS, NOAA, BOULDER, COLORADO, 80302, U.S.A.
WARNING- THE ACCURACY OF THE ABSOLUTE FLUX VALUES OVER CERTAIN WAVELENGTH RANGES IS QUITE LOW. CURRENT INDICES OF SOLAR ACTIVITY, INCLUDING THE 10.7 CM RADIO FLUX, DO NOT PROVIDE ACCURATE CORRECTIONS OF X-RAY AND ULTRAVIOLET FLUX FOR A PARTICULAR TIME OR LEVEL OF SOLAR ACTIVITY. SEE THE TEXT FOR A DISCUSSION OF ACCURACY.
THE FLUX OF A EMISSION LINE LISTED WITH A SEPARATE WAVELENGTH IS NOT INCLUDED IN THE FLUX VALUE FOR THE 10A INTERVAL THAT INCLUDES THE WAVELENGTH OF THE LINE.
MODEL AS OF MAY 30, 1973

	1		1.0 - 085.0 - 01
1	2		3.8 - 082.4 + 00
2	3		6.9 - 078.5 + 01
3	3.9		6.3 - 061.1 + 03
3.9	5		4.1 - 059.1 + 03
5	6		1.5 - 044.1 + 04
6	7		2.9 - 049.5 + 04
6.6	6.8	GROUP SI XIII	1.9 - 046.4 + 04
7	8		6.1 - 042.3 + 04
8	9		8.0 - 043.4 + 04
	8.4	MG XII	3.2 - 051.4 + 04
9	10		1.2 - 035.6 + 05
9.1	9.4	GROUP MG XI	1.8 - 048.4 + 04
10	12		0.00291.6 + 06
12	14		0.00138.5 + 05
12.1	12.3	NE X, FE XVII	0.00042.4 + 05
13.4	13.7	GROUP NE IX	0.00161.1 + 06
14	16		0.003 2.3 + 06
15	15.3	GROUP FE XVII	0.004 3.1 + 06
16	18		0.00131.1 + 06
16.8	17.2	GROUP FE XVII	0.003 2.6 + 06
18	20		0.00065.7 + 05
	19	O VIII	0.00131.2 + 06
20	23.3		0.007 7.6 + 06
21.6	22.3	GROUP O VII	0.002 2.2 + 06
23.3	26	N VII	0.005 6.2 + 06
26	28		0.003 4.1 + 06
28	31		0.00314.6 + 06
31	40		0.018 3.2 + 07
	33.7	C VI	0.00213.6 + 06
40	50	SI XI,XII	0.018 4.0 + 07
50	60	SI IX,X	0.031 8.4 + 07
60	70	SI VIII,FE XVI	0.031 9.9 + 07

PUBLICATION:

The 1-3000 Å Solar Flux for a Moderate Level of Solar Activity for use in Modeling the Ionosphere and Upper Atmosphere, by R. F. Donnelly and J. H. Pope, NOAA, Environmental Research Laboratory. This publication presents a table of solar flux at 1 AU (astronomical unit) in the 1-3000 Å wavelength range in fine wavelength intervals for a moderate level of solar activity (10.7-cm radio flux = 150 x $10^{-22}Wm^{-2}Hz^{-1}$ at 1 AU), based on recent satellite-and rocket-borne experiments. The table is intended for use in establishing the wavelength intervals for subsequent solar-flux models of the Solar-Terrestrial Environment Monitor (STEM), for use in modeling the upper atmosphere and ionosphere, and for use in making comparative tests of models for the ionosphere and upper atmosphere. Models for a high and low level of solar activity are also planned. As more solar-flux measurements with higher accuracy and more complete wavelength coverage become available, the 1-3000 Å solar-flux models will be revised.

COMPUTER FORMAT

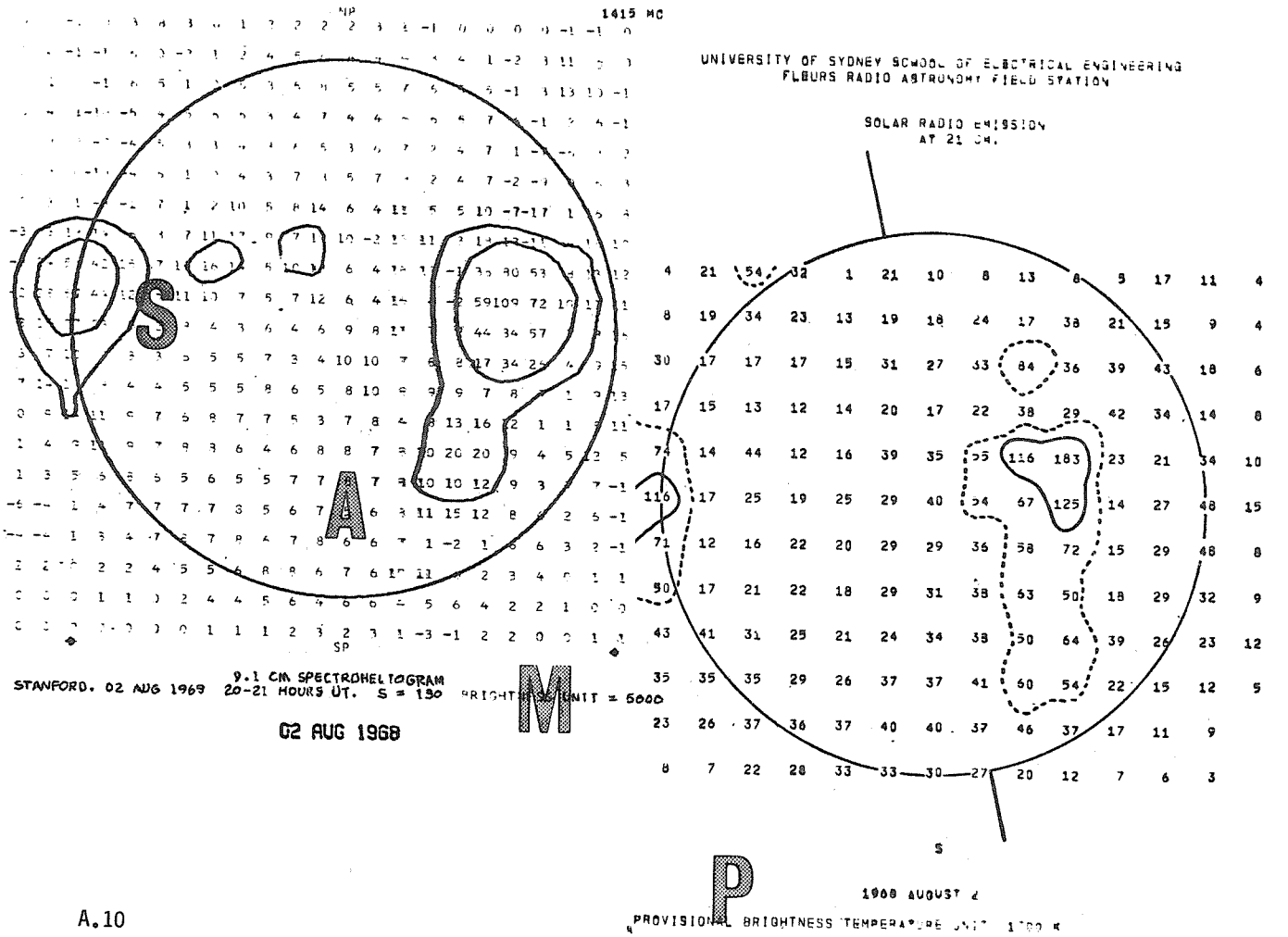
Copies of the model of the above publication are available on punched cards from World Data Center A for Solar-Terrestrial Physics, NOAA, Boulder, CO 80302, U.S.A.

A.8 TOTAL SOLAR RADIO FLUX MEASUREMENTS

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
OGO 3, RADIO ASTRONOMY HADDOCK (66-049A-1E)	060966	081668 ,	060766
ATS 2, RADIO ASTRONOMY STONE (67-031A-01)	040667	102367 ,	040667

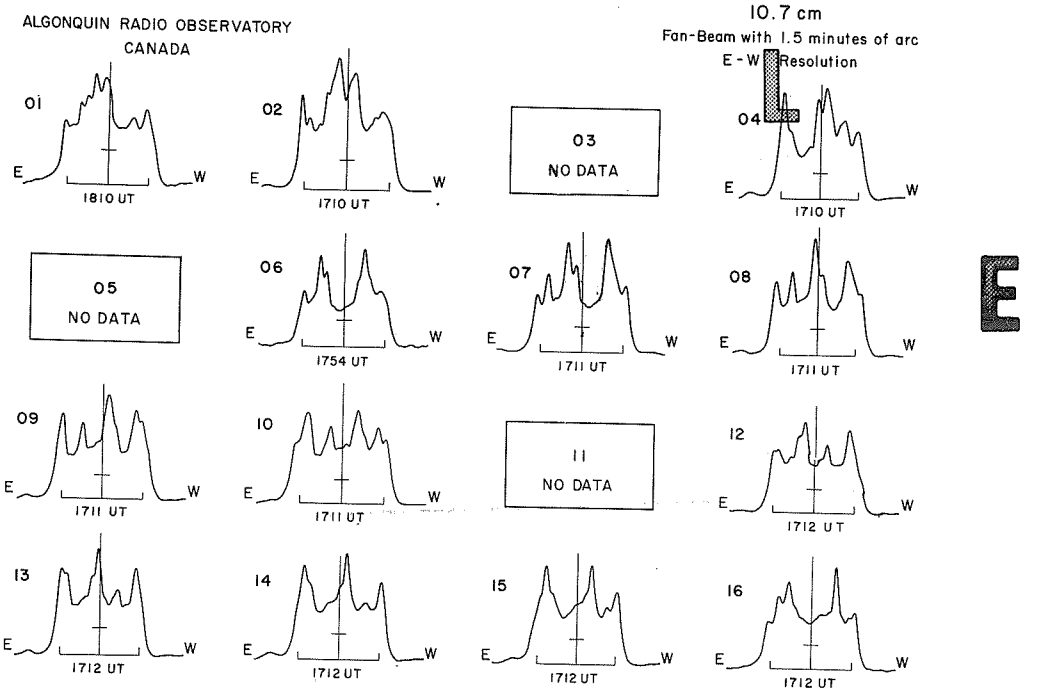
A.9



A.10

EAST-WEST SOLAR SCANS

June 1968



A.9 RADAR AND RADIO MAPS OF THE SUN

AT BOULDER

STATION	DIA CM	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	WAVELENGTH CM
EL CAMPO		29N	264					C	A	A	A	A	A	A	A	A					
FLEURS	15	36S	151	B	A	A	A	A	B		C	A	B	B	B	A	A	A	A	C	21.
PROSPECT HILL	15	42N	289											B	B	B	A	A	B		8.6
SAN FERNANDO OBS	20.5	34N	242									Q	Q	A	A	P					3.
STANFORD	15	37N	238				B	C	B	B	A	A	A	A	A	A	A	A	A	C	9.1

PUBLICATIONS:

1. *Solar-Geophysical Data*, NOAA - Daily maps reduced to 6 cm diameter, of Stanford, 3/1962 to 7/1973; Fleurs, 12/1964 to date; Prospect Hill 4/1970 to date.

A.10 RADIO EAST-WEST SCANS OF SOLAR DISK

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	FREQUENCY OR WAVELENGTH
FLEURS	33S	150										B	A	A	A	A	A	A	C	43. CM
FLEURS	33S	150									C	A	A	A	A	A	A	A	C	21. CM
NANCAY	47N	2									C	A	A	A	A	A	B			408 MHZ
NANCAY	47N	2	B	A	A	A	A	A	A	A	B	A	B	B	A	A	B	B	C	169 MHZ
NEDERHORST	52N	5									A	A	A	A	S					136 MHZ
NEDERHORST	52N	5									A	A	A	A	S					252 MHZ
OTTAWA	54N	285												B	A	A	A	A	B	10. CM

PUBLICATIONS:

1. *IAU Quarterly Bulletin on Solar Activity*, Zürich - Fleurs data from 7/1957 - 12/1962.
2. *Solar-Geophysical Data*, NOAA - Fleurs 21 cm. from 10/1965 to date; 43 cm. from 4/1966 to date; Ottawa 10 cm. from 6/1968 to date; Nancay 408 MHz from 11/1965 to date and 169 MHz from 1/1957 to date.

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

SOLAR X-RAYS MEASURED BY SATELLITE
SOLRAD 9-EXPLORER 37

NAVAL RESEARCH LABORATORY

1-8A HOURLY AVERAGES FOR FEBRUARY 1965

(10^{-3} ERGS/SQ.CM/SEC.)

DAY	HOUR																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	0.75	0.96	0.92	0.63	0.58	0.82	0.89	0.63	1.04	0.83	0.79	1.10	0.72	0.60	0.93	0.69	0.55	0.57	0.57	0.57	0.66	0.84	1.13
2	1.48	0.90	1.30	1.13	1.40	2.92	0.85	0.84	1.27	1.61	1.28	0.97	0.88	1.69	2.19	1.57	1.42	1.61	2.38	1.74	3.15	7.88	27.2
3	2.44	3.70	3.62	2.65	1.37	1.98	4.76	2.46	0.89	0.47	5.71	1.28	0.75	1.34	1.21	0.95	1.12	1.54	2.02	1.05	0.66	0.55	0.80
4	0.46	0.50	0.86	0.47	0.61	1.07	0.88	1.18	0.50	0.43	0.43	0.40	2.07	2.20	0.91	0.89	0.94	1.79	0.50	0.56	0.48	0.43	0.50
5	0.81	0.58	0.48	0.40	0.35	0.37	0.38	0.44	0.57	0.30	0.30	0.25	0.32	0.33	0.46	0.38	0.35	0.28	0.30	0.47	0.29	0.28	0.25
6	0.29	0.32	0.33	0.42	0.56	0.36	0.37	0.41	0.32	0.33	0.28	0.32	0.29	0.38	0.33	0.40	0.85	1.08	0.66	0.85	0.64	0.48	0.57
7	1.05	1.50	2.39	1.73	0.70	0.77	1.36	0.77	1.03	0.45	0.99	0.54	0.95	0.52	0.52	0.81	0.55	0.51	0.47	0.49	0.50	0.65	0.74
8	0.89	0.70	1.13	0.91	1.63	1.68	1.21	3.46	4.98	1.93	1.13	0.91	1.78	1.12	0.89	1.20	1.36	1.90	1.63	1.82	2.89	1.52	1.81
9	2.75	2.70	1.74	1.61	1.49	1.89	29.3	5.94	1.29	0.90	2.46	2.43	11.4	6.40	5.28	5.69	3.09	2.96	2.57	3.19	2.23	4.50	6.16
10	10.1	5.63	5.28	6.42	4.58	4.31	3.60	4.23	4.41	2.50	2.20	1.34	2.23	2.04	1.98	2.27	2.95	6.04	4.90	5.93	7.46	4.72	2.70
11	2.22	1.88	34.0	14.2	3.50	6.38	8.71	187.	43.9	8.20	4.24	8.90	5.36	4.55	3.96	13.2	7.35	2.11	2.22	6.04	9.09	186.	34.3
12	53.0	5.42	4.22	4.75	5.05	14.1	4.50	7.60	19.7	2.84	4.13	2.70	3.59	7.93	4.52	2.28	2.38	3.34	6.62	3.22	2.54	3.01	1.69
13	3.19	1.78	2.85	2.21	1.67	2.73	2.30	1.70	5.83	3.16	2.70	2.32	1.27	1.47	1.69	1.76	1.34	1.38	1.65	1.08	0.97	1.69	9.50
14	1.86	1.34	1.63	2.60	5.69	1.60	2.09	1.66	1.73	1.56	2.37	2.89	2.41	2.02	2.67	1.47	1.27	1.47	6.26	1.94	1.07	1.11	1.24
15	2.31	1.80	2.28	1.92	1.46	2.32	1.63	1.43	1.53	1.53	3.69	2.66	1.51	2.36	1.95	3.29	3.12	5.06	2.80	4.02	2.46	1.57	2.46
16	1.47	1.25	4.72	2.39	4.42	1.90	1.82	1.88	9.42	4.43	2.50	2.00	2.12	2.18	1.48	1.50	1.54	1.72	3.66	1.74	1.96	2.57	2.09
17	1.48	2.20	1.73	2.07	1.39	1.67	1.54	1.40	3.05	1.58	1.45	1.78	3.19	1.90	1.87	5.33	5.20	2.98	1.84	2.00	2.19	2.54	10.1
18	3.21	1.57	1.59	2.32	14.4	14.6	7.72	1.85	1.71	1.52	1.42	1.47	1.42	1.38	1.57	1.25	1.14	1.13	3.88	1.76	1.16	5.23	1.30
19	1.38	1.39	1.70	26.2	12.3	1.94	1.52	1.51	4.19	3.92	2.14	1.31	1.66	1.89	1.66	3.16	1.79	1.89	3.01	3.31	3.55	2.55	4.99
20	2.48	1.70	1.66	1.46	1.40	1.15	1.29	2.51	1.58	29.4	42.4	16.3	5.86	3.13	2.28	2.06	1.85	6.10	2.29	1.17	1.06	1.46	1.00
21	1.74	0.95	1.30	1.04	1.20	1.00	1.04	1.01	1.56	4.03	2.06	1.63	1.88	1.66	2.83	4.31	3.90	3.47	4.07	3.47	2.37	3.25	1.67
22	1.39	1.09	1.24	2.11	1.65	1.25	1.28	1.68	0.97	1.14	1.39	2.20	1.51	0.95	1.22	1.21	1.19	0.93	1.40	0.99	1.30	0.94	0.98
23	1.19	1.14	1.28	1.25	1.44	1.57	1.97	0.96	1.09	1.11	1.35	1.28	1.03	1.01	2.00	3.26	1.49	3.64	1.52	1.13	1.46	1.37	1.63
24	0.85	0.88	1.08	1.39	0.89	0.84	0.83	0.97	2.28	4.30	1.54	1.27	1.19	0.92	1.06	0.86	2.88	0.74	1.05	0.92	0.87	0.98	1.84
25	0.76	1.36	0.81	0.81	1.16	1.11	0.76	1.56	1.09	0.88	0.87	0.83	0.64	0.68	0.95	0.63	1.24	0.77	0.62	0.52	1.58	0.69	1.07
26	0.61	1.36	0.74	0.70	0.80	1.06	1.37	0.85	1.27	1.03	1.02	0.82	2.47	5.55	5.55	3.92	2.22	1.54	1.49	1.23	0.99	0.89	0.70
27	0.69	0.69	0.69	0.85	0.95	2.49	1.12	1.14	1.05	1.00	0.85	0.96	1.23	0.80	0.88	0.78	1.08	1.05	1.12	4.06	1.73	1.13	0.85
28	1.66	1.58	1.17	1.04	1.72	1.73	1.86	1.82	1.49	1.49	0.94	1.01	1.77	27.6	1.92	2.69	2.13	2.11	2.31	24.0	2.57	2.51	1.67

A.11 SOLAR X-RAY AND UV BACKGROUND LEVELS

AT BOULDER

SATELLITE	BAND	SOURCE	64	65	66	67	68	69	70	71	72	73
SOLRAD	0-8A	USNRL	A	A	A	A	A	C	A	A	A	C
SOLRAD	8-12A	USNRL	A	A	A	A	A	C	A	C		
SOLRAD	44-60A	USNRL	A	A	A	A	A	C				
OSO-5	9.1-10.5A	LEIC/UC-LONDON						B	A	C	B	S
SOLRAD	8-20A	USNRL							A	A	A	C
VELA 5	.05-.5	LASL			C	C		B	C			
VELA 6	0.3-3A	LASL							B	C	Q	Q
VELA 6	1-8A	LASL							B	C	Q	Q
VELA 6	1-16A	LASL							B	C	Q	Q
SOLRAD	0.1-1.6A	ARCETRI									B	C
SOLRAD	0.5-3A	ARCETRI									B	C
SOLRAD	1-5A	ARCETRI									B	C
SOLRAD	1-8A	ARCETRI									B	C
SOLRAD	8-20A	ARCETRI									B	C
SOLRAD	44-60A	ARCETRI									B	C
OSO-7	120-400A	GFSC										C

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

PUBLICATIONS:

1. *Solar-Geophysical Data,* NOAA, OSO-7 FE XV 284A Solar maps (from NASA Goddard for Oct. 1971 to date).

A.11 SOLAR X-RAY AND UV BACKGROUND LEVELS

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
SOLRAD 1, X-RAY AND LYMAN-ALPHA STUDY FRIEDMAN (60-007B-01)	062260	110160 ,	062260
INJUN 1, GM COUNTER FRANK (61-015B-01)	062961	083162 ,	062961
INJUN 1, 2- TO 8-A AND 8- 20-A X-RAY DETECTORS KREPLIN (61-015B-07)	062961	112561 ,	062961
OSO 1, SOLAR SPECTROMETER NEUPERT (62-006A-01)	030762	051562 ,	030762
OSO 1, 1- TO 8-A SOLAR X-RAY FLUX WHITE (62-006A-04)	030762	051562 ,	030762
OSO 1, SOLAR HYDROGEN LYMAN-ALPHA FLUX MONITOR HALLAM (62-006A-07)	030762	051562 ,	030762
INJUN 3, GEIGER TUBE DETECTORS O'BRIEN (62-067B-01)	121462	102863 ,	121362
SOLRAD 7A, SOLAR X-RAY (2 TO 60 A) AND UV (1225 TO 1350 A) FLUX, KREPLIN (64-001D-01)	011164	020365 ,	011164
OSO 2, SOLAR X-RAY BURSTS CHUBB (65-007A-02)	020465	030865 ,	020365
ERS 17, X-RAY DETECTORS VETTE (65-058C-02)	072065	110365 ,	072065
OGO 2, SOLAR X-RAYS KREPLIN (65-081A-16)	101465	102365 ,	101465
EXPLORER 30, SOLAR X-RAY AND ULTRAVIOLET MONITOR KREPLIN (65-093A-01)	111965	113067 ,	111965
OSO 3, 8 TO 12 A SOLAR X RAY ION CHAMBER TESKE (67-020A-06)	030967	071668 ,	030867
OSO 3, SOLAR AND CELESTIAL GAMMA-RAY TELESCOPE PETERSON (67-020A-07)	030967	040868 ,	030867
EXPLORER 35, ELECTRON AND PROTON DETECTORS VAN ALLEN (67-070A-01)	071967	052870 ,	071967
OGO 4, SOLAR X RAY EMISSIONS KREPLIN (67-073A-21)	072967	071668 ,	072867
OSO 4, SOLAR X-RAY TELESCOPE GIACCONI (67-100A-08)	102067	051268 ,	101867
OSO 4, SOLAR EUV SPECTROMETER GOLDBERG (67-100A-07)	102567	112967 ,	101867
OSO 5, SOLAR X-RAY RADIATION ION CHAMBER PHOTOMETER, CHUBB (69-006A-04)	012369	080270 ,	012269
VELA 5A, SOLAR X-RAY DETECTORS, .5-3.0 A, 1-8 A, 1-16 A, 44-60 A, CHAMBERS (69-046D-02)	052769	051570 ,	052369
VELA 5B, SOLAR X RAY DETECTORS, .5 TO 3.0 A, 1 TO 8 A, 1 TO 16 A , 44 TO 60 A, CHAMBERS (69-046E-02)	052769	051570 ,	052369
OSO 6, SOLAR UV SCANNING SPECTROMETER, SPECTROHELIOMETER (300 TO 1300 A), GOLDBERG (69-068A-01)	081369	051270 ,	080969
OSO 6, X-RAY SPECTROMETER ARGO (69-068A-04)	081469	012070 ,	080969
VELA 6A, SOLAR X RAY DETECTORS,.5 TO 3.0 A ,1 TO 8 A ,1 TO 16 A , 44 TO 60 A, CHAMBERS (70-027A-02)	041170	010171 ,	040870
VELA 6B, SOLAR X RAY DETECTORS,.5 TO 3.0 A ,1 TO 8 A ,1 TO 16 A , 44 TO 60 A, CHAMBERS (70-027B-02)	041170	010171 ,	040870

PROTON ENERGY GREATER THAN 30 MEV. HOURLY AVERAGES. IMP6 SOLAR PROTON MONITOR. JHU/APL AND GSFC

YEAR 1969

DATE	DAY OF YEAR	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
9 1	244	0.60	0.63	0.67	0.61	0.61	0.64	0.62	0.63	0.61	0.62	0.59	0.62	0.62	0.63	0.64	0.62	0.63	0.60	0.60	0.60	0.59	0.59
9 2	245	0.61	0.59	0.63	0.60	0.61	0.61	0.59	0.60	0.60	0.60	0.60	0.59	0.60	0.61	0.62	0.59	0.62	0.59	0.60	0.62	0.58	0.62
9 3	246	0.61	0.63	0.62	0.61	0.60	0.60	0.61	0.64	0.66	1.35	20.9	10.4	1.49	0.64	0.58	0.63	0.60	0.59	0.58	0.59	0.58	0.61
9 4	247	0.56	0.57	0.60	0.61	0.60	0.61	0.63	0.64	0.58	0.60	0.60	0.59	0.61	0.59	0.61	0.57	0.57	0.59	0.58	0.59	0.60	0.59
9 5	248	0.61	0.59	0.59	0.58	0.58	0.59	0.59	0.58	0.60	0.59	0.61	0.58	0.59	0.60	0.58	0.58	0.61	0.60	0.57	0.58	0.60	0.57
9 6	249	0.65	0.59	0.58	0.62	0.58	0.59	0.57	0.62	0.60	0.60	0.58	0.62	0.58	0.59	0.58	0.54	0.60	0.59	18.3	0.66	0.66	0.62
9 7	250	0.58	0.63	0.57	0.59	0.57	0.57	0.56	0.59	0.58	0.58	0.57	0.59	0.58	0.58	0.59	0.61	0.59	0.60	0.56	0.60	0.59	0.61
9 8	251	0.60	0.58	0.59	0.60	0.57	0.59	0.60	0.57	0.60	0.60	0.62	0.58	0.61	0.61	0.60	0.60	0.57	0.60	0.59	0.57	0.58	0.58
9 9	252	0.58	0.58	0.58	0.58	0.58	0.62	0.59	0.57	0.58	0.58	0.55	0.59	0.58	0.59	0.61	0.60	0.58	0.59	0.56	0.56	0.58	0.59
9 10	253	0.60	0.59	0.57	0.57	0.61	0.69	0.64	0.59	0.59	0.59	0.58	0.58	0.59	0.59	0.58	0.59	0.55	0.56	0.59	0.59	0.60	0.60
9 11	254	0.58	0.59	0.60	0.58	0.62	0.60	0.59	0.59	0.57	0.63	0.58	0.60	0.60	0.61	0.60	0.60	0.62	0.57	0.60	0.61	0.62	0.60
9 12	255	0.59	0.61	0.58	0.61	0.60	0.62	0.60	0.63	0.57	0.59	0.62	0.61	0.58	0.60	0.62	0.60	0.62	0.63	0.62	0.62	0.60	0.63
9 13	256	0.59	0.62	0.60	0.64	0.61	0.60	0.58	0.61	0.60	0.61	0.62	15.8	48.7	95.5	5.13	1.09	0.58	0.63	0.62	0.63	0.63	0.61
9 14	257	0.63	0.61	0.61	0.60	0.59	0.59	0.59	0.59	0.58	0.60	0.61	0.61	0.63	0.62	0.60	0.59	0.60	0.61	0.61	0.64	0.61	0.62
9 15	258	0.60	0.58	0.58	0.58	0.60	0.60	0.61	0.58	0.60	0.61	0.58	0.60	0.56	0.57	0.55	0.59	0.58	0.55	0.61	0.60	0.58	
9 16	259	0.58	0.58	0.57	0.60	0.57	0.61	0.62	0.60	0.58	0.61	0.60	0.62	0.58	0.58	0.58	0.61	0.59	0.61	0.56	0.60	13.8	0.63
9 17	260	0.59	0.57	0.60	0.62	0.59	0.59	0.61	0.58	0.60	0.58	0.54	0.57	0.59	0.59	0.58	0.57	0.58	0.58	0.59	0.60	0.58	0.59
9 18	261	0.61	0.59	0.58	0.58	0.58	0.60	0.60	0.59	0.58	0.58	0.59	0.61	0.57	0.56	0.60	0.57	0.56	0.56	0.60	0.58	0.57	0.57
9 19	262	0.60	0.58	0.57	0.59	0.58	0.57	0.58	0.58	0.61	0.55	0.59	0.59	0.57	0.57	0.61	0.60	0.55	0.56	0.61	0.57	0.59	0.59
9 20	263	0.58	0.55	0.58	0.57	93.0	129.	2.67	1.50	0.95	0.64	0.58	0.58	0.61	0.60	0.56	0.58	0.62	0.58	0.57	0.59	0.57	0.58
9 21	264	0.59	0.58	0.60	0.60	0.58	0.57	0.61	0.62	0.58	0.59	0.61	0.59	0.60	0.57	0.58	0.62	0.60	0.61	0.59	0.61	0.59	0.58
9 22	265	0.58	0.59	0.58	0.57	0.59	0.60	0.58	0.59	0.57	0.59	0.58	0.62	0.58	0.59	0.58	0.60	0.61	0.58		0.59	0.56	0.58
9 23	266	0.60	0.58	0.59	0.61	0.59	0.58		0.57	0.58	0.60	0.61	0.58	42.2	42	0.59	7.56	37.8	0.81	0.63	0.60	0.62	0.57	0.57
9 24	267	0.59	0.58	0.56	0.59	0.61	0.60	0.58	0.58	0.59	0.60	0.60	0.60	0.62	0.59	0.60	0.60	0.58	0.58	0.58		0.58	0.55
9 25	268	0.59	0.58	0.59	0.57	0.57	0.57	0.58	0.62	1.21		1.60	1.40	1.23	1.09	0.98	0.95	0.82	0.75	0.73	0.73	0.72	
9 26	269	0.68	0.62	0.63			0.61	0.65	0.62	0.62	0.65	0.63	0.66	0.62	0.63	0.61	0.64	666.	0.61	0.59	0.61	0.61	0.60
9 27	270	0.64	0.62	0.62	0.67	0.60	0.61	0.59	0.60	0.63	0.61	0.65	0.61	0.62	0.60	0.64	1.76	0.64	0.65	0.60	0.65	0.62	0.68
9 28	271	0.70		0.74	0.70	0.72	0.74	0.66	0.61	0.63	0.62	0.66	0.63	0.55	0.63	0.61	0.62	0.59	0.57	0.60	0.58	0.60	0.59
9 29	272	0.66	0.58	0.59	0.61	0.61	0.61	0.58		0.57	0.58	0.57	0.59	0.58	0.58	0.56	0.56	0.59	0.55	0.55	0.55	0.55	0.52
9 30	273	0.63	0.62	18.0	83	0.53	0.54	0.53	3.24	0.58	1.97	1.86	0.75	0.56	0.59	0.54	0.54		0.53	0.55	0.56	0.51	0.55	0.53

A.12 ENERGETIC SOLAR PROTONS AND SOLAR ELECTRONS

AT BOULDER

SATELLITE	ENERGY RANGE	SOURCE	67	68	69	70	71	72	73
EXPLORER 34	>10MEV	JHU/APL-GSFC	B	A	CS				
EXPLORER 34	>30MEV	JHU/APL-GSFC	B	A	CS				
EXPLORER 34	>60MEV	JHU/APL-GSFC	B	A	CS				
EXPLORER 41	>10MEV	JHU/APL-GSFC			B	A	B	BS	
EXPLORER 41	>30MEV	JHU/APL-GSFC			B	A	B	BS	
EXPLORER 41	>60MEV	JHU/APL-GSFC			B	A	B	BS	
EXPLORER 43	>10MEV	JHU/APL-GSFC					C	C	C
EXPLORER 43	>30MEV	JHU/APL-GSFC					C	C	C
EXPLORER 43	>60MEV	JHU/APL-GSFC					C	C	C
ATS-1	5-21MEV	AEROSPACE				A	A	B	Q
ATS-1	21-70MEV	AEROSPACE				A	A	B	Q
PIONEER 6	0.6-13 MEV	U OF CHICAGO			B	A	A	B	C
PIONEER 6	13-175 MEV	U OF CHICAGO			B	A	B	B	C
PIONEER 6	>175 MEV	U OF CHICAGO			B	A	A	B	C
PIONEER 7	0.6-13 MEV	U OF CHICAGO			B	A	B	C	C
PIONEER 7	13-175 MEV	U OF CHICAGO			B	A	B	C	C
PIONEER 7	>175 MEV	U OF CHICAGO			B	A	B	C	C
PIONEER 8	13.9 MEV	U OF NEW HAMP			C	A	A	B	C
PIONEER 8	>64 MEV	U OF NEW HAMP			C	A	A	B	C
PIONEER 9	13.9 MEV	U OF NEW HAMP			C	A	A	B	B
PIONEER 9	>40 MEV	U OF NEW HAMP			C	A	A	B	B

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

PUBLICATIONS:

1. *Solar-Geophysical Data*, NOAA - All of the data listed above under A, B or C entries have been published in Solar-Geophysical Data in graphical and/or tabular form.

Note: Beginning March 1974 the NOAA Space Environment Laboratory expects to provide data from the NOAA 2 (1971-91A) polar satellite. The first data set will include January-March 1973. These data will normally be received with a one-year time lag. These will be plots of counts/sec on microfilm, and will be for protons 0.27-0.56, 0.56-1.05, 1.05-3.2, 3.2-60, >10, >30, >60 Mev; for electrons ≥0.140 Mev, and alphas 12.5-32 Mev.

A.12 ENERGETIC SOLAR PROTONS AND SOLAR ELECTRONS

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
EXPLORER 4, CHARGED PARTICLE DETECTOR VAN ALLEN (58-005A-01)	072658	092158	072658
EXPLORER 6, PROPORTIONAL COUNTER TELESCOPE SIMPSON (59-004A-01)	080759	100559	080759
EXPLORER 7, RADIATION AND SOLAR PROTON VAN ALLEN (59-009A-04)	101359	022861	101359
PIONEER 5, PROPORTIONAL COUNTER TELESCOPE SIMPSON (60-001A-01)	031160	051560	031160
INJUN 1, GM COUNTER FRANK (61-015B-01)	062961	083162	062961
EXPLORER 12, CHARGED PARTICLES VAN ALLEN (61-020A-03)	081661	123661	081661
EXPLORER 12, COSMIC RAY MCDONALD (61-020A-04)	081661	123661	081661
OSO 1, BF-3 PROPORTIONAL COUNTER NEUTRON DETECTOR, HESS (62-006A-10)	030062	071463	030762
EXPLORER 14, COSMIC RAY MCDONALD (62-051A-04)	100262	081163	100262
INJUN 3, PROTON SPECTROMETER O'BRIEN (62-067B-07)	121462	103163	121362
1963-038C, ENERGETIC ELECTRON AND PROTON DETECTORS BOSTROM (63-038C-01)	092863	123168	092863
EXPLORER 18, COSMIC-RAY RANGE VS ENERGY LOSS SIMPSON (63-046A-03)	112763	060864	112763
EXPLORER 18, COSMIC RAYS MCDONALD (63-046A-04)	112763	052664	112763
OGO 1, COSMIC-RAY SPECTRA AND FLUXES SIMPSON (64-054A-16)	090564	112567	090564
EXPLORER 21, COSMIC-RAY RANGE VS ENERGY LOSS SIMPSON (64-060A-03)	100464	043065	100464
EXPLORER 25, SOLID-STATE DETECTOR VAN ALLEN (64-076B-04)	112364	071966	112164

EXPERIMENT NAME- ENERGETIC RADIATIONS FROM SOLAR FLARES NSSDC ID 68-014A-04

ORIGINAL EXPERIMENT INSTITUTION- U OF CALIFORNIA, BERK

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - K.A.	ANDERSON	U OF CALIFORNIA, BERK	BEREKLEY, CA
OI - S.R.	KANE	U OF CALIFORNIA, BERK	BERKELEY, CA
OI - H.	MARK	NASA-ARC	MOFFETT FIELD, CA

DATE LAST EXPERIMENT DATA RECORDED-071372
EXPERIMENT STATUS OF OPERATION- INOPERABLE

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO STUDY THE TIME VARIATION OF THE SPECTRUM OF ENERGETIC X RAYS, PROTONS, ALPHA PARTICLES, AND ELECTRONS EMITTED BY THE SUN IN ASSOCIATION WITH SOLAR FLARES. THE EXPERIMENT USED THREE SEPARATE DETECTING SYSTEMS. FIRST, AN OMNIDIRECTIONAL SODIUM IODIDE (THALLIUM) SCINTILLATION COUNTER MEASURED SOLAR X RAYS IN EIGHT ENERGY CHANNELS 9.6 TO 19.2, 19.2 TO 32, 32 TO 48, 48 TO 64, 64 TO 80, 80 TO 104, 104 TO 128, AND GREATER THAN 128 KEV, WHICH DATA WERE SAMPLED FOR 1.152 SEC ONCE EVERY 2.304 SEC. SECOND, A PARTICLE TELESCOPE COMPOSED OF SEVEN SOLID-STATE DETECTORS -- D1, D2, D3, D4, D5, D6, D7, AND AN ANTICOINCIDENCE SHIELD, MEASURED PROTONS IN THE SIX ENERGY CHANNELS FROM 7 TO 20, 20 TO 45, 45 TO 80, 80 TO 130, 130 TO 200, AND GREATER THAN 200 MEV. THESE CHANNELS HAD A NONSEPARABLE ALPHA PARTICLE COMPONENT. THE LOWEST ENERGY CHANNEL WAS SAMPLED ONCE EVERY 147 SEC. WHILE ALL OTHER CHANNELS WERE SAMPLED ONCE EVERY 9.216 SEC. THE THIRD SYSTEM CONSISTED OF A DIRECTIONAL GM TUBE MAGNETIC SPECTROMETER THAT MEASURED ELECTRONS IN TWO CHANNELS 22 TO 27 AND 50 TO 90 KEV. THESE DATA WERE SAMPLED ONCE EVERY 147 SEC. IN ORDER TO REDUCE THE POSSIBLE CONTRIBUTION OF MAGNETOSPHERIC RADIATION TO THE BACKGROUND COUNTING RATES OF THE DETECTORS, THE EXPERIMENT ONLY OPERATED AT SPACECRAFT ALTITUDES ABOVE 80,000 KM, I.E., ABOUT 48 HR OR 67 PERCENT OF EACH ORBIT. THE X RAY DETECTOR OPERATED SATISFACTORILY THROUGHOUT THE MISSION. THE D7 DETECTOR ELEMENT IN THE PROTON ALPHA TELESCOPE WAS FOUND TO BE VERY NOISY JUST PRIOR TO LAUNCH. IT WAS THEREFORE DISABLED ELECTRONICALLY, HENCE NO DATA WERE AVAILABLE FOR PROTONS OR ALPHA PARTICLES ABOVE 20[illegible] MEV PER NUCLEON. THE REST OF THIS TELESCOPE PERFORMED NORMALLY THROUGHOUT THE MISSION. THE ELECTRON SPECTROMETER PERFORMED NORMALLY FROM LAUNCH UNTIL SEPTEMBER 23, 1969, WHEN THE 22 TO 27 KEV CHANNEL BECAME ERRATIC AND LATER STOPPED COUNTING COMPLETELY. THE OTHER ELECTRON CHANNEL PERFORMED NORMALLY THROUGHOUT THE MISSION.

EXPERIMENT NAME- SOLAR PROTON MONITORING EXPERIMENT NSSDC ID 69-053A-07

ORIGINAL EXPERIMENT INSTITUTION- APPLIED PHYSICS LAB

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - C.O.	BOSTROM	APPLIED PHYSICS LAB	SILVER SPRING, MD
OI - D.J.	WILLIAMS	NOAA-ERL	BOULDER, CO
OI - D.E.	HAGGE	NASA-JSC	HOUSTON, TX
OI - F.B.	MCDONALD	NASA-GSFC	GREENBELT, MD

DATE LAST USABLE EXPERIMENT DATA RECORDED-122372
EXPERIMENT STATUS OF OPERATION- INOPERABLE

EXPERIMENT BRIEF DESCRIPTION

THE SOLAR PROTON MONITORING EXPERIMENT UTILIZED FOUR SEPARATE DETECTORS, EACH OF WHICH USED ONE OR MORE SOLID-STATE SENSORS. THREE DETECTORS MEASURED THE OMNIDIRECTIONAL FLUXES OF PROTONS AND ALPHA PARTICLES WITH ENERGY PER NUCLEON VALUES ABOVE 10, 30, AND 60 MEV. ALPHA PARTICLE CONTRIBUTIONS TO THE TOTAL COUNT RATES WERE GENERALLY LESS THAN 10 PERCENT. THE 10-MEV CHANNEL WAS SAMPLED FOR TWO 19.2 SEC INTERVALS EVERY 163.8 SEC AND THE 30- AND 60-MEV CHANNELS FOR ONE 19.2 SEC INTERVAL EVERY 163.8 SEC. RESULTANT HOURLY AVERAGED FLUXES HAVE BEEN PUBLISHED IN SOLAR-GEOPHYSICAL DATA (NOAA, BOULDER) ON A RAPID BASIS. THE FOURTH DETECTOR HAD A 60-DEG FULL LOOK ANGLE NORMAL TO THE SPACECRAFT SPIN AXIS. EACH OF TWO DISCRIMINATION LEVELS WAS SAMPLED FOR TWO 19.2 SEC INTERVALS EVERY 163.8 SEC. FLUXES OF 1- TO 10-MEV/NUCLEON PROTONS AND ALPHA PARTICLES WERE MEASURED IN THE LOWER AND UPPER DISCRIMINATION STATES, RESPECTIVELY. ALL DETECTORS FUNCTIONED NORMALLY FROM LAUNCH UNTIL THE SPACECRAFT DECAYED FROM ORBIT (JUNE 21, 1969 - DECEMBER 23, 1972).

A.12 ENERGETIC SOLAR PROTONS AND SOLAR ELECTRONS

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
MARINER 4, COSMIC-RAY TELESCOPE SIMPSON (64-077A-04)	112864	100165 ,	112864
EXPLORER 25, GEIGER-MUELLER COUNTER VAN ALLEN (64-076B-03)	021365	071966 ,	112164
EXPLORER 28, COSMIC-RAY RANGE VS ENERGY LOSS SIMPSON (65-042A-03)	052965	050267 ,	052965
VELA 3A, ELECTROSTATIC ANALYZER AND GM TUBES BAME (65-058A-04)	072665	052170 ,	072065
VELA 3B, HEMISPHERICAL ELECTROSTATIC ANALYZER AND GEIGER COUNTERS, BAME (65-058B-04)	072665	052170 ,	072065
OGO 1, SOLAR COSMIC RAYS ANDERSON (64-054A-12)	093065	050366 ,	090564
OGO 2, LOW-ENERGY PROTON, ALPHA PARTICLE MEASUREMENT, SIMPSON (65-081A-07)	101465	121366 ,	101465
OGO 2, GALACTIC AND SOLAR COSMIC RAY WEBBER (65-081A-08)	101565	102465 ,	101465
PIONEER 6, COSMIC RAY TELESCOPE FAN (65-105A-03)	121665	043071 ,	121665
PIONEER 6, COSMIC RAY ANISOTROPY DETECTION MCCRACKEN (65-105A-05)	121665	020667 ,	121665
OGO 3, COSMIC-RAY SPECTRA AND FLUXES SIMPSON (66-049A-03)	060966	120169 ,	060766
OGO 3, SOLAR COSMIC RAYS ANDERSON (66-049A-01)	062466	022767 ,	060766
EXPLORER 33, ION CHAMBER AND GM COUNTERS ANDERSON (66-058A-04)	070166	060967 ,	070166
PIONEER 7, COSMIC RAY ANISOTROPY MCCRACKEN (66-075A-05)	081766	013167 ,	081766
PIONEER 7, COSMIC-RAY TELESCOPE SIMPSON (66-075A-06)	081766	043071 ,	081766
ATS 1, OMNIDIRECTIONAL SPECTROMETER PAULIKAS (66-110A-03)	121766	083172 ,	120766
EXPLORER 34, LOW-ENERGY SOLID-STATE TELESCOPE BROWN (67-051A-01)	052467	050369 ,	052467
EXPLORER 34, ION CHAMBER ANDERSON (67-051A-02)	052467	091567 ,	052467
EXPLORER 34, COSMIC-RAY PROTON (R VS DE/DX) SIMPSON (67-051A-03)	052467	050369 ,	052467
EXPLORER 34, COSMIC-RAY ANISOTROPY MCCRACKEN (67-051A-05)	052467	042069 ,	052467
EXPLORER 34, SOLAR PROTON MONITOR BOSTROM (67-051A-07)	052467	050369 ,	052467
EXPLORER 34, LOW-ENERGY PROTON AND ELECTRON DIFFERENTIAL ENERGY ANALYZER (LEPEDEA), VAN ALLEN (67-051A-04)	063067	070467 ,	052467
EXPLORER 35, ELECTRON AND PROTON DETECTORS VAN ALLEN (67-070A-01)	071967	052870 ,	071967
EXPLORER 35, ENERGETIC PARTICLE ANDERSON (67-070A-02)	071967	072468 ,	071967
OGO 4, LOW-ENERGY PROTON, ALPHA PARTICLE MEASUREMENT, SIMPSON (67-073A-08)	072967	122468 ,	072867
OGO 4, GALACTIC AND SOLAR COSMIC RAY WEBBER (67-073A-09)	073067	082767 ,	072867
PIONEER 8, COSMIC RAY GRADIENT DETECTOR WEBBER (67-123A-06)	121367	103171 ,	121367
OGO 5, ELECTRON AND PROTON SPECTROMETER WEST, JR. (68-014A-06)	030468	050169 ,	030468
OGO 5, ENERGETIC RADIATIONS FROM SOLAR FLARES ANDERSON (68-014A-04)	030868	100469 ,	030468
OGO 5, PARTICLE WAVE STUDY COLEMAN, JR. (68-014A-13)	030868	021471 ,	030468
EXPLORER 40, SOLID STATE PARTICLE DETECTOR VAN ALLEN (68-066B-03)	080968	052970 ,	080868
HEOS 1, COSMIC RAY PARTICLE FLUX LABEYRIE (68-109A-06)	010169	110671 ,	120568
EXPLORER 41, ION CHAMBER ANDERSON (69-053A-02)	062169	021872 ,	062169
EXPLORER 41, COSMIC-RAY PROTON (R VS DE/DX) SIMPSON (69-053A-03)	062169	073070 ,	062169
EXPLORER 41, SOLAR PROTON MONITORING EXPERIMENT BOSTROM (69-053A-07)	062169	122372 ,	062169
GRS-A, PROTON TELESCOPE MORITZ (69-097A-03)	110869	063070 ,	110869
PIONEER 9, COSMIC RAY TELESCOPE WEBBER (68-100A-06)	120169	093071 ,	110868
APOLLO 14 LM, CHARGED PARTICLE LUNAR ENVIRONMENT O'BRIEN (71-008C-08)	020571	031271 ,	013171

Pioneer 6/7 Solar Wind Velocity and
Co-rotation Delay Times for
November, 1968

DATE 1968	PIONEER VI				PIONEER VII			
	Time (Z)	Pass	U_H^+	TAU	Time (Z)	Pass	U_H^+	TAU
Nov. 1	G1728	1052	414.1	-12.32	G0005	807	400.5	+5.44
2	G1604	1053	424.	-12.35	G2314	809	325.2	+5.4
3	G1[illegible]1	1054	364.8	-12.27				
4	G[illegible]0	1055	410.6	-12.37	G0025	810	360.4	+5.42
5	G1440	1056	426.8	-12.41				
6	G1600	1057	586.	-12.61				
7	G1617	1058	421.6	-12.45				
8								
9								
10								
11								
12					G0021	818	430.1	+5.44
13								
14								
15					G0019	821	352.3	+5.40
16					G0026	822	444.5	+5.45
17					G0016	823	408.9	+5.43
18					G0014	824	407.3	+5.43
19					G0002	825	371.4	+5.41
20					G1918	827	407.4	+5.44
21					G1910	828	432.3	+5.45
22					G2158	829	481.2	+5.47
23								
24								
25								
26					G0042	832	443.1	+5.46
27					G0049	833	411.1	+5.44
28					G0011	834	398.7	+5.44
29					G0000	835	405.7	+5.44
30					G0006	836	437.6	+5.46

A.13 SOLAR WIND

AT BOULDER

SPACE PROBE	SOURCE	MEASUREMENT	67	68	69	70	71	72	73
PIONEER 6	NASA AMES	VELOCITY AND CO-ROTATION DELAY	A	A	A	A	A	B	C
PIONEER 7	NASA AMES	VELOCITY AND CO-ROTATION DELAY	A	A	A	A	B		
PIONEER 6	MIT	VELOCITY AND NUMBER DENSITY			B	C	S		
PIONEER 7	MIT	VELOCITY AND NUMBER DENSITY			C		S		
PIONEER 9	NASA AMES	VELOCITY AND CO-ROTATION DELAY						C	C

A.13 SOLAR WIND

AT BOULDER

SATELLITE	SOURCE	MEASUREMENT	69	70	71	72	73
VELA 2	LASL	VELOCITY	B	S			
VELA 3	LASL	VELOCITY	A	A	A	C	P
VELA 4	LASL	VELOCITY	B	S			
VELA 5	LASL	VELOCITY	C	A	A	C	P

AT GREENBELT

A.13 SOLAR WIND

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC-ID	DATE SET AT NSSDC YEAR - MONTH - DAY FROM	TO	LAUNCH DATE
EXPLORER 10, PLASMA PROBE BRIDGE (61-010A-02)	032561	032761	032561
MARINER 2, SOLAR PLASMA ANALYZER NEUGEBAUER (62-041A-06)	082962	123062	082762
EXPLORER 18, SOLAR WIND PROTONS WOLFE (63-046A-06)	112763	040364	112763
EXPLORER 18, FARADAY CUP BRIDGE (63-046A-07)	112763	011365	112763
EXPLORER 21, SOLAR WIND PROTONS WOLFE (64-060A-06)	100564	122364	100464
EXPLORER 21, FARADAY CUP BRIDGE (64-060A-07)	101164	092465	100464
VELA 3A, ELECTROSTATIC ANALYZER AND GM TUBES BAME (65-058A-04)	072665	052170	072065
VELA 3B, HEMISPHERICAL ELECTROSTATIC ANALYZER AND GEIGER COUNTERS, BAME (65-058B-04)	072665	052170	072065
PIONEER 6, TWO-FREQUENCY RADIO RECEIVER ESHLEMAN (65-105A-04)	121665	071166	121665
PIONEER 6, ELECTROSTATIC ANALYZER WOLFE (65-105A-06)	121665	073072	121665
PIONEER 6, SOLAR WIND PLASMA FARADAY CUP BRIDGE (65-105A-02)	121865	022870	121665
EXPLORER 33, PLASMA PROBE BRIDGE (66-058A-06)	070166	093069	070166
PIONEER 7, TWO-FREQUENCY BEACON RECEIVER ESHLEMAN (66-075A-04)	081566	052069	081766
MARINER 5, TWO-FREQUENCY BEACON RECEIVER ESHLEMAN (67-060A-02)	081565	112167	061467
PIONEER 7, ELECTROSTATIC ANALYZER WOLFE (66-075A-03)	081766	022871	081766
PIONEER 7, SOLAR WIND PLASMA FARADAY CUP BRIDGE (66-075A-02)	081866	123170	081766
EXPLORER 34, ELECTROSTATIC ANALYZER OGILVIE (67-051A-08)	052467	020868	052467
MARINER 5, INTERPLANETARY ION PLASMA PROBE FOR E/Q OF 40 TO 9400 VOLTS, BRIDGE (67-060A-03)	061467	112167	061467
EXPLORER 35, PLASMA PROBE BRIDGE (67-070A-06)	071467	070368	071967
PIONEER 8, TWO-FREQUENCY BEACON RECEIVER ESHLEMAN (67-123A-03)	121467	030771	121367
PIONEER 9, TWO-FREQUENCY BEACON RECEIVER ESHLEMAN (68-100A-03)	121967	030771	110868
OGO 5, PLASMA SPECTROMETER SNYDER (68-014A-17)	030568	041968	030468
VELA 5A, SOLAR WIND EXPERIMENT BAME (69-046D-05)	110769	022871	052369
VELA 5B, SOLAR WIND EXPERIMENT BAME (69-046E-05)	110769	022871	052369
EXPLORER 43, MEASUREMENT OF SOLAR PLASMA OGILVIE (71-019A-04)	031871	041971	031371
APOLLO 16 LM, LUNAR PORTABLE MAGNETOMETER DYAL (72-031C-08)	042172	042372	041672

PUBLICATIONS:

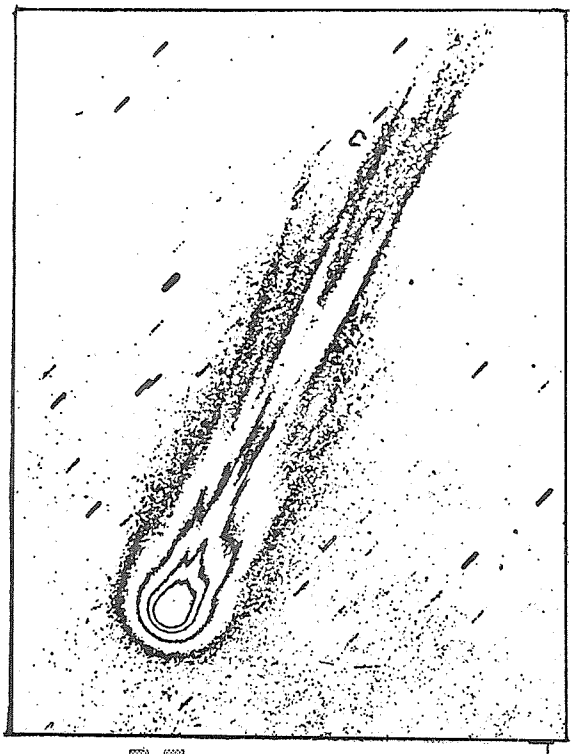
1. *Los Alamos Scientific Laboratory Report 4536*, Vol. 1, "A Compilation of Vela 3 Solar Wind Observations, 1965-1967".

2. *World Data Center A, Report UAG-27*, High Speed Streams in the Solar Wind, NOAA, June 1973.

MOVIES:

1. 16 mm movie "Interplanetary Shock Waves Generated by Solar Flares", by M. Dryer and G. H. Endrud. Rent at $10.00 for 30 days or for sale at $80.00.

A.14



A.15

DATE 1968	OBSERVING PERIOD	JUPITER OBSERVATIONS	INTENSITY	BURSTINESS	FREQ. RANGE MHZ	JUPITER LONGITUDE	Io RANGE
1 10	0309 1338	0654 0754	2	STRONG	13-24	237.9-274.2	346.6-355.1
		0942 1018	3	STRONG	12-16	339.4- 1.2	10.3- 15.4
1 11	0307 1339	1154 1314	3	MODERATE	16-33	209.8-258.2	232.5-243.8
1 12	0307 1340						
1 13	0309 1340	0408 0426	1	WEAK	26-30	229.5-240.4	213.8-216.3
		0642 0715	2	MODERATE	13-20	322.6-342.6	235.6-240.2
		0753 0848	2	STRONG	13-22	5.5- 38.8	245.6-253.4
1 14	0307 1340						
1 15	0307 0925	0756 0900	1	MODERATE	12-19	308.7-347.4	293.1-302.2
1 15	1000 1341						
1 16	0307 1336						
1 17	0339 1338						
1 18	0307 1337						
1 19	0308 1345						
1 20	0226 1340	0801 0819	2	STRONG	11-18	345.1-35[illegible].0	231.9-234.4
		0920 1006	2	MODERATE	13-18	32.8- 6[illegible]	243.1-249.6
1 21	0222 1340	0344 0443	3	MODERATE	11-18	340.3- 16.0	39.2- 47.5
1 22	0217 1337	0748 0808	1	WEAK	12-14	278.5-290.6	277.2-280.0
1 23	0213 1336	0606 0639	3	MODERATE	14-17	7.6- 27.5	106.3-111.0
1 24	0209 1338	0558 0612	1	MODERATE	14-16	153.4-161.9	308.7-310.7
1 25	0204 1342						
1 26	0202 1337						
1 27	0203 1340	0514 0623	1	WEAK	14-29	218.8-260.5	193.4-203.1
		1100 1129	2	STRONG	12-18	68.0- 85.5	242.3-246.4
1 28	0202 1340	0853 1015	1	STRONG	12-17	141.9-191.5	68.0- 79.6
1 29	0213 1349	0528 0536	1	MODERATE	15-17	168.7-173.5	242.5-243.7
		0618 0713	3	STRONG	14-22	198.9-232.2	249.6-257.4
		0942 1050	2	MODERATE	13-17	322.2- 3.4	278.4-288.1
1 30	0202 1336	0708 0802	3	STRONG	12-18	19.8- 52.5	100.2-107.8
1 31	0202 1342						
2 1	0156 1337	0158 0212	2	MODERATE	27-35	133.8-142.3	103.5-105.5
2 2	0205 1341						
2 3	0203 1335	0625 0731	1	STRONG	12-28	236.6-276.5	188.6-198.0
		0815 0855	1	MODERATE	12-14	303.1-327.3	204.2-209.8
		0927 1007	1	STRONG	12-16	346.7- 10.9	214.4-220.0
2 4	0207 1338						
2 5	0233 1337	0724 0959	3	STRONG	12-26	213.6-307.3	244.2-266.1
2 6	0207 1331	0556 0617	2	STRONG	14-16	311.1-323.8	75.3- 78.3
		0840 1015	3	STRONG	15-17	50.3-107.7	98.5-111.9
2 7	0202 1337	0709 0723	2	MODERATE	12-15	145.9-154.4	289.2-291.2
		0920 1120	2	STRONG	11-18	225.1-297.7	307.7-324.7

A.14 COMET TAILS, INTERPLANETARY SCINTILLATIONS, ZODAICAL LIGHT

COMET TAILS

AT BOULDER

1. Miscellaneous IQSY observations of comets by USSR observatories, Hamburg Observatory and Kodaikanal Observatory.
2. 1967 sample comet observation from Cordoba Observatory, Argentina.
3. *Atlas of Cometary Forms*, NASA SP-198, 1969, 17 comets from 1835 - 1962.
4. Miscellaneous observations by Jamaica, Tel Aviv.

ZODIACAL LIGHT

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC-ID	DATE SET AT NSSDC YEAR - MONTH - DAY FROM	TO	LAUNCH DATE
GEMINI 9, ZODICAL LIGHT PHOTOGRAPHY NEY (66-047A-01)	060366	060666 ,	060366
GEMINI 10, ZODIACAL LIGHT PHOTOGRAPHY NEY (66-066A-01)	071866	072166 ,	071866
PIONEER 5, SUPERIOR CONJUNCTION FARADAY ROTATION LEVY (65-105A-08)	101266	112466 ,	121665
PIONEER 7, SUPERIOR CONJUNCTION FARADAY ROTATION LEVY (66-075A-08)	061367	071967 ,	081766
OSO 5, ZODIACAL LIGHT MONITOR NEY (69-006A-07)	012769	031571 ,	012269

A.15 SPORADIC RADIO EMISSIONS FROM JUPITER

A.15 Observations at 18 and 22 MHz for Feb.-June, 1970 and Feb.-July 1971 by Jamaica. Available upon request from R.W.H. Wright, Prof. of Physics, Dept. of Physics, University of West Indies, Kingston 7, Jamaica, W.I.

Observations at 250 MHz available at McDonald Observatory, Marfa, Texas.

Observations at 7.6 - 41 MHz, University of Colorado 9/9/68 - 12/9/71 on punched cards, Boulder.

Magnetosphere and Radio Astronomy of Jupiter: Contact Prof. R. L. Dowden, Physics Department, University of Otago, Dunedin.

PUBLICATIONS:

IGY Solar Activity Reports #28, 32 & 34, World Data Center A - University of Colorado 7.6-41 MHz observations, 1/1960-6/1966.

World Data Center A Report UAG-3, ESSA Research Lab., University of Colorado 7.6-41 MHz observations, 7/1966 - 8/1968. See p. 3.

World Data Center A Report UAG-25, 7.6-41 observations, 9/1968-12/1971.

A.16 SOLAR RADIATION

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC-ID	DATE SET AT NSSDC YEAR - MONTH - DAY FROM	TO	LAUNCH DATE
OSO 1, 3800- TO 4800-A SOLAR FLUX MONITOR HALLAM (62-006A-06)	030762	051562 ,	030762

PIONEER IX

JULY 1972

Date July 1972	Time (UT)	ESP (°)	Solar Wind[1] U_{H^+} (km/sec)	Solar Wind[1] TAU (Days)	IP E-Field[2] 400 Hz (mv)	IP Magnetic Field[3] /B/ (Gamma)	IP Magnetic Field[3] ϕ (°)	IP Magnetic Field[3] Condition	Cosmic Ray Protons[4] (particles/sec) >13.9 Mev	Cosmic Ray Protons[4] (particles/sec) >40 Mev
1	0200		350	6.2917	.236	7.5	107	steady	5.54	0.60
	0400		350		.217				5.50	0.69
6	0940	65.43	325		.222				5.64	0.67
	1330		303	6.4023	.225	6.2	166	quiet(steady)	5.63	0.73
	1730		303		.198				5.59	0.55
7	2300		303		.179	8.7	103	disturbed	5.78	0.67
8	0400	63.49	303	6.2601	.155	8.7	103	disturbed	5.62	0.52
	1804	62.84	282	6.324	.163	8.3	87	quiet	5.90	0.53
9	0210		282		.19				5.68	0.60
10	1000	62.19	350	5.9628	.148	11.8	307	quiet	5.88	0.53
	1400		376		.182				5.66	0.54
	1800		376		.187				5.95	0.48
11	1000	61.54	350	5.9141	.163	10.2	343	quiet	5.72	0.61
	1400		325		.179				5.95	0.53
	1800		303		.148				5.78	0.54
12	1000	60.89	325	5.8651	.128	12.	332	quiet	5.92	0.56
	1400		350		.171				6.00	0.62
	1800		376		.19				5.30	0.59
13	1000	60.24	449	5.5296	.19				5.9[illegible]	0.75
	1400		468		.18	9.3	325	quiet	5.9[illegible]	0.52
	1800		430		.16				5.84	0.48
	2200	59.59	468	5.4391	.17				5.81	0.47
14	1930	59.95	430		.129	7.	349	very quiet	5.80	0.81
	2130		404	5.5429	.156				5.70	0.59
17	08[illegible]	57.66	350	5.6151	.147				6.19	0.55
	1200		390		.155	8.7	147	quiet	5.48	0.58
	1700		376		.171				5.48	0.66
18	0820	57.01	350	5.5644	.148				5.59	0.52
	1300		404		.171	8.9	135	disturbed	5.60	0.64
	1730		468		.187				5.50	0.46
19	0950		468		.186			disturbed*	5.62	0.53
	1300	56.37	430	5.[illegible]	.163	7.8	134		5.49	0.71
	1730		404		.191			quiet**	5.46	0.66
20	0820	55.73	468	5.1389	.171				5.54	0.54
	1300		430		.171	5.9	125	quiet***	5.46	0.73
	1700		417		.187				5.56	0.52
	2100		404		.148				5.61	0.54
21	0100	55.1	404	5.2399	.155	7.6	137	disturbed+	5.60	0.65
	0400		542		.171				5.61	0.63
	1900		404		.175				5.45	0.70
	2300	54.46	390	5.2286	.163	12.3	2[illegible]	quiet	5.47	0.59
22	0300		376		.178				5.49	0.68
23	0140	53.83	376	5.2199	.148	7.2	126	quiet	8.1	0.53
	0400				.168				(overflow)	0.58
24	1100	53.21	350	5.2516	.197				294.	--
	1400		325		.155	9.3	187	quiet	310.	--
	1800		430		.155				306.	--
25	0820	52.58	376	5.1173	.133		313++		369.	--
	1300		430		.155	7.	135	quiet	337.	--
	1700		376		.178				328.	--
26	0810	51.97	350	5.1527	.171		344+++		193.	--
	1300		404		.179	6.5	116	quiet	[illegible]4.	--
	1400		404		.163				[illegible]0.	--
	1700		376		.155				[illegible]3.	--
27	0820	51.35	404	4.9339	.163				[illegible]8.	--
	1200		404		.155				[illegible]1	--
	1400		404		.125	9.	128	disturbed	71.	--
	1600		376		.133				67.	--
	1730		376		.148				66.	--
31	0340	48.94	404	4.73	.187	10.4	356	quiet	11.2	0.52
	0730		404		.148				10.4	0.55
	1200		325		.195				9.8	0.59
	1600		350		.163	8.5	358	quiet	12.	--

[1] Wolfe - NASA/ARC
[2] Scarfe - TRW, Inc.
[3] Sonett and Colburn - NASA/ARC
[4] Webber - Univ. of N.H.

ESP = Earth-Sun Probe Angle.

* 0936 thru 1130 UT
** 1130 thru 1830 UT
*** no data 2200-0000 UT
\+ first noted at 0000 UT
++ between 1022 and 1023 UT the field reversed from towards to away from sun for rest of day.
+++ reversal in field occurred at 1056 UT.

Note: Pioneer 8 data are available in July for only one day as follows:

Date	Time	ESP	U_{H^+}	TAU	E-Field 400 Hz	Cosmic Ray Protons >13.9 Mev	Cosmic Ray Protons >64 Mev
9	0330	091.05	282	6.5296	0.399	7.25	0.50
	0440		282		0.452	7.02	0.43

A.17 INTERPLANETARY MAGNETIC FIELDS

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
PIONEER 5, SEARCH COIL MAGNETOMETER GREENSTADT (60-001A-02)	031160	071160 ,	031160
MARINER 2, FLUXGATE MAGNETOMETER COLEMAN, JR. (62-041A-03)	082962	111562 ,	082762
EXPLORER 18, FLUXGATE MAGNETOMETER NESS (63-046A-02)	112763	053064 ,	112763
MARINER 4, HELIUM MAGNETOMETER SMITH (64-077A-02)	112864	100165 ,	112864
EXPLORER 28, FLUXGATE MAGNETOMETER NESS (65-042A-02)	052965	051167 ,	052965
PIONEER 6, UNIAXIAL FLUXGATE MAGNETOMETER NESS (65-105A-01)	121765	090567 ,	121665
OGO 3, MAGNETIC SURVEY USING TWO MAGNETOMETERS HEPPNER (66-049A-11)	060956	081468 ,	060766
EXPLORER 33, GSFC MAGNETOMETER NESS (66-058A-01)	070166	100568 ,	070166
EXPLORER 33, AMES MAGNETIC FIELDS SONETT (66-058A-03)	070166	071169 ,	070166
PIONEER 7, SINGLE AXIS MAGNETOMETER NESS (66-075A-01)	081766	102967 ,	081766
EXPLORER 34, TRIAXIAL FLUXGATE MAGNETOMETER NESS (67-051A-11)	052467	030769 ,	052467
MARINER 5, TRIAXIAL LOW FIELD HELIUM MAGNETOMETER SMITH (67-060A-05)	061467	112167 ,	061467
EXPLORER 35, AMES MAGNETIC FIELDS SONETT (67-070A-03)	071967	122370 ,	071967
EXPLORER 35, GSFC MAGNETOMETER NESS (67-070A-04)	071957	050169 ,	071967
PIONEER 8, SINGLE AXIS MAGNETOMETER NESS (67-123A-01)	121367	120768 ,	121367
OGO 5, UCLA TRIAXIAL FLUXGATE MAGNETOMETER COLEMAN, JR. (68-014A-14)	030568	111869 ,	030468
OGO 5, PLASMA WAVE DETECTOR CROOK (68-014A-24)	030568	010371 ,	030468
OGO 5, TRIAXIAL SEARCH COIL MAGNETOMETER SMITH (68-014A-16)	030768	042568 ,	030468
PIONEER 9, THREE AXIS MAGNETOMETER SONETT (68-100A-01)	110868	061369 ,	110868
APOLLO 12 LM, LUNAR SURFACE MAGNETOMETER SONETT (69-099C-04)	111969	030570 ,	111869
APOLLO 15 LM, LUNAR SURFACE MAGNETOMETER DYAL (71-063C-03)	073171	102971 ,	072671
APOLLO 16 LM, LUNAR SURFACE MAGNETOMETER SONETT (72-031C-03)	042172	042472 ,	041672

A.18 INTERPLANETARY ELECTRIC FIELDS

AT GREENBELT

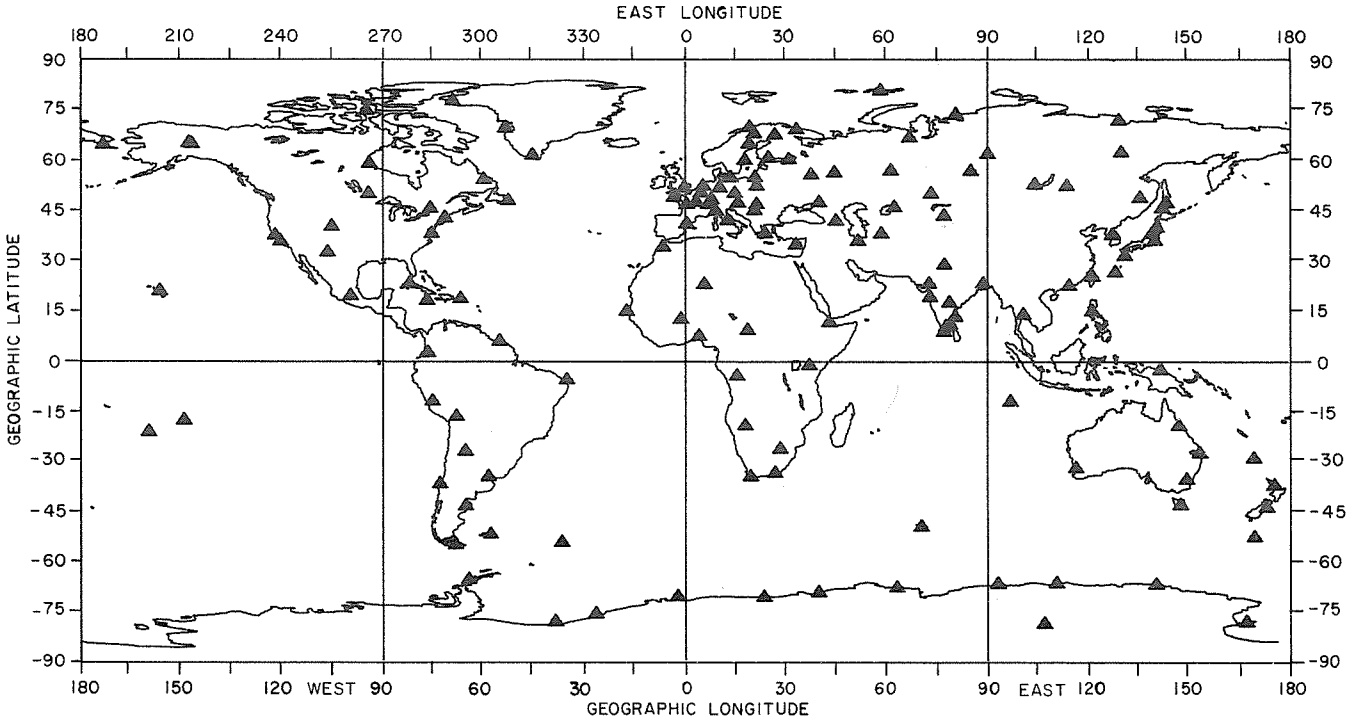
SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
PIONEER 8, PLASMA WAVE MEASUREMENT SCARF (67-123A-07)	121367	100768 ,	121367
OGO 5, PLASMA WAVE DETECTOR CROOK (68-014A-24)	030568	010371 ,	030468
PIONEER 9, PLASMA WAVE DETECTOR SCARF (68-100A-07)	110868	090769 ,	110868

B. IONOSPHERIC PHENOMENA

(other than flare - associated events)

The map shows all the stations that are currently submitting data. With the exception of the topside soundings in each section of the catalogue, the stations are arranged by geographic latitude in descending order north to south. For Section B.1 in addition to the summary of data from 1957 to date, there are listings by the year from 1970 through 1973 of the daily hourly values, f-plots and ionograms to assist the user in readily determining the network available in any given year. The data on magnetic tape are indicated in a separate section. The station names and two-letter indicators are taken from *List of Ionospheric Vertical Incidence Sounding Stations with Recommended Names and Identification*, by Piggott and Shapley published in IQSY Notes No. 11, March 1965, pp. 34-41. This list was adopted for the identification of station data and for other purposes by the Working Group for Ionosphere, of the III IQSY Assembly held in Madrid, March 1965.

IONOSPHERE VERTICAL INCIDENCE SOUNDING STATIONS 1973



B. IONOSPHERIC PHENOMENA

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B.I Ionospheric Characteristics Scaled at Station

	See Footnotes	See Code	foF2	MUF(3000)F2	M(3000)F2	h'F2	h'F	foF1	MUF(3000)F1	M(3000)F1	foE	h'E	fbEs	foEs	fEs	h'Es	Type Es	foE2	h'E2	fmI	fxI	M(3000)I	fmin	hpF2	YpF2	hc	qc	h'F1	foF1.5	h'F1.5	fminF	fzF2	fminE	hmF2	ymF2	foFo	h'Fo	FoT	foI	fxEs	q type Es	MUF	Des	FoF1s	h'F1s	hpF1	ftEs
ADAK		S	X		X	X	X	X		X	X	X	X	X		X	X						X																								
AHMEDABAD			X		X	X	X	X			X	X		X										X																							
AKITA			X		X	X	X	X		X	X	Z	X	X	Z	X	X						X	Z				Z			Z		Z														
ALERT		S	X			X	X	X			X	X			X								X																								
ALMA ATA			X		X	X	X	X		X	X	X	X	X		X	X						X	X																							
ANCHORAGE		S	X		X			X		X	X	X	X	X		X	X						X																								
ARCTICA I (NP-6)		S	X		X	X	X	X		X	X		X	X		X	X						X																								
ARCTICA II (NP-7)		S	X		X	X	X	X		X	X		X	X		X	X						X																								
ARCTICA (NP-8)		S	X		X	X	X	X		X	X		X	X		X	X						X																								
ARCTICA (NP-10)		S	X		X	X	X	X		X	X		X	X		X	X						X																								
ARCTICA (NP-11)		S	X		X	X	X	X		X	X		X	X		X	X						X																								
ARCTICA (NP-13)		S	X		X	X	X	X		X	X		X	X		X	X						X																								
ARGENTINE IS.			X		X	X	X	X		X	X	X	X	X		X	X						X																								
ASHKHABAD			X		X	X	X	X		X	X	X	X	X		X	X						X	X																							
ATHENS			X	X	X	X	X	X	X	X	X	X	X	X		X	X						X	X																							
AUCKLAND			X		X	Z	Z	Z		Z	Z	Z	Z	Z		Z	Z	Z			Z		X																								
BAGUIO		S	X		X	X	X	X		X	X	X	X	X		X	X						X																								
BAKER LAKE		S	X		X	X	X	X		X	X	X			X								X																								
BANGKOK			X		X	X	X	X		X	X	X	X	X		X	X						X																								
BANGUI		S	X		X	X	X	X		X	X	X	X	X		X							X																								
BARROW	1	S	X		X	Z	Z	Z		Z	Z	Z	X	X		X	X						X																								
BAUDOUIN			X	Z	X	X	X	X	Z	X	X	X	X	X		X	Z	X	X				X																								
BELGRANO			X		X	X	X	X		X	X	X	X	X		X	X						X																								
BEOGRAD			X		M	M	M	M		M	M	M	M	M		M	M						M																								
BILLERICA		S	X	X		X	X	X	X		X	X	X	X		X	X						X	X																							
BOGOTA		S	X		X	X	X	X		X	X	X	X	X		X	X						X																								
BOMBAY			X		X										X	X								X																							
BOULDER	2		X		X	X	X	X		X	X	X	X	X		X	X	X	X	X	X		X	Z																							
BRISBANE			X		X		Z				Z	Z	X	Z	X	Z	Z				Z	Z	X																								
BUDAPEST			X		Z	X	X	X		Z	X	X	Z	Z		X	X						X	Z																							
BUENOS AIRES			X		X	X	X	X		X	X	X	X	X		X	X						X																								
BUNIA	3	S	X	X	X	X		X			X	X			X	X		X	X					X				X		X						X	X										
BYRD		S	X		X	X	X	X		X	X	X	X	X		X	X						X																								
CALCUTTA			X		X	X	X	X			X	X		X		X							X																								
CAMPBELL IS			X		X	Z	Z	Z		Z	Z	Z	Z	Z		Z	Z	Z			Z		X																								
CANBERRA			X		X	Z	Z	Z		Z	Z	Z	X		X	Z	Z				Z	Z	X																								
CAPE HALLET		S	X		X	X	X	X		X	X	X	X	X		X	X	X					X																								
CAPE KENNEDY	4	S	X		X	Z	Z	X		Z	Z	Z	X	X		X	X	X	X				X																								
CAPE SCHMIDT		S	X		X		X	X			X	X	X	X		X	X						X																								
CAPETOWN		S	X		X	X	X	X			X	X	X	X		X	X						X																								
CAPE ZEVGARI			X		X	X	X	X		X	X	X	X	X		X	X						X																								
CASABLANCA		S	X		X	X	X	X			X	X	X	X		X	X						X																								
CASEY			X		X		X	X			X	X	X		X	X	X						X																								
CHICLAYO		S	X		X	X	X	X		X	X	X	X	X		X	X						X																								
CHIMBOTE		S	X		X	X	X	X		X	X		X	X		X	X						X																								
CHITA			X		X	X	X	X		X	X	X	X	X		X	X						X																								
CHRISTCHURCH			X		X		X	X		Z	X		X	X		X					Z		X																								
CHURCHILL			X		X	X	X	X		X	X		X	X	X						Z		X																								
CLYDE		S	X			X	X	X			X	X			X								X																								
COLLEGE	5		X		X		X	Z		Z	Z	Z	Z	X		Z	Z						X																								

Characteristic	CONCEPCION	CUBA	DAKAR	DEBILT	DECEPCION	DELHI	DIXON	DJIBOUTI	DOURBES	COCOS IS	DUSHANBE	ELIZABETHVILLE	ELLSWORTH	EUREKA	FLETCHERS ICE IS	FT. ARCHAMBAULT	FT. CHIMO
ftEs																	
hpF1																	
h'F1s																	
foF1s																	
Des																	
MUF																	
q type Es																	
fxEs																	
foI																	
FoI																	
h'Fo												X					
foFo												X					
ymF2																	
hmF2																	
fminF																	
fzF2																	
fminf																	
h'F1.5												X					
foF1.5																	
h'F1												X					
qc										Z							
hc										Z							
ypF2				X													
hpF2	Z			X					X		X	X					
fmin	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
M(3000)I										Z							
fxI	Z							Z		Z						Z	
fmI	Z																
h'E2	X			X								X					
foE2	X			X								X					
Type Es	X	X	X	X		X	X		X	Z	X		X		X	X	
h'Es	X	X	X	X		X	X	X	X	Z	X	X	X		X	X	
fEs				X						X		X		X			X
foEs	X	X	X			X	X	X	X		X		X		X	X	
fbEs	X	X	X	X		X	X	X	X	X	X		X		X	X	
h'E	X	X	X	X		X	X	X	X	Z	X	X	X	X	X	X	X
foE	X	X	X	X		X	X	X	X	Z	X	X	X	X	X	X	X
M(3000)F1	X		X	X	X		X	X	X		X		X			X	
MUF(3000)F1									X								
foF1	X	X	X	X	X	X	X	X	X	Z	X	X	X	X		X	X
h'F	X	X	X	X	X	X	X	X	X	Z	X		X	X	X	X	X
h'F2	X	X	X	X	X	X	X	X	X		X	X	X	X		X	X
M(3000)F2	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	
MUF(3000)F2									X			X					
foF2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
See Code					S							S	S	S	S		
See Footnotes								6				3					

Characteristic	FT. MONMOUTH	FREIBURG	FROBISHER BAY	GARCHY	GENOVA	GODHAVN	GOOSE BAY	GORKY	GRAHAMSTOWN	GRAND BAHAMA	GRAZ	HAIFA (F-PLOTS ONLY)	HALLEY BAY	HEISS IS.	HERMANUS	HOBART	HOLLANDIA
ftEs																	
hpF1																	
h'F1s																	
foF1s																	
Des																	
MUF																	
q type Es																	
fxEs							X										
foI							X										
FoI		X					X										
h'Fo																	
foFo																	
ymF2													Z				
hmF2													Z				
fminF																	
fzF2																	
fminf																	
h'F1.5																	
foF1.5																	
h'F1										X							
qc																	
hc																	
ypF2																	
hpF2						Z	X			Z					X		
fmin	X	X	X	X		X	X		X	X			X	X	X	X	X
M(3000)I																	
fxI				Z		Z				Z						Z	
fmI						Z				Z							
h'E2	X									X							
foE2	X	X								X							
Type Es	X	X		X		X	X	X		X			X	X	X		
h'Es	X	X		X		X	X		X	X			X	X	X		X
fEs			X													X	X
foEs	X	X		X	X	X	X	X	X	X			X	X	X		X
fbEs	X	X		X		X	X	X	X	X			X	X	X	X	
h'E	X	X	X	X		X	X		X	X			X	X	X		X
foE	X	X	X	X	X	X	X	X	X	X			X	X	X		X
M(3000)F1	X	X		X						X			X	X			X
MUF(3000)F1		X					X										
foF1	X	X	X	X		X	X	X	X	X			X	X	X		X
h'F	X	X	X	X	X	X	X			X			X	X	X		X
h'F2	X	X	X	X		X	X	X	X	X			X	X	X		X
M(3000)F2	X	X		X		X		X		X			X	X	X	X	X
MUF(3000)F2		X			X		X										
foF2	X	X	X	X	X	X	X	X	X	X	X	F	X	X	X	X	X
See Code	S		S						S	S							S
See Footnotes																	

Characteristic	HONG KONG	HUANCAYO	HYDERABAD	IBADAN	ILO	INVERNESS	IRKUTSK	JAMAICA (F-PLOTS ONLY)	JOHANNESBURG	JULIACA	JULIUSRUH/RUGEN	KALININGRAD	KARAGANDA	KERGUELEN	KERMADEC	KHABAROVSK
ftEs																
hpF1																
h'F1s																
foF1s																
Des																
MUF				X												
q type Es				X												
fxEs																
foI																
FoI																
h'Fo																
foFo																
ymF2																
hmF2									X							
fminF																
fzF2																
fminf																
h'F1.5																
foF1.5																
h'F1																
qc				X												
hc				X												
ypF2																
hpF2		Z	X				X		X			X	X			X
fmin	X	X	X	X	X	X	X	F	X	X		X	X	X	X	X
M(3000)I																
fxI		Z												Z		
fmI		Z														
h'E2																
foE2																
Type Es		X		X	X		X		X	X	X	X	X	X		X
h'Es	X	X	X		X	X	X		X	X	X	X	X	X		X
fEs																
foEs	X	X	X	X	X	X	X		X	X	X	X	X	X		X
fbEs	X	X	X		X	X	X	F	X	X	X	X	X	X		X
h'E	X	X	X		X	X	X		X	X		X	X	X		X
foE	X	X	X	X	X	X	X	F	X	X	X	X	X	X		X
M(3000)F1					X					X	X	X	X	X		X
MUF(3000)F1																
foF1		X	X	X	X	X	X	F	X	X	X	X	X	X		X
h'F	X	X	X	X	X	X	X		X	X	X	X	X	X		X
h'F2			X		X	X	X		X	X		X	X	X		X
M(3000)F2	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
MUF(3000)F2																
foF2	X	X	X	X	X	X	X	F	X	X	X	X	X	X	X	X
See Code					S	S				S						
See Footnotes				7												

KINSHAS BINZA
KIRUNA
KJELLER
KODAIKANAL
LANNION
LA PAZ
LA QUIACA
LENINGRAD
LINDAU
LITTLE AMERICA
LONGYEARBYEN
LULEA
LWIRO
LYCKSELE
MACAU
MACQUARIE IS
MADRAS
MANILA
MARION IS
MAUI
MAWSON
MAYNARD
MEANOOK
MEXICO CITY
MIEDZESZYN
MIRNY
MOSCOW
MUNDARING
MURMANSK
NAIROBI
NARSSARSSUAQ
NATAL
NORFOLK IS
NORIL#SK
NOVOKAZALINSK
NOVOSIBIRSK
NURMIJARVI
OKINAWA
OTTAWA
OUAGADOUGOU
PANAMA
PARAMARIBO
PARIS SACLAY
TUNGUSKA
POINT ARGUELLO
POITIERS
POPAYAN
PORT LOCKROY
PORT MORESBY
PORT STANLEY

PROVIDENYA	
PRUHONICE	
PUERTO RICO	S
QUETTA	S
RABAT	
RAROTONGA	
RESOLUTE BAY	S
REYKJAVIK	
ROME	
ROSTOV	
SALEKHARD	
SALISBURY (AUST)	11
SALISBURY (RHODESIA)	S
SAN SALVADOR	S
SANAE	S
SAO PAULO	
SCHWARZENBURG	S
SCOTT BASE	
SEOUL	
SIMFEROPOL	S
SINGAPORE	S
SLOUGH	
SODANKYLA	
SOFIA	
SOUTH GEORGIA	S
SOUTH POLE	S
SOYA SHIP	
ST. JOHNS	12
STANFORD	
SVERDLOVSK	
SYOWA BASE	
TAHITI	
TAIPEI	
TALARA	S
SP-16	
TAMANRASSET	
TANANARIVE	
TBILISI	
TEHRAN	
TERRE ADELIE	
THULE/CAMP TUTO	S
THULE/QANAQ	
THUMBA	
TIRUCHY	
TIXIE BAY	
TOGO	S
TOKYO	
TOMSK	
TORTOSA	
TOWNSVILLE	

	See Footnotes	See Code	foF2	MUF(3000)F2	M(3000)F2	h'F2	h'F	foF1	MUF(3000)F1	M(3000)F1	foE	h'E	fbEs	foEs	fEs	hEs	type Es	foE2	h'E2	fmI	fxI	M(3000)I	fmin	hpF2	YpF2	hc	qc	h'F1	foF1.5	h'F1.5	fminF	fzF2	fminE	hmF2	ymF2	foFo	h'Fo	FoT	foT	fxEs	q type Es	MUF	Des	foFIs	h'FIs	hpFI	ftEs
TRELEW			X	X	X	X	X		X	X	X	X	X		X							X																								
TRIVANDRUM		S	X	X									X	X	X								X																							
TROMSO			X	X	X	X	X		X	X	X	X	X		X	X				Z		X	Z																							
TSUMEB			X	X	X	X	X		X	X	X		X		X	X	X																												
TUCUMAN			X	X	M	X	M		M	M												M																							
UPPSALA			X	X	X	X	X		X	X	X	X	Z	X	X	Z	Z	Z	Z			X							X												X				
USHUAIA			X	X	X	X	X	X	X	X	X	X		X	X							X																							
VANIMO			X	X		Z	Z		Z	Z	X	Z	X		Z					Z	Z	X																							
VICTORIA		S	X	X	X	X	X	X	X	X			X									X																							
VOSTOK			X	X	X	X	X	X	X	X	X	X		X	X							X																							
WAKKANAI			X	X	X	X	X	X	X	Z	X	X	Z	X	X							X	Z				Z		Z		Z													
WALLOPS IS			X	X	X	X	X	X	X	X	X	X		X	X	X	X	Z	Z			X	Z																						
WATHEROO		S	X	X		X			X			X										X																							
WASHINGTON		S	X	X	X	X	X	X	X	X	X	X		X	X	X	X					X																							
WHITE SANDS			X	X	X	X	X	X	X	X	X	X		X	X	X	X	Z	Z			X	Z																						
WILKES		S	X	X	Z	X	X	Z	X	X	X	X		X	X							X																							
WINNIPEG			X	X	X	X	X	X	X	Z	X	X	X									X																							
WOOMERA			X	X	Z	X	X		X	X	X	X		X	X	Z	Z					X																							
YAKUTSK			X	X	X	X	X	X	X	X	X	X		X	X							X	X																						
YAMAGAWA			X	X	X	X	X	X	X	Z	X	X	Z	X	X							X				Z		Z		Z														
YELLOWKNIFE		S	X		X	X	X		X	X			X									X																							
YUZHNO SAKHALI			X	X	X	X	X	X	X	X	X	X		X	X	X						X	X																						
ZARYA SHIP		S	X	X	X	X	X	X	X	X	X	X	X		X	X																												

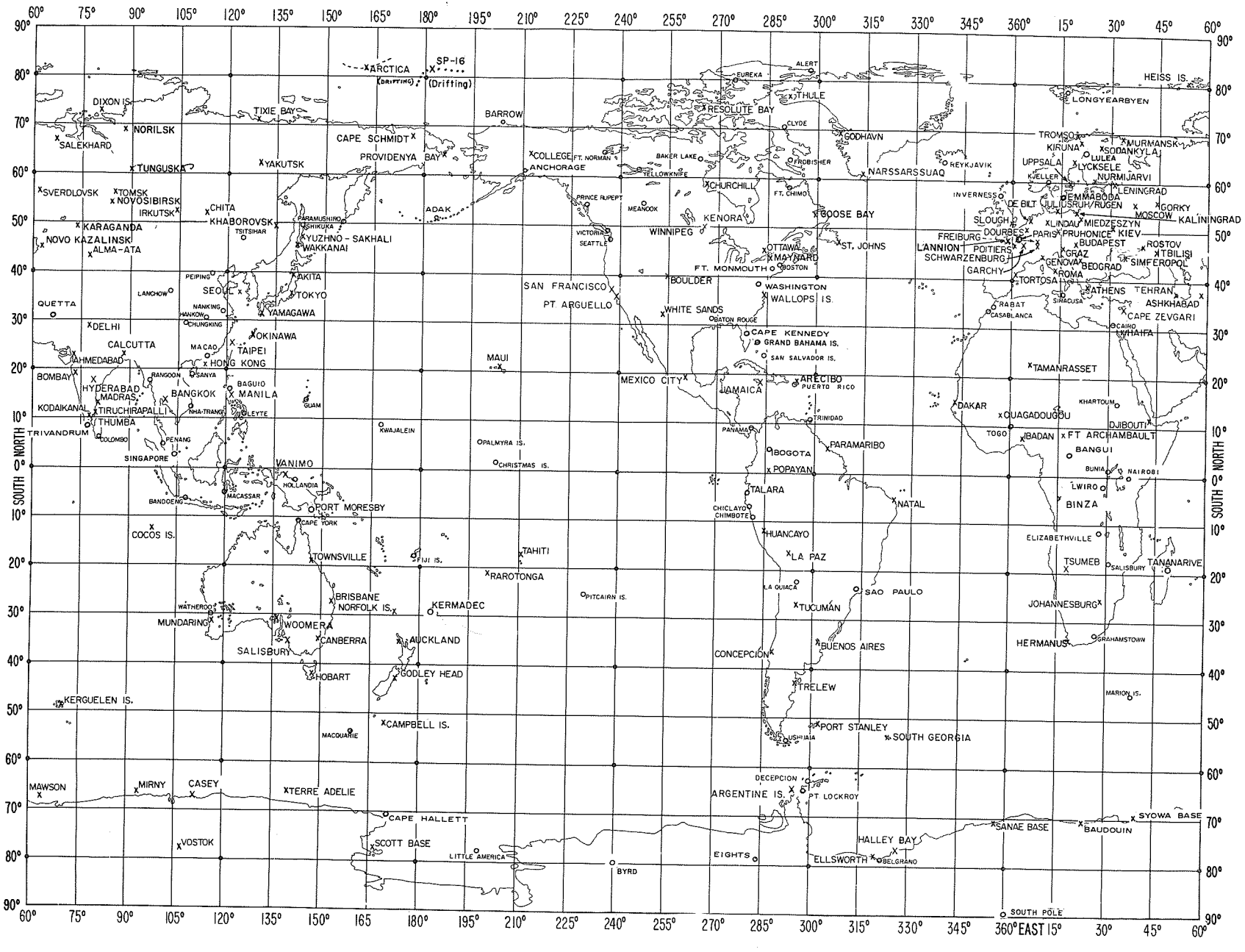
SYMBOL CODE

X Characteristic Tabulated
Z Check with WDC-A for exact availability of data
S Station closed - See Master Station List
M Medians only
F F plots only

FOOTNOTES

1. BARROW - I indicates characteristics reduced for IGY only.
2. BOULDER - Beginning dates for fMI, fXI not known as 1969 data have not been completely reduced.
3. BUNIA & ELIZABETHVILLE - Also tabulated MUF(2000)E, fE2S, h'E2S, and MUF(2000)Es.
   KINSHASA BINZA - Also tabulated h'F1, MUF(2000)E, fE2S, h'E2S, and MUF(2000)E2 through April 1966.
4. CAPE KENNEDY - Full data reduction through January 1959. f-plots only through February 1964 when 7E'S resumed on patrol basis: f-min, fbEs, foEs, h'Es, types Es, foF2, M(3000)F2 plus foF1.
5. COLLEGE - Beginning 1968 reduced foF2 and M(3000)F2 only on 6 hourly basis; September 1969 added f-min, and h'F. April 1970 added foEs. July 1, 1972 - will reduce foF2, M(3000)F2, fMI, fXI, h'F, fbEs, and h'Es on hourly basis.
6. DJIBOUTI - No beginning date on fXI as 1970 data have not been received, but have received January - May 1971.
7. IBADAN - MUF - no other description or designation, does not fit MUF(3000)F2.
8. LWIRO - Also tabulated foF1s, foF0, h'F1s,
9. MAWSON - Have data for February 1958. Then no data until April 1959 when only foF2, M(3000)F2, and h'F were tabulated through December 1959. In 1960 station was down during installation of new sounding equipment. Operation resumed June 1960.
10. NATAL - Last reduced data was for May 1965. Ionograms are received on somewhat routine basis.
11. SALISBURY - h'F2 not tabulated from July 1965 until 1971. h'E and foEs not tabulated 1969 or 1972, but were in 1971. These data may be had on request.
12. STANFORD - Hourly values reduced through January 1959. Receive only f-plots with hourly plotting of foF2 only.

IONOSPHERE VERTICAL SOUNDINGS STATIONS, OCTOBER 1973



x OPERATING o NOT OPERATING

8.1 IONOSPHERE VERTICAL SOUNDINGS

AT BOULDER

BASED ON DAILY - HOURLY VALUES

STATION	MICRO-FILM	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	INDICATOR	COMPUTER CODE
ARCTICA (NP 6)	Y	87N		B	A	B	S														XG	
ALERT	X	82N	297	C	A	S															AL	J82
FLETCHERS ICE		82N		B	A	S															XC	982
ARCTICA(NP 13)	Y	81N									B	A	B	S							XL	
ARCTICA (NP 8)	Y	80N					B	B	S												XI	
EUREKA	X	80N	274	C	A	C	S														EU	980
HEISS IS	Y	80N	57	B	A	B	A	A	A	A	A	A	A	A	A	Q	B	Q	Q	Q	BT	280
ARCTICA (NP 7)	Y	79N		B	A	C	S														XH	
ARCTICA(NP 11)	Y	79N							C	S											XK	
ARCTICA(NP 10)	Y	78N							C	A	C	S									XJ	
ARCTICA(NP 16)	Y	78N	176												C						XM	676
LONGYEARBYEN	X	78N	15	B	A	B	S														LG	178
THULE/QANAQ	Y	77N	290													Q	Q	A	A	C	TH	J77
THULE/TUTO	X	76N	291	B	A	A	B	A	A	A	A	A	B	S							TH	J76
RESOLUTE BAY	X	74N	265	B	A	A	A	A	A	A	A	A	A	A	A	B	B	A	B	C	RB	974
DIXON	Y	73N	80	B	A	A	B	B		B	B	A	A	A	A	B	C	Q	Q	Q	DI	373
BARROW	X	71N	203	B	A	A	A	A	A	B	A	B	S								BW	771
TIXIE BAY	Y	71N	128	C	B	B	B	C			B	A	C	B	B	Q	Q	Q	Q	Q	TX	471
CLYDE	X	70N	291	C	B	S															CR	J70
GODHAVN	Y	69N	306	B	A	B	B	A	A	B	A	A	A	A	A	A	A	A	A	C	GO	J69
MURMANSK	Y	68N	33	B	A	A	A	A	A	B	A	A	A	A	A	B	A	B	C	Q	MM	168
NORLISK	Y	69N	88																C	Q	NO	369
TROMSO	X	69N	19	B	A	A	B	A	A	A	A	A	B	B	A	A	A	A	B	Q	TR	169
CAPE SCHMIDT	X	68N	181				A	A	B	C	C				B	B	C	Q	Q	Q	CE	669
KIRUNA	X	67N	20	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	KI	167
SODANKYLA	X	67N	26	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	SO	166
SALEKHARD	Y	66N	66	C	A	C	A	A	A	A	A	A	A	A	A	A	A	A	B	Q	SD	266
LULEA	X	65N	22	B	A	A	A	A	A	A	A	B	B	P	C	S					LU	165
BAKER LAKE	X	64N	264	B	A	C	S														BL	964
COLLEGE	X	64N	212	B	A	A	A	A	A	B	A	A	A	A	A	B	A	A	B	C	CO	764
FORT NORMAN		64N	234	C	S																FN	864
LYCKSELE	X	64N	18	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	LY	164
PROVIDENYA	Y	64N	186	B	A	A	A	A	A	A	A	A	A	A	A	B	C	Q	Q	Q	PD	664
REYKJAVIK	X	64N	338	B	A	A	A	A	A	A	A	S									RK	A64
FROBISHER BAY	X	63N	291	C	B	C	S														FB	J63
TUNGUSKA	Y	62N	90												Q	Q	Q	Q	C	Q	TZ	362
YELLOWKNIFE	X	62N	245	C	B	C	S														YE	862
ANCHORAGE	X	61N	210	B	A	A	A	A	A	B	A	A	S								AN	761
NARSSARSSUAQ	Y	61N	314	C	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	C	NQ	J61
YAKUTSK	Y	61N	129	B	A	B	A	A	A	A	A	A	A	A	A	C	Q	Q	Q	Q	YA	462
KJELLER	X	60N	11	B	A	C	S														OS	059
NURMIJARVI	X	60N	24	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	Q	NU	159
LENINGRAD	Y	59N	30	B	B	B	A	A	A	B	A	A	A	A	A	A	A	A	B	Q	LD	160
UPPSALA	X	59N	17	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	UP	158
CHURCHILL	X	58N	265	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	CH	958
FORT CHIMO	X	58N	291		C	S															FC	J58
INVERNESS	X	57N	355	B	A	A	A	A	A	B	S										IN	056
EMMABODA		56N	15														Q	Q	S		EM	157
GORKY	Y	56N	44		B	A	B	A	A	A	A	A	A	A	A	A	A	A	B	Q	GK	156

Continued

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months
W = World Days Only
+ = Ionograms and f-plots only, for some years

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

X = Much of these data are held on microfilm up through about 1967.
Y = Data are usually received on microfilm only.
Z = In addition to the tabulations, some of these data are also available on microfiche.

B.1

Hourly Values - these are monthly tables of hourly values and monthly medians normally for the following parameters: foF2, foF1, foE, foEs, fbEs, fmin, fxI, dfS, h'F, h'Es, h'E, M(3000)F2 or MUF(3000)F2, Es types. On the average there are 12 sheets of data per month. Most of the data have been microfilmed on 35 mm film. One 100 foot roll will contain several years of data for one station at a cost of $5.15, e.g., Huancayo for 1957 - 1964 is on one roll. Electrostatic copies monthly daily-hourly original sheets, letter size, are 25¢ per sheet.

S

HOURLY VALUES

IONOSPHERIC DATA

BOULDER LAT. 40.0N LONG. 105.3W SWEEP 0.25 MC TO 20.0 MC IN 27 SEC. 105.0W TIME

YR-MO	C
1966 11	00

foF2

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
1	35	34	33	29	31	26	25	54	75	71	81	88	95	94	86	80	82	71
		U F	F	U F	U F	U F											J R	
2	28	27		32	33	34	40	56	67	73	80	92	87	104	102	101	88	74
3	30	32	33	33	3[illegible]	[illegible]0	33	54	67	80	81	91	96	101	100	92	80	63
4	29	31	32	34	33	32	29	55	68	82	84	93	91	92	87	93	C	63
5	26	27	29	29	29	29	29	58	71	85	85	92	102	95	86	80	70	63
6	25	28	28	29	28	27	29	57	76	82	85	76	84	84	90	90	86	70
7	26	28	29	29	28	26	27	51	7[illegible]	77	82	82	83	83	80	80	80	61
8	30	33	33	32	32	31	30	C	C	C	C	92	89	86	90	92	82	68
9	30	32	32	32	34	34	35	62	76	76	81	86	87	92	92	86	77	60
10	30	31	33	34	33	31	32	56	75	92	95	94	104	94	92	90	85	70
11	33	35	37	37	31	32	33	58	87	88	85	9[illegible]	98	98	97	J R 86	75	60
12	36	38	36	32	33	34	35	56	84	87	82	95	101	104	114	105	90	65
13	33	33	35	36	35	37	37	52	65	80	83	100	102	102	97	95	90	66
14	33	33	32	35	36	33	32	53	76	86	80	90	96	98	92	89	78	62
15	26	28	31	33	34	34	35	56	80	84	87	98	C	C	C	[illegible]	C	C
	C	C	C	C	C	C	C	C	C	C	C							
16												99	112	98	94	78	80	66
17	36	36	33	31	31	31	33	53	73	C	90	95	87	99	104	104	92	67
18	33	A	34	33	30	31	32	50	76	75	93	100	105	106	100	97	92	77
	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
19	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	C	C	C	C	C	C	C	C	C	C	C							
21												92	91	90	86	85	80	64

B.1 IONOSPHERE VERTICAL SOUNDINGS

AT BOULDER

BASED ON DAILY - HOURLY VALUES Cont'd.

STATION	MICRO-FILM	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	INDICATOR	COMPUTER CODE
SVERDLOVSK	Y	56N	61	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	Q	SV	256
TOMSK	Y	56N	84	B	A	B	A	A	A	A	A	A	A	A	A	A	A	A	B	Q	TK	356
KALININGRAD	Y	55N	21								Q	Q	Q	Q	Q	Q	Q	Q	C		KL	154
MOSCOW	Y	55N	37	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	Q	MO	155
NOVOSIBIRSK	Y	55N	83																C		NS	355
JULIUSRUH/RU	X	54N	13	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	Q	JR	055
MEANOOK	X	54N	246	C	A	C	S														ME	855
GOOSE BAY		53N	299																B	Q	GS	J53
CHITA	X	52N	113	B	A	A	A	A	A	C	P	P									CX	452
DE BILT	X	52N	5	B	A	A	A	A	A	A	A	A	A	C	A	A	A	A	B	Q	DT	053
IRKUTSK	Y	52N	104	C	B	B	A	A	A	A	A	A	A	A	A	A	A	A	Q	Q	IR	352
MIEDZESZYN	X	52N	21		C	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	MZ	152
ADAK	X	51N	183	B	A	A	A	B	A	A	A	A	S								AD	651
KIEV	Y	51N	30								Q	Q	Q	Q	Q	Q	C	Q	Q	Q	KV	151
LINDAU	X	51N	10	B	A	A	A	A	A	A	A	A	A	A	A	A	B	Q	Q	Q	LI	050
SLOUGH	X	51N	0	B	A	A	A	A	A	A	A	A	A	A	A	A	A	B	A	C	SL	051
DOURBES	X	50N	4	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	Q	DB	049
KARAGANDA	Y	50N	73																C		KR	250
PRUHONICE	X	50N	14			A	A	A	A	A	A	A	A	A	A	A	B	B	B	Q	PQ	052
LANNION		49N	357															A	B	Q	LN	047
WINNIPEG	X	49N	265	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	WI	949
FREIBURG	X	48N	7	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	FR	048
KHABAROVSK	Y	48N	135					C	A	A	A	A	A	B	B	A	A	B	B	Q	KB	548
PARIS SACLAY	X	48N	2				B	A	A	A	B	B	A	B	A	A	B	S			SC	047
VICTORIA	X	48N	236	B	A	C	S														VI	848
BAIE ST PAUL+		47N	289					C	C	S											PL	J48
GARCHY	X	47N	3			C	B	B	B	A	A	A	A	A	A	B	A	A	C	Q	GY	042
GRAZ	X	47N	15	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	GZ	146
ROSTOV	Y	47N	39	B	B	B	A	A	A	A	A	A	A	A	A	A	A	A	B	Q	RV	149
SEATTLE+		47N	237		B	B	C														SE	847
ST JOHNS	X	47N	307	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	SJ	J47
YUZHNO SAKHALI	Y	47N	143	B	A	A	B	A	A	B	B	A	A	A	B	B	Q	Q	Q	Q	SA	547
BUDAPEST	X	46N	21	B	A	A	S				B	A	B	B	A	C		C	A	C	BU	147
NOVOKAZALINSK	Y	46N	62																C		NK	246
POITIERS		46N	0	B	A	A	A								A	A	A	A	A	Q	PT	046
SCHWARZENBJRG	X	46N	6	B	A	B	A	A	A	A	B	A	A	A	A	A	A	C	Q	Q	SZ	045
OTTAWA	X	45N	284	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	OT	945
WAKKANAI	X	45N	141	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	Q	WK	545
BEOGRAD	X	44N	20						C	A	A	A	A	A	A	A	A	B	A	Q	BE	145
GENOVA	X	44N	9	B	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	Q	GV	044
SIMFEROPOL	Y	44N	34	B	A	B	S														SF	144
ALMA ATA	Y	43N	76	B	B	A	A	A	A	A	A	A	A	A	A	A	A	B	A	Q	AA	343
HANOVER+		43N	287												Q	Q	Q	Q	Q	Q	HN	J44
MILLSTONE HILL+		43N	288											A	A	B	A	C	Q	Q	MH	J45
SOFIA		43N	23								A	P	P	P	P	P	P	P	P	P	SQ	143
BILLERICA/BOSTN		42N	288									C	B	B	A	A	A	S			BO	J43
MAYNARD		42N	288														C	A	A	Q	MY	J43
ROMA	X	41N	12	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	RO	041
TBILISI	Y	41N	44							C	A	A	A	A	A	B	Q	C	B	Q	TB	142
BOULDER	XY	40N	254		C	B	A	B		B	A	A	A	A	A	A	A	A	A	B	BC	840

Continued

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S = Program STOPPED operations (see MASTER STATION LIST for actual date)

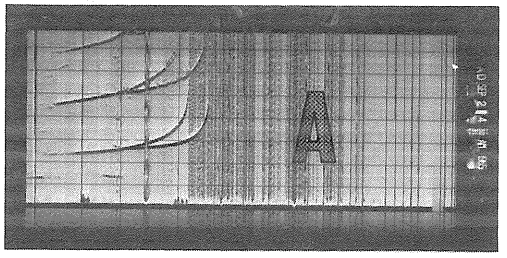
X = Much of these data are held on microfilm up through about 1967.
Y = Data are usually received on microfilm only.
Z = In addition to the tabulations, some of these data are also available on microfiche.

B.1

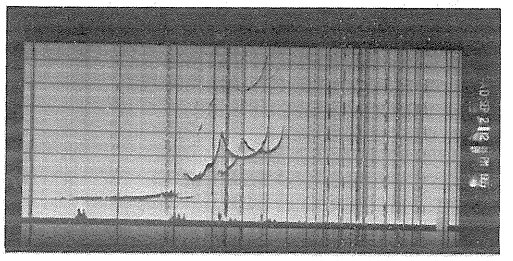
Ionograms - the original sounding record, usually on 35 mm film. Normally, soundings are taken quarter-hourly, and more frequently during Regular World Days and Alerts. The monthly length of film is 900 to 3000 feet depending upon station. Film copies are prepared at a cost of $.05 per foot. If cutting and subsequent splicing of the film is required in order to copy short lengths, there will be an additional charge of $4.00 per interval.

S

*IONOGRAMS 1.0 - 20.0 MHz



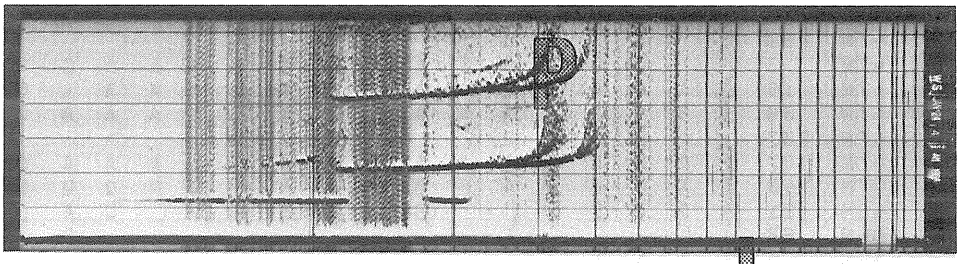
NIGHT



DAY

M

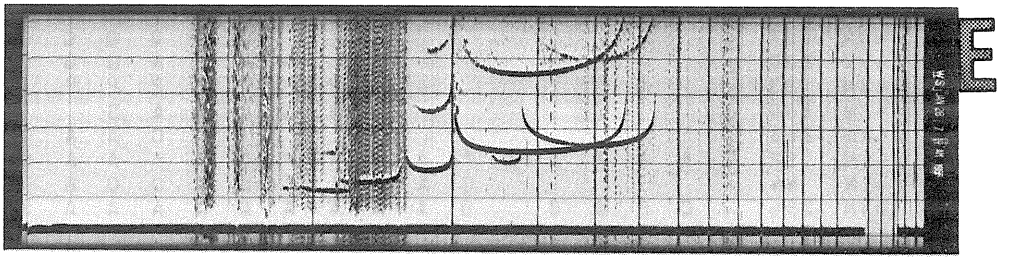
*IONOGRAMS 0.25 - 20.0 MHz



NIGHT

L

E



DAY

B.1 IONOSPHERE VERTICAL SOUNDINGS

AT BOULDER

BASED ON DAILY - HOURLY VALUES Cont'd.

STATION	MICRO-FILM	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	IND 73	INDICATOR	COMPUTER CODE
FORT MONMOUTH	X	40N	285	B	A	A	A	B	A	A	A	A	S								FM	J40
TORTOSA	X	40N	0	B	A	B	A	B	A	A	B	A	B	A	A	A	B	B	C	Q	EB	040
AKITA	X	39N	140	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	Q	AK	539
ATHENS	X	38N	23				C	A	A	B	A	C	P	P	C	P	B	Q	Q	Q	AT	138
WASHINGTON	X	38N	282	B	A	A	A	A	A	A	A	A	A	A	B	S					WA	938
ASHKHABAD	Y	37N	58	B	A	A	B	A	A	B	A	A	A	A	A	A	A	Q	C	Q	AS	237
SAN FRANCISCO+		37N	237	B	A	C				A	A	A	A	B	A	A	A	A	A	C	ST	837
SEOUL+		37N	127											C		B	C	P	P	P	SU	437
WALLOPS IS+	XY	37N	284							B	A	A	A	A	A	A	A	A	A	C	WP	937
POINT ARGUELLO+	X	35N	239							B	A	A	B	A	A	A	A	A	B	C	PA	836
TEHRAN	X	35N	51							B	A	A	B								TE	236
TOKYO	X	35N	139	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	Q	TO	535
CAPE ZEVGARI	X	34N	33								B	B	B	A	C	Q	A	B	B	Q	CV	135
CASABLANCA	X	33N	352	B	C	S															CA	033
RABAT	X	33N	353		B	C	A	Q	Q	S											RT	034
HAIFA+		32N	34				C	B													HA	132
WHITE SANDS	XY	32N	253	B	A	A	A	A	A	B	A	A	A	A	A	A	A	A	B	C	WS	832
YAMAGAWA	X	31N	130	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	Q	YG	431
EGLIN AFB+		30N	273								C	C		C		C	S				EG	930
QUETTA	X	30N	67	C	B	C	C	C	C		S										QT	230
CAPE KENNEDY+	X	28N	279		B	A	A	A	A	A	A	A	B	S							CC	929
DELHI	X	28N	77	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	C	DH	328
GRAND BAHAMA	X	26N	281	B	A	A	B	B	B	A	A	A	A	A	A	A	A	B	S		GB	926
OKINAWA	XY	26N	127	B	A	A	C	B	B	A	A	A	A	A	A	C	C	A	C	Q	OK	426
TAIPEI	X	25N	121	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	Q	TP	424
SAN SALVADOR+	X	24N	285		C	A	A	A	A	A	A	C	S								SS	J24
AHMEDABAD	X	23N	72	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	C	AH	223
CALCUTTA	X	23N	88	B	A	B	C				B	A	B	A	A	A	A	C	Q	Q	CU	322
CUBA	X	23N	277								C	B			B	C					CD	923
HONG KONG		22N	114													B	B	Q	Q	Q	HK	423
MACAU	X	22N	113		B	A	C	C	S												MC	422
TAMANRASSET	X	22N	5	C	B	B	A	A	B	B	A	A	A	A	A	A	C	Q	Q	Q	TN	022
MAUI	XY	20N	203	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	MA	720
BOMBAY	X	19N	72	A	A	A	A	A	A	A	A	A	A	B	B	A	A	A	B	Q	BM	219
MEXICO CITY	X	19N	260		C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	MX	919
ARECIBO+		18N	293											Q	Q	Q	Q	Q	Q	Q	AR	J19
JAMAICA+	X	18N	283						C	A	A	A	A	A	B		B	B	C	C	JA	918
PUERTO RICO+	X	18N	292	B	A	A	C	C	C	C	S										PR	J18
HYDERABAD	X	17N	78							B	A	A	A	B	A	A	A	B	Q	Q	HY	317
BAGUIO	X	16N	120	B	A	A	A	A	A	A	S										BF	416
DAKAR	X	14N	342	B	A	A	A	A	A	A	A	A	A	A	A	A	Q	A	Q	Q	DK	A14
MANILA	X	14N	121								A	A	A	A	A	A	A	A	A	B	MN	414
BANGKOK	X	13N	100							C	A	A	A	A	B	A	A	A	B	Q	BK	314
BARBADOS+		13N	300	C							C	C		C	S						BS	J13
MADRAS	X	13N	80	B	A	A	A	A	A	A	C		B								MD	313
OUAGADOUGOU		12N	358										B	B	A	A	A	A	C	Q	OU	012
DJIBOUTI	X	11N	42	B	B	A	A	A	A	B	A	A	A	A	A	A	Q	B	Q	Q	DJ	111
KODAIKANAL	X	10N	77	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	Q	KO	310
TIRUCHIRAPALLI	X	10N	78	B	A	A	A	A	A	A	B	A	A	A	A	A	A	B	B	Q	TI	311
TOGO		10N	0									C	A	C	S						TG	011

Continued

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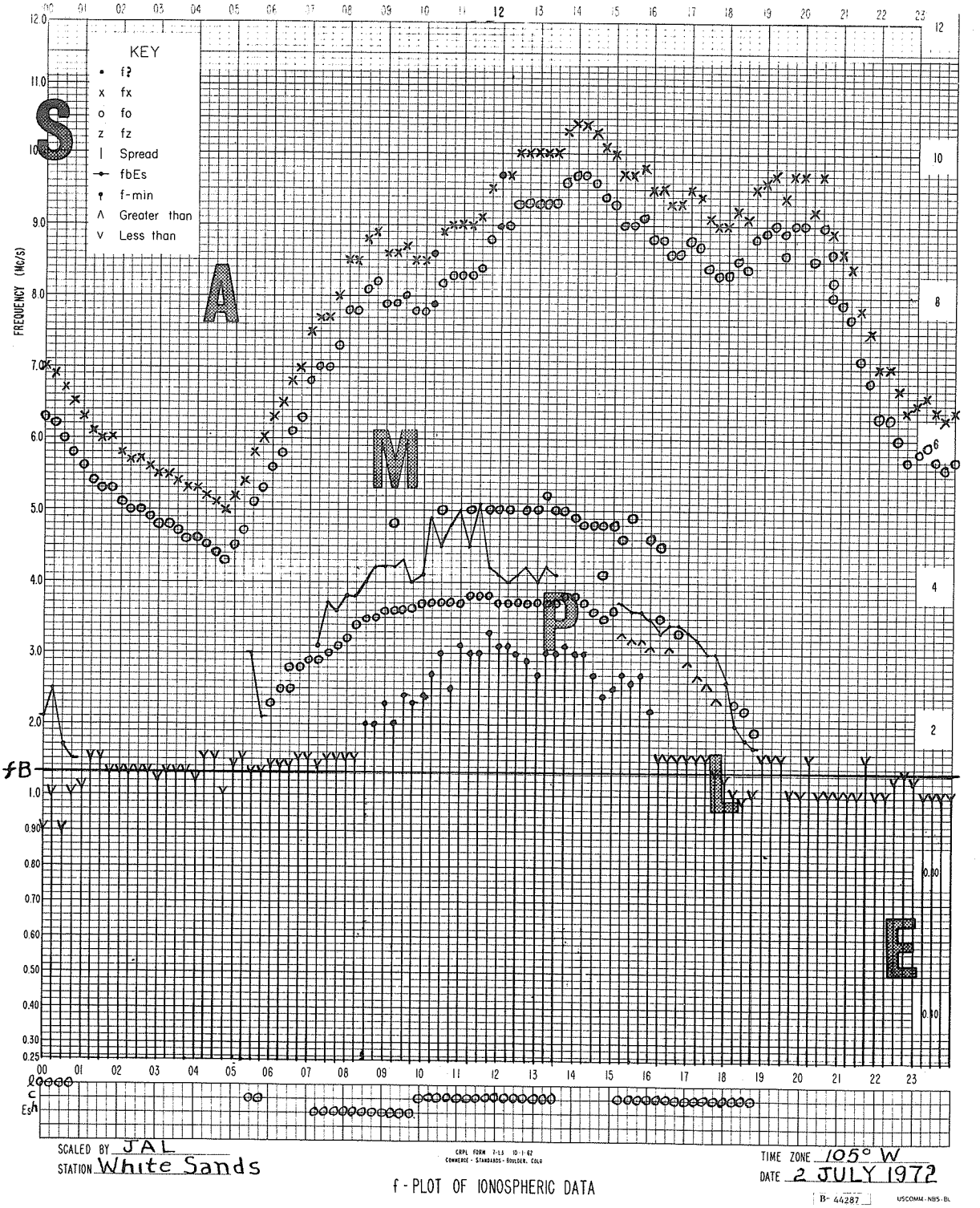
f- PLOT



f - PLOT OF IONOSPHERIC DATA

AT BOULDER

B.1 IONOSPHERE VERTICAL SOUNDINGS

BASED ON DAILY - HOURLY VALUES Cont'd.

STATION	MICRO-FILM	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	INDICATOR	COMPUTER CODE
FT ARCHAMBAULT		03N	18													B	A	A	C	Q	FA	109
PANAMA	X	03N	280	B	A	S															PN	909
THUMBA	X	08N	76								C	B	B	A	A	A	A	A	B	Q	TC	309
TRIVANDRUM	X	08N	77	B	A	A	A	A	A	A	B	S									TM	308
IBADAN	X	07N	3	B	A	A	A	A	A	A	A	A	A	B	B	A	A	B	C	Q	IB	007
ACCRA+		05N	359					C	C	C											AG	005
PARAMARIBO	X	05N	304	B	A	B	A	A	C		A	B	A	A	B		C	Q	Q	Q	PM	J06
BANGUI	X	04N	18		B	A	B	S			B	A	C	S							BI	104
BOGOTA	X	04N	285	C	A	A	C		C	A	A	A	A	B	S						BG	J05
POPAYAN		02N	283														C	Q	C	Q	PP	902
BUNIA	X	01N	30	C	A	A	B	S													BN	102
SINGAPORE	X	01N	103	B	A	A	A	A	A	A	A	A	A	A	A	A	A	B	S		SI	301
NAIROBI	X	01S	36								A	B	B	A	B	Q	Q	Q	Q	Q	NR	10J
HOLLANDIA	X	02S	140	C	A	C	S														HL	50K
LWIRO	X	02S	28	C	B	A	A				A	A	A	B	S						LW	10K
VANIMO	X	02S	141								B	A	B	A	A	A	A	A	A	C	VA	50L
KINSHASA BINZA	X	04S	15	B	A	A	A	A	B	B	B	B	B	B	B	A	B	Q	Q	Q	LB	10M
TALARA	X	04S	278	B	A	A	A	A	A	A	A	A	S								TA	90M
NATAL+	X	05S	324		B	B	B	A	A	C	B	C	C	Q	C	Q	Q	Q	Q	Q	NL	A0N
CHICLAYO	X	06S	280	B	A	S															CY	90P
CHIMBOTE	X	09S	281	B	A	C	S														CM	90R
PORT MORESBY	X	09S	147					B	A	A	A	A	A	A	A	B	B	A	B	S	PY	50R
ZARYA SHIP	X	10S				C	B	B	C	C	C	C	C								XF	
ELIZABETHVILLE	X	11S	27	B	A	A	B	S													EZ	11J
JICAMARCA+		11S	283												C	Q	Q	Q	Q	Q	JI	91J
COCOS IS	X	12S	96					C	A	B	A	A	A	A	A	A	A	A	A	C	CS	31K
HUANCAYO	XY	12S	284	B	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	HU	91K
JULIACA	X	15S	289			C	S														JU	J1N
LA PAZ	X	16S	291	C	A		B	C	C	B	B	B	C	B	C	Q	Q	S			LP	J10
ILO	X	17S	288			C	S														IL	J1P
SALISBURY/RHOD		17S	31		A	S															SY	11P
TAHITI	X	17S	210	C	A	B	A	A	A	A	B	A	B	A	A	A	Q	Q	Q	Q	TT	71P
TANANARIVE	X	18S	47	B	A	A	A	A	A	A	A	A	A	A	A	A	B	Q	Q	S	IV	21Q
TOWNSVILLE	X	19S	146	B	A	B	A	B	B	A	A	A	A	A	A	A	A	A	A	C	TV	51R
TSUMEB	X	19S	17	B	A	A					B	A	C	B	A	C	Q	Q	Q	Q	TS	11R
RAROTONGA	X	21S	200	C	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	Q	RA	72J
LA QUIACA	X	22S	294		C	S															LQ	J2K
SAO PAULO	X	23S	313	B	A	A	A	B	A	B	P	S									SP	J2L
JOHANNESBURG	X	26S	28	B	A	A	A	A	A	A	B			A	A	A	A	B	A	C	JO	120
TUCUMAN	X	26S	294	B	A	A	B	B	C	A	B	B	B	Q	A	A	A	Q	Q	Q	TU	J20
BRISBANE	X	27S	152	B	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	C	BR	52P
KERMADEC	X	29S	182								B	A	A	B	A	C	B	A	B	S	KC	62R
NORFOLK IS	X	29S	168								B	A	A	A	A	A	A	A	A	C	NI	63v
WOOMERA	X	30S	136					C	A	A	A	A	A	A	A	Q	S				WO	53J
MUNDARING	X	32S	116	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	MU	43K
GRAHAMSTOWN	X	33S	26		B	C	S					B									GR	13L
BUENOS AIRES	X	34S	301	C	A	B	A	A	A	A	A	A	A	A	A	B	Q	Q	Q	Q	BA	J3M
CAPE TOWN+	X	34S	18	B	A	A	A	A	B	A	B	B	Q	B	A	A	A	C	S		CT	13M
HERMANUS		34S	19															C	B	Q	HE	13M
SALISBURY	X	34S	138						C	A	A	A	A	C	A	A	B	A	B	C	SR	53M

CON'T.

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B.1

AT BOULDER

B.1 IONOSPHERE VERTICAL SOUNDINGS

BASED ON DAILY - HOURLY VALUES Cont'd.

STATION	MICRO-FILM	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	INDICATOR	COMPUTER CODE
CANBERRA	X	35S	149	B	A	A	B	B	A	A	A	A	A	A	A	A	A	A	C	C	CB	53N
CONCEPCION	X	36S	287	C	A	A	A	A	C	A	A	B	A	B	B	A	A	A	B	Q	CP	J30
AUCKLAND	X	37S	175											A	A	A	A	A	B	Q	AU	63P
HOBART	X	42S	147	B	A	C		B	A	A	A	A	A	A	A	A	A	A	A	C	HO	54K
GODLEY HEAD	X	43S	172	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	Q	GH	64L
TRELEW		43S	294		B	B	B	A	A		C	C	P	P	P	P	P	P	P	P	TW	J4L
MARION IS	X	46S	37	B	C	S															MR	140
KERGUELEN	X	49S	70	B	A	A	B	A	A	A	B	B	A	A	A	A	A	C	Q	Q	KG	24R
PORT STANLEY	X	51S	302	B	A	A	A	A	A	A	A	A	A	A	B	A	A	A	A	C	PS	J5J
CAMPBELL IS	X	52S	169	B	B	A	B	A	A	A	A	A	A	A	A	A	A	A	B	Q	CI	65K
MACQUARIE IS	X	54S	159	B	B	S															MQ	55M
SOUTH GEORGIA		54S	323														B	B	Q	Q	SG	A5M
USHUAIA		54S	291	C	B	C		C	A	C	C	Q	C	Q	Q	Q	P	P	P	P	UA	J5M
SOYA SHIP	X	60S			C	C	B	B	C												XD	
DECEPCION	X	63S	300	C	A				C	C				S							DE	J6L
ARGENTINE IS	X	65S	295	B	A	A	A	A	B	A	A	A	A	A	A	A	A	A	C	Q	AI	J6M
CASEY		66S	110													B	A	B	Q	Q	CW	460
MIRNY	Y	66S	92	B	A	A	A	A	A	A	A	A	A	B	B	Q	Q	Q	Q	Q	MI	360
TERRE ADELIE		66S	140	B	A	A	A	A	A	A	A	A	A	A	A	A	C	Q	Q	Q	DU	560
WILKES	X	66S	110	B	B	A	A	A	A	C	A	A	A	A	A	C	S				WL	460
MAWSON	X	67S	62		C	B	B	A	A	A	A	A	A	A	A	A	A	B	Q	Q	MW	26P
SYOWA BASE		69S	39			B	A	A	C				B	A	A	A	A	B	Q	Q	SW	16R
BAUDOUIN		70S	23		B	C	S				B	A	A	Q	Q	Q	Q	Q	Q	Q	BB	17v
SANAE	X	70S	357						B	A	A	A	B	A	A	A	B	B	B	Q	QM	07v
CAPE HALLETT	X	72S	170	B	A	A	A	A	A	A	C	S									HT	67K
EIGHTS+		75S	282					C	C			B	S								EI	97N
HALLEY BAY+	X	75S	333	B	A		B	A	A	A	B	A	A	B	B	A	B	C	Q	Q	HB	A70
BELGRANO+		77S	321						Q	C	C	C	P	P	C	P	P	P	P	P	GE	A7Q
ELLSWORTH	X	77S	318	B	A	B	A	A	B	S											EL	A7P
SCOTT BASE	X	77S	166	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	Q	SB	67Q
LITTLE AMERICA	X	78S	197	B	A	S															LA	77Q
VOSTOK	Y	78S	106		B	A	A	A			B	A	A	A	A	Q	Q	Q	Q	Q	VO	47P
BYRD STATION	X	80S	240	B	A	A	A	A	B	A	A	A	A	B	C	Q	Q	S			BD	88v
SOUTH POLE	X	90S	0	B	A	A	A	A	B	B	A	A	A	Q	Q	Q	S				PO	09v

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PUBLICATIONS:

1. *Ionospheric Data* Tables of Monthly Medians and other statistics for each hour of the day for the principal characteristics derived from ionograms. See page 7.

COMPUTER FORMAT:

1. See page 124.

B.1

SPECIAL WORLD INTERVALS
and
RETROSPECTIVE WORLD INTERVALS
for Ionospheric Programs
1957 - 1972

	1957		
June	30 - July 3	Oct.	22-23
Aug.	24, 29-30	Nov.	26-27
Sept.	2-4, 12-13		
	1958		
Mar.	5, 15, 23-25, 30-31	Oct.	23-25
June	6-8, 20-22	Nov.	26-27
July	8-9, 30-31	Dec.	13-14
Aug.	17-18, 24, 27-28		
	1959		
Jan.	24-25	June	11-12
Feb.	11-12, 25-26	July	15-16
Mar.	26-28	Sept.	4-5, 20-21
Apr.	10-11	Nov.	23-24, 28-29
May	12-13	Nov.	30 - Dec. 2
	1960		
Feb.	5-6	Aug.	16-18
Mar.	31 - Apr. 3	Sept.	4-6
Apr.	28-30	Oct.	6-8
May	1, 7-9	Nov.	12-17
June	4-6		
	1961		
Mar.	6-7, 27-28	Sept.	24-26, 29-30
May	6-7	Oct.	1-2, 28-29
July	12-18, 27-28	Nov.	3-4
Aug.	30-31	Dec.	1-3
	1962		
Jan.	10-11	Aug.	1-2, 22-23
Feb.	16-17	Sept.	12-13
Mar.	2-3	Oct.	8-9
Apr.	7-8, 22-23	Dec.	18-21
July	26-27		
	1963		
Jan.	13-15, 30 - Feb. 1	Sept.	13-30
May	1-3	Oct.	28-31
Aug.	18-19		
	1964		
Jan.	3-4	Sept.	6-9, 21-24
Mar.	4-5, 27 - April 3		
	1965		
Feb.	5-9	June	14-18
	1966		
Mar.	12-31	Aug.	28 - Sept. 6
July	7-11		
	1967		
Jan.	28-30	May	24-31
	1968		
June	9-13	Nov.	18-20
Oct.	24 - Nov. 6		
	1969		
Mar.	21-26	Nov.	2, 8-10
	1970		
Jan.	24	Sep.	1
Mar.	6-10	Nov.	6-8
	1971		
Jan.	24	Sep.	1
	1972		
Jul.	26 - Aug. 14		

AT BOULDER

B.1 IONOSPHERE VERTICAL SOUNDINGS

1970

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	HOURLY VALUES	F PLOTS	IONOGRAMS
HEISS IS	80N	57	B	B	Q
THULE	77N	192			B
RESOLUTE BAY	74N	266	B	B	A
DIXON	73N	80	C	C	Q
GODHAVN	69N	307	A	A	A
MURMANSK	69N	33	A	A	AW
TROMSO	69N	19	A		Q
KIRUNA	67N	20	A		Q
SODANKYLA	67N	26	A	B	Q
SALEKHARD	66N	66	A	A	BW
COLLEGE	64N	213	A		B
LYCKSELE	64N	18	A		Q
PROVIDENYA	64N	186	C	C	C
NARSSARSSUAQ	61N	315	A	A	A
LENINGRAD	60N	30	A	A	BW
NURMIJARVI	60N	24	A	AW	Q
UPPSALA	59N	17	A		Q
CHURCHILL	58N	266	A	A	B
EMMABODA	56N	15			B
GORKY	56N	44	A	A	AW
SVERDLOVSK	56N	61	A	A	BW
TOMSK	56N	84	A	A	AW
MOSCOW	55N	37	A	A	AW
JULIUSRUH/RU	54N	13	A	AW	
DE BILT	52N	5	A		Q
IRKUTSK	52N	104	A	A	BW
MIEDZESZYN	52N	21	A		Q
SLOUGH	51N	360	A		AW
DOURBES	50N	4	A		Q
PRUHONICE	50N	14	B		Q
WINNIPEG	49N	266	A	A	A
FREIBURG	48N	7	A		Q
KHABORVSK	48N	135	A	A	BW
PARIS-SACLAY	48N	2	B		Q
GARCHY	47N	3	A		Q
GRAZ	47N	15	A		Q
ROSTOV	47N	39	A	A	AW
ST JOHNS	47N	308	A	A	A
POITIERS	46N	0	A		Q
SCHWARZENBURG	46N	6	A		Q
OTTAWA	45N	285	A	A	A
PARAMARIBO	05N	304	B		
WAKKANAI	45N	141	A	A	AW
BEOGRAD	44N	20	A		Q
GENOVA	44N	9	A		Q
ALMA ATA	43N	76	A	A	AW
HANOVER	43N	188			Q
MILLSTONE HILL	43N	288			A
BILLERICA	42N	289	B		
MAYNARD	42N	288	C		Q
LINDAU	51N	10	B		Q
ROMA	41N	12	A		Q
BOULDER	40N	255	A		A
TORTOSA	40N	0	B		Q
AKITA	39N	140	A	A	AW
ATHENS	38N	23	C		
ASHKHABAD	37N	58	A	A	Q
SAN FRANCISCO	37N	238		A	A
SEOUL	37N	127	C	CW	C
WALLOPS	37N	285	A	B	A
POINT ARGUELLO	35N	240	A		A
TOKYO	35N	139	A	A	BW
CAPE ZEVGARI	34N	32	A		

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	HOURLY VALUES	F PLOTS	IONOGRAMS
WHITE SANDS	32N	254	A	A	A
YAMAGAWA	31N	130	A	A	AW
DELHI	28N	77	A		
GRAND BAHAMA	26N	282	A		Q
OKINAWA	26N	127	C	C	C
TAIPEI	25N	121	A	B	Q
AHMEDABAD	23N	72	A		Q
CALCUTTA	23N	88	A		
HONG KONG	22N	114	B	BW	B
TAMANRASSET	22N	5	C		Q
MAUI	20N	204	A	AW	A
BOMBAY	19N	72	A		Q
MEXICO CITY	19N	261	A	A	A
JAMAICA	18N	284		B	B
HYDERABAD	17N	78	B		
MANILA	14N	121	A	A	A
BANGKOK	13N	100	A		Q
OUAGADOUGOU	12N	359	A		Q
KODAIKANAL	10N	77	A		
TIRUCHIRAPALLI	10N	78	A		
FT ARCHAMBAULT	09N	18	A		
ARECIBO	18N	193	B		Q
THUMBA	08N	76	A		
IBADAN	07N	3	A		
POPAYAN	02N	283			B
SINGAPORE	01N	103	A	AW	AW
VANIMO	02S	141	A		Q
KINSHASA BINZA	04S	15	B		
NATAL	05S	325			A
PORT MORESBY	09S	147	B		Q
COCOS IS	12S	96	A		Q
HUANCAYO	12S	285	A	A	A
LA PAZ	16S	292			C
TANANARIVE	18S	47	B		Q
TOWNSVILLE	19S	146	A		Q
RAROTONGA	21S	201	A		Q
JOHANNESBURG	26S	28	A	BW	Q
TUCUMAN	26S	295	A		Q
BRISBANE	27S	152	A		Q
KERMADEC (RAOUL)	29S	183	B		
NORFOLK IS	29S	168	A		Q
MUNDARING	32S	116	A		Q
BUENOS AIRES	34S	302			A
CAPETOWN	34S	18	A	BW	
SALISBURY	34S	138	A		Q
CANBERRA	35S	149	A		Q
CONCEPCION	36S	287	A	A	Q
AUCKLAND	37S	175	A		Q
HOBART	42S	147	A		Q
GODLEY HEAD	43S	172	A		Q
KERGUELEN	49S	70	A		
PORT STANLEY	51S	303	A	BW	AW
CAMPBELL IS	52S	169	A		Q
SOUTH GEORGIA	54S	324	B	B	Q
ARGENTINE IS	65S	296	A		Q
CASEY	66S	110	A		Q
MAWSON	67S	62	A		Q
TERRE ADELIE	67S	140	C		Q
SYOWA BASE	69S	39	A		AW
SANAE	70S	358	B		Q
HALLEY BAY	75S	333	B	B	Q
SCOTT BASE	77S	166	A		Q
BYRD STATION	80S	240			B

International Geophysical Calendar for 1971

JANUARY

S	M	T	W	T	F	S
					1	2
[3	4	5	6	7	8	9
10	11	(12)	(13)	(14)	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

FEBRUARY

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	(9)	◇10◇	(11)	12	13
14	15	16	17	18	19	20
21	22	23	24	[25]	26	27
28						

MARCH

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	(16)	(17)	(18)	19	20
21*	22*	23*	24*	25*	26*	27*
28	29	30	31			

APRIL

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	(13)	(14)	(15)	16	17
18	19	20	21	[22	23	24
25	26	27	28	29	30	

MAY

S	M	T	W	T	F	S
						1
2	3	4	[5]	[6]	7	8
9	10	(11)	◇12◇	(13)	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

JUNE

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	[8]	[9]	[10]	[11]	[12]
13	14	(15)	(16)	(17)	18	19
20*	21*	[22*]	[23*]	[24*]	25*	26*
27	28	29	30			

JULY

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	(20)	(21)	[22]	23	24
25	26	27]	[28]	[29]	[30]	31]

AUGUST

S	M	T	W	T	F	S
1]	2]	3	4	5	6	7
8	9	[10	[11	[12	[13	[14
15	16	(17)	◇18◇	(19)	20	21
22	23	24	25	26	27	28
29	30	31				

SEPTEMBER

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	(14)	(15)	(16)	17	18
19*	20*	21*	22*	23*	24*	25*
26	27	28	29	30		

OCTOBER

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	(19)	(20)	[(21)]	[22]	23
24	25	26	27	28	29	30
31						

NOVEMBER

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	(16)	[(17)]	(18)	19	20
21	22	23	24	25	26	27
28	29	30				

DECEMBER

S	M	T	W	T	F	S
			1	2	3	4
5]	6]	7]	8	9	10	11
[12]	[13]	[(14)]	(15)	(16)	17	18
19*	20*	21*	[22*	[23*	24*	25*
26	27	28	29	30	31	

1972 JANUARY

S	M	T	W	T	F	S
						1
2	[3	[4	5	6	7	8
9	10	11	12	13	14	15
16	17	(18)	◇19◇	(20)	21	22
23	24	25	26	27	28	29
30	31					

(12) Regular World Day (RWD)

(13) Priority Regular World Day (PRWD)

◇10◇ Quarterly World Day (QWD) also a PRWD and RGD

6 Regular Geophysical Day (RGD)

[25] Day of Solar Eclipse

* Micropulsation Interval Day

[9 10] World Geophysical Interval (WGI)

[3 Day with unusual meteor shower activity, Northern Hemisphere

15] Day with unusual meteor shower activity, Southern Hemisphere

[24 25] Airglow and Aurora Period

Note: International Hydrological Decade Field Year, April 1, 1971 - Sept. 30, 1972.

OPERATIONAL EDITION, AUGUST 1970

AT BOULDER

1971

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	HOURLY VALUES	F PLOTS	IONOGRAMS
THULE	77N	290	A	A	A
RESOLUTE BAY	74N	266	A	A	A
GODHAVN	69N	307	A	A	A
MURMANSK	69N	33	B	B	BW
TROMSO	69N	19	A		Q
KIRUNA	67N	20	A		Q
SODANKYLA	67N	26	A	A	Q
CASEY	66N	110	B		Q
SALEKHARD	66N	66	A	A	AW
COLLEGE	64N	213	A		A
LYCKSELE	64N	18	A		Q
NARSSARSSUAQ	61N	315	A	A	A
LENINGRAD	60N	30	A	A	AW
NURMIJARVI	60N	24	A	AW	Q
UPPSALA	59N	17	A		Q
CHURCHILL	58N	266	A	A	A
EMMABODA	56N	15			C
GORKY	56N	44	B	B	AW
SVERDLOVSK	56N	61	A	A	BW
TOMSK	56N	84	A	A	AW
MOSCOW	55N	37	A	A	BW
JULIUSRUH/RU	54N	13	A		Q
DE BILT	52N	5	A		Q
IRKUTSK	52N	104	A	A	AW
MIEDZESZYN	52N	21	A		Q
SLOUGH	51N	360	A	AW	AW
DOURBES	50N	4	A		Q
PRUHONICE	50N	14	B		Q
LANNION	49N	357	A		Q
WINNIPEG	49N	265	A	A	B
FREIBURG	48N	7	A		Q
KHABOROVSK	48N	135	B	B	BW
BUDAPEST	47N	19	C	CW	Q
GARCHY	47N	3	A		Q
GRAZ	47N	15	A		Q
ROSTOV	47N	39	A	A	B
ST JOHNS	47N	308	A	A	A
POITIERS	46N	0	A		Q
SCHWARZENBURG	46N	6			Q
OTTAWA	45N	285	A	A	A
WAKKANI	45N	141	A	A	AW
BEOGRAD	44N	20	B		Q
GENOVA	44N	9	A		Q
ALMA-ATA	43N	76	B	B	AW
HANOVER	43N	188			P
MAYNARD	42N	288	A		Q
MILLSTONE HILL	42N	288			A
ROMA	41N	12	A		Q
TBILISI	41N	44	C	C	CW
BOULDER	40N	255	A		A
TORTOSA	40N	0	B		Q
AKITA	39N	140	A	A	AW
ASHKHABAD	37N	58			AW
SAN FRANCISCO	37N	238		A	A
WALLOPS	37N	285	A	B	A
POINT ARGUELLO	35N	240	A		A
TOKYO	35N	139	A	A	AW
CAPE ZEVGARI	34N	33	B		Q
HERMANUS	34N	19	C		Q
WHITE SANDS	32N	254	A	A	A
YAMAGAWA	31N	130	A	A	AW
DELHI	28N	77	A		Q
GRAND BAHAMA	26N	282	B		Q
OKINAWA	26N	127	A	A	A
TAIPEI	25N	121	A	C	Q
AHMEDABAD	23N	72	A		Q
CALCUTTA	23N	88	C		Q
MAUI	20N	204	A	AW	A
BOMBAY	19N	72	A		Q
MEXICO CITY	19N	261	A	A	A
ARECIBO	18N	293			Q
JAMAICA	18N	284		B	C
HYDERABAD	17N	78	B		Q
DAKAR	14N	342	A		Q
MANILA	14N	121	A	A	B
BANGKOK	13N	100	A		Q
OUAGADOUGOU	12N	359	A		Q
DJIBOUTI	11N	42	C		Q
KODAIKANAL	10N	77	A		Q
TIRUCHIRAPALLI	10N	78	B		Q
FORT ARCHAMBAULT	09N	18	A		Q
THUMBA	08N	76	A		Q
IBADAN	07N	3	B		Q
POPAYAN	02N	283			C
VANIMO	02S	141	A		Q
NATAL	05S	325			A
PORT MORESBY	09S	147	A		Q
COCOS IS	12S	96	A		Q
HUANCAYO	12S	285	A	A	A
TOWNSVILLE	19S	146	A		Q
RARATONGA	21S	201	B		Q
JOHANNESBURG	26S	28	B		Q
TUCUMAN	26S	295	P		P
BRISBANE	27S	152	A		Q
KERMADEC	29S	183	A		Q
NORFOLK IS	29S	168	A		Q
MUNDARING	32S	116	A		Q
BUENOS AIRES	34S	302			A
CAPETOWN	34S	18	C		Q
SALISBURY	34S	138	A		Q
CANBERRA	35S	149	A		Q
CONCEPCION	36S	287	A	A	Q
AUCKLAND	37S	175	A		Q
HOBART	42S	147	A		Q
GODLEY HEAD	43S	172	A		Q
KERGUELEN	49S	70	C		Q
PORT STANLEY	51S	303	A	BW	BW
CAMPBELL IS	52S	169	A		Q
SOUTH GEORGIA	54S	324	B		Q
ARGENTINE IS	65S	296	A	B	
MAWSON	67S	62	B		Q
SYOWA BASE	69S	39	B		CW
SANAE	70S	358	B		Q
HALLEY BAY	75S	333	C		Q
SCOTT BASE	77S	166	A		Q

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months
W = World Days Only
+ = Ionograms and f-plots only, for some years

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

International Geophysical Calendar for 1972

JANUARY

S	M	T	W	T	F	S
						1
2	[3	[4	5	6	7	8
9	10	11	12	13	14	15
16	17	(18)	◇19◇	(20)	21	22
23	24	25	26	27	28	29
30	31					

FEBRUARY

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	(15)	(16)	(17)	18	19
20	21	22	23	24	25	26
27	28	29				

MARCH

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12*	13*	(14)*	(15)*	(16)*	17*	18*
19	20	21	22	23	24	25
26	27	28	29	30	31	

APRIL

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	(18)	◇19◇	(20)	[21	[22
23	24	25	26	27	28	29
30						

MAY

S	M	T	W	T	F	S
	1	2	3	[4]	[5]	[6]
7	8	9	10	11	12	13
14	15	(16)	(17)	(18)	19	20
21	22	23	24	25	26	27
28	29	30	31			

JUNE

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	[8]*	[9]*	[10]*
[11]*	[12]*	(13)*	(14)*	(15)	16	17
18	19	20	21	22	[23]	[24]
25	26	27	28	29	30	

JULY

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	(11)	◇12◇	(13)	14	15
16	17	18	19	20	21	22
23	24	25	26]	[27]	[28]	[29]
[30]	31]					

AUGUST

S	M	T	W	T	F	S
		1]	2	3	4	5
6	7	8	9	[10	[11	[12
[13	14	(15)	(16)	(17)	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

SEPTEMBER

S	M	T	W	T	F	S
					1	2
3	4*	5*	6*	7*	8*	9*
10*	11	12	13	14	15	16
17	18	(19)	(20)	(21)	22	23
24	25	26	27	28	29	30

OCTOBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	(17)	◇18◇	(19)	[20]	[21]
22	23	24	25	26	27	28
29	30	31				

NOVEMBER

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	(14)	(15)	[(16)]	[17]	18
19	20	21	22	23	24	25
26	27	28	29	30		

DECEMBER

S	M	T	W	T	F	S
					1	2*
3*	4*	5*	6*	7*	8*	9
10	11	[12]	[13]	[14]	15	16
17	18	(19)	(20)	(21)	[22	23
24	25	26	27	28	29	30
31						

1973 JANUARY

S	M	T	W	T	F	S
	1	2	[3]	[4]	5	6
7	8	9	10	11	12	13
14	15	(16)	(17)	(18)	19	20
21	22	23	24	25	26	27
28	29	30	31			

(18) Regular World Day (RWD)

(16) Priority Regular World Day (PRWD)

◇19◇ Quarterly World Day (QWD) also a PRWD and RGD

5 Regular Geophysical Day (RGD)

[10] Day of Solar Eclipse

* Micropulsation Interval Day

[10 11] World Geophysical Interval (WGI)

[3 Day with unusual meteor shower activity, Northern Hemisphere

4] Day with unusual meteor shower activity, Southern Hemisphere

[12 13] Airglow and Aurora Period

Notes: D-region Winter Anomaly Program planned Jan. 15 — Feb. 15, 1972.
Atmospheric Electricity Intensification Interval of Ten Year Program is Jan. 26 — Feb. 25, 1972.
Campaign for Integrated Observation of Solar Flares (CINOF) planned 5-10, 12-17 and 19-24 June 1972.
International Hydrological Decade Field Year continues through Sept. 30, 1972.

OPERATIONAL EDITION, SEPTEMBER 1971

AT BOULDER

1972

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	HOURLY VALUES	F PLOTS	IONOGRAMS
THULE	77N	290	A	A	B
RESOLUTE BAY	74N	266	A	A	A
GODHAVN	69N	307	A	A	B
MURMANSK	69N	33			CW
NORILSK	69N	88	C	C	
TROMSO	69N	19	B		Q
KIRUNA	67N	20	A		Q
SODANKYLA	67N	26	A	A	Q
CASEY	66N	110	Q		P
SALEKHARD	66N	66	B	B	BW
COLLEGE	64N	213	B		B
LYCKSELE	64N	18	A		Q
TUNGUSKA	62N	90	C	C	Q
NARSSARSSUAQ	61N	315	A	A	B
LENINGRAD	60N	30	B	B	BW
NURMIJARVI	60N	24	A	AW	Q
UPPSALA	59N	17	A		Q
CHURCHILL	58N	266	A	A	A
GORKY	56N	44	B	B	BW
SVERDLOVSK	56N	61	C	C	Q
TOMSK	56N	84	B	B	BW
KALININGRAD	55N	21	C	C	Q
MOSCOW	55N	37	B	B	BW
NOVOSIBIRSK	55N	83	C	C	
JULIUSRUH/RU	54N	13	A		Q
GOOSE BAY	53N	299	B		
DE BILT	52N	5	B		Q
IRKUTSK	52N	104	C		C
MIEDZESZYN	52N	21	A		Q
SLOUGH	51N	360	A	BW	AW
DOURBES	50N	4	A		Q
KARAGANDA	50N	73	C	C	Q
PRUHONICE	50N	14	B		Q
LANNION	49N	357	B		Q
WINNIPEG	49N	266	A	A	A
FREIBURG	48N	7	A		Q
KHABAROVSK	48N	135	B	B	CW
KHABORVSK	48N	135			CW
BUDAPEST	47N	19	A	AW	A
GARCHY	47N	3	C		Q
GRAZ	47N	15	A		Q
ROSTOV	47N	39	B	B	
ST JOHNS	47N	306	A	A	A
NOVOKAZALINSK	46N	62	C	C	
POITIERS	46N	0	A		Q
OTTAWA	45N	285	A	A	A
WAKKANAI	45N	141	B	B	Q
BEOGRAD	44N	20	A		Q
GENOVA	44N	9	A		Q
ALMA-ATA	43N	76	A	A	AW
MAYNARD	42N	288	A		Q
MILLSTONE HILL	42N	288			A
ROMA	41N	12	A		Q
TBILISI	41N	44	B	B	Q
BOULDER	40N	255	A		A
TORTOSA	40N	0	C		Q
AKITA	39N	140	B	B	Q
ASHKHABAD	37N	58	C	C	Q
SAN FRANCISCO	37N	238		A	A
WALLOPS	37N	285	A	C	A
POINT ARGUELLO	35N	240	A		A
TOKYO	35N	139	B	B	Q
CAPE ZEVGARI	34N	33	B		Q
HERMANUS	34N	19	B		Q
WHITE SANDS	32N	254	B	B	B
YAMAGAWA	31N	130	B	B	Q
DELHI	28N	77	B		Q
OKINAWA	26N	127	C	C	C
TAIPEI	25N	121	B		Q
AHMEDABAD	23N	72	B		Q
MAUI	20N	204	A	AW	A
BOMBAY	19N	72	B		Q
MEXICO CITY	19N	261	A	A	A
ARECIBO	18N	293			P
JAMAICA	18N	284			B
MANILA	14N	121	A	A	A
BANGKOK	13N	100	B		Q
OUAGADOU GOU	12N	359	C		Q
KODAIKANAL	10N	77	B		Q
TIRUCHIRAPALLI	10N	78	B		Q
FT ARCHAMBAULT	09N	18	C		Q
THUMBA	08N	76	B		Q
IBADAN	07N	3	C	C	Q
POPAYAN	02N	283	C		B
VANIMO	02S	141	A		Q
NATAL	05S	325			B
PORT MORESBY	09S	147	B		Q
COCOS IS	12S	96	A		Q
HUANCAYO	12S	285	A	A	A
TOWNSVILLE	19S	146	A		Q
RAROTONGA	21S	201	B		Q
JOHANNESBURG	26S	28	A		Q
BRISBANE	27S	152	A		Q
KERMADEC	29S	183	B		Q
NORFOLK IS	29S	168	A		Q
MUNDARING	32S	116	A		Q
BUENOS AIRES	34S	58			A
SALISBURY	34S	138	B		Q
CANBERRA	35S	149	A		Q
CONCEPCION	36S	287	B	B	Q
AUCKLAND	37S	175	B		Q
HOBART	42S	147	A		Q
GODLEY HEAD	43S	172	B		Q
PORT STANLEY	51S	303	A	AW	AW
CAMPBELL IS	52S	169	B		Q
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MURMANSK	69N	33	C	C	Q
KIRUNA	67N	20	C		Q
SODANKYLA	67N	26		C	Q
EIELSON AFB	65N	213	C		
COLLEGE	64N	213	C		C
LYCKSELE	64N	18	C		Q
NARSSARSSUAQ	61N	315	C	C	Q
UPPSALA	59N	17	C		Q
CHURCHILL	58N	266	C	C	C
MIEDZESZYN	52N	21	C		P
SLOUGH	51N	360	C		CW
WINNIPEG	49N	266	C	C	Q
FREIBURG	48N	7	C		Q
BUDAPEST	47N	19	C	CW	Q
GRAZ	47N	15	C		P
ST JOHNS	47N	308	C	C	C
OTTAWA	45N	285	C	C	C
ALMA-ATA	43N	76			CW
MILLSTONE	42N	288			C
ROMA	41N	12	C		Q
BOULDER	40N	255	C		C
TORTOSA	40N	0	C		Q
AKITA	39N	140			P
SAN FRANCISCO	37N	238		C	B
WALLOPS	37N	285	C	C	C
POINT ARGUELLO	35N	240	C		C
WHITE SANDS	32N	254	C	C	C
AHMEDABAD	23N	72	C		Q
MAUI	20N	204	C	C	B
MEXICO CITY	19N	261	C	C	C
JAMAICA	18N	284		C	
MANILA	14N	121	C	C	B
POPAYAN	02N	283	C		C
NATAL	05S	325			C
PORT MORESBY	09S	147	C		Q
COCOS IS	12S	96	C		Q
HUANCAYO	12S	285	C	C	C
TOWNSVILLE	19S	146	C		Q
BRISBANE	27S	152	C		Q
NORFOLK IS	29S	168	C		Q
MUNDARING	32S	116	C		Q
BUENOS AIRES	34S	302			P
SALISBURY	34S	138	C		Q
CANBERRA	35S	149	C		Q
HOBART	42S	147	C		Q
PORT STANLEY	51S	303	C	CW	CW

KEY TO SYMBOLS

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P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

International Geophysical Calendar for 1973

(See other side for information on the use of this Calendar)

JANUARY

S	M	T	W	T	F	S
	1	2	[3	4]	5	6
7	8	9	10	11	12	13
14	15	(16)	(17)	(18)	19	20
21	22	23	24	25	26	27
28	29	30	31			

FEBRUARY

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	(13)	(14)	(15)	16	17
18	19	20	21	22	23	24
25	26	27	28			

MARCH

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	(20)	◇21	(22)	23	24
25	26	27	28	29	30	31*

APRIL

S	M	T	W	T	F	S
1*	2*	3*	4*	5*	6*	7
8	9	10	11	12	13	14
15	16	(17)	(18)	(19)	20	[21
[22	23	24	25	26	27	28
29	30					

MAY

S	M	T	W	T	F	S
		1	2	3	[4]	[5]
[6]	7	8	9	10	11	12
13	14	(15)	(16)	(17)	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

JUNE

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	[8]	[9]
[10]	[11]	[12]	13	14	15	16
17	18	(19)	(20)	(21)	22	[23]
[24]	25	26	27*	28*	29*	30*

JULY

S	M	T	W	T	F	S
1*	2*	3*	4	5	6	7
8	9	10	11	12	13	14
15	16	(17)	(18)	(19)	20	21
22	23	24	25	26]	[27]	[28]
[29]	[30]	31]				

AUGUST

S	M	T	W	T	F	S
			1]	2	3	4
5	6	7	8	9	[10]	[11
[12	[13	(14)	(15)	(16)	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

SEPTEMBER

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	(18)	(19)	(20)	21	22
23*	24*	25*	26*	27*	28*	29*
30						

OCTOBER

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	(16)	(17)	(18)	19	[20]
[21]	[22]	23	24	25	26	27
28	29	30	31			

NOVEMBER

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	(13)	(14)	(15)	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

DECEMBER

S	M	T	W	T	F	S
						1
2	3	4]	5]	6]	7	8
9	10	11	12]	[13]	[14]	[15
16	17	(18)	(19)	(20)	21*	22*
23*	24*	25*	26*	27*	28	29
30	31					

1974

S	M	T	W	T	F	S
		1	2	[3	4	5
6	7	8	9	10	11	12
13	14	(15)	(16)	(17)	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

(16) Regular World Day (RWD)

(17) Priority Regular World Day (PRWD)

◇21 Quarterly World Day (QWD) also a PRWD and RGD

6 Regular Geophysical Day (RGD)

4 Day of Solar Eclipse

* Micropulsation Interval Day

12 13 World Geophysical Interval (WGI)

[3 Day with unusual meteor shower activity, Northern Hemisphere

31] Day with unusual meteor shower activity, Southern Hemisphere

2 3 Airglow and Aurora Period

Notes: GATE: GARP Atlantic Tropical Experiment Field Tests June-August 1973.
Atmospheric Electricity Intensification Intervals of Ten Year Program are Jan. 15-Feb. 15, 1973 and Oct. 15-Dec. 17, 1973 (first priority Nov. 7-10 and second priority Nov. 5-Dec. 3).

OPERATIONAL EDITION, September 1972

SEE OTHER SIDE

B.1 IONOSPHERE VERTICAL SOUNDINGS

AT BOULDER

1973

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	HOURLY VALUES	F PLOTS	IONOGRAMS
THULE	77N	290	C	C	Q
RESOLUTE BAY	74N	266	C	C	C
GODHAVN	69N	307	C	C	Q
MURMANSK	69N	33	C	C	Q
KIRUNA	67N	20	C		Q
SODANKYLA	67N	26		C	Q
COLLEGE	64N	213	C		C
LYCKSELE	64N	18	C		Q
NARSSARSSUAQ	61N	315	C	C	Q
UPPSALA	59N	17	C		Q
CHURCHILL	58N	266	C	C	C
MIEDZESZYN	52N	21	C		P
SLOUGH	51N	360	C		CW
WINNIPEG	49N	266	C	C	Q
FREIBURG	48N	7	C		Q
BUDAPEST	47N	19	C	CW	Q
GRAZ	47N	15	C		P
ST JOHNS	47N	308	C	C	C
OTTAWA	45N	285	C	C	C
ALMA-ATA	43N	76			CW
MILLSTONE	42N	288			C
ROMA	41N	12	C		Q
BOULDER	40N	255	C		C
TORTOSA	40N	0	C		Q

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	HOURLY VALUES	F PLOTS	IONOGRAMS
AKITA	39N	140			P
SAN FRANCISCO	37N	238		C	B
WALLOPS	37N	285	C	C	C
POINT ARGUELLO	35N	240	C		C
WHITE SANDS	32N	254	C	C	C
AHMEDABAD	23N	72	C		Q
MAUI	20N	204	C	C	B
MEXICO CITY	19N	261	C	C	C
JAMAICA	18N	284		C	
MANILA	14N	121	C	C	B
POPAYAN	02N	283	C		C
NATAL	05S	325			C
PORT MORESBY	09S	147	C		Q
COCOS IS	12S	96	C		Q
HUANCAYO	12S	285	C	C	C
TOWNSVILLE	19S	146	C		Q
BRISBANE	27S	152	C		Q
NORFOLK IS	29S	168	C		Q
MUNDARING	32S	116	C		Q
BUENOS AIRES	34S	302			P
SALISBURY	34S	138	C		Q
CANBERRA	35S	149	C		Q
HOBART	42S	147	C		Q
PORT STANLEY	51S	303	C	CW	CW

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months
W = World Days Only
\+ = Ionograms and f-plots only, for some years

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

M O V I E S:

1. A Large-Scale Ionospheric Disturbance of Short Duration, by Vaughn Agy, NOAA Research Lab., 16 mm color movie film with sound, $10.00 minimum charge for loan.
2. Polar Blackouts During the IGY, by Vaughn Agy, NOAA Research Lab., 16 mm color movie with sound, $10.00 minimum charge for loan.

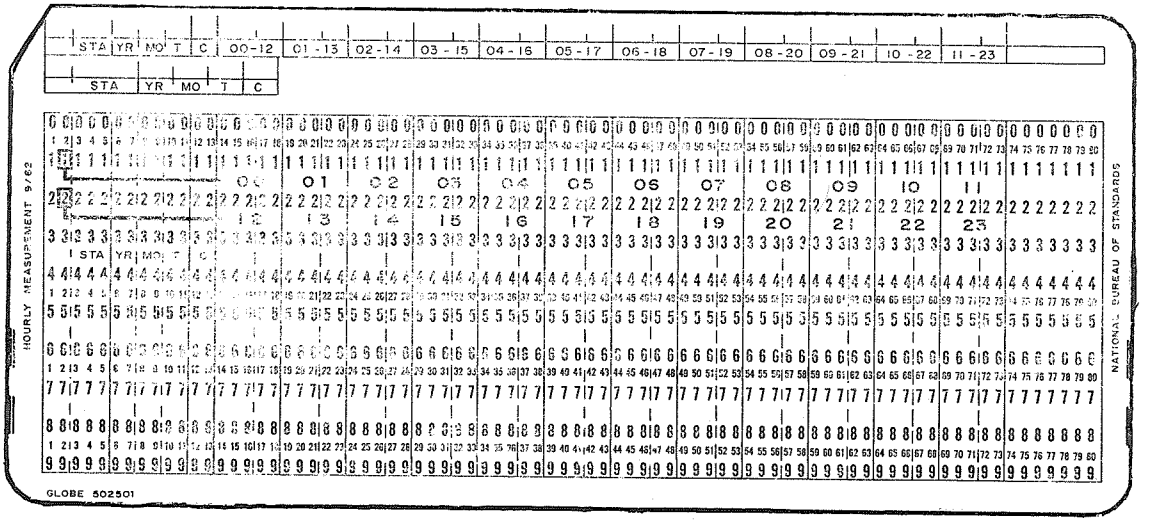
B.1

Ionospheric Phenomena in Computerized Format

A considerable amount of vertical soundings daily-hourly values are now in machine readable format. The punched card format is given below for convenience of the user.

In the catalog samples of data formats are illustrated. The internationally recommended punched card format is given. For convenience it is copied below.

CARD COLUMN	DESCRIPTION	REMARKS
1 - 2	Type Card	Column 1 one punch - Ionospheric Data 2 one punch - Hours 00 thru 11
		2 two punch - Hours 12 thru 23
3 - 5	Station Code	See section B.1
6 - 11	Date code	Year - Month - Day
12 - 13	Characteristic code	See table below
14 - 73	Hourly Measurements	Divided into five columns per hour
		First three columns - hourly reading
		fourth column - qualifying symbol
		fifth column - descriptive symbol
74 - 80	Blank	



In many cases the punched card images have been written on magnetic tapes having the following characteristics:

556 BPI (Bits-Per-Inch); (BCD Binary-Coded-Decimal) mode; Even Parity, 7 track.

In other cases the data remain on punched cards. WDC-A should be contacted directly as to the availability of these punched card data in magnetic tape format. The cost of obtaining these data from magnetic tape will vary considerably depending upon whether information is requested by all stations for a given time period or by specific station. Requests for copies of punched cards will vary depending on whether the cards are to be interpreted to column 80 or column 60, etc.

AT BOULDER

B.1 IONOSPHERE VERTICAL SOUNDINGS H-V ON MAGNETIC COMPUTER TAPE

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	INDICATOR	COMPUTER CODE
FLETCHERS ICE	82N		C	A																XC	982
THULE	77N	290	B	B	A	B	A	B		A	B									TH	J76
RESOLUTE BAY	74N	265									C	A	A	A	B	B	B			RB	974
BARROW	71N	203	B	A	A	A	B	A		A	B									BW	771
GODHAVN	69N	306	B	A	B	B	A	A		A	A									GO	J69
COLLEGE	64N	212	A	B	A	A	A	B		B	A									CO	764
REYKJAVIK	64N	338	B	B	B	B	B	B		A										RK	A64
ANCHORAGE	61N	210	A	A	B	A	A	A		A	A									AN	761
NARSSARSSUAQ	61N	314	B	A	A	A	A	A	B	A	A									NQ	J61
CHURCHILL	58N	265									C		A	A	A	A	B			CH	958
ADAK	51N	183	A	A	B	A	B	B	A	A	A									AD	651
KENORA	49N	265									C	A	A	A	A	A	B			WI	949
ST JOHNS	47N	307	B	B	C						C	A	A	A	A	A	B			SJ	J47
OTTAWA	45N	284									C	A	A	A	A	A	B			OT	945
BOULDER	40N	254		C	B	A	B		B	A	A									BC	840
FT MONMOUTH	40N	285	B	A	A	A	B	A	A	A	A									FM	J40
WASHINGTON	38N	282	A	A	B	A	A	A	A	A	A									WA	938
SAN FRANCISCO	37N	237	A	B	C															ST	837
WHITE SANDS	32N	253	B	A	A	A	B	A	B	A	A									WS	832
CAPE KENNEDY	28N	279		B																CC	929
GRAND BAHAMA	26N	281	B	A	A	B		B	A	A	A									GB	926
OKINAWA	26N	127	B	A	A	A	B	B	B	A	A									OK	426
SAN SALVADOR	24N	285			C															SS	J24
MAUI	20N	203	B	A	B		B	A	A	A	A									MA	720
PUERTO RICO	18N	282	B	A	C															PR	J18
PANAMA	09N	280	B	A																PN	909
BOGOTA	04N	285	C	B	A	C		C	A	A	A									BG	J05
TALARA	04S	278	B	A	A	B	B	B	B	A	A									TA	90M
NATAL	05S	324		B	C															NL	A0N
CHICLAYO	06S	280	B	A																CY	90P
CHIMBOTE	09S	281	B	B	C															CM	90R
HUANCAYO	12S	284	B	A	B	A	A	B	A	A										HU	91K
JULIACA	15S	289			C															JU	J1N
LA PAZ	16S	291	C	A		A	C	C	B	B	B									LP	J10
ILO	17S	288			C															IL	J1P
CONCEPCION	36S	287	C	A	B	A	B		B	A	C									CP	J30
WILKES	66S	110	C	B	C															WL	460
ELLSWORTH	77S	318	B	A																EL	A7P
LITTLE AMERICA	78S	197	B	A																LA	77Q
BYRD STATION	80S	240	B	A	B	B	B	B	B	B										BD	88v
SOUTH POLE	90S	0	B	A	B	A	B	B	B	B										PO	09v

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months

Note: In addition to the above data on magnetic tape, the data center holds tapes provided by Australia, France, German Federal Republic and Sweden. These are for various stations, years, and characteristics. Details can be provided upon request. Japan plans to provide tapes in the near future for their stations.

The Ionospheric Network Advisory Group, Working Group Commission III.1, URSI, has recommended that the characteristic codes for punched cards be as below:

Codes of Characteristics, Card Columns 12 and 13

CHARACTERISTIC CODES USED FOR IONOSPHERIC MEASUREMENTS										Jan. 1970
		FREQUENCIES			PARAMETERS			HEIGHTS		
CARD COL 13 CARD COL 12 LAYER	0	1	2	3	4	5	6	7	8	9
F2	0	00 foF2*	01 fxF2	02 fzF2	03 M(3000)F2*	04 h'F2*	05 hpF2	06 h'Ox	07 MUF(3000)F2	08 hc	09 qc
F1	1	10 foF1*	11 fxF1		13 M(3000)F1*	14 h'F1		16 h'F*	17 MUF(3000)F1		
E	2	20 foE*		22 foE2		24 h'E*		26 h'E2			
Es	3	30 foEs*	31 fxEs	32 fbEs*	33 fEs	34 h'Es*		36 Type Es*			
Other	4	40 foF1.5		42 fmin*	43 M(3000)F1.5	44 h'F1.5			47 fm2	48 fm3	
Spread F and Oblique	5	50 foI	51 fxI*	52 fmI	53 M(3000)I	54 h'I			57 dfS		

Characteristics normally interchanged are marked with an asterisk (*).

B.1 IONOSPHERE VERTICAL SOUNDING STATIONS
ALPHABETICAL LISTING

STATION NAME	LAT	EAST LONG	STATION INDICATOR	COMPUTER CODE
ACCRA+	05N	359	AG	005
ADAK	51N	183	AD	651
AHMEDABAD	23N	72	AH	223
AKITA	39N	140	AK	539
ALERT	82N	297	AL	J82
ALMA ATA	43N	76	AA	343
ANCHORAGE	61N	210	AN	761
ARCTICA (NP 6)	87N		XG	
ARCTICA (NP 7)	79N		XH	
ARCTICA (NP 8)	80N		XI	
ARCTICA(NP 10)	78N		XJ	
ARCTICA(NP 11)	79N		XK	
ARCTICA(NP 13)	81N		XL	
ARCTICA(NP 16)	78N	175	XM	676
ARECIBO+	18N	293	AR	J19
ARGENTINE IS	65S	295	AI	J6M
ASHKHABAD	37N	58	AS	237
ATHENS	38N	23	AT	138
AUCKLAND	37S	175	AU	63P
BAGUIO	16N	120	BF	416
BAIE ST PAUL+	47N	289	PL	J48
BAKER LAKE	64N	264	BL	964
BANGKOK	13N	100	BK	314
BANGUI	04N	18	BI	104
BARBADOS+	13N	300	BS	J13
BARROW	71N	203	BW	771
BAUDOUIN	70S	23	BB	17v
BELGRANO+	77S	321	GE	A7Q
BEOGRAD	44N	20	BE	145
BILLERICA/BOSTN	42N	288	BO	J43
BOGOTA	04N	285	BG	J05
BOMBAY	19N	72	BM	219
BOULDER	40N	254	BC	840
BRISBANE	27S	152	BR	52P
BUDAPEST	46N	21	BU	147
BUENOS AIRES	34S	301	BA	J3M
BUNIA	01N	30	BN	102
BYRD STATION	80S	240	BD	88v
CALCUTTA	23N	88	CU	322
CAMPBELL IS	52S	169	CI	65K
CANBERRA	35S	149	CB	53N
CAPE HALLETT	72S	170	HT	67K
CAPE KENNEDY+	28N	279	CC	929
CAPE SCHMIDT	68N	181	CE	669
CAPE TOWN+	34S	18	CT	13M
CAPE ZEVGARI	34N	33	CV	135
CASABLANCA	33N	352	CA	033
CASEY	66S	110	CW	460
CHICLAYO	06S	280	CY	90P
CHIMBOTE	09S	281	CM	90R
CHITA	52N	113	CX	452
CHURCHILL	58N	265	CH	958
CLYDE	70N	291	CR	J70
COCOS IS	12S	96	CS	31K
COLLEGE	64N	212	CO	764
CONCEPCION	36S	287	CP	J30
CUBA	23N	277	CD	923
DAKAR	14N	342	DK	A14
DE BILT	52N	5	DT	053
DECEPCION	63S	300	DE	J6L
DELHI	28N	77	DH	328
DIXON	73N	80	DI	373
DJIBOUTI	11N	42	DJ	111
DOURBES	50N	4	DB	049
EGLIN AFB+	30N	273	EG	930
EIELSON AFB	65N	213	EN	765
EIGHTS+	75S	282	EI	97N
ELIZABETHVILLE	11S	27	EZ	11J
ELLSWORTH	77S	318	EL	A7P
EMMABODA	56N	15	EM	157
EUREKA	80N	274	EU	980
FLETCHERS ICE	82N		XC	982
FORT CHIMO	58N	291	FC	J58
FORT MONMOUTH	40N	285	FM	J40
FORT NORMAN	64N	234	FN	864
FREIBURG	48N	7	FR	048
FROBISHER BAY	63N	291	FB	J63
FT ARCHAMBAULT	09N	18	FA	109
GARCHY	47N	3	GY	042
GENOVA	44N	9	GV	044
GODHAVN	69N	306	GO	J69
GODLEY HEAD	43S	172	GH	64L
GOOSE BAY	53N	299	GS	J53
GORKY	56N	44	GK	156
GRAHAMSTOWN	33S	26	GR	13L
GRAND BAHAMA	26N	281	GB	926
GRAZ	47N	15	GZ	146
HAIFA+	32N	34	HA	132
HALLEY BAY+	75S	333	HB	A7O
HANOVER+	43N	287	HN	J44
HEISS IS	80N	57	BT	280
HERMANUS	34S	19	HE	13M
HOBART	42S	147	HO	54K
HOLLANDIA	02S	140	HL	50K
HONG KONG	22N	114	HK	423
HUANCAYO	12S	284	HU	91K
HYDERABAD	17N	78	HY	317
IBADAN	07N	3	IB	007
ILO	17S	288	IL	J1P
INVERNESS	57N	355	IN	056
IRKUTSK	52N	104	IR	352
JAMAICA+	18N	283	JA	918
JICAMARCA+	11S	283	JI	91J
JOHANNESBURG	26S	28	JO	120
JULIACA	15S	289	JU	J1N
JULIUSRUH/RU	54N	13	JR	055
KALININGRAD	55N	21	KL	154
KARAGANDA	50N	73	KR	250
KERGUELEN	49S	70	KG	24R
KERMADEC	29S	182	KC	62R
KHABAROVSK	48N	135	KB	548
KIEV	51N	30	KV	151

Note: In the last column of the computer code:

O = letter "oh" 0 = number "zero"

B.1 IONOSPHERE VERTICAL SOUNDING STATIONS
ALPHABETICAL LISTING

STATION NAME	LAT	EAST LONG	STATION INDICATOR	COMPUTER CODE
KINSHASA BINZA	04S	15	LB	10M
KIRUNA	67N	20	KI	167
KJELLER	60N	11	OS	059
KODAIKANAL	10N	77	KO	310
LA PAZ	16S	291	LP	J10
LA QUIACA	22S	294	LQ	J2K
LANNION	49N	357	LN	047
LENINGRAD	59N	30	LD	160
LINDAU	51N	10	LI	050
LITTLE AMERICA	78S	197	LA	77Q
LONGYEARBYEN	78N	15	LG	178
LULEA	65N	22	LU	165
LWIRO	02S	28	LW	10K
LYCKSELE	64N	18	LY	164
MACAU	22N	113	MC	422
MACQUARIE IS	54S	159	MQ	55M
MADRAS	13N	80	MD	313
MANILA	14N	121	MN	414
MARION IS	46S	37	MR	140
MAUI	20N	203	MA	720
MAWSON	67S	62	MW	26P
MAYNARD	42N	288	MY	J43
MEANOOK	54N	246	ME	855
MEXICO CITY	19N	260	MX	919
MIEDZESZYN	52N	21	MZ	152
MILLSTONE HILL+	43N	288	MH	J45
MIRNY	66S	92	MI	360
MOSCOW	55N	37	MO	155
MUNDARING	32S	116	MU	43K
MURMANSK	68N	33	MM	168
NAIROBI	01S	36	NR	10J
NARSSARSSUAQ	61N	314	NQ	J61
NATAL+	05S	324	NL	A0N
NORFOLK IS	29S	168	NI	63v
NORLISK	69N	88	NO	369
NOVOKAZALINSK	46N	62	NK	246
NOVOSIBIRSK	55N	83	NS	355
NURMIJARVI	60N	24	NU	159
OKINAWA	26N	127	OK	426
OTTAWA	45N	284	OT	945
OUAGADOUGOU	12N	358	OU	012
PANAMA	09N	280	PN	909
PARAMARIBO	05N	304	PM	J06
PARIS SACLAY	48N	2	SC	047
POINT ARGUELLO+	35N	239	PA	836
POITIERS	46N	0	PT	046
POPAYAN	02N	283	PP	902
PORT MORESBY	09S	147	PY	50R
PORT STANLEY	51S	302	PS	J5J
PROVIDENYA	64N	186	PD	664
PRUHONICE	50N	14	PQ	052
PUERTO RICO+	18N	292	PR	J18
QUETTA	30N	67	QT	230
RABAT	33N	353	RT	034
RAROTONGA	21S	200	RA	72J
RESOLUTE BAY	74N	265	RB	974
REYKJAVIK	64N	338	RK	A64
ROMA	41N	12	RO	041
ROSTOV	47N	39	RV	149
SALEKHARD	66N	66	SD	266
SALISBURY	34S	138	SR	53M
SALISBURY/RHOD	17S	31	SY	11P
SAN FRANCISCO+	37N	237	ST	837
SAN SALVADOR+	24N	285	SS	J24
SANAE	70S	357	QM	07v
SAO PAULO	23S	313	SP	J2L
SCHWARZENBURG	46N	6	SZ	045
SCOTT BASE	77S	166	SB	67Q
SEATTLE+	47N	237	SE	847
SEOUL+	37N	127	SU	437
SIMFEROPOL	44N	34	SF	144
SINGAPORE	01N	103	SI	301
SLOUGH	51N	0	SL	051
SODANKYLA	67N	26	SO	166
SOFIA	43N	23	SQ	143
SOUTH GEORGIA	54S	323	SG	A5M
SOUTH POLE	90S	0	PO	09v
SOYA SHIP	60S		XD	
ST JOHNS	47N	307	SJ	J47
SVERDLOVSK	56N	61	SV	256
SYOWA BASE	69S	39	SW	16R
TAHITI	17S	210	TT	71P
TAIPEI	25N	121	TP	424
TALARA	04S	278	TA	90M
TAMANRASSET	22N	5	TN	022
TANANARIVE	18S	47	IV	21Q
TBILISI	41N	44	TB	142
TEHRAN	35N	51	TE	236
TERRE ADELIE	66S	140	DU	560
THULE/QANAQ	77N	290	TH	J77
THULE/TUTO	76N	291	TH	J76
THUMBA	08N	76	TC	309
TIRUCHIRAPALLI	10N	78	TI	311
TIXIE BAY	71N	128	TX	471
TOGO	10N	0	TG	011
TOKYO	35N	139	TO	535
TOMSK	56N	84	TK	356
TORTOSA	40N	0	EB	040
TOWNSVILLE	19S	146	TV	51R
TRELEW	43S	294	TW	J4L
TRIVANDRUM	08N	77	TM	308
TROMSO	69N	19	TR	169
TSUMEB	19S	17	TS	11R
TUCUMAN	26S	294	TU	J20
TUNGUSKA	62N	90	TZ	362
UPPSALA	59N	17	UP	158
USHUAIA	54S	291	UA	J5M
VANIMO	02S	141	VA	50L
VICTORIA	48N	236	VI	848
VOSTOK	78S	106	VO	47P
WAKKANAI	45N	141	WK	545
WALLOPS IS+	37N	284	WP	937
WASHINGTON	38N	282	WA	938
WHITE SANDS	32N	253	WS	832
WILKES	66S	110	WL	460
WINNIPEG	49N	265	WI	949
WOOMERA	30S	136	WO	53J
YAKUTSK	61N	129	YA	462
YAMAGAWA	31N	130	YG	431
YELLOWKNIFE	62N	245	YE	862
YUZHNO SAKHALI	47N	143	SA	547
ZARYA SHIP	10S		XF	

Note: Computer identification code numbers for new stations will be furnished upon request to World Data Center A for Solar-Terrestrial Physics. WDC-A has been asked to provide this service by the Ionospheric Network Advisory Group.

Note: In the last column of the computer code:

O = letter "oh" 0 = number "zero"

B.1

IONOSPHERIC ELECTRON DENSITY

General

This section deals with data of the vertical distribution of electron density in the ionosphere, N(h), obtained from ionograms of vertical-incidence sounding of the ionosphere at ground-based stations. Electron density data obtained by other methods are covered in other sections of this catalog (B.2, B.3, B.5).

World Data Center A for Solar-Terrestrial Physics has a relatively extensive collection of electron density profiles produced by inversion of ionograms in programs carried out in the Central Radio Propagation Laboratory of the U. S. National Bureau of Standards, and its successor organizations in ESSA and NOAA. In addition to the data produced by CRPL, the Data Center has in its archives data from several other organizations and countries. The WDC-A archives are indicated on the facing catalog pages.

Ionogram inversion service available from EDS-NOAA

Information on procedures and theoretical bases for obtaining "true-height" profiles of electron density from ionograms may be found in WDC-A for STP Report UAG-23 titled "URSI Handbook of Ionogram Interpretation and Reduction", and in the special issue of *Radio Science*, No. 10, volume 2 (new series), pp 1119-1282, issued in October 1967, which was devoted to the "analysis of ionograms for electron density profiles". The basis for the system presently in use at EDS-NOAA is described by Howe and McKinnis, pp 1135-1158, in the special issue of *Radio Science*.

The data center at Boulder has staff and facilities for inversion, upon request, of any ionogram of suitable quality. These may be from the archives of this or other data centers, or may be supplied by the requester. The cost for this service varies with the quality and format of the ionogram -- an ionogram in standard format is more readily processed.

A new semi-automatic system for ionogram inversion is being developed which promises to permit more rapid processing, with consequent reduction in cost, increased production capacity, and use of more sophisticated and accurate inversion procedures.

A requester for new N(h) processing, whether from ionograms that have not previously been inverted, or from existing virtual height punched cards, may receive output on punched cards or magnetic tape, and in either of the printout formats. Such new N(h) data are also added to the archives.

Briefly, the inversion process consists of:

1. Obtaining selected values of the virtual height from the ionogram and placing them on punched cards or magnetic tape.
2. Entering the virtual height data together with the inversion program into a computer.
3. Receiving the resulting N(h) data on punched cards or magnetic tape, and printout.
4. Examining the printout for validity, and rerunning the computation if necessary.

At present the computer printouts are in two formats as shown below:

FORMAT NO. 1 gives electron density at fixed 10 km intervals between the highest and lowest heights obtained by the calculation.

LOC. ZONE TIME	Q	COMPOSITE	ELECTRON DENSITY					STATION WP				SCAT	HMIN	HMAX	SHMAX
		KM	00	10	20	30	40	50	60	70	80	90				
68 01 29 0000		200			5.3	9.1	17.0	37.6	72.3	109	147	184	55.0			
		300	213	234	249	256	260	260						217	343	176
68 01 30 0100		200		5.2	7.2	10.4	16.0	27.5	48.6	80.9	115	147	52.0			
		300	177	202	221	236	245	249	249					210	354	177
68 01 26 0200		200			5.3	7.4	11.0	18.8	35.4	65.8	105	142	51.6			
		300	180	214	242	263	276	283	285	285				219	358	195
68 01 23 0300		200		4.1	7.8	14.9	28.9	56.4	90.1	126	165	202	45.6			
		300	235	263	281	291	294	294						206	339	190
68 01 22 0400		200					8.0	39.1	94.5	150	198	240	52.9			
		300	271	290	299	304	304							237	333	188
68 01 24 0500		100							5.2	7.0	9.5	13.1	51.1			
		200	18.5	26.8	40.0	59.3	85.3	115	147	179	206	227				
		300	245	255	261	261	261							155	325	193

B.1 TRUE HEIGHT-ELECTRON DENSITY DATA

AT BOULDER — N(H) PROFILE

STATION	GEOGRAPHIC LAT	LONG	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
								YEAR											
FLETCHERS ICE	82N			4															
EUREKA	80N	274		4															
HEISS IS	80N	57	1	2															
LONGYEARBYEN	78N	15	1	2															
THULE/TUTO	76N	291	1	4	12	11	12	12	12	12	12	6							
RESOLUTE BAY	74N	265	1	4				1	2	4		2	1						
DIXON	73N	80	1	2															
BARROW	71N	203		4					1	4									
TIXIE BAY	71N	128		1															
GODHAVN	69N	306		4			2	12	12	9	12	12	8						
MURMANSK	69N	33								12	12	12	12	6					
TROMSO	69N	19	1	2									1						
LULEA	65N	22		5															
BAKER LAKE	64N	264		4															
COLLEGE	64N	212	2	3			1	1		1		8	1						
REYKJAVIK	64N	338		5				3	1	4									
ANCHORAGE	61N	210		3			1	3	11	2									
NARSSARSSUAQ	61N	314	1	4			1	11	9	3	12	10	8						
NURMIJARVI	60N	24						1											
CHURCHILL	58N	265	1	4				2	2	6	3	7	2	2					
INVERNESS	57N	356	3																
GORKY	56N	44		4						4									
TOMSK	56N	85								12	12	12	12	12	12	12			
MOSCOW	55N	37	6	12							12	12	12	11					
MEANOOK	54N	246		3															
DE BILT	52N	5						1											
IRKUTSK	52N	104									10								
ADAK	51N	183		2	7	12	11	11	12	12	12								
SLOUGH	51N	0						1											
WINNIPEG	49N	265	1	4		1	3			4		2							
FREIBURG	48N	7								3				1			2		
VICTORIA	48N	236		4															
GRAZ	47N	15						1											
ST JOHNS	47N	307	1		9	9	6	1				2					4		
OTTAWA	45N	284		5		2	7	2	5	12	6			1	1				
MILLSTONE HILL	43N	288						3	1										
ROMA	41N	12						3	2										
BOULDER	40N	254				1	9	6	10	12	12	12	12	7	6	7			6
FORT MONMOUTH	40N	285			11	12	10	12	12	12	12								
TORTOSA	40N	0											5	2	3				
WASHINGTON	38N	282				4	8	12	7	4									
ASHKHABAD	38N	58	2	4	3														
SAN FRANCISCO	37N	237		4						2	3	4		1	3	1		1	
WALLOPS IS	37N	285				1	5	7	7	12	12	12	12	12	12	12	12	12	8
POINT ARGUELLO	35N	240							1	3	12	5							
CAPE ZEVGARI	34N	33																1	
WHITE SANDS	32N	253			10	12	12	9	8	12	12	12	7	5	5	5	3		1
YAMAGAWA	31N	130						1											
EGLIN AFB	30N	273						2	4	3	3		3		1		2		
CAPE KENNEDY	28N	279				3	11	3	6	10	12	7	1		1				
DELHI	28N	77		1															
GRAND BAHAMA	26N	281	1	1	11	11	7	11	12	12	12	12	12	3	1	1			
YEAR			57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73

Key: Numbers 1 through 12 indicate the number of months during the year for which at least one individual or composite N(h) profile exists. For a more detailed list of available true height data, write World Data Center A for Solar-Terrestrial Physics.

Note: Electron density profiles during eclipses are also available for:

Wallops Island	(37N, 284E)	for March 1970
Aitutaki	(19S, 160E)	for May 1965
Rio Grande	(32S, 308E)	for November 1966.

B.1

FORMAT NO. 2 gives true height, H, at selected $\log_{10} f_N$ between fmin and foF2, $Z^* = \left(\frac{dH}{d\log(f_N^2)}\right)$

$Z^{**} = \left(\frac{d^2H}{d(\log f_N^2)^2}\right)$, the integral from hmin to H and the electron density at H.

BOULDER, COLO 73 06 15 0700
FOR SAMPL. Q=G. F=0.560000. FH=1.429120. SIN I=0.924546.

	LOG FX	LOG FN	H*	H	Z*	Z**	INTEGRAL	EL/CC	RESIDUAL
A102	9.9050	EXTRAP		90.00	0.000			8.00805+003	(SD******)
	0.005	90 O		90.00	0.000	0.00	0.000	1.26919+004	-0.000
	0.015	90 O		90.00	0.000	0.00	0.000	1.32901+004	-0.000
	0.250	107 O		94.91	20.915	44.50	1.386	3.92217+004	
	0.350	110 O		98.79	17.801	-000015.57	3.302	6.21623+004	
	0.370	120 O		99.99	42.475	616.85	4.092	6.81596+004	
	0.400	119 O		102.04	25.630	-000280.75	5.576	7.82576+004	
	0.420	131 O		103.70	57.802	804.29	6.952	8.58078+004	
	0.430	150 O		105.37	108.706	2545.21	8.417	8.98518+004	
	0.440	218 OV		109.51	305.188	9824.13	12.236	9.40864+004	
	0.450	190 O		112.52	141.785	-000882.00	15.134	9.85205+004	
	0.470	181 O		117.49	106.505	-000882.00	20.247	1.08026+005	
	0.500	190 O		124.27	119.715	220.17	28.117	1.24030+005	
	0.530	210 O		132.26	146.497	446.36	38.761	1.42405+005	
	0.560	251 O		143.16	217.021	1175.41	55.486	1.63503+005	
	0.580	307 O		154.09	329.392	2809.28	74.257	1.79278+005	
	0.593	395 O		165.46	545.043	8294.26	95.306	1.90339+005	
	0.603	586 O		181.75	1084.418	26968.74	127.119	1.99309+005	
LOGFM=0.6067			HMAX=199.86		S= 69.527		SHMAX= 163.608	2.02697+005	

N(h) data being produced by WDC-A are available in one or both of the above formats, and in most cases the original virtual height input data on punched cards have been retained, so it is possible to reprocess these data with more recent and improved inversion programs.

Inversion service costs -- The cost of the inversion process is determined by the availability, quality, complexity and format of the ionogram records. Because these factors are quite variable the charge for inverting the virtual height data can only be determined on an individual case by case basis. From past experience, however, we can estimate that the cost will range from $5 to $10 per profile. When our semi-automatic system is operational the cost is estimated to be about $3 to $5 per profile for those ionogram frames suitable for this type of processing. Ionograms not suitable for this processing would have to be inverted by the more costly hand methods. Additional charges may be necessary when ionograms must be ordered from other sources. Of course when the request is for data previously inverted and available in our archives, these data will be supplied at the cost of copying and mailing or shipping.

Assumptions and Limitations -- A fully accurate and unambiguous electron density profile can be derived only if virtual height data are available for all heights in the ionosphere up to the maximum height of the profile. Actual ionograms are deficient in two basic respects:

1. The usual ionosonde is not capable of obtaining virtual height data below a certain minimum frequency -- the upper limit of the standard broadcast band (1.6 MHz) sets an effective lower limit in most cases; so virtual heights for electron density less than about 10^4 electrons per cubic centimeter are not obtained.

2. Virtual heights from ionization in valleys (for example, between the E and F layers at night) cannot be obtained by ionosondes, although use of the virtual heights of reflection of both ordinary and extraordinary waves can provide limited information about valley content; and of course ionization in the topside of the ionosphere above hmaxF2 cannot be observed with bottomside ionosondes.

To obtain even approximate N(h) data from such incomplete virtual height data, certain assumptions must be made or models of the "unseen" ionization adopted. This is the subject of continuing investigation.

B.1 TRUE HEIGHT-ELECTRON DENSITY DATA

AT BOULDER — N(H) PROFILE

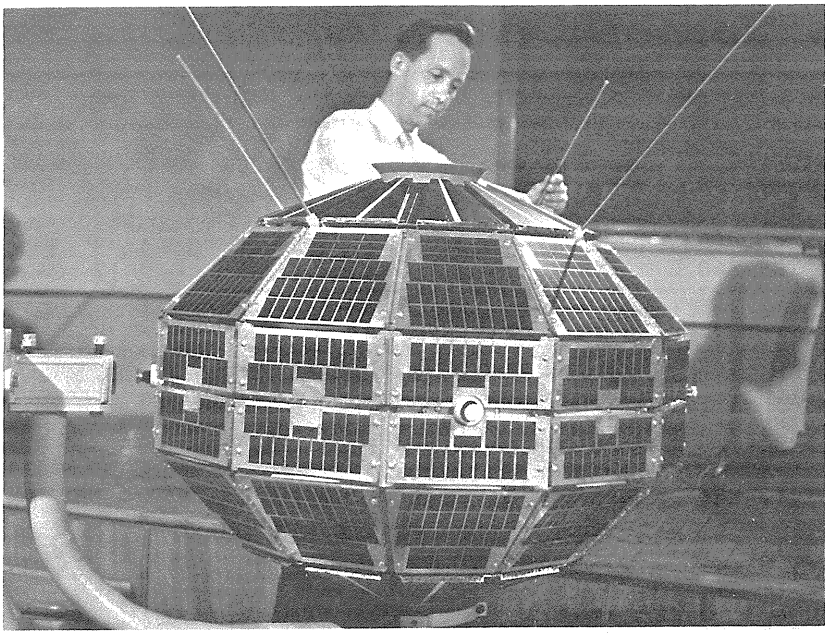
STATION	GEOGRAPHIC LAT	LONG	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
OKINAWA	26N	127			7	2		3	1	2	1							2	1
TAIPEI	25N	121								9			1						
SAN SALVADOR	24N	285			3		1	3	5	9	2								
AHMEDABAD	23N	72	2	4	3														
CUBA	23N	277										1							
MAUI	20N	203		2			3	4	1	4	12	3	1	1	3	5	1	1	
MEXICO CITY	19N	260					2	4	6	3	12	5			12				
JAMAICA	18N	283						3	2	12	5	8	1						
PUERTO RICO	18N	292		1	12	12	12	11	7										
ARECIBO	18N	293											1					2	
BAGUIO	16N	120				11	12	3	2			1							
MANILA	14N	121								12	12	12	10	3					
KODAIKANAL	10N	77					1												
PANAMA	09N	280		1															
IBADAN	07N	3	6	12															
BOGOTA	04N	285		1	4	4	4	1	5	12	12	12	6						
SINGAPORE	01N	103						1	2			1							
TALARA	04S	278		3	3	12	12	7	3	12	11								
NATAL	05S	324													1		1		
CHICLAYO	06S	280		2															
CHIMBOTE	09S	281		4			1												
PORT MORESBY	09S	147										2							
COCO IS	12S	96							1			1							
HUANCAYO	12S	284	4	12	7	3	12	8	7	12	12	12	12	6	5				
LA PAZ	16S	291		1		3	2	1	1			1							
TAHITI	17S	210							2			1							
TANANARIVE	18S	47												1					
TOWNSVILLE	19S	146							1			1							
TSUMEB	19S	17												1					
RAROTONGA	21S	200			1	1			1										
JOHANNESBURG	26S	28				1		1		1	2	2		2	7	9			
BRISBANE	27S	152						2	1			1							
NORFOLK IS	29S	168									1								
WOOMERA	30S	136				3	4					1	2						
MUNDARING	32S	116							1			1							
BUENOS AIRES	34S	301		1				1	1			8	1						
CAPETOWN	34S	18						1											
CANBERRA	35S	149								3	3	4	6	2	3				
CONCEPCION	36S	287		1	4	3	7	2	4	1	1	2							
HOBART	42S	147										1							
GODLEY HEAD	43S	172						2	2										
PORT STANLEY	51S	302						2	2			1							
USHUAIA	54S	291						1				2							
ARGENTINE IS	65S	295										2							
WILKES	66S	110										1							
MAWSON	67S	62										1							
EIGHTS	75S	282									1								
BELGRANO	77S	321		1															
ELLSWORTH	77S	318		1															
BYRD STATION	80S	240										2							
SOUTH POLE	90S	0							1			3	1						
YEAR			57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73

Key: Numbers 1 through 12 indicate the number of months during the year for which at least one individual or composite N(h) profile exists. For a more detailed list of available true height data, write World Data Center A for Solar-Terrestrial Physics

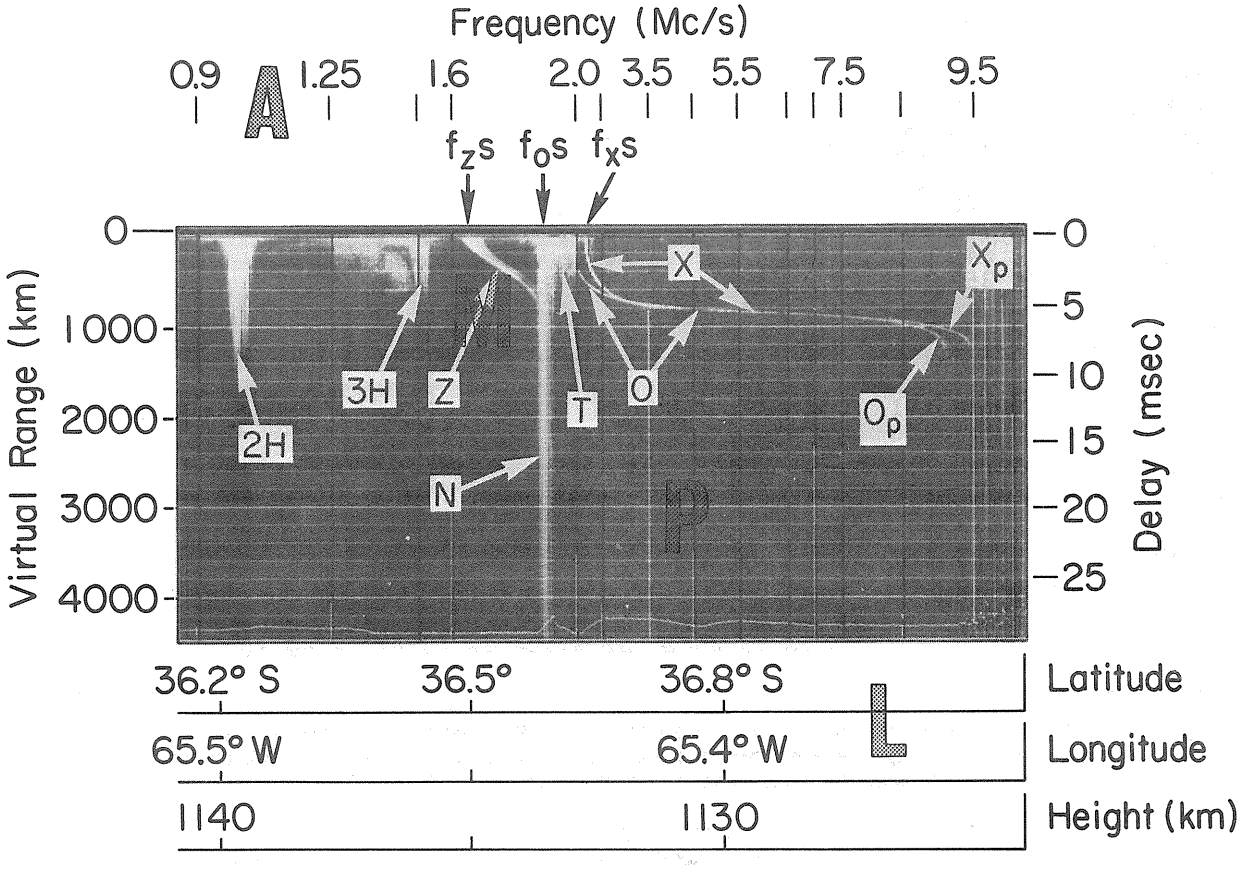
Note: Electron density profiles during eclipses are also available for:

Wallops Island	(37N, 284E)	for March 1970
Aitutaki	(19S, 160E)	for May 1965
Rio Grande	(32S, 308E)	for November 1966.

ALOUETTE I



S



L

E

8.2 TOPSIDE-VERTICAL INCIDENCE SOUNDINGS

AT BOULDER

ALOUETTE 1 - 1962 BETA ALPHA 1

STATION	DATE BEGINNING	FILM HELD THROUGH	STATION CLOSING DATE
AGASTA, CHILE	9/30/1962	7/28/1963	8/1963
BLOSSOM POINT MARYLAND, U.S.A.	9/27/1962	9/23/1965	9/23/65
BOULDER, COLORADO, U.S.A	1/25/1966	12/13/1971	3/31/1972
BRETIGNY	7/25/1967	2/6/1972	
BYRD, ANTARCTICA	2/11/1966	1/22/1968	1/22/1971
CANARY ISLANDS	11/30/1967	3/22/1968	
COLLEGE, ALASKA, U.S.A.	9/29/1962	10/10/1966	11/1966
EAST GRAND FORKS, MINN. U.S.A.	2/18/1963	6/20/1966	CLOSED
FORT MYERS, FLORIDA, U.S.A.	9/30/1962	6/28/1970	
JOHANNESBURG, REP OF SOUTH AFR	11/11/1965	1/8/1966	
KANO, NIGERIA	9/3/1964	10/26/1966	11/1966
KASHIMA, JAPAN	8/15/1966	10/27/1968	
KAUAI, HAWAII, U.S.A.	8/10/1965	11/2/1969	3/10/1972
ORORAL, AUSTRALIA	11/23/1965	6/27/1970	
OTTAWA, ONTARIO, CANADA	9/29/1962	11/9/1972	
OUAGADOUGOU, UPPER VOLTA	8/11/1967	2/22/1972	
PRINCE ALBERT, SASK. CANADA	9/30/1962	7/26/1963	8/1963
QUITO, ECUADOR	9/30/1962	5/17/1970	
RESOLUTE BAY, N.W.T., CANADA	9/29/1962	4/25/1972	
SANTIAGO, CHILE	8/6/1963	11/18/1969	
SINGAPORE	10/1/1962	11/22/1969	
SOUTH ATLANTIC (PORT STANLEY)	9/30/1962	1/21/1971	12/31/72
SOUTH POINT, HAWAII, U.S.A.	11/7/1962	6/10/1965	6/1965
ST JOHN S, NFLD., CANADA	9/30/1962	3/9/1970	3/1970
TROMSO, NORWAY	8/17/1966	3/27/1972	
ULASKA, ALASKA, U.S.A.	11/29/1965	6/29/1970	
WINKFIELD, ENGLAND	9/29/1962	6/28/1970	
WOOMERA, AUSTRALIA	9/30/1962	10/31/1965	11/1965

Swept-Frequency Topside Sounder. Launched September, 1962. Data are being received on a continuing basis. Ionograms are on 35 mm film in 100 foot rolls. There are approximately 5358 rolls available from the above telemetry stations (dates are not necessarily inclusive for each station).

Alouette I no longer operating as of Sept. 29, 1972.

PUBLICATIONS:

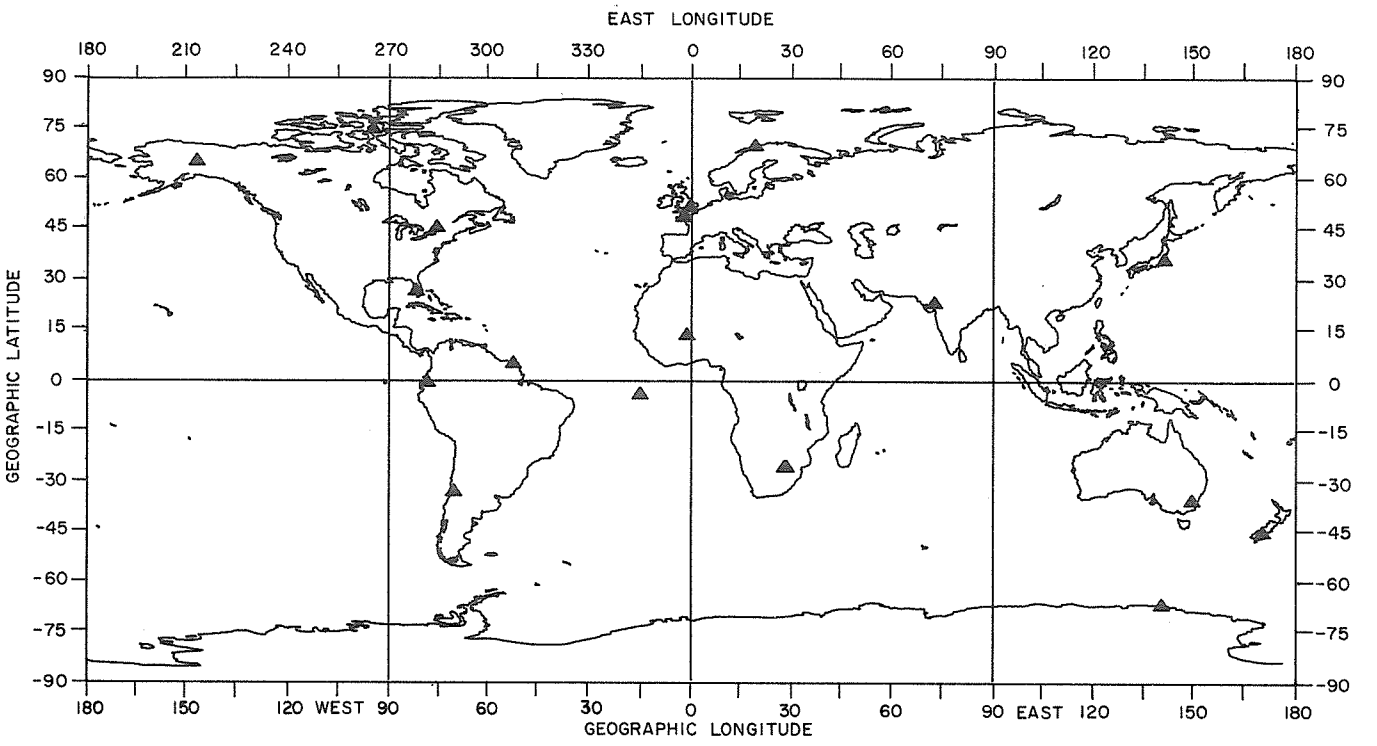
1. Alosyn Data, Defence Research Telecommunications Establishment, Ottawa - Alouette 1 topside sounder synoptic data which consist of tabulations of selected ionospheric parameters from the ionograms. The parameters are listed in the order in which the ionograms were recorded, one tabulation row for each ionogram. The parameters are compiled for all sounder data recorded during the month at the following stations:

Antofagasta, Chile	Resolute Bay, N.W.T., Canada
College, Alaska, U.S.A.	Santiago, Chile
East Grand Forks, Minn., U.S.A.	South Atlantic (Port Stanley), Falkland Is.
Fort Myers, Florida, U.S.A.	South Point, Hawaii, U.S.A.
Ottawa, Ont., Canada	St. John's, Nfld., Canada
Prince Albert, Sask., Canada	Winkfield, England
Quito, Ecuador	Woomera, Australia

The data are tabulated covering the period of September 29, 1962 to Jan. 31, 1968 and include:

1. Time of observation (universal and local).
2. Latitude, longitude, and height of the satellite.
3. Solar zenith angle and magnetic dip angle at the satellite.
4. Gyrofrequency and plasma frequency at the satellite.
5. Observed extraordinary wave frequency and its accuracy.
6. Quality of the reflection trace at the satellite.
7. Observed ordinary and extraordinary wave penetration frequencies of the F2 layer.
8. Maximum frequency of observation of sporadic E.
9. Strength of signal returned from the earth (strong, weak, no echoes).
10. Three-hourly magnetic Kp index.

TOPSIDE – VERTICAL INCIDENCE SOUNDINGS TELEMETRY STATIONS 1973



Ionograms from Alouette 1, Alouette 2, Explorer 20, ISIS I and II Satellites are available. Time charts providing a graphical indication of the duration of Alouette 1 operations can be furnished on request. Some reduced data are available. The map shows all the telemetry stations currently reporting. The data summaries are in alphabetical order. 35 mm film copies of ionograms available at $5.15 per roll, when ordered through Boulder.

PUBLICATIONS: (continued)

2. *Electron Density vs. Real Height*, Department of Communications, Ottawa - Sept. 29, 1962 - July 27, 1968.
3. *Electron Densities and Scale Heights in the Topside Ionosphere: Alouette 1 Observations in Midlatitudes*, by Thomas, Rycroft and Colin, NASA, May 1, 1963 - Jan. 28, 1964.
4. *Electron Densities and Scale Heights in the Topside Ionosphere: Alouette 1 Observations Over The American Continents*, by Chan, Colin, and Thomas, NASA, Mar. 1, 1963 - Oct. 31, 1963.
5. *Electron Densities and Scale Heights in the Topside Ionosphere: Alouette 1 Observations Recorded at Hawaii*, by Colin and Chan, NASA, Nov. 7, 1962 - Nov. 30, 1963.

COMPUTER FORMAT:

1. Electron density profiles for selected Alouette 1 ionograms reduced by ISIS experimenters covering period Sept. 29, 1962 - June 19, 1965.

B.2 TOPSIDE-VERTICAL INCIDENCE SOUNDINGS

AT BOULDER

ALOUETTE 2 - 1965 98A

STATION	DATE BEGINNING	FILM HELD THROUGH	STATION CLOSING DATE
AHMEDABAD	6/10/1970	8/30/1970	
BOULDER COLORADO, U.S.A.	11/29/1965	3/31/1972	3/31/1972
BRAZZAVILLE	8/12/1967	8/12/1972	
BRETIGNY	8/1/1967	6/13/1972	
BYRD, ANTARCTICA	1/19/1967	1/22/1971	1/22/1971
COLLEGE, ALASKA, U.S.A.	11/29/1965	10/3/1966	
EAST GRAND FORKS, MINN. U.S.A.	11/30/1965	5/21/1966	
FORT MYERS, FLORIDA, U.S.A.	11/29/1965	7/23/1971	
JOHANNESBURG, REP. OF SOUTH AFRICA	12/9/1965	12/16/1971	
KANO, NIGERIA	11/30/1965	10/15/1966	11/1966
KASHIMA, JAPAN	11/7/1966	11/6/1971	
KAUAI, HAWAII, U.S.A.	12/2/1965	11/30/1970	11/30/1970
LAUDER	11/2/1971	11/13/1971	
LIMA, PERU	11/11/1966	8/1/1969	9/1969
ORORAL, AUSTRALIA	12/1/1965	5/17/1971	
OTTAWA, ONTARIO, CANADA	11/29/1965	12/22/1972	
OUAGADOUGOU, UPPER VOLTA	8/8/1967	8/16/1972	
QUITO, ECUADOR	11/29/1965	9/30/1971	
RESOLUTE BAY, N.W.T., CANADA	11/29/1965	7/28/1972	
SANTIAGO, CHILE	11/29/1965	9/30/1971	
SINGAPORE	12/1/1965	7/31/1971	
SOUTH ATLANTIC (PORT STANLEY)	12/5/1965	7/8/1971	
ST JOHN S, NFLD., CANADA	11/30/1965	3/6/1970	3/1970
TERRE ADELIE	1/17/1972		
TROMSO, NORWAY	8/16/1966	11/19/1972	
ULASKA, ALASKA, U.S.A.	11/29/1965	12/23/1970	
WINKFIELD, ENGLAND	11/29/1965	3/31/1972	

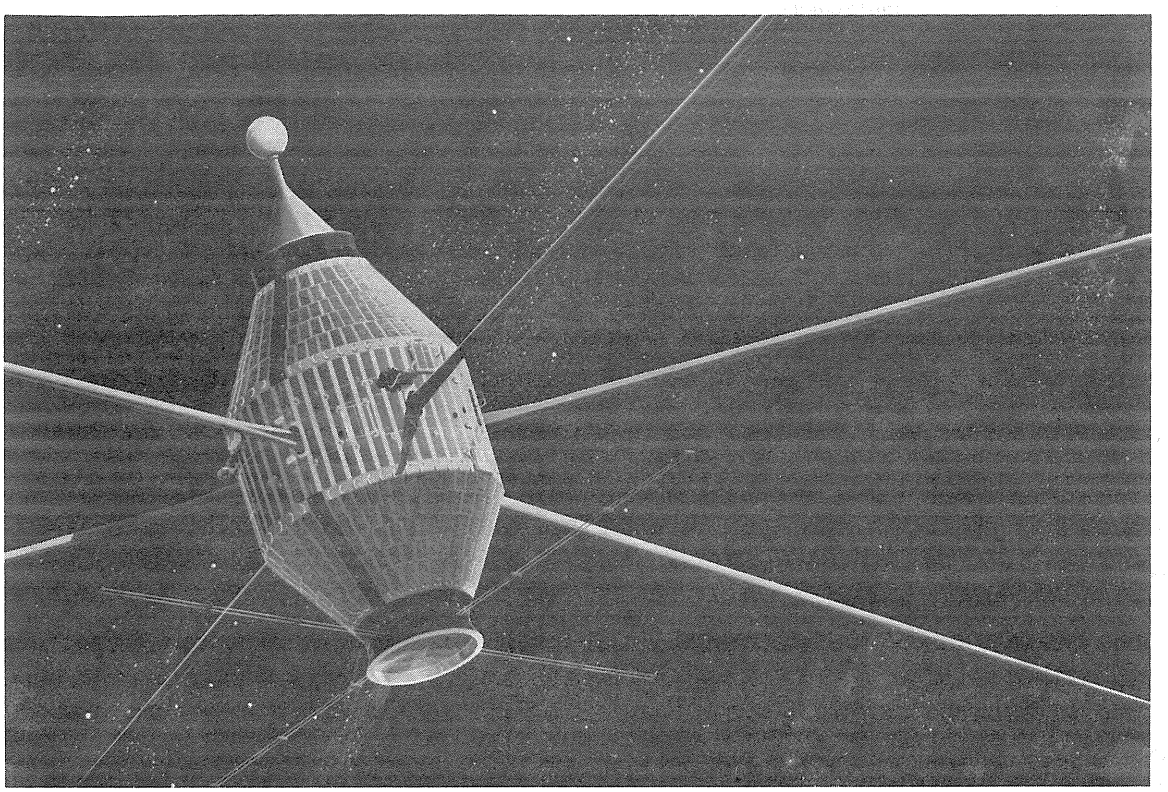
Swept-Frequency Topside Sounder. Launched November, 1965 and still in operation. Data are being received on a continuing basis. Ionograms are on 35 mm film in 100 foot rolls. There are approximately 1750 rolls available at the present time from the above telemetry stations (dates are not necessarily inclusive for each station).

PUBLICATIONS:

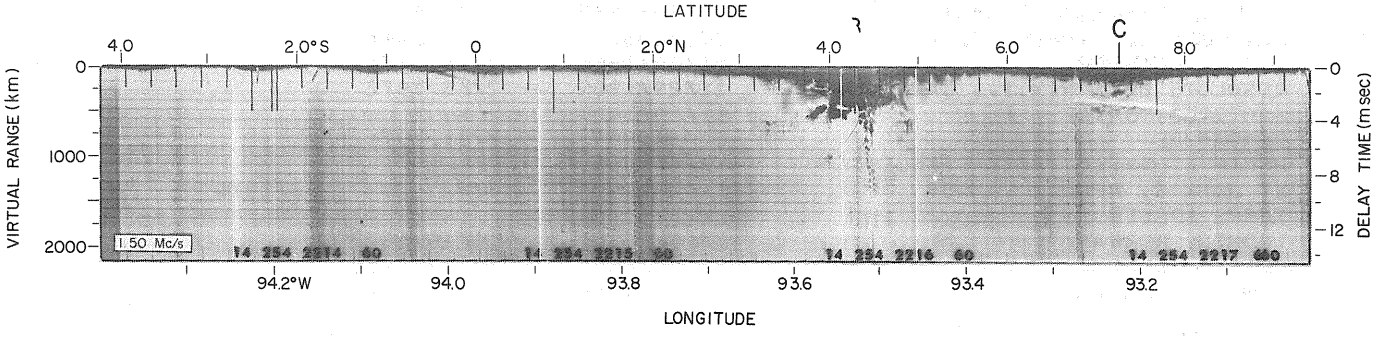
1. *Alouette II - Data Available*, Department of Communications, Ottawa - Nov. 29, 1965 - Mar. 8, 1970.
2. *Alouette II, Electron Density vs. Real Height*, Department of Communications, Ottawa, Dec. 15, 1965 - Mar. 8, 1970.
3. *Data on Topside Ionosphere*, Electron Densities and Scale Heights from Alouette II observations over Japan, Radio Research Laboratories, Ministry of Posts and Telecommunications, Tokyo, Vol. 2, Jan. - April 1967; Vol. 3 May - Aug. 1967; Vol. 4 Sept. - Dec. 1967.

B.2

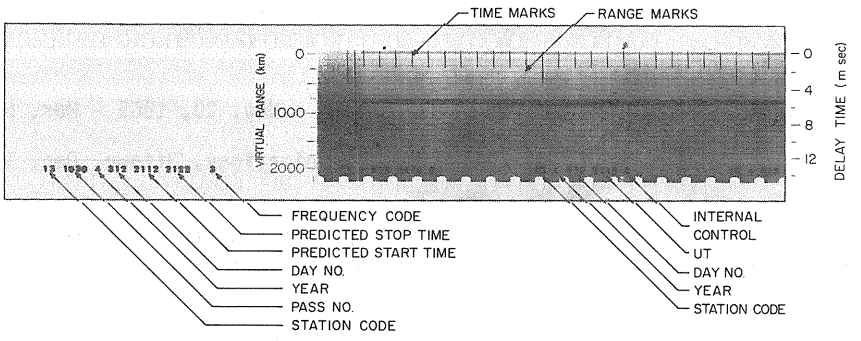
EXPLORER XX



SAMPLE FIXED FREQUENCY IONOGRAMS



IONOGRAM SCHEMATIC



FREQUENCY CODE

1 - 7.22 MHz/sec
2 - 5.47 MHz/sec
3 - 3.72 MHz/sec
4 - 2.85 MHz/sec
5 - 2.00 MHz/sec
6 - 1.50 MHz/sec

B.2

AT BOULDER

EXPLORER 20 - 1964 51A

Fixed Frequency Topside Sounder (1.50, 2.00, 2.85, 3.72, 5.47 and 7.22 MHz) Launched August 1964 - completed December 30, 1965: a total of 1423 rolls of 35 mm film covers this experiment. The film is organized by orbit. Each orbit includes ionograms from all telemetry stations which took data for that orbit, along with the orbital information. One 100 foot roll may contain 1-10 orbits, depending on the number of stations telemetering, copies $5.15 per roll.

B.2 TOPSIDE-VERTICAL INCIDENCE SOUNDINGS

AT BOULDER

ISIS 1 - 1969 009A

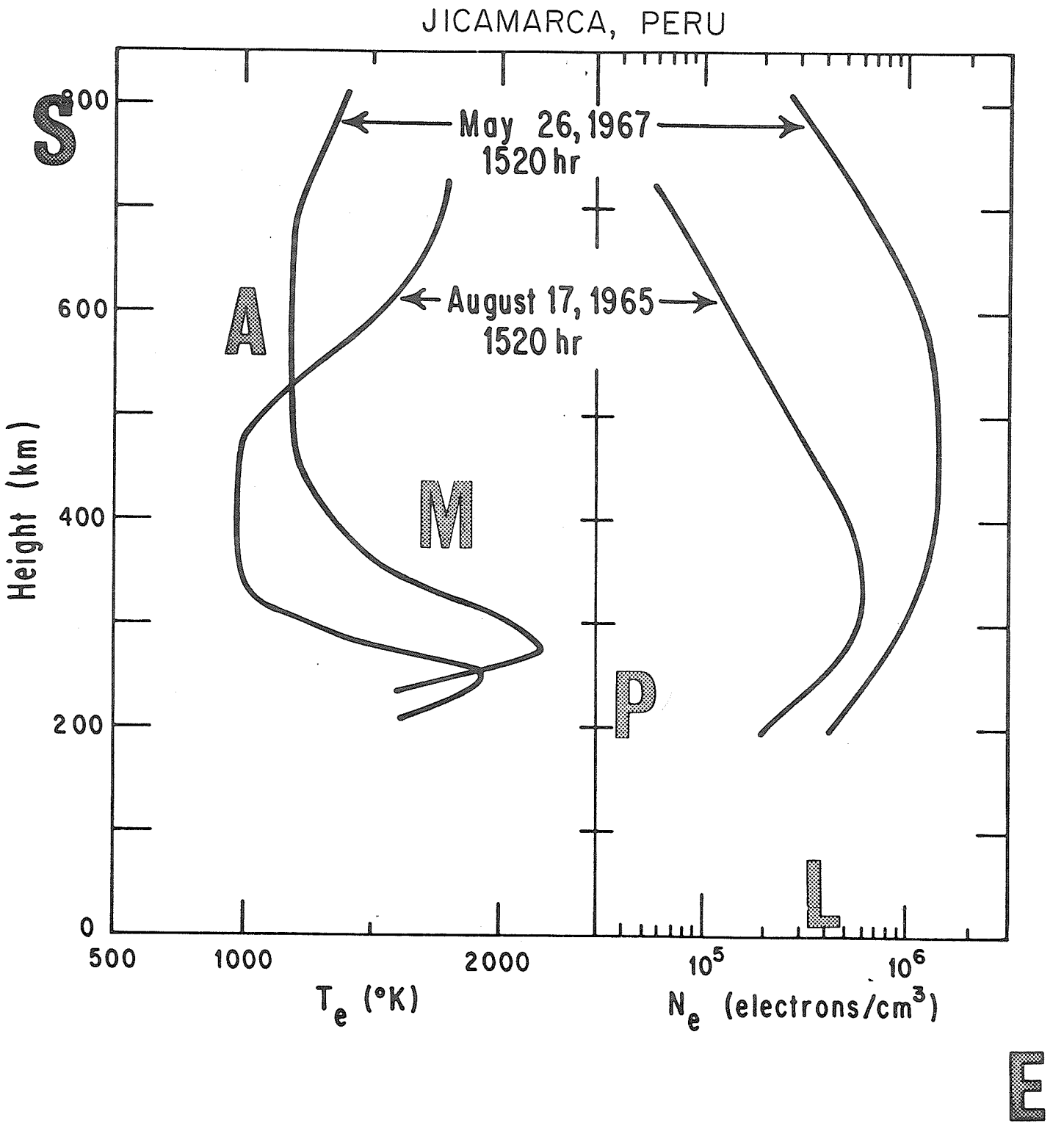
STATION	DATE BEGINNING	FILM HELD THROUGH	STATION CLOSING DATE
AHMEDABAD	11/29/71		
BOULDER	2/3/69	3/31/1972	3/31/72
BRAZZAVILLE	3/30/69	8/20/1972	
BRETIGNY	11/8/69	8/31/1972	
FORT MYERS	1/31/69	10/26/1971	
JOHANNESBURG	1/31/69	4/6/1972	
KASHIMA	1/19/70	6/28/1972	
KAUAI	2/2/69	3/11/1972	3/10/71
KOUROU	6/4/1972	8/9/1972	
LAUDER	11/1/1971	2/2/1972	
LIMA	2/1/69	8/18/69	9/69
ORORAL	1/30/69	3/31/1972	
OTTAWA	1/30/69	2/14/1973	
OTTAWA DUMP	2/3/1969	1/30/1970	
OUAGADOUGOU	2/2/69	8/13/1972	
PRETORIA	3/27/1970	8/11/1972	
QUITO	1/31/69	3/29/1972	
RESOLUTE BAY	1/30/69	4/2/1972	
SANTIAGO	1/31/69	3/30/1972	
SINGAPORE	2/3/69	7/31/71	
SOUTH ATALNTIC	2/2/69	3/15/1972	
ST JOHNS	1/31/69	3/7/70	3/70
TERRE ADELIE	1/27/1972	2/26/1972	
TROMSO	2/3/69	3/28/1971	
ULASKA	1/31/69	5/27/1972	
WINKFIELD	1/30/69	11/12/1972	

B.2 TOPSIDE-VERTICAL INCIDENCE SOUNDINGS

AT BOULDER

ISIS II - 1971 024A

STATION	DATE BEGINNING	FILM HELD THROUGH	STATION CLOSING DATE
BOULDER	4/6/71	3/31/1972	3/31/72
BRAZZAVILLE	6/3/1972	6/30/1972	
FT MYERS	4/23/1971	6/8/1972	
JOHANNESBURG	4/1/1971	10/28/1971	
KASHIMA	5/7/71	10/18/1972	
LAUDER	11/1/1971	2/8/1972	
ORORAL	4/1/1971	6/26/1972	
OTTAWA	4/22/71	2/1/1973	
OTTAWA DUMP	4/6/1971	2/3/1972	
OUAGADOUGOU	4/1/1971	8/21/1972	
QUITO	4/2/1971	6/21/1972	
RESOLUTE BAY	4/16/71	1/25/1973	
SANTIAGO	4/2/1971	12/29/1971	
SINGAPORE	4/2/1971	7/30/71	
SOUTH ATLANTIC	4/8/71	3/17/1972	
TERRE ADELIE	2/1/1972	2/26/1972	
TROMSO	4/2/1971	12/30/1971	
ULASKA	4/1/1971	12/24/1971	
WINKFIELD	4/1/71	12/6/1972	


JICAMARCA, PERU
May 26, 1967
1520 hr
August 17, 1965
1520 hr
S
A
M
P
L
E
800
600
400
200
0
Height (km)
500
1000
2000
10^5
10^6
T_e (°K)
N_e (electrons/cm^3)

B.2 TOPSIDE-VERTICAL INCIDENCE SOUNDINGS AND SATELLITE PROBE DATA

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
ARIEL 1, RADIO FREQUENCY CAPACITANCE PROBE SAYERS (62-015A-01)	042762	070862 ,	042662
ALOUETTE 1, SWEEP FREQUENCY SOUNDER NELMS (62-049A-01)	092962	031870 ,	092962
EXPLORER 17, LANGMUIR PROBES BRACE (63-009A-02)	040363	071063 ,	040363
TIROS 7, LANGMUIR PROBE BRACE (63-024A-03)	061963	070963 ,	061963
EXPLORER 20, FIXED-FREQUENCY IONOSONDE KNECHT (64-051A-01)	082564	031067 ,	082564
EXPLORER 22, LANGMUIR PROBE BRACE (64-064A-02)	101064	053165 ,	101064
ALOUETTE 2, SWEEP FREQUENCY SOUNDER WARREN (65-098A-01)	112965	101372 ,	112965
EXPLORER 31, MAGNETIC ION MASS SPECTROMETER HOFFMAN (65-098B-05)	120165	030368 ,	112965
ALOUETTE 2, CYLINDRICAL ELECTROSTATIC PROBE BRACE (65-098A-05)	022166	111367 ,	112965
ARIEL 3, LANGMUIR PROBE SAYERS (67-042A-01)	050567	041468 ,	050567
ARIEL 3, MOLECULAR OXYGEN DISTRIBUTION STEWART (67-042A-03)	050567	011268 ,	050567
ARIEL 3, RADIO FREQUENCY CAPACITANCE PROBE SAYERS (67-042A-06)	050567	041468 ,	050567
ISIS 1, SWEEP FREQUENCY SOUNDER WHITTEKER (69-009A-01)	013069	083172 ,	013069
ISIS 1, FIXED FREQUENCY SOUNDER CALVERT (69-009A-02)	013069	042071 ,	013069
ISIS 1, CYLINDRICAL ELECTROSTATIC PROBE BRACE (69-009A-07)	013069	060570 ,	013069
ISIS 2, SWEEP FREQUENCY SOUNDER WHITTEKER (71-024A-01)	040071	010573 ,	040171
ISIS 2, FIXED FREQUENCY SOUNDER CALVERT (71-024A-02)	040871	061071 ,	040171

B.3 INCOHERENT SCATTER SOUNDINGS

AT BOULDER

STATION	GEOGRAPHIC LAT	LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
CHATANIKA	62N	212																Q	Q
PRINCE ALBERT	53N	254								Q	Q								
MALVERN	52N	357										Q	Q	Q	Q	Q	Q	Q	Q
SAINT SANTIN	44N	2									C	B	A	B	Q	Q	Q	Q	Q
MIT/MILLSTONE	42N	288				Q	Q	Q	A	A	A	A	A	Q	Q	Q	A	Q	Q
STANFORD	37N	237										Q	Q	Q	Q	Q	S		Q
ARECIBO	18N	293							Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
TRINIDAD	11N	298					Q	Q											
JICAMARCA	11S	284							Q	Q	Q	Q	Q	Q	Q	Q+	Q+	Q	Q

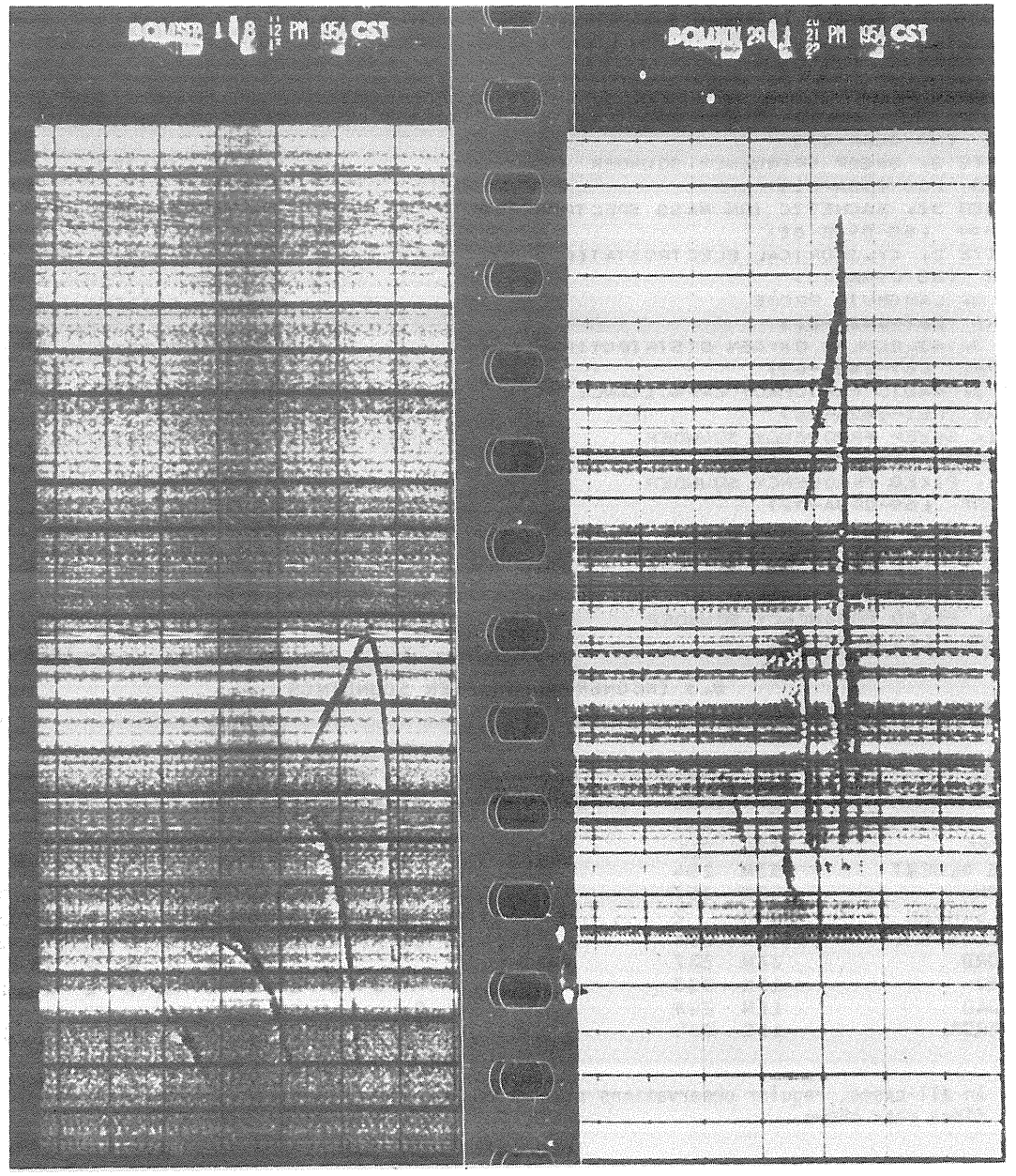
NOTE: In all cases, regular observations did not become common until 1 - 2 years following the first year shown.

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months
\+ = Very Intermittent scattered observations

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

B.4



SAMPLE OBLIQUE INCIDENCE SOUNDINGS

B.4 OBLIQUE INCIDENCE SOUNDINGS

AT BOULDER

TRANSMITTER STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	RECEIVER
THULE	76N	292						B										PULLMAN
ANDOYA	69N	16						B										PULLMAN
ANDOYA	69N	16						B										MAYNARD
LINDAU	51N	10												Q	Q	Q		TSUMEB
LINDAU	51N	10												Q	Q	Q		ALSBJERG
WINNIPEG	49N	263	C	C														RESOLUTE BAY
OTTAWA	45N	285	C	A	B													THE HAGUE
OTTAWA	45N	285		B	B													RESOLUTE BAY
SAN FRANCISCO	37N	238						B										MAYNARD
YAMAGAWA	31N	138												B	A	C		ST. KILDA
YAMAGAWA	31N	138												B	A	C		TOWNSVILLE
ORLANDO+	28N	272										B	C	C	S			BOULDER
OKINAWA	26N	127						A	A	B	A	B	B	A	A	C		ST KILDA
OKINAWA	26N	127								C	A	A	B	A	A	C		TOWNSVILLE
PUERTO RICO	18N	293					C	B										MONTEVIDEO
PUERTO RICO	18N	293						B										MAYNARD
ASMARA	15N	39									B							LA PLATA

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

WDC-A for Rockets and Satellites
Code 601, Goddard Space Flight Center
Greenbelt, Maryland 20771 U.S.A.

SRL-52
1 January 1971

Summary of Sounding Rocket Launchings*
Supplementary List 1970

Date (UT)	Time (UT)	Rocket Number or Type	Sponsoring Country	Launching Site	Experiments (see page 4 for Discipline Codes)										Approx. Altitude (km)	Principal Experimenter(s)
					Aurora and Airglow	Atmospheric Physics	Ionosphere	Energetic Particles	Magnetic Fields	Solar Physics	Astronomy	Planetology	Biology	Test and Other		
					1	2	3	4	5	6	7	8	9	0		
1970																
04 Aug.	1105	Sparrow/HV Arcas	Norway	Andoya			C D								85	A. Johannessen
02 Sept.	1014	S-84	Japan	Kagoshima			C D E								174	K. Kato M. Ejiri T. Aso
02 Sept.	1014	S-84-1	Japan	Kagoshima		V	G								174	H. Kimura T. Matsuoka N. Ohchi S. Kato I. Kuriki
02 Sept.	1014	S-84-3	Japan	Kagoshima		V	E								174	K. Oyama
19 Sept.	1130	S-85-1	Japan	Kagoshima	D										2017	T. Masuoka
19 Sept.	1130	S-85-2	Japan	Kagoshima						E					2017	T. Tohmatsu T. Ogawa T. Hayashi M. Hashimoto
19 Sept.	1130	S-85-3	Japan	Kagoshima			C E								2017	H. Mori
19 Sept.	1130	S-85-4	Japan	Kagoshima			E								2017	K. Oyama
19 Sept.	1130	S-85-6	Japan	Kagoshima				C							2017	M. Ueno M. Fujii Y. Hishida K. Kajiyama
19 Sept.	1130	S-85-7	Japan	Kagoshima											2017	H. Oya T. Aso
19 Sept.	N/A	S-85-9	Japan	Kagoshima		G									N/A	S. Nakai Y. Izawa
19 Sept.	1130	S-85-10	Japan	Kagoshima			E								2000	N. Kawashima
19 Sept.	1130	S-85-11	Japan	Kagoshima		E									329	T. Tohmatsu T. Ogawa T. Hayashi
19 Sept.	1130	S-85-12	Japan	Kagoshima							F				N/A	S. Hayakawa K. Kato T. Kono K. Yamashita

Latest Monthly "Data Report - High Altitude Meteorology" issued by WDC-A for Meteorology is February 1969.

*Compiled from rocket flight summaries received by WDC-A for Rockets and Satellites during period 1December 1970 - 1 January 1971.

B.5 IONOSPHERIC OR AERONOMICAL ROCKETS

AT GREENBELT

Summaries of sounding rocket launchings are available, compiled from reports of sounding rocket launchings, National Reports to COSPAR, and other reports received by WDC-A for Rockets and Satellites. The following table lists launching sites for ionospheric or aeronomical rockets.

Sponsoring Launching Site	Geographical Latitude	Longitude East
ARGENTINA		
Chamical	30.33S	293.69
Mar Chiquita	37.77S	302.58
Mar Del Plata	38.00S	302.00
Tartagul (Vespucio)	22.77S	296.18
AUSTRALIA		
Carnarvon	25.00S	114.00
Woomera	31.10S	136.78
BRAZIL		
Cassino(1966 Solar Eclipse)	32.20S	307.83
Natal(Barreira do Inferno)	05.70S	324.80
CANADA		
Cape Parry	70.17N	235.28
East Quoddy	44.90N	296.60
Fort Churchill	58.80N	265.80
Gillam		
Resolute Bay	74.70N	265.10
FRANCE		
Dumont d'Urville	66.40S	140.01
Hamaguir, Algeria	30.85N	356.93
Ile du Levant	43.05N	06.47
Kourou	05.00N	307.00
Landes Test Center	44.27N	356.40
Reggane, Algeria	26.72N	00.17
Vik	63.42N	341.00
GREECE		
Karystos, Euboea (Evvoia)	38.02N	24.42
Koroni Beach	36.77N	21.95
INDIA		
Thumba	08.60N	76.90
INDONESIA	Western part of Java,	
LAPAN Space Center	Pameungpeuk area	
ITALY		
Sardinia	39.56N	09.24
JAPAN		
Akita	39.57N	140.07
Kagoshima	31.25N	131.07
Obachi	40.70N	141.73
Syowa Station	69.00S	39.60
KENYA		
San Marco Platform	02.93S	40.21
NETHERLANDS		
Surinam (Coronie)	05.83N	303.69
NEW ZEALAND		
Cape Karikari	34.00S	173.50
NORWAY		
Andoya	69.30N	16.00
PAKISTAN		
Sonmiani	25.20N	66.75
SPAIN		
El Arenosillo	37.10N	353.27
SWEDEN		
Kiruna (Esrange)	67.90N	20.50
Kronogard	66.22N	19.78
UNITED KINGDOM		
South Uist, Scotland	57.20N	352.80
U.S.A.		
Alaska Rocket Range	65.10N	212.50
Antigua, BWI	17.15N	298.21
Ascension Island	07.98S	345.58
Barking Sands (Kauai),Hawaii	22.07N	200.23
Barter Is., Alaska	70.12N	216.37
Cape Kennedy, Florida	28.40N	279.40
Eastern Test Range, Florida	28.45N	279.47
Eglin AFB, Florida	30.38N	273.30
Fairbanks, Alaska	64.80N	212.37
Fort Sherman, C. Z.	09.33N	280.02
Fort Wainwright, Alaska	64.82N	212.37
Johnston Atoll	16.75N	190.48
Keweenaw, Michigan	47.42N	272.28
Point Arguello, California	35.60N	239.40
Point Barrow, Alaska	77.30N	203.20
Point Mugu, California	34.12N	240.88
Puka Puka	15.00N	221.00
San Nicolas Is., California	33.23N	240.58
Tonopah, Nevada	38.00N	243.50
Vega Baja(Camp Tortoquero),PR	18.47N	293.58
Wallops Island, Virginia	37.90N	284.50
White Sands, New Mexico	32.30N	253.50
Yuma, Arizona	32.87N	245.68
USNS Croatan	Western N. Atlantic and eastern South Pacific Oceans	
U.S.S.R.		
Kapustin Yar	48.52N	45.80
Kheysa Island	80.62N	58.05
Molodezhnaya	67.67S	45.85
Volgograd	48.68N	44.35
Mid-Latitudes of U.S.S.R. Ship "Professor Vize"	45-50N	

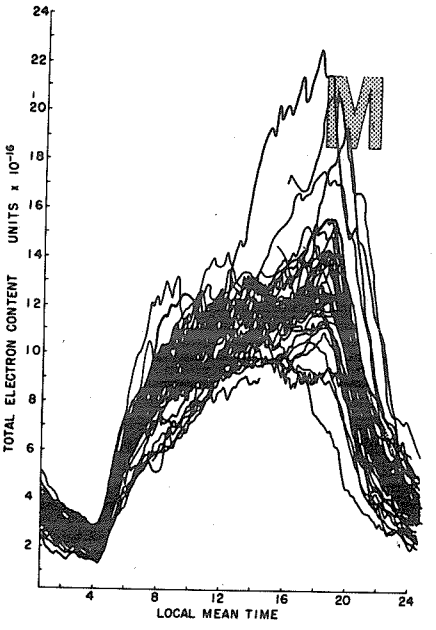


Fig. 4(a)

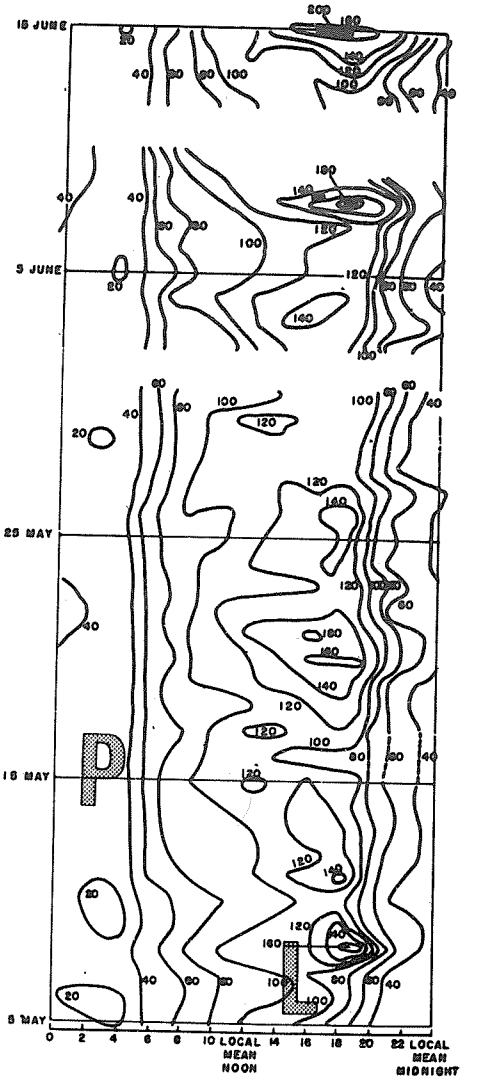


Fig. 4(b) Isopleths of constant electron content. Units x 10^{-15} electrons/mr^2

Fig. 4 Observations of the 136 MHz beacon of the Early Bird synchronous satellite made at the Sagamore Hill Radio Astronomy Observatory, Massachusetts, USA

B.6 TOTAL ELECTRON CONTENT - SATELLITE BEACONS

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
KIRUNA	68N	21								C	A	C							
OULU	65N	25											Q	Q					
KJELLER	60N	11								C									
COLD BAY	55N	197												Q	Q	Q	Q	Q	Q
KUHLUNGSBORN	54N	12								C									
LINDAU	52N	10								C	A	A	A	A	C				
BREISACH	48N	8									C	A	C	B					
EDMONTON	47N	239															A		
INVERCARGILL	46S	168									Q	Q	Q	Q	Q	Q	Q	Q	Q
FLORENCE	44N	11								C	A	B	Q	Q	Q		Q		
VAL-JOYEUX	44N	4								C	A	B	B						
FT COLLINS	41N	255															A		
GRAZ	41N	15								C	C	A	A	A	C				
TORTOSA	41N	0								C	A	A	A	A	C				
UNIV PARK	41N	282								C	C	B							
BOULDER	40N	254														A	A	A	Q
URBANA	40N	272		Q	Q		Q	Q	Q	Q	Q	Q	Q	A	A	A	Q	Q	Q
ASHKABAD	37N	58																	
PALO ALTO	37N	242								A	A	A	Q	Q	A	A	A	Q	Q
CHINA LAKE	35N	243											Q	Q	Q	Q	Q	Q	
TOKYO	35N	139								Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
CORONA	34N	243												Q	Q	Q	Q	Q	
UCLA	34N	242													Q	Q	Q	Q	Q
CLARK LAKE	33N	243															A		
HAIFA	33N	35									C								
SAGAMORE HILL	33N	254								C	B	A	Q	Q	Q	Q	Q	Q	Q
ROSMAN	32N	279													A		A		
COLLEGE STA	30N	264								C	A	B	B	B	C				
DELHI	28N	77								C	A	A	A	Q	Q	Q	Q		
TAIPEI	25N	121													Q	Q			
AHMEDABAD	23N	72								C	A	A	A						
HONG KONG	22N	114							Q	C	A	A	B	A	C				
HONOLULU	21N	201								C	A	A	A	A	A	A	Q	Q	Q
MIAHUATLAN	16N	264													Q	Q	Q	Q	Q
BANGKOK	13N	100								C	B	A	B						
ADDIS ABABA	09N	38										B	B						
ACCRA	05N	359								Q	Q	Q	Q						
SINGAPORE	01N	103						C	C										
NAIROBI	01S	36								C	A	B	B						
DAR ES SALAAM	06S	39										B	B						
TSUMEB	19S	17											Q	Q	Q				
SAN JOSE	23S	315								C	C								
TUCUMAN	27S	295									C	C							
BRISBANE	28S	153								C	B	C	C						
AUCKLAND	37S	175									Q	Q	Q	Q	Q	Q	Q	Q	Q
PORT STANLEY	51S	303							C										

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months
W = World Days Only

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

B.6 TOTAL ELECTRON CONTENT - SATELLITE BEACONS

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
PIONEER 6, TWO-FREQUENCY RADIO RECEIVER ESHLEMAN (65-105A-04)	121665	071166 ,	121665
PIONEER 7, TWO-FREQUENCY BEACON RECEIVER ESHLEMAN (66-075A-04)	081566	052069 ,	081766
MARINER 5, TWO-FREQUENCY BEACON RECEIVER ESHLEMAN (67-066A-02)	081566	112167 ,	061467
ATS 1, FARADAY ROTATION DAROSA (66-110A-15)	012167	123171 ,	120766
PIONEER 8, TWO-FREQUENCY BEACON RECEIVER ESHLEMAN (67-123A-03)	121467	030771 ,	121367
PIONEER 9, TWO-FREQUENCY BEACON RECEIVER ESHLEMAN (68-100A-03)	121967	030771 ,	110868

ABSORPTIONS-DEKREMENTE L/DB JANUAR 1969 1200 TU

(ABSORPTION LOSS)

FREIBURG

F/MHZ	1.725 I	1.725 II	2.05 I	2.05 II	2.44 I	2.44 II	2.90 I	2.90 II	B	C
TAG										
1	46.2	45.1	42.2	44.2	40.7	46.0	35.4	33.5	241	2.9
2	43.3	44.4	47.7	49.2	46.9	49.0	28.0+	28.0+	136	6.9
3	39.6	39.0	37.1	41.2	34.1	36.8	31.5	35.0	275	2.9
4	46.7	46.7	52.5	52.5	38.2	40.8	28.0+	24.9+	240	4.5
5	39.7	39.7	43.8	42.7	35.8	38.6	39.4	43.5	279	3.9
6	45.6	45.7	43.3	41.2	46.0	48.4	44.5	43.5	213	5.9
7	43.3	43.3	46.4	47.9	35.5	38.6	44.0	44.5	185	5.1
8	33.0	37.3	29.0	41.9	43.9	40.8	38.6	39.5	225	3.7
9	34.1	33.0	35.3	38.4	48.5	44.0	20.4+	18.5+	258	2.1
10	37.3	37.3	27.0	31.2	22.8	25.0	22.6	24.5	240	1.6
11	29.0<	28.5<	23.4<	26.4<	21.2<	20.3<	22.6	23.3	230	0.9
12	39.6	37.3	27.8	[illegible]	17.0<	22.5<	20.2	25.1	193	1.2
13	25.4<	27.5<	23.2<	[illegible]	20.0	19.1	26.6	26.9	180	2.9
14	30.0	34.1	18.9<	[illegible]	16.5	24.5	23.6	27.6	193	2.4
15	37.3	37.3	30.0	34.1	22.0	30.2	28.5	31.5	219	2.7
16	36.3	36.3	27.2	31.6	30.6	36.7	27.4	33.4	229	3.3
17	36.3	38.6	31.1	37.8	28.7	30.4	25.8	30.1	259	2.2
18	37.9	39.1	36.2	37.3	35.2	34.3	37.2	36.7	219	4.5
19	23.5	24.5	22.2	23.1	20.0	21.1	23.3+	18.0+	134	3.7
20	C	C	C	C	C	[illegible]	C	C	G	G
21	C	C	C	C	C	[illegible]	C	C	G	G
22	20.4<	24.5<	30.5<	26.8<	21.7	22.6	31.6	30.4	183	3.1
23	33.0	36.2	27.4	31.3	24.3	28.7	33.6	35.9	221	3.3
24	30.0<	34.0<	30.5	29.1	25.0	23.8	29.8	31.0	241	2.1
25	30.5<	31.5<	28.6<	28.6<	30.1	34.7	37.7	35.8	148	5.4
26	25.5<	29.5<	15.1<	22.7<	21.7	28.0	32.5	35.0	130	4.0
27	19.8	20.6	12.4<	14.1<	19.6<	20.2<	17.6	25.0	107	2.9
28	20.6<	17.5<	15.9<	17.9<	20.0	20.0	14.7	16.3	112	2.5
29	16.3<	14.8<	11.7<	25.7<	20.9	22.0	23.4	20.3	107	3.0
30	36.4	35.3	41.7	42.2	35.6	36.2	34.3	36.3	237	5.1
31	37.8	33.0	28.7<	29.8<	20.3	22.3	17.6	23.7	227	3.8
MEDIAN COUNT	42		38		52		58		29	29
MEDIAN	37.3		37.2		30.4		29.1		148	3.3

B.7 ABSORPTION - METHOD A1 (PULSE ECHO)

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
RESOLUTE BAY	74N	266	B	A	B	B	C	S											
DIXON	73N	80	C	A	A	B	B		B	B	A	A	Q	Q					
TROMSO	69N	19	B	A	S														
MURMANSK	68N	33			A	A	A	A	A	A	A	A	A						
BAKER LAKE	64N	264	C	B	C	S													
KJELLER	60N	11	B	A	C	S													
CHURCHILL	58N	266	B	A	B	C	S												
SVERDLOVSK	57N	61								Q	Q	Q	Q						
TOMSK	56N	84	C	A	A	A	A	B	A	A	A	A	A	A	C				
MOSCOW	55N	37	B	A	S														
JULIUSRUH/RU	54N	13	C	C	A	A	A	C	B	A	A	S							
ABERYSTWYTH	52N	356								A	A								
DE BILT	52N	5	B	A	A	A	A	A	A	A	A	A	C	B	A	A	A	B	
IRKUTSK	52N	104	C	B	B	A	A	A	A	C	S								
LINDAU	51N	10	C	A	A	S													
SWANSEA	51N	356	C	A	S														
WINNIPEG	49N	263	C	A	S														
FREIBURG	48N	7	B	A	A	A	A	A	A	A	A	A	A	A	A	A	Q	Q	
ROSTOV	47N	39		B	B	A	A	B	A	A	A	B	A	A	B				
OTTAWA	45N	285	B	A	S														
GENOVA	44N	9		A	A	A	A	A	B	A	B	A	A	B	B	A	Q	Q	
ALMA ATA	43N	76	B	A	A	B	A	C		A	A	A	A	A	B	A	C	Q	
PENN STATE U	40N	283	B	A		C	S												
ASHKHABAD	37N	58	B	A	A	B	C	B		A	A	B	B	B	B	A	Q		
TOKYO	35N	139	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	Q	
DELHI	28N	77	B	B	A					B	C								
TAIPEI	25N	121									B	S							
AHMEDABAD	23N	72	C	A	C	S													
IBADAN	07N	3	A	A	S														
COLOMBO	06N	79	B	A	A					A	A	A	A	A	A	A	S		
SINGAPORE	01N	103								A	A	S							
LWIRO	02S	28			A	S													
TSUMEB	19S	17	B	A	S														
JOHANNESBURG	26S	28	C	A	S														
BRISBANE	27S	153	B	B	S														
PORT STANLEY	51S	303	B	B	A														
MIRNY	66S	93				Q	Q			Q	A	A							
HALLEY BAY	75S	334	B	A	S														

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

Absorption--Method A2 (Riometer)

Method A2 (Riometer) data consist of monthly tables of values of absorption (in dB) occurring at the hours obtained by the cosmic-noise technique (riometer). For selected stations the original strip charts or microfilm of the strip chart recordings are held.

ABSORPTION

A2 (RIOMETER)

Ionospheric Absorption of 27.6 Mc/s Cosmic Noise

Maximum Absorption During Each Hour, in Tenths of Decibels

(Time in Tenths of Hours)

April 1964 — Time in UT — Observatory: Kiruna

	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09
	Abs-Time	Abs-Time	Abs-Time	Abs-Time	Abs-Time	Abs-Time	Abs-Time	Abs-Time	Abs-Time
1	E	E	E	E	E	E	E	2 077	2 087
2	8 002	5 019	24 029	35	60 049	54 050	32 060	16 070	18 082
3	13 005	20 015	16 020	38	60 040	38 050	12 065	6 070	E
4	6 000	3 010	20 029	23 032	6 040	20 057	28 061	12 070	10 088
5	E	E	E	E	26 049	27 050	8 060	6 074	2 080
6	E	E	E	E	E	4 050	E	2 078	E
7	17 000	5 010	5 021	3 030	E	E	2 060	7 079	13 081
8	E	3 016	E	E	2 040	E	E	E	E
9	E	E	E	2 031	7 04[illegible]	12 053	6 060	E	E
10	3 000	3 010	6 020	6 030	3 04[illegible]	5 050	E	3 079	4 082
11	E	E	E	E	E	E	2 069	E	3 086
12	E	E	E	E	E	E	3 065	3 070	4 084
13	E	E	3 024	4 030	4 040	4 050	4 060	4 076	10 088
14	E	E	E	E	E	E	E	3 078	3 088
15	E	E	E	E	E	E	E	E	E
16	E	6 015	24 027	20 030	2 044	3 050	[illegible]	E	E
17	E	28 018	29 020	4 030	E	E	[illegible]	E	E
18	3 001	E	E	E	E	E	[illegible]	E	E
19	29 005	13 010	16 020	32 033	15 040	10 051	9 060	7 072	5 089
20	5 000	22 019	24 021	8 039	5 040	7 058	8 061	12 079	42 088

B.8 ABSORPTION - METHOD A2 (RIOMETER)

AT BOULDER

HOURLY VALUES

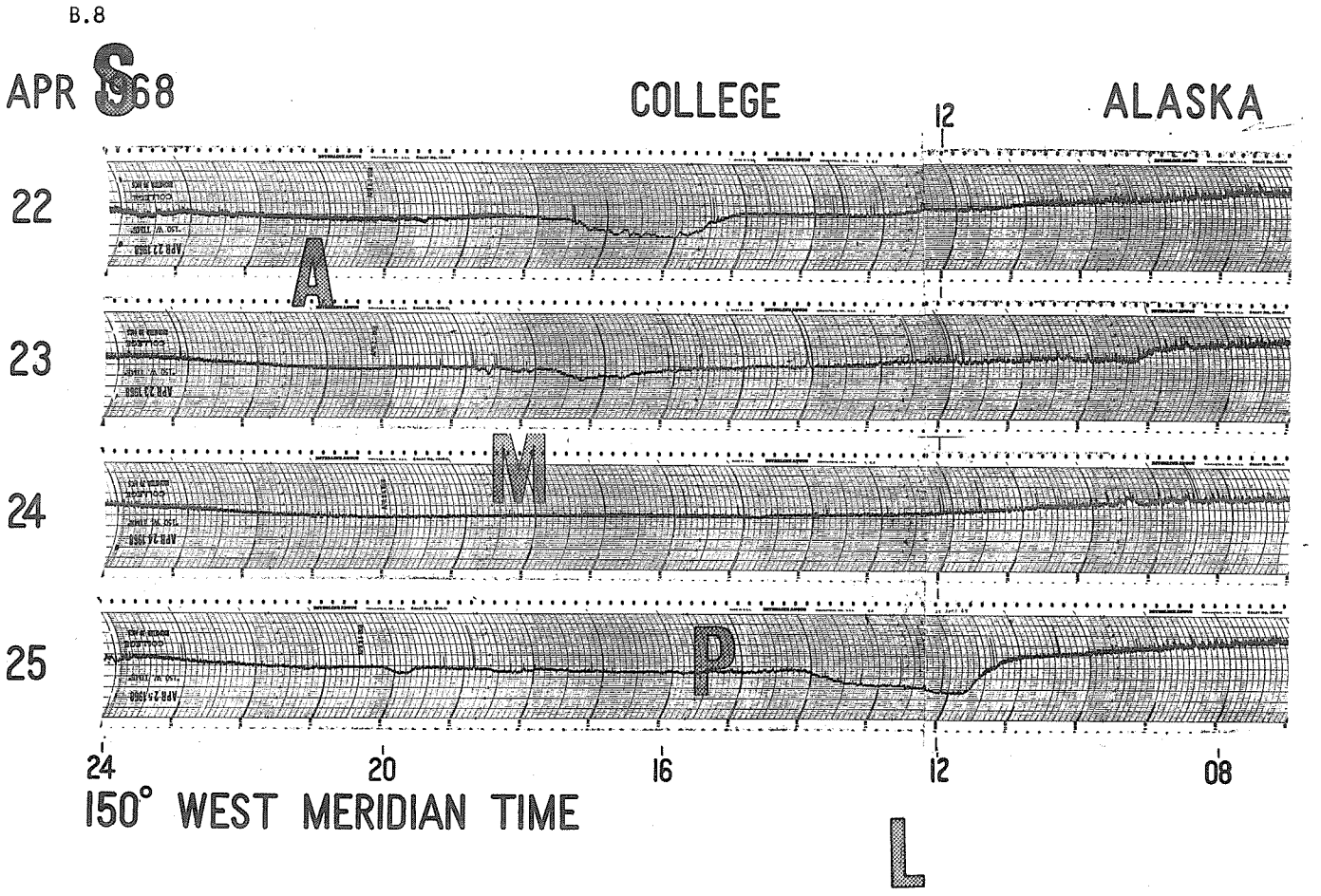
STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
HEISS IS	80N	58								A	A	A	B	A	A	A	Q		
DIXON	73N	80								B	B	B	A	A	A	A			
TIXIE BAY	71N	128								A	S			C					
KEVO	69N	26														B			
NORILSK	69N	88																C	
MURMANSK	68N	33								B	A	A	A	A	A	B	A		
KIRUNA	67N	20		B	B	B	A	A	A	B	A	A	A	A	A	A	B	Q	Q
SODANKYLA	67N	26														B	Q		
OULU	65N	25														C			
COLLEGE	64N	213			B	A	A	A	B										
FROBISHER BAY	63N	292							B	B	C	S							
CHURCHILL	58N	266	B	A	A														
EDINBURGH	55N	357		B	B														
GREAT WHALE	55N	283							B	B									
CAPE JONES	54N	281							B	A		S							
MEANOOK	54N	247		B	A	S													
NEUSTRELITZ	53N	11			B	A	A	C	B	A	A	A	A						
BAIE ST PAUL	47N	290							B	A	A	S							
PULLMAN	46N	243		A	A	S													
OTTAWA	45N	285	C	A															
ALMA ATA	43N	76								A	A	A	A						
FLORENCE	43N	11							B	A	A	C							
WASHINGTON	38N	283							A	A	C	S							
SAN FRANCISCO	37N	238		A	A	S													
CANARY IS	28N	345															B	B	
DELHI	28N	77	B																
AHMEDABAD	23N	72	B	A	A	S				B	A								
PUERTO RICO	18N	293			A	S													
MIRNY	66S	92					B	C			Q	Q							
SYOWA BASE	69S	39													A	Q	Q	Q	
EIGHTS	75S	283							B	B		S							
BYRD STATION	80S	240							A	A									
SOUTH POLE	90S	0							A	A									

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

B.8


APR 68
COLLEGE
ALASKA
12
22
23
24
25
A
M
P
24
20
16
12
08
150° WEST MERIDIAN TIME
L
E

AT BOULDER

B.8 ABSORPTION - METHOD A2 (RIOMETER)

STRIP CHARTS

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
THULE	76N	292		B				Q	Q	Q	Q	Q	Q	Q	Q	A	A	A	C
RESOLUTE BAY	74N	266			Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	A	A	A	A	Q
BARROW	71N	204		B	S														
AMDERMA	69N	61								P	P								
BAR 1	69N	220											B	A	A	A	A	B	S
GODHAVN	69N	307							Q		Q	Q	Q	Q	Q	Q	Q	Q	Q
NORILSK	69N	88								Q	Q	B							
TROMSO	69N	19									Q	Q	Q	Q	Q	Q	Q	Q	
UTSJOKI	69N	27											Q	Q	Q	Q	Q	Q	
SHEPHERD BAY	68N	267							Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	
KIRUNA	67N	20										A	A	A	A	A	B	B	Q
SDR STROMFJORD	67N	310														Q	Q	Q	Q
FT YUKON	66N	215		C									A	A	A	A	A	A	C
OULU	65N	25														Q	Q	Q	
COLLEGE	64N	213	B	A					B	A	A	A	A	A	A	A	A	A	C
CORAL HARBOR	64N	277			Q	Q	Q	Q	Q	Q	S								
REYKJAVIK	64N	339									B	A	A	A	A	S			
FROBISHER BAY	63N	292							B	A	C	S							
PAXSON	63N	215											B	A	A	A	A	A	C
FAREWELL	62N	207	C	A	S														
YAKUTSK	62N	129															Q		
ANCHORAGE	61N	211						B	A	A	A	A	A	A	A	A	A	A	C
SHEEP MOUNTAIN	61N	213											B	A	A	A	A	A	C
NARSSARSSUAQ	61N	314										Q	Q	Q	Q	Q	Q	Q	Q
WILDWOOD	60N	209											B	A	A	A	A	C	S
NURMIJARVI	60N	24											Q	Q	Q	Q	Q	Q	
CHURCHILL	58N	266	C	A	A	Q	Q	Q	Q	Q	Q	Q	Q	Q	A	A	A	A	Q
KING SALMON	58N	204	C	A	S														
EDINBURGH	55N	357								Q	Q								
GREAT WHALE	55N	283							B	A	A	A	A	A	A	A	A	A	C
CAPE JONES	54N	281			Q	Q	Q	Q	A	A	B	S							
COLD LAKE	54N	249							Q	Q									
PRINCE ALBERT	53N	255							Q	Q	Q	Q	Q	S					
UNALASKA	53N	194	C	A	S														
GOOSE BAY	53N	300															Q	Q	Q
MOOSONEE	51N	280							Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	
VAL D'OR	48N	283			Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q			
BAIE ST PAUL	47N	290							B	A	A	S							
OTTAWA	45N	285	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	A	A	A	A	Q
BOSTON	42N	289							Q	B	A	A	Q	B	Q	Q	Q	Q	
TOLEDO	39N	355														Q	Q	Q	
ATHENS	37N	23							Q	Q									
ALAMOGORDO	32N	319						Q	Q	Q	S								
HAIFA	32N	35							Q	Q	Q	Q	Q	Q					
DELHI	28N	77							Q	Q	Q	Q	Q	Q	Q	Q	Q		
MAUI	20N	204						Q	Q	Q	Q	S							
JAMAICA	18N	284									Q	Q	Q	Q	Q	S			
MANILA	14N	121							Q	Q	Q	Q	Q	Q	Q	Q	Q		
ACCRA	05N	360						Q	Q	Q	Q	Q	Q	Q	Q	Q			

Continued

KEY TO SYMBOLS

A = 12 Months
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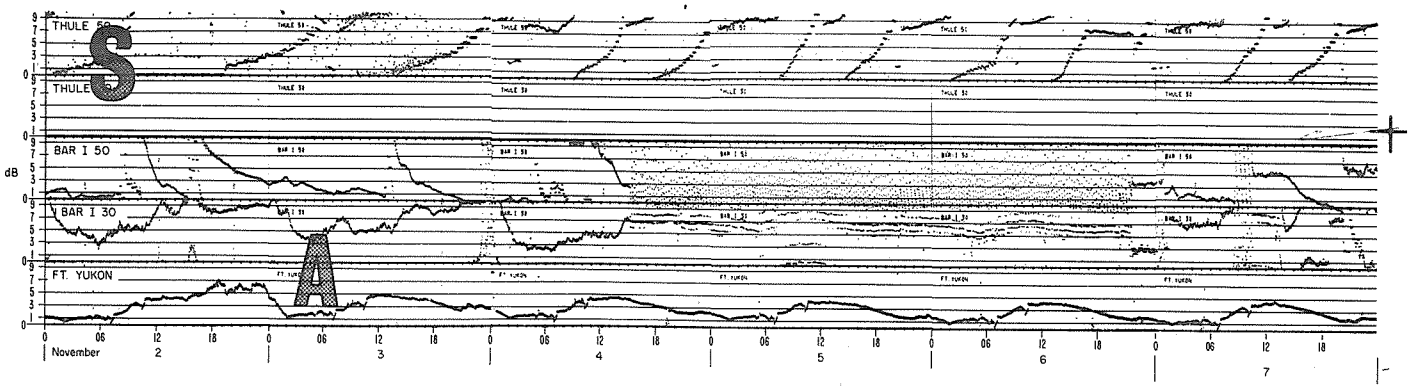
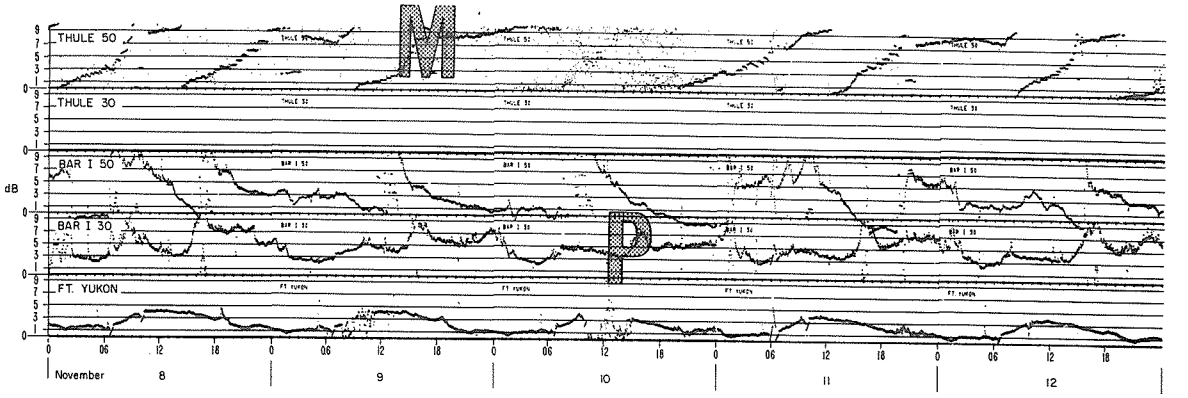
C = 1-5 Months

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

RIOMETER DATA FROM HIGH LATITUDE STATIONS

November 2-12, 1969





These data are recorded on magnetic tape. A computer program converts the data to dB units and produces this microfilm output showing the stations on the same time scale.

B.8 ABSORPTION - METHOD A2 (RIOMETER)

AT BOULDER

STRIP CHARTS Cont'd.

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
HUANCAYO	12S	285					Q	Q	Q	Q	Q		Q	Q	Q	Q			
SAN JOSE	23S	315							Q	B	Q	Q	Q	Q	Q	Q			
CARNARVON	25S	114										C	Q	Q	Q	Q	Q		
DURBAN	29S	30														Q	Q		
HERMANUS	34S	19						Q	Q	Q	Q	Q	Q	Q	Q	Q			
MELBOURNE	37S	144											Q	Q					
KERGUELEN	49S	70						Q		Q	Q		Q	Q					
CAMPBELL IS	52S	169												Q	Q	Q	Q	Q	
MACQUARIE	54S	150												Q	Q	Q	Q		
CASEY	66S	110													Q	Q	Q		
MAWSON	67S	62												Q	Q	Q	Q		
DAVIS	68S	78													Q	Q	Q		
SYOWA BASE	69S	39											B	A	A	A	A	A	
SANAE	70S	358								B	A	C							
BAUDOUIN	70S	23									Q	Q							
CAPE HALLETT	72S	170				B	Q	Q	Q	S									
EIGHTS	75S	283							B	A	B	S							
BELGRANO	77S	322								B	A	A	A						
MCMURDO	77S	166						C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	
VOSTOK	78S	106								C	A	A	A	A	A	A	A	A	
BYRD STATION	80S	240							A	A	A	A	A	A	A	A	A	S	
SOUTH POLE	90S	0							A	A	A	A	A	A	A	A	A	A	

NOTE: Some of these data are held on paper charts and some on 35 mm microfilm.
The Alaskan chain strip charts for 1969-1972 are on microfilm.

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months

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S = Program STOPPED operations (see MASTER STATION LIST for actual date)

Method A3 (CW Field-Strength) data consist of monthly tables of hourly or half-hourly values of absorption obtained by measurement of the field strength of sky-wave signals at either short distance or at oblique incidence on suitable frequencies. Some unscaled strip charts, used primarily for relative field-strength for evidence of sudden ionospheric disturbances, are also available. See C.6, SWF.

Transmitter: Kiel-radio Frequency: 2775 kHz Recept. station: Kolberg

Power: 0.5 kW Reduct. factor: Distance: 340 km

Month: April 1964 Geograph. coord. of refl. point: φ = 53° 19' / λ = 12° 01'

Time: [GMT]	06.00 06.15	06.30 06.45	07.00 07.15	07.30 07.45	08.00 08.15	08.30 08.45	09.00 09.15	09.30 09.45	10.00 10.15	10.30 10.45
Date	dB	dB	dB	dB	dB	dB	dB	dB	dB	dB
1.	–		29,0	27,0	27,0	24,0	22,0	18,0	17,5	15,5
2.	47,0		48,0	52,5	51,0	49,0	45,5	41,0	36,5	37,0
3.	44,0	40,5	41,5	–	–	–	–	–	–	–
4.	–	37,0	37,0	35,0	34,0	33,0	31,0	28,0	30,0	29,0
5.	–	–	–	–	–	–	–	–	–	–
6.	43,5	42,5	39,5	39,5	37,5	36,0	35,0	34,0	33,0	31,0
7.	46,5	44,5	43,5	40,5	41,5	34,5	35,5	35,0	35,5	32,0
8.	50,5	50,5	44,5	42,5	41,5	38,0	35,0	32,0	34,5	30,0
9.	48,0	48,0	43,5	42,5	39,5	35,0	34,0	32,5	29,5	29,0
10.	42,0	43,0	40,5	35,0	34,5	31,5	26,0	29,0	24,5	27,5
11.	37,5	34,0	34,0	31,5	34,0	30,5	26,5	–	26,5	24,5
12.	40,0	39,5	34,5	33,0	30,0	28,0	26,5	24,5	20,5	21,0
13.	40,0	34,0	33,0	31,0	23,0	26,0	24,0	28,0	26,5	25,0
14.	36,0	31,5	32,0	28,0	27,5	22,5	21,0	26,5	27,0	19,0
15.	45,0	44,0	41,0	37,5	34,0	–	24,0	25,5	23,0	23,0
16.	42,0	41,0	–	34,5	33,5	29,5	26,0	23,5	24,5	21,0
17.	38,0	37,5	–	32,5	29,5	26,5	26,5	23,5	22,0	20,5
18.	43,0	–	–	–	33,0	28,0	28,5	26,0	21,5	23,0
19.	38,0	36,5	37,5	33,0	32,5	31,0	25,0	–	28,5	27,0
20.	42,5	43,5	42,5	37,5	34,5	33,0	32,5	25,5	25,5	23,0
21.	40,0	38,5	34,5	30,5	26,5	24,5	22,0	20,5	19,0	17,0
22.	41,0	35,0	35,0	30,5	38,5	24,5	22,0	22,5	20,0	20,0
23.	45,5	41,0	30,5	34,0	29,5	24,0	22,5	22,0	19,0	19,5
24.	33,5	33,0	33,5	–	24,5	23,0	21,0	21,0	17,0	19,0
25.	41,0	37,5	36,0	30,5	27,0	25,5	22,0	23,0	20,5	15,5
26.	42,0	38,0	35,5	36,0	29,5	25,0	21,5	23,0	16,0	18,0
27.	48,0	48,5	41,5	36,5	31,5	27,0	22,0	21,0	20,5	20,5
28.	51,5	50,0	45,5	40,0	33,0	26,0	24,5	–	–	–
29.	33,0	31,0	30,5	25,5	26,5	28,0	25,5	24,5	25,0	21,0
30.	34,5	35,0	31,0	–	25,0	23,0	17,5	21,0	18,5	20,5
31.										
Median										

B.9 ABSORPTION - METHOD A3 (CW FIELD STRENGTH)

AT BOULDER

TABULATIONS

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
KUHLUNGSBORN	54N	11	B	A	B	B	A	B	B	A	A	A	A	A	A	A	A	A	
NEUSTRELITZ	53N	11								A	A	A	A	A	A	A	A	A	
DE BILT	52N	5												B	A	A	A	B	Q
KOLBERG	52N	13								A	A	S							
COLLM	51N	13						B	A	A	A	A	A	A	A	Q	Q	Q	
LINDAU	51N	10	C	B	A	A	A	A	A	A	A	A	A	A	A	C			
PANSKA VES	50N	14					A		C	A	A	S							
PRUHONICE	50N	14		C	A					A	A	A	A	A	A	A	A	B	
NAGYCENK	47N	16											Q	A	Q	Q			
SOFIA	42N	23								A	A								
AKITA	39N	140								A	A	S							
ATHENS	38N	23														C	C		

B.9 FIELD-STRENGTH STRIP CHARTS (UNSCALED)

AT BOULDER

STRIP CHARTS (UNSCALED)

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
ANCHORAGE	61N	211	B	A	A	A	A	A	B	A	A	A	A	B	B	B	B	C	P
ADAK	51N	184	B	A	A	A	A	A	A	A	A	S							
BOULDER NOAA	40N	255				B	A	A	B	A	A	B	A	A	A	A	A	A	B
FT MONMOUTH	40N	286		C	A	A	A	A	A	A	A	B	C	S					
FT BELVOIR	38N	283	B	A	A	A	A	A	A	A	A	A	A	C	S				
WHITE SANDS	32N	253	B	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	C
OKINAWA	26N	128	B	A	A	A	A	A	A	A	A	A	A	B	A	C	C	P	S
PUERTO RICO	18N	293	B	A	A	A	A	A	B	S									
TRINIDAD	10N	299								B	A	A	B	A	B	A	B	B	C
HUANCAYO	12S	285	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B

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B.10

Drift measurements are of four methods:

D1 - intercomparison of fading signals at three or more antennas spaced a few wavelengths apart

D2 - radio observations on drifting meteor trails

D3 - radio-star scintillations with three or more antennas spaced many wavelengths apart

D4 - observations of characteristic reflection features at widely spaced sites

[D5 - chemical releases from rockets] (cf COSPAR Information Bulletin No. 45, p. 14, Decision 20, August 1968)

IRKUTSK — IONOSPHERIC DRIFTS

Дата Date	Время Time GMT	Слой, высота (км) Region Height (км)	V м/сек. m/s	Ф град. deg.	Vx м/сек. m/s	Vy м/сек. m/s
		Январь — 1968 год January				
3	03.09	130 E	97	317	—66	+72
	04.36	120 E	161	27	+73	+143
	08.35	250 F_2	240	180	00	—240
	13.06	330 F_2	337	00	00	+337
4	00.35	250 F_2	136	237	—113	—75
	01.05	110 Es	124	241	—108	—61
	01.35	110 Es	97	229	—73	—64
	02.05	110 Es	55	251	—52	—18
	02.35	110 Es	113	221	—73	—86
	03.05	105 Es	104	244	—93	—46
	03.35	110 Es	264	212	—141	—223
	04.05	110 Es	107	225	—76	—75
	04.35	130 E	152	236	—127	—84
	06.05	125 E	216	00	00	+216
	06.35	100 E	182	22	+68	+169
	11.35	225 F_2	234	318	—157	+174
	19.05	335 F_2	107	282	—104	+22
	19.35	305 F_2	147	270	--147	00
	20.05	300 F_2	120	270	—120	00
	20.35	305 F_2	87	231	—67	—55

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
			YEAR																
GODHAVN	69N	307										Q	Q	Q	Q	S			
MURMANSK	68N	33		C	A	C				B	A	C	S						
COLLEGE	64N	213												Q					
GORKY	56N	44	B	A	A	C	S												
TOMSK	56N	84	C	A	B	A	B	B	B	A	A	B	A	B					
KOOTWIJK	55N	5	B	A	S														
MOSCOW	55N	37	CW	AW	AW					B	B	S							
KUHLUNGSBORN	54N	11	B	A	B	B	A	B	B	A	A	A	A	A	A	A	A	A	
ABERYSTWYTH	52N	356								A	A								
CAMBRIDGE	52N	0	B	B	B	S													
DE BILT	52N	5											A	A	A	A	A	Q	
IRKUTSK	52N	104		B	B	A	A	B	C	B	B	B	B	C					
NEDERHORST	52N	5	B	A	S														
COLLM	51N	13						B	A	A	A	A	A	A	A	A	A	A	
SWANSEA	51N	356	B	C	S														
COLOGNE	50N	6	B	C	S														
KHARKOV	50N	36	C	A	A	Q	S												
FREIBURG	48N	7	B	A	A	A	A	S											
GARCHY	47N	3										P	P	P					
ROSTOV	47N	39		BW	AW	BW				AW	BW		BW	CW					
OTTAWA	45N	285	C	S															
SIMEIS	44N	34	C	B	S														
ALMA ATA	43N	76								B	B	B	B	C	C				
ASHKHABAD	37N	58		A	A	B	B	B	C	B	B	B	B						
YAMAGAWA	31N	130	B	A	B	C	C	C	C	A	A	C	C	C					
AHMEDABAD	23N	72	B	B	S														
PUERTO RICO	18N	293	A		B	B													
WALTAIR	17N	83	B	A	B	S													
BARBADOS+	13N	300								B	B								
TOGO	10N	0									B	B	S						
IBADAN	07N	3	C	B	S														
PARAMARIBO	06N	305															A		
SINGAPORE	01N	103								B	C	S							
JOHANNESBURG	26S	28		A	S														
BRISBANE	27S	153	B	A	S														
ADELAIDE	34S	138												Q	Q	Q			
LOWER HUTT	41S	174	B	A	S														
HALLEY BAY	75S	334	B	A						C	A								

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PUBLICATIONS:

World Data Center A Report UAG-17, NOAA, October 1971, Ionospheric Drift Velocity Measurements at Jicamarca, Peru (July 1967 - March 1970).

B.11

IONOSPHERIC SCINTILLATIONS FROM SATELLITE BEACONS

In the polar regions there often occur columns of enhanced ionization aligned with the earth's magnetic field, known as field aligned irregularities. These irregularities of the ionosphere occur in association with the aurora and other high-latitude phenomena. Owing to variations in refractive index and to multipath effects produced by these irregularities, signals propagating through the ionosphere during times when such irregularities are present suffer perturbations which have characteristics similar to "noise". These perturbations have been studied extensively over the past decade by radio-astronomy techniques and are known as radio-star scintillations. Since they are related to the aurora, the occurrence statistics are similar to that of the aurora: the diurnal maximum occurs near magnetic midnight; the day-to-day fluctuations are similar; seasonal variations maximize near equinoxes; and they are more frequent during solar maximum periods.

During the past several years they have been noted to affect signals from satellites in the polar regions. On such signals they produce an effect very similar to a noise-enhancement. The data signals will sometimes be nearly unusable and command functions from the ground to the spacecraft will sometimes become scrambled. These effects are common in the 100 MHz to 400 MHz region. Such effects diminish according to the inverse square of the frequency. Thus recent spacecraft utilize frequencies in the range of 1700 MHz. Similar irregularities occur also in the equatorial regions and are observed during acquisition of satellite signals at stations located within about ± 10° from the geomagnetic equator.

The scintillation signals as received during satellite acquisition may provide a means of studying such scintillations in addition to the usual radio astronomical methods. Further, such studies may help in design of spacecraft telemetry and in determining best locations for satellite data acquisition stations. Thus the WDC will attempt to preserve records for certain of the existing stations in the polar and equatorial regions.

Recordings held are the strip charts from some of the telemetry sites for selected periods.

8.11 IONOSPHERIC SCINTILLATIONS FROM SATELLITE BEACONS

AT BOULDER

STRIP CHARTS

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
GODHAVN	69	307														Q	Q	Q	Q
OULU	65N	25											Q	Q	Q	Q	Q	Q	
BAKER LAKE	64N	264				B	B	B	B	B									
COLLEGE	64N	212							C	B	A	A	A						
NORTHWAY	63N	218							C										
CAMPBELL IS	52S	169												Q	Q	Q	Q		
ADAK	51N	183					C	B											
MOOSE RIVER	51N	279							C										
HOUGATON	47N	271					C	C											
MADISON	43N	271					A	C											
DANVILLE	40N	272							C										
URBANA	40N	272		B	A	B	B	B	A	B									
TAIPEI	25N	121													Q	Q	Q		
WAKE ISLAND	20N	166				C		C											
LIMA	11S	282										A	B						
AUCKLAND	37S	175													Q	Q	Q	Q	
WELLINGTON	41S	174													Q	Q	Q		
INVERCARGILL	46S	168													Q	Q	Q	Q	
SCOTT BASE	77S	166													Q	Q	Q		
BYRD	80S	240					C												

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S = Program STOPPED operations (see MASTER STATION LIST for actual date)

PUBLICATIONS:

The following list of publications is from work done by The Joint Satellites Studies Group:

1. Auroral Oval and Scintillation Boundary, *AFCRL*, Bedford *#68-0380*, July 1968.
2. Geophysical Aspects of Radio Star and Satellite Ionosphere Scintillations from book *Spread F and Its Effects Upon Radio Wave Propagation and Communication*, pp 247-266, 1966.
3. Latitudinal Effects on Satellite Scintillations, *AFCRL #66-864*, Dec. 1966.
4. Measurements of Radio Star and Satellite Scintillations at a Sub-Auroral Latitude, *AFCRL #65-40*, Jan. 1965.
5. Relation of Sudden Frequency Deviations to the Spectrum and Other Characteristics of Solar Microwave Bursts, *J. Atmos. and Terr. Phys.*, Vol. 31, 1969.
6. Scintillation Boundary, *J. Geophys. Res.*, Vol. 74, Feb. 1969.
7. Scintillation Observations of Synchronous Satellites, *AFCRL #69-0011*, Jan. 1969.
8. Studies of Latitudinal Variations of Irregularities by Means of Synchronous and 1000 Kilometer Satellites, *Space Research*, Vol. 7.
9. Synoptic Study of Scintillations of Ionospheric Origin in Satellite Signals, *AFCRL*, April 1965.
10. 136 MHz Early Bird Scintillations, Summer, 1965 Observations, *AFCRL #66-0859*, Oct. 1966.
11. Geomagnetic Control of Satellite Scintillations, *J. Geophys. Res.*, Vol. 68, 1963.
12. The Statistics of Satellite Scintillations at a Sub-Auroral Latitude. *J. Geophys. Res.*, Vol. 69, 1964.
13. High Latitude Models, Observations, and Analysis of Ionospheric Scintillations, *AFCRL #73-0048*, Jan. 1973.

IONOSPHERIC BACK-AND FORWARD-SCATTER

Little data in WDC-A. Stations are invited to report their experimental arrangement, the outline of the observing schedule, and the data reduction and analysis made or intended. The information will be catalogued and inquiries referred to the experimenter.

S

Kühlungsborn
(54°07'N ; 11°46'E)

September 1963

A

33 Mc/s Radar Observations

of E_s-propagated ground-backscatter and
of long-duration (> 0,3 s) meteor echoes

\- = no occurrence
x = no observation

M

P

E

E

Date	Occurrence of E_s-propagated ground-backscatter (Direction/Intensity,0-3)							Mean daily meteor echo rate (h^{-1})
	13.35	15.05	16.35	18.05	19.35	21.05	22.35 UT	
1.	-	-	-	-	-	-	-	17
2.	-	-	-	-	-	-	-	21
3.	-	-	-	-	-	-	-	23
4.	-	-	-	-	-	-	-	23
5.	-	-	-	-	-	-	-	16
6.	-	-	-	-	-	-	-	25
7.	-	-	-	-	-	-	-	14
8.	-	-	-	-	-	-	-	24
9.	-	-	-	-	-	-	-	25
10.	-	-	-	-	-	-	-	28
11.	-	-	-	-	-	-	-	5
12.	-	-	-	-	-	-	-	17
13.	-	-	-	-	-	-	-	14
14.	-	-	-	-	-	-	-	20
15.	-	-	-	-	-	-	-	29
16.	-	-	-	-	-	-	-	30

E

B.12 IONOSPHERIC BACK AND FORWARD SCATTER

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
BARROW	71N	204								B	A	A	B	Q	Q	Q	Q	Q	
COLLEGE	64N	213	C	C	S														
YAKUTSK	62N	129	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
NARSSARSSUAQ	61N	315									Q	Q	Q	Q	C	B	A	A	C
ALSBJERG	56N	9														Q	Q	Q	
ANNETTE	55N	229								A	A	A	A	S					
KNOB LAKE	54N	294		C	S														
KUHLUNGSBORN	54N	11	B	A	B	B	A	B	B	A	A	A	A	B	A	A	A	A	
MEANOOK	54N	247		B	S														
LINDAU	51N	10														Q	Q	Q	
PULLMAN	46N	243	C	A	S														
PLUM ISLAND	43N	289								C	A	S							
MILLSTONE	42N	288							B	C									
CEDAR RAPIDS	41N	269		B	S														
ROMA	41N	12	C	B	S														
BOULDER	40N	255	C	A	S														
FT MONMOUTH	40N	286		B	S														
SAN FRANCISCO	37N	238	C	A	S														
TOKYO	35N	139	BW	AW	CW	S													
OKINAWA	26N	127		C	S														
PANAMA	09N	281	C	C	S														
NAIROBI	01S	36													Q	Q	Q	Q	
HUANCAYO	12S	285	C	A	S														
AREQUIPA	16S	289	C	B	S														
ANTOFAGASTA	23S	290	C	B	S														
DURBAN	29S	30	C	S															
CAMDEN	34S	150	C	A	S														

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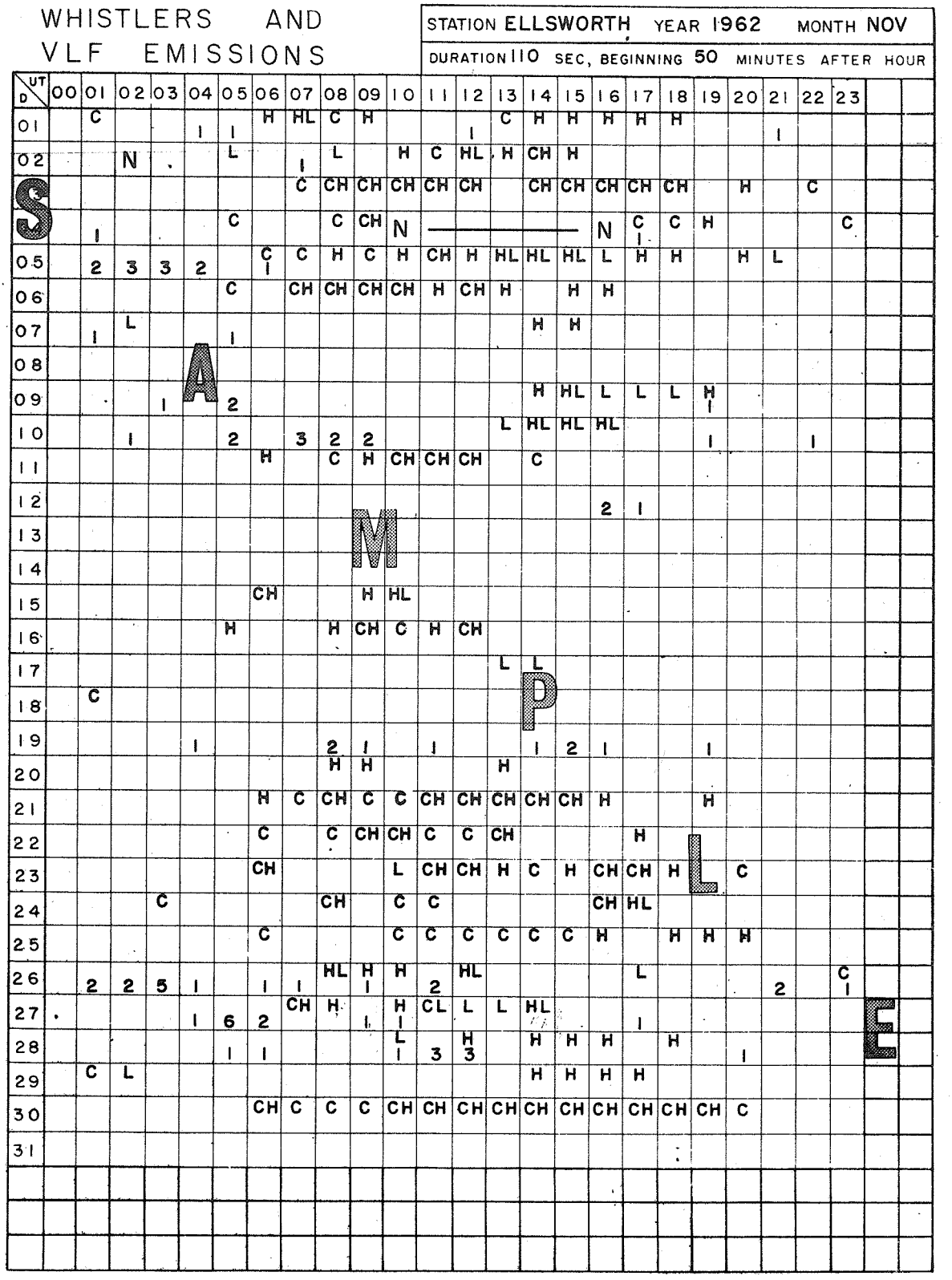
M O V I E S:

1. Influence of Ionospheric Waves on HF Sweep-Frequency Backscatter, by Thomas A. Croft, Radio Science Laboratory, Stanford University, Stanford, California, 16 mm color movie film, no sound, $10.00 minimum charge for loan.

B.13

These data consist of monthly aural data summaries and continuous VLF noise recordings.



AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
NORD	81N	344								A	S								
THULE	75N	292								Q	Q	Q	Q	Q	Q	Q	Q	S	
GODHAVN	69N	307	B	A	A	A	A	A	B	A	Q	Q	Q	Q	Q	Q	S		
TROMSO	69N	19							A	S									
KOTZEBUE	65N	198	C	A	S														
COLLEGE	64N	213		A	B	C	S												
FROBISHER BAY	63N	292	C	C	B	S													
SOGRA	62N	46								B	A	A	B	C					
ANCHORAGE	61N	211	C	A	S														
NARSSARSSUAQ	61N	315							A	A	Q	Q	Q	Q	Q	Q	Q	S	
GREAT WHALE	55N	283						C	S										
MOSCOW	55N	37	C	B	A	A	S												
SALTHOLM	55N	12				B	A	S											
KNOB LAKE	54N	294		B	B	B	B	A	A	B	A	C	S						
KUHLUNGSBORN	54N	11	B	A	B	B	A	B	B	A	A	A	A	C					
NEUSTRELITZ	53N	11												B	A	A	Q	Q	
UNALASKA	53N	194	B	A	C	S													
CAMBRIDGE	52N	0	C	S															
WETASKIWIN	52N	247	C	A	S														
ADAK	51N	184						B	S										
MOISIE	50N	294				B	B		B	S									
PRUHONICE	50N	14			A	C	S												
SUFFIELD	50N	249						B	S										
KAMENICE	49N	22												Q	Q	Q	Q	Q	
FREIBURG	48N	7									A	A	A						
MONT JOLI	48N	292		B	A	C	S												
SEATTLE	47N	238	B	A	A	A	B	S											
POITIERS	46N	0							A	A	A	A	A	A	A	A	A	A	Q
OTTAWA	45N	285	B	A	S														
WAKKANAI	45N	141	B	A	A	A	A	A	S										
GENOVA	44N	9										B	A	C					
HALIFAX	44N	300	B	B	S														
MOSHIRI	44N	142						C	A	A	A	A	A	A	A	A	A	A	Q
ROBURENT	44N	7										B	A	C					
HANOVER	43N	288	C	C	S														
NORWICH	43N	288	C	A	A	A	A	A	A	A	A	C	S						
ROCHESTER	43N	283					C	A	A	C	A	C	S						
BATTLE CREEK	42N	275	B	A	S														
BOULDER	40N	255	B	A	C	S													
MISENO	40N	15				B	B	A	C	S									
WASHINGTON	38N	289	C	A	B	S													
SAN FRANCISCO	37N	238	B	A	A	A	C	A	C	S									
SAKUSHIMA	34N	137										Q	Q	Q	Q	Q	Q	A	Q
TOYOKAWA	34N	137	B	A	A	A	A	A	A	A	A	B	S						
BERMUDA	32N	296	C	B	B	A	A	B	C	S									
GAINESVILLE	29N	278	C	B	C	S													
ARECIBO	18N	294									A	C	S						
TUCUMAN	26S	294							B	C									
BRISBANE	27S	153	B	A	A	S													
DURBAN	29S	30	C	B	C					A	B	C							
ADELAIDE	34S	138	C	A	S														
WELLINGTON	41S	174	C	A	A	A	B	A	Q	Q	Q	Q	Q	Q	Q				
HOBART	42S	147	B	A	S														
DUNEDIN	45S	170		B	C	A	C	S											
LAUDER	45S	169						B	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	
KERGUELEN	49S	70								B	A	A	B	C					
CAMPBELL IS.	52S	169																Q	
MACQUARIE	54S	158	B	A	C	S													
ARGENTINE ISLAND	65S	296	B	A	A	A	A	B	C	A	A	C	S						
SANAE	70S	357																	
ELLSWORTH	77S	319	B	A	A	A	A	B	S							Q	Q	Q	
SCOTT BASE	77S	166																	
BYRD STATION	80S	240			B	B	B	S							Q	Q	Q	Q	

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

These data consist of monthly tables of hourly values of the noise power in dB for each frequency on which measurements are made. Most stations observe on several frequencies in the range 0.013 to 20 MHz.

MONTH-HOUR VALUES OF RADIO NOISE

STATION ENKOPING, SWEDEN LAT. 59.5 N LONG. 17.3 E MARCH 1966

HR. LST	FREQUENCY (MHz) .013					.051					.160					.495				
	F_{am}	D_u	D_ℓ	V_{dm}	L_{dm}	F_{am}	D_u	D_ℓ	V_{dm}	L_{dm}	F_{am}	D_u	D_ℓ	V_{dm}	L_{dm}	F_{am}	D_u	D_ℓ	V_{dm}	L_{dm}
00	150			10.0	15.8	117	4.0	5.3	* 9.5	*14.0	95	6.0	2.3	* 6.8	*10.5	105	2.0	8.0	* 1.0	* 1.5
01	150	1.3		11.0	16.5	116	5.1	4.6	*10.0	*15.5	97	5.9	6.0	* 6.5	*10.0	105	4.0	10.2	* 3.0	* 3.5
02	150	2.0		12.0	18.5	117	4.0	6.0	10.5	16.0	* 93			* 6.5	* 9.0	101	7.0	5.5	* 4.0	* 5.0
03	149	3.0		11.0	17.0	117	4.0	7.5	10.0	15.0	97	7.7	4.1	* 5.3	* 9.3	97	6.0	9.3		
04	150	2.0	5.3	11.3	17.0	117	2.0	8.0	9.5	14.5	94	5.1	3.0	* 6.0	* 9.5	79	14.9	8.9		
05	150	2.0	6.0	11.0	18.0	113	4.1	7.7	*10.0	*14.5	* 97					* 72				
06	148	3.5	4.0	11.5	17.0	107	3.9	6.0	*10.5	*15.5	81	8.0	4.0	* 4.0	* 6.3	60	13.3	5.0	* 2.5	* 4.0
07	144	2.0	4.0	11.5	17.5	103	8.2	6.2	9.8	13.8	83	8.2	4.2	* 2.8	* 5.3	65	6.4	8.3	* 2.5	* 4.5
08	142	4.0	4.0	11.0	16.5	99	11.9	6.0	*11.3	*15.5	86	9.9	7.0	* 7.8	*14.0	55	8.0	2.0	* 3.0	* 4.5
09	142	2.1	4.1	11.3	17.3	99	13.5	5.4	*12.8	*16.0	87	6.0	5.3	* 6.3	*10.5	* 57			* 2.8	* 5.0
10	142	4.0	4.9	*12.3	*18.5	99	10.1	6.0	*13.0	*18.0	85	4.7	8.0	* 6.5	*10.0	55	5.3	2.0	* 3.0	* 5.5
11	142	4.0	4.0	11.5	17.5	103	7.1	6.1	11.5	16.5	85	6.1	2.8	* 5.0	* 8.0	55	8.0	3.9	* 2.5	* 5.0
12	143	3.0	5.0	10.5	16.0	103	7.9	12.1	*13.0	*18.5	* 82			* 4.5	* 8.0	55	2.1	2.3	* 1.5	* 3.5
13	144	2.0	4.0	* 9.3	*14.5	105	4.9	12.9	*13.0	*16.0	81	4.0	5.1	* 4.5	* 7.0	55	7.5	2.0	* 3.5	* 5.0
14	144	2.0	2.1	8.5	13.0	101	10.9	8.0	*12.5	*19.5	80	7.0	7.1	* 4.5	* 7.5	57	4.3	6.0	* 2.0	* 3.0
15	144	4.0	2.0	8.5	13.0	102	9.2	7.1	*10.5	*14.0	83	4.7	7.4	* 6.0	*10.0	65	11.0	4.0	* 1.3	* 3.0
16	144	3.6	3.6	7.0	11.0	104	10.7	7.1	* 6.0	*10.0	85	4.0	6.7	* 5.5	* 9.0	70	18.7	7.6	* 3.5	* 4.3
17	144	3.6	4.0	7.5	12.0	107	8.0	8.0	*11.5	*17.5	85	8.0	4.3	* 4.8	* 9.5	89	7.5	7.5	* 2.5	* 3.5
18	144	5.5	2.0	7.5	12.0	109	7.9	4.2	8.0	12.5	91	4.0	6.0	* 5.3	* 9.0	96	6.3	16.1		
19	146	4.0	3.5	7.5	12.0	113	4.3	6.0	7.0	11.0	93	4.1	5.9	* 6.5	*10.3	96	4.3	8.3	* 4.0	* 5.0
20	146	5.6	2.0	7.5	12.0	115	3.7	7.6	6.0	10.0	93	4.0	2.0	* 4.5	* 7.0	99	5.5	7.5	* 1.5	* 2.0
21	146	4.0	2.0	7.5	12.8	115	6.0	5.5	8.0	12.5	93	4.0	6.0	* 6.5	*10.3	96	9.9	3.9		
22	148	3.5	2.0	7.5	12.3	115	6.0	4.1	9.0	13.5	95	4.1	7.2	* 6.3	* 9.0	103	4.0	5.1	* 1.5	* 2.0
23	148	3.5	2.0	9.5	14.0	117	4.0	6.0	8.5	13.0	97	4.0	7.5	* 6.5	* 9.5	101	5.5	4.0	* 1.5	* 2.0

F_{am} = median value of effective antenna noise in dB above kT_0b

D_u = ratio of upper decile to median in dB.

D_ℓ = ratio of median to lower decile in dB.

V_{dm} = median deviation of average voltage in dB below mean power.

L_{dm} = median deviation of average logarithm in dB below mean power.

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
THULE	76N	292		B	B	B	C	B	S										
MURMANSK	68N	33			C	A	A	A	A	B	B	S							
ENKOPING	59N	17		B	B	A	A	A	B	A	A	A	A	B	Q				
SVERDLOVSK	56N	61			B	B	A	B	A	B	B	S							
MOSCOW	55N	37		B	A	A	B	C	B	B	S								
KUHLUNGSBORN	54N	11	B	A	B	B	A	B	B	A	A	A	A	A	A	A	A	A	
IRKUTSK	52N	104		C	A	B		B	B	A	A	S							
SLOUGH	51N	360	B	A	C	S													
TATSFIELD	51N	0	C																
KIEV	50N	30				C	B	A	A	A	A	S							
PANSKA VES	50N	14	B	A	A	A		A	C	A	A	A	A	A	A	A	A	B	
BAGNEUX	48N	2	B	A	S														
BREST	48N	356	B	A															
KHABAROVSK	48N	135		C	A	B	B	A	B	B	A	S							
TRAPPES	48N	2	B	A															
SIMFEROPOL	44N	34		C	B	B	B		C	A	A	S							
ALMA ATA	43N	76		C	A	C	B	B	A	A	A								
BILL	43N	255	C	B	A	C	C	C	A	A	B	S							
STAR HILL	43N	285											A	A	C	S			
TBILISI	41N	44			C	A	B	A	A	B	A	S							
BOULDER	40N	255	B	A	A	B	A	A	A	A	B	B	S						
FRONT ROYAL	39N	282	C	A	B	A	A	A	B	A	B	S							
WARRENSBURG	38N	267					B	B	A	B	C	S							
ASHKHABAD	37N	58			B	B	B	C	S										
NICOSIA	35N	33	C	S															
OHIRA	35N	140		B	A	A	A	A	A	A	B	A	A	B	Q	Q	S		
TOTTORI	35N	134									C	S							
YOKOSHIBA	35N	140	C	A	S														
TOYOKAWA	34N	137	B	A	A	A	A	A	A	A	A	Q	Q	Q					
RABAT	33N	354	B	B	B	A	B	B	B	C	B	B	A	B	Q				
GILA BEND	32N	248											C	A	C	S			
DELHI	28N	77		Q	Q	B	A	B	A	A	B	B	A	B	Q				
TAIPEI	25N	121											B	B	Q	Q	Q	Q	C
KEKAHA	22N	201		B	A	B	A	A	A	B	B	S							
MACAU	22N	113			C	S													
BANGKOK	13N	100										C	Q	Q	S				
ZARIA	11N	7												Q	C			S	
BALBOA	09N	281		B	A	A	A	A	A	B	A	B	C	S					
IBADAN	07N	3		B	C	B	B	C	S										
ACCRA	05N	360	B	C	S														
BANGUI	04N	18		B															
FANNING	03N	201	C	S															
SINGAPORE	01N	103		B	A	A	A	B	A		B	B	S						
COONAWARRA	12S	130	C	S															
CLONCURRY	20S	40	C	A	S														
SAN JOSE	23S	315		C	B	A	B	C	B	A	B	A	A	B	Q				
PRETORIA	26S	28		B	B	A	A	A	A	A	B	B	A	B	Q			Q	
COOK	30S	130		B	A	A	A	A	A	A	A	B							
PEARCE	31S	116	C	S															
ROCK BANK	37S	144	C	B	S														
KERGUELEN	49S	70	B	A	C	S													
PORT STANLEY	51S	303	C	S															
USHUAIA	54S	292																	
ELTANIN SHIP	60S							B	A	B	C	S							
BYRD STATION	80S	240		B	B	A	A	B	C	C	S								

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
ARIEL 3, TERRESTRIAL RADIO (THUNDERSTORM) NOISE MURPHY (67-042A-04)	050567	041468 ,	050567
ARIEL 3, V.L.F RECEIVER, FIXED FREQUENCY SIGNAL STRENGTH, KAISER (67-042A-05)	050567	041468 ,	050567

C. FLARE-ASSOCIATED EVENTS

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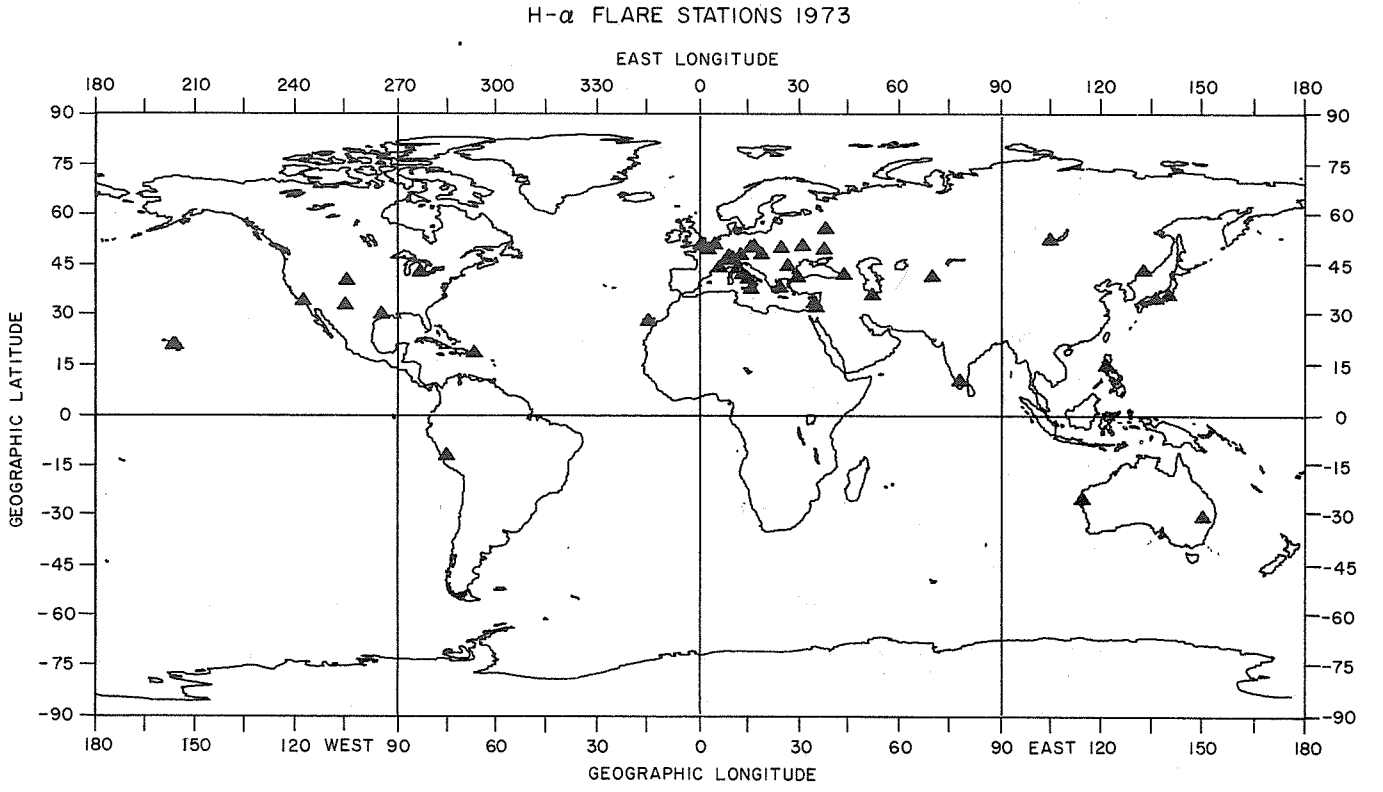


AT BOULDER

C.1 H-α FLARES

TABULATIONS

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
HERSTMONCEUX	50N	0	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
TORTOSA	40N	0								C	B	A	C						
MEUDON	49N	2	B	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B
UCCLE	50N	4	B	A	B	A	A	A	A	A	A	A	B	B	A	A	C	P	P
HAUTE PROVENCE	44N	5						A	A				C	A	A	A	B	B	
NERA	52N	5	C	A	B	C	C	B	B	A	A	A	A	C	B	C			
UTRECHT	52N	5	B	A	B														
LOCARNO	46N	8		B	A	C	A	A	A	A	A	A	A	A	A	B	A	B	B
SCHAUINSLAND	48N	8	C	A	B	C	B	A	C										
ZURICH	47N	8	B	A	A	B	A	A	A	A	A	A	A	A	A	B	A	A	B
AROSA	46N	9	C	B	B	C	A	A	A	B	C	B	B	B	C	C	C		
ARCETRI	34N	11	B	A	A	A	A	A	A	A	A	A	A	A	B	B	A	A	B
ROME	41N	12									B	B	A	A	A	A	A	B	B
WENDELSTEIN	47N	12				B	A	A	A	B	B	A	A	A	B	A	A	A	B
KANZELHOHE	46N	13	B	A	A	A	A			A	A	B							
CAPRI-F	40N	14	B	B	B	C	B	A	B	A	A	B	B	B	B	B	B	A	B
CAPRI-S	40N	14	B	A	A	A	A	A	A	A	B	A	A	A	A	B	B	C	C
ONDREJOV	49N	14	B	A	A	A	A	A	A	A	A	A	A	A	A	A	B	A	C
CATANIA	37N	15								A	A	A	A	A	A	A	B	A	B
UPICE	50N	16																C	B
WROCLAW	51N	17								B	A								
CAPETOWN	33S	18		B	A	A	A	A	A	A	A	C	B	A	A	A	A	S	
HURBANOVO	47N	18													B	A	B	C	
SALTSJOBADEN	59N	18	B	A	A	B	A	B	B	C	C	B							
ATHENS	37N	23	B	A	B	C		B	A	A	A	A	A	B			B	A	C
THESSALONIKA	40N	23								A	B	C	B						
LVOV	49N	24								B	A	B	C		C	B	B	Q	Q
BUCHAREST	44N	26		B	A		B	B	B	A	A	B	A	A	A	A	A	A	B
ISTANBUL	41N	28	B	A	A	A	B	B	B	B	A	B	A	A	A	A	A	A	B
KANDILLI	41N	29									A	A	C						
KIEV	50N	30	B	A	A	A	A	A	A	B	A	A	B	B	B	A	B	A	C
KIEV (UNIV)	50N	30	B	A	A	A	A	A	A	A	A								
SIMEIS	44N	34	B	A	A	A	A	A	A	B	B	C	C	C	A	B	C	C	P
TEL-AVIV	32N	34													C		C	C	P
KHARKOV	50N	36	B	A	B	A	A	B	B	C	B	B	A	B	B	B	B	A	C
MOSCOW (UNIV)	55N	37	B	A	B	A	B	B											
MOSCOW IZMIRAN	55N	37	B	A	A	B	A	A	A	A	B				C	B	C	P	P
ABASTUMANI	41N	42	B	A	A	A	B	A	A	A	A	A	A	B	B	A	A	A	C
BAKOU	40N	48	C	B	B	A	A	A	A	B	B	A	C						
TEHRAN	35N	51													C	B	B	C	C
TASHKENT	41N	69	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
ALMA ATA	43N	77	C	A	B	A	A	B											B
KODAIKANAL	10N	77	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
HYDERABAD	17N	78	B	A	A	B	B	A	B	A	C								
IRKUTSK	52N	104							C	B	B	B	A	A	A	A	B	A	P
CARNARVON	25S	114											B	A	A	A	A	A	B
MANILA	14N	121							B	A	A	A	A	A	A	A	A	A	B
USSURISK	43N	132	C	A	A	A	A	A	A	A	A	B		B	A	A	A	A	C
IKOMASAN	34N	135	B	A	A	A	A	A	A	A	A	A	A	C	P	P	P	P	P
MITAKA	35N	139	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B

Continued

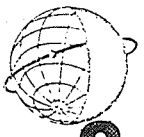
KEY TO SYMBOLS

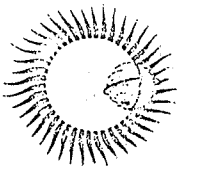
A = 12 Months
B = 6-11 Months
C = 1-5 Months

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

C.1

The flares are scaled in accordance with the recommendations of IAU Commission 10 as of January 1, 1966.





FLARE DATA

Station Mitaka(Tokyo) Month May Year 1968

Date	Time of Observation UT			Helio. Position		Imp.	Obs	H-α Line		Maximum Area			H-α Intensity		Remarks
	Beg.	End.	Max.	Lat.	Mer. Dist.			Time	Width	Time	Apparent	Corr. in sq. deg.	Time	%	
1	0009	0019	0012	15N	08E	Sn	C	–	–	0012	70	0.8	–	–	
	0156	0205	0201	22N	61E	Sn	C	–	–	0201	50	1.2	–	–	
	0310	0323	0312	18N	68E	Sn	C	–	–	0312	50	–	–	–	4
	0325	0334	0328	23N	62E	Sn	C	–	–	0328	70	1.7	–	–	8
	0343	0400	0345	18N	07E	Sn	C	–	–	0345	70	0.8	–	–	4
	0431	0455	0437	18N	68E	1n	C	–	–	0437	120	–	–	–	
2	0311	0323	0312	18N	07W	Sn	C	–	–	0312	70	0.8	–	–	5
	0505	0517	0509	18N	47E	Sn	C	–	–	0509	80	1.3	–	–	
	0512	0533	0516	17N	06W	Sn	C	–	–	0516	170	1.9	–	–	
	0516	0519	0517	15N	53E	Sn	C	–	–	0517	110	2.0	–	–	
4	0025	0042	0029	19N	26W	Sf	C	–	–	0029	60	0.8	–	–	
	0428	0600	0429	20N	18E	1b	C	–	–	0429	220	2.6	–	–	
	0543	0559	0555	21N	16E	Sf	C	–	–	0555	100	1.2	–	–	5
	0645	0651	0649	10N	09W	Sf	C	–	–	0649	70	0.7	–	–	
	2309	2321	2317	20N	43W	Sb	C	–	–	2317	80	1.2	–	–	8
	2332	2345	2333	20N	07E	Sn	C	–	–	2333	60	0.7	–	–	
	2352	2422	2400	19N	07E	Sn	C	–	–	2400	100	1.1	–	–	5
5	0052	0116	0106	17N	33E	1n	C	–	–	0106	180	2.3	–	–	5
	0211	0220	0213	18N	45E	Sn	C	–	–	0213	70	1.1	–	–	
	0220	0241	0223	17N	47W	Sn	C	–	–	0223	80	1.2	–	–	8
	0311	0321	0312	20N	06E	Sn	C	–	–	0312	80	0.9	–	–	5
	0423	0515	0428	17N	33E	1n	C	–	–	0428	360	4.7	–	–	5
	0459	0521	0507	21N	03E	Sn	C	–	–	0507	80	0.9	–	–	
	0517	0540	0522	17N	33E	Sn	P	–	–	0522	130	1.7	–	–	
	0531	0540	0534	21N	03E	Sn	P	–	–	0534	170	1.9	–	–	5
6	0150	0229	–	18N	25E	Sn	C	–	–	0150	140	1.8	–	–	
	0212	0231	0216	16N	42E	Sn	C	–	–	0216	80	1.2	–	–	4
9	0320	0338	0330	17N	46W	Sn	C	–	–	0330	50	0.8	–	–	

Send one copy to World Data Center C, Observatoire de Meudon, 92 Meudon, France;
one copy to World Data Center A for Solar-Terrestrial Physics, NOAA, Boulder, Colorado, U.S.A. 80302;
one copy to World Data Center B2, Molodezhnaya, 3, Moscow B-296, U.S.S.R.
Reports should be sent airmail monthly.

C.1 H-α FLARES

AT BOULDER

TABULATIONS Cont'd.

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
CULGOORA	30S	147									A	A	B	A	A	A	A	B	C
SYDNEY	36S	151	B	A	A	C				A									
WELLINGTON	41S	174	C																
HONOLULU	21N	202	B	A	A	A	A	A	B	S									
HALEAKALA	20N	204								B	A	A	A	A	B	A	A	C	B
LOCKHEED	33N	242			A	A	A	A	A	A	A	A	A	C		A	B	C	
MT WILSON	31N	242	B	A															
CLIMAX	39N	254	B	A	B	B	A	A	A	A	A	B	S						
BOULDER	40N	255											C	A	A	A	A	A	B
SACRAMENTO PK	32N	255	B	A	A	A	A	A	A	A	A	A	A	A	B	P	P	P	P
TONANZINTLA	19N	261	B																
HOUSTON	30N	265											B	A	A	C	P		
PALEHUA	21S	268													C	C	A	C	C
MCMATH-HULBERT	42N	277	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
WASHINGTON NRL	38N	283	B	A	C	S													
HUANCAYO	12S	285	B	A	A	A	A	B	A	A	A	A	A	A	B	B	A	A	B
OTTAWA	54N	285	B	A	B		A	A	A	B	A	B	S						
RAMEY	18N	292													C	A	A	C	C
SAN MIGUEL	34S	302											B	B	B	B	P		
CANARY ISLANDS	28N	345											B	A	A	A	A	A	B
DUNSINK	53N	354	B	A	A	A	A	B	A	B	S								
EDINBURGH	56N	357	B	B	S														

AT BOULDER

H-α PATROL FILM

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
CARNARVON	25S	114											B	A	A	A	A	A	C
BOULDER	40N	258											C	A	A	A	A	A	B
PALEHUA	21S	268														C	B	B	C
TEHRAN	35N	309														C	B	B	C
CANARY ISLANDS	28N	345											B	A	A	A	A	A	C
HOUSTON	30N	365											B	A	A	C			

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S = Program STOPPED operations (see MASTER STATION LIST for actual date)

COMPUTER FORMAT:

1. Flare reports - from each observatory reporting - July 1955 to date
2. Hours of flare patrol - most observatories - Jan. 1965 to date
3. Grouped flares 1955-1964; Feb. 1967 to date as published in *Solar-Geophysical Data*, NOAA.
4. Event log - Preliminary reports of flare-associated events in time sequence. Includes flares, radio emission bursts, SID, x-ray bursts. (listing only)

PUBLICATIONS:

1. *Solar-Geophysical Data*, NOAA, publishes all of the individual station reports together with a grouped report. The flares are divided into "confirmed" and "unconfirmed" events.
2. *I.A.U. Quarterly Bulletin on Solar Activity*, Zürich, These reports included all individual station reports through Dec. 1962, and since then have included only a flare event list -- now limited to those that are "confirmed".
3. *IGY Solar Activity Report Series*, No. 12 (microfilm only), Nos. 14, 15, 17, 18, 21, 25, 29, 33, 35.

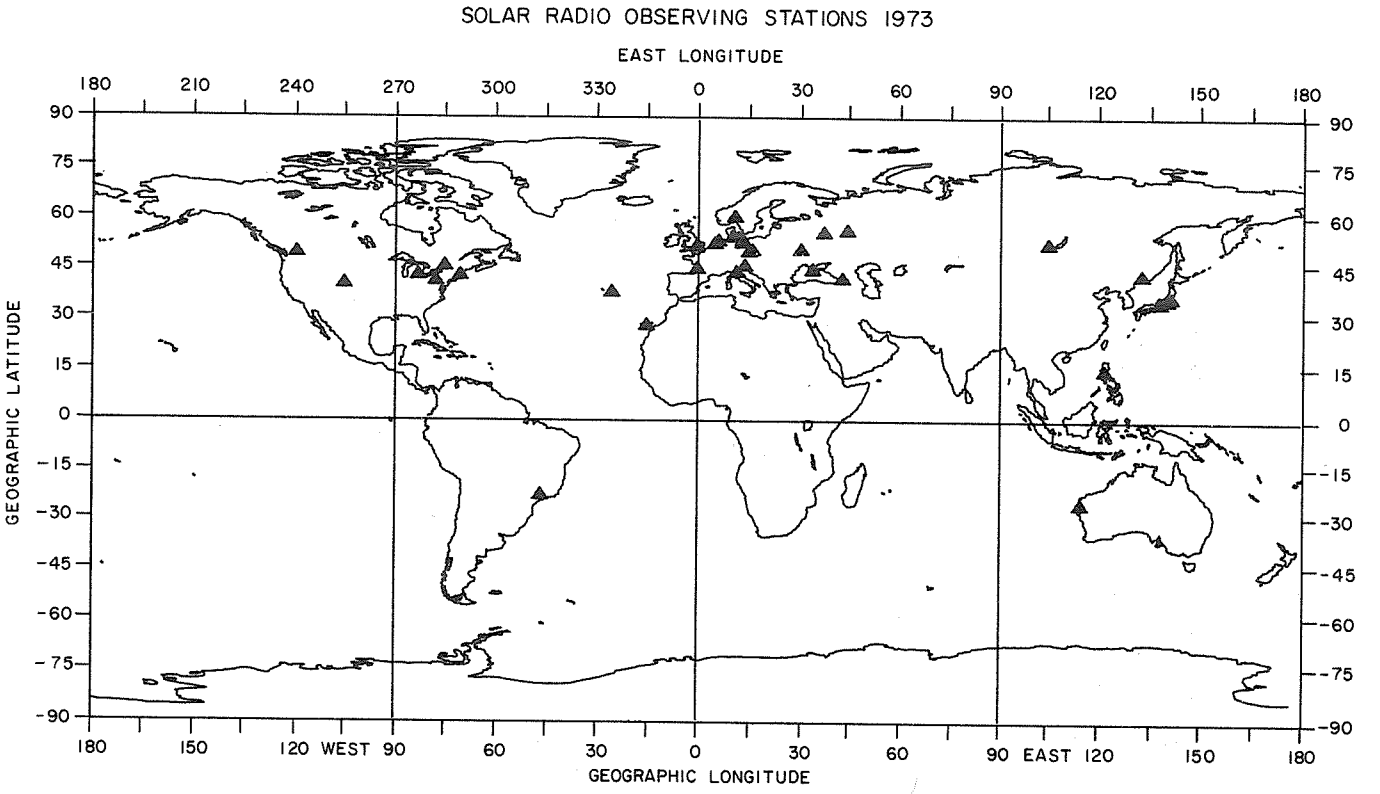
C.2 SOLAR MAGNETIC FIELD IN ACTIVE REGIONS AND THEIR SHORT-TERM CHANGES

No data at Boulder.

Stations known to be capable of such measurements are Meudon, Culgoora, Lockheed, Kitt Peak, Climax, Sacramento Peak and San Fernando Observatory.

C.3

The data consist of tabulations and for a few selected events, copies of the strip chart records. The map indicates the stations currently reporting.



AT BOULDER

C.3 SOLAR RADIO EVENTS FIXED FREQUENCY

BY LONGITUDE

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	FREQUENCY MHZ
CAMBRIDGE	52N	0	B	A	S															81
CAMBRIDGE	52N	0	B	A	S															175
SLOUGH	51N	0												A	A	B	A	A	C	2800
SLOUGH	51N	0												A	A	A	A	A	C	19000
SLOUGH	51N	0												A	A	A	A	A	C	71000
SLOUGH	51N	0												B		A	A	A	C	9400
SLOUGH	51N	0													C	A	A	A	C	37000
UCCLE	50N	4	B	A	A	A	A													169
UCCLE	50N	4	B	A	A	A	A	A	A	A	A	A	A	B	A	A	A	C	C	600
NEDERHORST	52N	5									B	A	A	A	A	B	S			610
NEDERHORST	52N	5			C	A	A	A	A		C	A	B	C	A	B	S			9500
NEDERHORST	52N	5	B	A	A	A	A	A	A	A	A	A	A	A	A	B	Q	Q	Q	200
NEDERHORST	52N	5	B	A	A	A	A	A	A	A	C	S								550
NEDERHORST	52N	5	B	A	B	B	A	A	A	A	B	B	A	A	A	B	Q	Q	Q	3000
DWINGELOO	53N	6																C	C	400
DWINGELOO	53N	6																C	C	3000
BERNE	47N	7													A	A	B	C	C	10500
BONN	50N	7												B	S					35000
WEISSENAU	47N	9												C	S					611
WEISSENAU	47N	9												C	S					1000
HARESTUA	60N	10	B	B	B	B	B	B	B	B	B	B	A	A	B	B	B	B	C	225
KIEL	54N	10													A	A	A	C	Q	240
KIEL	54N	10													A	A	A	C	Q	410
KIEL	54N	10													A	A	A	C	Q	1420
ARCETRI	43N	11																A	C	9285
ARCETRI	43N	11																A	C	1420
ARCETRI	43N	11									C	A	A					A	C	2830
ONSALA	57N	11	C	B	B	S														150
ROME	41N	12							B	A	A	S								18
ROME	41N	12							B	A	A	B	S							27
BERLIN	52N	13	B	A	A	A	A	A							B	S				900
BERLIN	52N	13	B	A	A	A	A	A	A	A	A	A	A	A	A	S				1470
BERLIN	52N	13	B	A	A	A	A	A	A	A	A	A	A	A	B	S				9490
BERLIN	52N	13	C	A	A	A	A				B	A	B	C	S					3000
BERLIN	52N	13													B	S				2920
BERLIN	52N	13													A	A	A	A	C	9500
BERLIN	52N	13													B	A	A	A	C	1490
NEUSTRELITZ	53N	13								B	B	A	B	A	S					2000
NEUSTRELITZ	53N	13					A	A	A	A	A	A	A	A	C	P				9140
NEUSTRELITZ	53N	13				A	A	A	A	A	A	A	B	A	B	P				1490
NEUSTRELITZ	53N	13	C	A	A	A	A				B	A	A	A	B	P				2920
POTSDAM	52N	13														C	A	B	Q	23
POTSDAM	52N	13	B	A	A	A	A		B	B	B	B	A	A	B	B	A	B	Q	234
POTSDAM	52N	13	B	A	B	A	A		B	A	A	A	A	A	A	A	A	B		111
POTSDAM	52N	13	B	B					B	B	B	A	A	A	B	B	S			40
POTSDAM	52N	13	B										C	B	S				Q	113
TRIESTE	45N	13													B	C	S			235
TRIESTE	45N	13										B	A	A	C	S				239
TRIESTE	45N	13														B	A	B	C	237
TRIESTE	45N	13															A	B	C	408

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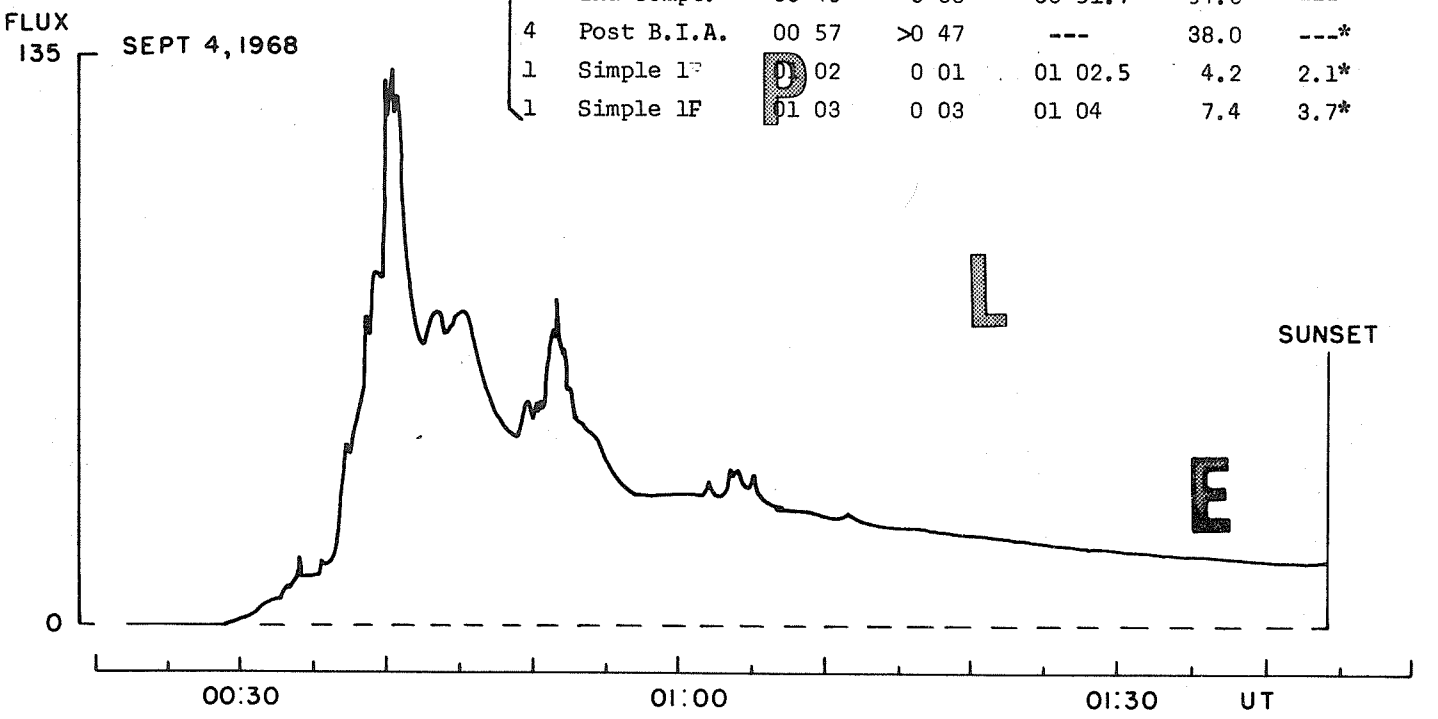
OTTAWA

OUTSTANDING EVENTS - SOLAR RADIATION AT 2700 & 2800 Mc/s

DATE 1968	URANE KEY	CLASS	START U.T.	DURATION	MAXIMUM U.T.	PEAK FLUX	MEAN FLUX
Sept.			H M	H M	H M		
1	3	Simple 3A	00 42	0 55	00 43	4.0	2.0*
	7	Irregular Activity	00 47	0 02	00 48	7.9	---*
	3	Simple 3A	16 15	0 50	16 30	2.0	1.0
	1	Simple 1	16 17.5	0 03.5	16 19	2.6	1.3
		Spike	16 22	---	16 22	2.0	---
	1	Simple 1	16 23	0 01	16 23.4	3.0	1.2
	3	Simple 3	20 05	0 25	20 12	2.6	1.3
	3	Simple 3	20 45	3 25	21 40	3.2	1.6
2	2	Simple 2F	01 04	0 03	01 05	15.0	8.0*
	3	Simple 3	20 05	2 50	21 35	5.0	2.5
3	3	Simple 3	16 20	0 50	16 25	2.0	1.0
4	6	Complex F	00 29	0 28	00 40.5	135.0	48.0*
		1st Compt.	00 29	0 20	00 40.5	135.0	---
		2nd Compt.	00 49	0 08	00 51.7	94.0	---
	4	Post B.I.A.	00 57	>0 47	---	38.0	---*
	1	Simple 1F	01 02	0 01	01 02.5	4.2	2.1*
	1	Simple 1F	01 03	0 03	01 04	7.4	3.7*



AT BOULDER

C.3 SOLAR RADIO EVENTS FIXED FREQUENCY

BY LONGITUDE

STATION	GEOGRAPHIC LAT	LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	FREQUENCY MHZ
ONDREJOV	49N	14					B	A				C	B	B	A	A	A	B	C	9400
ONDREJOV	49N	14			B	B	B	A				B	A	A	A	A	A	B	C	808
ONDREJOV	49N	14		C	A	B	B	A	A	A	A	A	A	A	A	A	A	B	C	260
ONDREJOV	49N	14	B	A	A	A	B	A	A	A	A	B	A	A	A	A	A	B	C	536
UPICE	50N	16										A	A	A	A	A	Q	A	C	295
TORUN	53N	18		C	A	C	A	S												127
KRAKOW	50N	19	C	B	A	C	S													810
RIGA	56N	24	C	C	C	C			C	B	B	C	S							220
GRAHAMSTOWN	33S	26		B	S															125
LWIRO	02S	28	B	A	C	S														169
KIEV	50N	30																C	C	204
KIEV	50N	30													B	A	A	A	C	550
PULKOVO	59N	30	C	C	S															9375
GIZA	30N	31	C	C	S															81
SIMFEROPOL	44N	34										C	S							1000
SIMFEROPOL	44N	34												B	B	A	C	A	C	3100
SIMFEROPOL	44N	34		B	A	B	C	S												210
SIMFEROPOL	44N	34								B	C	S								220
MOSCOW IZMIRAN	55N	37															A	C		202
MOSCOW IZMIRAN	55N	37																		545
MOSCOW IZMIRAN	55N	37	C	A	A	A	A	C		A	A	A	A	A	B	A	S		B	206
MOSCOW IZMIRAN	55N	37	C	B	A	B	A	C	S										B	210
ABASTUMANI	41N	42	C	A	A	A	A	B	B	A	A	A	A	B	B	A	A	A	C	221
KISLOVODSK	43N	42								B	A	B	B	B	C	S				6100
KISLOVODSK	43N	42								C	B	B	B	B	C	S				15000
KISLOVODSK	43N	42	C	A	B	A	A	A	C	B	S									178
BJURAKAN	40N	44	B	B	C	C	S													191
GORKY	56N	44											A	A	A	A	A	C	C	650
GORKY	56N	44											B	A	A	A	A	C	C	100
GORKY	56N	44											B	A	A	S				3800
GORKY	56N	44	C	B	B								A	A	A	A	A	C	C	2950
GORKY	56N	44	C	B	B	B				B	C		A	A	A	A	A	C	C	9100
GORKY	56N	44	C	B	C								B	B	A	B	A	C	C	200
GORKY	56N	44												A	B	B	A	C	C	950
PIRKULI	40N	48			C	A	A	C	S											234
KODAIKANAL	10N	77										B	C	B	A	A	A	B	Q	100
HYDERABAD	17N	78		C	S															30
IRKUTSK	52N	104														C	B	S		9570
IRKUTSK	52N	104															C	A		209
IRKUTSK	52N	104								C	B	B	B	B	C	S				9620
IRKUTSK	52N	104	C	B	A	C	B	A	C	B	B	C	S							9700
IRKUTSK	52N	104													B	B	S		C	9750
MACAO	22N	113		B	A	C	S													60
CARNARVON	25S	114										Q	C	Q	B	B	A	A	B	1420
CARNARVON	25S	114										Q	Q	Q	Q	A	A	A	B	2695
CARNARVON	25S	114										Q	Q	Q	Q	A	A	A	B	4995
MANILA	14N	121														A	A	A	B	1415
MANILA	14N	121											C	A	A	A	A	A	B	2695
MANILA	14N	121											C	A	A	A	A	A	B	4995
MANILA	14N	121											C	A	A	A	A	A	B	8800

Continued

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Heinrich-Hertz-Institut für solar-terrestrische Physik (HHI/24)

Outstanding solar events April 1970

Date	Frequ. MHz	Starting Time U.T. h m s	Time of Max U.T. h m s	Duration Minutes	Q.B. Type	Max.Flux.Density s.u. Inst.	Smooth	Spectr. Type	Frequency range MHz
2.	234	10 13 49	10 13 59	0.32	F	150	10	III	287-111
	111	11 18 17	11 18 20	0.35	C	1700	600		isol.
	111	11 52 39	11 52 46	0.63	C	200	20	III	234-111
	111	12 09 03	12 09 05	0.20	S	175	60		isol.
	111	12 49 41	12 49 44	4.63	F	1700	30	partly III	111- 40
3.	23	10 28 05	10 28 13	3.78	F	25000	350	III/V	793- 23
	234	10 29 54	10 30 05	0.47	C	1400	200	III	793- 23
	111	10 29 58	10 30 14	0.33	C	1000	150	III	793- 23
	111	10 56 32	10 57 02	3.30	C	400	15	partly III	111- 23
	23	10 56 32	10 57 40	4.25	C	2000	100	partly III	111- 23
4.	111	08 02 41	08 02 44	0.45	C	250	20		isol.
	234	14 08 33	14 08 51	0.38	C	175	8		isol.
5.	111	07 36 10	07 36 35	0.82	C	100	20	partly III	234- 23
	23	07 36 40	07 36 44	0.43	S	3000	1000	partly III	234- 23
	23	08 21 35	08 21 43	0.68	C	1200	240	III	111- 23
6.	111	11 42 13	11 42 30	2.02	C	800	60	partly III	287- 30
	234	11 43 01	11 44 06	1.38	C	130	13	partly III	287- 30
7.	23	07 28 43	07 28 45	0.38	S	2000	700	III	40- 23
	234	14 36 06	14 36 08	1.68	C	120	3		isol.
	234	14 53 42	14 53 44	1.02	F	200	6		isol.
8.	111	07 45 58	07 50 49	8.40	C	600	25	III	111- 23
	23	07 48 07	07 48 23	3.12: [1]	C	10000	500	III	111- 23
	111	08 31 17	08 31 30	0.68	C	350	35		isol.
	111	08 59 38	08 59 56	0.68	C	200	20		isol.
	23	09 52 24	09 52 39	0.77	C	4000	1000	III	40- 23
	23	10 21 48	10 21 56	0.57	S	3000	1000	III	30- 23
	111	12 11 37	12 11 41	0.17	S	200	70	III	111-
	23	12 11 41	12 11 50	0.43	S	4000	1500	III	111-
	111	13 53 55	13 53 57	0.48	F	600	60		isol.
	23	14 04 55	14 05 13	4.03	F	4000	300	III	287- 23 [2]
9.	111	06 50 36	06 51 32	1.38	C	600	60		isol.
	111	07 29 42	07 39 46	10.10	F	800	2		isol.
	111	09 10 47	09 11 26	2.28	F	300	5		isol.

1) disturbed by transmitter

2) 367 MHz, 234 MHz, 111 - 30 MHz partly calibration

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	FREQUENCY MHZ
MANILA	14N	121											C	A	A	A	A	A		27
MANILA	14N	121						B	A				B	A	S					18
MANILA	14N	121						B	A	A	A	A	A	A	S				B	606
USSURISK	43N	132			B	A	A	C		A	A	B	A	A	B	A	A	B	C	208
TOYOKAWA	34N	137	B	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	1000
TOYOKAWA	34N	137	B	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	2000
TOYOKAWA	34N	137	B	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	3750
TOYOKAWA	34N	137	B	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	9400
MITAKA	35N	139												C	S					35000
MITAKA	35N	139											C	A	B	B		C		612
MITAKA	35N	139								B	A	B	A	A	B	B	B	C		17000
MITAKA	35N	139	B	A	B	B	B	A	A	S										3000
MITAKA	35N	139	B	A	A	A	B	A	A	C	S		C							9500
MITAKA	35N	139	B	A	A	A	A	A	A	A	A	B	A	A	S					227
MITAKA	35N	139	B	A	A	B	B	A	B	S										100
MITAKA	35N	139	B	B	B	B	B	A	B	S										671
HIRAISO	36N	140														A	S		C	500
HIRAISO	36N	140							A	A	A	A	B	A	A	A	A	A	C	200
HIRAISO	36N	140	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		100
HONOLULU	21N	202		C	A	A	A	C	S											18
HONOLULU	21N	202	C	A	B	S														200
HALEAKALA	20N	204								B	B	A	S							18
HALEAKALA	20N	204								B	B	C	S							107
PENTICTON	49N	241								C	A	A	A	A	A	A	A	A	B	2700
UPPER VAN NORMAN	35N	242												Q	Q	Q	Q	Q	Q	3000
PULLMAN	47N	243									C	B	A	C	C	S				486
BOULDER HAO	40N	255	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	18
BOULDER HAO	40N	255	C	A	A	A	A	A	A	A	A	A	A	A	C					27
BOULDER NBS	40N	255	C	A	S															467
BOULDER NBS	40N	255	C	A	A	B	S													167
BOULDER NOAA	40N	255																B	S	184
BOULDER NOAA	40N	255															B	A		108
BOULDER NOAA	40N	255															B	A	C	245
BOULDER NOAA	40N	255															B	A	B	1420
BOULDER NOAA	40N	255										B	A	A	C	A	A	C	B	2695
BOULDER NOAA	40N	255				C	A	A	A	A	A	B	B	S					B	4995
SACRAMENTO PK	32N	255	C	A	A	C	C	S												18
HOUSTON	30N	265										C	C	B	B	C	S			1420
HOUSTON	30N	265										C	C	B	B	C	S			2695
HOUSTON	30N	265										C	C	B	B	C	S			4995
MCMATH HULBERT	42N	277	C	A	A	B	A	C		A	A	A	A	A	A	A	A	A	B	18
PENN STATE	41N	282									A	A	A	A	B	B	A	A	C	2700
PENN STATE	41N	282									A	A	A	A	B	B	A	A	C	10700
PENN STATE	41N	282									B	B	B	B	B	B	A	A	C	328
PENN STATE	41N	282									C	A	A	A	B	B	A	A	C	960
GRAFTON	42N	283	C	A	A	B	B	C	S											18
WASHINGTON NRL	38N	283		B	C	S														3200
WASHINGTON NRL	38N	283		B	C	S														9530
HUANCAYO	12S	284													B	A	A	A	B	9400
ITHACA	42N	284									C	S								430

Continued

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Outstanding Occurrences in Total Flux Density

Frequency: 9400 Mhz. Month: Februry , Year: 1970

Date	Type	Starting Time UT	Time of Maximum UT	Duration Minutes	Flux Density 10^{-22} w.m^{-2}Hz^{-1} Peak	Flux Density 10^{-22} w.m^{-2}Hz^{-1} Mean	Polarization at time of Max. Degree Percent	Polarization at time of Max. Sense r, l & O	Polarization Process r & l
1	-	-	-	-	-	-	-	-	-
2	1S	1406.2	1406.6	1.1	14.7	4.1	-	-	-
	28Precursor	2127.2	2138.3	11.1	5.5	4.1	30.7	1	1
	46eC	2138.3	2140.8	7.9	263.0	77.6	7.9	1	1
	29p.i.	2146.2	2150.6	71.1U	40.5	38.3	8.3	1	1
3	-	-	-	-	-	-	-	-	-
4	20S	1709.0	1724.0	[illegible]	7.5	3.2	-	-	-
5-8	-	-	-	-	-	-	-	-	-
9	20S	1336.3	1351.2	32.7	5.9	2.6	-	-	-
	1S	2112.0	2112.6	2.7	9.9	4.8	-	-	-
10	46C	1309.4	1315.0	9.8	41.1	10.2	18.1	1	1
	1S	1517.0	1517.8	2.3	13.1	4.5	10.0	1	1
	20S	1525.1	1539.7	36.5	9.3	4.5	18.8	1	1
	28Precursor	1617.6	1621.0	3.4	7.5	3.3	-	-	-
	46eC	1621.0	1621.5	1.2	41.1	25.1	5.3	1	1
	29p.i.	1622.2	1622.2	11.6	14.9	10.1	14.7	1	1
	28Precursor	1656.3	1659.0	3.1	9.4	4.0	-	-	-
	3C	1659.4	1700.2	1.0	54.2	23.5	21.8	1	1
	29p.i.	1700.4	1700.4	37.9	22.4	12.6	29.1	1	1
	3S	1853.4	1854.5	2.2	26.2	10.4	-	-	-
	29p.i.	1855.6	1901.2	11.6	7.5	3.4	-	-	-
	20S	1940.3	1942.2	10.1	16.8	5.2	20.8	1	1
	3S	2005.2	2006.0	1.6	20.6	13.5	21.3	1	1
	29p.i.	2006.8	2008.0	27.4	11.2	3.0	-	-	-

AT BOULDER

C.3 SOLAR RADIO EVENTS FIXED FREQUENCY

BY LONGITUDE

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	FREQUENCY MHZ
ITHACA	42N	284	C	A	S															201
OTTAWA	54N	285	B	A	A	S														50
OTTAWA	54N	285	B	A	A	S														500
OTTAWA	54N	285	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	2800
TORONTO	43N	285	B	A	A	S														320
SAGAMORE HILL	42N	288												A	A	A	A	A	B	15400
SAGAMORE HILL	42N	288										A	A	A	A	A	A	A	B	8800
SAGAMORE HILL	42N	288										B	A	A	A	A	A	A	B	4995
SAGAMORE HILL	42N	288									C	A	A	A	A	A	A	A	B	606
SAGAMORE HILL	42N	288									C	A	A	A	A	A	A	A	B	1415
SAGAMORE HILL	42N	288									C	A	A	A	A	A	A	A	B	2695
SAGAMORE HILL	42N	288													B	A	A	A	B	35000
SAGAMORE HILL	42N	288												A	A	A	A	A	B	245
SAGAMORE HILL	42N	288																A	B	410
SAN MIGUEL	34S	302											A	A	B	A	A	A	C	408
PARAMARIBO	05N	305	B	A	A	A	A	A	A	A	B	A	C	S						200
PARAMARIBO	05N	305	B	A	A	A	A	A	A	A	B	A	C	S						545
SAO PAULA	22S	314											C	A	A	C	B	B	C	7000
CANARY IS	28N	345											Q	C	C	A	A	A	B	1420
CANARY IS	28N	345											Q	C	C	A	A	A	B	2695
CANARY IS	28N	345											Q	C	C	A	A	A	B	4995
JODRELL BANK	53N	357	B	A	C	S														80
JODRELL BANK	53N	357	B	A	C	S														200
JODRELL BANK	53N	357	B	A	C	S														2000
BORDEAUX	44N	359												C	A	A	A	A	B	930

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ACTIVITE SOLAIRE

Evénements remarquables sur 600 MHz.

UCCLE — JUILLET 1968.

Date	Début T.U.	Max. T.U.	Durée min.	Type	Densité de Flux 10^{-22} W.m.$^{-2}$ Hz.$^{-1}$ max.inst.	Densité de Flux 10^{-22} W.m.$^{-2}$ Hz.$^{-1}$ moy.	Type CRPL	Remarques
5	0958,7	0959,2	1,3	s	9	5	Minor	?
	1113,7	1114,7	1,8	c	5	-	Minor	
6	0714,5	0719,2	6,	f	18	-	group	
	0838,3	0839	2,	s	5	3	Minor	
	0941,7	0947,5	62	ES	206	34	Major	
7	0810	0813	4,3	f	14	-	group	?
8	1707,7	1709,8	47,5	EC	1098	111	Major	
9	1813,8	1819,5	17	c		12	group	
11	1129,2	1130,2	3,3	s	5	3	Minor	
12	1255	1256	2,8	f	11	-	group	?
	1343,5	1414	48,5	C	280	68	Major	
17	1443	1455	62	RF	15	7	R and F	
20	0812,5	0819,5	15	RF	27	6	R and F	?
	1211,5	1016	9,5	RF	13	7	R and F	?
26	1232,8	1233,8	4,5	c	17	6	Minor	?
	1245,2	1246	3,5	s	10	4	Minor	?
31	0537,8	0540,7	22,7	s	(14)	-	R and F	?
	1057,3	1057,8	0,8	c	33	-	Minor	?
	1121,8	1121,8	0,6	s	9	-	Minor	?
	1400,2	1400,5	0,7	s	6	-	Minor	

AT BOULDER

C.3 SOLAR RADIO EVENTS FIXED FREQUENCY

BY FREQUENCY

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	FREQUENCY MHZ
BOULDER HAO	40N	255	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	18
GRAFTON	42N	283	C	A	A	B	B	C	S											18
HALEAKALA	20N	204								B	B	A	S							18
HONOLULU	21N	202		C	A	A	A	C	S											18
MANILA	14N	121						B	A	A	A	A	A	A	S					18
MCMATH HULBERT	42N	277	C	A	A	B	A	C		A	A	A	A	A	A	A	A	A	B	18
ROME	41N	12							B	A	A	S								18
SACRAMENTO PK	32N	255	C	A	A	C	C	S												18
POTSDAM	52N	13	B	A	A	A	A		B	B	B	B	A	A	B	B	A	B	Q	23
BOULDER HAO	40N	255	C	A	A	A	A	A	A	A	A	A	A	A	C					27
MANILA	14N	121						B	A				B	A	S					27
ROME	41N	12							B	A	A	B	S							27
HYDERABAD	17N	78		C	S															30
POTSDAM	52N	13	B										C	B	S					40
OTTAWA	54N	285	B	A	A	S														50
MACAO	22N	113		B	A	C	S													60
JODRELL BANK	53N	357	B	A	C	S														80
CAMBRIDGE	52N	0	B	A	S															81
GIZA	30N	31	C	C	S															81
GORKY	56N	44											B	A	A	A	A	C	C	100
HIRAISO	36N	140														A	S			100
KODAIKANAL	10N	77										B	C	B	A	A	A	B	Q	100
MITAKA	35N	139	B	A	A	B	B	A	B	S										100
HALEAKALA	20N	204								B	B	C	S							107
BOULDER NOAA	40N	255				C	A	A	A	A	A	B	B	S						108
POTSDAM	52N	13	B	B					B	B	B	A	A	A	B	B	S			111
POTSDAM	52N	13														C	A	B	Q	113
GRAHAMSTOWN	33S	26		B	S															125
TORUN	53N	18		C	A	C	A	S												127
ONSALA	57N	11	C	B	B	S														150
BOULDER NBS	40N	255	C	A	A	B	S													167
LWIRO	02S	28	B	A	C	S														169
UCCLE	50N	4	B	A	A	A	A													169
CAMBRIDGE	52N	0	B	A	S															175
KISLOVODSK	43N	42	C	A	B	A	A	A	C	B	S									178
BOULDER NOAA	40N	255										B	A	A	C	A	A	C	S	184
BJURAKAN	40N	44	B	B	C	C	S													191
GORKY	56N	44	C	B	C								B	B	A	B	A	C	C	200
HIRAISO	36N	140	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	200
HONOLULU	21N	202	C	A	B	S														200
JODRELL BANK	53N	357	B	A	C	S														200
NEDERHORST	52N	5	B	A	A	A	A	A	A	A	A	A	A	A	A	B	Q	Q	Q	200
PARAMARIBO	05N	305	B	A	A	A	A	A	A	B	A	C	S							200
ITHACA	42N	284	C	A	S															201
MOSCOW IZMIRAN	55N	37	C	A	A	A	A	C		A	A	A	A	A	B	A	S			202
KIEV	50N	30													B	A	A	A	C	204
MOSCOW IZMIRAN	55N	37															A	C	B	206
USSURISK	43N	132			B	A	A	C		A	A	B	A	A	B	A	A	B	C	208
IRKUTSK	52N	104	C	B	A	C	B	A	C	B	B	C	S							209
MOSCOW IZMIRAN	55N	37																	B	210

Continued

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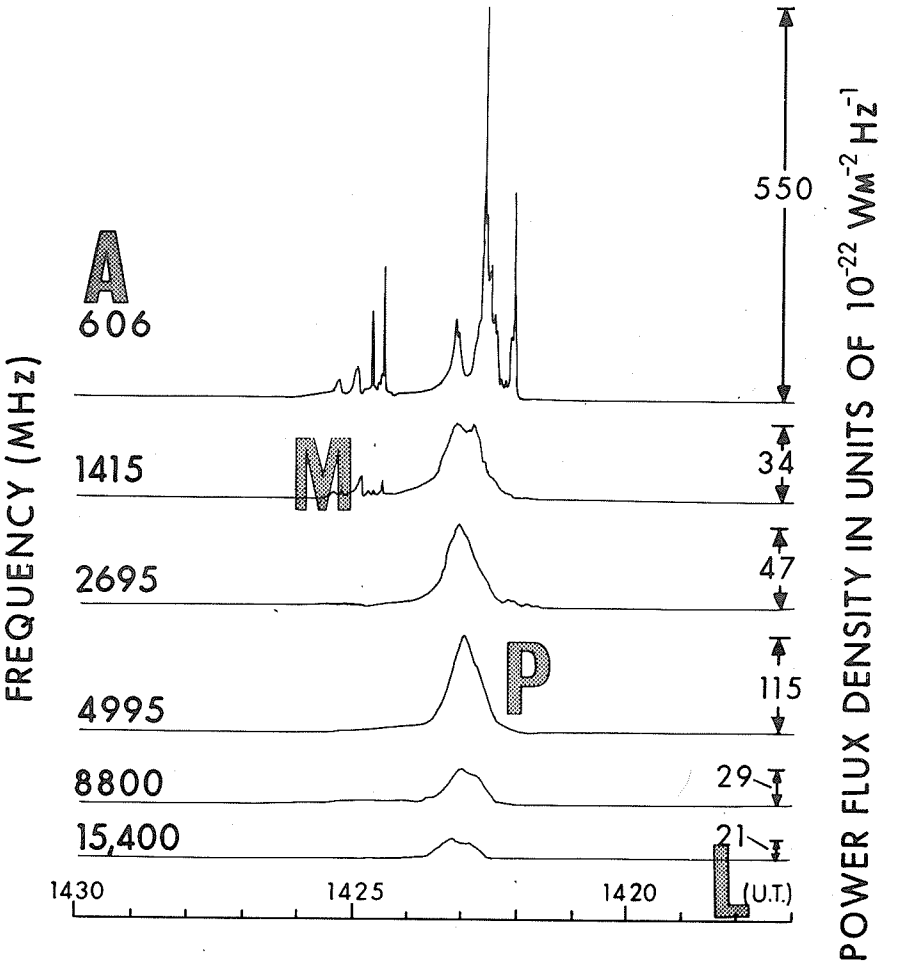
S



COMPLEX AND SIMPLE 2 RADIO BURST OBSERVED ON 10 AUGUST, 1969 AT SAGAMORE HILL RADIO OBSERVATORY HAMILTON, MASS.

E

AT BOULDER

C.3 SOLAR RADIO EVENTS FIXED FREQUENCY

BY FREQUENCY Cont'd.

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	FREQUENCY MHZ
SIMFEROPOL	44N	34		B	A	B	C	S												210
RIGA	56N	24	C	C	C	C			C	B	B	C	S							220
SIMFEROPOL	44N	34								B	C	S								220
ABASTUMANI	41N	42	C	A	A	A	A	B	B	A	A	A	A	B	B	A	A	A	C	221
HARESTUA	60N	10	B	B	B	B	B	B	B	B	B	B	A	A	B	B	B	B	C	225
MITAKA	35N	139	B	A	A	A	A	A	A	A	A	B	A	A	S					227
PIRKULI	40N	48			C	A	A	C	S											234
POTSDAM	52N	13	B	A	B	A	A		B	A	A	A	A	A	A	A	A	B	Q	234
TRIESTE	45N	13													B	C	S			235
TRIESTE	45N	13														B	A	B	C	237
TRIESTE	45N	13										B	A	A	C	S				239
KIEL	54N	10													A	A	A	C	Q	240
BOULDER NOAA	40N	255																B	C	245
SAGAMORE HILL	42N	288												A	A	A	A	A	B	245
ONDREJOV	49N	14		C	A	B	B	A	A	A	A	A	A	A	A	A	A	B	C	260
UPICE	50N	16										A	A	A	A	A	Q	A	C	295
TORONTO	43N	285	B	A	A	S														320
PENN STATE	41N	282									B	B	B	B	B	B	A	A	C	328
DWINGELOO	53N	6																C	C	400
SAN MIGUEL	34S	302											A	A	B	A	A	A	C	408
TRIESTE	45N	13															A	B	C	408
KIEL	54N	10													A	A	A	C	Q	410
SAGAMORE HILL	42N	288																A	B	410
ITHACA	42N	284									C	S								430
BOULDER NBS	40N	255	C	A	S															467
PULLMAN	47N	243									C	B	A	C	C	S				486
HIRAISO	36N	140							A	A	A	A	B	A	A	A	A	A	C	500
OTTAWA	54N	285	B	A	A	S														500
ONDREJOV	49N	14	B	A	A	A	B	A	A	A	A	B	A	A	A	A	A	B	C	536
MOSCOW IZMIRAN	55N	37	C	B	A	B	A	C	S											545
PARAMARIBO	05N	305	B	A	A	A	A	A	A	A	B	A	C	S						545
KIEV	50N	30																C	C	550
NEDERHORST	52N	5	B	A	A	A	A	A	A	A	C	S								550
UCCLE	50N	4	B	A	A	A	A	A	A	A	A	A	A	B	A	A	A	C	C	600
MANILA	14N	121														A	A	A	B	606
SAGAMORE HILL	42N	288									C	A	A	A	A	A	A	A	B	606
NEDERHORST	52N	5									B	A	A	A	A	B	S			610
WEISSENAU	47N	9												C	S					611
MITAKA	35N	139											C	A	B	B		C		612
GORKY	56N	44											A	A	A	A	A	C	C	650
MITAKA	35N	139	B	B	B	B	B	A	B	S										671
ONDREJOV	49N	14			B	B	B	A				B	A	A	A	A	A	B	C	808
KRAKOW	50N	19	C	B	A	C	S													810
BERLIN	52N	13	B	A	A	A	A	A							B	S				900
BORDEAUX	44N	359												C	A	A	A	A	B	930
GORKY	56N	44												A	B	B	A	C	C	950
PENN STATE	41N	282									C	A	A	A	B	B	A	A	C	960
SIMFEROPOL	44N	34										C	S							1000
TOYOKAWA	34N	137	B	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	1000
WEISSENAU	47N	9												C	S					1000

Continued

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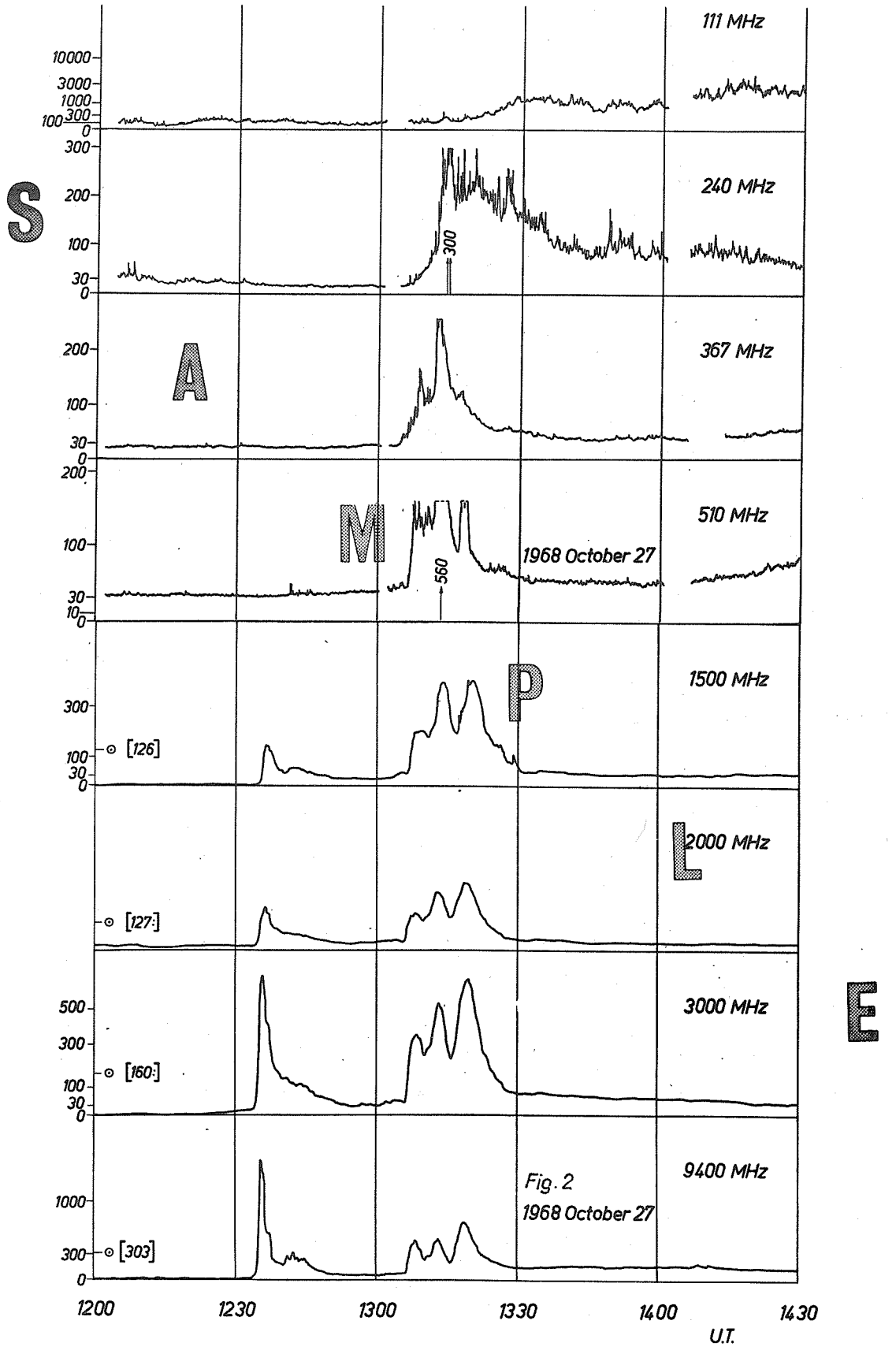

Type IV burst observed at HHI October 27, 1968.

AT BOULDER

C.3 SOLAR RADIO EVENTS FIXED FREQUENCY

BY FREQUENCY Cont'd.

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	FREQUENCY MHZ
MANILA	14N	121											C	A	A	A	A	A	B	1415
SAGAMORE HILL	42N	288									C	A	A	A	A	A	A	A	B	1415
ARCETRI	43N	11																A	C	1420
BOULDER NOAA	40N	255															B	A	B	1420
CANARY IS	28N	345											Q	C	C	A	A	A	B	1420
CARNARVON	25S	114										Q	C	Q	B	B	A	A	B	1420
HOUSTON	30N	265										C	C	B	B	C	S			1420
KIEL	54N	10													A	A	A	C	Q	1420
BERLIN	52N	13	B	A	A	A	A	A	A	A	A	A	A	A	A	S				1470
BERLIN	52N	13													B	A	A	A	C	1490
NEUSTRELITZ	53N	13				A	A	A	A	A	A	A	B	A	B	P				1490
JODRELL BANK	53N	357	B	A	C	S														2000
NEUSTRELITZ	53N	13								B	B	A	B	A	S					2000
TOYOKAWA	34N	137	B	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	2000
BOULDER NOAA	40N	255															B	A	B	2695
CANARY IS	28N	345											Q	C	C	A	A	A	B	2695
CARNARVON	25S	114										Q	Q	Q	Q	A	A	A	B	2695
HOUSTON	30N	265										C	C	B	B	C	S			2695
MANILA	14N	121											C	A	A	A	A	A	B	2695
SAGAMORE HILL	42N	288									C	A	A	A	A	A	A	A	B	2695
PENN STATE	41N	282									A	A	A	A	B	B	A	A	C	2700
PENTICTON	49N	241								C	A	A	A	A	A	A	A	A	B	2700
OTTAWA	54N	285	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	2800
SLOUGH	51N	0												A	A	B	A	A	C	2800
ARCETRI	43N	11																A	C	2830
BERLIN	52N	13													B	S				2920
NEUSTRELITZ	53N	13	C	A	A	A	A				B	A	A	A	B	P				2920
GORKY	56N	44	C	B	B								A	A	A	A	A	C	C	2950
BERLIN	52N	13	C	A	A	A	A				B	A	B	C	S					3000
DWINGELOO	53N	6																C	C	3000
MITAKA	35N	139	B	A	B	B	B	A	A	S										3000
NEDERHORST	52N	5	B	A	B	B	A	A	A	A	B	B	A	A	A	B	Q	Q	Q	3000
UPPER VAN NORMAN	35N	242												Q	Q	Q	Q	Q	Q	3000
SIMFEROPOL	44N	34												B	B	A	C	A	C	3100
WASHINGTON NRL	38N	283		B	C	S														3200
TOYOKAWA	34N	137	B	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	3750
GORKY	56N	44											B	A	A	S				3800
BOULDER NOAA	40N	255															B	A	B	4995
CANARY IS	28N	345											Q	C	C	A	A	A	B	4995
CARNARVON	25S	114										Q	Q	Q	Q	A	A	A	B	4995
HOUSTON	30N	265										C	C	B	B	C	S			4995
MANILA	14N	121											C	A	A	A	A	A	B	4995
SAGAMORE HILL	42N	288										B	A	A	A	A	A	A	B	4995
KISLOVODSK	43N	42								B	A	B	B	B	C	S				6100
SAO PAULA	22S	314											C	A	A	C	B	B	C	7000
MANILA	14N	121											C	A	A	A	A	A	B	8800
SAGAMORE HILL	42N	288										A	A	A	A	A	A	A	B	8800
GORKY	56N	44	C	B	B	B				B	C		A	A	A	A	A	C	C	9100
NEUSTRELITZ	53N	13					A	A	A	A	A	A	A	A	C	P				9140
ARCETRI	43N	11									C	A	A					A	C	9285

Continued

KEY TO SYMBOLS

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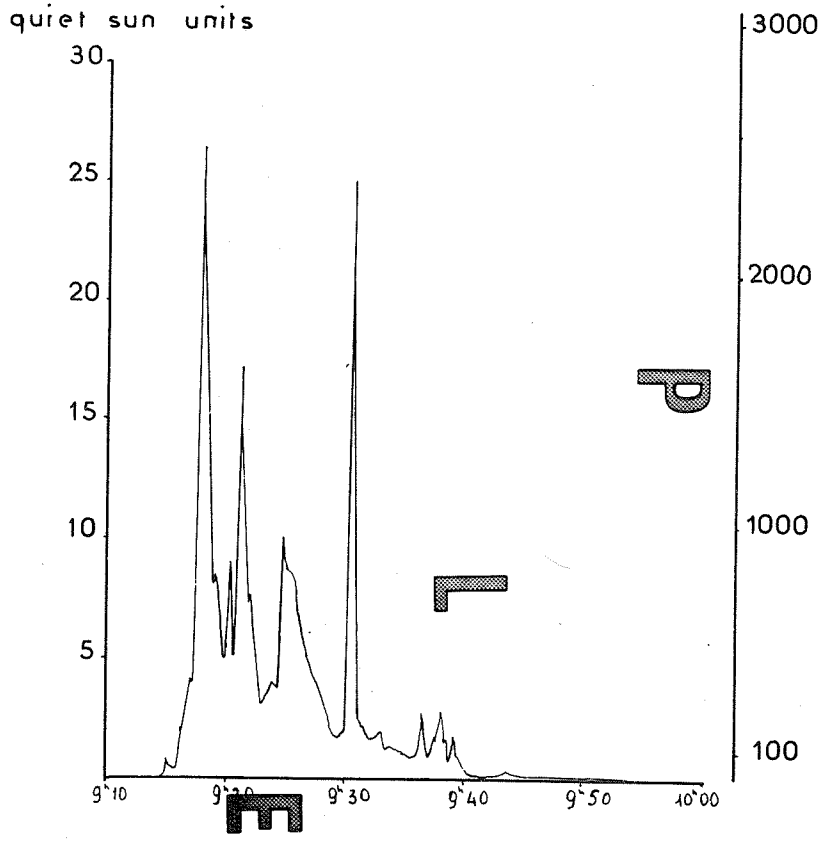
BORDEAUX 930 MHz

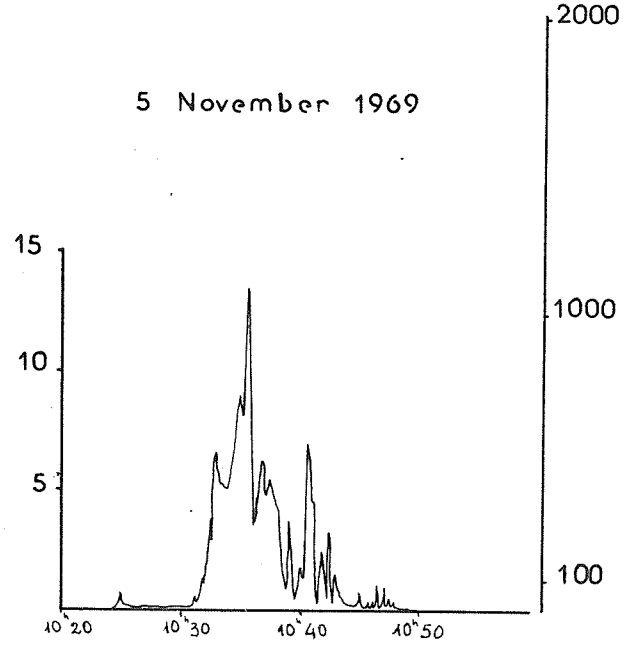
24 November 1969



FLUX DENSITY

10^{-22} wm^{-2} hz^{-1}

5 November 1969



C.3 SOLAR RADIO EVENTS FIXED FREQUENCY

AT BOULDER

BY FREQUENCY Cont'd.

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	FREQUENCY MHZ
PULKOVO	59N	30	C	C	S															9375
HUANCAYO	12S	284													B	A	A	A	B	9400
ONDREJOV	49N	14					B	A				C	B	B	A	A	A	B	C	9400
SLOUGH	51N	0												B		A	A	A	C	9400
TOYOKAWA	34N	137	B	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	9400
BERLIN	52N	13	B	A	A	A	A	A	A	A	A	A	A	A	B	S				9490
BERLIN	52N	13													A	A	A	A	C	9500
MITAKA	35N	139	B	A	A	A	B	A	A	C	S		C							9500
NEDERHORST	52N	5			C	A	A	A	A		C	A	B	C	A	B	S			9500
WASHINGTON NRL	38N	283		B	C	S														9530
IRKUTSK	52N	104								C	B	B	B	B	C	S				9570
IRKUTSK	52N	104													B	B	S			9620
IRKUTSK	52N	104														C	B	S		9700
IRKUTSK	52N	104															C	A	C	9750
BERNE	47N	7													A	A	B	C	C	10500
PENN STATE	41N	282									A	A	A	A	B	B	A	A	C	10700
KISLOVODSK	43N	42								C	B	B	B	B	C	S				15000
SAGAMORE HILL	42N	288												A	A	A	A	A	B	15400
MITAKA	35N	139								B	A	B	A	A	B	B	B	C		17000
SLOUGH	51N	0												A	A	A	A	A	C	19000
BONN	50N	7												B	S					35000
MITAKA	35N	139												C	S					35000
SAGAMORE HILL	42N	288													B	A	A	A	B	35000
SLOUGH	51N	0													C	A	A	A	C	37000
SLOUGH	51N	0												A	A	A	A	A	C	71000

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COMPUTER FORMAT:

1. Radio events - Fixed Frequencies (one card/event by observatory)

Worldwide	- 1/1969 to date	Manila	- 12/1967 to date
AFCRL	- 4/1966 to date	Ottawa	- 4/1966 to date
Boulder	- 4/1966 - 7/1966	Penn State	- 4/1966 to date
	3/1967 - 1/1968	Sao Paulo	- 11/1967 to date
	7/1968 - 6/1969	San Miguel	- 10/1967 to date
		Washington State	- 7/1966 - 12/1967

PUBLICATIONS:

1. *Solar-Geophysical Data*, NOAA. Western Hemisphere grouped reports - 4/1966 - 12/1968. Worldwide grouped reports 1/1969 to date.
2. *IAU Quarterly Bulletin on Solar Activity*, Zurich, all data are published.
3. *Solar Terrestrial Activity Chart* (see reference on p. 81).
4. *Solar Activity Chart* (see reference on p. 81).
5. *Pennsylvania State University*, Dept. of Astronomy, *Scientific Report No. 023* "A Catalog of Distinct Solar Radio Events for Fixed Frequency Observations made at the Pennsylvania State University Radio Astronomy Observatory During the Period 1 July 1964 through 30 June 1970", by John P. Hagen and Frederick L. Wefer.

C.4

In addition to the tabulations of observing period and outstanding events by spectral band, A. D. Fokker has made a "Collection of Spectral Diagrams of Solar Radio Type IV Events" from fixed frequency observations for the following events:

April	1, 1960, ∿0900 UT	Nov.	15, 1960, ∿0230 UT
May	4, 1960, ∿1030	Mar.	26, 1961, ∿1030
May	13, 1960, ∿0500	July	12, 1961, ∿1030
May	26, 1960, ∿0915	July	18, 1961, ∿0930
June	1, 1960, ∿0830	Sept.	16, 1963, ∿1410
Nov.	10, 1960, ∿1015	Sept.	26, 1963, ∿0715
Nov.	11, 1960, ∿0315	Oct.	4, 1965, ∿1000
Nov.	12, 1960, ∿1330	Jan.	17, 1966, ∿1030

FT. DAVIS, TEXAS

DATE AND OBSERVING TIMES U.T.	IMPORTANT BURSTS FREQUENCY RANGE dm (580-300 mc/s)	INT	m (300-30 mc/s)	INT	Dkm (30-10 mc/s)	INT	SPECTRAL TYPE	REMARKS
JANUARY 1969								
5								
1415-2349			1432-1438	1			IIIGG	
			1454-1456	2			IIIG	
	1459	1	1459-1501	2			IIIG	
	1503-1505	2	1503-1505	2	1503-1505	1	IIIGG	
	1518-1519	1	1518-1519	2	1518-1519	2	IIIG	
			1614-1615	2	1614-1615	2	IIIG	
			1714-2123	2	1714-2123	2	IIIN	
	1721-1724	1	1721-1724	3	1721-1724	3	IIIGG	
	1733-1734	1	1732-1734	2	1732-1734	3	IIIGG,V	
			1909-1910	2	1909-1910	2	IIIG	
	1917-1923	2	1915-1925	2	1915-1925	3	IIIGG	
	1928-1929	1	1928-1932	2	1928-1932	2	IIIGG	
			1937	1	1937	2	IIIG	
			2019-2021	2	2019-2021	3	IIIG	
			2334-2337	1	2334-2335	2	IIIG	
			2341-2344	1			IIIG	
6								
1541-2349			1607-1610	2	1607-1610	2	IIIG	
			1628-2053	2	1628-2053	2	IIIN	
			1725-1820	1			IIN	
	1759-1800	1	1759-1800	2	1759-1800	3	IIIG	
			1808-1811	1	1808-1811	2	IIIG	
			1820-2349	1			II	
			1839-1840	2	1839-1840	2	IIIG	
			1854-1856	1	1854-1856	2	IIIG	
	1954-1955	2	1954-1956	2	1954-1956	3	IIIG	
	2018	2	2018	3	2018	3	IIIG	
	2023-2024	2	2023-2025	3	2023-2025	3	IIIGG	
	2044-2047	2	2044-2047	2	2044-2047	3	IIIGG	
			2115-2118	2	2115-2118	3	IIIGG	
			2242-2243	1	2242-2243	1	IIIG	
			2251-2252	1			IIIG	
7								
1415-2350			1415-2350	1			IIN	
			1536-1539	2	1536-1539	2	IIIGG	
			1649-1651	2	1650-1651	2	IIIG	
			1823-2218	1	1823-2218	1	IIIN	
			2000-2001	1	2000-2001	2	IIIG	
	2208-2209	1	2207-2212	2	2207-2210	2	IIIGG	

C.4 SOLAR RADIO SPECTROGRAMS OF EVENTS

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	SWEEP FREQUENCY MHZ
NEDERHORST	52N	5												Q	Q	Q	Q	Q	S	160-320
DWINGELOO	53N	6																Q	C	160-320
WEISSENAU	47N	9										C	A	A	A	A	A	A	B	46-540
ONDREJOV	50N	15											B	B						50-210
CULGOORA	30S	147													B	S				8-222
CULGOORA	30S	147													C	C	S			8-2000
CULGOORA	30S	147											A	A	S					10-210
CULGOORA	30S	147														A	A	S		8-4000
CULGOORA	30S	147																A	S	800-8000
SYDNEY	33S	151	B	A	A	A	A	A	A	A	A	A								10-250
BIG PINE	37N	241				C	B	S												450-1000
CLARK LAKE	33N	244														B	B	C	Q	20-65
BOULDER HAO	40N	255			B	A	A	A	A	A	A	A	A	A	A	B	A	A	C	7-80
FT DAVIS	30N	257				B	A	S												2100-3900
FT DAVIS	30N	257	B	A	A	A	A	A	A	A	A	A	A	A	A	C	S			10-580
FT DAVIS	30N	257														B	A	A	B	10-2000
ANN ARBOR	42N	277		C	A	C	B	S												100-580
SAGAMORE HILL	42N	288												A	B	B	A	A	B	19-41
VILLA ELISA	34S	302										B	C							10-210

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S = Program STOPPED operations (see MASTER STATION LIST for actual date)

COMPUTER FORMAT:

1. Radio events - Spectral (one card/event by observatory)
   - AFCRL 1/1968 to date
   - Boulder 1/1967 to date
   - Culgoora 1/1967 to date
   - Ft. Davis 1/1967 to date
   - Weissenau 4/1968 to date

PUBLICATIONS:

1. *Solar-Geophysical Data*, NOAA. Western Hemisphere grouped reports 4/1966 - 12/1968
   Worldwide grouped reports 1/1969 to date
2. *IAU Quarterly Bulletin on Solar Activity*, Zurich, all data are published.
3. *IGY Solar Activity Report Series, No. 23*, World Data Center A, University of Colorado. Spectral Observations in the Dekameter Range, 24 July 1959 - 28 February 1961, by J. W. Warwick.

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
ALOUETTE 1, COSMIC RADIO NOISE HARTZ (62-049A-04)	092962	031870	092962
ALOUETTE 2, COSMIC RADIO NOISE HARTZ (65-098A-03)	112965	101372	112965
ISIS 1, COSMIC RADIO NOISE HARTZ (69-009A-10)	013069	083172	013069
ISIS 2, COSMIC RADIO NOISE HARTZ (71-024A-10)	040871	010573	040171

The data are listed by satellite with the reporting station or group responsible also indicated for data held at Boulder.

SOLAR X-RAYS MEASURED BY SATELLITE
SOLRAD 9-EXPLORER 37

NAVAL RESEARCH LABORATORY

X-RAY FLARES OBSERVED DURING JANUARY,1969

DAY	START TIME	0.5-3A FLUX XE-5	PEAK TIME	1-8A FLUX XE-4	PEAK TIME	8-20A FLUX XE-3	PEAK TIME	END TIME
1	1622	6,70	1626	37,00	1623	25,00	1627	1628
1	2027E	17,00	2034	78,00	2036	39,00	2046	2056
1	2109	4,50	2111	32,00	2112	27,00	2112	2113
2	1141	6,70D	1154E	73,00	1147	39,00	1206	1210
2	2119	6,70	2123	41,00	2124	29,00	2126	2127
3	0123	5,60D	0128E	67,00	0125	27,00	0124	0129
3	0433	130,00D	0454E	510,00	0453	140,00	0453	0548
3	1050	5,60	1353	37,00	1357	39,00	1357	1359
3	2337	13,00	2339	44,00	2338	27,00	2341	2343
4	0622D	34,00	0624	88,00	0626	39,00	0633	0636
4	0954	30,00	0955	69,00	0956	29,00D	0959D	1001
4	1112	10,00	1112	38,00	1114	25,00	1114	1117
4	1306	13,00D	1321E	54,00D	1321E	39,00D	1322E	1325
4	1408E	11,00	1410	38,00	1411	28,00	1416	1419
4	1546E	30,00	1548	74,00	1548	27,00	1551	1552
4	2041E	8,90	2043	36,00	2042	26,00	2044	2045
4	2055	130,00D	2124E	1300,00	2114	320,00	2118	2204D
5	0315E	12,00	0315	46,00	0316	24,00	0317	0319
5	1551	6,70	1555	38,00	1554	27,00	1558	1602
5	1825	10,00	1826	46,00	1826	25,00	1827	1829
5	1909	4,50	1914	37,00	1913	27,00	1920	1921
5	1923	19,00	1928	65,00	1929	28,00	1927	1932
6	0213	5,60	0216	38,00	0217	28,00	0216	0229
6	0306	29,00	0312	90,00	0313	39,00	0321	0326
6	0527	13,00	0529	46,00	0529	24,00	0530	0531
6	0806	34,00	0809	90,00	0810	39,00	0810	0813
6	0907	120,00D	0909D	390,00	0912	120,00	0912	0918
6	1147	18,00	1149	56,00	1153	29,00	1152	1204
6	2234	28,00	2236	74,00	2237	29,00	2240	2245
7	0105	4,50	0109	32,00	0107	25,00	0109	0110
7	0121	8,90	0137	54,00	0129	29,00	0140	0148
7	0318	8,90	0324	44,00	0325	26,00	0329	0334
7	0440	4,50D	0449D	34,00	0449	29,00	0449	0450
7	0452	2,20D	0505E	86,00	0458	39,00D	0459D	0515
7	0518	2,20	0519	33,00	0519	28,00	0521	0525
7	0550	130,00D	0558E	510,00	0556	120,00	0557	0630D
7	0645E	12,00	0655	6,80	0651	40,00	0656	0738D
7	0738E	16,00	0740	8,00	0740	40,00	0740	0759
7	0917	6,70	0917	38,00	0917	28,00	0927	0928
7	1100	30,00	1104	87,00	1108	52,00	1109	1120
7	1313	7,80	1320	51,00	1319	39,00	1325	1338
7	1404	8,90	1405	46,00	1405	29,00	1404	1410
7	1419	10,00	1420	44,00	1421	28,00	1419	1426
7	1536	4,50	1537	38,00	1537	29,00	1536	1543
7	1704	38,00	1706	94,00	1706	39,00	1713	1717

C.5 SOLAR X-RAY OBSERVATIONS

AT BOULDER

SATELLITE	BAND	SOURCE	61	62	63	64	65	66	67	68	69	70	71	72	73
INJUN 1	0-20A	U OF IOWA	B	C											
INJUN 3	0-20A	U OF IOWA		C	B										
VELA 2		LASL									B				
VELA 3	0.5-4A	LASL			C						A	C			
VELA 4	0.5-4A	LASL			C						B				
VELA 5	.05-.5	LASL						C	C		B	C			
OGO-1	10-50<EV	U OF MINNESOTA					C	B							
OGO-3	10-50KEV	U OF MINNESOTA						B							
SOLRAD	0-8A	USNRL				A	A	A	A	A	A	A	A	A	C
SOLRAD	8-12A	USNRL				A	A	A	A	A	A	A	A		
SOLRAD	44-60A	USNRL				A	A	A	A	A	A	C			
SOLRAD	0-8A	ABERDEEN S DAK					B	B	B	B					
SOLRAD	8-12A	ABERDEEN S DAK					B	B	B	B					
SOLRAD	44-60A	ABERDEEN S DAK					B	B	B	B					
SOLRAD	0-8A	ESSA BOULDER					C	A	B	B					
SOLRAD	8-12A	ESSA BOULDER					C	A	B						
SOLRAD	44-60A	ESSA BOULDER					C	A	B						
EXPLORER 33	2-12A	U OF IOWA						B	A	B	A	A	B	S	
EXPLORER 35	2-12A	U OF IOWA								B	A	A	A	B	Q
OSO-3	8-12A	MCMATH-HULBERT							B						
VELA 6	0.3-3A	LASL										B	C	Q	P
VELA 6	1-8A	LASL										B	C	Q	P
VELA 6	1-16A	LASL										B	C	Q	P
SOLRAD	8-20A	USNRL												A	C

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COMPUTER FORMAT:

1. X-ray Events (one card/event)
   USNRL - 11/1965 - 2/1966; 4/1966 - 6/1966; 2/1967 - 11/1968; 12/1968 - 10/1969 (on magnetic tape).
   Aberdeen, S. Dakota - 2/1967 - 10/1968.
2. X-ray Daily Averages (one card/day)
   USNRL (covers same period as above events)
   Aberdeen - 4/1967 - 10/1968.
3. Event log - Preliminary reports of flare-associated events in time sequence. Includes x-ray bursts, flares, radio emission bursts, SID. (listing only)

PUBLICATIONS:

1. *Solar-Geophysical Data*, NOAA. Most of the data listed above have been published.

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
SOLRAD 1, X-RAY AND LYMAN-ALPHA STUDY FRIEDMAN (60-007B-01)	062250	110160 ,	062260
INJUN 1, 2- TO 8-A AND 8- 20-A X-RAY DETECTORS KREPLIN (61-015B-07)	062961	112661 ,	062961
OSO 1, 20- TO 100-KEV SOLAR X-RAY DETECTOR FROST (62-006A-02)	030762	051562 ,	030762
OSO 1, 0.1- TO 0.7-MEV SOLAR GAMMA-RAY MONITOR FROST (62-006A-03)	030762	051562 ,	030762
SOLRAD 7A, SOLAR X-RAY (2 TO 60 A) AND UV (1225 TO 1350 A) FLUX, KREPLIN (64-001D-01)	011164	020365 ,	011164

Continued

SPACECRAFT COMMON NAME- EXPLORER 37 NSSDC ID 68-017A
ALTERNATE NAMES- SOLRAD 9

LAUNCH DATE- 03/05/68 SPACECRAFT WEIGHT IN ORBIT- 433. KG

FUNDING AGENCY- NASA-OSSA

SPACECRAFT STATUS OF OPERATION- NORMAL

EPOCH DATE- 03/06/68 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 98.68 MIN
APOAPSIS- 881.000 KM ALT PERIAPSIS- 513.000 KM ALT INCLINATION- 59.43 DEG

SPACECRAFT BRIEF DESCRIPTION
THE NRL SOLRAD 9 SATELLITE WAS ONE OF A SERIES OF SATELLITES THAT BEGAN IN 1960 TO PROVIDE CONTINUOUS COVERAGE OF SOLAR RADIATION WITH A SET OF STANDARD PHOTOMETERS. SOLRAD 9 WAS A SPIN-STABILIZED SATELLITE ORIENTED WITH ITS SPIN AXIS PERPENDICULAR TO THE SUN-SATELLITE LINE SO THAT THE 14 SOLAR X-RAY AND UV PHOTOMETERS POINTING RADIALLY OUTWARD FROM ITS EQUATORIAL BELT VIEWED THE SUN WITH EACH REVOLUTION. DATA WERE SIMULTANEOUSLY TRANSMITTED VIA FM/AM TELEMETRY AND RECORDED IN A CORE MEMORY THAT READ OUT ITS CONTENTS ON COMMAND. INDIVIDUAL SCIENTISTS AND INSTITUTIONS ARE INVITED TO RECEIVE AND USE THE DATA TRANSMITTED ON THE 136-MHZ TELEMETRY BAND ON THE STANDARD PCM/FM CHANNELS 3 THROUGH 8. THE SPACECRAFT OPERATED NORMALLY FROM LAUNCH TO FEBRUARY 1973.

EXPERIMENT NAME- SOLAR RADIATION DETECTORS NSSDC ID 68-017A-01

ORIGINAL EXPERIMENT INSTITUTION- NAVAL RESEARCH LAB

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - R.W. KREPLIN NAVAL RESEARCH LAB WASHINGTON, DC

EXPERIMENT STATUS OF OPERATION- NORMAL

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF 14 DETECTORS COVERING THE RANGES 20 TO 80 KEV, 0.5 TO 60 A, AND 1080 TO 1350 A. THE DETECTORS WERE DESIGNED TO MEASURE WAVELENGTH AND FLUX SHIFTS OF SOLAR RADIATION DURING PERIODS OF LOW AND HIGH SOLAR ACTIVITY. THE DETECTORS WERE STANDARDIZED PHOTOMETERS SIMILAR TO THOSE FLOWN ON SOLRAD 8. DATA FROM THREE PAIRS OF IDENTICAL DETECTORS COVERING THE RANGE 0.5 TO 16 A WERE STORED IN THE ONBOARD MEMORY TO PROVIDE FULL TIME COVERAGE, WHILE THE OTHER DATA WERE TRANSMITTED IN REAL TIME ONLY. (REAL-TIME DATA WERE RECORDED FOR AT LEAST 10 MIN PER ORBIT.) THE UV AND 20- TO 80-KEV DETECTORS FAILED SHORTLY AFTER LAUNCH. THE REMAINING DETECTORS CONTINUE TO PERFORM NORMALLY AS OF FEBRUARY 1973.

DATA SET NAME- PLOTS OF REDUCED SOLAR X-RAY FLUX VS TIME ON MICROFILM NSSDC ID 68-017A-01A

AVAILABILITY OF DATA SET- DATA AT NSSDC BEING PROCESSED

TIME PERIOD COVERED- 031468 TO 123171 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 2 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION
THIS DATA SET CONSISTS OF 16-MM MICROFILMED PLOTS OF THE DETECTOR OUTPUTS, IN X-RAY FLUX UNITS OF ERGS/CM SQ SEC, FOR THE 0.5- TO 3-A, 1- TO 8-A, AND 8- TO 20-A PHOTOMETERS (ASSUMING A 2 TIMES 10 TO THE 6 POWER DEG K 'GRAY BODY' TEMPERATURE DISTRIBUTION FOR THE 1- TO 8-A AND 8- TO 20-A DETECTORS AND A 10 TIMES 10 TO THE 6 POWER DEG K 'GRAY BODY' DISTRIBUTION FOR THE 0.5- TO 3-A DETECTOR). EACH FRAME PRESENTS DATA COVERING 24 HR, WITH 1-MIN TIME RESOLUTION, ON A LOG BASE 10 SEMILOG GRID. THE DATA GAPS THAT OCCUR INDICATE SATELLITE NIGHT. PARTICLE INTERFERENCE IS INDICATED BY A BACKGROUND COUNT PLOT THAT WAS PRODUCED BY THE 0.5- TO 3-A PHOTOMETER WHEN IT WAS FACING AWAY FROM THE SUN. THE DATA, WHICH COVER THE PERIOD MARCH 14, 1968 TO DECEMBER 31, 1971, WERE PROVIDED BY THE EXPERIMENTER. A COMPLETE DESCRIPTION OF THE SOLRAD 9 SATELLITE CAN BE FOUND IN NRL REPORT NO. 6800, "THE NRL SOLRAD 9 SATELLITE, SOLAR EXPLORER 8, 1968-17A."

AT GREENBELT

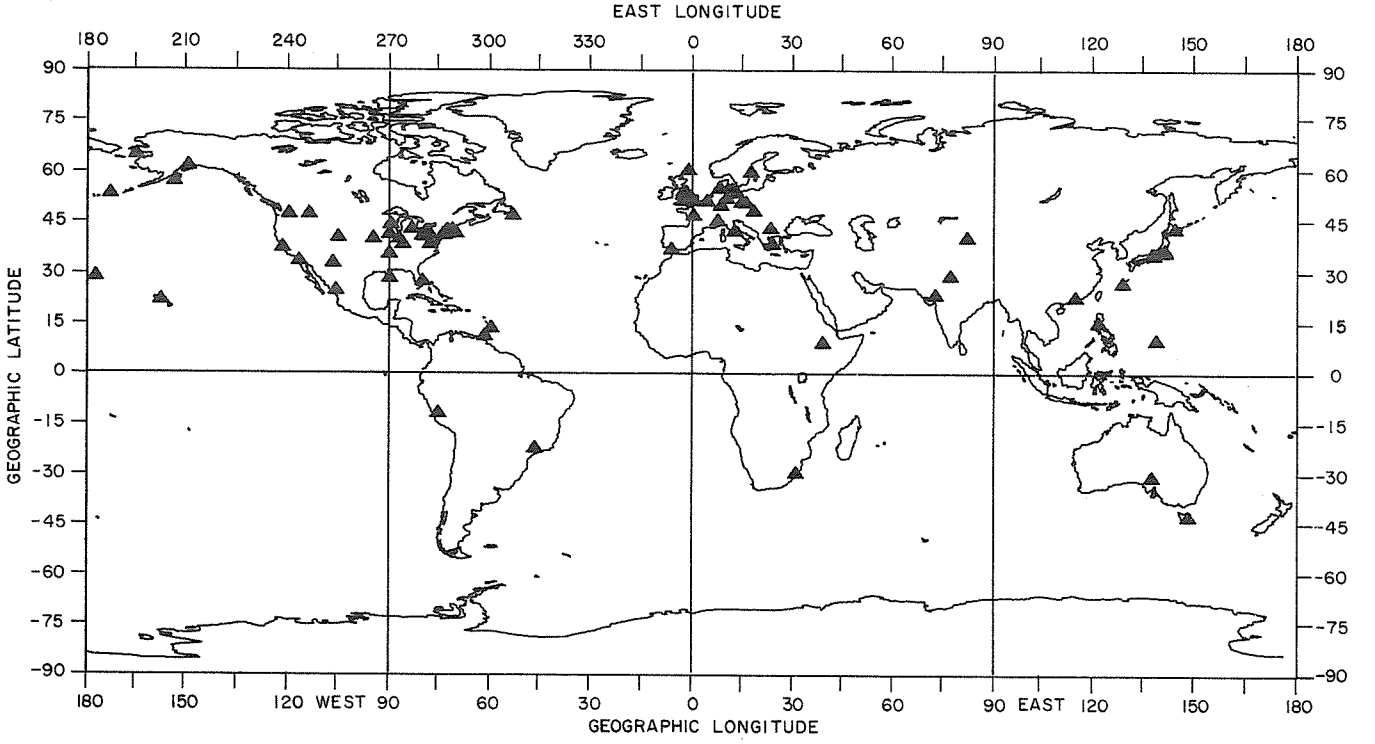
SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
OSO 2, SOLAR X-RAY BURSTS CHUBB (65-007A-02)	020465	030865 ,	020365
ERS 17, X-RAY DETECTORS VETTE (65-058C-02)	072065	110365 ,	072065
OGO 2, SOLAR X-RAYS KREPLIN (65-081A-16)	101465	102365 ,	101465
EXPLORER 30, SOLAR X-RAY AND ULTRAVIOLET MONITOR KREPLIN (65-093A-01)	111965	113067 ,	111965
OSO 3, 8 TO 12 A SOLAR X RAY ION CHAMBER TESKE (67-020A-06)	030967	071568 ,	030867
OSO 3, SOLAR AND CELESTIAL GAMMA-RAY TELESCOPE PETERSON (67-020A-07)	030967	040868 ,	030867
EXPLORER 35, ELECTRON AND PROTON DETECTORS VAN ALLEN (67-070A-01)	071967	052870 ,	071967
OGO 4, SOLAR X RAY EMISSIONS KREPLIN (67-073A-21)	072967	071568 ,	072867
OSO 4, SOLAR X-RAY TELESCOPE GIACCONI (67-100A-08)	102067	051268 ,	101867
EXPLORER 37, SOLAR RADIATION DETECTORS KREPLIN (68-017A-01)	030868	123171 ,	030568
OSO 5, SOLAR X-RAY RADIATION ION CHAMBER PHOTOMETER, CHUBB (69-006A-04)	012369	080270 ,	012269
VELA 5A, SOLAR X-RAY DETECTORS, .5-3.0 A, 1-8 A, 1-16 A, 44-60 A, CHAMBERS (69-046D-02)	052769	051570 ,	052369
VELA 5B, SOLAR X RAY DETECTORS, .5 TO 3.0 A, 1 TO 8 A, 1 TO 16 A , 44 TO 60 A, CHAMBERS (69-046E-02)	052769	051570 ,	052369
OSO 6, X-RAY SPECTROMETER ARGO (69-068A-04)	081469	012070 ,	080969
VELA 6A, SOLAR X RAY DETECTORS,.5 TO 3.0 A ,1 TO 8 A ,1 TO 16 A , 44 TO 60 A, CHAMBERS (70-027A-02)	041170	010171 ,	040870
VELA 6B, SOLAR X RAY DETECTORS,.5 TO 3.0 A ,1 TO 8 A ,1 TO 16 A , 44 TO 60 A, CHAMBERS (70-027B-02)	041170	010171 ,	040870

C.6

The data are listed by type of report: short-wave fadeout (SWF), sudden cosmic noise absorption (SCNA), sudden enhancement of atmospherics (SEA), sudden frequency deviations (SFD), sudden phase anomaly (SPA) and sudden enhancement of signal (SES).

The map shows currently reporting stations.

SUDDEN IONOSPHERIC DISTURBANCES - GROUND - BASED STATIONS 1973



SUDDEN IONOSPHERIC DISTURBANCES

	Page
SWF	195
SES	197
SEA	199
SPA	201
SFD	203
SCNA	203

AT BOULDER

GROUND BASED OBSERVATIONS

SWF

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
BRENTWOOD	51N	0				B	C	B	C			B	C						
POITIERS	46N	0												C	C				
TATSFIELD	51N	0	B	B	B	B	B	B	B	B	B	B							
NEDERHORST	52N	5	B	A	A	A	A	A	A	A	A	B							
DARMSTADT	49N	8												B	A	B	B	B	C
LINDAU	51N	10	B	A	A	A	B							C					
KUHLUNGSBORN	54N	11	B	A	A	A	A	A	A	A	B	A	C	B	B				
ROME	41N	12											B						
NEUSTRELITZ	53N	13				A	A	A	A	A	B	A	B	B	B	C	A	B	C
PANSKA VES	50N	14									A	A	A	B	A	A	A	A	B
ENKOPING	59N	17				A	A	A	A	A	B	A	A	B	A	B	C	C	C
HURBANOVO	47N	18													B	C			
ATHENS	37N	23												B	A	B	B	Q	P
DELHI	28N	77													B	C	B	B	C
COLUMBUS	39N	83												C					
SINGAPORE	01N	103				B													
HONGKONG	22N	114				B		C	C			C	B	B	C	C			
MANILA	14N	121							B	A	A	A	A	A	A	A	A	A	C
OKINAWA	26N	128	B	A	A	A	A	A	A	A	A	A	A	B	A	C	C	P	S
HIRAISO	36N	140	B	A	A	A	A	A	A	A	A	A	B	A	A	A	A	A	B
HOLLANDIA	02S	140				A	A	A	C										
CANBERRA	35S	149								C	C	C	A	A	C				
CHRISTCHURCH	43S	172				C	A	A	A	A	C		C						
GODLEY HEAD	43S	172						B	A	B	A	A	A	C	S				
ADAK	51N	184	B	A	A	A	A	A	A	A	A	S							
ANCHORAGE	61N	211	B	A	A	A	A	A	B	A	A	A	A	B	B	B	B	C	
LOS ANGELES	34N	242		B	A	A	C												
WHITE SANDS	32N	253	B	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	C
BOULDER NOAA	40N	255				B	A	A	B	A	A	B	A	A	A	A	A	A	B
MCMATH-HULBERT	42N	277	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
CORNELL	42N	283	C	A															
FT BELVOIR	38N	283	B	A	A	A	A	A	A	A	A	A	A	C	S				
GREENBELT	39N	284										C	C	C	B	C	S		
HUANCAYO	12S	285	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
FT MONMOUTH	40N	286		C	A	A	A	A	A	A	A	B	C	S					
PUERTO RICO	18N	293	B	A	A	A	A	A	B	S									
TRINIDAD	10N	299								B	A	A	B	A	B	A	B	B	C
BARBADOS	13N	301				C		C				B	B	C	C	C			
PARAMARIBO	05N	305				A	A	A	A	A	A	C							
BEARLEY	52N	358											C	B	B	B	C	C	C
SOMERTON	51N	358				B	C	C	C			C	B	B	B	B	C	C	C

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
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S = Program STOPPED operations (see MASTER STATION LIST for actual date)

C.6

SHORT WAVE FADEOUTS - SWF

MONTH February YEAR 1969

OBSERVING STATION Huancayo, Perú

CHART SPEED 3 inch hour

RECORDER TIME CONSTANT

DATE	START UT	END UT	MAX UT	TYPE	DEFI-NITE-NESS	M-POR-TANCE	TRANSMITTER LOCATION	TRANSMITTER CALL LETTERS	TRANSMITTER FREQ MC/S	REMARKS
01	2136	2157	2140U	S	5	1				
08	1750	1809U	1756	SL	4	1				
09	1431	1450U	1435U	SL	1	1-				
09	1603	1622	1607U	S	0	1-				
09	1724	1740	1727	S	5	1				
13	2012	2018	2014	S	0	1-				
24	2039	2050U	2041	S	0	1-				
25	1658U	1735U	1706U	SL	0	1				
25	1940	2015U	-	(S)	4	1				
27	1358	152[illegible]U	)-	(S)	4	2				
28	1947U	202[illegible]	1955	S	4	1				

Location

10	MHz	WWV	Washington	D.C.	U.S.A.
15	"	"	"		"
20	"	"	"		"

Power Failure

Date	From	To
06	1435	2125
13	1511	1655
16	1345	1950
20	1512	1940
28	1520	1735

SUDDEN COSMIC NOISE ABSORPTION - SCNA
SUDDEN ENHANCEMENTS OF ATMOSPHERICS - SEA
SUDDEN ENHANCEMENTS OF VLF SIGNALS - SES
SOLAR NOISE BURSTS AT SCNA FREQUENCY

MONTH October YEAR 1968

OBSERVING STATION AAVSO, Solar Division

	FREQUENCY		CHART SPEED	RECORDER TIME CONSTANT
SCNA		Mc/s		
SEA	27	kc/s		
SES	24	kc/s		
BURSTS		Mc/s		

DATE	START UT	END UT	MAX. UT	SCNA %ABS	SCNA IMPT	SEA IMPT	SES IMPT	BURST IMPT	DEFI-NITE-NESS	REMARKS
✓5	1430	1515	1436			2+			4	A-17, Durban, S. Africa
✓5	1431	1520	1437				1		2	A-1, Valley Cottage, N.Y.
✓12	0833	0920	0838			2+			5	A-17
✓12	1341	1420	1345			1			2	A-17

AT BOULDER

C.6 SUDDEN IONOSPHERIC DISTURBANCES

GROUND BASED OBSERVATIONS

SES

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
SYLT	54N	8													B	B	B	B	B
ROME	41N	12										B	C						
PANSKA VES	50N	14												C	A	A	A	A	B
SOFIA	43N	23														C	A	A	C
DURBAN A17	29S	30								C	C	B	C	C	C				
DELHI	28N	77								A	B	B	A		B	B	B	B	C
MAYFIELD VILLAGE A28	40N	82															C	C	C
MANILA	14N	121					C	C	C				B		C				
MARCUS	26N	128													B	A		C	B
YAP	09N	138													C	B	C		
HOKKAIDO	42N	143													B				
GESASHI	24N	154													C	B	C	B	B
KURE	23N	182													C	B	B	B	C
ATTU	52N	186													B	B	A	B	
PORT CLARENCE	64N	194													B	B	B	C	
HAWAII	21N	202										B	C	C		C			
SITKINAK	56N	205													C	B	B	B	
SUNNYVALE A30	37N	238															C	A	C
YAKIMA A37	47N	240																C	B
BEVERLY HILLS	34N	242					B	B	C										
MISSOULA A31	47N	246															C	C	B
GLENN ELLYN A33	41N	250																B	B
BOULDER	40N	255										B	C	C					
LITTLETON A21	39N	255											C	B	B	B	B	A	B
ST JOSEPH	40N	265													B				
MEMPHIS	35N	270													C				
ORMOND BEACH A38	26N	270																	C
PITTSBURGH	40N	280					A	B		C									
LATROBE A19	40N	281											C	B	C	B	A	B	
RAMSEY A5	41N	286		C	A	A	A	A	A	C	C		C						
VALLEY COTTAGE A1	41N	286						B	A	B	B	C	B	B	B	B	A	B	
BENNINGTON	42N	287						C	C	C	C	C							
BROOKLYN PK A35	40N	287																C	C
WEST NYACK	41N	287											C	B	B				
WORTHINGTON A36	42N	287																C	B
HADDAM A8	41N	288										C	C		C				
SCITUATE	42N	288									C	B	B	C					
NANTUCKET	42N	289													B	B	B	B	B
CAPE RACE	46N	306													B	C			
SAO PAULO	22S	314						C	C			B	B	A	B	B	A	A	B

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S

SUDDEN COSMIC NOISE ABSORPTION - SCNA
SUDDEN ENHANCEMENTS OF ATMOSPHERICS - SEA
SUDDEN ENHANCEMENTS OF VLF SIGNALS - SES
SOLAR NOISE BURSTS AT SCNA FREQUENCY

A

MONTH October YEAR 1968 OBSERVING STATION AAVSO, Solar Division

	FREQUENCY	CHART SPEED	RECORDER TIME CONSTANT
SCNA	Mc/s		
SEA	27 kc/s		
SES	24 kc/s		
BURSTS			

M

DATE	START UT	END UT	MAX. UT	SCNA %ABS	SCNA IMPT	SEA IMPT	SES IMPT	BURST IMPT	DEFINITENESS	REMARKS
✓5	1430	1515	1436			2+			4	A-17, Durban, S. Africa
✓5	1431	1520	1437				1	P	2	A-1, Valley Cottage, N.Y.
✓12	0833	0920	0838			2+			5	A-17
✓12	1341	1420	1345			1			2	A-17
✓12	2000	2040	2006			1+			4	A-6
✓12	2000	2045	2007			1+			4	A-19, Latrobe, Penna.
✓19	1852	1920	1857			1+			4	A-6, Oshkosh, Wisconsin
✓19	1852	1930	1900				1		2	A-1
✓21	1427	1520	1437			3			5	A-17
✓21	1427	1530	1440				3		5	A-1
✓21	1423	1520	1428			3			5	A-22, Wellesley, Mass.

L

E

AT BOULDER

GROUND BASED OBSERVATIONS

SEA

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
HERSTMONCEUX	50N	0								B					C	B	A	A	C
POITIERS	46N	0												C	A	B	C	A	C
TORTOSA	40N	0						B	C	B	B								
UCCLE	50N	4								A	A	A	B	B	C	C	C	Q	P
NEDERHORST	52N	5	B	A	A	A	A	A	A										
ARCETRI	34N	11								B	B	A	B	B					
KUHLUNGSBORN	54N	11	B	A	A	A	A	A	A	B	B	B	B	B	B	B	A	B	C
ROME	41N	12								A	B	A	A	B	B	B	B		
NEUSTRELITZ	53N	13	B	A	A	A	A	A	A	B	B	B	C	B					
ONDREJOV	49N	14								C	C	A	B						
PANSKA VES	50N	14		B	C						C	C	A	B	A	A	B	A	B
UPICE	50N	16										A	A	A	A	A	A	A	C
ATHENS	37N	23												B	B	C			
DURBAN A17	29S	30									B	B	B	B	B	B	B	C	C
ADDIS ABABA	09N	38				C	C												
KERGUELEN	49S	70												A					
DELHI	28N	77	C	B						A	B	B	A	C	C				
MANILA	14N	121				C	B	C	C	A	B	A	A	C	B	B			
TOYOKAWA	34N	137				C	A	B	C	A	A	B	A	A	B	C			
YAP	09N	138														B	B	C	
HOLLANDIA	02S	140	C	A	A	A	A	A	A	S									
HOBART	42S	147					B	A	B	A	B	B	A	A	A	B	B	A	B
HAWAII	21N	202		C	A	A	A	A	B	B	B	A	C						
ANCHORAGE	61N	211										B	B	C	C				
OAKLAND	37N	238			C	B	B	B	C										
BEVERLY HILLS	34N	242						B	B										
CHINA LAKE	35N	243		C	B	C	B	C											
MISSOULA A31	47N	246																B	B
GLEN ELLYN A33	41N	250																B	B
BOULDER	40N	255	B	A	A	A	A	A	A	A	B	A	C	B	A	A	C	B	B
LITTLETON	39N	255		B									C	C	S				
SACRAMENTO PK	32N	255	B	A	A	C	C	S											
ST JOSEPH A23	40N	265													B	C	C	C	C
MEMPHIS	35N	270													C				
NEW ORLEANS	29N	270					C	B											
OSHKOSH A6	44N	271		C	A	B	B					C	B	B	B	B	B		
COLUMBUS A4	40N	273													C	C	C	C	Q
LOUISVILLE A26	38N	274														C	B	A	B
MCMATH-HULBERT	42N	277	B	A	A	A	A	A	C	B	B	B	C		C				
PITTSBURG	40N	280		B	A	B	C	C			C	C	C		C	B	C		
PLEASANT UNITY A27	41N	280															C	C	S
LATROBE A19	40N	281										C	C	C	B	B	C	A	B
PAEONIAN SPGS A34	38N	282																B	C
DERWOOD	39N	283		B	C	S													
RAMSEY	41N	286		B	A	A	B	A	B	B	B	B		C				C	
VALLEY COTTAGE A1	41N	286		A	A	A	B	B	A	B	B	A	B	C	B	B	B	A	B
UNIV OF NEW YORK	41N	286																C	
POMPTON PLAINS A32	41N	286																B	C
BENNINGTON	42N	287							C	B	C	C							
BLAUVELT	41N	287				B	C	B	C	C	C								
BROOKLYN PK A35	40N	287																B	B
WEST NYACK	41N	287											C	C	C				
HADDAM A8	41N	288									C	C	C	C	B	B	C	C	C
SCITUATE A18	42N	288									C	B	C	C				C	C
WELLESLEY A22	42N	289												B	B	B	B	B	C
LEXINGTON A29	42N	289														C	C	C	P
PARAMARIBO	05N	305	C	A	A	A	A	A	A										
SAO PAULO	22S	314							C	C		B	B	C	C	C			
DUNSINK	53N	354	B	A	A	A	A	A	A	A	B	S							
RABAT	34N	354	C	B	B														
EDINBURGH	55N	357	B	A	C	S													
PRESTON	43N	358	B	A	A	A	B	B	A	A	A	A	A	B	A	A	B	A	B

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ESSA RESEARCH LABORATORIES

ESSA FORM 86-3C
(10/68)

SUDDEN PHASE ANOMALIES - SPA

MONTH MARCH YEAR 1970 OBSERVING STATION #59 MANIBA OBSERVATORY
CHART SPEED 1.2 inches/hour
RECORDER TIME CONSTANT 1.0 second

DATE	START UT	END UT	MAX. UT	PHASE SHIFT AT MAX, DEGREES	TRANSMITTER LOCATION	TRANSMITTER CALL LETTERS	TRANSMITTER FREQ kc/s	REMARKS
01	0035	0050	0038	18	Jim Creek	NLK	18.6	
01	0207	0245	0218	30	Rugby, England	GBR	16.0	
01	0204	0246	0218	34	Jim Creek	NLK	18.6	
01	0250	0324	0301	29	Rugby	GBR	16	
01	0251	0310	0259	14	Jim Creek	NLK	18.6	
01	0421	0600	0437	90	Jim Creek	NLK	18.6	2nd Max at 0508Z /of 87°
01	0420	0501	0434	32	Cutler Maine	NAA	17.8	
01	0502	0530	0507	32	Rugby	GBR	16	
01	0502	0524	0507	18	Cutler Maine	NAA	17.8	
01	0808	0830	0815	32	Rugby	GBR	16	
01	0937	1052	0943	140	Rugby	GBR	16	End uncertain. Vry /rough trace.
01	1402	1430	1408	30	Rugby	Slight	SES.	
01	1530	1555	1533	30	Rugby	GBR	16	SES
01	2100	2214	2114	198	Jim Creek	NLK	18.6	
01	2335	2407	2344	36	Jim Creek	NLK	18.6	
02	0013	0047D	0012	85	Jim Creek	NLK	2nd	SPA began on tail
02	0047	0146	0052	54	Jim Creek	NLK	Adv. projection	measured from of tail of previous SPA
02	0047	0117	0050	25	Rugby	GBR	16	
02	0437	0446	0441	18	Rugby	GBR	16	
02	0438	0452	0442	23	Cutler Maine	NAA	17.8	
02	0448	0529	0502	45	Rugby	GBR	16.0	
02	0448	0521	0500	22	Jim Creek	NLK	18.6	
02	0505	0542	0524	24	Cutler Maine	NAA	17.8	
03	0022	0108	0027	41	Rugby	GBR	16	
03	0022	0110	0029	65	Jim Creek	NLK	18.6	
03	0630	0717	0648	205	Rugby	GBR	16	
03	0630	0717	0644	51	Jim Creek	NLK	18.6	
03	0843	0930	0850	115	Rugby	GBR	16	
03	2034	2130	2040	108	Jim Creek	NLK	18.6	phase seems lost on /tail till 2130Z
03	2240	2350	2250	75	Jim Creek	NLK	18.6	
04	0055	0135	0108	36	Rugby	GBR	16	
04	0055	0200	0110	83	Jim Creek	NLK	18.6	
04	0056	0154	0110	88	Cutler Maine	NAA	17.8	
04	0230	0322	0243	48	Rugby	GBR	16	
04	0227	0325	0243	64	Jim Creek	NLK	18.6	
04	0607	0711	0618	93	Rugby	GBR	16	
04	0608	0631	0616	23	Jim Creek	NLK	18.6	
05	0419	0656	0453	134	Rugby	GBR	16	
05	0419	0642	0455	140	Jim Creek	NLK	18.6	
05	0418	0607	0458	142	Cutler Maine	NAA	17.8	
06	0934	1100	0944	101	Rugby	GBR	16	
07	0143	0243	0154	80	Rugby	GBR	16	
07	0143	0303	0200	97	Jim Creek	NLK	18.6	

C.6 SUDDEN IONOSPHERIC DISTURBANCES

AT BOULDER

GROUND BASED OBSERVATIONS

SPA

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
SYLT	54N	8													B	B	B	B	B
KUHLUNGSBORN	54N	11								B	C	B	B			B	A	B	B
NEUSTRELITZ	53N	13								B	C	C							
TORINO	42N	13															B	A	B
STOCKHOLM	59N	18													A	C			
DEBRA ZEIT	08N	38												B	A	C			
DELHI	28N	77										C	C	C					
MANILA	14N	121									B	A	A	A	A	A	B	A	B
MARCUS	26N	128													B	A		C	B
WOOMERA	31S	136												B	B	C			
KASUGAI	35N	137														A	A	A	C
YAP	09N	138													C	B	B	C	B
TOKYO	35N	139												C	C	C			
INUBO	35N	141													B	A	B	A	B
HOKKAIDO	42N	143													B		A	Q	
GESASHI	24N	154													C	B	C	B	B
KURE	28N	182													C	B	C	B	C
ATTU	52N	186													B	B	A	B	
FORESTPORT	43N	186														B	C		
PORT CLARENCE	64N	194													B	B	B	B	
HAWAII	21N	202										A	A	A	A	A	S		
PYRAMID ROCK	21N	203														B	C		
SITKINAK	56N	205													C	B	B	B	
ANCHORAGE	61N	210										A	B	A	A	B	B	C	
NELC	33N	243														B	B	Q	Q
BOULDER	40N	255				B	C	C	C	C		B	A	A	C	A	A	A	B
JUPITER	27N	272															A	B	B
HUANCAYO	12S	285										C	B						
NANTUCKET	42N	289													B	B	B	B	B
TRINIDAD	11N	299														B	B		
CAPE RACE	46N	306													B	C			
SAO PAULO	23S	314										B	C	A	B	B	A	A	B
SAN FERNANDO	36N	354												B	C				
SLOUGH	51N	360								A	A	B	B	A	A	A	C	C	Q

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

SUDDEN FREQUENCY DEVIATIONS–SFD

MONTH JANUARY YEAR 1969 TAPE NUMBER
OBSERVING STATION University of Hawaii
TIMING ACCURACY ± 1 minute

DATE	START UT	END UT	MAX. UT	FREQ. DEV., Hz	TRANSMITTER LOCATION	TRANSMITTER CALL LETTERS	TRANSMITTER FREQ MHz	REMARKS
4	2101	2102	2102	.9	Maui	WWVH	10	
	2057	2101	2059	.3			5	

SUDDEN COSMIC NOISE ABSORPTION–SCNA
SUDDEN ENHANCEMENTS OF ATMOSPHERICS–SEA
SUDDEN ENHANCEMENTS OF VLF SIGNALS–SES
SOLAR NOISE BURSTS AT SCNA FREQUENCY

MONTH OCTOBER YEAR 1968 OBSERVING STATION #59 MANILA OBSERVATORY

	FREQUENCY	CHART SPEED	RECORDER TIME CONSTANT
SCNA	18 & 30 Mc/s	1.2 inch/hour	1 second
SEA	____ kc/s		
SES	____ kc/s		
BURSTS	____ Mc/s		

DATE	START UT	END UT	MAX. UT	SCNA %ABS	SCNA IMPT	SEA IMPT	SES IMPT	BURST IMPT	DEFINITENESS	REMARKS
04	0035	0040	0037	8	1-				2	30 MHz
21	0603	0705	0613	70	1				5	18 MHz
21	0608	0618	0611	50	1				5	30 MHz
23	0357	0432	0446	30	1				5	18 MHz
23	0401	0435	0405	40	1				5	30 MHz

C.6 SUDDEN IONOSPHERIC DISTURBANCES

AT BOULDER

GROUND BASED OBSERVATIONS

SFD

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
DELHI	28N	77										B	B	B	C	C	C	C	Q
HAWAII	21N	202										C	B	A	B	A	B	A	B
BOULDER	40N	255				C	A	A	A	B	A	A	A	A	A	C	Q	Q	Q

C.6 SUDDEN IONOSPHERIC DISTURBANCES

AT BOULDER

GROUND BASED OBSERVATIONS

SCNA

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
KUHLUNGSBORN	54N	11	B	A	A	A	A	A	A	B	B	A	B	C					
ROME	41N	12								A	B	B	B	A	B	A	B		
NEUSTRELITZ	53N	13	B	A	A	A	A	A	A	B	B	A		C		A	A	A	C
ONDREJOV	49N	14								C	C								
PANSKA VES	50N	14									B	A	A	C					
DELHI	28N	77		C						A	B	B	B	C	B	B	B	C	
MANILA	14N	121						B	B	A	B	A	A	A	A	B	B	A	B
HAWAII	21N	202		C	A	A	A	A	B	B	B	A	B	S					
ANCHORAGE	61N	211										A	B	B	A	C	C	C	
BOULDER	40N	255	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	C	C
SACRAMENTO PK	32N	255	B	A	A	C	C	S											
MCMATH-HULBERT	42N	277	B	A	A	A	A	A	C	B	B	B	B	C	A	A	A	A	B
GRAFTON	42N	282	B	A	A	B	B	C											
EDINBURGH	55N	357	B	B															

COMPUTER FORMAT:

1. All types of SIDs summarized 10/1955 to date, Single station reports - 8/1968 to date.

PUBLICATIONS:

1. *Solar-Geophysical Data,* NOAA, single line entries by type of SID until data for 12/1969 when combined into one line per SID event.
2. *IGY Solar Activity Report Series No. 24,* World Data Center A - SIDs from 7/1957 - 12/1959.

ORIGINAL RECORDINGS:

Selected SWF recordings are available. For the most part these are for the stations given in Section B9 of this catalogue.

MICROFILM:

Original recordings of SCNA-SEA from Rome, Manila, Hawaii, Boulder and McMath-Hulbert grouped on 35 mm microfilm. Monthly strips $3.00 per month.

MISCELLANY:

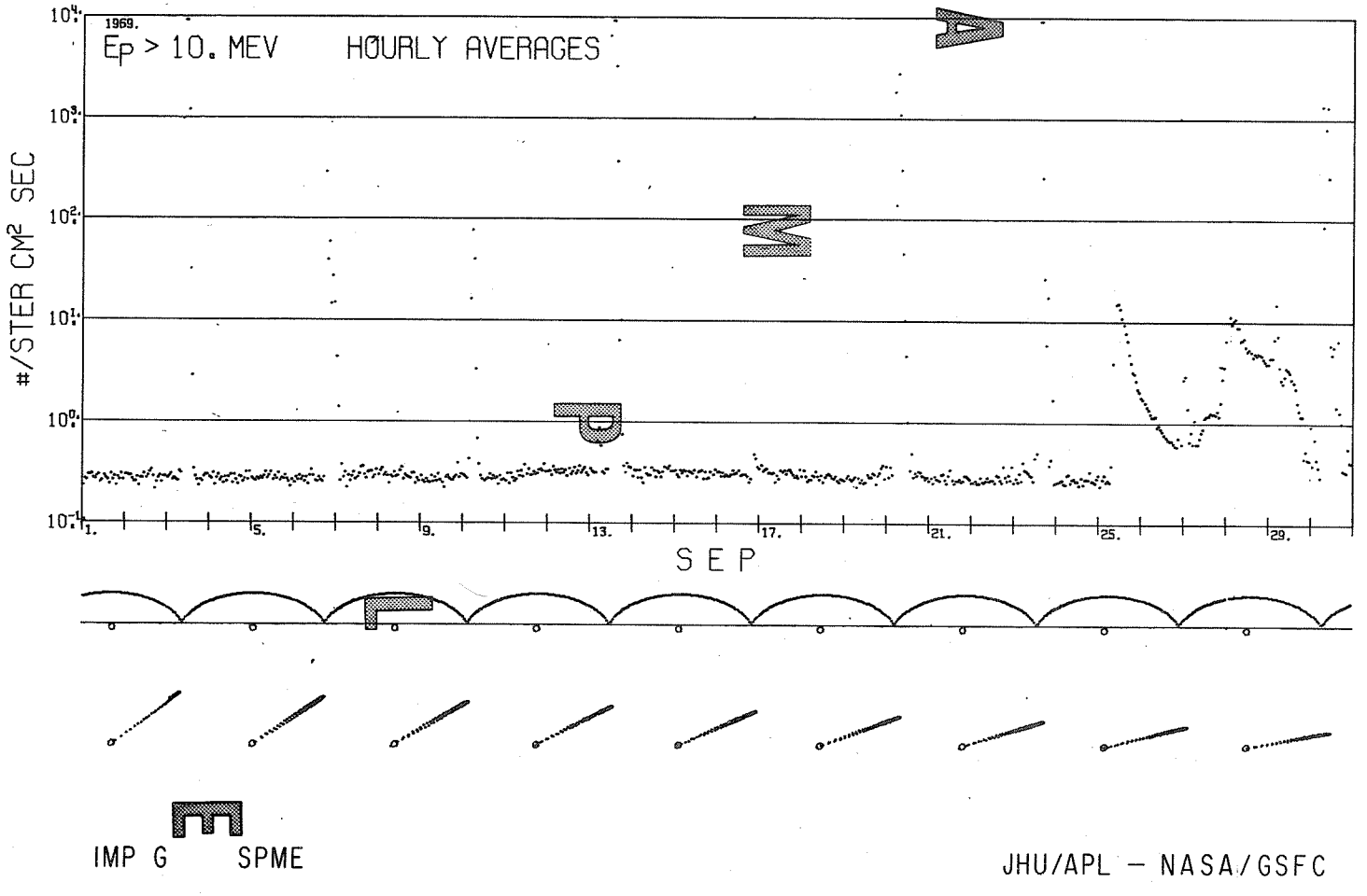
1. SPA and SES available from Boulder, Table Mountain site.
2. Sonograms of SFD available from Boulder.

Note: See also B.8 Absorption - Method A.2 (Riometer) for data recordings on strip charts.

The graphs of the Explorer 41 data indicate outstanding events of more than one hour's [illegible]tion.

SOLAR PROTONS BY SATELLITE
EXPLORER 41 (1969-53A)

SEPTEMBER 1969



JHU/APL – NASA/GSFC

C.7 SOLAR PROTONS AND ELECTRONS - DIRECT MEASUREMENT

AT BOULDER

SATELLITE	ENERGY RANGE	SOURCE	67	68	69	70	71	72	73
EXPLORER 34	>10MEV	JHU/APL-GSFC	B	B	CS				
EXPLORER 34	>30MEV	JHU/APL-GSFC	B	B	CS				
EXPLORER 34	>60MEV	JHU/APL-GSFC	B	B	CS				
EXPLORER 41	>10MEV	JHU/APL-GSFC			B	B	A	B	S
EXPLORER 41	>30MEV	JHU/APL-GSFC			B	B	A	B	S
EXPLORER 41	>60MEV	JHU/APL-GSFC			B	B	A	B	S
ATS-1	5-21MEV	AEROSPACE				A	A	B	Q
ATS-1	21-70MEV	AEROSPACE				A	A	B	Q
EXPLORER 43	>10MEV	JHU/APL-GSFC						Q	Q
EXPLORER 43	>30MEV	JHU/APL-GSFC						Q	Q
EXPLORER 43	>60MEV	JHU/APL-GSFC						Q	Q
PIONEER 6	0.6-13MEV	U OF CHICAGO			B	A	A	B	Q
PIONEER 6	13-175MEV	U OF CHICAGO			B	A	B	B	Q
PIONEER 6	>175MEV	U OF CHICAGO			B	A	A	B	Q
PIONEER 7	0.6-13MEV	U OF CHICAGO			B	A	B	C	Q
PIONEER 7	13-175 MEV	U OF CHICAGO			B	A	B	C	C
PIONEER 7	>175MEV	U OF CHICAGO			B	A	B	C	Q
PIONEER 8	>13.9MEV	U OF NEW HAMP			C	A	A	B	Q
PIONEER 8	>64MEV	UNIV N HAMPSHIRE				A	A	B	C
PIONEER 9	>13.9MEV	U OF NEW HAMP			C	A	A	B	Q
PIONEER 9	>40MEV	UNIV N HAMPSHIRE				A	A	B	C

KEY TO SYMBOLS

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B = 6-11 Months
C = 1-5 Months

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P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

NOTE: Proton data in the range 0.5-60 Mev are available on microfilm from satellites ESSA-1 and NOAA-1, for the approximate period November 1970 - July 1971.

PUBLICATIONS:

Solar-Geophysical Data, NOAA Research Laboratories, Explorer 34 (5/67 - 8/69), Explorer 41 (9/69 - 12/72), ATS-1 (1/70 - 8/72), and Explorer 43 (11/71 - present), data published monthly.

Data on prompt solar flare electron events for the years 1964-1967 may be found in the following references:

Lin, R. P., "The emission and propagation of 40 keV solar flare electrons: I. The relationship of 40 keV electron to energetic proton and relativistic electron emission by the sun", *Solar Physics, 12,* 266-303, May 1970.

Lin, R. P. and K. A. Anderson, "Electrons >40 keV and protons >500 keV of Solar Origin", *Solar Physics, 1,* 446-464, June 1967.

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
EXPLORER 4, CHARGED PARTICLE DETECTOR VAN ALLEN (58-005A-01)	072658	092158 ,	072658
EXPLORER 6, PROPORTIONAL COUNTER TELESCOPE SIMPSON (59-004A-01)	080759	100659 ,	080759
EXPLORER 7, RADIATION AND SOLAR PROTON VAN ALLEN (59-009A-04)	101359	022861 ,	101359
PIONEER 5, PROPORTIONAL COUNTER TELESCOPE SIMPSON (60-001A-01)	031160	051660 ,	031160
INJUN 1, GM COUNTER FRANK (61-015B-01)	062961	083162 ,	062961
EXPLORER 12, CHARGED PARTICLES VAN ALLEN (61-020A-03)	081661	120661 ,	081661

Continued

SPACECRAFT COMMON NAME- EXPLORER 41 NSSDC ID 69-053A
ALTERNATE NAMES- PL-691K, IMP 5, IMP-G

LAUNCH DATE- 06/21/69 SPACECRAFT WEIGHT IN ORBIT- 79.4 KG

FUNDING AGENCY- NASA-OSSA

DATE LAST USABLE SPACECRAFT DATA RECORDED-122372
SPACECRAFT STATUS OF OPERATION- INOPERABLE

EPOCH DATE- 06/21/69 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 4843. MIN
APOAPSIS- 176434. KM ALT PERIAPSIS- 378.000 KM ALT INCLINATION- 86.78 DEG

SPACECRAFT BRIEF DESCRIPTION
EXPLORER 41 (IMP-G) WAS A SPIN-STABILIZED SPACECRAFT PLACED INTO A HIGH-INCLINATION, HIGHLY ELLIPTIC ORBIT TO MEASURE ENERGETIC PARTICLES, MAGNETIC FIELDS, AND PLASMA IN CISLUNAR SPACE. THE LINE OF APSIDES AND THE SATELLITE SPIN VECTOR WERE WITHIN A FEW DEGREES OF BEING IN AND NORMAL TO, RESPECTIVELY, THE ECLIPTIC PLANE. INITIAL LOCAL TIME OF APOGEE WAS ABOUT 1300 HR. INITIAL SATELLITE SPIN RATE WAS 27.5 RPM. THE BASIC TELEMETRY SEQUENCE WAS 20.48 SEC. THE SPACECRAFT FUNCTIONED VERY WELL FROM LAUNCH UNTIL IT DECAYED FROM ORBIT ON DECEMBER 23, 1972. DATA TRANSMISSION WAS NEARLY 100 PERCENT FOR THE SPACECRAFT LIFE EXCEPT FOR THE INTERVAL NOVEMBER 15, 1971, TO FEBRUARY 1, 1972, WHEN DATA ACQUISITION WAS LIMITED TO THE VICINITY OF THE MAGNETOTAIL NEUTRAL SHEET.

EXPERIMENT NAME- SOLAR PROTON MONITORING EXPERIMENT NSSDC ID 69-053A-07

ORIGINAL EXPERIMENT INSTITUTION- APPLIED PHYSICS LAB

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - C.O.	BOSTROM	APPLIED PHYSICS LAB	SILVER SPRING, MD
OI - D.J.	WILLIAMS	NOAA-ERL	BOULDER, CO
OI - D.E.	HAGGE	NASA-JSC	HOUSTON, TX
OI - F.B.	MCDONALD	NASA-GSFC	GREENBELT, MD

DATE LAST USABLE EXPERIMENT DATA RECORDED-122372
EXPERIMENT STATUS OF OPERATION- INOPERABLE

EXPERIMENT BRIEF DESCRIPTION
THE SOLAR PROTON MONITORING EXPERIMENT UTILIZED FOUR SEPARATE DETECTORS, EACH OF WHICH USED ONE OR MORE SOLID-STATE SENSORS. THREE DETECTORS MEASURED THE OMNIDIRECTIONAL FLUXES OF PROTONS AND ALPHA PARTICLES WITH ENERGY PER NUCLEON VALUES ABOVE 10, 30, AND 60 MEV. ALPHA PARTICLE CONTRIBUTIONS TO THE TOTAL COUNT RATES WERE GENERALLY LESS THAN 10 PERCENT. THE 10-MEV CHANNEL WAS SAMPLED FOR TWO 19.2 SEC INTERVALS EVERY 163.8 SEC AND THE 30- AND 60-MEV CHANNELS FOR ONE 19.2 SEC INTERVAL EVERY 163.8 SEC. RESULTANT HOURLY AVERAGED FLUXES HAVE BEEN PUBLISHED IN SOLAR-GEOPHYSICAL DATA (NOAA, BOULDER) ON A RAPID BASIS. THE FOURTH DETECTOR HAD A 60-DEG FULL LOOK ANGLE NORMAL TO THE SPACECRAFT SPIN AXIS. EACH OF TWO DISCRIMINATION LEVELS WAS SAMPLED FOR TWO 19.2 SEC INTERVALS EVERY 163.8 SEC. FLUXES OF 1- TO 10-MEV/NUCLEON PROTONS AND ALPHA PARTICLES WERE MEASURED IN THE LOWER AND UPPER DISCRIMINATION STATES, RESPECTIVELY. ALL DETECTORS FUNCTIONED NORMALLY FROM LAUNCH UNTIL THE SPACECRAFT DECAYED FROM ORBIT (JUNE 21, 1969 - DECEMBER 23, 1972).

DATA SET NAME- HOURLY AVERAGED SOLAR PROTON FLUXES PUBLISHED IN 'SOLAR-GEOPHYSICAL DATA' NSSDC ID 69-053A-07A

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 062169 TO 083172 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 14 BOOK(S) OR BOUND VOLUME(S)

DATA SET BRIEF DESCRIPTION
THIS PUBLISHED DATA SET CONSISTS OF MONTHLY PLOTS AND TABULAR LISTINGS OF HOURLY AVERAGED OMNIDIRECTIONAL FLUXES OF PROTONS WITH ENERGIES ABOVE 10, 30, AND 60 MEV. DATA OBTAINED DURING A GIVEN MONTH THROUGH AUGUST 1972 WERE PUBLISHED IN 'SOLAR-GEOPHYSICAL DATA (COMPREHENSIVE REPORTS)' WITH A 6-MONTH LAG. FOR THE PERIOD BEGINNING SEPTEMBER 1, 1972, EQUIVALENT EXPLORER 43 DATA HAVE BEEN PUBLISHED.

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
EXPLORER 12, COSMIC RAY MCDONALD (61-020A-04)	081661	120661 ,	081661
EXPLORER 14, COSMIC RAY MCDONALD (62-051A-04)	100262	081163 ,	100262
INJUN 3, PROTON SPECTROMETER O'BRIEN (62-067B-07)	121462	103163 ,	121362
1963-038C, ENERGETIC ELECTRON AND PROTON DETECTORS BOSTROM (63-038C-01)	092863	123168 ,	092863
EXPLORER 18, COSMIC-RAY RANGE VS ENERGY LOSS SIMPSON (63-046A-03)	112763	060864 ,	112763
EXPLORER 18, COSMIC RAYS MCDONALD (63-046A-04)	112763	052664 ,	112763
OGO 1, COSMIC-RAY SPECTRA AND FLUXES SIMPSON (64-054A-18)	090564	112567 ,	090564
EXPLORER 21, COSMIC-RAY RANGE VS ENERGY LOSS SIMPSON (64-060A-03)	100464	040965 ,	100464
EXPLORER 25, SOLID-STATE DETECTOR VAN ALLEN (64-076B-04)	112364	071966 ,	112164
MARINER 4, COSMIC-RAY TELESCOPE SIMPSON (64-077A-04)	112864	100165 ,	112864
EXPLORER 25, GEIGER-MUELLER COUNTER VAN ALLEN (64-076B-03)	021365	071966 ,	112164
EXPLORER 28, COSMIC-RAY RANGE VS ENERGY LOSS SIMPSON (65-042A-03)	052965	050267 ,	052965
ERS 17, CHARGED PARTICLE DETECTORS VETTE (65-058C-01)	072065	110465 ,	072065
ERS 17, GAMMA-RAY DETECTOR VETTE (65-058C-03)	072065	110365 ,	072065
OGO 1, SOLAR COSMIC RAYS ANDERSON (64-054A-12)	093065	050366 ,	090564
OGO 2, LOW-ENERGY PROTON, ALPHA PARTICLE MEASUREMENT, SIMPSON (65-081A-07)	101465	121366 ,	101465
OGO 2, GALACTIC AND SOLAR COSMIC RAY WEBBER (65-081A-08)	101565	102465 ,	101465
PIONEER 6, COSMIC RAY TELESCOPE FAN (65-105A-03)	121665	043071 ,	121665
PIONEER 6, COSMIC RAY ANISOTROPY DETECTION MCCRACKEN (65-105A-05)	121665	020667 ,	121665
OGO 3, COSMIC-RAY SPECTRA AND FLUXES SIMPSON (66-049A-03)	060966	120169 ,	060766
OGO 3, SOLAR COSMIC RAYS ANDERSON (66-049A-01)	062466	022767 ,	060766
EXPLORER 33, ION CHAMBER AND GM COUNTERS ANDERSON (66-058A-04)	070166	060967 ,	070166
PIONEER 7, COSMIC RAY ANISOTROPY MCCRACKEN (66-075A-05)	081766	013167 ,	081766
PIONEER 7, COSMIC-RAY TELESCOPE SIMPSON (66-075A-06)	081766	043071 ,	081766
ATS 1, OMNIDIRECTIONAL SPECTROMETER PAULIKAS (66-110A-03)	121766	083172 ,	120766
EXPLORER 34, LOW-ENERGY SOLID-STATE TELESCOPE BROWN (67-051A-01)	052467	050369 ,	052467
EXPLORER 34, ION CHAMBER ANDERSON (67-051A-02)	052467	091567 ,	052467
EXPLORER 34, COSMIC-RAY PROTON (R VS DE/DX) SIMPSON (67-051A-03)	052467	050369 ,	052467
EXPLORER 34, COSMIC-RAY ANISOTROPY MCCRACKEN (67-051A-05)	052467	042069 ,	052467
EXPLORER 34, SOLAR PROTON MONITOR BOSTROM (67-051A-07)	052467	050369 ,	052467
EXPLORER 34, LOW-ENERGY PROTON AND ELECTRON DIFFERENTIAL ENERGY ANALYZER (LEPEDEA), VAN ALLEN (67-051A-04)	063067	070467 ,	052467
EXPLORER 35, ELECTRON AND PROTON DETECTORS VAN ALLEN (67-070A-01)	071967	052870 ,	071967
EXPLORER 35, ENERGETIC PARTICLE ANDERSON (67-070A-02)	071967	072468 ,	071967

Continued

C.8

Suitably located riometers are capable of recording solar protons (at geomagnetic latitude ≥ 65°).

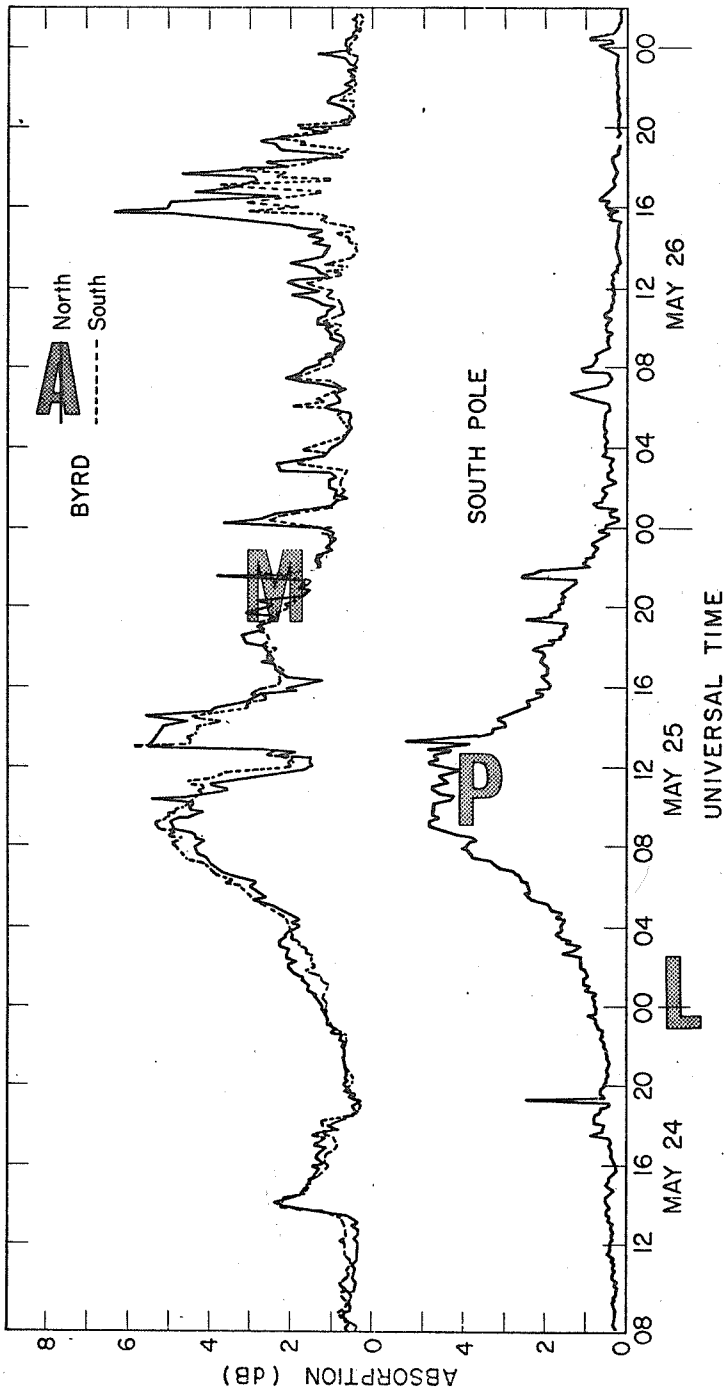

Fig. 1. Polar-cap absorption on 30 MHz at Byrd and South Pole, May 24-26, 1967.

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
OGO 4, LOW-ENERGY PROTON, ALPHA PARTICLE MEASUREMENT, SIMPSON (67-073A-08)	072967	122468 ,	072867
OGO 4, GALACTIC AND SOLAR COSMIC RAY WEBBER (67-073A-09)	073067	082767 ,	072867
PIONEER 8, COSMIC RAY GRADIENT DETECTOR WEBBER (67-123A-06)	121367	103171 ,	121367
OGO 5, ELECTRON AND PROTON SPECTROMETER WEST, JR. (68-014A-06)	030468	050169 ,	030468
OGO 5, ENERGETIC RADIATIONS FROM SOLAR FLARES ANDERSON (68-014A-04)	030868	100469 ,	030468
OGO 5, PARTICLE WAVE STUDY COLEMAN, JR. (68-014A-13)	030868	021471 ,	030468
EXPLORER 40, SOLID STATE PARTICLE DETECTOR VAN ALLEN (68-066B-03)	080968	052970 ,	080868
HEOS 1, COSMIC RAY PARTICLE FLUX LABEYRIE (68-109A-06)	010169	110671 ,	120568
EXPLORER 41, LOW-ENERGY SOLID-STATE TELESCOPE BROWN (69-053A-01)	062169	081570 ,	062169
EXPLORER 41, ION CHAMBER ANDERSON (69-053A-02)	062169	021872 ,	062169
EXPLORER 41, COSMIC-RAY PROTON (R VS DE/DX) SIMPSON (69-053A-03)	062169	073070 ,	062169
EXPLORER 41, SOLAR PROTON MONITORING EXPERIMENT BOSTROM (69-053A-07)	062169	122372 ,	062169
GRS-A, PROTON TELESCOPE MORITZ (69-097A-03)	110869	063070 ,	110869
PIONEER 9, COSMIC RAY TELESCOPE WEBBER (68-100A-06)	120169	093071 ,	110868

AT BOULDER

C.8 SOLAR PROTONS - RIOMETER

STATION	GEOGRAPHIC LAT	LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	INDICATOR
HEISS ISLAND	80N	58								A	A	S								BT
THULE	76N	292		B				Q	Q	A	B	Q	Q	B	A	A	A	A	C	TH
RESOLUTE BAY	74N	266			Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	A	A	A	B		RB
BARROW	71N	204		B	S															
BAR 1	69N	220											B	A	A	A	A	B	S	
GODHAVN	69N	307							Q	Q	Q	Q	Q	Q	Q	Q	S			GO
KIRUNA	67N	20		B	B	B	A	A	A	B	A	A	A	A	A	A	C	Q	Q	KI
FT YUKON	65N	215		C									A	A	A	A	A	A	C	
COLLEGE	64N	213	B	A	B	A	A	A	B	A	A	A	A	A	A	A	A	A	C	CO
CORAL HARBOR	64N	277			Q	Q	Q	Q	Q	Q	S									
LEIRVOGUR	64N	339										Q	Q	Q	Q	S				
REYKJAVIK	64N	339									B	A	A	A	A	S				RK
FROBISHER BAY	63N	292							B	A	C	S								FB
CHURCHILL	58N	266	B	A	A	Q	Q	Q	Q	Q	Q	Q	Q	Q	A	A	A	B		CH
GREAT WHALE	55N	283							B	A	A	A	A	A	A	A	A	A	C	GW
CAPE JONES	54N	281			Q	Q	Q	Q	A	A	B	S								CJ
SYOWA BASE	69S	39											B	A	A	A	A	A		SW
CAPE HALLETT	72S	170				B	Q	Q	Q	S										HT
MCMURDO	77S	166						C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q		
VOSTOK	78S	106								C	A	A	A	A	A	A	A	A		VO
BYRD STATION	80S	240							A	A	A	A	A	A	A	A	A	S		BD
SOUTH POLE	90S	0							A	A	A	A	A	A	A	A	A	A		PO

KEY TO SYMBOLS

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Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

PUBLICATIONS:

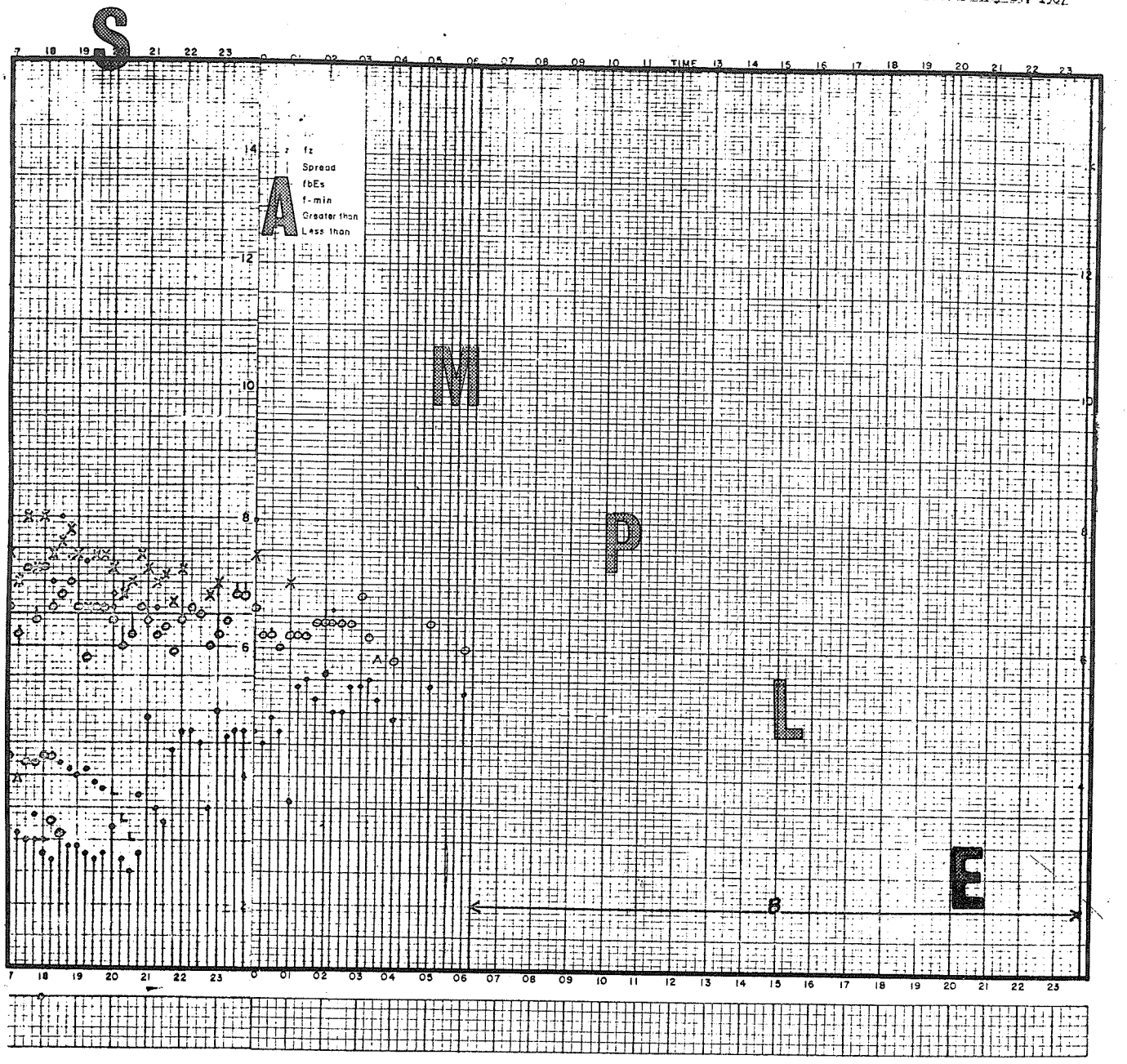
1. Reid and Leinbach, "Polar Cap Absorption During the Solar Cosmic Ray Outbursts of July 1959", *IUGG Proc. Symposium on the July 1959 Events and Associated Phenomena*, Helsinki (1960).
2. *Expedition Antarctique Belgo-Neerlandaise*, Riometer events from Base Roi Baudouin from 2/1965 - 12/1965.

STRIP CHARTS

See Section B.8 for list of stations available.

The 15-minute f min scalings from polar cap stations can indicate solar protons as polar cap absorption events.

DATE May 23, 1962 STATION RESOLUTE BAY, N.W.T. f-PLOT OF IONOSPHERIC DATA DATE May 24, 1962



SCALED BY NA/DS/PKB

C.9 SOLAR PROTONS - IONOSPHERIC VERTICAL INCIDENCE SOUNDINGS

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	INDICATOR
ARCTICA (NP-6)	87N		B	A	B	S														XA
ALERT	82N	298	C	A	S															AL
FLETCHERS ICE	82N		B	A	S															XC
ARCTICA(NP-13)	81N									B	A	B	S							XG
ARCTICA (NP-8)	80N					B	B	S												XG
EUREKA	80N	275	C	A	C	S														EU
HEISS ISLAND	80N	58	B	A	B	A	A	A	A	A	A	A	A	B	Q	B	Q	Q		BT
ARCTICA (NP-7)	79N		B	A	C	S														XG
ARCTICA(NP-11)	79N							C	S											XB
ARCTICA(NP-10)	78N							C	A	C										XG
THULE/QANAQ	77N	291													Q	Q	B	A	C	TH
THULE/TUTO	76N	292	B	A	A	B	A	A	A	B	B	B	S							TH
RESOLUTE BAY	74N	266	B	A	A	A	A	A	A	A	A	A	A	A	B	B	A	A	C	RB
BARROW	71N	204	B	A	A	A	A	A	B	A	B	S								BW
CLYDE	70N	292	C	B	S															CR
GODHAVN	69N	307	B	A	B	B	A	A	B	A	A	A	A	A	A	A	A	A	C	GO
TROMSO	69N	19	B	A	A	B	A	A	A	A	A	B	B	A	A	A	A	B		TR
KIRUNA	67N	20	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	KI
BAKER LAKE	64N	264	B	A	C	S														BL
COLLEGE	64N	213	B	A	A	A	A	A	B	B	A	A	A	A	B	A	A	C	C	CO
FORT NORMAN	64N	235	C	S																FN
REYKJAVIK	64N	339	B	A	A	A	A	A	A	A	S									RK
YELLOWKNIFE	62N	246	C	B	C	S														YE
NARSSARSSUAQ	61N	315	C	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	C	NQ
CHURCHILL	58N	266	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	CH
FORT CHIMO	58N	292		C	S															FC
MIRNY	66S	93	B	A	A	A	A	A	A	A	A	A	A	B	Q	Q	Q	Q		MI
TERRE ADELIE	66S	140	B	A	A	A	A	A	A	A	A	A	A	A	A	S				DU
WILKES	66S	110	B	B	A	A	A	A	C	A	A	A	A	A	C	S				WL
MAWSON	67S	62		C	B	B	A	A	A	A	A	A	A	A	A	A	B	Q		MW
SYOWA BASE	69S	39			B	A	A	C				B	A	A	A	A	B			SW
CAPE HALLETT	72S	170	B	A	A	A	A	A	A	C	S									HT
HALLEY BAY+	75S	334	B	A		B	A	A	A	B	A	A	B	B	A	B	B	Q		HB
ELLSWORTH	77S	319	B	A	B	A	A	B							Q					EL
SCOTT BASE	77S	166	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B		SB
LITTLE AMERICA	78S	198	B	A	S															LA
VOSTOK	78S	106		B	A	A	A			B	A	A	A	A	Q	Q				VO
BYRD STATION	80S	240	B	A	A	A	A	B	A	A	A	A	C	Q	Q	Q	S			BD
SOUTH POLE	90S		B	A	A	A	A	B	B	A	A	A	Q	Q	S					PO
CASEY	66N	110													B	A	B	C		CW

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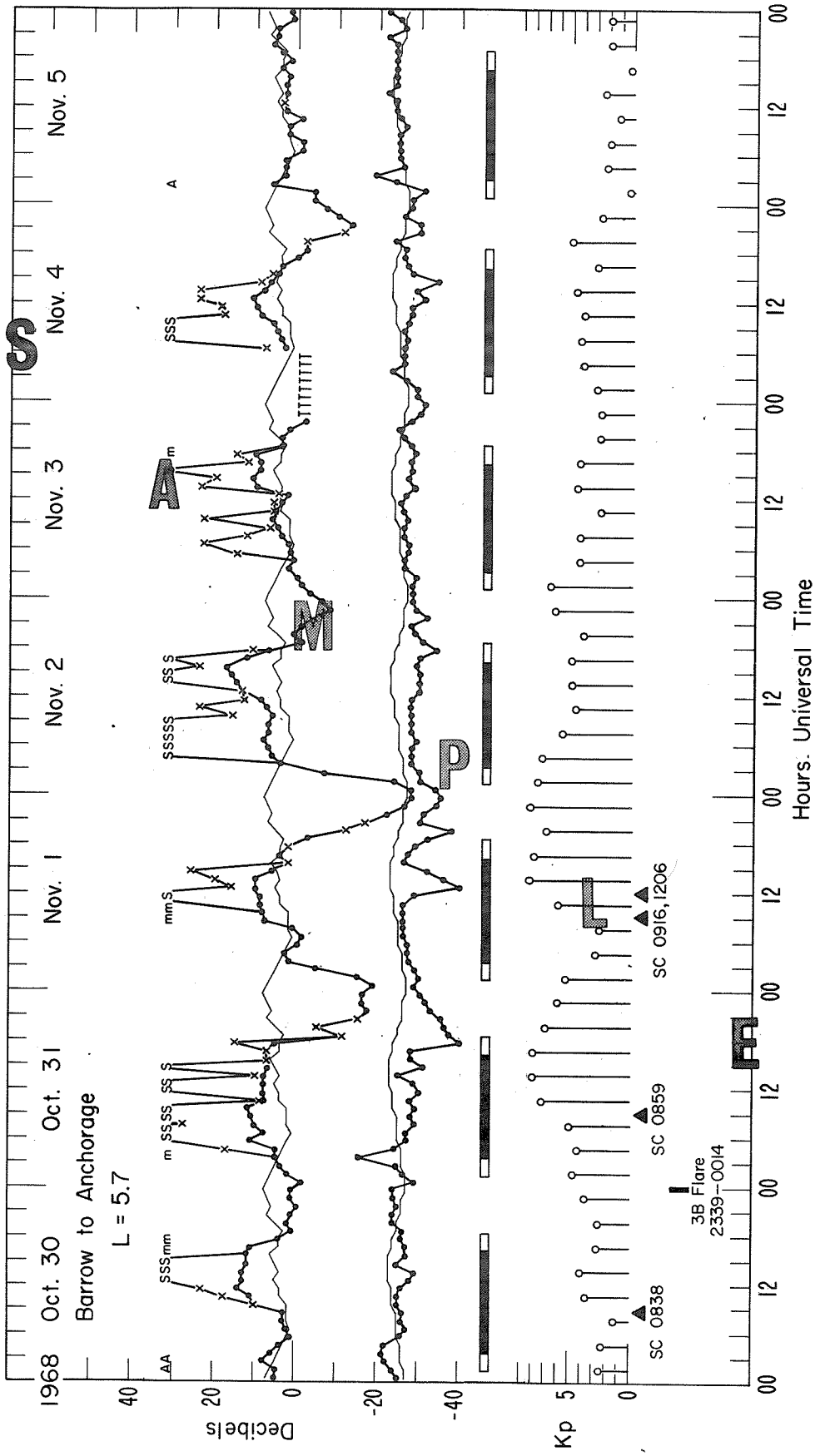
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

PUBLICATIONS:

1. Y. Hakura, Y. Takenashita and K. Matsuaka, Influence of Solar Activity on the Ionosphere Blackout Index, *J. Radio Res. Labs. Japan*, 1967, 14 No. 73. - defines Ip Indices.
2. *Annals of IQSY*, Vol. 2 pp. 286-294 contains Ip Indices for 1957-1965.
3. *Solar-Geophysical Data*, NOAA and *STP Notes* publish current Ip Indices in the Calendar Records.



Ionospheric forward-scatter observations from Alaska showing effects of solar protons and electron precipitation at L = 5.7.

C.10 SOLAR PROTONS AND ELECTRONS

AT BOULDER

VHF FORWARD SCATTER

RECEIVING STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	64	65	66	67	68	69	70	71	72	73	TRANSMITTER	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST
COLLEGE	64N	213	A	A	A	A	S						ANNETTE	55N	131W
ANCHORAGE	61N	211	B	A	A	B	A	A	A	A	A	C	BARROW	71N	204E
GREAT WHALE	55N	283	Q	Q									FROBISHER BAY	63N	292E
MCMURDO	77S	166	Q	Q									BYRD	80S	240E
VOSTOK	78S	106	Q	Q									MCMURDO	77S	166E
SOUTH POLE	90S	0	Q	Q									BYRD	80S	240E

KEY TO SYMBOLS

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S = Program STOPPED operations (see MASTER STATION LIST for actual date)

PUBLICATIONS:

1. D. K. Bailey, *Planetary and Space Science*, 12, 495-541, 1964 - Comprehensive list of solar proton events by VHF Forward Scatter.

2. D. K. Bailey, et.al., Characteristics of Precipitated Electrons Inferred from Ionospheric Forward Scatter, *J. Geophysical Research*, *71*, 5179-5182, 1966.

C.11

C.11 SOLAR PROTONS AND ELECTRONS - OTHER TYPES

AT BOULDER

"Blackout" of HF communications over polar circuits can sometimes be interpreted as polar cap absorption events, e.g. HF field strength recordings of Thule transmissions received at Anchorage and Tokyo are suitable for such analysis.

WDC-A holds some Thule-Anchorage data.

C.12

C.12 SOLAR, IONOSPHERIC OR AERONOMICAL ROCKETS

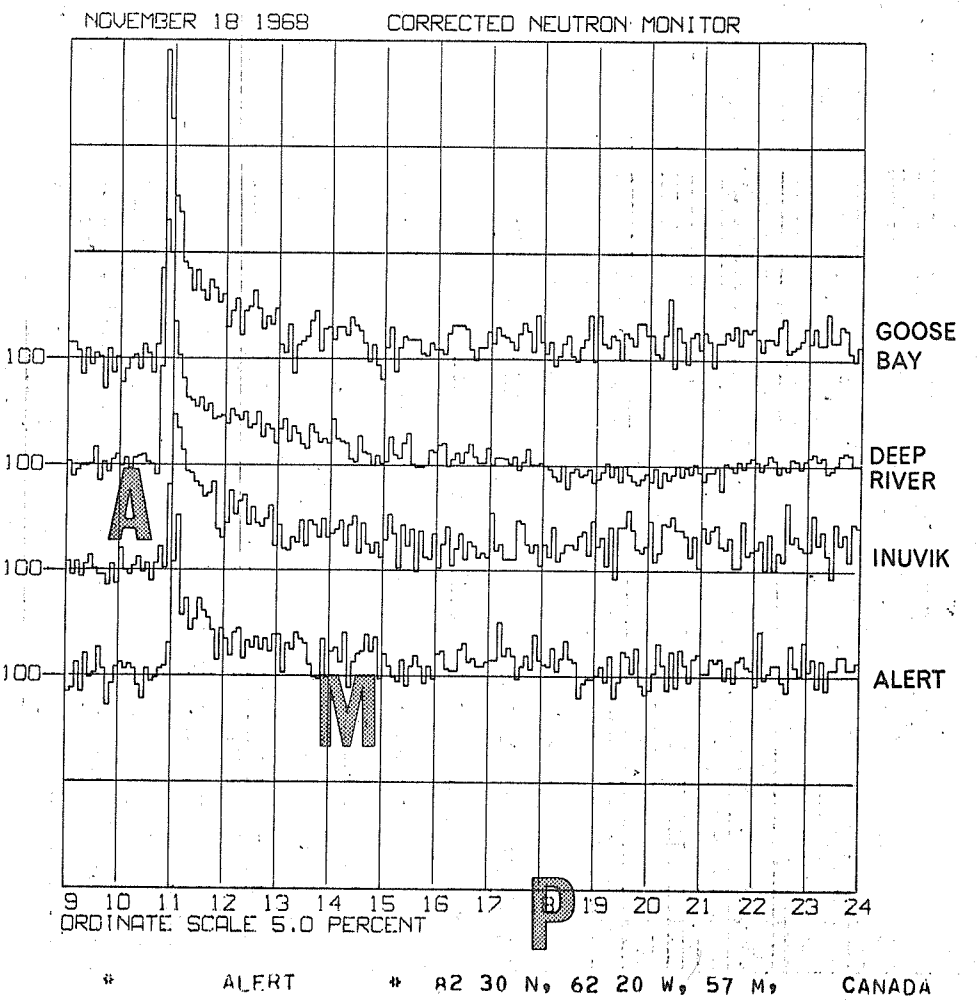
AT GREENBELT

To identify rockets launched during events, see summary listings in World Data Center A Rockets and Satellites Catalogue, NASA, Greenbelt, Maryland.

Rocket launching sites are listed in Section B.5.

C.13

Neutron or super neutron monitors record ground level increases occurring at the time of great solar proton events.



NOVEMBER 18, 1968

TIME U.T.		05	10	15	20	25	30	35	40	45	60		AVERAGE
900 - 1000	*	6351	6364	6441	6351	6467	6396	6409	6487	6422	6428	*	6400
1000 - 1100	*	6441	6422	6435	6422	6370	6331	6422	6383	6396	6500	*	6414
1100 - 1200	*	6746	6888	6584	6636	6539	6571	6636	6597	6577	6545	*	6609
1200 - 1300	*	6513	6461	6532	6545	6455	6506	6487	6519	6481	6526	*	6501
1300 - 1400	*	6526	6410	6500	6481	6532	6513	6500	6436	6397	6397	*	6466
1400 - 1500	*	6474	6487	6442	6532	6365	6442	6468	6474	6525	6391	*	6466
1500 - 1600	*	6468	6430	6398	6385	6449	6372	6430	6462	6430	6391	*	6419
1600 - 1700	*	6468	6474	6423	6417	6417	6481	6500	6442	6455	6442	*	6448
1700 - 1800	*	6449	6449	6563	6461	6487	6461	6392	6430	6461	6449	*	6462

C.13 COSMIC RAY GROUND LEVEL INCREASES

See station lists in Sections F.1 and F.2 for stations recording at the time of the outstanding ground level increases.

OUTSTANDING GROUND LEVEL INCREASES

1942	Feb	28	1960	Nov	20
1946	July	25	1961	July	18
1949	Nov	19	1961	July	20
1956	Feb	23	*1967	Jan	28
1956	Aug	31	*1968	Nov	18
1959	July	16	*1969	Feb	25
1960	May	04	*1971	Jan	24-25
1960	Sept	03	*1971	Sept	1-2
1960	Nov	12	*1972	Aug	04
1960	Nov	15	*1972	Aug	07

* WDC-A holds several graphs of the events marked by the asterisks.

P U B L I C A T I O N S:

1. *World Data Center A Report UAG-9*, Data on Cosmic Ray Event of Nov. 18, 1968 and Associated Phenomena.

2. *World Data Center A for Solar-Terrestrial Physics Report UAG-21*, Data on Solar-Geophysical Activity Associated with the Major Ground Level Cosmic Ray Events of 24 January and 1 September 1971.

D. GEOMAGNETIC PHENOMENA

The map shows all the observatories currently submitting geomagnetic data to the World Data Center A. The catalogue listings are arranged by geographic latitude from north to south. They are included alphabetically in the Master Station List pp. 21-48.

Because of the various forms in which geomagnetic data are received (microfilm, publications, photostats, etc.) not all types of reproductions are available for each kind of record. For example, photostats and microfilm copies of selected records can only be furnished when the original or paper copies are available. Most of the data are on microfilm. The type of copy furnished would depend on the source material. For information concerning the types of reproduction available for specific data and cost of copying, user should write to the World Data Center.

The magnetograms from most observatories contain the recordings for a 24-hour period. Since the records from different observatories may not show the same 24-hour period, the interval (UT) for which the copies of the recordings are required should be specified.

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AT BOULDER

NORMAL MAGNETOGRAMS — HOURLY VALUES

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	NORMAL MAGNETOGRAMS YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	HOURLY VALUES YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
NORTH POLE 7	86N	297	B	A	C	S														B	A	C													
ALERT	83N	298					C	A	A	A	A	A	A	A	A	A	A	B						C	A	A	A	A	A	A	A	A			
NORTH POLE 6	82N	9	B	A	B	S														B	A	B													
HEISS IS	81N	58		B	A	A	A	A	A	A	A	A	A	A		A	A				B	A	A	A	A	A	A	A	A	A	A		A		
NORTH POLE 13	81N	165								B	S																B	A							
ARCTIC ICE FLO	80N	195	B	S																															
MURCHISON BAY	80N	18	C	A	B	S														C	A	B													
NORTH POLE 8	80N	165			B	A	A	C	S													B	A	A	C									
TIKHAYA BAY	80N	58	B	B																B	B														
NORTH POLE 12	79N	187							B	S																B	C							
CAPE CHELYUSKIN	78N	104	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A			B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
NORTH POLE 10	78N	165					C	C	S															C	C										
THULE	77N	291	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		B	A	A	A	A	A	A	A	A	A	A	A	A	A		
MOULD BAY	75N	241					C	A	A	A	A	A	A	A	A	A	A	A	C						A	A	A	A	A	A	A	A	A		
THULE AFB	75N	291										C	A	A	A	A	A	B																	
RESOLUTE BAY	75N	265	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	
DIXON	74N	80	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	
BARROW	72N	204	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
TIXIE BAY	72N	129	B	A	A	A	A	A	A	A	A	B	B	B	A	A	A	C		B	A	A	A	A	A	A	A	A	A	A					
BARTER ISLAND	70N	216	C	A	S															C	A	S													
KAP TOBIN	70N	338	C	A	S																														
TROMSO	70N	19								A	A	A	A	A	A	A				B	A	A	A	A	A	A	A	A			A	A			
GODHAVN	69N	306	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		B	A	A	A	A	A	A	A	A	A	A	C	C	C	C	
IVALO	69N	27	C	A	C																														
MURMANSK	69N	33	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C			B	A	A	A	A	A	A	A	A	A	A	A	A	A	
ABISKO	68N	19										C	C	A	A	A	A	A																	
KIRUNA	68N	21	B	A	C		C	A	A	A	A	A	A	A	A	A	A	A	C						C	B	C	A	B			C			
FORT YUKON	67N	215	C	A	Q	Q	Q	Q	Q	Q	Q	Q	Q	C	Q	Q	Q	Q	C	C	A														
KOTZEBUE	67N	198	C	A	S															C	A	S													
SODANKYLA	67N	27	B	B						A	A	A	A	A	A	A	A	A	C	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
CAPE WELLEN	66N	190	B	A	A	A	A	A	A	A	A	A	A	B	A	A	A			B	A	A	A	A	A	A	A	A	A	A	A	C	A		
COLLEGE	65N	212	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
SUKKERTOPPEN	65N	307								A	A	C																C							
BAKER LAKE	64N	264	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	B	A	A	A	A	A	A	A	A	A	A	A	A			
BIG DELTA	64N	214	B	A	S															B	A	S													
EIELSON AFB	64N	213										C	A	A	A	A	A	B																	
HEALY	64N	211	B	A	S															B	A														
LEIRVOGUR	64N	338	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
NORTHWAY	63N	218	B	A	S															B	A									A					
DOMBAS	62N	9								A	A	A	A	A	A	A	A	B	C	B	A	A	A	A	A	A	A	A	A	A	A	A	A		
SREDNIKAN	62N	152	B	A	A	A	A	A	A	B	A	B								B	A	A	A	A	A	A	B								
YAKUTSK	62N	130	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B		B	A	A	A	A	A	A	A	A	A	A	A	A	A	B	
YELLOWKNIFE	62N	246	B	B	S															B	B														
ANCHORAGE	61N	210	B	A												Q	Q	Q		B	A														
JULIANEHAAB	61N	314	C	C	P					B	C																								
NARSSARSSUAQ	61N	315												B	A	A	A	A												A		A	C		
NURMIJARVI	61N	25	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
LENINGRAD	60N	31	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
LERWICK	60N	359	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C		B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	
FORT CHURCHILL	59N	266	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	B	A					A	A	A	A	A	A	A	C		

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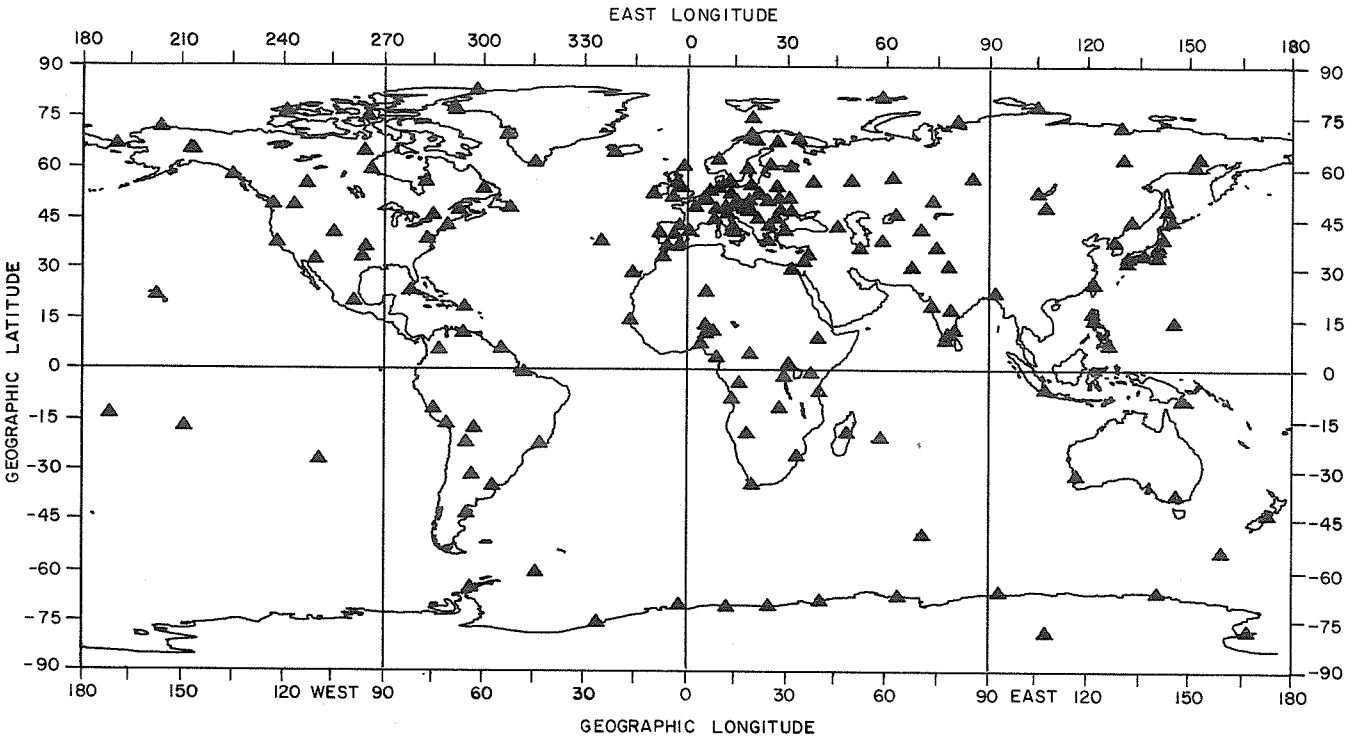
GEOMAGNETIC OBSERVATORIES 1973



AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	NORMAL MAGNETOGRAMS YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	HOURLY VALUES YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
LOVO	59N	18	B	A	A	A	C			A	A	A	A	A	A	A	A	B		B	A	A	A	A	A	A	A	A	A	A	A	A	A		
SITKA	57N	225	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
SVERDLOVSK	57N	61	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
KAZAN	55N	49	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A			B	A	A	A	A	A	A	A	A	A	A	A	A	A		
ESKDALEMUIR	55N	357	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C		B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	
GREAT WHALE	55N	282									B	A	A	A	A	A	A	A	C								C	A	A	A	A	A	A	C
HEL	55N	19	B	A	A		A			A																									
MEANOOK	55N	247	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	
MOSCOW	55N	37	B	A	A	A	A	A	B	A	A	A	A	A	A	A	A			B	A	A	A	A	A	B	A	A	A	A	A	A	A	A	
RUDE SKOV	55N	12	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A			B	A	A	A	A	A	A	A	A	A	A					
MINSK	54N	27					A	A	A	A	A	A	A	A	A	A	A	A	C					A	A	A	A	A	A	A	A	A	A	A	C
STONYHURST	54N	358		B			A	A	A	A	A	A												A	A	A	A	A	A	A				
WINGST	54N	9			A	A	A		A	A	A	A	A	A	A	A	A			B	A	A	A	A	A	A	A	A	A	A	A	A	A		
MELVILLE AFB	53N	300										C	A	A	A	A	A	A																	
WITTEVEEN	53N	7	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C		B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
ADAK	52N	183								C	A	S																							
BELSK	52N	21										A	A	A														A	A	A	A	A	A	B	
GOTTINGEN	52N	10	B	A																															
IRKUTSK	52N	104	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		B	A	A	A	A	A	A	A	A	A	A	A	A	A		
NIEMEGK	52N	13	B	A	A					A	A	A	A	A	A	A	A	C		B	A	A	A	A	A	A	A	A	A	A	A	A	A	C	
SWIDER	52N	21	B	A	A	A														B	A	A	A	A	A	A	A	A	A	A					
VALENTIA	52N	350	B	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A		B	A	A	A	A	A	A	A	A	A	A	A	A	A		
HARTLAND	51N	356	B	A	A		B		B	A	A	A	A	A	Q	Q	Q			B	A	A	A	A	A	A	A	A	A	A	A	A	A		
DOURBES	50N	5	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
KIEV	50N	31		B	A	A	A	A	A	A	A	A	A	A	A	A	A	B			B	A	A	A	A	A	A	A	A	A	A	A	A	B	
LVOV	50N	24	B	A	A	A	A	A	A	A	A	A	A	A	A	A	B			B	A	A	A	A	A	A	A	A	A	A	A	A	B		
MANHAY	50N	6	B	A																															
PRUHONICE	50N	15	B	A	A					A	P									B	A	A	A	A	A	A	A		A	A	A				
VICTORIA	49N	237	B	A					C	A	A	A	A	A	A	A	A	A	C	B	A	A	A	A	A	A	A	A	A	A	A	A	A		
CHAMBON-LA-FORET	48N	2	B	A	A	A	A	A	A	A	A	A	A	A	A	A	Q			B	A	A	A	A	A	A	A								
FURSTENFELDBRUCK	48N	11								A	A	A	A	A	A	A	A	A	C	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
HURBANOVO	48N	18									C	Q	Q	Q	Q	Q	Q			B	A	A	A	A	A	A	A	A	A	A					
NAGYCENK	48N	17								A	A																								
NEWPORT	48N	243										B	A	A	A	A	A	A	C									B	A	A	A	A	A	B	
ST JOHNS	48N	307												B	A	A	A	B												C	A	A		C	C
ULAN BATOR	48N	106										A	A	A	C	C												A	A	A	C	C			
WIEN-KOBENZL	48N	16	B	A						A	A									B	A	A	A	A	A	A	A	A	A	A	A	A	A		
LORING AFB	47N	292										C	A	A	A	A	A	A																	
ODESSA	47N	31	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
TIHANY	47N	18	B	A	A	A														B	A	A	A	A	A	A	A	A	A	A	A	A	A		
YUZHNO SAKHALINSK	47N	143	B	A	A	A	A	A	A	A	A	B	A	A	A	A	B			B	A	A	A	A	A	A	A	A	B	A	A	A	A	B	
GROCKA	45N	21		A																	B														
OTTAWA	45N	284												B	A	A	A	A	C											A	A	A	A	C	C
SURLARI	45N	26	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B		B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
AGINCOURT	44N	281	B	A	A	A	A	A	A	A	A	A	A	A	S					B	A	A	A	A	A	A	A	A	A	A	A	C	S		
CASTELLACCIO	44N	9	B	A	A	A	A	B	Q	Q	Q	Q	Q	Q	Q	Q				B	A	A	A	A	B										
MEMAMBETSU	44N	144	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		B	A	A	A	A	A	A	A	A	A	A	A	A	A		
MONTE CAPELLINO	44N	9						S												B	A	A	A	A	A	S									
ROBURENT	44N	8																									C	A	A	A	A	A	A	A	
CASPER	43N	254	B	A	S															C	B	S													

KEY TO SYMBOLS

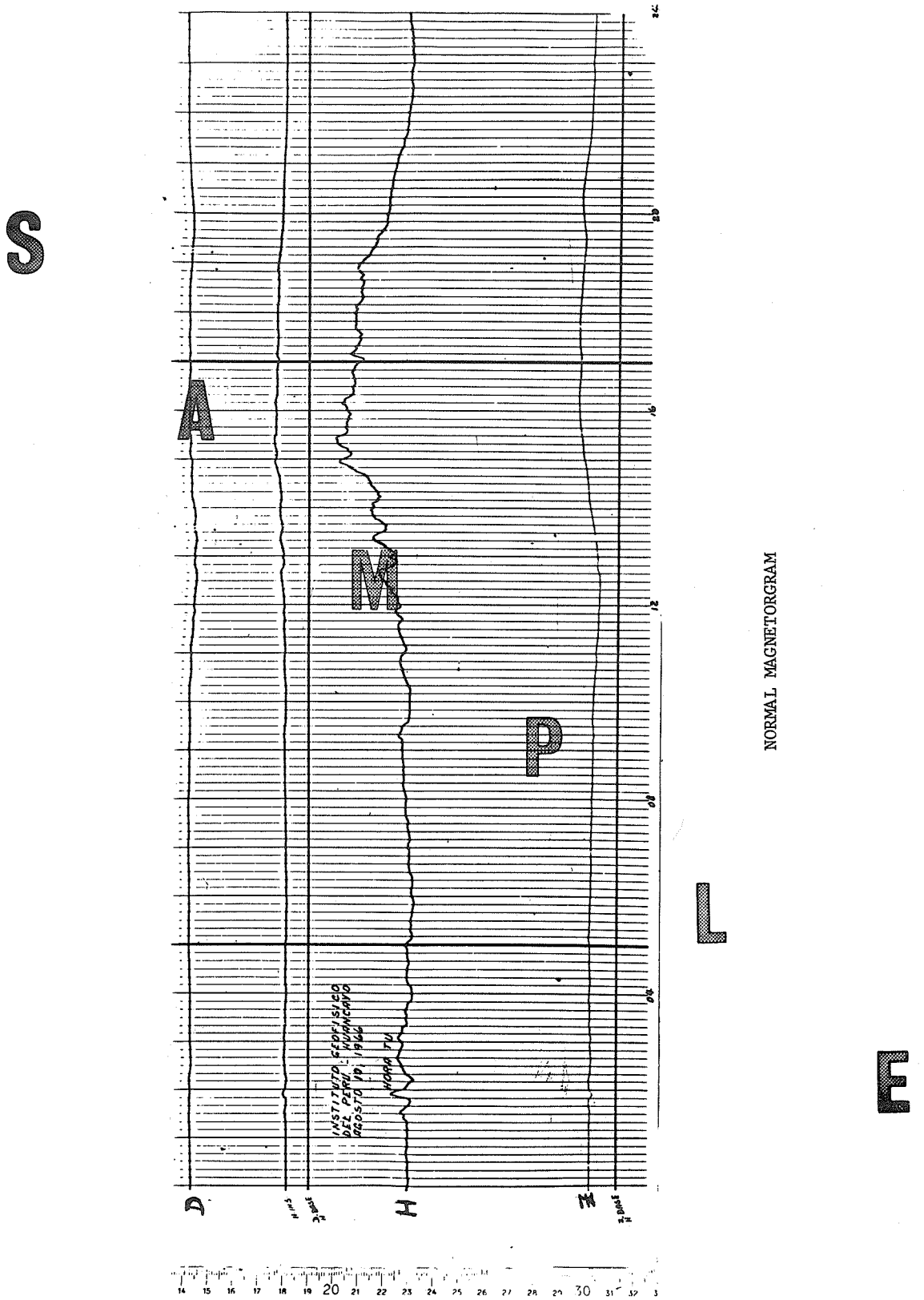
A = 12 Months
B = 6-11 Months
C = 1-5 Months

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data

P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability

S = Program STOPPED operations (see MASTER STATION LIST for actual date)

D.1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INSTITUTO GEOFISICO
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NORMAL MAGNETORGRAM

NORMAL MAGNETOGRAMS

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
PANAGYURISHTE	43N	24	B	A	A	A													
VLADIVOSTOK	43N	132	B	A	A	A	A	A	A	A	B	A	A	A	A	A	A	B	
L AQUILA	42N	13		B	A	A	A	C		A	A	Q	Q	Q	Q	C	Q		
LOGRONO	42N	358	B	A	A					A	A	A	A	A	A	A	A	A	C
TBILISI	42N	45	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
WESTON	42N	289								B	A	A	A	A					
CAPRI	41N	14		A	B		B			A	A	A	A	Q	Q	Q			
EBRO	41N	0	B	A						A	A	A	A	A	A	A	A		
KANDILLI	41N	29	Q	Q	Q	Q	Q	Q	Q	A	A	Q	Q	Q	Q	Q	Q		
TASHKENT	41N	69	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
BOULDER	40N	255					A	A	A	A	A	A	A	A	A	A	A	A	B
COIMBRA	40N	352																	
TOLEDO	40N	356	B	A	A					A	A	A	A	A	A	A	A	A	C
BELOIT	39N	262	B	A	S														
BURLINGTON	39N	258	B	A	S														
CARROLLTON	39N	267	B	A	S														
LEADVILLE	39N	254	B	A	S														
MIZUSAWA	39N	141																	
PRICE	39N	249	B	A	S														
ANDREWS AFB	38N	283															C		
ASHKHABAD	38N	58		C	A	A	A	A		A	A	A	A	A	A	B			
FREDERICKSBURG	38N	283	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
PENDELI	38N	24									C	A	C			A	A	A	
SAN MIGUEL	38N	334								A	A								
ALMERIA	37N	358	B	A	A	Q	Q	Q	Q	A	A	A	A	A	A	A	A	A	C
CASTLE ROCK	37N	248																	
SEOUL	37N	127										S							
ESPANOLA	36N	254	B	A	S														
KAKIOKA	36N	140	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
SAN FERNANDO	36N	354	B	A	A	A	A	A	A	A	A	A	A	B	A	A	A	A	C
TEHRAN	35N	51	C	B	C	C					A	C	C						
TULSA	36N	264					B	A	A	A	A	A	A	A	A	A	A	A	C
KANOZAN	35N	140																	
KSARA	34N	36	Q	Q	Q	Q	Q	Q	Q	A	A	Q	Q	Q	Q	Q	Q	Q	
MT WILSON	34N	242	B	A	S														
SIMOSATO	34N	136	B	A									A	A	A		A		
ASO	33N	131	B	B	B					A	A	P	P	P	P	P			
AVERROES	33N	353																	
DALLAS	33N	263								A	A	A	A	A	A	A	A	A	B
HACHIJO	33N	140													A	A	A		
NITSANIM	32N	35																	
TUCSON	32N	249	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
KANOYA	31N	131	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
HELWAN	30N	31						S											
MISALLAT	30N	31							A	A	A								
SABHAWALA	30N	78																	
MIDWAY	28N	183								B	A	S							
TENERIFE	28N	344								A	A	C					A	A	
LUNPING	25N	121									B		A	A	A	A	C		
HAVANA	23N	278								C	A	A	A	A					

HOURLY VALUES

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
PANAGYURISHTE	43N	24	B	A	A	A	A	A	A	A	A	A	A		A	A	A		
VLADIVOSTOK	43N	132	B	A	A	A	A	A	A	A	B	A	A	A	A	A	B	B	
L AQUILA	42N	13		C	C	A	A	A	A	A	A	A	A	A					
LOGRONO	42N	358	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
TBILISI	42N	45	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	C
WESTON	42N	289				C	A	A	A	A	A	A	A	A	A	B	B		
CAPRI	41N	14	B	A	B		B	A	A	A	A	A	A	Q	Q	Q			
EBRO	41N	0	B	A	A						A	A	A	A	A	A	A		
KANDILLI	41N	29	B	A	A	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	A	A		
TASHKENT	41N	69	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
BOULDER	40N	255							B	A	A	A	A	A	A	A	A	A	B
COIMBRA	40N	352	B	A	A	A	A	A	A	A	A	A	A	Q					
TOLEDO	40N	356	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
BELOIT	39N	262	B	A	C	S													
BURLINGTON	39N	258	B	A	C	S													
CARROLLTON	39N	267		A	C														
LEADVILLE	39N	254	B	B	C														
MIZUSAWA	39N	141														A			
PRICE	39N	249	B	A	C	S													
ANDREWS AFB	38N	283																	
ASHKHABAD	38N	58			A	A	A	A		A	A	A	A	A	A	B			
FREDERICKSBURG	38N	283	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
PENDELI	38N	24																	
SAN MIGUEL	38N	334				B	C												
ALMERIA	37N	358	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
CASTLE ROCK	37N	248														B	A	A	
SEOUL	37N	127									B	S							
ESPANOLA	36N	254	B	A	C	S													
KAKIOKA	36N	140	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
SAN FERNANDO	36N	354	B	A	A	A	A	A	A	A	A	A	A	B	A	A	A	C	
TEHRAN	35N	51									A	A	A	A	A	A			
TULSA	36N	264																	
KANOZAN	35N	140												A		A			
KSARA	34N	36																	
MT WILSON	34N	242																	
SIMOSATO	34N	136	B	A	A	A	A	A	A	A	A	A	A	A	A				
ASO	33N	131	B	A	A														
AVERROES	33N	353															A		
DALLAS	33N	263								A	A	A	A	A	A	A	A	A	B
HACHIJO	33N	140												B	A	A	A		
NITSANIM	32N	35							A					A	A				
TUCSON	32N	249	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
KANOYA	31N	131	B	A	A	A	A	A	A	A	A	A	A	A	A		A		
HELWAN	30N	31	B	A	A														
MISALLAT	30N	31				B	A	A	A	A	A	A	A	A	A	A	A		
SABHAWALA	30N	78								A	A	A	A				A		
MIDWAY	28N	183																	
TENERIFE	28N	344					A	A	A	A	A	C	A	A	A	A	A		
LUNPING	25N	121									B	A	A	A	A				
HAVANA	23N	278								C	A	A	A	A					

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Ministry of Scientific Research

HELWAN OBSERVATORY Misallat

U A R

Horizontal Intensity

31000γ + Tabulated values in gammas

HOURLY VALUES

November 1967

D.1

Days of Month	Hours of Observation G. M. T.																							Sum	Mean	Remarks
	1	2	3	4	5	6	7	8	9	10	11	Noon	13	14	15	16	17	18	19	20	21	22	23	Midn			
1	180	181	184	189	196	203	211	212	221	228	228	221	211	199	190	186	190	186	177	173	179	177	175	162	4659	194	
2	160	162	183	185	185	188	185	186	194	207	202	182	171	164	165	167	168	156	145	140	169	156	151	151	4122	172	
3	150	153	157	159	169	173	181	185	193	206	182	189	182	176	136	145	149	122	161	163	146	162	160	158	3957	165	
4	154	152	166	164	167	175	178	182	184	184	178	170	163	161	167	173	178	177	174	173	174	173	[illegible]	170	4106	171	
5	174	171	174	177	181	189	192	193	189	188	184	174	167	170	164	157	157	155	152	165	165	16[illegible]	[illegible]	164	4128	172	
6	165	169	172	177	181	190	196	200	207	217	215	203	193	185	179	179	184	186	181	184	184	187	186	185	4505	188	
7	183	183	187	192	197	199	209	218	226	235	234	218	208	198	188	186	191	191	186	186	188	188	189	188	4768	199	
8	187	176	183	182	179	184	193	198	208	209	209	192	191	191	184	158	169	179	183	171	138	139	147	146	4296	179	
9	147	150	154	155	161	166	169	176	183	193	184	173	164	146	141	153	154	165	178	168	169	171	170	170	3960	165	
10	168	169	171	174	179	187	195	201	201	201	192	183	174	171	172	172	171	174	173	173	172	173	174	174	4294	179	
11	174	172	172	178	184	192	194	198	201	207	207	195	186	183	183	188	193	198	200	195	176	181	150	150	4457	186	
12	154	151	161	163	165	164	160	172	175	177	174	167	162	164	162	155	159	164	[illegible]	158	163	154	162	160	3896	162	
13	164	163	169	170	177	184	192	197	197	191	181	170	168	169	163	165	168	[illegible]	181	179	172	170	182	179	4221	176	
14	170	168	167	172	181	191	191	200	201	195	187	174	173	174	169	168	174	[illegible]	174	173	178	174	173	176	4267	178	
15	175	175	176	181	185	192	195	200	209	213	208	193	174	160	164	157	146	133	128	142	157	166	166	172	4167	174	
16	167	165	169	169	179	195	206	215	214	214	211	194	183	174	175	169	175	175	173	173	175	177	177	173	4397	183	
17	171	171	174	175	182	186	197	202	206	205	199	190	182	177	175	175	180	182	182	180	180	180	180	180	4411	184	
18	180	178	175	180	187	194	200	207	209	205	198	190	179	181	182	181	184	185	183	184	184	183	182	181	4492	187	
19	181	181	181	186	191	197	198	203	205	207	207	201	193	189	185	183	181	182	185	186	185	183	183	182	4555	190	
20	177	180	182	186	189	193	199	203	203	199	195	190	181	178	179	183	188	188	188	188	188	188	188	188	4521	188	
21	188	188	189	194	202	205	205	205	200	201	201	201	194	[illegible]	209	211	211	204	196	192	187	185	204	187	4756	198	
22	187	189	188	198	204	196	183	177	179	171	162	158	144	144	165	176	179	182	179	174	179	182	181	179	4256	177	
23	179	180	185	192	204	204	206	204	197	185	182	177	166	156	158	167	174	175	184	186	183	180	179	184	4387	183	
24	181	177	184	183	186	184	184	179	172	173	149	148	146	147	155	153	147	136	132	138	150	155	155	159	3873	161	
25	165	162	162	162	165	171	176	180	185	181	170	151	137	135	136	130	132	137	142	148	148	149	158	162	3744	156	
26	163	173	170	170	174	178	180	177	172	169	168	166	164	157	152	158	160	162	160	160	165	172	175	173	4018	167	
27	170	175	177	178	182	190	191	199	200	196	190	184	181	181	178	175	170	165	154	151	162	164	167	170	4250	177	
28	168	172	178	177	182	177	173	172	165	163	158	151	147	144	144	143	139	150	149	136	134	135	139	155	3751	156	
29	171	161	165	167	174	187	197	203	[illegible]	185	185	185	170	166	165	163	158	159	166	168	173	177	177	179	4198	175	
30	179	178	179	183	191	203	200	193	191	187	187	182	177	178	157	158	166	173	172	165	156	159	154	163	4231	176	
31																											
Sum	5132	5125	5234	5318	5479	5637	5736	5837	5886	5890	5727	5472	5231	5115	5042	5034	5095	5082	5081	5072	5079	5102	5117	5120	127643		
Mean	171	171	174	177	183	188	191	195	196	196	191	182	174	170	168	168	170	169	169	169	169	170	171	171		177	
Mean Q	178	179	180	184	189	194	201	207	210	210	207	198	189	185	182	182	185	186	185	185	185	184	184	184			
Mean II	167	164	17	171	175	178	182	186	189	191	177	173	170	169	166	155	158	154	161	162	154	156	161	160			
Deviation	-6	-6	-3	0	+6	+11	+14	+18	+19	+19	+14	+5	-3	-7	-9	-9	-7	-8	-8	-8	-8	-7	-6	-6			

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NORMAL MAGNETOGRAMS

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
TAMANRASSET	23N	6	B	A	A	P													
CHA-PA	22N	104	C	A	A	P													
HONOLULU	21N	202	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
TEOLOYUCAN	20N	261	B	A						B	A					C			
ALIBAG	19N	73	B	A	A				A	A	A	A	A	A	A	A	Q		
SAN JUAN	18N	294	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
HYDERABAD	17N	79									B	A	A	A	A	A	A		
BAGUIO	16N	121					A			A	A	A	A	A	A	A	A	A	
GUAM	14N	145	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
MBOUR	14N	343	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	
MUNTINLUPA	14N	121	B	A	A		A	A	A	A	A	A	A	A	A	A	A		
ZARIA	12N	352								A	A	Q	Q	Q	Q	Q	Q	Q	
ANNAMALAINGAR	11N	80	C	A	A				A	A	A	A	A	A	A	A	C		
CEBU	10N	124					B	Q											
KODAIKANAL	10N	77	B	A	A				A	A	A	A	A	A	A	A			
KONTAGORA	10N	5								C	A								
ADDIS ABABA	09N	39		A	A	A	A	A	A	A	A	B	B	Q	A	C	Q		
TRIVANDRUM	09N	77	B	A	A				A	A	A	A	A	A	A	A			
FREETOWN	08N	347					B	A	A	A	A	A	C						
DAR ES SALAAM	07S	39																C	
DAVAO	07N	126									B	A	A	A	A	A	A	A	
IBADAN	07N	4	B	A						C	A	Q	Q	Q	Q	Q	Q		
KOROR	07N	135	B	A						B	A	C							
MAJURO	07N	171								C	A	S							
PALMYRA ISLAND	06N	198	C	S															
PARAMARIBO	06N	305	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	
BANGUI	05N	19	B	A	A	B	A	A	A	A	A	A	A	A	A	A	A	B	
FUQUENE	05N	286	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	
FANNING	04N	201	C	A	S														
MOCA	03N	9		C	A					A	A	A	A	A	A	A	A		
JARVIS ISLAND	00S	200	C	S															
NAIROBI	01S	37								B	A	C	C						
TATUOCA	01S	311	C	A						A	A					C			
LWIRO	02S	29								B	B	P	P	P	P	P	P		
HOLLANDIA	03S	141	B	A	A	A	A	B	S										
BINZA	04S	15										B		A	A				
TALARA	05S	279	B	B	A	C													
KUYPER	06S	107	B	A	A	A	B	S											
TANGERANG	06S	107								B	A	C	B	A	A	A	A	A	C
CHICLAYO	07S	280	C	A	A	C	P												
CHIMBOTE	09S	281	C	A	C		P												
LUANDA	09S	13																	
PORT MORESBY	09S	147		B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
HUANCAYO	12S	285	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	
APIA	14S	188	B	A					A	A	A								
CUZCO	14S	288									C	C	P						
AREQUIPA	16S	289								A	A	A		A	B	B			
YAUCA	16S	285	C	A	A	C													
TAHITI	18S	211		B	C							B		A	A	A	A	A	C
TANANARIVE	19S	48	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A		

HOURLY VALUES

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
TAMANRASSET	23N	6																	
CHA-PA	22N	104	C	A	A														
HONOLULU	21N	202	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
TEOLOYUCAN	20N	261	B	A				A			A	A	A	A	A	A	A	C	
ALIBAG	19N	73	B	A	A		A	A	A	A	A	A	A	A	A	A	A		
SAN JUAN	18N	294	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
HYDERABAD	17N	79									B	A	A	A	A	B	A		
BAGUIO	16N	121						A	A	A	A	A	A	A	A	A	A	B	
GUAM	14N	145	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
MBOUR	14N	343	B	A	A	A	A	A	A	A	A	A	A	A	A	C			
MUNTINLUPA	14N	121	B	A	A		A	A	A	A	A	A	A	A	A	A	A		
ZARIA	12N	352																	
ANNAMALAINGAR	11N	80	C	A	A		A	A	A	A	A	A	A	A	A	A	A		
CEBU	10N	124						A	C										
KODAIKANAL	10N	77	B	A	A	A	A	A		A	A	B	A		B	A	A		
KONTAGORA	10N	5																	
ADDIS ABABA	09N	39		A	A	A	A	A	A	A	A	A	A	A	A	A	A		
TRIVANDRUM	09N	77	B	A	A		A	A	A	A	A	A	A	A	A	A	A		
FREETOWN	08N	347					B	A	A	A	B								
DAR ES SALAAM	07S	39																	
DAVAO	07N	126									B			A	B	A	A	B	
IBADAN	07N	4	B	A							C								
KOROR	07N	135	B	A															
MAJURO	07N	171								B	A	C							
PALMYRA ISLAND	06N	198	C	B															
PARAMARIBO	06N	305		A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	
BANGUI	05N	19	B	A	A	B	A	A	A	A	A	A	A	A	A	C			
FUQUENE	05N	286	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
FANNING	04N	201	C	A	S														
MOCA	03N	9		C	A	A	A	A	A	A	A	A	A	A	A	A	A		
JARVIS ISLAND	00S	200	C	A	C	S													
NAIROBI	01S	37								B	A	C	C					A	
TATUOCA	01S	311	C	A	A	A	A	A		C	A								
LWIRO	02S	29		B	A	A	B		B	B	B	B	A	A	A	A	A		
HOLLANDIA	03S	141	B	A	A	A	A	BS											
BINZA	04S	15																	
TALARA	05S	279	B	B	A	C													
KUYPER	06S	107	B	A	A	A	A	S											
TANGERANG	06S	107									A	A	A	B	A	A	A	A	
CHICLAYO	07S	280	C	A	A	C													
CHIMBOTE	09S	281	C	A	C														
LUANDA	09S	13	C	A				A	A	A	A	A	A	A	A	A	A		
PORT MORESBY	09S	147		B	A	A	A	A	A	A	A	A	A	A	A	A	A		
HUANCAYO	12S	285	B	A	A	A	A		A	A	A	A	C	C	C				
APIA	14S	188	B	A	A	A	A	A	A	A	A								
CUZCO	14S	288																	
AREQUIPA	16S	289								A	A	A							
YAUCA	16S	285	C	A	A														
TAHITI	18S	211		B	C												C	A	A
TANANARIVE	19S	48	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

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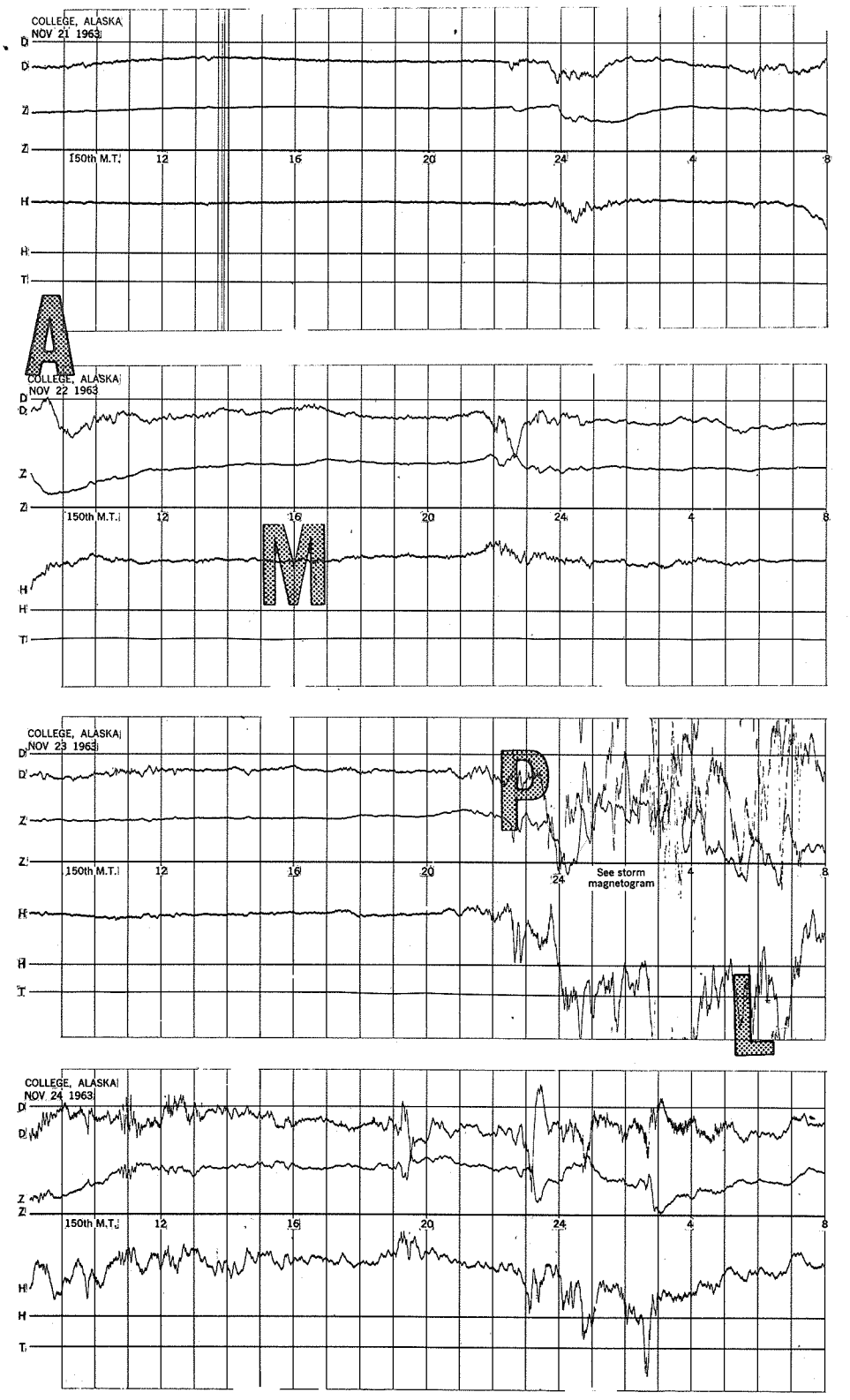

NORMAL MAGNETOGRAMS

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	NORMAL MAGNETOGRAMS YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	HOURLY VALUES YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
TSUMEB	19S	18																									C	A							
PLAISANCE	20S	58										A	P																						
LA QUIACA	22S	294							A	A	A	A	A							B	A					A	A	A	A					
VASSOURAS	22S	316	B	A	A					A						C				B	A	A	A	A	A										
EASTER ISLAND	27S	251		B		B	B		B	A																B	C				C				
GNANGARA	32S	116	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
PILAR	32S	296				B	A	A	A	A	A	A	A	A	C	C				B	A		B	A	A	A	A	B	A	A	A				
WATHEROO	32S	116	B	A																A	A	S													
HERMANUS	34S	19	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
LAS ACACIAS	35S	302								A	B	B	A	A	A	A	A	B																	
TOOLANGI	38S	145	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
AMBERLEY	43S	173	B	A						A	A	Q	Q	Q	Q	A	A	A		B	A	A	A	A	A	A	A	B							
TRELEW	43S	295	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B		C	A	A	A	A			C	A	A	A	C				
PORT AUX FRANCAIS	49S	70	C	A	B	B	A	A	A	A	A	A	A	A	A	A	A			C	A	B	B	A	A	A	A	A	A						
MACQUARIE ISLAND	55S	159	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B			A			A	A	A	A	A	A	A	C				
ARGENTINE ISLAND	65S	296	B	A	A	A	A	A	A	A	A	A	A	Q	Q	Q	Q			B	A	A	A	A	A	A	A	A	A	A	A				
GONZALES VIDELA	65S	297					B																	B											
OASIS	66S	101	B	B	S															B	B														
WILKES	66S	112	B	A	A	A	A	A	A	A	A	A	C							B	A						C	A	C						
DUMONT D URVILLE	67S	140	B	A	A	A		B	A	A	A	A	A	A	A	A	A			B	A	A	A		B	A	A	A	A						
MIRNY	67S	93	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A			B	A	A	A	A	A	A	A	A	A	A	A	A	A		
MAWSON	68S	63	B	A	A	A	A	A	A	A	A	C	Q	Q	Q	Q	Q	Q		B	A						C	B	C						
CHARCOT	69S	139																		B	A														
SYOWA BASE	69S	40			B	C						B	C			C																			
LAZAREV	70S	13				A	C																A	C										
PIONERSKAYA	70S	96	B	A																B	A														
ROI BAUDOUIN	70S	23								B	A	A									B	C					B	A	A						
SANAE STATION	70S	358																							B	A	A	A	A	A	A	A	C		
NORWAY STATION	71S	357																						A	C										
NOVOLAZAREVSKAYA	71S	12					B	A	A	A	A	A	A	A	A	A	A							B	A	A	A	A	A	A					
CAPE HALLETT	72S	170	B	A	A	A	A	A	P	P	P	P	P	P	P	P				B	A														
EIGHTS	75S	283							B	A	B	S														B	A	B	S						
HALLEY BAY	76S	333	B	A	A	A	A	A	A	A	Q	Q	Q	Q	Q	Q	Q			A	A	A	A	A	A	A	A									
LITTLE AMERICA	78S	198	B	A	S															B	A	S													
SCOTT BASE	78S	167	B	A						A	A									B	A														
PLATEAU	79S	40										B	A	B	S														A	A	B				
VOSTOK	79S	107		A	A	A	A		B	A	A	A	A	A	A	A	A				A	A	A	A		B	A	A	A	A	A				
BYRD STATION	80S	240	B	A	A	A	A	A	A	A	A	A	A	A	A	A	B	S		B	A	A	A	A	A	A	A	A		A	A				S
SOUTH POLE	90S	0			A	B	A	A	A	B	A	A	A	A	A	A	A	A				B	B	A	A	A	B	A	A	A	A				

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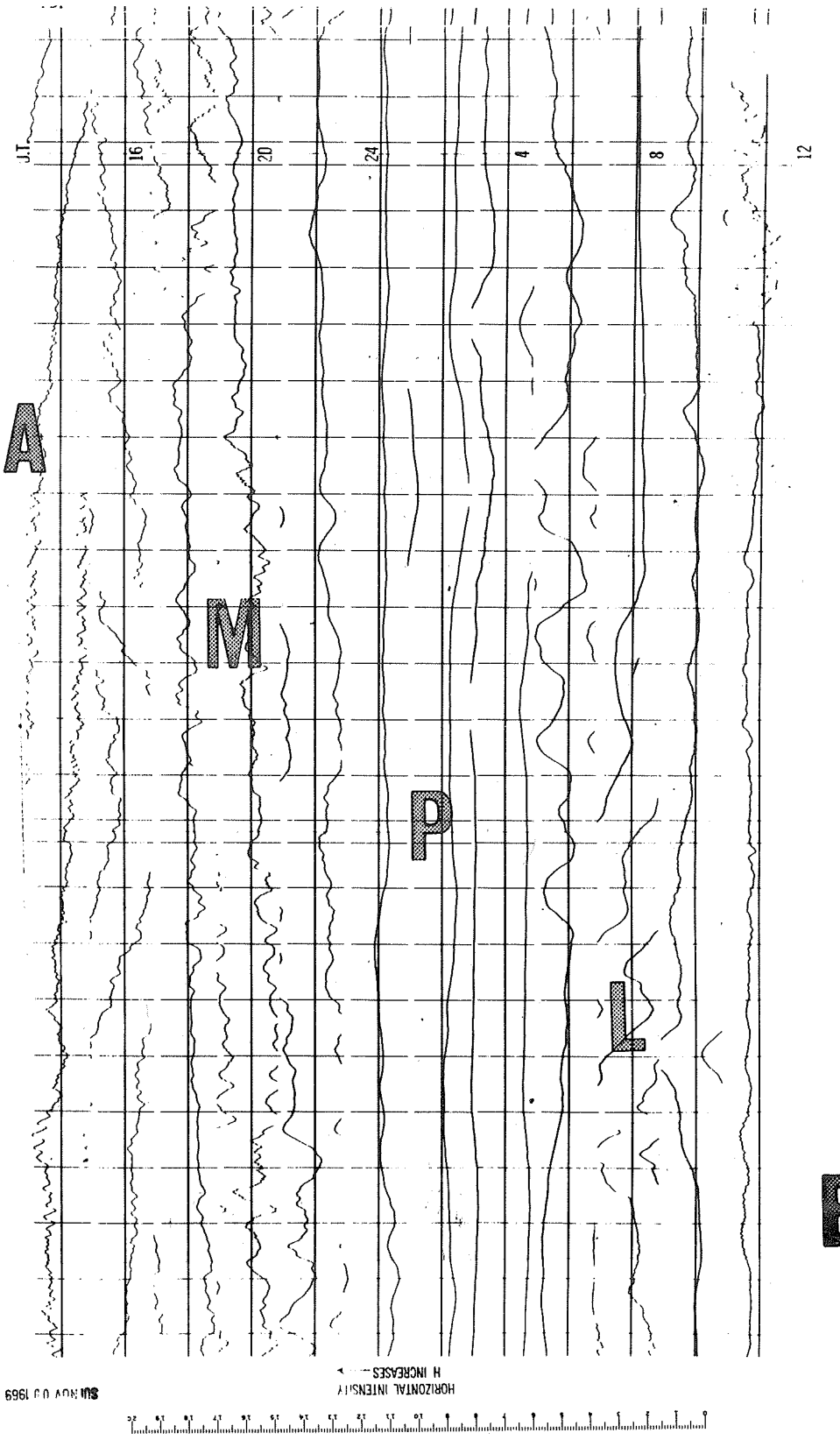
D.1



RAPID-RUN MAGNETOGRAM

AT BOULDER

RAPID-RUN MAGNETOGRAMS

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
MURCHISON BAY	80N	18	C	A															
THULE	77N	291	B																
BARROW	72N	204	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
GODHAVN	69N	306								A	A								
KIRUNA	68N	21	C						A	A	A	A	A	A	A	A	A	A	C
LOVOZERO	68N	35	C	A	A	A				A	A	B	A	A	A	A			
SODANKYLA	67N	27	B	B						A	A	A	A	A	A	A	A	A	C
COLLEGE	65N	212	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
SUKKERTOPPEN	65N	307								A	A								
BIG DELTA	64N	214	B	A	C	S													
HEALY	64N	211	B	A	C														
LEIRVOGUR	64N	338	C	A	A	A	A	A	A	A	A				C	B	A	A	C
YAKUTSK	62N	130			B														
JULIANEHAAB	61N	314								B	C								
NURMIJARVI	61N	25	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
LERWICK	60N	359								A	A								
LOVO	59N	18	B	A						A	A	A	A	A	A	A			
BOROK	58N	38	C	A	A	A	A	A	A	A	A	A							
SITKA	57N	225	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
ESKDALEMUIR	55N	357								A	A								
GREAT WHALE	55N	282									B	A	A	A	A	A	A	B	
RUDE SKOV	55N	12								A	A								
WINGST	54N	9								A	A	A	A	A		A			
PETROPAVLOVSK	53N	158	C	A	A	A	A	A	A	B	C								
WITTEVEEN	53N	7	B	A	A					A	A	A	A	A	A	A	B	C	
DOURBES	50N	5	C	A	A					A	B								
KIEV	50N	31		B	A	A	A	A	A	A	A	A							
CHAMBON-LA-FORET	48N	2	B	A	A														
MEMAMBETSU	44N	144	B	A	A	A	A	A	A	A	A	A	A	A	A	A		B	
SIMFEROPOL	44N	34	B	A	A														
TBILISI	42N	45	B	B	A	C				A									
BOULDER	40N	255								B	A	A	A	A	A	A	A	A	B
TOLEDO	40N	356								A	A	B	C						
ASHKHABAD	38N	58			B	A	A	A	A	B		A	A	B	A	B			
FREDERICKSBURG	38N	283	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
ONAGAWA	38N	141	B	A															
KAKIOKA	36N	140	B	A												A		B	
SIMOSATO	34N	136	B	A													A		
TUCSON	32N	249	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
KANOYA	31N	131	B	A	A	A	A	A	A	A	A	A	A	A	A	A		B	
HONOLULU	21N	202	B	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	B
SAN JUAN	18N	294										C	A	A	A	A	A	A	B
GUAM	14N	145	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
KOROR	07N	135	B	A															
PARAMARIBO	06N	305	B	A						B									
MOCA	03N	9								A	A	B	C						
HOLLANDIA	03S	141	C	A				S											
PORT MORESBY	09S	147			C	A		A	A	A	A	A	A	A	A	A	B		
APIA	14S	188	B	A						A	A								
WATHEROO	32S	116	B	A	S														
HERMANUS	34S	19	B	A	A														
MACQUARIE ISLAND	55S	159							A	A	A	A	A	A	A	A	A	A	
WILKES	66S	112	B	A	A	A	A	A	A	A	A	A							
MIRNY	67S	93	C	A															
EIGHTS	75S	283								A	B								
LITTLE AMERICA	78S	198	B	A	S														
SCOTT BASE	78S	167	B	A															
BYRD STATION	80S	240		A	A	A	A	A	A	A	A	A	A	A	A	A	A	S	

Note: When requesting copies of rapid-run magnetograms from United States observatories, the element(s) required should be specified because there is a separate record for each element (D, H, Z) for each 24 hour period.

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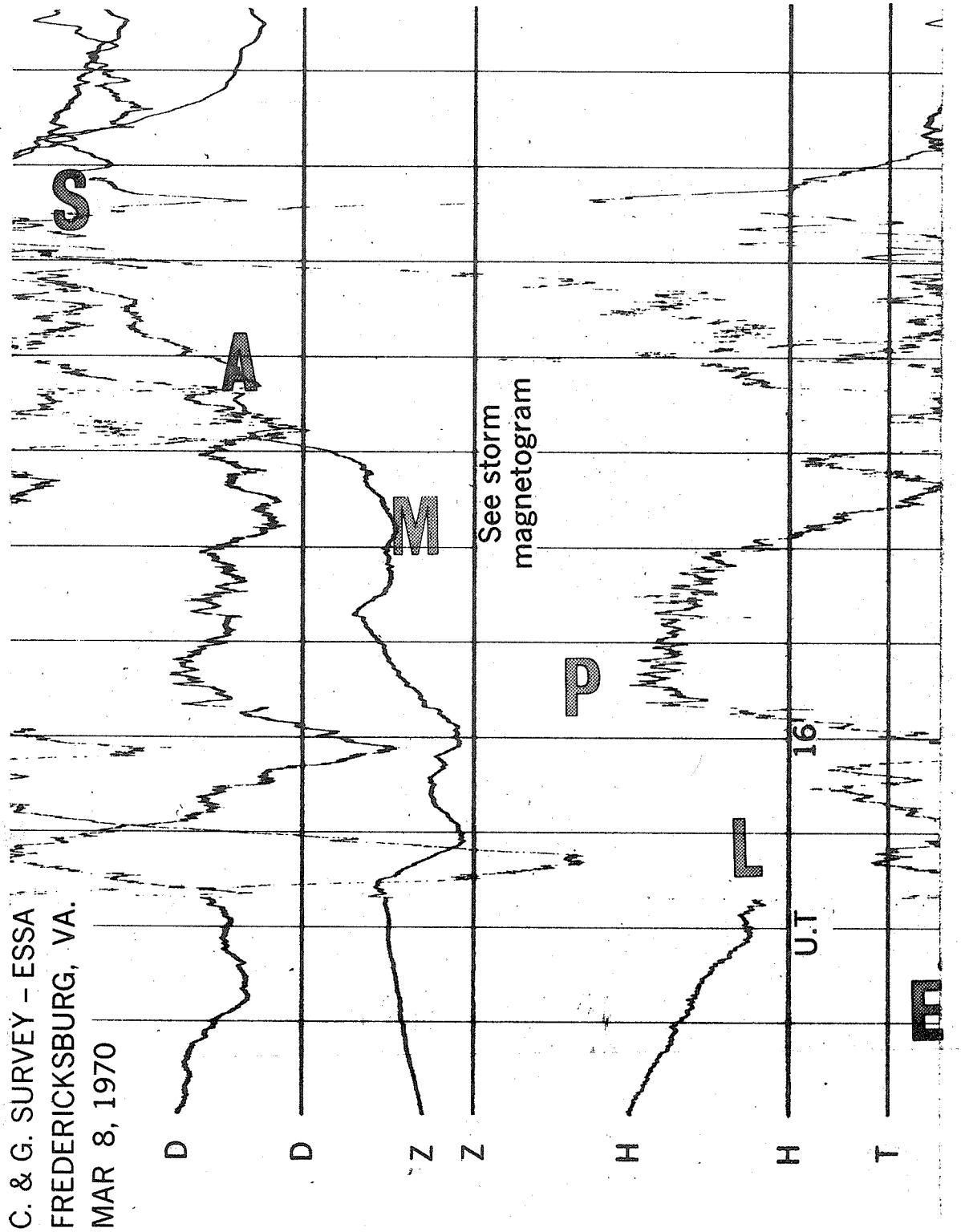
C. & G. SURVEY – ESSA
FREDERICKSBURG, VA.
MAR 8, 1970
D
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See storm
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16'
U.T
E

D.1 2.5 MINUTE DIGITIZATIONS OF MAGNETOGRAMS AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
ALERT	83N	298								C	A	A	B	C	C	C			
HEISS ISLAND	81N	58									C	B	C						
CAPE CHELYUSKIN	78N	104								C	A	C	C	A	A	A			
VOSTOK	78N	107											A						
THULE	77N	291								C	A	C	A	C					
MOULD BAY	76N	241								C	A	A	C	B	C				
RESOLUTE BAY	75N	265								C	A	B	C	C	C	C			
DIXON	74N	80								C	A	C	C	A	A	A	C	C	
BARROW	72N	204								C	A	A	B	A	A	A	C	C	
TIXIE BAY	72N	129								C	A		C	A		A		C	
GODHAVN	69N	306								C	A	C	C	C	C	C			
MURMANSK	69N	33								C	A	A		C					
ABISKO	68N	19												A	A	A	C		
KIRUNA	68N	21						C	B	C	A	B				C			
SODANKYLA	67N	27										B	A	C				C	
CAPE WELLEN	66N	190								C	A		C	A	A	A			
COLLEGE	65N	212						C	B	B	A	A	A	A	A	A		C	
SUKKERTOPPEN	65N	307									C	C							
BAKER LAKE	64N	264								C	A	B	B	B					
LEIRVOGUR	64N	338						C	B	C	A	A	A	A	A	A		C	
YAKUTSK	62N	130								C	A	B	B	C	C	C			
NARSSARSSUAQ	61N	315												A	A	A	C	C	
NURMIJARVI	61N	25								C	A	A	B	B		C			
LENINGRAD	60N	31										C							
LERWICK	60N	359								C	A	C				C			
FORT CHURCHILL	59N	266								C	A	C	C	A	A	A	C	C	
LOVO	59N	18								C	A	C							
SITKA	57N	225								B	A	A	A	A	A	C		C	
SVERDLOVSK	57N	61								C	A	A	C	C	C	C			
GREAT WHALE	55N	282									C	A	A	A	A	A		C	
MEANOOK	55N	247								C	A	A	A	B		C			
RUDE SKOV	55N	12								C		C		C					
IRKUTSK	52N	104								C	A	B	B	B	C				
HARTLAND	51N	356								B	A	A	B						
VICTORIA	49N	237								A	A	C							
FURSTENFELDBRUCK	48N	11								C	A	A	B	C	C	C			
NEWPORT	48N	243										B	A	A	A				
ST JOHNS	48N	307													C				
ODESSA	47N	31									B	B	C	C	C				
YUZHNO SAKHALINSK	47N	143										C							
OTTAWA	45N	284														C			
SURLARI	45N	26					C			C	C								
MEMAMBETSU	44N	144								C	A	B							
VLADIVOSTOK	43N	132														C			
LOGRONO	42N	358										C							
TBILISI	42N	45											C	C					
EBRO	41N	0										B							
TASHKENT	41N	69								C	A	A	A	B					
BOULDER	40N	255								C			A	A	A				
TOLEDO	40N	356								C	A	C	C	C	C				

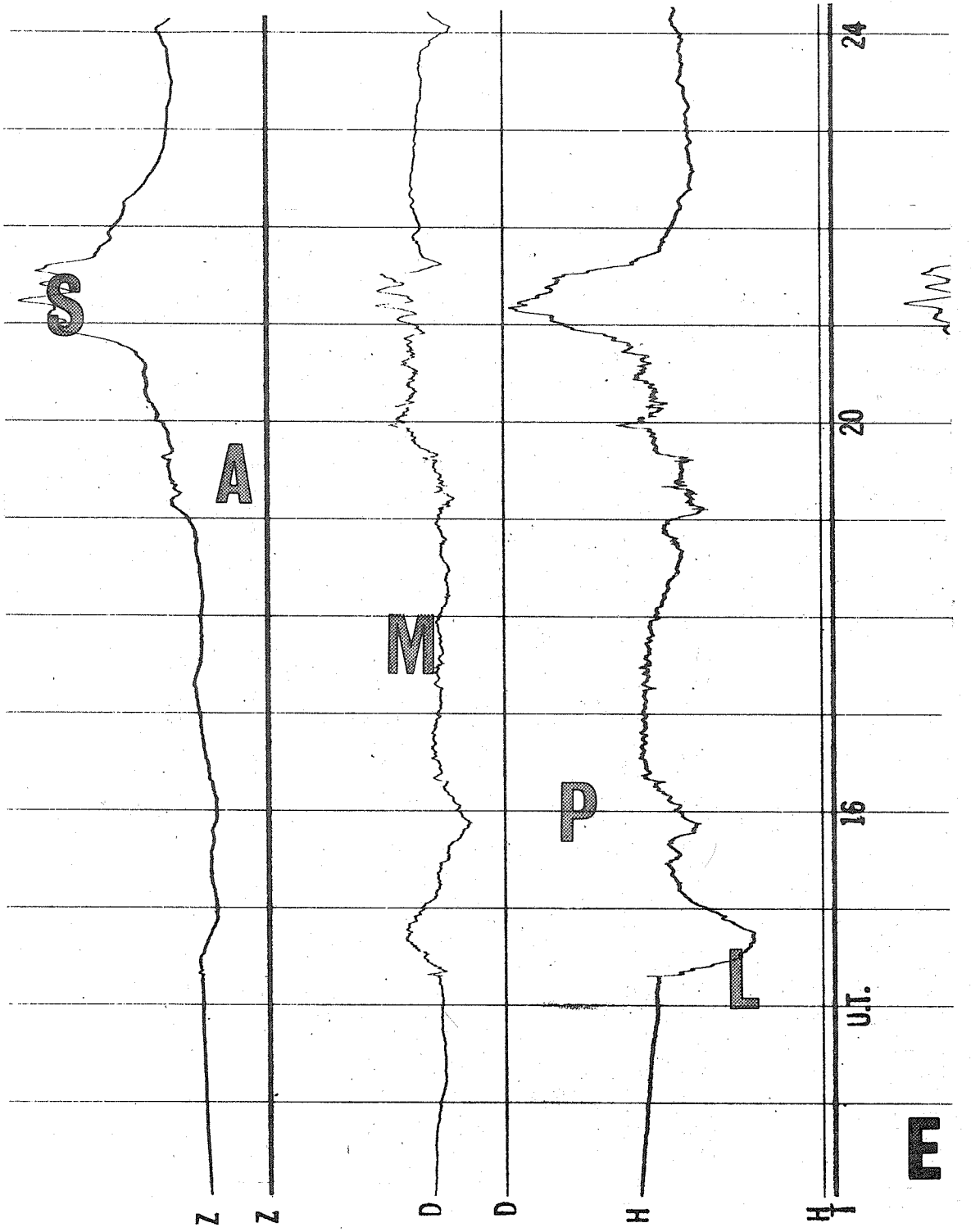
Continued

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

D.1



FREDERICKSBURG STORM MAGNETOGRAPH SUN MAR 0 8 1970

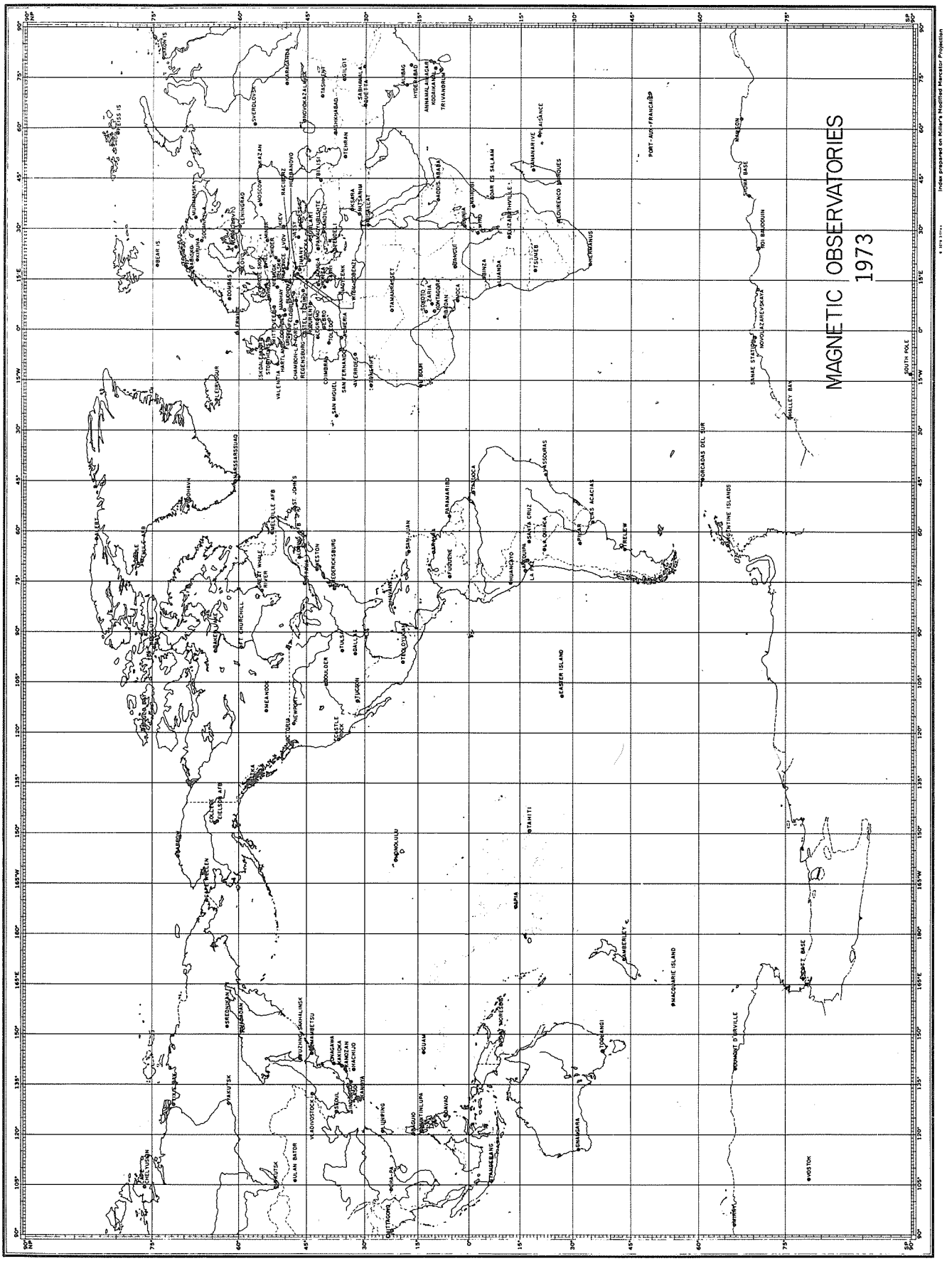
AT BOULDER·

STATION	GEOGRAPHIC LAT	LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
FREDERICKSBURG	38N	283					C		C	A	A	A	A	A	A	C	C		C
SAN MIGUEL	38N	334									C								
ALMERIA	37N	358										C							
CASTLE ROCK	37N	248														B	A	A	
KAKIOKA	35N	140					C			A	A	A	A	A	A				
SAN FERNANDO	36N	354										C							
TEHRAN	36N	51										C							
DALLAS	33N	263								C	A	C	A	A	A	A	B		
TUCSON	32N	249					C			A	A	A	A	A	A	C			
KANOYA	31N	131										C							
MISALLAT	30N	31								C	A								
TENERIFE	28N	344								C	B	C							
HAVANA	23N	278											C	C					
HONOLULU	21N	202					C		B	A	A	A	A	A	A	C			
ALIBAG	19N	73								B		C							
SAN JUAN	18N	294					C	C	A	A	A	A	A	A	A	C			
HYDERABAD	17N	79									A	C		B					
BAGUIO	16N	121										C	C	C					
GUAM	14N	145					C	C	B	A	A	A	A	B	A	C			
MBOUR	14N	343									C	A	A	A	C	C			
MUNTINLUPA	14N	121								C	A								
ANNAMALAINAGAR	11N	80											C						
ADDIS ABABA	09N	39								C	A								
IBADAN	07N	4									C								
KOROR	07N	135								B	A	C							
PARAMARIBO	05N	305								C	A	B	C	C	C				
BANGUI	05N	19					C				C	C	B	C	C	C			
FUQUENE	05N	286					C			A	A	B	C	C	C				
MOCA	03N	9								A	A	B	C	C	C				
NAIROBI	01S	37								C	A	C	C						
TATUOCA	01S	311								C	A								
TANGERANG	06S	107										C	B		C				
PORT MORESBY	09S	147					C			C	A	A	B	C	C	C			
HUANCAYO	12S	285								A	A	A	C	C	C				
APIA	14S	188							B	B	A								
TAHITI	18S	210										C		C	C	C			
TANANARIVE	19S	48									C	A	C	C	C	C			
LA QUIACA	22S	294										C							
EASTER ISLAND	27S	251								C									
GNANGARA	32S	116					C			A	A	A	A	B	C	C			
PILAR	32S	296								C	B	A	B	B					
HERMANUS	34S	19							B	A	A	A	A	A	C	C			
TOOLANGI	38S	145					C			C	A	A	B	B	C	C			
AMBERLEY	43S	173								B	C								
TRELEW	43S	295								C	A	A	A	C					
PORT AUX FRANCAIS	49S	70									C	B							
MACQUARIE ISLAND	55S	159						C	B	C	A	C	C	C					
WILKES	66S	112					C			C	A	C							
DUMONT D URVILLE	67S	140								C	A								
MIRNY	67S	93								C			C						
MAWSON	68S	63								C	B	C							
ROI BAUDOIN	70S	23										C							
EIGHTS	75S	283								C	B								
BYRD	80S	240							A	A	A		B	B					
SOUTH POLE	90S	0						C	B	B	A	A	A	A	A	A	A		

NOTE:

The 2.5 minute values for observatories listed in this catalogue were scaled from the magnetograms by means of a semi-automatic scaling machine and are stored on magnetic tape. Hourly values computed from these 2.5 minute values are also available. The cost of copying these data will be furnished on request.

D.1


MAGNETIC OBSERVATORIES
1973
Index prepared on Hillaire Modified Mercator Projection

D.1 HOURLY VALUES ON MAGNETIC TAPE

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
ALERT	83N	298							C	C	A	A	A	B	B	C			
HEISS IS	81N	58	B	A	A						C	B	C						
MURCHISON BAY	80N	18	C	A	B														
CAPE CHELYUSKIN	78N	104	B	A	A					C	A	C	C	A	A	A			
THULE	77N	291	B	A	A					C	A	C	A	C					
MOULD BAY	75N	241						C	A	C	A	A	A	A	B				
RESOLUTE BAY	75N	265	B	A	A	A	A	A	A	C	A	A	A	A	A	C			
DIXON	74N	80	B	A	A					C	A		C	A	A	A	C		
BARROW	72N	204								C	A	A	A	A	A	A	A	A	B
TIXIE BAY	72N	129	B	A	A					C	A	C	C	A		A			
TROMSO	70N	19	B	A	A														
GODHAVN	69N	306	B	A	A					C	A	C	C	C	C	C			
MURMANSK	69N	33		B	A					C	A	A		C					
ABISKO	68N	19												A	A	A	C	C	
KIKUNA	68N	21						C	B	C	A	B				C			
SODANKYLA	67N	27	A	A	A	A	A	A	A	A	A	A	A	C				C	
CAPE WELLEN	66N	190	B	A	A					C	A		C	A	A	A			
COLLEGE	65N	212	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
SUKKERTOPPEN	65N	307									C	C							
BAKER LAKE	64N	264	B	A	A	A	A	A	A	A	A	B	A	A	B				
BIG DELTA	64N	214	B	A	S														
HEALY	64N	211	B	A															
LEIRVOGUR	64N	338						C	B	C	A	A	A	A	A	A		C	
DOMBAS	62N	9	B	A	A														
YAKUTSK	62N	130	B	A	A					C	A	B	B	C	C	C			
ANCHORAGE	61N	210	B	A															
NARASSARSSUAQ	61N	315												A	A	A	C	C	
NURMIJARVI	61N	25	A	A	A	A	A	A	A	A	A	A	B	B	A	C			
LENINGRAD	60N	31	B	A	A							C							
LERWICK	60N	359	B	A	A					C	A	C				C			
FORT CHURCHILL	59N	266	B	A						C	A	C	C	A	A	A	C	C	
LOVO	59N	18	B	A	A					C	A	A	A	A	A	A			
SITKA	57N	225	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
SVERDLOVSK	57N	61	B	A	A					C	A	A	C	C	C	C			
KAZAN	56N	49	B	A	A														
ESKDALEMUIR	55N	357	B	A	A														
GREAT WHALE	55N	282									C	A	A	A	A	A		C	
MEANOOK	55N	247	B	A	A					C	A	A	A	A	B	C			
MOSCOW	55N	37	B	A	A														
RUDE SKOV	55N	12	B	A	A					C		C		C		C			
WINGST	54N	9	B	A	A														
BELSK	52N	21														A	A		
IRKUTSK	52N	104	B	A	A					C	A	B	B	B	C				
NIEMEGK	52N	13	B	A	A														
SWIDER	52N	21	B	A	A														
VALENTIA	52N	350	B	A	A														
HARTLAND	51N	356	B	A	A					B	A	A	B						
DOURBES	50N	5	B	A	A														
LVOV	50N	24	B	A	A														
PRUHONICE	50N	15	B	A	A														

D.1 HOURLY VALUES ON MAGNETIC TAPE Cont'd.

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
VICTORIA	49N	237	B	A	A					A	A	C							
FURSTENFELDBRUCK	48N	11	B	A	A					C	A	A	B	C	C	C			
HURBANOVO	48N	18	B	A	A														
NEWPORT	48N	243										B	A	A	A	A	A	B	B
ST JOHNS	48N	307												C	A				
WIEN-KOBENZL	48N	16	B	A	A														
ODESSA	47N	31	B	A	A						B	B	C	C	C				
TIHANY	47N	18	B	A	A														
YUZHNO-SAKHALINSK	47N	143	B	A	A							C							
OTTAWA	45N	284													A	C			
SURLARI	45N	26	B	A	A		C			C	C								
AGINCOURT	44N	281	B	A	A							A	A	A	C	S			
CASTELLACCIO	44N	9	B	A	A														
MEMAMBETSU	44N	144	B	A	A					C	A	B							
MONTE CAPELLINO	44N	9		B	A														
VLADIVOSTOK	43N	132	B	A	A											C			
LOGRONO	42N	358	B	A	A							C							
TBILISI	42N	45	B	A	A								C	C					
EBRO	41N	0	C	A	A							B							
TASHKENT	41N	69	B	A	A					C	A	A	A	B		C			
BOULDER	40N	255								C			A	A	A	A	A	A	B
TOLEDO	40N	356	B	A	A					C	A	C	C	C	C				
BELOIT	39N	262	B	A	S														
FREDERICKSBURG	38N	283	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
MISALLAT	38N	31								C	A								
SAN MIGUEL	38N	334									C								
ALMERIA	37N	358	B	A	A							C							
CASTLE ROCK	37N	248														B	A	A	
KAKIOKA	36N	140	A	A	A		A			A	A	A	A	A	A				
SAN FERNANDO	36N	354	B	A	A							C							
TEHRAN	36N	51										C							
SIMOSATO	34N	136	B	A	A														
ASO	33N	131	B	A	A														
DALLAS	33N	263								A	A	C	A	A	A	A	A	A	B
TUCSON	32N	249	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
KANOYA	31N	131										C							
HELWAN	30N	31	B	A	A	S													
TENERIFE	28N	344								C	B	C							
HAVANA	23N	278											C	C					
CHA-PA	22N	104	C	A	A														
HONOLULU	21N	202	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
ALIBAG	19N	73	B	A	A		A			A		C							
SAN JUAN	18N	294	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
HYDERABAD	17N	79									A	C		B					
BAGUIO	16N	121										C	C	C					
GUAM	14N	145	B	A	A	A	A	A	B	A	A	A	A	B	A	A	A	A	B
M BOUR	14N	343	B	A	A		A				C	A	A	A	C	C			
MUNTINLUPA	14N	121	B	A	A					C	A								
ANNAMALAINAGAR	11N	80											C						
KODAIKANAL	10N	77	B	A	A														

D.1 HOURLY VALUES ON MAGNETIC TAPE Cont'd.

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
ADDIS ABABA	09N	39		A	A					C	A								
TRIVANDRUM	09N	77	C	A	A														
IBADAN	07N	4	B	A	A						C								
KOROR	07N	135	B	A						B	A	C							
PARAMARIBO	06N	305								C	A	B	C	C	C				
BANGUI	05N	19	B	A	A		C				C	C	B	C	C	C			
FUQUENE	05N	286					C			A	A	B	C	C	C				
FANNING ISLAND	04N	201	B	A															
MOCA	03N	9								A	A	B	C	C	C				
JARVIS ISLAND	00	200	C	A															
NAIROBI	01S	37								C	A	C	C						
TATUOCA	01S	311	C	A	A					C	A								
HOLLANDIA	03S	141	B	A	A			S											
TALARA	05S	279		B	A														
TANGERANG	06S	107	B	A	A							C	B		C				
LUANDA	09S	13	C	A															
PORT MORESBY	09S	147					C			C	A	A	B	C	C	C			
HUANCAYO	12S	285	B	A	A					A	A	A	C	C	C				
APIA	14S	188	B	A	A		A		A	B	A								
TAHITI	18S	211										C		C	C	C			
TANANARIVE	19S	48	B	A	A						C	A	C	C	C	C			
TSUMEB	19S	18								C	A								
LA QUIACA	22S	294										C							
VASSOURAS	22S	316	B	A	A														
EASTER ISLAND	27S	251								C									
GNANGARA	32S	116			C		C			A	A	A	A	B	C	C			
PILAR	32S	296					A			C	B	A	B	B					
WATHEROO	32S	116	A	A	S														
HERMANUS	34S	19	A	A	A	A	A	A	A	A	A	A	A	A	C	B			
AMBERLEY	43S	173	B	A	A					B	B								
TRELEW	43S	295	C	A	A					C	A	A	A	C					
TOOLANGI	38S	145	A	A			C			C	A	A	B	B	C	C			
PORT-AUX-FRANCAIS	49S	70					A	A	A	A	A	B							
MACQUARIE IS	55S	159		A				C	B	C	A	C	C	C					
ARGENTINE IS	65S	296	A	A	A	A	A	A	A	A	A	A	A						
OASIS	66S	101	B	B															
WILKES	66S	112	B	A			C			C	A	C							
DUMONT D URVILLE	67S	140								C	A								
MIRNY	67S	93	B	A	A					C			C						
MAWSON	68S	63								C	B	C							
ROI BAUDOUIN	70S	23										C							
EIGHTS	75S	283								C	B								
HALLEY BAY	76S	333	A	A	A	A	A	A	A	A									
LITTLE AMERICA	78S	198	B	A															
SCOTT BASE	78S	167	B	A															
PLATEAU	79S	40										A	A	B	S				
VOSTOK	79S	107		A	A								A						
BYRD	80S	240	C	A	A	A	A	A	A	A	A		B	B					
SOUTH POLE	90S	0			A	A	A	B	B	B	A	A	A	A	A	A	A	A	

D.1 DAILY MEANS ON MAGNETIC TAPE

Abinger	D	1/77-12/57*
	H	1/26-12/57
	Z	6/21-12/57
Agincourt	D	1/03-12/39
	H	1/03-12/39
	Z	9/14-12/39
Alibag	D	1/06-12/46
	H	1/06-12/46
	Z	1/21-12/46
Amberley	D	1/19-12/60
	H	1/19-12/60
	Z	1/23-12/60
Apia	D	1/31-12/60
	H	1/31-12/60
	Z	7/34-12/60
Chambon-La-Foret	D	1/83-12/56*
	H	1/83-12/56*
	Z	1/83-12/56*
Cheltenham	D	7/01-12/55
	H	7/01-12/55
	Z	7/01-12/55
Eskdalemuir	D	1/11-12/60
	H	1/11-12/60
	Z	1/14-12/60
Fredericksburg	D	1/57-12/63
	H	1/57-12/63
	Z	1/57-12/63
Godhavn	D	1/27-12/58
	H	1/27-12/58
	Z	1/27-12/58
Hermanus	D	8/32-12/58
	H	8/32-12/58
	Z	8/32-12/58
Honolulu	D	1/02-12/61
	H	1/02-12/61
	Z	1/05-12/61
Huancayo	D	5/22-12/47
	H	5/22-12/47
	Z	5/22-12/47
Lerwick	D	1/26-12/60
	H	1/26-12/60
	Z	1/26-12/60
Lovo	D	2/28-12/59
	H	10/28-12/59
	Z	2/29-12/59
Niemegk	D	1/90-12/44*
	H	1/90-12/44*
Oslo	D	7/42-12/30*
	H	1/43- 6/76*
	H	3/78-12/30*
Rude Skov	D	6/07-12/61
	H	6/07-12/61
	Z	6/07-12/61
San Fernando	D	1/91-12/58
	H	1/91-12/58
San Juan	D	2/28-12/61
	H	10/28-12/61
	Z	10/28-12/61
Sitka	D	4/02-12/61
	H	1/02-12/61
	Z	3/05-12/61
Sodankyla	D	1/14-12/44
	H	1/14-12/44
	Z	1/14-12/44
Tucson	D	1/09-12/61
	H	1/09-12/61
	Z	1/09-12/61
Watheroo	D	1/19-12/47
	H	1/19-12/47
	Z	1/19-12/47
Witteveen	D	1/03-12/57
	H	1/03-12/57
	Z	1/03-12/57

* Observations began in 19th century.

COLLEGE

HORIZONTAL INTENSITY = 12000 plus tabular values, in gammas

DECEMBER 1963

Tabular values are averages for successive hourly periods beginning at midnight, 150th West Meridian Time.

Quiet (Q) and stormy (S) days are based on Universal Time.

( ) Interpolated
[ ] Significant portion of hour interpolated.
□ No record; or no values available because of faulty record.
[ ] Scaling uncertain because of magnetic storm.
△ Record off sheet for part or all of hour; if value is given, curve was estimated for missing part.

DAY	C	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN	SUM
1	0	827	829	826	808	821	771	820	831	824	829	831	831	827	82[illegible]	[illegible]	839	842	844	838	841	863	915	872	841	835	20029
2	1	835	837	820	797	456	578	760	795	800	830	837	839	840	843	841	842	829	854	891	852	858	813	840	874	807	19361
S 3	1	535	389	208	218	497	682	735	722	771	753	829	830	846	825	832	837	846	838	858	847	885	849	824	777	718	17233
S 4	1	733	642	483	628	702	593	658	667	830	830	807	775	788	882	936	855	847	872	836	838	869	871	828	662	768	18432
S 5	1	701	761	714	270	289	616	680	815	794	783	840	789	802	841	834	851	858	858	851	861	837	837	862	831	757	18175
S 6	1	841	697	299	597	567	794	787	792	756	774	811	823	827	845	836	833	833	856	853	857	850	861	815	662	769	18466
7	1	675	594	336	716	686	692	810	866	843	831	819	817	817	823	823	835	842	845	827	832	872	908	931	810	785	18850
8	1	735	719	431	633	730	684	765	831	828	836	829	822	830	836	836	835	839	836	836	822	828	803	823	597	774	18564
9	1	602	740	686	618	713	822	837	844	839	837	837	836	832	830	835	835	833	835	835	834	830	830	830	830	800	19200
Q 10	0	831	833	832	834	832	834	833	832	832	831	828	830	832	833	836	838	838	837	834	831	831	831	830	825	832	19978
Q 11	0	821	814	833	836	836	834	833	832	83[illegible]	[illegible]	832	832	831	832	831	831	832	831	831	826	824	822	832	831	830	19918
12	0	830	830	832	829	826	830	830	831	831	[illegible]	833	839	840	824	820	837	843	838	849	854	865	864	843	834	837	20088
13	0	834	835	823	815	770	818	842	833	85[illegible]	[illegible]	822	823	830	832	831	835	834	829	835	839	842	854	886	887	834	20005
14	1	865	846	606	664	447	522	832	846	8[illegible]	[illegible]	837	840	850	836	837	836	838	829	833	839	855	847	848	861	794	19056
15	0	838	820	751	811	812	796	820	823	835	831	835	832	830	830	829	831	835	838	838	838	837	831	835	838	826	19814
16	0	834	828	817	821	824	821	839	824	818	827	831	830	828	819	825	837	837	837	837	838	836	829	827	827	829	19891
17	0	827	824	829	828	813	821	821	828	828	823	821	829	837	837	836	837	839	837	837	837	837	836	836	837	831	19935
Q 18	0	836	840	842	835	836	836	831	830	830	831	833	830	831	831	836	834	837	838	836	836	836	836	833	833	834	20027
19	0	833	834	836	838	836	840	829	827	830	828	834	835	805	805	835	836	843	850	843	857	913	901	892	828	842	20209
S 20	1	774	697	496	333	611	814	820	813	836	807	746	818	830	824	828	839	841	835	839	835	832	835	846	850	775	18599
21	1	832	826	783	599	751	801	827	818	820	826	826	830	814	809	833	838	836	840	833	834	870	869	841	793	815	19549
22	1	699	670	538	246	736	822	851	827	809	814	845	838	823	829	845	843	837	841	833	832	827	840	858	792	779	18695
23	1	837	826	819	827	830	812	742	710	818	830	844	830	825	816	826	821	835	833	834	833	832	830	828	826	819	19664
24	0	826	827	809	[illegible]	[illegible]	842	826	791	832	838	822	828	827	835	834	833	834	834	834	834	827	830	822	792	820	19677
Q 25	0	609	814	810	821	[illegible]	835	835	833	834	834	834	831	829	828	833	834	834	833	828	829	834	836	831	827	821	19700
26	0	819	817	822	821	815	800	830	836	835	832	829	827	821	821	825	834	839	830	835	836	832	836	835	835	828	19862
27	0	829	826	771	786	829	844	843	836	836	830	833	830	832	833	833	832	836	839	838	839	843	840	843	840	831	19941
28	0	838	834	833	829	804	811	827	834	836	841	820	832	836	837	841	840	841	844	850	846	847	837	851	841	835	20050
29	1	825	584	427	433	587	655	566	765	828	858	844	834	818	823	851	846	853	859	839	840	836	834	836	836	762	18277
30	0	836	824	826	811	749	772	836	829	829	830	829	827	824	819	834	844	842	839	841	835	833	835	833	847	826	19824
Q 31	0	832	829	826	813	836	834	829	829	829	829	829	829	829	829	834	836	840	842	842	837	835	842	840	839	833	19989
MEAN ALL DAYS		787	771	696	692	724	769	800	813	824	824	827	827	827	830	837	837	839	841	840	839	846	845	844	813	808	
MEAN 5 QUIET DAYS (Q)		786	826	829	828	835	835	832	831	831	831	831	830	830	831	834	837	837	836	836	834	832	832	830	826	830	
MEAN 5 STORMY DAYS (S)		717	637	440	409	533	700	736	762	797	789	807	807	819	839 843	856 853	844	845	854	856	851	872	854	849	794	761	

SUM ALL DAYS	(LAST FOUR DIGITS ONLY)						GRAND SUM
	4389	3886	1564	1441	2449	3826	4794	5190	5530	5539	5647	5636	5631	5731	5942	5954	6013	6071	6044	6009	6216	6202	6151	5203	601058

D.1 PUBLICATIONS OF MAGNETIC HOURLY VALUES

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
ALERT	83N	298					A	A		A	A	A	A	A	A				
THULE	77N	291	A	A	A	A	A	A	A	A	A	A							
MOULD BAY	76N	241								A	A	A	A	A	A				
RESOLUTE BAY	75N	265	A	A	A	A	A	A		A	A	A	A	A	A				
TROMSO	70N	19	A	A	A	A	A	A	A	A	A			A	A				
GODHAVN	69N	306	A	A	A	A	A	A	A	A	A	A							
SODANKYLA	67N	27	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
COLLEGE	65N	212	A	A	A	A	A	A	A										
BAKER LAKE	64N	264	A	A	A	A	A	A		A	A	A	A	A	A				
BIG DELTA	64N	214	B	A	S														
HEALY	64N	211	B	A	S														
LEIRVOGUR	64N	338	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
DOMBAS	62N	9	A	A	A	A	A	A	A	A	A	A	A	A	A				
YELLOWKNIFE	62N	246	B	B															
LERWICK	60N	359	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
FORT CHURCHILL	59N	266	A	A						A	A	A	A	A	A				
LOVO	59N	18	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
SITKA	57N	225	A	A	A	A	A	A	A										
ESKDALEMUIR	55N	357	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
GREAT WHALE	55N	282											A	A	A				
MEANOOK	55N	247	A	A	A	A	A	A	A	A	A	A	A	A	A				
RUDE SKOV	55N	12	A	A	A	A	A	A	A	A	A	A	A						
STONYHURST	54N	358					A	A	A	A	A	A	A						
WINGST	54N	9	A	A	A	A	A	A	A	A	A	A	A	A	A				
WITTEVEEN	53N	7	A	A	A	A	A	A	A	A	A	A	A						
BELSK	52N	21										A	A	A	A	A	A		
NIEMEGK	52N	13	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
SWIDER	52N	21	A	A	A	A	A	A	A	A	A	A							
VALENTIA	52N	350	A	A	A	A	A	A	A	A	A	A	A	A	A				
HARTLAND	51N	356	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
DOURBES	50N	5	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
KIEV	50N	31													A				
LVOV	50N	24												A					
PRUHONICE	50N	15	A	A	A	A	A	A	A	A		A							
VICTORIA	49N	237	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
CHAMBON-LA-FORET	48N	2	A	A	A	A	A	A	A	A									
FURSTENFELD BRUCK	48N	11	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
HURBANOVO	48N	18	A	A	A	A	A	A	A	A	A	A	A	A					
WIEN-KOBENZL	48N	16	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
ODESSA	47N	31												A					
TIHANY	47N	18	A	A	A	A	A	A	A	A	A	A	A	A					
SURLARI	45N	26							A	A	A	A							
AGINCOURT	44N	281	A	A	A	A	A	A	A	A	A	A	A	A	S				
CASTELLACCIO	44N	9	A	A	A	A	A	A											
MEMAMBETSU	44N	144	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
MONTE CAPELLINO	44N	9	A	A	A	A	A	A											
ROBURENT	44N	8								C	A	A	A	A	A	A	A	A	
PANAGYURISHTE	43N	24					A	A	A	A	A		A	A	A	A	A		
L AQUILA	42N	13				A	A	A	A	A	A	A	A	A					
LOGRONO	42N	358	A	A	A	A	A	A	A	A	A	A	A	A	A	A			

VERTICAL COMPONENT OF TERRESTRIAL MAGNETIC FIELD

MEAN VALUES FOR PERIODS OF SIXTY MINUTES
UNCORRECTED FOR NON - CYCLIC VARIATIONS

Z 4 — $Z = 600_{\gamma}S$ (0.006 C.G.S. UNIT) + ... — APRIL 1964

U.T. / DATE	0 1	1 2	2 3	3 4	4 5	5 6	6 7	7 8	8 9	9 10	10 11	11 12	12 13	13 14	14 15	15 16	16 17	17 18	18 19	19 20	20 21	21 22	22 23	23 24	R
1D	038	038	039	039	037	032	029	024	028	030	033	037	039	042	047	044	042	037	040	040	041	044	042	044	074
2D	044	043	044	041	042	043	044	044	043	041	047	051	050	048	040	042	042	042	042	042	042	043	043	043	016
3	044	046	046	046	044	048	041	036	036	037	040	039	035	034	035	039	039	039	039	039	039	040	039	039	017
4	039	040	040	041	038	032	028	028	027	027	028	035	039	040	039	040	041	040	040	040	040	040	040	040	017
5	041	042	043	043	043	040	037	035	038	039	036	037	039	035	039	040	040	039	039	039	038	038	039	039	013
6	039	040	040	040	038	037	038	039	042	039	038	039	038	039	041	042	042	042	041	041	041	042	042	042	009
7	043	043	043	043	043	041	037	036	037	041	039	039	039	042	041	043	042	041	040	039	039	040	042	042	012
8	042	043	043	043	044	044	039	039	043	045	043	041	038	036	039	039	040	039	039	039	038	039	039	039	012
9	039	040	040	041	041	041	041	038	039	034	034	030	029	029	028	033	036	036	036	037	037	037	037	037	012
10	039	039	040	039	035	028	024	023	027	027	027	029	035	035	035	041	041	039	038	038	038	038	038	038	020
11	038	038	039	035	032	031	036	041	046	048	050	050	052	054											
12Q								036	042	045	039	042	042	040	041	043	042	042	041	041	041	042	042	042	
13	043	044	044	043	043	043	044	043	043	042	040	043	043	042	042	044	045	044	044	044	044	043	044	045	008
14Q	046	047	048	046	043	042	039	039	041	042	046	044	041	039	040	043	044	044	044	043	043	043	044	045	012
15	043	044	044	042	040	039	034	037	040	047	050	050	050	048	046	042	042	041	040	040	040	040	040	041	021
16	042	042	043	043	043	040	034	036	039	037	036	037	039	039	041	041	041	040	040	041	040	040	041	042	011
17	041	042	043	043	043	038	031	032	039	040	038	042	036	037	041	042	042	042	041	041	041	041	042	042	031
18	041	041	042	042	045	042	033	035	035	033	028	031	035	035	035	035	035	035	034	035	036	036	036	037	020
19D	037	037	038	037	036	037	036	037	038	039	039	042	040	040	040	040	039	039	039	039	039	039	039	040	013
20	039	039	040	040	043	046	040	036	036	035	032	030	032	032	033	037	038	038	038	039	039	039	039	040	020
21	039	040	041	039	040	038	036	036	037	038	038	038	038	038	039	041	041	040	041	041	041	041	041	042	009
22Q	042	043	044	045	046	040	036	036	032	029	030	032	034	035	038	040	040	039	038	038	038	038	039	039	019
23Q	039	039	039	039	040	036	038	039	039	036	034	038	042	041	041	043	043	043	042	042	042	042	043	043	021
24Q	045	046	047	045	042	039	035	035	035	032	032	035	043	043	043	043	044	043	043	043	043	043	044	045	017
25	045	046	046	043	043	048	041	041	039	036	036	041	041	042	042	043	043	042	041	040	041	042	042	042	017
26	044	045	045	045	049	051	047	044	041	038	036	036	037	038	038	042	042	042	042	041	041	041	042	042	021
27D	042	043	044	043	049	049	042	039	037	036	037	036	036	036	038	038	038	037	036	036	036	038	038	038	019
28D	039	039	041	039	042	041	035	038	035	036	033	036	038	037	036	037	037	036	035	035	035	035	035	036	018
29	037	037	040	039	039	0	027	028	026	023	025	028	025	025	029	032	032	031	030	032	032	032	032	033	021
30	033	034	035	037	042	0																			
MEAN	041	042	042	042	042	040	037	036	037	037	037	038	039	039	039	040	041	040	039	040	040	040	040	041	016
Q	043	044	045	044	043	039	037	037	038	037	036	038	040	040	041	042	043	042	042	041	041	041	042	043	017
D	041	041	042	041	043	042	039	038	037	037	039	041	041	041	040	040	040	038	038	038	039	040	039	040	018

D.1 PUBLICATIONS OF MAGNETIC HOURLY VALUES Cont'd.

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
TBILISI	42N	45			A														
CAPRI	41N	14	A	A	A		A	A	A	A	A	A	A						
EBRO	41N	0	A	A	A														
KANDILLI	41N	29	A	A	A														
COIMBRA	40N	352	A	A	A	A	A	A	A	A	A	A	A						
TOLEDO	40N	356	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
BELOIT	39N	262	B	A	S														
FREDERICKSBURG	38N	283	A	A	A	A	A	A	A										
ALMERIA	37N	358	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
KAKIOKA	36N	140	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
SAN FERNANDO	36N	354	A	A	A	A	A	A	A	A	A	A	A	A					
TEHRAN	36N	51									A	A	A	A	A	A			
KANOZAN	35N	140												A		A			
SIMOSATO	34N	136	A	A	A	A	A	A	A	A	A	A	A	A	A				
AVERROES	33N	353															A		
NITSANIM	32N	35											A						
TUCSON	32N	249	A	A	A	A	A	A	A										
KANOYA	31N	131		A	A	A	A	A	A	A	A	A	A	A	A		A		
HELWAN	30N	31	A	A	A	S													
SABHAWALA	30N	78								A	A	A	A	A			A		
TENERIFE	28N	344					A	A	A	A	A		A	A	A	A			
LUNPING	25N	121									A	A	A	A	A				
CHA-PA	22N	104	A	A	A														
HONOLULU	21N	202	A	A	A	A	A	A	A										
TEOLOYUCAN	20N	261									A	A	A	A	A	A	A		
ALIBAG	19N	73	A	A	A		A	A	A	A	A	A	A	A	A	A	A		
SAN JUAN	18N	294	A	A	A	A	A	A											
HYDERABAD	17N	79									A	A	A	A	A	A	A		
GUAM	14N	145	B	A	A	A	A	A											
M BOUR	14N	343	A	A	A	A	A	A	A	A									
MUNTINLUPA	14N	121	A	A	A	A	A	A											
ANNAMALAINAGAR	11N	80	C	A	A		A	A	A	A	A	A	A	A	A	A	A		
KODAIKANAL	10N	77	A	A	A	A	A	A		A	A	B	A		B	A	A		
ADDIS ABABA	09N	39		A	A	A				A									
TRIVANDRUM	09N	77	C	A	A		A	A	A	A	A	A	A	A	A	A	A		
KOROR	07N	135	B	A	S														
PARAMARIBO	06N	305		A	A	A	A	A	A	A	A	A	A						
BANGUI	05N	19	A	A	A	A	A	A	A	A									
FANNING	04N	201	C	A	S														
MOCA	03N	9		A	A	A	A	A	A	A	A	A	A	A	A	A			
ANCHORAGE	01N	210	B	A															
NURMIJARVI	01N	25	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
JARVIS ISLAND	00	200	C	A	C	S													
NAIROBI	01S	37															A		
TATUOCA	01S	311	A	A	A	A	A	A											
LWIRO	02S	29		B	A	A	B		B	B	B	A	A	A	A	A			
HOLLANDIA	03S	141	A	A	A	A	A	A	S										
KUYPER	05S	107	A	A	A	A	A	C	S										
TANGERANG	06S	107								A	A	A	B	A	A	A			
LUANDA	09S	13	A	A				A	A	A	A	A	A	A	A	A			

ALIBAG D 1969

HOURLY AVERAGES CENTRED AT HALF HOURS UT

IUARY

0 DEGREES PLUS TABULAR VALUES IN TENTHS OF MINUTE WESTERLY

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	DMN	RNG	TMAX	MAX	TMIN	MIN		DAY
												HOURS UT																				
537	539	537	526	520	526	532	532	529	530	529	535	535	532	530	533	531	530	529	532	533	535	537	538		532	19	0432	518	0132	540		1
539	538	537	530	527	532	536	538	536	537	534	535	537	536	534	534	534	534	534	534	535	536	538			535	12	0426	526	0050	539		2
539	538	537	530	525	525	529	533	538	534	528	530	533	533	532	533	533	534	534	536	536	539	541			534	16	0508	524	2346	541	Q	3
541	539	530	518	521	534	539	538	535	532	526	523	532	533	530	532	534	534	535	535	536	536	538			533	23	0342	516	0012	541		4
539	539	541	536	533	536	538	541	538	534	525	518	527	531	532	533	535	535	534	535	535	536	537	538		535	23	1124	517	0708	542		5
538	535	527	520	527	546	555	555	548	538	527	521	529	533	531	532	534	536	535	536	537	537	537	538		535	35	0346	519	0648	556	Q	6
538	538	539	535	534	551	569	571	558	544	537	532	539	539	534	533	532	530	528	526	526	530	534	534		539	45	2024	524	0716	573		7
537	534	526	526	537	552	562	559	550	544	530	527	533	534	530	532	533	533	532	532	530	530	533	532		536	36	0304	521	0710	563		8
533	533	532	530	526	534	549	558	552	546	533	529	531	531	528	528	531	531	531	532	532	532	532	534		535	32	0452	524	0742	559		9
533	529	520	520	541	565	571	572	560	547	536	534	538	536	532	532	532	531	531	531	531	532	533	534		538	53	0304	516	0700	574	Q	10
533	532	530	519	515	527	542	563	565	556	543	531	531	533	528	530	533	533	532	532	534	534	535	535		535	50	0416	513	0754	569		11
536	536	529	523	526	541	552	552	549	546	538	535	539	538	531	531	531	530	529	531	532	532	533	533		536	30	0326	521	0624	554		12
534	534	528	521	524	536	549	555	551	540	527	520	524	529	528	529	531	532	533	533	535	535	536	537		533	36	1140	518	0732	557	Q	13
539	535	529	517	519	539	555	558	554	551	536	530	533	534	531	532	531	530	530	528	527	529	526	526		534	42	0414	514	0652	559		14
528	528	530	526	523	532	549	553	548	542	532	529	533	533	529	530	531	529	527	526	530	534	534	537		533	30	0444	521	0652	554	D	15
537	534	533	523	524	537	548	553	558	549	541	534	539	532	534	531	530	529	529	532	532	534	534	533		536	34	0352	521	0804	560		16
532	532	530	519	511	522	536	535	533	529	527	522	529	530	531	529	531	530	529	528	531	533	534	534		529	25	0414	510	0718	539	D	17
535	535	537	528	526	531	539	546	541	536	532	521	526	532	529	528	528	528	528	530	532	531	533	533		532	25	1146	514	0714	547	D	18
536	534	533	528	537	546	559	560	551	535	527	524	528	530	528	530	530	529	531	531	530	532	533	533		535	37	1106	523	0656	566		19
536	534	533	531	535	541	546	545	545	540	534	533	534	532	530	531	530	529	529	529	530	532	535	533		534	17	1819	527	0640	548		20
534	531	531	523	520	526	540	548	546	540	529	523	524	529	526	528	530	530	531	532	532	532	532	533		531	28	0732	518	0752	549		21
533	530	529	523	524	534	544	550	548	545	538	530	525	527	528	529	531	532	532	531	531	532	532	533		533	28	0408	521	0720	551		22
533	532	529	516	512	525	544	549	546	542	531	525	527	530	528	530	530	532	532	532	531	532	534	534		531	38	0412	511	0724	550		23
536	533	533	524	523	530	541	550	551	544	536	531	530	527	523	522	522	525	524	525	527	531	530	537		531	29	1550	519	0742	553		24
542	541	539	528	517	518	528	523	525	525	525	521	531	527	518	517	520	516	521	523	526	534	535	537		526	26	1252	513	0108	548	D	25
550	551	545	544	537	541	547	548	545	541	536	530	527	527	527	526	529	529	529	530	529	530	533	533		536	24	1536	524	0104	561	D	26
534	533	527	516	509	516	528	534	533	533	525	522	525	522	525	526	525	527	528	529	531	530	530	533		527	26	0452	507	0752	535		27
531	532	532	524	523	531	539	545	540	537	531	530	532	532	530	530	530	529	530	530	530	531	532	531		532	22	0336	523	0724	546		28
530	530	522	505	496	512	533	537	535	528	523	523	529	532	530	531	531	531	531	532	532	534	534	534		527	41	0424	494	0704	538	Q	29
537	533	530	522	524	535	544	548	550	545	540	534	536	535	530	530	530	530	531	531	531	531	530	530		534	29	0350	519	0810	552		30
531	530	524	512	516	524	533	536	530	522	518	516	525	527	527	524	524	527	531	533	533	533	532	531		527	27	0604	510	0933	537		31
536	535	532	524	524	534	544	548	545	539	531	527	531	532	529	530	530	530	530	531	531	533	534	534		533	24	MEAN ALL DAYS					
535	533	527	519	523	537	548	551	546	538	528	525	531	533	531	531	532	533	533	533	534	535	536	537		534	31	MEAN IQ DAYS					
538	537	536	529	523	529	540	541	535	530	525	527	528	527	526	527	526	527	527	530	532	534	535			531	19	MEAN ID DAYS					

Q AND D FOR INTERNATIONAL QUIET AND DISTURBED DAYS RESPECTIVELY
RNG FOR DIFFERENCE BETWEEN MAXIMUM AND MINIMUM HOURLY VALUES OF DAY
MAX AND MIN FOR MAXIMUM AND MINIMUM INSTANTANEOUS VALUES DURING DAY

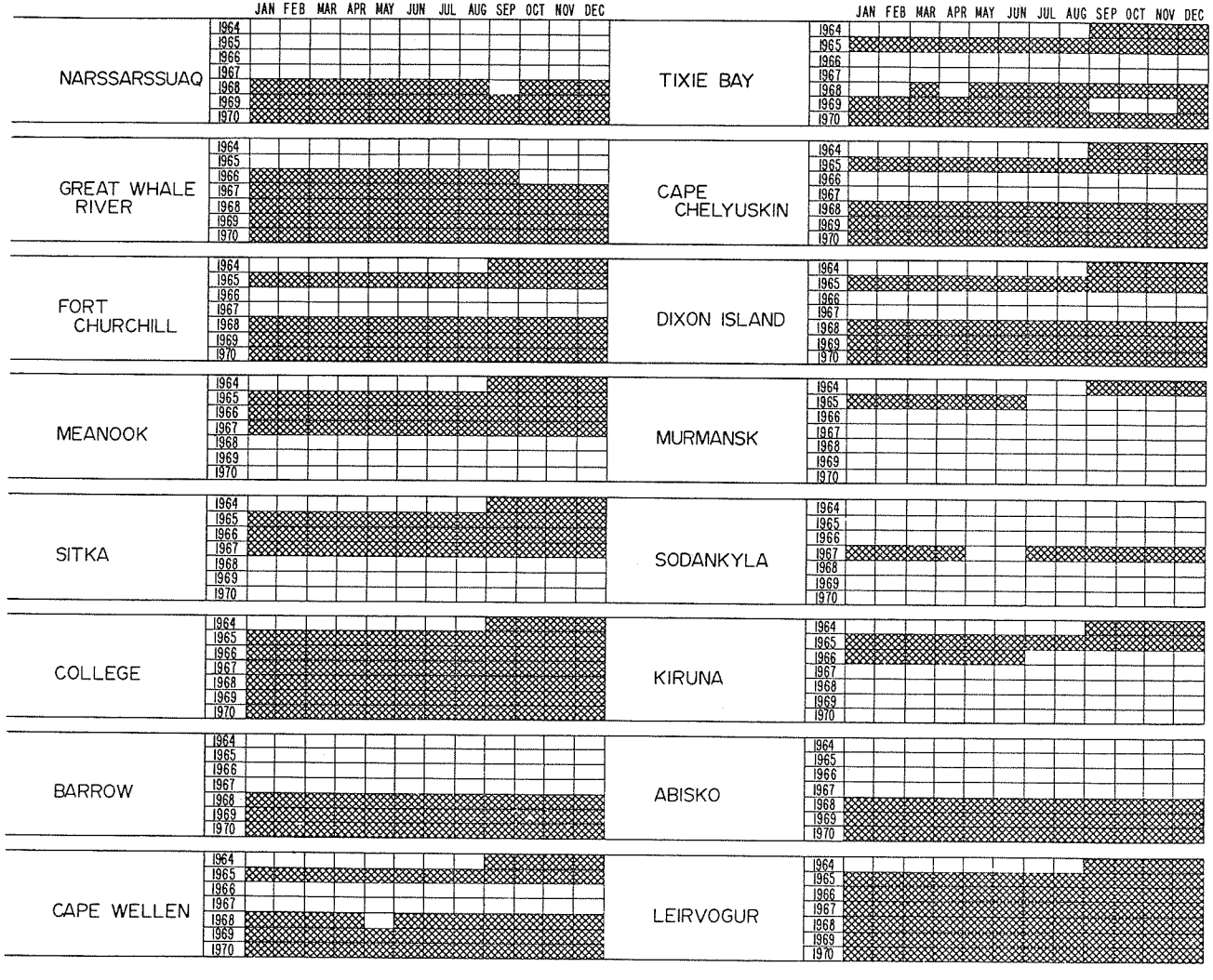
DMN FOR AVERAGE OF THE 24 HOURLY VALUES OF DAY
TMAX AND TMIN FOR TIMES OF MAXIMUM AND MINIMUM INSTANTANEOUS VALUES
MISSING VALUES IF ANY SHOWN AS BLANK SPACES

D.1 PUBLICATIONS OF MAGNETIC HOURLY VALUES Cont'd.

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
HUANCAYO	12S	285	A	A	A	A	A												
APIA	14S	188	A	A	A	A	A	A	A	A									
TANANARIVE	19S	48	A	A	A	A	A	A	A	A	A	A	A	A	A				
TSUMEB	19S	18								C	A								
LA QUIACA	22S	294								A	A	A							
EASTER ISLAND	27S	251							A										
PILAR	32S	296								A		A	A						
WATHEROO	32S	116	A	A	S														
HERMANUS	34S	19	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
TOOLANGI	38S	145	A	A															
AMBERLEY	43S	173	A	A	A	A	A	A	A	A									
TRELEW	43S	295	A	A	A	A	A												
PORT-AUX-FRANCAIS	49S	70	A	A	A	A	A	A	A	A	A	A							
OASIS	66S	101	B	B	S														
WILKES	66S	112	B	A															
DUMONT D URVILLE	67S	140	A	A	A	A		A	A	A	A	A							
MIRNY	67S	93	A	A	A	A													
CHARLOT	69S	139	B	A															
LAZAREV	70S	13				A													
PIONERSKAYA	70S	96	B	A															
ROI BAUDUIN	70S	23								B	A	A							
SANAE	70S	358						B	A	A	A	A	A	A	A	A			
NORWAY STATION	71S	357					A	C											
HALLEY BAY	76S	333	B	A															
LITTLE AMERICA	78S	198	B	A	S														
SCOTT BASE	78S	167	B	A	S														
VOSTOK	79S	107		A	A	A													
BYRD	80S	240	B	A	A	A	A												
SOUTH POLE	90S	0			B	B	A												

STATIONS USED FOR 2.5-MIN AE'S



D.1 GEOMAGNETIC INDICES

AURORAL ELECTROJET (AE) INDICES

MAGNETIC TAPE:

Hourly Values:	July 1957 - December 1970
2.5 Minute Values:	September 1964 - December 1970

MICROFILM:

Hourly Values:	July 1957 - December 1968
Plots of Hourly Values:	July 1957 - December 1964
2.5 Minute Values:	September 1964 - December 1968
Plots of 2.5 Minute Values:	September 1964 - December 1970

PUBLICATIONS:

1. *Hourly Values of the Auroral Electrojet Activity Index AE.* UAG-R Series, Geophysical Institute, University of Alaska 7/1957 - 12/1964.

2. *Auroral Electrojet Magnetic Activity Indices (AE) for 1970, Report UAG-22,* World Data Center A for Solar-Terrestrial Physics.

3. *Auroral Electrojet Magnetic Activity Indices AE(11) for 1968, Report UAG-29,* World Data Center A for Solar-Terrestrial Physics.

4. *Auroral Electrojet Magnetic Activity Indices AE(11) for 1969, Report UAG-31,* World Data Center A for Solar-Terrestrial Physics.

NOTE: 2.5 minute AU and AL indices are available on magnetic tape for the interval September 1964 - December 1970. AO indices are also available for the years 1968-1970.

EQUATORIAL Dst INDICES

Hourly values of Dst are available on magnetic tape and in published form for the years 1957-1972. Beginning with 1973 they are prepared by M. Sugiura and D. J. Poros, and distributed by World Data Center A for Rockets and Satellites, National Space Science Data Center, on a monthly basis.

Q-INDICES

AT BOULDER:

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
HEISS ISLAND	81N	58	B	A	C					A	A								
MURCHISON BAY	80N	18	B	A	B														
ARCTICA	79N	179				C													
CAPE CHELYUSKIN	78N	104	B	A	B					A	A								
THULE	77N	291	B	A															
RESOLUTE BAY	75N	265	B	A															
DIXON ISLAND	74N	80	B	A	B					A	A								
BARROW	72N	204	B	A															
TIXIE BAY	72N	129	B	A						A	A								
GODHAVN	69N	306	B	A															
KIRUNA	68N	21	B	A	A	A	A												
SODANKYLA	67N	27	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
CAPE WELLEN	66N	190	B	A	B					A	A								
COLLEGE	65N	212	C	C															
BAKER LAKE	64N	264	B	A															
YELLOWKNIFE	62N	246	B	B															
NURMIJARVI	61N	25					C												
LERWICK	60N	359	B	A															
ESKDALEMUIR	55N	357	B	A															
MACQUARIE ISLAND	55S	159	B	A															
MIRNY	67S	93	B	A	B					A	A								
MAWSON	68S	63	B	A															
NOVOLAZAREVSKAYA	71S	12								A	A								
HALLEY BAY	76S	333	B	A						A									
VOSTOK	79S	107								A	A								

INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS
INTERNATIONAL ASSOCIATION OF GEOMAGNETISM AND AERONOMY

INDICES OF GEOMAGNETIC ACTIVITY

OBSERVATORY L'Aquila
MONTH: February 1970
RANGE FOR K-9: 350 γ

SCALE-VALUES OF VARIOMETERS IN γ/MM
D 7.0 H 5.1 Z 2.7

GR DAY 19—	K-INDICES FOR THREE-HOUR INTERVAL										CHAR. 0, 1, 2
	00h-03h	03h-06h	06h-09h	09h-12h	12h-15h	15h-18h	18h-21h	21h-24h	SUM		FULL DAY
1	2	2	1	0	1	1	2	4	13		1
2	3	2	2	2	3	2	5	5	24		2
3	3	1	2	2	1	0	0	1	10		1
4	1	1	1	2	2	4	4	2	17		1
5	2	2	1	1	3	2	1	3	15		1
6	2	0	0	0	0	0	1	1	4		0
7	0	0	0	0	0	0	0	0	0		0
8	0	1	1	1	0	1	1	1	5		0
9	1	0	1	0	0	0	2	1	5		0
10	1	1	1	0	0	3	4	1	11		1
11	0	0	1	1	0	0	1	0	3		0
12	1	0	0	1	0	1	2	1	6		0
13	1	2	1	2	2	1	2	1	12		0
14	2	3	1	3	2	3	2	1	17		1
15	2	2	1	3	1	2	2	2	15		1
16	1	0	1	2	2	1	1	2	10		0
17	2	0	0	2	1	2	4	3	14		1
18	2	1	2	1	2	2	2	3	15		1
19	1	0	1	2	1	0	0	1	6		0
20	0	0	0	1	1	1	1	1	5		0
21	0	0	0	1	0	0	1	1	3		0
22	0	0	0	0	0	0	1	1	2		0
23	1	0	0	0	1	0	3	2	7		0
24	1	2	1	1	2	4	3	1	15		1
25	1	2	2	1	0	1	1	0	8		0
26	2	1	1	2	4	3	1	1	15		1
27	1	0	2	2	2	2	3	3	15		1
28	3	2	2	3	2	3	3	3	21		1
29											
30											
31											

AT BOULDER

K - INDICES

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST
HEISS ISLAND	81N	58
CAPE CHELYUSKIN	78N	104
DIXON ISLAND	74N	80
BARROW	72N	204
MURMANSK	69N	33
SODANKYLA	67N	27
CAPE WELLEN	66N	190
COLLEGE	65N	212
LEIRVOGUR	64N	338
YAKUTSK	62N	130
NURMIJARVI	61N	25
LENINGRAD	60N	31
MAGADAN	60N	151
SITKA	57N	225
SVERDLOVSK	57N	61
TOMSK	57N	85
KAZAN	56N	49
MOSCOW	55N	37
MINSK	54N	27
WINGST	54N	9
WITTEVEEN	53N	7
BELSK	52N	21
GOTTINGEN	52N	10
IRKUTSK	52N	104
NIEMEGK	52N	13
SWIDER	52N	21
HARTLAND	51N	356
DOURBES	50N	4
KIEV	50N	31
LVOV	50N	24
KARAGANDA	49N	73
HURBANOVO	48N	18
NEWPORT	48N	243
ULAN BATOR	48N	106
ODESSA	47N	31
YUZHNO-SAKHALINSK	47N	143
NOVOKAZALINSK	45N	62
SURLARI	45N	26
ALMA ATA	43N	77
VLADIVOSTOK	43N	132
L AQUILA	42N	13
LOGRONO	42N	2
TBILISI	42N	45
EBRO	41N	0
KANDILLI	41N	29
TASHKENT	41N	69
BOULDER	40N	255
COIMBRA	40N	352
TOLEDO	40N	356
ASHKHABAD	38N	58
FREDERICKSBURG	38N	283
PENDELI	38N	24
ALMERIA	36N	2
SAN FERNANDO	36N	354
KSARA	34N	36
AVERROES	33N	353
DALLAS	33N	263
TUCSON	32N	249
MISALLAT	30N	31
TENERIFE	28N	16
TAMANRASSET	22N	5
HONOLULU	21N	202
TEOLOYUCAN	20N	261
ALIBAG	19N	73
SAN JUAN	18N	294
GUAM	14N	145
BANGUI	05N	19
MOCA	03N	9
BINZA	04S	15
TANGERANG	06S	107
LUANDA	09S	13
PORT MORESBY	09S	147
HUANCAYO	12S	285
TAHITI	17S	149
TANANARIVE	19S	48
LA QUIACA	22S	294
GNANGARA	32S	116
HERMANUS	34S	19
LAS ACACIAS	35S	302
SAN MIGUEL	35S	301
TOOLANGI	38S	145
AMBERLEY	43S	173
TRELEW	43S	295
MACQUARIE ISLAND	55S	159
MIRNY	67S	93
MAWSON	68S	63
SYOWA BASE	69S	40
NOVOLAZAREVSKAYA	71S	12
SCOTT BASE	78S	167
VOSTOK	79S	107
SOUTH POLE	90S	0

The Tables of K Indices are received on a current basis (within 6 months of the recording period) from the above list of observatories.

PUNCHED CARDS:

K - Fredericksburg, 1 card/day 1966 to date.

ESRO MAGNETIC TAPE LISTING

YEAR	MO	DAY	SUNROT	CYCLE	KP								SUM(KP)	3-H-AP							SUM(AP)	AP	CP	C9	SUNSPOT	FLUX	CODE
67	1	1	1825	23	2+	2+	2-	30	3+	5+	3+	2+	24-	9	9	6	15	18	56	18	9	140	18	1.0	5	73	124.4	0
67	1	2	1825	24	2+	3-	1+	1+	1+	10	2+	1+	14-	9	12	5	5	5	4	9	5	54	7	0.3	1	96	143.0	1
67	1	3	1825	25	1+	2+	1+	3-	3+	3+	20	0+	17-	5	9	5	12	18	18	7	2	76	10	0.5	2	124	154.0	0
67	1	4	1825	26	00	0+	0+	00	1-	0+	10	10	4-	0	2	2	0	3	2	4	4	17	[illegible]	0.0	0	148	160.7	0
67	1	5	1825	27	1+	0+	0+	1-	1-	1-	0+	1-	50	5	2	2	3	3	3	2	3	23	3	0.1	0	150	168.2	0
67	1	6	1826	1	0+	10	3-	20	10	1+	20	1-	110	2	4	12	7	4	5	7	3	44	6	0.2	1	148	160.5	0
67	1	7	1826	2	1-	0+	3+	4-	4+	50	5-	5+	27+	3	2	18	22	32	48	39	56	220	28	1.2	6	134	153.6	0
67	1	8	1826	3	6+	7-	6+	60	40	50	3+	2+	400	94	111	94	80	27	48	18	9	481	60	1.7	7	116	142.9	0
67	1	9	1826	4	2+	40	2+	20	3+	30	2-	20	21-	9	27	9	7	18	15	6	7	98	12	0.7	3	111	144.7	0
67	1	10	1826	5	20	0+	0+	0+	0+	2-	20	20	90	7	2	2	2	2	6	7	7	35	4	0.2	1	111	145.6	0
67	1	11	1826	6	3+	3-	30	20	3+	40	30	30	24+	18	12	15	7	18	27	15	15	127	16	0.9	4	104	139.8	0
67	1	12	1826	7	10	00	0+	0+	0+	00	1-	0+	30	4	0	2	2	2	0	[illegible]	2	15	2	0.0	0	97	139.1	0
67	1	13	1826	8	10	20	30	20	6-	3-	4+	6-	26+	4	7	15	7	67	12	[illegible]	67	211	26	1.2	6	93	138.1	0
67	1	14	1826	9	7+	8-	60	5+	2-	1+	10	10	31+	154	179	80	56	6	5	4	4	488	61	1.7	7	85	135.2	0
67	1	15	1826	10	30	1-	10	2+	3-	2-	2+	3-	16+	15	3	4	9	12	6	9	12	70	9	0.5	2	60	126.6	0
67	1	16	1826	11	3-	3-	3+	20	20	1+	2-	1+	170	12	12	18	7	7	5	6	5	72	9	0.5	2	56	120.2	0
67	1	17	1826	12	1+	1+	10	1+	0+	1+	1-	10	8+	5	5	4	5	2	5	3	4	33	4	0.1	0	59	116.9	0
67	1	18	1826	13	1+	1+	0+	1-	1+	20	20	1+	10+	5	5	2	3	5	7	7	5	39	5	0.2	1	72	117.4	0
67	1	19	1826	14	20	1-	1-	10	0+	10	2+	1+	9+	7	3	3	4	2	4	9	5	37	5	0.2	1	82	116.4	0
67	1	20	1826	15	1+	2+	3+	2+	3-	40	3+	2+	22-	5	9	18	[illegible]	12	27	18	9	107	13	0.8	4	92	127.0	0
67	1	21	1826	16	20	30	2+	2+	20	30	10	10	17-	7	15	9	[illegible]	7	15	4	4	70	9	0.5	2	125	138.2	0
67	1	22	1826	17	2+	00	1+	10	1-	1-	1+	10	8+	9	0	5	[illegible]	3	3	5	4	33	4	0.1	0	140	139.9	0
67	1	23	1826	18	2+	2-	20	2-	0+	1-	10	1+	110	9	6	7	6	2	3	4	5	42	5	0.2	1	152	148.8	1
67	1	24	1826	19	10	0+	00	00	0+	0+	0+	1+	4-	4	2	0	0	2	2	2	5	17	2	0.0	0	122	146.8	0
67	1	25	1826	20	2-	1+	10	2-	20	10	1-	1-	100	6	5	4	6	7	4	3	3	38	5	0.2	1	133	142.7	1
67	1	26	1826	21	1+	10	1+	20	2-	00	00	0+	8-	5	4	5	7	6	0	0	2	29	4	0.1	0	136	154.3	0
67	1	27	1826	22	0+	0+	1-	2-	1+	10	1-	10	70	2	2	3	6	5	4	3	4	29	4	0.1	0	130	158.3	0
67	1	28	1826	23	20	4-	4-	3+	10	1+	3-	2-	19+	7	22	22	18	4	5	12	6	96	12	0.0	3	125	156.2	0
67	1	29	1826	24	2-	2-	2+	10	1-	1-	10	00	90	[illegible]	6	9	4	3	3	4	0	35	4	0.2	1	122	158.2	1
67	1	30	1826	25	0+	1-	10	1-	1-	0+	1-	1-	50	2	3	4	3	3	2	3	3	23	3	0.1	0	132	159.0	0
67	1	31	1826	26	00	0+	1-	0+	0+	10	1-	1-	40	0	2	3	2	2	4	3	3	19	2	0.0	0	110	156.4	0
67	2	1	1826	27	1+	2-	20	2-	10	1-	00	0+	9-	5	6	7	6	4	3	0	2	33	4	0.1	0	93	151.6	0
67	2	2	1827	1	00	00	1-	1-	0+	0+	1+	1-	40	0	0	3	3	2	2	5	3	18	2	0.0	0	88	143.5	0
67	2	3	1827	2	00	00	00	2-	0+	00	10	10	40	0	0	0	6	2	0	4	4	16	2	0.0	0	92	138.7	0
67	2	4	1827	3	0+	2+	20	20	2+	[illegible]	[illegible]	[illegible]	40	2	9	7	7	9	18	12	27	91	11	0.7	3	100	137.3	1
67	2	5	1827	4	5-	30	2+	20	3+	4-	2-	10	22-	39	15	9	7	18	22	6	4	120	15	0.8	4	72	146.8	1
67	2	6	1827	5	10	2+	20	1+	2-	10	10	3+	14-	4	9	7	5	6	4	4	18	57	7	0.4	2	89	148.8	0
67	2	7	1827	6	2-	10	10	1+	2-	5+	6-	6+	240	6	4	4	5	6	56	67	94	242	30	1.3	6	138	162.5	0
67	2	8	1827	7	60	60	5-	5-	5-	4-	5-	40	38+	80	80	39	39	39	22	39	27	365	46	1.5	7	109	148.3	0
67	2	9	1827	8	3+	2+	3+	1-	1-	0+	1+	1-	13-	18	9	18	3	3	2	5	3	61	8	0.4	2	112	145.9	0
67	2	10	1827	9	00	1+	0+	1-	1-	00	00	00	30	0	5	2	3	3	0	0	0	13	2	0.0	0	97	140.5	0
67	2	11	1827	10	10	4-	4-	30	2+	10	2+	2-	19-	4	22	22	15	9	4	9	6	91	11	0.7	3	96	133.7	0
67	2	12	1827	11	0+	[illegible]	[illegible]	1-	1-	1-	0+	1+	4+	2	0	2	3	3	3	2	5	20	2	0.0	0	79	132.9	0
67	2	13	1827	12	1-	[illegible]	[illegible]	1-	0+	20	2-	2-	7+	3	0	2	3	2	7	6	6	29	4	0.1	0	77	130.0	0
67	2	14	1827	13	2-	10	10	1+	1+	00	1+	1+	90	6	4	4	5	5	0	5	5	34	4	0.1	0	58	129.2	0
67	2	15	1827	14	1+	10	0+	00	00	00	1-	5-	80	5	4	2	0	0	0	3	39	53	7	0.3	1	58	126.4	0

PUBLICATION:

IAGA Bulletin 12 Series, International Union of Geodesy and Geophysics - K-indices from individual observatories through 1969. (Publication of the Bulletin 12 Series ceased with the issue containing the 1969 data.)

MAGNETIC TAPE:

K-indices from many individual observatories for the years 1969-1971.

Kn, Ks, Km Indices

These data are available as follows:

MAGNETIC TAPE: 1959-1970
PUBLICATIONS: 1964-1967 - *Indices Kn, Ks, et Km 1964-1967*, Editions du CNRS, Paris, 1968
1968-1971 *IAGA Bulletin 32 Series*

Beginning with the data for 1969 tables have been prepared and distributed on a monthly basis by P. N. Mayand, Institute de Physique du Globe, Paris, France.

Kp, Ap, Cp, Ci, C9 Indices

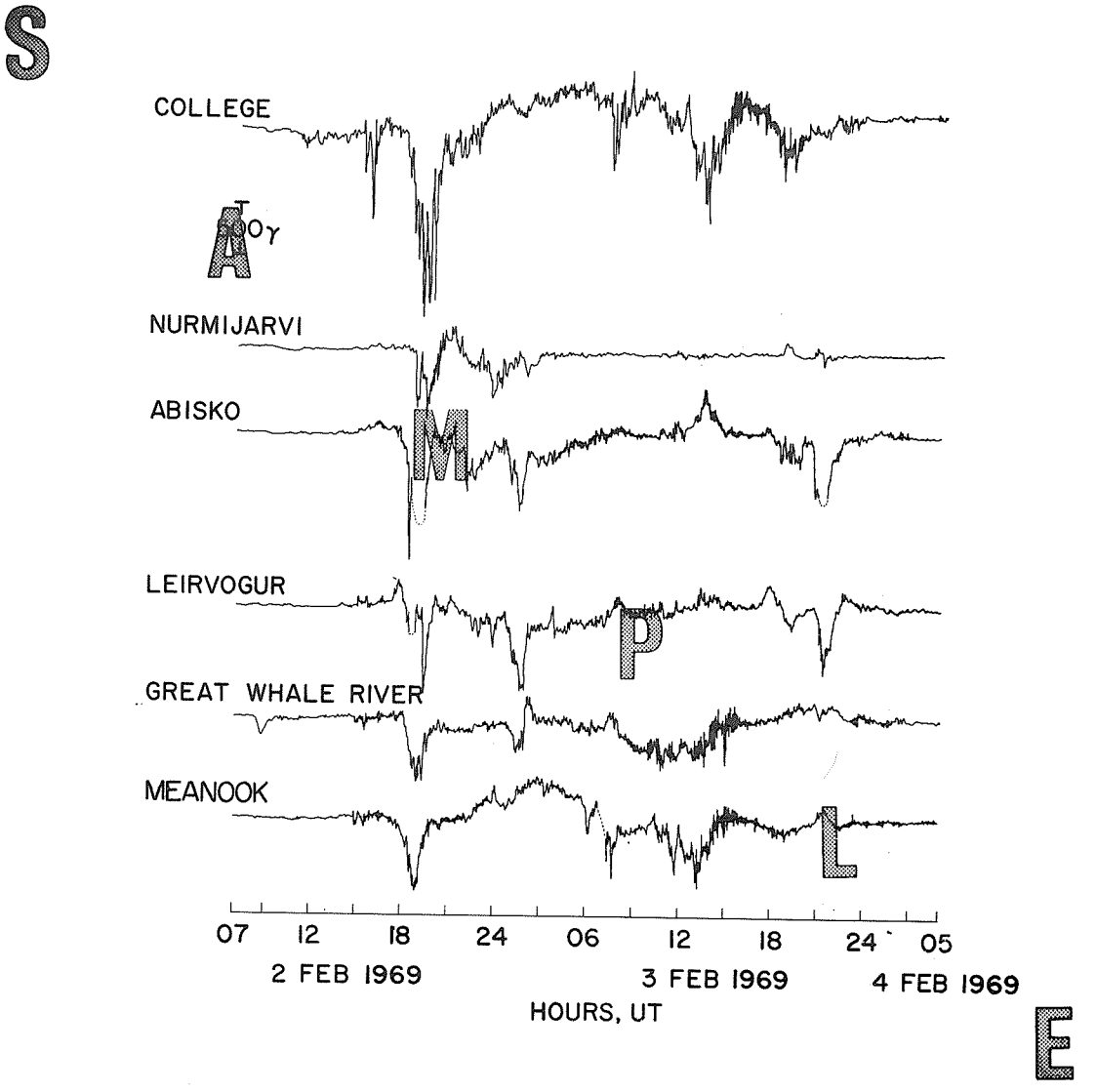
These data are available as follows:

TABULATIONS:	(Kp, Ap)	Jan. 1, 1932 to date
PUNCHED CARDS:	(Kp, Ap)	one card/day 1932 to date
	(Ci)	one card/day 1960 to date
MAGNETIC TAPE (ESRO):	Kp	for 1932 to date, Cp and C9 for 1951 to date. (Tape also includes solar rotation number and day of cycle; sunspot number; Ottawa flux)

PUBLICATIONS:

1. *Solar-Geophysical Data*, NOAA - monthly Kp, Ap, Cp, Ci, K_{FR} indices; monthly list of principal magnetic storms and magnetograms of storms selected by S. -I. Akasofu (all original records reduced to the same sensitivity and time scale.)
2. *IAGA Bulletin No. 18*, International Union of Geodesy and Geophysics, Kp, Ap and Cp indices for 1932-1961.
3. *IAGA Bulletin No. 12 Series* (*No. 32 Series* beginning with data for 1970), International Union of Geodesy and Geophysics, Kp, Ap, Cp indices from 1932 to 1971.

REDUCED MAGNETOGRAMS OF GEOMAGNETIC STORMS



Prepared by Dr. S. -I. Akasofu of the Geophysical Institute of the University of Alaska from magnetograms furnished by World Data Center A for Solar-Terrestrial Physics.

D.1 SPECIAL EVENTS

Listings of special events are available from many observatories. For information concerning the availability of these data for any particular observatory-month, please write to the Data Center. These listings are being received on a current basis from the following observatories.

AT BOULDER

SPECIAL EVENTS

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST
BARROW	72N	204
SODANKYLA	67N	27
COLLEGE	65N	212
NURMIJARVI	61N	25
SITKA	57N	225
KAZAN	56N	49
HEL	55N	19
MOSCOW	55N	37
WINGST	54N	9
BELSK	52N	21
IRKUTSK	52N	104
NIEMEGK	52N	13
KIEV	50N	31
HURBANOVO	48N	18
NEWPORT	48N	243
ULAN BATOR	48N	106
ODESSA	47N	31
L AQUILA	42N	13
LOGRONO	42N	358
TBILISI	42N	45
TASHKENT	41N	69
BOULDER	40N	255
COIMBRA	40N	352
TOLEDO	40N	356
ASHKHABAD	38N	58
FREDERICKSBURG	38N	283
PENDELI	38N	24
ALMERIA	37N	358
SAN FERNANDO	36N	354
DALLAS	33N	263
TUCSON	32N	249
TENERIFE	28N	16
TAMANRASSET	22N	5
HONOLULU	21N	202
TEOLOYACAN	20N	261
SAN JUAN	18N	294
TAHITI	17S	149
GUAM	14N	145
BANGUI	05N	19
MOCA	03N	9
BINZA	04S	15
LUANDA	09S	13
PORT MORESBY	09S	147
HUANCAYO	12S	285
APIA	14S	188
TANANRIVE	19S	48
LOURENCO MARQUES	26S	32
GNANGARA	32S	116
HERMANUS	34S	19
LAS ACACIAS	35S	302
SAN MIGUEL	35S	301
TOOLANGI	38S	145

COMPUTER FORMAT:

Principal magnetic storms - one card/storm/observatory - 1/1966 to date.

PUBLICATIONS:

Solar-Geophysical Data, NOAA - monthly list of principal magnetic storms and magnetograms of storms selected by S. -I. Akasofu (all original records reduced to the same sensitivity and time scale).

AT BOULDER

REPORTS OF SPECIAL PROJECTS

Aeromagnetic Survey in Japan by the Geographical Survey Institute and the Hydrographic Office (Japan) - Approximately 8500 values of magnetic declination, inclination, and horizontal, vertical, and total intensities obtained in flights made during the years 1961-1965.

Airborne Magnetic Survey by the Division of Geomagnetism, Dominion Observatory (Canada) - Approximately 11,000 values of magnetic declination, inclination and horizontal, vertical, and total field intensities obtained in flights made during the years 1953-1963.

Hermanus Magnetic Observatory, South African Antarctic Scientific Records, Measurements of Total Magnetic Intensity During Voyages of the "RSA", December 1964-April 1965, Geophysical Series 1, Report No. B4, approximately 300 values.

Hermanus Magnetic Observatory, South African Antarctic Scientific Records, Seaborne Magnetic Measurements, Cape Town-Sanse December 1965-January 1966, Geophysical Series 1, Report No. B.7, Approximately 250 values of total magnetic intensity.

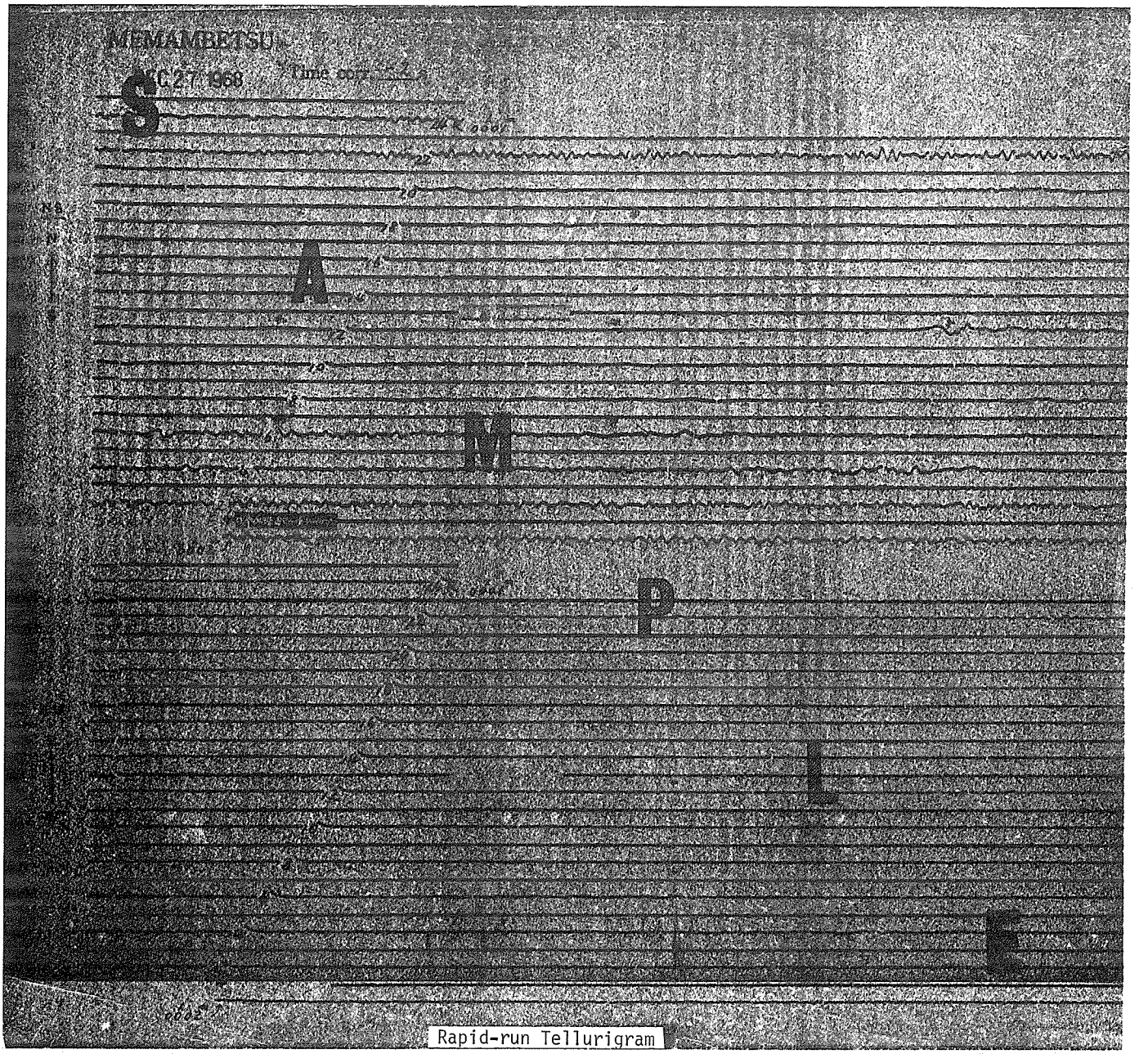
Nagata, T., T. Oguti, and S. Kakinuma, Results of Geomagnetic Total Force Surveys over Southern Ocean, Indian Ocean, and South China Sea, National Antarctic Committee, Science Council of Japan, 75, 1961.

Project Magnet (Airborne Geomagnetic Data) - Approximately 40,000 values of magnetic declination, inclination, and horizontal, vertical, and total intensity obtained in flights made during the years 1953-1963 by the U.S. Naval Oceanographic Office. Special Publication No. 66 and Special Publication No. 66, Supplement No. 1, Airborne Magnetic Data, contain these data.

VEMA MAGNETIC DATA - Approximately 3600 geomagnetic total field intensity readings obtained on cruises of the R/V VEMA during the years 1959-1962 by the Lamont Geological Observatory.

ZARYA MAGNETIC DATA - Results of magnetic observations made on board the USSR Ship ZARYA by the Magnetic Survey Section, Leningrad Office, IZMIRAN on four expeditions during the years 1957-1967. Data consist of approximately 3400 values of declination and horizontal, vertical, and total intensities.

D.1



Rapid-run Tellurigram

AT BOULDER

NORMAL TELLURIGRAMS

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
TIXIE BAY	72N	129		C	A														
LOVOZERO	68N	35								A	A	B	A	A	A	A			
MINSK	54N	27								A	A	B	A	B	B	B	C	B	
SHATSK	54N	42	C	A	A	A													
IRKUTSK	52N	104								C	A	A	B	A					
NIEMEGK	52N	13								A	A	A	A	B	A	A	B		
KORETS	51N	27												Q					
LVOV	50N	24																	
BUDKOV	49N	14																	
ODESSA	47N	31								A	B	A	A	A	B				
TIHANY	47N	18		B	A														
YUZHNO-SAKHALINSK	47N	143		C	A														
MEMAMBETSU	44N	144	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
ALMA ATA	43N	77	C	A	A														
TBILISI	42N	45	C	A	A					A	B								
EBRO	41N	0	B	A	Q														
TOLEDO	40N	356	B	A	A														
ASHKHABAD	38N	58	B	A	B					A	A	B							
KAKIOKA	35N	140	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	
KANOYA	31N	131	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
LEGON	05N	0							B	A	C								
OASIS	66S	101	B		S														

HOURLY VALUES

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
TIXIE BAY	72N	129		C	A														
LOVOZERO	68N	35																	
MINSK	54N	27														A		B	
SHATSK	54N	42	C	A	C	A													
IRKUTSK	52N	104																	
NIEMEGK	52N	13																	
KORETS	51N	27																	
LVOV	50N	24																	
BUDKOV	49N	14		A			A		A	A		A	A						
ODESSA	47N	31														A		C	
TIHANY	47N	18																	
YUZHNO-SAKHALINSK	47N	143																	
MEMAMBETSU	44N	144	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
ALMA ATA	43N	77	C																
TBILISI	42N	45	C	A	A														
EBRO	41N	0	B	A	A														
TOLEDO	40N	356		A	A	A	A	A											
ASHKHABAD	38N	58	B	A	B											A	A	C	
KAKIOKA	35N	140	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
KANOYA	31N	131	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
LEGON	05N	0																	
OASIS	66S	101	B		S														

RAPID-RUN TELLURIGRAMS

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
HEISS ISLAND	81N	58			A	B	B	B	B	A	A	A	A	B	C	B	C		
TIKHAYA BAY	80N	58	C	A															
BARENTSBURG	78N	16	C	A	B	S										S			
CAPE CHELYUSKIN	78N	104	C	A	B														
TIXIE BAY	72N	129		B	B	C													
LOVOZERO	68N	35	B	A	A	A	C			A	A	B	A	A	A	A	A	B	
BOROK	58N	39	B	A	A	A	A	A	A	A	A	A	A	A	B	A	A		
MINSK	54N	27							A	A	A	B	A	B	B	B	C	B	
SHATSK	54N	42	B	A	A	A													
VOLOZHIN	54N	27		B	A	C													
PETROPAVLOVSK	53N	158	B	A	A	A	B	B	A	A	C				B				
WITTEVEEN	53N	7	B	A	A					B		B							
IRKUTSK	52N	104	C	A	A					B	A	A	A	A					
LVOV	50N	24	C	A	C														
BUDKOV	49N	14		B															
YUZHNO-SAKHALINSK	47N	143		B	A														
ALOUSHTA	44N	34	B	A	A	A	B												
MEMAMBETSU	44N	144	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
ALMA ATA	43N	77	B	A	A	A	B												
TBILISI	42N	45	B	A						A	B								
ASHKHABAD	39N	58	B	A	B					B	A	A							
KAKIOKA	36N	140	B	A															
KANOYA	31N	131	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
SOROA	22N	277								B	B	C	B						
PARAMARIBO	06N	305	B	A															
HOLLANDIA	03S	141	C	A				S											
OASIS	66S	101	C	B	S														
MIRNY	67S	93	B	B	B	A	A	A	A	A	B	A	A	B	C				

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months

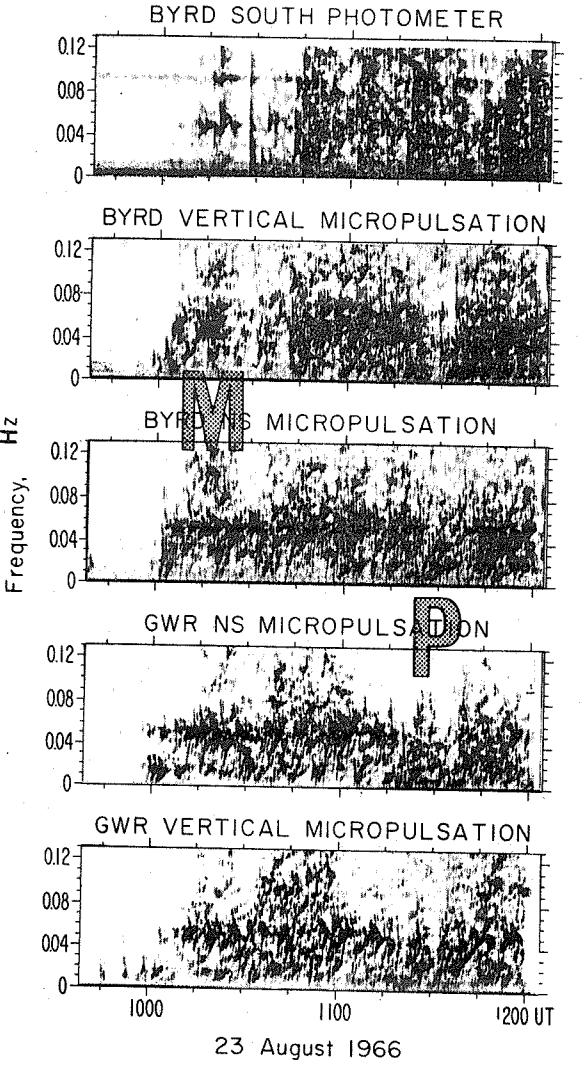
Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data

P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability

S = Program STOPPED operations (see MASTER STATION LIST for actual date)

D.2

The stations listed on pages 255, 257 and 259 have reported their research programs at the request of Working Group 5 of Commission IV of the International Association of Geomagnetism and Aeronomy. Details are available in *Tabulation of Rapid-Run Geomagnetic Micropulsation Stations* by H. B. Liemohn. The report is available from WDC-A for Solar-Terrestrial Physics. Corrections or additions to its entries should be sent to WDC-A for Solar-Terrestrial Physics, NOAA, Boulder, Colorado, U.S.A. 80302.



D.2 MAGNETOSPHERIC MICROPULSATION PHENOMENA

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG	GEOMAGNETIC LAT	GEOMAGNETIC LONG EAST
ADDIS ABABA	09.03 N	38.77 E	05.4 N	109.2
ALMA-ATA	43.25 N	76.92 E	33.4 N	150.7
ANCHORAGE	61.10 N	149.55 W	60.9 N	258.1
APIA	13.80 S	171.77 W	16.1 S	260.2
ASHKHABAD	37.95 N	58.10 E	30.3 N	133.0
ASHLAND	46.3 N	68.3 W	57.0 N	3.
ASO	32.53 N	131.01 E	22.0 N	198.1
AUCKLAND	36.51 S	174.45 E	42.7 S	253.6
AUSTIN	30.18 N	97.47 W	40.0 N	326.
BAGUIO	16.42 N	120.6 E	05.1 N	189.2
BAIE ST. PAUL	47.37 N	70.55 W	58.7 N	359.3
BAKER LAKE	64.33 N	96.03 W	73.8 N	315.2
BANDA	09.16 N	18.36 E		
BANGUI	04.43 N	18.57 E	04.8 N	88.5
BAR I	69.6 N	140.18 W	70.4 N	258.1
BARROW	71.30 N	156.75 W	68.5 N	241.1
BASE ROI BAUDOUIN	70.42 S	24.30 E		
BAURU	22.19 S	49.07 W		
BOROK	58.03 N	38.97 E	52.9 N	123.3
BORREGO	33.36 N	116.28 W		
BOULDER	40.14 N	105.24 W	48.9 N	43.1
BUDKOV	49.04 N	14.01 E	49.01N	96.02
BYRD	79.98 S	120.02 W	70.4 S	336.
CALGARY	51.0 N	114.2 W	58.7 N	302.0
CAMBRIDGE BAY	69.1 N	105. W	77.0 N	301.0
CAMP TORUGUERO	18.29 N	66.25 W	30.0 N	5.
CAPE CHELYUSKIN	77.72 N	104.28 E	65.9 N	177.5
CAPE WELLEN	66.17 N	169.83 W	61.8 N	237.1
CENTRO GEOFISICO	22.97 N	82.15 W	34.1 N	345.3
CHAMBON-LA-FORET	48.02 N	02.16 E	50.5 N	83.9
COLLEGE	64.87 N	147.83 W	64.6 N	256.5
COUGAR MT.	47.63 N	122.35 W	52.15N	293.
DALLAS	32.98 N	96.75 W	43.0 N	327.7
DAVAO	10.33 N	123.9 E	0.0 N	189.
DILLINGHAM AFB	21.6 N	158.0 W	21.0 N	270.
DIXON	73.53 N	80.55 E	63.0 N	161.4
DOURBES	50.1 N	04.6 E	52.0 N	87.7
DUNEDIN	45.8 S	170.5 W	53.3 S	252.7
DURBAN	29.92 S	30.93 E	31.5 S	93.0
EDINBURGH	55.92 N	3.19 W	55.3 N	79.4
EIGHTS	75.23 S	77.17 W	63.9 S	355.3
ENKOPING	59.58 N	17.13 E	58.5 N	105.3
ESK	27.25 S	152.50 E	35.8 S	226.9
ESKDALEMUIR	55.32 N	03.20 W	58.5 N	82.9
FORT CHEPEWYAN	58.7 N	111. W	67.0 N	303.
FORT MCMURRAY	56.7 N	111.3 W	65. N	300.0
FORT SMITH	60.0 N	111.9 W	68.5 N	302.0
FREDERICKSBURG	38.2 N	77.38 W	49.6 N	349.8
FREETOWN	08.47 N	13.22 W	14.8 N	57.8
FT. RELIANCE	62.7 N	109. W	71.4 N	300.
FT. YUKON	66.57 N	145.25 W		
FURSTENFELDBRUK	48.17 N	11.28 E	48.9 N	92.4
GARCHY	47.30 N	03.10 E	49.6 N	84.9
GODHAVN	69.23 N	53.52 W	79.9 N	32.5
GOTTINGEN	51.53 N	09.95 E	52.3 N	93.8
GREAT WHALE RIVER	55.33 N	77.83 W	66.6 N	14.4
GROCKA	44.63 N	20.77 E	43.6 N	100.9
GUAM	13.45 N	144.75 E	4.0 N	212.9
HALLEY BAY	75.52 S	26.7 W	65.8 S	24.3
HARTLAND	51.00 N	04.48 W	54.6 N	79.0
HEISS IS.	80.62 N	58.05 E	74.3 N	144.1

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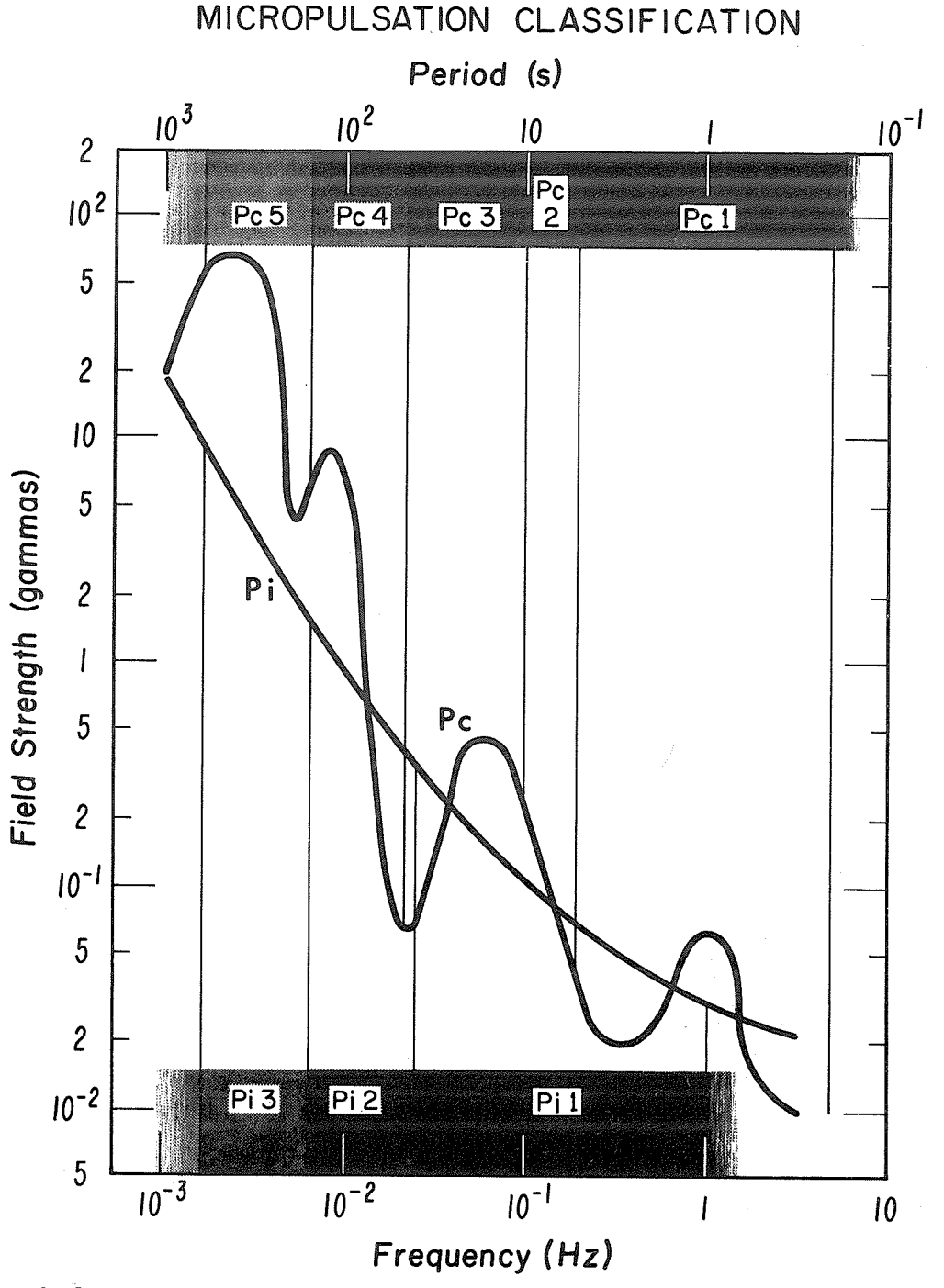

Amplitude levels of signals to be expected in the Micropulsation range. The period range for pc and pi classification is noted.

STATION	GEOGRAPHIC LAT		GEOGRAPHIC LONG		GEOMAGNETIC LAT		GEOMAGNETIC LONG EAST
HERMANUS	34.42	S	19.23	E	33.7	S	80.70
HOBART	42.87	S	147.33	E	52.0	S	223.
HUANCAYO	12.1	S	75.3	W	00.6	S	353.8
HUROQUE	43.92	N	0.35	W	47.0	N	79.4
IBADAN	07.43	N	03.9	E	10.7	N	74.6
INUVIK	68.	N	130.	W	72.	N	268.
INVERCARGILL	47.2	S	168.3	E			
IRKUTSK	52.47	N	104.03	E	44.4	N	218.2
JAKUTSK	62.02	N	129.67	E	56.4	N	199.1
JICAMARCA	11.95	S	76.87	W			
KAKIOKA	36.14	N	140.11	E	26.0	N	206.0
KANOYA	31.25	N	130.53	E	20.5	N	198.1
KAO-JUNG	24.55	N	121.08	E			
KIEV	50.72	N	30.30	E	47.6	N	112.2
KINGSTON	41.62	N	71.73	W			
KIRUNA	67.83	N	20.42	E	65.3	N	115.7
KOROR	07.27	N	134.53	E	3.3	S	203.5
KOTZEBUE	66.92	N	162.60	W	63.7	N	242.1
LA ROCHE GODON	37.83	S	77.57	E	46.70	S	140.6
LAE	6.07	S	146.9	E			
LAGRANDE	45.5	N	118.	W	50.0	N	297.
LAUNCESTON	41.25	S	147.07	E			
LEBANON, N.J.	39.63	N	74.5	W	50.0	N	
LEDUC	53.6	N	113.4	W	61.2	N	301.5
LEGON	05.63	N	00.18	W	03.0	S	
LEIRVOGUR	64.18	N	21.70	W	70.2	N	71.0
LERWICK	60.13	N	01.18	W	62.5	N	88.6
LOVOZERO	67.98	N	35.08	E	63.6	N	115.5
M≠BOUR	14.4	N	16.95	W	21.5	N	55.1
MACQUARIE	54.5	S	158.95	E	61.6	S	243.1
MAKERERE	00.5	N	32.5	E	12.6	S	
MANILA	14.7	N	121.1	E	06.0	N	182.
MAUI	20.71	N	156.26	W	21.1	N	266.5
MAWSON	67.58	S	62.9	E	73.1	S	103.4
MCMURDO	77.85	S	166.62	E			
MEANOOK	54.62	N	113.33	W	62.5	N	301.2
MEMAMBETSU	43.54	N	144.12	E	34.0	N	208.4
MIRNY	66.55	S	93.02	E	77.0	S	146.8
MOCA	03.35	N	58.10	E	05.7	N	78.6
MT. ST. HILAIRE	45.53	N	73.15	W	57.	N	355.
MUNDARING	31.90	S	116.15	E			
NAGYCENK	47.63	N	16.72	E	47.2	N	98.3
NEWCASTLE	32.75	S	151.5	E	42.0	S	226.
NEWPORT	48.26	N	117.12	W			
NIEMEGK	52.07	N	12.68	E	52.2	N	96.6
NOORD OOST POLDER	52.72	N	05.65	E	51.4	N	90.
NOVOLARZAREVSKAYA	74.77	S	11.82	E	66.2	S	53.6
NURMIJARVI	60.52	N	24.65	E	57.9	N	112.6
OAMARU	44.99	S	170.97	E	47.7	S	250.
ONAGAWA	38.26	N	141.28	E	28.3	N	206.8
OTTAWA	45.2	N	75.5	W	57.0	N	351.5
PAMATAI	17.57	S	149.57	W	15.35	S	77.23
PARAKOU	09.35	N	02.62	E	12.6	N	74.8
PARAMARIBO	05.82	N	55.22	W	16.9	N	15.3
PETROPAVLOVSK	53.1	N	158.63	E	44.7	N	218.2
PLATEAU	79.47	S	40.58	E			
PORT ALFRED	46.43	S	51.87	E	51.20	S	109.3
PORT MORESBY	9.40	S	147.15	E	18.6	S	217.9
PORT-AUX-FRANCAIS	49.35	S	70.20	E	56.5	S	127.8
RED DEER	52.3	N	113.8	W	60.3	N	300.
RESOLUTE BAY	74.70	N	94.90	W	83.0	N	289.6
ROBURENT	44.3	N	07.88	E	45.8	N	88.5
RUDE SKOV	55.85	N	12.45	E	55.9	N	98.5

Continued

EXPERIMENT NAME- TRIAXIAL SEARCH COIL MAGNETOMETER NSSDC ID 68-014A-16

ORIGINAL EXPERIMENT INSTITUTION- NASA-JPL

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI -	E.J. SMITH	NASA-JPL	PASADENA, CA
OI -	R.E. HOLZER	U OF CALIFORNIA, LA	LOS ANGELES, CA

DATE LAST EXPERIMENT DATA RECORDED-071372
EXPERIMENT STATUS OF OPERATION- INOPERABLE

EXPERIMENT BRIEF DESCRIPTION

THE UCLA-JPL SEARCH COIL MAGNETOMETER SAMPLED AMBIENT FIELD FLUCTUATIONS FROM 0.01 TO 1000 HZ IN TWO MODES. THE TRIAXIAL SEARCH COILS MOUNTED AT THE END OF A 6.1-M BOOM PROVIDED TRIAXIAL WAVEFORM DATA IN THREE BANDS, FROM 0.03 TO 0.1 HZ, 0.1 TO 0.3 HZ, AND 0.3 HZ TO CUTOFF, WHICH DEPENDED ON SAMPLING RATE IN THE FOLLOWING WAY -- FOR BIT RATES OF 1, 8 OR 64 KBS THE CUTOFF WAS 0.9, 7, OR 55 HZ. SIGNALS FROM THE TRIAXIAL SEARCH COILS WERE ALSO SAMPLED BY SEVEN COMB FILTERS WITH CENTER FREQUENCIES OF 10, 22, 47, 100, 216, 467, AND 1000 HZ. THE TIME REQUIRED FOR A COMPLETE TRIAXIAL SPECTRUM ANALYSIS (21 DATA VALUES) WAS 8.06, 1.01, OR 0.126 SEC, ALSO DEPENDING ON THE SATELLITE BIT RATE. INTERFERENCE OCCURRED BETWEEN THE SEVEN-CHANNEL SPECTRUM ANALYZER AND THE BROADBAND CHANNELS, SERIOUSLY DEGRADING THE BROADBAND SIGNALS THROUGHOUT THE OPERATIONAL LIFE OF THE EXPERIMENT. THE EXPERIMENT OPERATED ADEQUATELY THROUGHOUT THE MISSION.

DATA SET NAME- 2.5-MIN AVG SEARCH COIL MAGNETOMETER NSSDC ID 68-014A-16A
NOISE AMPLITUDES, 0.03 TO 1000 HZ ON FILM

AVAILABILITY OF DATA SET- DATA AT NSSDC BEING PROCESSED

TIME PERIOD COVERED- 030768 TO 042568 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 6 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THESE EXPERIMENTER-GENERATED COMPRESSED DATA PLOTS ON MICROFILM OF VARIOUS SIZES, SUMMARIZE THE INSTRUMENT RESPONSE TO BOTH AMBIENT AND INSTRUMENTAL EFFECTS. CONTAINING 36-SEC AVERAGES, THE PLOTTED MAGNETOMETER DATA ARE READABLE TO ABOUT 1.5-MIN TIME RESOLUTION. EACH ORBIT IS REPRESENTED BY A PAIR OF PLOTS, THE FIRST CONTAINING COMPRESSED PHYSICAL DATA, AND THE SECOND THE INFORMATION THAT MAY AFFECT THE EXPERIMENT -- SUCH AS INSTRUMENT GAIN, BANDWIDTH INFORMATION, SAMPLE OUTPUT FROM THE E-FIELD EXPERIMENT (68-014A-24), SAMPLE OUTPUT FROM THE FLUXGATE MAGNETOMETER EXPERIMENT (68-014A-14), AND SAMPLES OF THE SPACECRAFT STATUS. THE PHYSICAL DATA CONSIST OF THE SEVEN MAGNITUDES (AVERAGED OVER THREE COMPONENTS) FROM THE SEVEN-CHANNEL TRIAXIAL SPECTRUM ANALYZER, THE DATA QUALITY INDICATOR, AND THE THREE SETS OF TRIAXIAL WAVEFORM DATA REPRESENTING MAGNETIC SIGNALS FROM 0.03 TO 0.1 HZ, 0.1 TO 0.3 HZ, AND 0.3 HZ TO EXPERIMENT CUTOFF THAT WAS ADJUSTED WITH TELEMETRY RATE AS FOLLOWS -- AT 1-, 8- OR 64-KBS CUTOFF WAS 0.9, 7, OR 55 HZ. THESE PLOTS WERE USEFUL IN IDENTIFYING THE INTERPLANETARY REGION, BOW SHOCK, MAGNETOPAUSE, PLASMA AND PLASMASPHERE, ETC. WHICH THE SPACECRAFT COULD BE SAMPLING AT ANY PARTICULAR TIME.

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG	GEOMAGNETIC LAT	GEOMAGNETIC LONG EAST
SAN JUAN	18.12 N	66.15 W		
SAO JOSE D CAMPOS	23.2 S	45.8 W	12.4 S	26.6
SIMOSATO	33.34 N	135.56 E	23.0 N	202.4
SITKA	57.07 N	135.33 W	60.0 N	275.3
SODANKYLA	67.37 N	26.63 E	63.8 N	120.0
SOGRA	62.8 N	46.25 E	57.9 N	122.1
SOUTH POLE	90.00 S	0.0		
STANFORD	37.26 N	122.10 W	43.5 N	299.0
STEPANOVKA	46.78 N	30.9 E	43.8 N	111.1
SUKKERTOPPEN	65.42 N	52.90 W	76.1 N	28.7
SYOWA BAY	69.0 S	39.35 E	69.7 S	77.7
TAMANRASSET	22.8 N	05.52 E	25.07N	80.1
TBILISI	42.08 N	44.70 E	36.7 N	122.1
TERRE ADELIE	66.67 S	140.0 E	75.6 S	230.9
THULE	76.61 N	68.65 W	88.9 N	357.8
TIXIE	71.58 N	129. E	65.6 N	195.2
TOLEDO	39.88 N	04.05 W	43.9 N	74.7
TOOLANGI	37.53 S	145.47 E	46.7 S	220.8
TOWNSVILLE	19.32 S	146.73 E	29.0 S	217.
TRINIDAD	10.42 N	61.38 W	21.0 N	9.
TROMSO	69.67 N	18.97 E	67.1 N	116.7
TUCSON	32.25 N	110.83 W	40.4 N	312.2
TULALIP	48.08 N	122.19 W	53.6 N	292.
TUNGSTEN	62.00 N	128.15 W		
ULAN BATOR	47.85 N	106.75 E	36.4 N	176.5
VICTORIA	48.5 N	123.42 W	54.2 N	293.
VOSTOK	78.45 S	106.87 E	89.2 S	92.6
WILKES	66.25 S	110.58 E	77.7 S	179.2
WINGST	53.73 N	09.07 E	54.5 N	94.00
WITTEVEEN	52.82 N	06.67 E	54.1 N	91.2
WOOMERA	31.11 S	136.54 E	41.8 S	209.
ZARIA	11.15 N	7.65 E	13.7 N	79.1

PUBLICATION:

1. *Tabulation of Rapid-Run Geomagnetic Micropulsation Stations* by H. B. Liemohn, Boeing Scientific Research Laboratories Document D1-82-1043, January 1971.

D.3 SPACE MAGNETISM (MAGNETOSPHERIC)

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
PIONEER 1, SINGLE AXIS SEARCH COIL MAGNETOMETER SONETT (58-007A-02)	101158	101358 ,	101158
EXPLORER 6, SEARCH COIL MAGNETOMETER SONETT (59-004A-04)	080759	100359 ,	080759
INJUN 1, FLUXGATE MAGNETOMETER VAN ALLEN (61-015B-05)	063061	083162 ,	062961
EXPLORER 12, FLUXGATE MAGNETOMETERS CAHILL, JR. (61-020A-02)	081661	120561 ,	081661
MARINER 2, FLUXGATE MAGNETOMETER COLEMAN, JR. (62-041A-03)	082962	111562 ,	082762
EXPLORER 14, FLUXGATE MAGNETOMETERS CAHILL, JR. (62-051A-02)	010163	053063 ,	100262
EXPLORER 18, FLUXGATE MAGNETOMETER NESS (63-046A-02)	112763	053064 ,	112763
OGO 1, TRIAXIAL SEARCH COIL MAGNETOMETER SMITH (64-054A-01)	090564	111767 ,	090564
1964-083C, RUBIDIUM VAPOR MAGNETOMETER ZMUDA (64-083C-01)	121764	062665 ,	121364
EXPLORER 28, FLUXGATE MAGNETOMETER NESS (65-042A-02)	052965	051167 ,	052965
OGO 2, RUBIDIUM VAPOR MAGNETOMETER CAIN (65-081A-05)	101465	100267 ,	101465
OGO 3, MAGNETIC SURVEY USING TWO MAGNETOMETERS HEPPNER (66-049A-11)	060966	081468 ,	060766
OGO 3, TRIAXIAL SEARCH COIL MAGNETOMETER SMITH (66-049A-12)	060966	042768 ,	060766
EXPLORER 33, GSFC MAGNETOMETER NESS (65-058A-01)	070166	100568 ,	070166
EXPLORER 33, AMES MAGNETIC FIELDS SONETT (66-058A-03)	070166	071169 ,	070166
ATS 1, BIAXIAL FLUXGATE MAGNETOMETER COLEMAN, JR. (66-110A-02)	120765	123168 ,	120766

D.4

DATA SET NAME- SEARCH COIL MAGNETOMETER SUMMARY TAPES, 36.9-SEC TIME RESOLUTION — NSSDC ID 68-014A-16B

AVAILABILITY OF DATA SET- DATA AT NSSDC BEING PROCESSED

TIME PERIOD COVERED- 030768 TO 010171 (AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA IN THIS DATA SET- 47 REEL(S) OF MAGNETIC TAPE

DATA SET BRIEF DESCRIPTION

THESE EXPERIMENTER-SUPPLIED DIGITAL TAPES REPRESENT SUMMARIES OF ABOUT 2000 FINE-TIME SCALE DATA TAPES, WHICH THE EXPERIMENTER CURRENTLY HOLDS. THESE TAPES ARE 9-TRACK MULTIPLE-FILE EBCDIC CODED DIGITAL MAGNETIC TAPES PRODUCED ON AN IBM 360/91 COMPUTER. RECORDED AT 800 BPI, THEY HAVE 420 CHARACTERS PER RECORD AND ABOUT 1500 RECORDS PER FILE, WHICH REPRESENTS ONE SPACECRAFT ORBIT OR ABOUT 2.7 DAYS. THESE DATA ARE TIME ORDERED EXCEPT FOR OCCASIONAL OVERLAPPING DATA AT THE END OF A FILE. AN INDEX TO THE FILES ON EACH TAPE IS PROVIDED IN DATA SET 68-014A-16C. EACH DATA RECORD CONTAINS 36.9-SEC AVERAGED VALUES FOR TRIAXIAL SPECTRUM ANALYZER OUTPUTS AT 10, 22, 47, 100, 216, 467, AND 1000 HZ (21 VALUES), TRIAXIAL BROADBAND DATA FROM 0.03 TO 0.1 HZ, 0.1 TO 0.3 HZ, AND 0.3 HZ TO INSTRUMENT NYQUIST FREQUENCY THAT IS DETERMINED BY BIT RATE (9 VALUES). ALIASING DOES NOT OCCUR EXCEPT DURING THE TAPE RECORDER PLAYBACK MODE. HOWEVER THIS QUESTION OF ALIASING, IS ACADEMIC FOR THE OGO 5 INSTRUMENTS OPERATING IN THE WAVEFORM MODE, AS INTERFERENCE OCCURS BETWEEN THE SEVEN SPECTRUM ANALYZER CHANNELS AND THESE THREE BROADBAND MODES, SERIOUSLY DEGRADING THE BROADBAND CHANNELS. ALSO ON THE TAPES IS A DATA QUALITY INDICATOR.

DATA SET NAME- INDEX TO THE MAGNETIC TAPES CONTAINING SEARCH COIL 37 SEC. AVERAGED DATA — NSSDC ID 68-014A-16C

AVAILABILITY OF DATA SET- DATA AT NSSDC BEING PROCESSED

TIME PERIOD COVERED- 030768 TO 042568 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS REEL OF EXPERIMENTER-GENERATED MICROFILM CONTAINS NECESSARY INFORMATION TO INTERPRET AND USE DATA SET 68-014A-16B. IT CONTAINS THE NUMBER OF FILES FOR EACH OF THE MAGNETIC TAPES IN THAT SET. IN addition THERE ARE FOR EACH FILE ON EACH TAPE THE ORBIT NUMBER, FILE NUMBER, DATE, TIME, AND A SERIES OF STATUS WORDS RELATING TO WAVEFORM CHANNEL GAIN, BANDWIDTH, AND THE ANALOG CHANNEL.

EXPERIMENT NAME- LIGHT ION MASS MAGNETIC SPECTROMETER — NSSDC ID 68-014A-18

ORIGINAL EXPERIMENT INSTITUTION- LOCKHEED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - G.W.	SHARP	LOCKHEED	PALO ALTO, CA
OI - T.J.	CROWTHER	LOCKHEED	PALO ALTO, CA
OI - K.K.	HARRIS	LOCKHEED	PALO ALTO, CA

D.3 SPACE MAGNETISM (MAGNETOSPHERIC) Cont'd.

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
EXPLORER 34, TRIAXIAL FLUXGATE MAGNETOMETER NESS (67-051A-11)	052467	030769 ,	052467
EXPLORER 35, AMES MAGNETIC FIELDS SONETT (67-070A-03)	071967	122370 ,	071967
EXPLORER 35, GSFC MAGNETOMETER NESS (67-070A-04)	071967	050169 ,	071967
OGO 5, UCLA TRIAXIAL FLUXGATE MAGNETOMETER COLEMAN, JR. (68-014A-14)	030568	111869 ,	030468
OGO 5, TRIAXIAL SEARCH COIL MAGNETOMETER SMITH (68-014A-16)	030768	042568 ,	030468
PIONEER 9, THREE AXIS MAGNETOMETER SONETT (68-100A-01)	110868	061369 ,	110868
ATS 5, MAGNETIC FIELD MONITOR SKILLMAN (69-069A-13)	090169	093071 ,	081269
GRS-A, FLUXGATE MAGNETOMETER MUSMANN (69-097A-01)	110869	062870 ,	110869
APOLLO 15 LM, LUNAR SURFACE MAGNETOMETER DYAL (71-063C-03)	073171	102971 ,	072671
APOLLO 16 LM, LUNAR PORTABLE MAGNETOMETER DYAL (72-031C-08)	042172	042372 ,	041672

D.4 MAGNETOSPHERIC PARTICLES

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
EXPLORER 1, COSMIC-RAY DETECTOR VAN ALLEN (58-001A-01)	020158	031658 ,	020158
PIONEER 1, ION CHAMBER SONETT (58-007A-01)	101158	101358 ,	101158
EXPLORER 6, SCINTILLATION COUNTER SONETT (59-004A-02)	080759	100359 ,	080759
EXPLORER 6, ION CHAMBER AND GM COUNTER WINCKLER (59-004A-03)	080759	100659 ,	080759
EXPLORER 7, RADIATION AND SOLAR PROTON VAN ALLEN (59-009A-04)	101359	022861 ,	101359
PIONEER 5, ION CHAMBER AND GM TUBE WINCKLER (60-001A-03)	031160	042960 ,	031160
EXPLORER 10, PLASMA PROBE BRIDGE (61-010A-02)	032561	032761 ,	032561
EXPLORER 11, CRYSTAL SANDWICH/CERENKOV COUNTER GARMIRE (61-013A-02)	042861	111261 ,	042761
INJUN 1, GM COUNTER FRANK (61-015B-01)	062961	083162 ,	062961
INJUN 1, CADMIUM SULFIDE DETECTOR FREEMAN (61-015B-02)	063061	083162 ,	062961
INJUN 1, ELECTRON DIFFERENTIAL ENERGY SPECTROMETER, LAUGHLIN (61-015B-03)	063061	083162 ,	062961
INJUN 1, SOLID-STATE PROTON DETECTOR BOSTROM (61-015B-06)	063061	083162 ,	062961
EXPLORER 12, CHARGED PARTICLES VAN ALLEN (61-020A-03)	081661	120561 ,	081661
EXPLORER 12, COSMIC RAY MCDONALD (61-020A-04)	081661	120661 ,	081661
EXPLORER 12, PROTON-ELECTRON SCINTILLATION DETECTOR DAVIS (61-020A-05)	081661	121861 ,	081661
OSO 1, PROTON ELECTRON ANALYZER SCHRADER (62-006A-11)	030762	071463 ,	030762
TELSTAR 1, PROTON AND ELECTRON RADIATION BROWN (62-029A-01)	071062	022163 ,	071062
MARINER 2, COSMIC RAY IONIZATION ANDERSON (62-041A-04)	082862	123062 ,	082762
MARINER 2, SOLAR PLASMA ANALYZER NEUGEBAUER (62-041A-06)	082962	123062 ,	082762
ALOUETTE 1, ENERGETIC PARTICLES DETECTORS MCDIARMID (62-049A-02)	092962	032664 ,	092962

Continued

SPACECRAFT COMMON NAME- EXPLORER 41 NSSDC ID 69-053A
ALTERNATE NAMES- PL-691K, IMP 5, IMP-G

LAUNCH DATE- 06/21/69 SPACECRAFT WEIGHT IN ORBIT- 79.4 KG

FUNDING AGENCY- NASA-OSSA

DATE LAST USABLE SPACECRAFT DATA RECORDED-122372
SPACECRAFT STATUS OF OPERATION- INOPERABLE

EPOCH DATE- 06/21/69 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 4843. MIN
APOAPSIS- 76434. KM ALT PERIAPSIS- 378.000 KM ALT INCLINATION- 86.78 DEG

SPACECRAFT BRIEF DESCRIPTION

EXPLORER 41 (IMP-G) WAS A SPIN-STABILIZED SPACECRAFT PLACED INTO A HIGH-INCLINATION, HIGHLY ELLIPTIC ORBIT TO MEASURE ENERGETIC PARTICLES, MAGNETIC FIELDS, AND PLASMA IN CISLUNAR SPACE. THE LINE OF APSIDES AND THE SATELLITE SPIN VECTOR WERE WITHIN A FEW DEGREES OF BEING IN AND NORMAL TO, RESPECTIVELY, THE ECLIPTIC PLANE. INITIAL LOCAL TIME OF APOGEE WAS ABOUT 1300 HR. INITIAL SATELLITE SPIN RATE WAS 27.5 RPM. THE BASIC TELEMETRY SEQUENCE WAS 20.48 SEC. THE SPACECRAFT FUNCTIONED VERY WELL FROM LAUNCH UNTIL IT DECAYED FROM ORBIT ON DECEMBER 23, 1972. DATA TRANSMISSION WAS NEARLY 100 PERCENT FOR THE SPACECRAFT LIFE EXCEPT FOR THE INTERVAL NOVEMBER 15, 1971, TO FEBRUARY 1, 1972, WHEN DATA ACQUISITION WAS LIMITED TO THE VICINITY OF THE MAGNETOSPHERIC NEUTRAL SHEET.

EXPERIMENT NAME- SOLAR PROTON MONITORING EXPERIMENT NSSDC ID 69-053A-07

ORIGINAL EXPERIMENT INSTITUTION- APPLIED PHYSICS LAB

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - C.O.	BOSTROM	APPLIED PHYSICS LAB	SILVER SPRING, MD
OI - D.J.	WILLIAMS	NOAA-ERL	BOULDER, CO
OI - D.E.	HAGGE	NASA-JSC	HOUSTON, TX
OI - F.B.	MCDONALD	NASA-GSFC	GREENBELT, MD

DATE LAST USABLE EXPERIMENT DATA RECORDED-122372
EXPERIMENT STATUS OF OPERATION- INOPERABLE

EXPERIMENT BRIEF DESCRIPTION

THE SOLAR PROTON MONITORING EXPERIMENT UTILIZED FOUR SEPARATE DETECTORS, EACH OF WHICH USED ONE OR MORE SOLID-STATE SENSORS. THREE DETECTORS MEASURED THE OMNIDIRECTIONAL FLUXES OF PROTONS AND ALPHA PARTICLES WITH ENERGY PER NUCLEON VALUES ABOVE 10, 30, AND 60 MEV. ALPHA-PARTICLE CONTRIBUTIONS TO THE TOTAL COUNT RATES WERE GENERALLY LESS THAN 10 PERCENT. THE 10-MEV CHANNEL WAS SAMPLED FOR TWO 19.2 SEC INTERVALS EVERY 163.8 SEC AND THE 30- AND 60-MEV CHANNELS FOR ONE 19.2 SEC INTERVAL EVERY 163.8 SEC. RESULTANT HOURLY AVERAGED FLUXES HAVE BEEN PUBLISHED IN SOLAR-GEOPHYSICAL DATA (NOAA, BOULDER) ON A RAPID BASIS. THE FOURTH DETECTOR HAD A 60-DEG FULL LOOK ANGLE NORMAL TO THE SPACECRAFT SPIN AXIS. EACH OF TWO DISCRIMINATION LEVELS WAS SAMPLED FOR TWO 19.2 SEC INTERVALS EVERY 163.8 SEC. FLUXES OF 1- TO 10-MEV/NUCLEON PROTONS AND ALPHA PARTICLES WERE MEASURED IN THE LOWER AND UPPER DISCRIMINATION STATES, RESPECTIVELY. ALL DETECTORS FUNCTIONED NORMALLY FROM LAUNCH UNTIL THE SPACECRAFT DECAYED FROM ORBIT (JUNE 21, 1969 - DECEMBER 23, 1972).

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
EXPLORER 14, TRAPPED PARTICLE RADIATION VAN ALLEN (62-051A-03)	100262	081163 ,	100262
EXPLORER 14, COSMIC RAY MCDONALD (62-051A-04)	100262	081163 ,	100262
EXPLORER 14, PROTON-ELECTRON SCINTILLATION DETECTOR DAVIS (62-051A-05)	100252	081063 ,	100262
EXPLORER 15, ELECTRON AND PROTON SOLID STATE DETECTORS, BROWN (62-059A-01)	102762	010163 ,	102762
EXPLORER 15, DIRECTIONAL AND OMNIDIRECTIONAL ENERGETIC PROTONS AND ELECTRONS, MCILWAIN (62-059A-02)	102762	013063 ,	102762
EXPLORER 15, PROTON-ELECTRON SCINTILLATION DETECTOR DAVIS (62-059A-05)	102862	012763 ,	102762
RELAY 1, SOLID-STATE ION CHAMBER ELECTRON AND PROTON DETECTOR, BROWN (62-068A-02)	121362	033164 ,	121362
RELAY 1, PROTON-ELECTRON DETECTORS MCILWAIN (62-068A-03)	121362	102064 ,	121362
INJUN 3, GEIGER TUBE DETECTORS O'BRIEN (62-067B-01)	121462	102863 ,	121362
INJUN 3, PULSE SCINTILLATOR O'BRIEN (62-067B-02)	121462	102863 ,	121362
INJUN 3, MAGNETIC DIFFERENTIAL ELECTRON SPECTROMETER, O'BRIEN (62-067B-03)	121462	102863 ,	121362
INJUN 3, INTEGRAL MAGNETIC ELECTRON SPECTROMETER O'BRIEN (62-067B-04)	121462	102563 ,	121362
INJUN 3, DC SCINTILLATOR O'BRIEN (62-067B-05)	121462	103163 ,	121362
INJUN 3, ELECTRON MULTIPLIER O'BRIEN (62-067B-06)	121462	102563 ,	121362
TELSTAR 2, PROTON AND ELECTRON RADIATION BROWN (63-013A-01)	050763	050765 ,	050763
1963-038C, ENERGETIC ELECTRON AND PROTON DETECTORS BOSTROM (63-038C-01)	092863	123168 ,	092863
EXPLORER 18, RETARDING POTENTIAL ANALYZER SERBU (63-046A-01)	112763	112763 ,	112763
EXPLORER 18, ION CHAMBER AND GM COUNTERS ANDERSON (63-046A-05)	112763	032665 ,	112763
EXPLORER 18, FARADAY CUP BRIDGE (63-046A-07)	112763	011365 ,	112763
RELAY 2, SOLID-STATE ION CHAMBER ELECTRON AND PROTON DETECTOR, BROWN (64-003A-02)	012164	123165 ,	012164
ERS 13, CHARGED PARTICLE DETECTORS VETTE (64-040C-01)	071764	120864 ,	071764
OGO 1, ELECTRON SPECTROMETER WINCKLER (64-054A-21)	090564	120667 ,	090564
OGO 1, IONIZATION CHAMBER WINCKLER (64-054A-20)	090564	120667 ,	090564
OGO 1, TRAPPED RADIATION SCINTILLATION COUNTER KONRADI (64-054A-16)	090764	111665 ,	090564
EXPLORER 21, ION CHAMBER AND GM COUNTERS ANDERSON (64-060A-05)	100464	092365 ,	100464
EXPLORER 21, RETARDING POTENTIAL ANALYZER SERBU (64-060A-01)	100564	040465 ,	100464
EXPLORER 21, FARADAY CUP BRIDGE (64-060A-07)	101164	092465 ,	100464
EXPLORER 26, PROTON-ELECTRON SCINTILLATION DETECTOR DAVIS (64-086A-04)	120064	060965 ,	122164
EXPLORER 26, SOLID-STATE ELECTRON DETECTOR BROWN (64-086A-01)	122164	051567 ,	122164
EXPLORER 26, OMNIDIRECTIONAL AND UNIDIRECTIONAL ELECTRON AND PROTON FLUXES, MCILWAIN (64-086A-02)	122164	052567 ,	122164
EXPLORER 25, GEIGER-MUELLER COUNTER VAN ALLEN (64-076B-03)	021365	071966 ,	112164
EXPLORER 25, CADMIUM SULFIDE DETECTORS VAN ALLEN (64-076B-05)	021365	071966 ,	112164

Continued

SPACECRAFT COMMON NAME- OV1-13 NSSDC ID 68-026A
ALTERNATE NAMES- PL-682D

LAUNCH DATE- 04/06/68 SPACECRAFT WEIGHT IN ORBIT- 107. KG

FUNDING AGENCY- DOD-USAF

DATE LAST USABLE SPACECRAFT DATA RECORDED-110369
SPACECRAFT STATUS OF OPERATION- INOPERABLE

EPOCH DATE- 04/06/68 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 199.7 MIN
APOAPSIS- 9316.00 KM ALT PERIAPSIS- 558.000 KM ALT INCLINATION- 100.05 DEG

SPACECRAFT BRIEF DESCRIPTION
THIS SPACECRAFT WAS PLACED INTO A POLAR ORBIT TO STUDY ENERGETIC PARTICLE PHENOMENA ALONG ITS ORBIT. THE SPACECRAFT WAS SPIN-STABILIZED, WITH A SPIN PERIOD OF ABOUT 7.5 SEC AND A SPIN AXIS DIRECTION NORMAL TO THE SPACECRAFT ORBITAL PLANE. THE SPACECRAFT PROVIDED USEFUL DATA FROM ITS LAUNCH UNTIL NOVEMBER 3, 1969.

EXPERIMENT NAME- ELECTRON SPECTROMETER NSSDC ID 68-026A-02

ORIGINAL EXPERIMENT INSTITUTION- AFCRL

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - L.	KATZ	AFCRL	BEDFORD, MA
OI - P.L.	ROTHWELL	AFCRL	BEDFORD, MA
OI - J.G.	KELLEY	AFCRL	BEDFORD, MA

DATE LAST USABLE EXPERIMENT DATA RECORDED-081568
EXPERIMENT STATUS OF OPERATION- INOPERABLE

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WAS DESIGNED TO MEASURE ELECTRONS IN EIGHT ENERGY WINDOWS BETWEEN 0.1 AND 1.0 MEV. A MAGNETIC ANALYZER FOCUSED PARTICLES ONTO EIGHT SEPARATE SOLID-STATE DETECTORS ACCORDING TO PARTICLE ENERGY. UPPER LEVEL DISCRIMINATION WAS USED TO REJECT MOST COUNTS DUE TO PENETRATING PROTONS. THE INSTRUMENT LOOK DIRECTION WAS NORMAL TO THE SPACECRAFT SPIN AXIS WHICH WAS ITSELF NORMAL TO THE SPACECRAFT POLAR ORBITAL PLANE. COUNTING IN A GIVEN SOLID-STATE DETECTOR WAS MEASURED 24 TIMES IN 1 SEC, AFTER WHICH THE NEXT DETECTOR WAS SAMPLED. THUS THE FULL EXPERIMENT CYCLE REQUIRED 8 SEC. APPROXIMATELY THE SAME AS THE SPACECRAFT SPIN PERIOD. THE INSTRUMENT PROVIDED USEFUL ELECTRON DATA IN FIVE ENERGY WINDOWS (AT 160, 210, 503, 685, AND 930 KEV) FOR THE PERIOD APRIL 6, 1968 TO AUGUST 15, 1968.

DATA SET NAME- HIGH-TIME RESOLUTION ELECTRON COUNT RATES ON MAGNETIC TAPE NSSDC ID 68-026A-02A

AVAILABILITY OF DATA SET- DATA AT NSSDC BEING PROCESSED

TIME PERIOD COVERED- 051368 TO 071068 (AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA IN THIS DATA SET- 12 REEL(S) OF MAGNETIC TAPE

DATA SET BRIEF DESCRIPTION
THIS DATA SET CONSISTS AT PRESENT OF ELEVEN EXPERIMENTER-SUPPLIED MAGNETIC TAPES OF 7-TRACK, 556-BPI, CDC 6600 BINARY FORMAT. THE PACKED DATA FOUND ON THE TAPES CONTAIN TIME, EPHEMERIS INFORMATION, AND ALL THE COUNT RATES FOR THE LOWER ENERGY (0.1 TO 1 MEV) ELECTRON INSTRUMENT AND THE HIGHER ENERGY (1 TO 10 MEV) ELECTRON INSTRUMENT. THE HIGHER ENERGY DATA, SEPARATELY IDENTIFIED AS DATA SET 68-026A-04A, IS NOT READILY USABLE. EACH TAPE CONTAINS DATA TAKEN DURING ONE SPACECRAFT ORBIT. THERE IS QUIET TIME DATA FOR FIVE ORBITS IN MAY AND FOR SIX ORBITS IN JULY 1968. THESE TAPES ARE BEING USED AT NSSDC IN THE GENERATION OF A QUIET TIME MODEL INNER ZONE ELECTRON ENVIRONMENT. IT IS EXPECTED THAT AS A RESULT OF THIS EFFORT, MORE READILY USABLE TAPES CONTAINING PROTON-BACKGROUND-SUBTRACTED, 1-SEC AVERAGED, LOW-ENERGY ELECTRON FLUXES, POSSIBLY ORDERED BY L RATHER THAN BY TIME, WILL BECOME AVAILABLE.

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
EXPLORER 25, PLASTIC SCINTILLATOR PARTICLE DETECTORS VAN ALLEN (64-076B-06)	021365	071966 ,	112164
EXPLORER 28, RETARDING POTENTIAL ANALYZER SERBU (65-042A-01)	052965	050567 ,	052965
EXPLORER 28, ION CHAMBER AND GM COUNTERS ANDERSON (65-042A-05)	052965	010367 ,	052965
ERS 17, CHARGED PARTICLE DETECTORS VETTE (65-058C-01)	072065	110465 ,	072065
ERS 17, X-RAY DETECTORS VETTE (65-058C-02)	072065	110365 ,	072065
VELA 3A, ELECTROSTATIC ANALYZER AND GM TUBES BAME (65-058A-04)	072665	052170 ,	072065
VELA 3B, HEMISPHERICAL ELECTROSTATIC ANALYZER AND GEIGER COUNTERS, BAME (65-058B-04)	072665	052170 ,	072065
OV1- 2, ELECTRON AND PROTON DETECTORS FARLEY (65-078A-02)	100565	120165 ,	100565
OGO 2, COSMIC-RAY IONIZATION ANDERSON (65-081A-06)	101465	040266 ,	101465
OGO 3, ELECTRON SPECTROMETER WINCKLER (66-049A-22)	060066	050368 ,	060766
OGO 3, IONIZATION CHAMBER WINCKLER (66-049A-23)	060866	081268 ,	060766
OGO 3, TRAPPED RADIATION SCINTILLATION COUNTER KONRADI (66-049A-10)	060966	012667 ,	060766
EXPLORER 33, ION CHAMBER AND GM COUNTERS ANDERSON (66-058A-04)	070166	060967 ,	070166
EXPLORER 33, PLASMA PROBE BRIDGE (66-058A-06)	070166	093069 ,	070166
OGO 3, LOW-ENERGY ELECTRONS AND PROTONS FRANK (66-049A-08)	071466	071666 ,	060766
OV3-3, MAGNETIC ELECTRON SPECTROMETER VAMPOLA (66-070A-05)	080466	090867 ,	080466
ATS 1, ELECTRON SPECTROMETER WINCKLER (66-110A-04)	120966	123067 ,	120766
ATS 1, PARTICLE TELESCOPE BROWN (66-110A-05)	120966	030167 ,	120766
ATS 1, SUPRATHERMAL ION DETECTOR FREEMAN (66-110A-01)	121066	021867 ,	120766
ATS 2, OMNIDIRECTIONAL PROTON AND ELECTRON DETECTORS, MCILWAIN (67-031A-05)	040767	102367 ,	040667
EXPLORER 34, LOW-ENERGY SOLID-STATE TELESCOPE BROWN (67-051A-01)	052467	050369 ,	052467
EXPLORER 34, ION CHAMBER ANDERSON (67-051A-02)	052467	091567 ,	052467
EXPLORER 34, LOW-ENERGY PROTON AND ELECTRON DIFFERENTIAL ENERGY ANALYZER (LEPEDEA), VAN ALLEN (67-051A-04)	063067	070467 ,	052467
EXPLORER 35, ELECTRON AND PROTON DETECTORS VAN ALLEN (67-070A-01)	071967	052870 ,	071967
EXPLORER 35, ENERGETIC PARTICLE ANDERSON (67-070A-02)	071967	072468 ,	071967
OGO 4, LOW-ENERGY AURORAL PARTICLE DETECTOR HOFFMAN (67-073A-11)	073067	012569 ,	072867
OSO 4, PROTON ELECTRON DETECTOR WAGGONER (67-100A-04)	102367	123067 ,	101867
OGO 5, ELECTRON AND PROTON SPECTROMETER WEST, JR. (68-014A-06)	030468	050169 ,	030468
OGO 5, PLASMA SPECTROMETER SNYDER (68-014A-17)	030568	041968 ,	030468
OGO 5, LIGHT ION MASS MAGNETIC SPECTROMETER SHARP (68-014A-18)	030768	053169 ,	030468
OGO 5, PARTICLE WAVE STUDY COLEMAN, JR. (68-014A-13)	030868	021471 ,	030468
OGO 5, PARTICLE WAVE STUDY COLEMAN, JR. (68-014A-13)	030868	021471 ,	030468

Continued

EXPERIMENT NAME- WHISTLER AND AUDIOFREQUENCY ELECTROMAGNETIC WAVES (F-25)

NSSDC ID 69-051A-25

ORIGINAL EXPERIMENT INSTITUTION- DARTMOUTH COLLEGE

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - T.	LAASPERE	DARTMOUTH COLLEGE	HANOVER, NH
OI - M.G.	MORGAN	DARTMOUTH COLLEGE	HANOVER, NH

DATE LAST USABLE EXPERIMENT DATA RECORDED-030072
EXPERIMENT STATUS OF OPERATION- INOPERABLE

EXPERIMENT BRIEF DESCRIPTION

TWO 60-FT ELECTRIC DIPOLE ANTENNAS WERE USED TO STUDY THE PROPAGATION AND CHARACTERISTICS OF WHISTLER-MODE WAVES IN THE IONOSPHERE OVER AN EXTENDED RANGE OF FREQUENCIES. FOUR 15-KHZ BROAD BANDS (0.02 TO 15 KHZ, 15 TO 30 KHZ, 92.5 TO 107.5 KHZ, AND 280 TO 295 KHZ) COULD BE RECEIVED IN REAL TIME, TWO 0.2-KHZ NARROW BANDS (AT 200 AND 540 KHZ) COULD BE TAPE RECORDED, AND A 0.02- TO 1000-KHZ BROADBAND SIGNAL COULD BE RECORDED. THE TAPE RECORDED DATA CONSISTED OF DIGITAL VALUES OF SIGNAL INTENSITIES. THE REAL-TIME DATA WERE NORMALLY CYCLED THROUGH EACH OF THE FOUR BANDS AT A GIVEN GAIN, RECYCLED AT A SECOND OVERLAPPING GAIN, AND FINALLY CYCLED AT A THIRD OVERLAPPING GAIN. THIS WHOLE 12-CYCLE STEP WAS THEN REPEATED. EACH OF THE STEPS IN THE CYCLE REQUIRED 18.4 SEC WHICH MEANS ALL BANDS WERE OBSERVED IN 1.26 MIN, AND ALL BANDS AT ALL GAINS WERE OBSERVED IN 3.7 MIN. THE AUTOMATIC CYCLING COULD BE INTERRUPTED FOR MANUAL CONTROL. THESE REAL-TIME DATA WERE TRANSMITTED ON SPECIAL PURPOSE TELEMETRY TO, AND OBSERVED NEAR, EIGHT LOCATIONS -- QUITO (QUI), ROSSMAN OR OGO CONTROL CENTER (ROS OR OCC), FAIRBANKS (SKA), MADAGASCAR (MAD), WINKFIELD (WNK), JOHANNESBURG (JOB), ORRORAL OR ACTON (ORR OR ACT), AND SANTIAGO (SNT). EVERY 0.144 SEC, THE NARROW-BAND (NB) RECEIVERS RECORDED SIGNAL INTENSITIES OF 200 KHZ SIGNALS FROM BBC ENGLAND, AND OF 540 KHZ SIGNALS FROM NEW MEXICO, OR FROM OTHER EMITTERS AT THOSE FREQUENCIES. THE TAPE RECORDED BROADBAND DETECTOR RECORDED SIGNAL INTENSITY EVERY 18.9 SEC, I.E., ONCE FOR EACH 128 NB OBSERVATIONS AT A GIVEN FREQUENCY. DIGITAL TAPE RECORDED DATA WERE OBSERVED ALMOST CONTINUOUSLY FROM LAUNCH UNTIL SPACECRAFT TURNOFF ON JUNE 28, 1971. REAL-TIME DATA WERE OBTAINED FROM TELEMETRY STATIONS ON ALL SCHEDULED DAYS (2 DAYS OUT OF 6 SINCE THIS WAS ONE OF THREE DIFFERENT EXPERIMENTS SHARING THE SAME SPECIAL PURPOSE TELEMETRY SYSTEM) OVER THE SAME TIME PERIOD. A SPECIAL OPERATION OF THE REAL-TIME BROADBAND RECEIVERS WAS MADE BY RRL, JAPAN, WITH OBSERVATIONS NEAR SIPLE STATION, ANTARCTICA, AND KASHIMA, JAPAN, FROM OCTOBER 1, 1971 TO MARCH 1972.

DATA SET NAME- VLF SPECTROGRAMS

NSSDC ID 69-051A-25A

AVAILABILITY OF DATA SET- DATA AVAILABLE FROM EXPERIMENTER

TIME PERIOD COVERED- 061069 TO 030470 (AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA IN THIS DATA SET- 2032 FRAMES

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF STANDARD SPECTROGRAMS RUN AT 15 IN. OF FILM PER MIN ON 2032 ROLLS OF 35-MM PAPER. EACH ROLL CONTAINS ONE STATION PASS

D.4 MAGNETOSPHERIC PARTICLES (Cont'd)

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
OV1-13, ELECTRON SPECTROMETER KATZ (68-026A-02)	051368	071068	040668
EXPLORER 40, LOW-ENERGY PROTON AND ELECTRON DIFFERENTIAL ENERGY ANALYZER (LEPEDEA), FRANK (68-066B-01)	080968	052970	080868
EXPLORER 41, LOW-ENERGY SOLID-STATE TELESCOPE BROWN (69-053A-01)	062169	081570	062169
EXPLORER 41, ION CHAMBER ANDERSON (69-053A-02)	062169	021872	062169
ATS 5, TRI-DIRECTIONAL MEDIUM ENERGY PARTICLE DETECTOR, MOZER (69-069A-04)	091669	040971	081269
VELA 5A, SOLAR WIND EXPERIMENT BAME (69-046D-05)	110769	022871	052369
VELA 5B, SOLAR WIND EXPERIMENT BAME (69-046E-05)	110769	022871	052369
APOLLO 14 LM, CHARGED PARTICLE LUNAR ENVIRONMENT O'BRIEN (71-008C-08)	020571	031271	013171

D.5 MEASUREMENT OF MAGNETOSPHERE BY WHISTLER AND VLF EMISSIONS

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
INJUN 3, VLF RECEIVER SIGNAL STRENGTH GURNETT (62-067B-09)	122562	102563	121362
P 11-AS, VLF ELECTRIC FIELD DETECTOR SCARF (64-045B-06)	081564	091364	081464
OGO 1, TRIAXIAL SEARCH COIL MAGNETOMETER SMITH (64-054A-01)	090564	111767	090564
OGO 1, WIDE-BAND AND NARROW-BAND STEP FREQUENCY VLF RECEIVERS, HELLIWELL (64-054A-08)	090764	122965	090564
OGO 2, VLF RECEIVERS, WIDE BAND, NARROW BAND, STEP FREQUENCY, AND TUNABLE, HELLIWELL (65-081A-02)	030865	090266	101465
FR 1, VLF RECEIVER STOREY (65-101A-01)	120765	123168	120665
OGO 3, TRIAXIAL SEARCH COIL MAGNETOMETER SMITH (66-049A-12)	060966	042768	060766
ARIEL 3, VLF RECEIVER, FIXED FREQUENCY SIGNAL STRENGTH, KAISER (67-042A-05)	050567	041468	050567
OGO 5, PLASMA WAVE DETECTOR CROOK (68-014A-24)	030568	010371	030468
OGO 5, TRIAXIAL SEARCH COIL MAGNETOMETER SMITH (68-014A-16)	030768	042568	030468
EXPLORER 40, VLF RECEIVER GURNETT (68-066B-02)	080968	052970	080868
OGO 6, WHISTLER AND AUDIOFREQUENCY ELECTROMAGNETIC WAVES (F-25), LAASPERE (69-051A-25)	061069	123170	060569

E. AURORA

All-sky camera photographs are the main type of auroral data, recorded on film (16 or 35 mm) in rolls approximately 100 feet in length. These cameras are located mainly in the northern and southern auroral regions; a few are in the sub-auroral belts. These data are supplemented by photographs of auroras taken by ordinary camera (not all-sky) and telescopes, and by sets of simultaneous photographs from groups of associated stations taken to determine the heights and location of auroras. Spectrographic (patrol spectrograph) data are available; however, though copies may be used for verifying the presence or absence of spectral lines and bands, they cannot be considered suitable for studies for which details are essential, e.g., microphotometry, since normal copying processes introduce uncertainties in spectral resolution and densities. Radar echo (auroral) data are recorded on 16 mm film. The tabulations are divided into northern and southern hemispheres, in north to south order. The symbol A represents data for substantially all of the winter months, while the symbol C represents data for less than all the winter months. To indicate the auroral seasons for northern hemisphere stations the symbol is placed between the calendar years, and for southern hemisphere stations the symbol is placed under the calendar year.

Auroral photographs taken by satellite are an exciting new form of auroral data. They are cataloged under E.5, and a discussion of these data is presented on page 281.

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E.3	Other Optical Techniques (Spectral Lines, etc.) . . .	276
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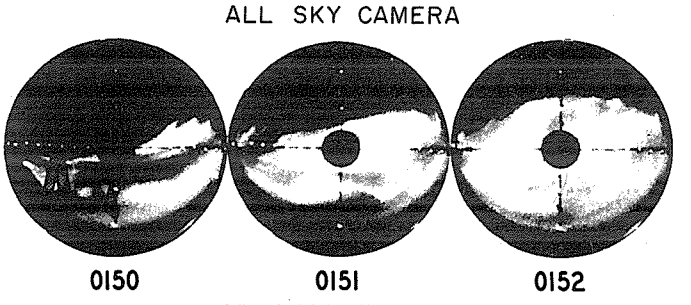
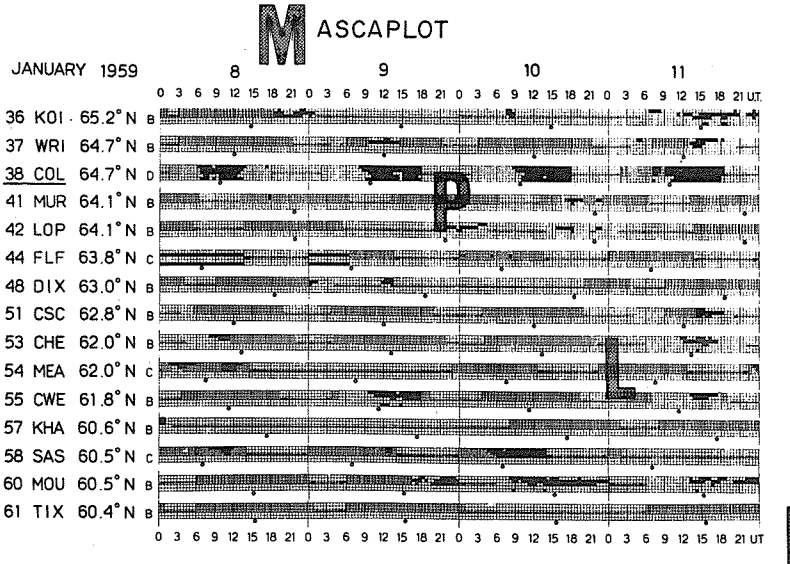
S



College: 0147-0152, 150°WMT, 10 January 1959.

M



P

L

E

AT BOULDER

NORTHERN

STATIONS NORTHERN	GEOGRAPHIC LAT	LONG EAST	YEAR 57-58	58-59	59-60	60-61	61-62	62-63	63-64	64-65	65-66	66-67	67-68	68-69	69-70	70-71	71-72	72-73
ALERT	82N	298	C	C	S													
ARCTICA 1	81N		A	A	S													
NORD	81N	344	Q	Q										Q	P	P	P	P
ARCTIC ICE FLO	80N		A	S														
ARCTICA 11	80N		A	A	S													
ARLIS III	80N								C	S								
FLETCHER S ICS	80N		A	C	S													
HEISS ISLAND	80N	58	A						C	P	P	P	P	P	P	P	P	P
MURCHISON BAY	80N	18	A	S														
T-3	80N									C	A	C	Q	S				
NY-ALESUND	79N	12												Q	P	P	P	P
WIESE IS	79N	77	Q	Q	Q	S												
PYRAMIDA	78N	15	C	C	S													
CAPE CHELYUSKIN	77N	104	A	Q					C	P	P	P	P	P	P	P	P	P
THULE	77N	291	C	A	A	A	A	A	Q	Q	Q	Q	Q	Q	Q	Q	P	P
UEDINENIE IS	77N	82	Q	Q	S													
CAPE ZHELANIA	76N	68	C	S														
KOTELNY IS	76N	137		Q	S													
MOULD BAY	75N	241									A	Q			Q	Q	Q	Q
PREOBRAZHENIE	74N	112		C	S													
RESOLUTE BAY	74N	266	A	A					Q	Q	Q	S						
CAPE SHALAUROV	73N	143	C	Q	S													
DIXON ISLAND	73N	80	A	A					C	P					P	P	P	P
SACHS HARBOUR	72N	235													Q	Q	Q	Q
BARROW	71N	204	A	A	C	Q		Q		A	A	C	Q	S				
MUOSTAKH	71N	130	C	Q	Q	S												
TIXIE BAY	71N	129	C	C	Q				C	P	P	P	P	P	P	P	P	P
WRANGEL ISLAND	71N	182	Q	Q	S													
CAP TOBIN	70N	338													Q	P	P	P
CHETIREKHSTOLBOVOI	70N	162	Q	A	Q	S												
KAZACHIE	70N	136	C	A					C	P	P	P	P	Q	Q	P	P	P
TROMSO	70N	18	A	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	P	P
BAR I	69N	220								A	A	Q	S					
GODHAVN	69N	307	Q	Q											P	P	P	P
MURMANSK	69N	33	A	Q	Q	Q	P	P	A	P	P	P	P	P	P	P	P	P
NORILSK	69N	88														P	P	P
UTSJOKI	69N	27									Q	Q	Q	Q	Q	Q	P	P
ABISKO	68N	18	A	A	S													
AKLAVIK	68N	225	C	C	S													
CAPE SCHMIDT	68N	181	A	Q					C	S								
INUVIK	68N	226												Q	Q	Q	Q	Q
IVALO	68N	27		Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	P	P	P
OLENEK	68N	112	C	C					C	P	P	P	P	P	P	P	P	P
KIRUNA	67N	20	A	C									Q	Q	Q	Q	P	P
NARYAN MAR	67N	53		Q							Q	Q	S					
SODANKYLA	67N	27	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	P	P
SONDER STROMFJORD	67N	310													Q	P	P	P
VERKHOYANSK	67N	133	Q	Q	S									P	P	P	P	P
ALLAKAKET	66N	207									A	Q	S					
BETTLES	65N	209	A	A	Q		C			C	Q	Q	Q	Q	S			

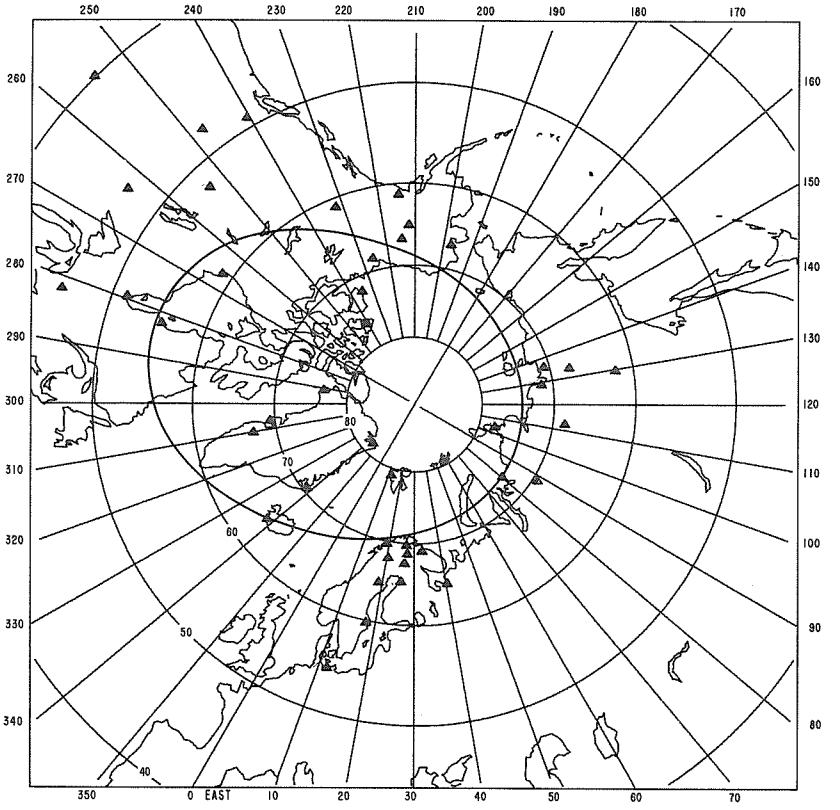
Continued

KEY TO SYMBOLS

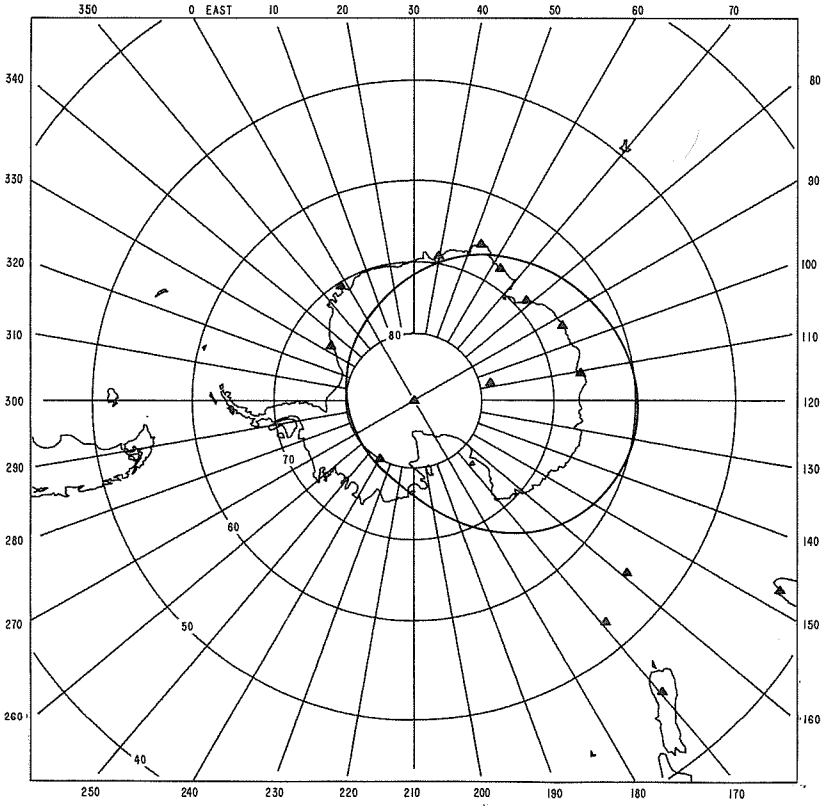
A = All Winter Months
C = Incomplete Winter Months
Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

ALL-SKY CAMERA STATIONS 1973

NORTH



SOUTH



The approximate position of the Feldstein auroral oval at local geomagnetic midnight is indicated.

AT BOULDER

NORTHERN

STATIONS NORTHERN	GEOGRAPHIC LAT	LONG EAST	YEAR 57-58	58-59	59-60	60-61	61-62	62-63	63-64	64-65	65-66	66-67	67-68	68-69	69-70	70-71	71-72	72-73
CAPE WELLEN	66N	191	C	Q	S													
FORT YUKON	65N	215	Q	Q	Q	Q	Q	Q		A		Q	Q	Q	Q	Q	Q	Q
KOTZEBUE	66N	198	Q	Q			Q	Q	Q	A	C	Q	Q	Q	Q	Q	Q	P	P
SALEKHARD	65N	66	C	A	S													
STEVENS VILLAGE	66N	212															Q	Q	Q
EGILSSTADIR	65N	346									A	A	A	A	A	Q	S		
KRISTINEBERG	65N	18	C	A	S														
OULU	65N	25												Q	Q	Q	Q	P	P
ARKHANGELSK	64N	40	Q	A										Q	Q	P	P	P	P
BAKER LAKE	64N	264	A	A	Q					Q	Q	S							
COLLEGE	64N	213	A	A	A	A	A	A	C	A	A	C	Q	Q	Q	Q	Q	Q	Q
EAGLE	64N	219											Q	Q	S				
HEALY	64N	211	C	C	S														
LYCKSELE	64N	18	A	A											Q	P	P	P	P
REYKJAVIK	64N	339	Q	C	C						A	A	A	A	A	Q	Q	Q	Q
NORTHWAY	63N	218		C	S														
FAREWELL	62N	207	A	C	S														
TALKEETNA	62N	210								Q	Q	Q	S						
YAKUTSK	62N	129	Q	Q	Q	Q	Q	Q	C	Q	Q	Q	Q	Q	Q	Q	P	P	P
YELLOWKNIFE	62N	246	C	C	S														
ENNADAI LAKE	61N	260	A	C	S														
NARSSARSSUAQ	61N	318													Q	P	P	P	P
SIKTIVKAR	61N	50	Q	Q					C	S									
TUNGSTEN	61N	232											Q	Q	Q	Q	Q	P	P
JULIANEHAAB	60N	314	C	S															
LERWICK	60N	359								C	S								
ROSCHINO	60N	29	C	Q	S														
WHITE HORSE	60N	225										C	Q	S					
UPPSALA	59N	17	Q												Q	P	P	P	P
ALDAN	58N	125	C	Q	S														
CHURCHILL	58N	267	A	A	Q				Q	Q	Q	Q	Q	Q	Q	Q	P	P	P
FORT SMITH	58N	246																	Q
O DAY	57N	266	C	S															
BIRD	56N	266	A	C	S														
GREAT WHALE	55N	283								Q	Q	Q	Q	Q	Q	Q	Q	P	P
ZVENIGOROD	55N	36	P	P	S														
FLIN FLON	54N	258	A	C	S														Q
KNOB LAKE	54N	294	C	C	C	Q	Q	Q	Q	Q	Q	C	S						
MEANOOK	54N	247	C	A	C				Q	Q	Q	Q	Q	S					
SASKATOON	52N	254	A	A	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	P	P	P	P
MOOSENEE	51N	279												Q	Q	Q	Q	P	P
REGINA	50N	256	A	C	S														
MOUNT KOBAU	49N	119											Q	Q	Q	P	P	P	P
VICTORIA	48N	237	C	C	S														
CHOTEAU	47N	248	A	A	Q	Q	Q	Q	Q		C	A	C	P	P	P	P	P	P
FARGO	45N	264	A	A	A	Q	Q	Q	Q	A	A	P	P	P	P	P	P	P	P
PRESQUE ISLE	46N	292								Q	A	S							
PULLMAN	46N	243	C	A	A	Q	Q	Q	Q	A	A	C	S						
SHINGLETON	46N	274	A	A	S														
LAKE TRAVERSE	45N	282										Q	Q	Q	Q	Q	Q	P	P

Continued

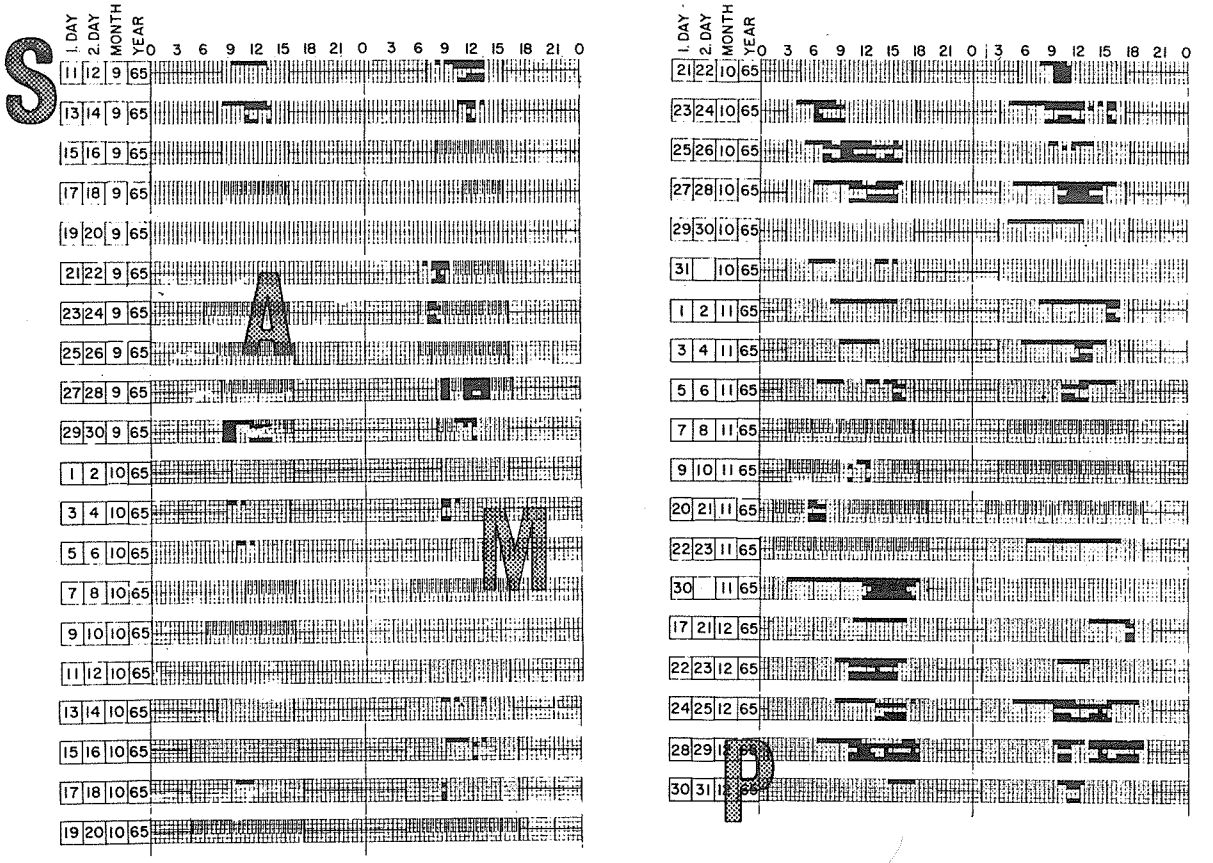
KEY TO SYMBOLS

A = All Winter Months
C = Incomplete Winter Months

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

ASCAPLOTS

ALLAKAKET



AMUNDSEN SCOTT

AT BOULDER

NORTHERN

STATIONS NORTHERN	GEOGRAPHIC LAT	LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
OTTAWA	45N	285	A	A	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	S			
RAPID CITY	44N	257	C	C	S														
REDMOND	44N	239	A	A	A	Q	Q	Q	S										
HANOVER	43N	288	C	A	Q	Q	Q	Q	Q	Q	A	C	S						
ITHACA	42N	284	A	A	A	C	C				C	C	S						
POCATELLO	42N	248	A	A	A	Q	Q	Q	Q	S									
VERMILLION	42N	264	A	A	Q	Q	Q	Q	S										
WILLIAMS BAY	42N	272	A	A	Q	Q	Q	S											
DELAWARE	40N	277	A	A	Q	Q	S												
FRITZ PEAK	39N	255	C	C						Q	Q	Q	Q	Q	Q	Q	P	P	P

SOUTHERN

STATIONS SOUTHERN	GEOGRAPHIC LAT	LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
CAMDEN	34S	150	C	C	S														
MELBOURNE	37S	145	A	C	S														
HOBART	43S	147	C	C	S														
LAUDER	45S	169														P	P	P	P
AWARUA	46S	168	A	A	S														
CAMPBELL IS	52S	169	C	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	P		
MACQUARIE	54S	159		C				C	A	A	Q	Q	Q	Q		Q	Q	P	P
O HIGGINS	63S	303	A	C	S														
GONZALES VIDELA	64S	298	C	C	S														
CASEY	66S	111													Q	Q	Q	P	P
MIRNY	66S	93	A	C						Q	Q				P	P	P	P	P
NOVOLAZAREVSKA	66S	53									Q					P	P	P	P
OASIS	66S	100	A	Q	S														
WILKES	66S	110	A	A	A				A	Q	Q	A	Q	Q	S				
MAWSON	67S	62	A	A					A	Q	A	Q	Q	Q	Q	Q	Q	P	P
DAVIS	68S	78	A	A						Q					Q	Q	P	P	P
SYOWA BASE	69S	39			A	A							Q	Q	Q	Q	Q	P	P
ROI BAUDOUIN	70S	23		Q		Q	S												
SANAE	70S	358													P	P	P	P	P
CAPE HALLETT	72S	170	C	A					A	S									
EIGHTS STATION	75S	283							A		A	S							
HALLEY BAY	75S	334	A	A	A	A				C	A	Q	Q	Q	Q	Q	P	P	P
ELLSWORTH	77S	319	A	A	C	C	A	S											
SCOTT BASE	77S	166	A	A	S														
BELGRANO	78S	322		A						A	A	A	S						
LITTLE AMERICA	78S	196	A	A	S														
VOSTOK	78S	106		A	A						Q				P	P	P	P	P
PLATEAU	79S	40										Q	Q	Q	Q	S			
BYRD	80S	241	C	A	A	A	A	A	A	A	A	Q	Q	Q	Q	Q	Q	Q	P
AMUNDSEN-SCOTT	90S		A	A	A	A	A	A	A	A	A	Q	Q	Q	Q	Q	Q	P	P

PUBLICATIONS:

1. Southernmost limits of outstanding aurora as reported by U.S. - Canada, Western Europe and USSR have been published as "Calendar Records" or "Abbreviated Calendar Records" in the following:

   Annals of IGY, Vol. XVI, Parts I and III, Pergamon Press, 7/1957 - 12/1959
   Annals of IQSY, MIT Press, Vol. 2, 1/1960 - 12/1965
   IQSY Notes, IQSY Secretariat, London, 1/1964 - 12/1966
   World Data Center A, UAG Report Series #4, 1/1966 - 12/1967
   STP Notes, IUCSTP, NAS, Washington, D. C., 1/1967 - 11/1968
   Solar-Geophysical Data, NOAA, 12/1968 to date

2. JARE Data Reports, Records of All-Sky Camera Utilization at Syowa Station, Antarctica, 1966-1970.

3. IQSY Ascaplots, Greenland, 1964-1965.

4. IQSY Ascaplots from 20 U.S. All-Sky Camera Stations, July 1964 - November 15, 1967, Univ. of Alaska.

E.2 VISUAL OBSERVATIONS

The visual data held at Boulder were transferred from the center at Ithaca, New York, in July 1968. Currently there are no routine visual observations being received.

Visual data have been the main data obtained in the sub-auroral and min-auroral belts. The observers included members of the meteorological services.

Some of the data are on punched cards. All cards give a description of certain angular intervals of the north-south meridian. The intervals correspond to degrees of latitude for forms 100 km high. Each card from the Weather Bureau system contains six hourly reports of this type, while the volunteers (Canadian and United States) and Antarctic cards refer to a single time. Every card contains the latitude of the observer, the time of the observation, and information about color and motion, in addition to the description of the auroral forms and intensity in each angular interval of the meridian.

The punched cards are designed to facilitate listing auroral data by latitude of the aurora rather than that of the observer; geographic or geomagnetic latitude can be used. The Weather Bureau data are listed by longitude and latitude for every hour, while the other programs are listed by latitude and time.

The IGY, IGC, and IQSY auroral data from Canada and the United States are plotted on hourly maps, drawn to a scale of about 170 miles to the inch. Microfilm copies of the maps have been sent to WDCs B and C. The northern hemisphere data for the IGY and the IQSY have been collected into Northern Hemisphere Synoptic Auroral Maps and copies of these maps have been exchanged between the Data Centers. Some final maps for the IGY have been published in the Annals of the IGY and the IQSY final maps are available.

The above maps give two geographic coordinates at a given time, but there are many purposes for which it is more valuable to have latitude and time plotted as variables, for a given longitude. Such a plot is called a Visoplot; all three WDCs supplied them for publication in the IGY Annals. The Visoplots show the position of the aurora, or its inferred position, or its known absence. North American Visoplots also show the type of form present. Each Visoplot covers 45° of geomagnetic latitude and 24 hours of Universal Time, and applies to one of the two sectors of geomagnetic longitude which cover the western hemisphere.

The majority of the reports are on the special forms provided during the IGY-IGC programs. When these showed no aurora, they were not put on IBM cards, but are still available for the maps and for reference.

The Antarctic workers kept aurora log books, which are stored at WDC-A. These include, in some cases, summaries of the relevant data. Written observations by mariners are on file, mostly taken from the Monthly Notices of the Hydrographic Office.

The IQSY All-sky Camera data from many of the All-sky cameras run by College, Alaska, were put on special report forms and were used for inclusion in the synoptic maps.

The IBM cards have been analyzed for various projects, and written reports are on file in multilith form. These reports cover the South Pole observations, the Ellsworth observations, a tentative list of aurora sizes during the IGY, and statistical analyses of the Visoplot data. Most of them are available in IGY General Report No. 12 of WDC-A, or the Visual Aurora Series (in limited supply).

Digests of the above data are available. The main ones are:

1. IGY General Report #12, "Report on IGY Visual Aurora Observations"

2. Volumes 1 - 10 of the description and analysis of data at the Visual Aurora Subcenter while at University of Cornell are available. Volume 1 is a collection of data studies published previously as the experimental part of "The Origin and Morphology of the Aurora." Volume 2 and 7 are digests of auroral theories. Volume 8 includes a summary of studies on the auroral-radio effects conducted by the University of Cornell and a summary report on the Visual Aurora Newsletters. Volume 9 is a collection of data on the auroral zones and conjugate points.

3. "North American Visoplots," Canadian-US IGY data

4. IQSY Northern Hemisphere Synoptic Auroral Maps.

AREA	TYPE OF DATA	PERIOD COVERED
Central America		
Cuba	Reports on 09/23/57 and 02/11/58 aurora	
Mexico	Reports on 09/23/57 and 02/11/58 aurora	
North America		
Canada	IBM cards	IGY
	Visoplots for Annals	IGY
	Maps of aurora	01/64-03/68
United States		
Alaska	IBM cards for 14 USWB stations	07/57-12/65
	All-sky camera auroraplots	01/64-12/65
Continental U.S.	Graphic reports from volunteers	07/57-06/68
	IBM cards from USWB	07/57-12/65
	All-sky camera auroraplots	01/64-12/66
Ships	Reports from U.S. Naval Hydrographic Office	07/57-12/59
Antarctic	IBM cards and log books	
	Wilkes	IGY-IGC
	Ellsworth	IGY
	Little America	IGY
	Byrd	01/57-11/61, 1964-65
	Amundsen-Scott	01/57-11/62, 1964-65
	Eights	1965
South America		
Argentina	Reports from Antarctic and Argentine observers	IGY
	Visual observations from Ellsworth	01/60-12/63
	Visual observations from Base Sobral and Base Belgrano	01/64-12/65
Chile	Weather Bureau type cards for O'Higgins (Risopatron), and Gonzales Videla	IGY
Australasia		
Australia	Reports from Mawson, Antarctic, July 1957-October 1958, giving time of auroral sighting	07/57-10/58
	Preliminary reports of aurora seen from Australia (Date, time, duration, location of observer and number of reports)	IGY-IGC
New Zealand	Summary reports on date, time and type of aurora seen in New Zealand, parts of Australia, and Campbell Island	IGY
Antarctic	Hallett Station	
	IBM cards, 1957	IGY
	Daily and Monthly Logs	IGY
	Scott Base	
	Daily and Monthly Logs	IGY
Japan	Copies of all IGY publications dealing with the aurora, including auroral reports from the Antarctic and from Japan	07/57-10/67
Europe		
Belgium	Observations at Base Roi Baudouin	IGY
Czechoslovakia	Antarctic Data	03/65-09/65
Denmark	Danish Visual Observations	1957/1960
France	Kerguelen Islands Data	11/57-03/59, 01/64-12/65
German FR	List of reports from ships and volunteers	07/57-12/64
Hungary	Reports on the 02/11/58 aurora	
Rumania	Reports on the 09/29/57 and 07/09/58 auroras	
Sweden	Visual aurora index	IGC, 01/63-12/66
WDC-A Processed Data	IGY cards from volunteer reports	07/57-12/67
	15-hour summary of USWB reports	IGY-IGC
	Hourly data plot of USWB reports	07/57-12/65
	List of all Antarctic Data	IGY-1965
	Maps of all North American data	IGY-06/68
	First stage maps of Alaska and United States data	01/59-08/60, 01/64-12/65
	Microfilm of maps	IGY, 1964, 1965
	WDC-A Visoplots	IGY
	Greatest Southern Extent List	IGY-IGC 01/60-06/68
	Occurrence List	07/57-06/68
	Summary of color and motion	IGY
WDC-B	Catalogue for period 07/01/57-06/30/65	
	Greatest Southern Extent List sector C, D, E	IGY-IGC
	Visual Observations	07/57-11/57
	Visual Observations for selected days	12/57-12/58
	Microfilm of Visoplots	IGY
	Maps	01/64-12/65
WDC-C	Tabular plots for sector B	IGY
	Jodrell Bank Auroral Radar	07/57-10/57
	Greatest Southern Extent List sector B	IGY-IGC, 1960-1964
	South African Auroral Observations	09/29/57
	Halley Bay Report	IGY-IGC, 1960
	Visual Observations from Atlantic and Europe	IGY-IGC-IQSY
	British Antarctic Survey Report	1957-1965

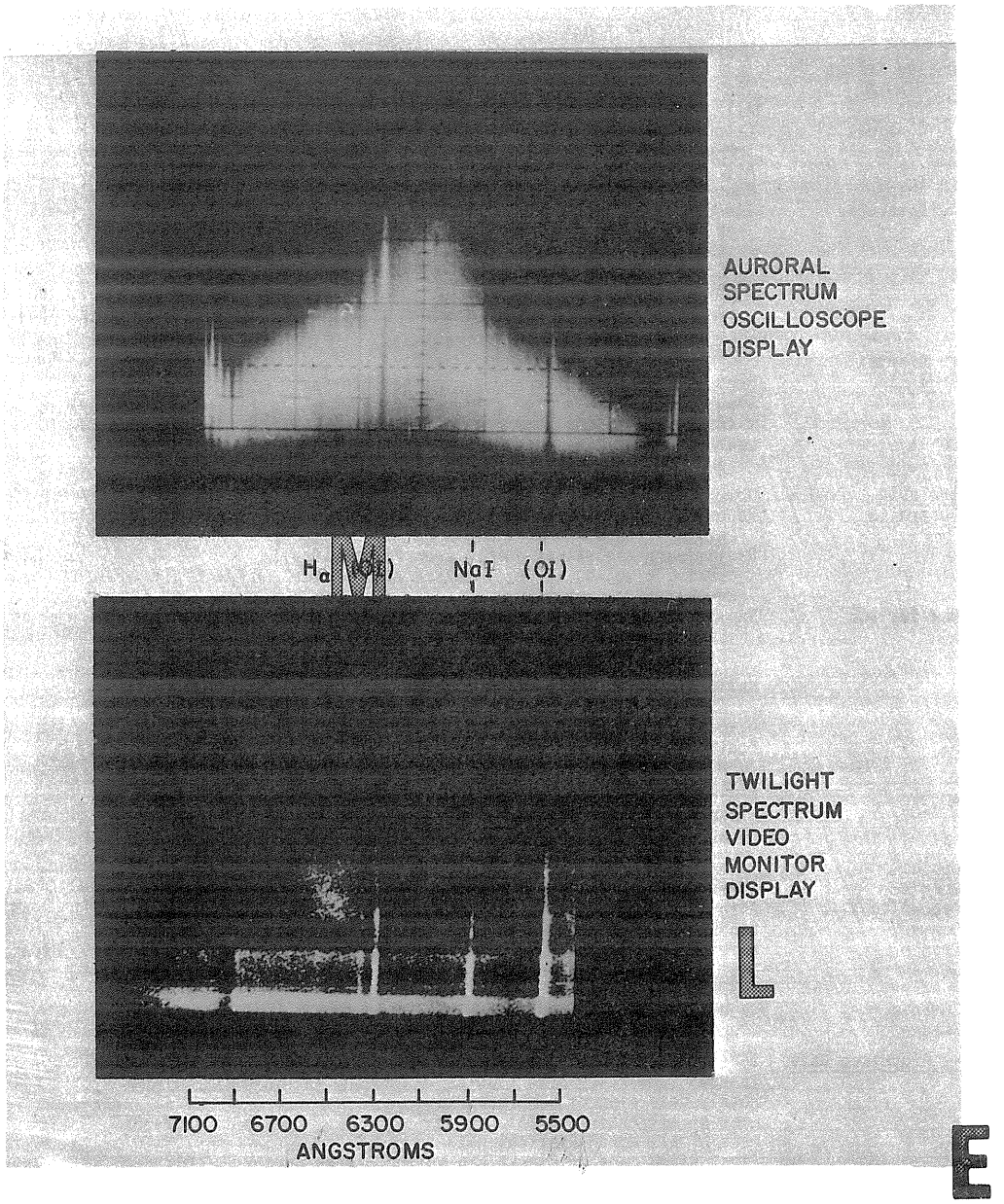


Fig. 4. Examples of two readout methods used with the TV spectrograph. The top spectrogram is an oscilloscope trace of the entire video signal. The bottom spectrogram is a twilight spectrum taken from the video monitor and including the wavelength region 5500 to 7500 A. The exposure is one second.

E.3 PATROL SPECTROGRAPH

AT BOULDER

NORTHERN

STATIONS NORTHERN	GEOGRAPHIC LAT	LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
ARCTIC ICE FLO	80N		C	S															
THULE	77N	291	A	A	C											Q	P	P	P
RESOLUTE BAY	74N	266	C	C	S														
MURMANSK	69N	33														P	P	P	P
MIRNY	66S	93															P	P	P
BAKER LAKE	64N	264	C	C	S														
COLLEGE	64N	213	A	C	C											Q	P	P	P
YAKUTSK	62N	130	C													P	P	P	P
MEANOOK	54N	247	C	C	S														
SASKATOON	52N	106	C	C												Q	P	P	P
SHINGLETON	46N	274	A	A	S														
RAPID CITY	44N	257	C	S															
ANDOVER	42N	289	C	S															
ITHACA	42N	284	C	C	S														
WILLIAMS BAY	42N	272	C	C	C	S													
FRITZ PEAK	39N	255	C	S												Q	P	P	P
ALAMORGORDO	32N	255	C	C	S														

PATROL SPECTROGRAPH

SOUTHERN

STATIONS SOUTHERN	GEOGRAPHIC LAT	LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
INVERCARGILL	46S	168	A	C	S	Q		Q	S										
MIRNY	66S	93														Q	P	P	P
WILKES	66S	110	A	A	A					Q	Q	Q	Q	S					
CAPE HALLETT	72S	170	A	A	A					S									
ELLSWORTH	77S	319	A	A		Q		Q	S										
LITTLE AMERICA	78S	198	A	A	S	Q		Q	S										
BYRD	80S	241	A	A	A											Q	P	P	P
AMUNDSEN-SCOTT	90S		C	A	A											Q	P	P	P

KEY TO SYMBOLS

A = All Winter Months
C = Incomplete Winter Months

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

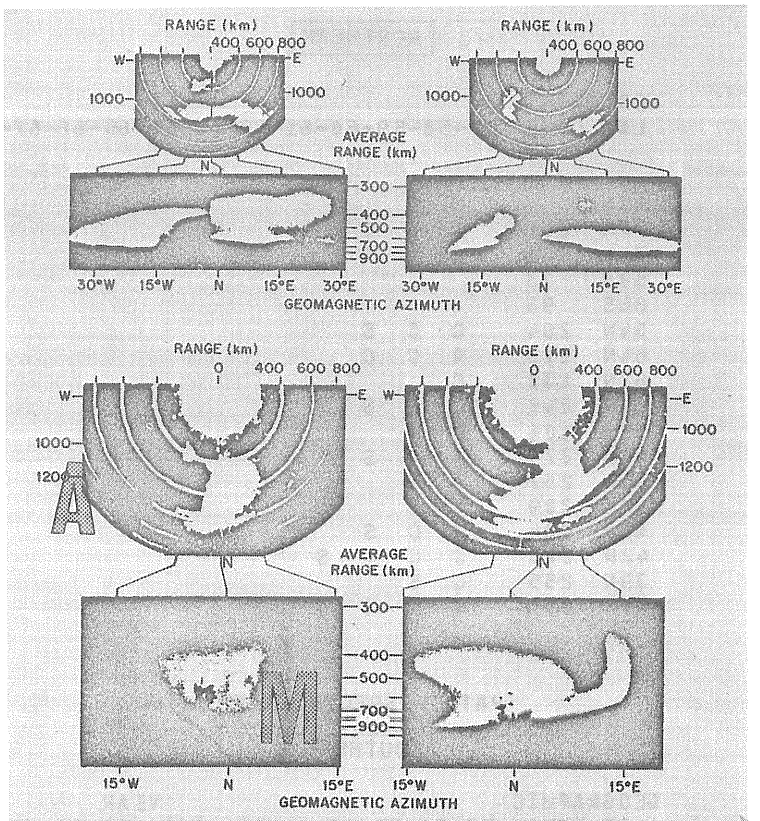
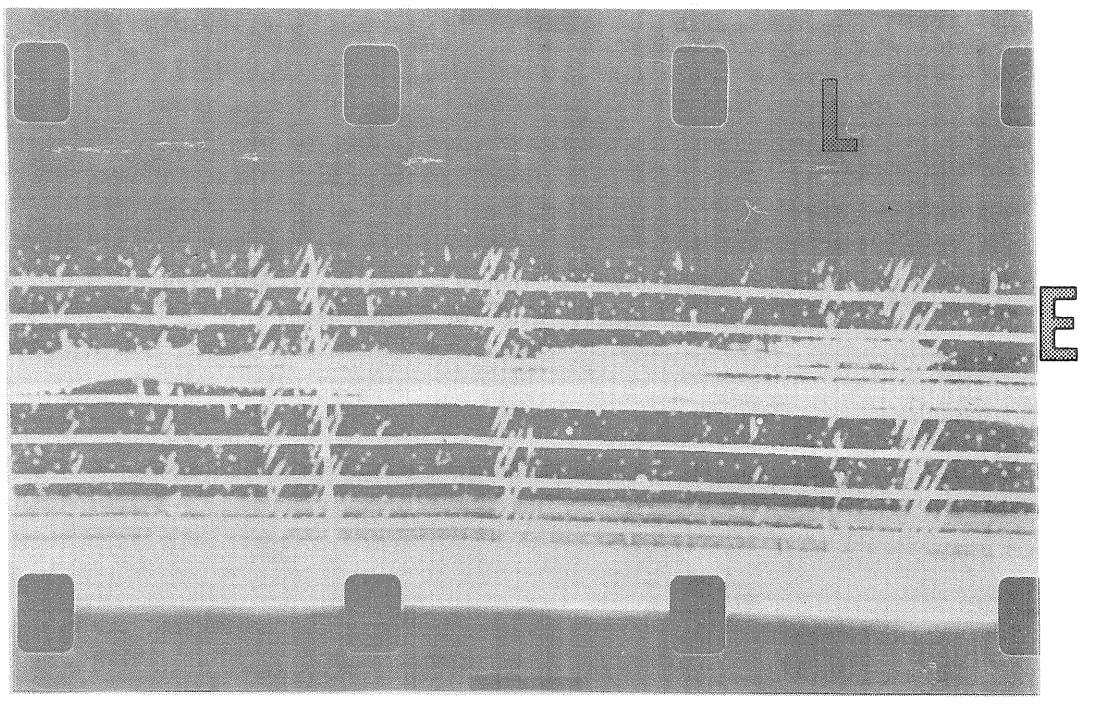


FIG. 5. Photographs of visible aurora compared with PPI presentations of 106-Mc/sec radar echoes taken simultaneously at College, Alaska.



AT BOULDER

E.4 AURORAL RADAR

NORTHERN

STATIONS NORTHERN	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
TIXIE BAY	72N	129													Q	Q	P	P	P
BARROW	71N	204	A	A	S														
MURMANSK	69N	33													Q	Q	P	P	P
KOTZEBUE	66N	198	C												Q	Q	P	P	P
COLLEGE	64N	213	A	A	A	A	C								Q	Q	P	P	P
FAREWELL	62N	207	C	C	S														
YAKUTSK	62N	130													P	P	P	P	P
CHURCHILL	58N	266												Q	Q	Q	P	P	P
KING SALMON	58N	204		C	C	S													
GREAT WHALE	55N	283												Q	Q	Q	P	P	P
THOMPSON	55N	263												Q	Q	Q	P	P	P
KUHLUNGSBORN	54N	12														Q	P	P	P
UNALASKA	53N	194		C	S														
OTTAWA	45N	284												Q	Q	Q	P	P	P
RAPID CITY	44N	257		C	S														
ITHACA	42N	284	C	C									S						

SOUTHERN

STATIONS SOUTHERN	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
HOBART	43S	147														P	P	P	P
MIRNY	66S	93														P	P	P	P
SYOWA BASE	69S	40														P	P	P	P

KEY TO SYMBOLS

A = All Winter Months
C = Incomplete Winter Months

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
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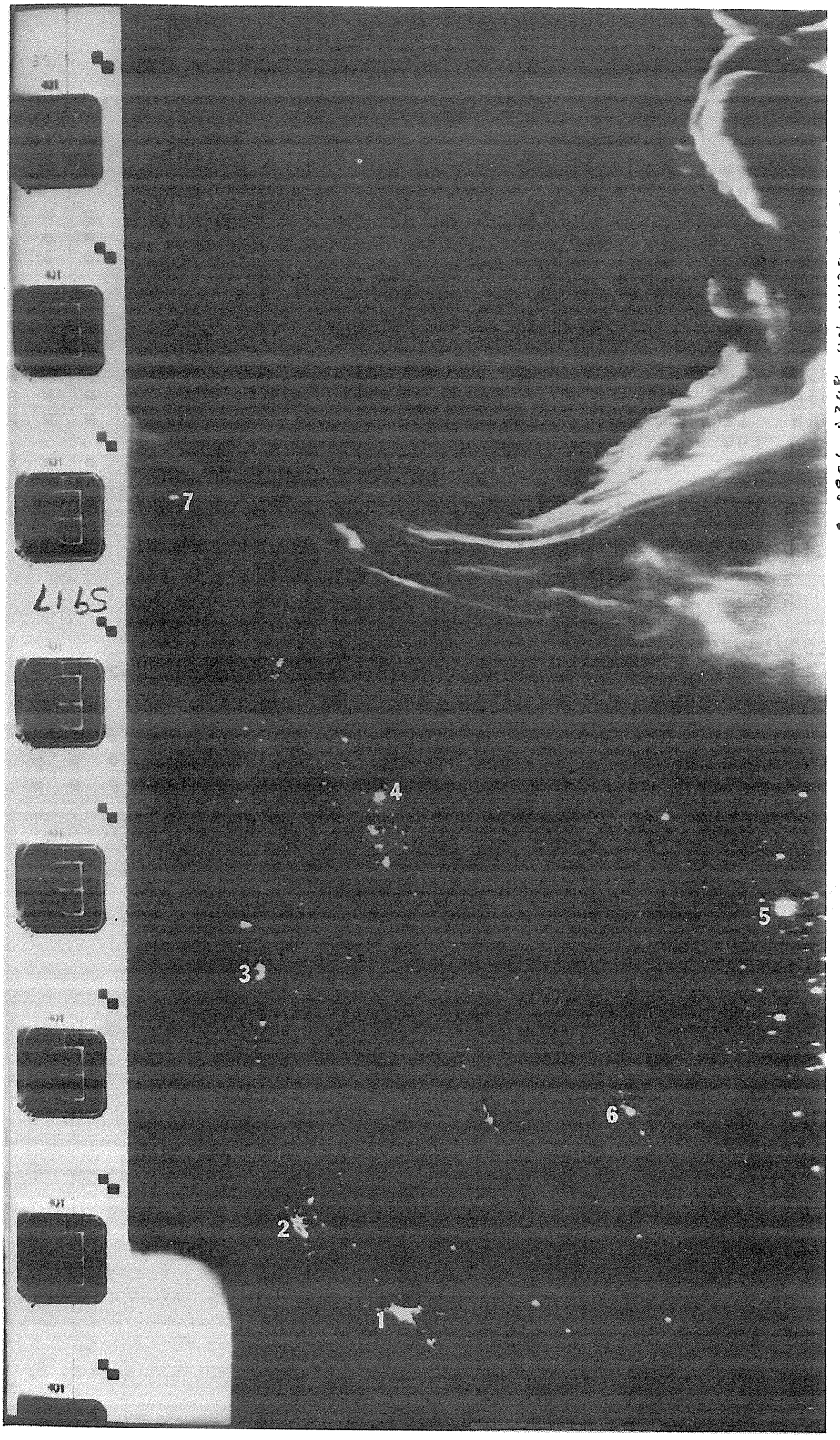
E.5



City Identification

1. Los Angeles
2. San Francisco
3. Seattle area
4. Edmonton
5. Minneapolis - St. Paul
6. Denver
7. Oil well flare near Norman Wells

Sample of satellite auroral imagery showing auroral features as well as lights from locations on the ground. From a USAF DAPP satellite in dawn-dusk orbit.

At Boulder

WDC-A for Solar-Terrestrial Physics has access to the satellite auroral imagery which are archived in the U.S. national data center (NGSDC) at Boulder. Requests will be honored at the costs indicated below.

The data are from the U.S. Air Force's "DAPP" satellites and are provided through the cooperation of the USAF Air Weather Service. These satellites are in sun-synchronous orbits with 99° inclination, with altitudes ranging from 815 to 850 km (orbital period about 102 minutes). Data from both dawn-dusk and noon-midnight orbits are included. The NGSDC archives comprise the nighttime high-latitude imagery from these satellites.

Images telemetered from camera systems aboard the satellites show a nearly 3000 km-wide strip of the earth. During passages over the earth's dark side the automatically adjusted cameras record auroral phenomena when present. The monitoring systems are sensitive to the wavelength range of 4,000-11,000 Å with peak sensitivity approximately 8000 Å. Geographic positions of auroral forms can be determined by the automatically recorded ephemeris information along with overlay grids, and by ground features indicated by lights or terrain, when visible.

NGSDC microfilms the original auroral imagery on 35 mm film. Special copying procedures have been developed to retain maximum resolution and to control contrast. NGSDC prepares both film copies and paper prints. The film copies are organized by month and contain the available data from the DAPP satellites and both hemispheres. A microfilm strip of the ephemeris data and the universal grids is sent with the film. Microfilm copies can be either negative (dark aurora) or positive (light aurora).

The photographic prints (8" x 10") from the negative microfilm are available in two grades: standard (semi-mat, mass produced) and custom (glossy, individually produced). The standard prints are more contrasty and consequently lose faint auroral features, e.g., diffuse aurora. The annotations, or labels, on the prints (and microfilm images) give the date, time (UT), and longitude of equatorial crossing for the semi-orbit as well as satellite number, orbit number, and the geographic pole. With this information and from city lights and terrain features when shown on the print, one can locate the auroral features fairly accurately. For additional cost, the corresponding precise ephemeris information (geographic latitude and longitude) and universal grids can be provided for individual prints or a series of prints.

The data now available are as follows:

		Approximate no. of images*	Satellite: Noon-Midnight	Satellite: Dawn-Dusk
1972	June (18-28 only)	30	Yes	No
	July	50	Yes	No
	August	250	Yes	No
	September	250	Yes	No
	October	500	Yes	Yes
	November	200	Yes	Yes
	December	500	Yes	Yes
1973	January	400	Yes	Yes
	February	400	Yes	Yes
	March	500	Yes	Yes
	April	300	Yes	Yes
	May	350	Yes	Yes
	June (1-10 only)	130	Yes	Yes

* Many images require two or more microfilm frames.

The price for microfilm copies (user should specify whether positive or negative) is $21.00 for a full month and $143.00 for 12 months for data from June 1972 to June 1973. For later data, the price is tentatively set at $40.00 and $400.00, respectively, since these data are being copied by a higher quality process.

The prices for 8" x 10" paper prints are $1.00 each for standard prints and $2.00 for custom prints. An additional charge of $10.00 will be made for precise ephemeris information accompanying individual or consecutive series of prints.

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
INJUN 3, AURORAL AND AIRGLOW PHOTOMETERS O'BRIEN (62-067B-08)	121462	102863 ,	121362
OGO 4, COSMIC RAY IONIZATION ANDERSON (67-073A-07)	073067	081167 ,	072867
OGO 4, LOW-ENERGY AURORAL PARTICLE DETECTOR HOFFMAN (67-073A-11)	073067	012569 ,	072867
OGO 4, AIRGLOW PHOTOMETER REED (67-073A-12)	081967	012968 ,	072857

F. COSMIC RAYS

The data are taken from observations made with the following types of cosmic ray instruments:

Super Neutron Monitor
Neutron Monitor
Cubical Meson Telescope
Ionization Chamber
Underground Telescope
Narrow Angle Telescope
Shower Apparatus (non-synoptic)

The cosmic ray stations are arranged in order of vertical cutoff rigidities, in Bv, calculated using the 6-degree quiescent magnetic field coefficients by Finch-Leaton for epoch 1955.0. Whether the data are both corrected and uncorrected data, pressure-corrected data only, or uncorrected data only, is indicated.

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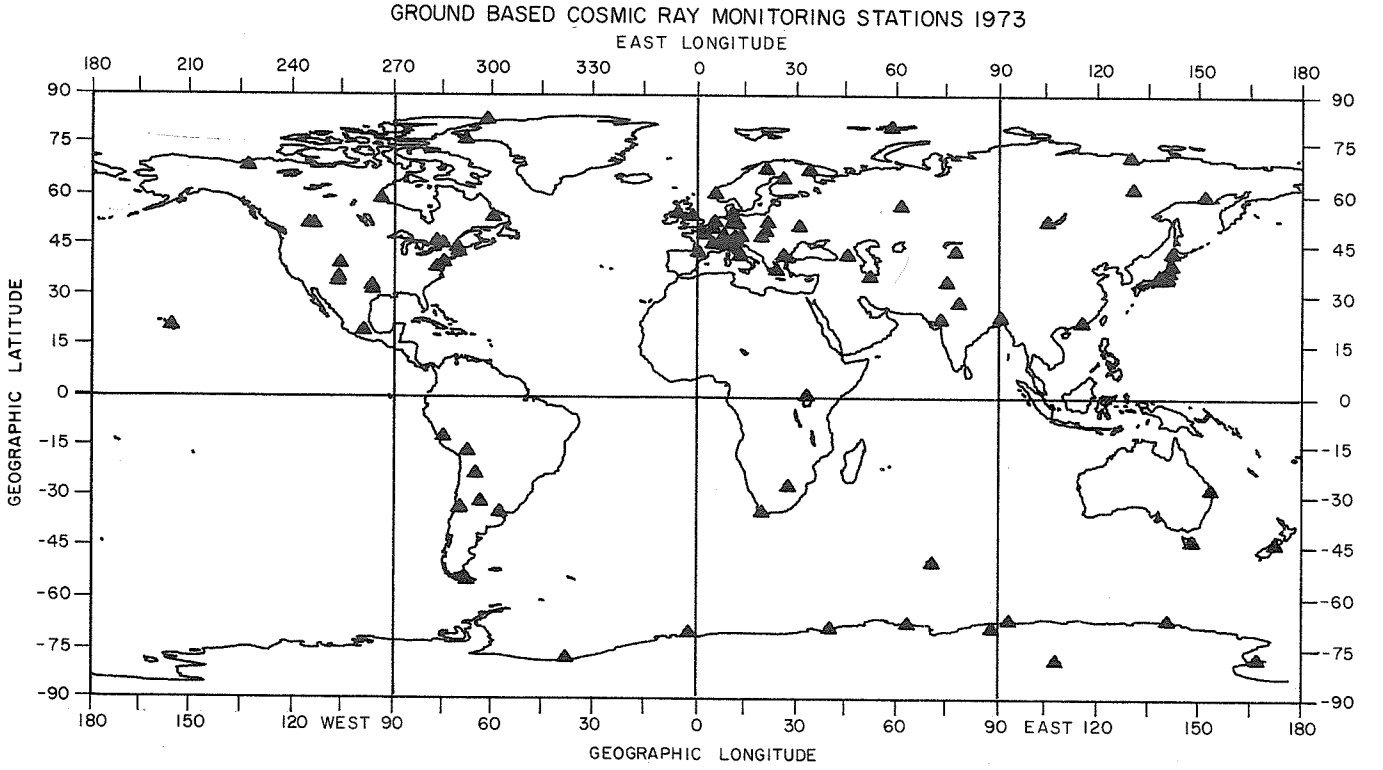

F.1

Asymptotic Viewing directions for Cosmic-ray Stations

Cosmic-ray stations located on the surface of the earth view the galactic cosmic-ray flux in interplanetary space through an acceptance cone defined by the geomagnetic field. As a result of the geomagnetic bending induced by the earth's magnetic field these asymptotic cones of acceptance generally lie to the east of the station. Cosmic-ray neutron monitors located at extremely high geomagnetic latitudes view in relatively narrow well-defined cones far above the ecliptic plane. At less extreme latitudes in the polar region the viewing directions are contained in wider but still well defined cones extending somewhat above the equatorial plane. The viewing direction of these stations are often referred to as the "polar ring". For mid and low latitude stations the asymptotic directions (direction of the particle velocity vector at the magnetospheric boundary) lie near the equatorial plane.

The asymptotic cone of the principal response of each neutron monitor was derived utilizing the neutron monitor differential response function of Lockwood and Webber (1967), and the asymptotic directions published by McCracken et al. (1965) and Shea et al. (1968). For the rigidity range used in the accompanying figures only very minor perturbations occur due to the external fields contained in the magnetosphere.

Figure A illustrates the well defined asymptotic cone of the high latitude neutron monitors generally considered to be those stations located at vertical cutoff rigidities of less than 1 GV. The concept of the "polar ring" is illustrated in this figure. The rigidity range for the principal response of these stations was considered to be the rigidity interval from 3.5 to 13.0 GV.

Figure B illustrates the asymptotic longitude of the principal response of mid-latitude neutron monitors (vertical cutoff rigidities of 1-9 GV) to the galactic cosmic-ray flux. The rigidity range for the principal response of these stations was considered to be from 3.5 to 13.0 GV, or, for stations where the cutoff rigidity is greater than 3.5 GV, the principal response was considered to be the rigidity interval from the geomagnetic cutoff to 13.0 GV. In addition to the principal response longitude illustrated here there is a diffuse lower energy "tail" that extends to the East around the world in the equatorial plane. If the asymptotic longitude in the principal response cone breaks up into a penumbral structure, the asymptotic longitude of the approximate "main cone" cutoff rigidity is indicated by the boxed rigidity value.

Figure C illustrates the asymptotic longitude of the approximate principal response of the low-latitude neutron monitors to the galactic cosmic-ray flux. Since the mean response rigidity of these stations to the galactic cosmic radiation is considerably higher than the mid or high latitude stations the rigidity range selected for the approximate principal response was from the main cone cut-off of each station to 20 GV. The boxed numbers may be used to provide an indication of the rigidity range where a significant portion of the mean response occurs. The asymptotic cones of stations displaced more than $\sim$ 15 degrees in latitude from the cosmic-ray equator break up into a diffuse penumbral structure at rigidities just above the cut-off. This is indicated in this figure by the notation PEN. Truly equatorial neutron monitors have a relatively well defined asymptotic cone that does not break up into a penumbral structure.

REFERENCES

LOCKWOOD, J. A. and W. R. WEBBER — JGR, 1967, p. 3395.

McCRACKEN, K. G., U. R. RAO, B. C. FOWLER, M. A. SHEA and D. F. SMART — Cosmic Ray Tables (Asymptotic Directions, Variational Coefficients and Cut-off Rigidities), IQSY Instruction Manual No. 10, May 1965.

SHEA, M. A., D. F. SMART, K. G. McCRACKEN and U. R. RAO — Supplement to IQSY Instruction Manual No. 10, Cosmic Ray Tables, AFCRL-68-0030, January 1968.

F 1

ASYMPTOTIC CONES OF THE PRINCIPAL RESPONSE OF NEUTRON MONITORS TO THE GALACTIC COSMIC-RAY FLUX

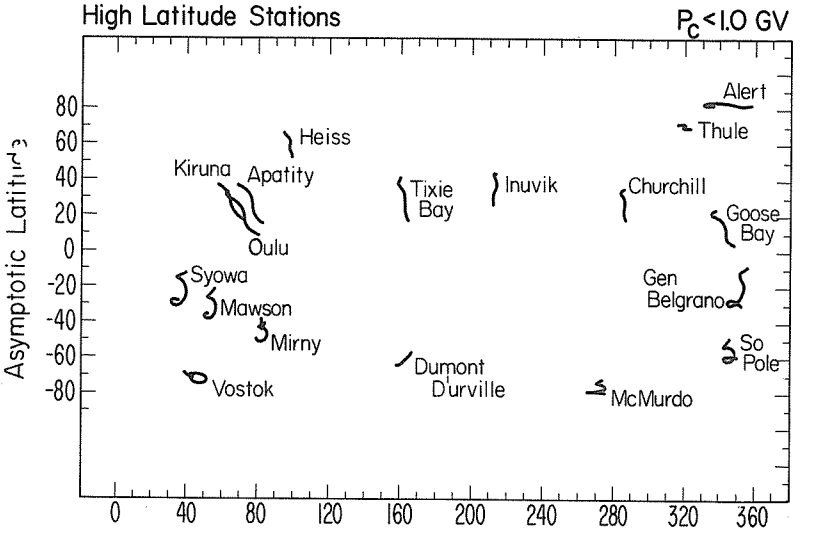

Fig. A

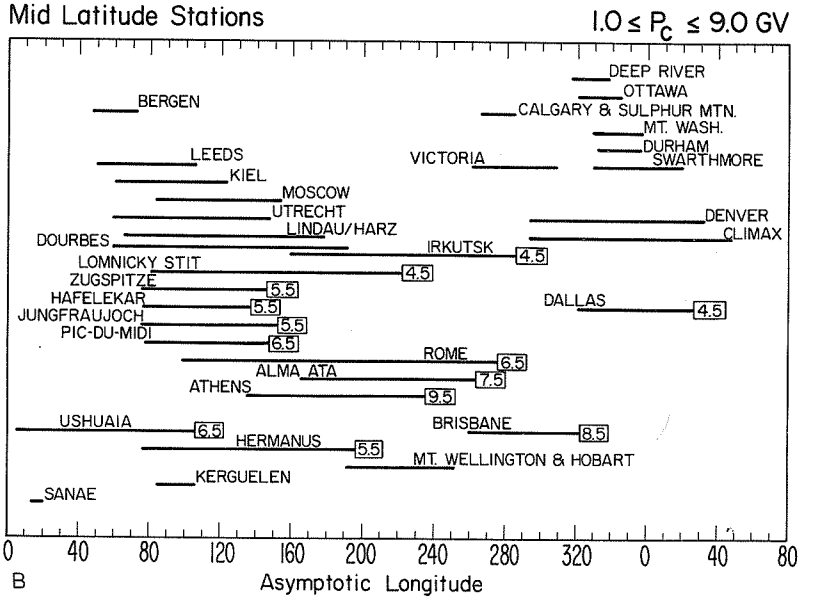

Fig. B

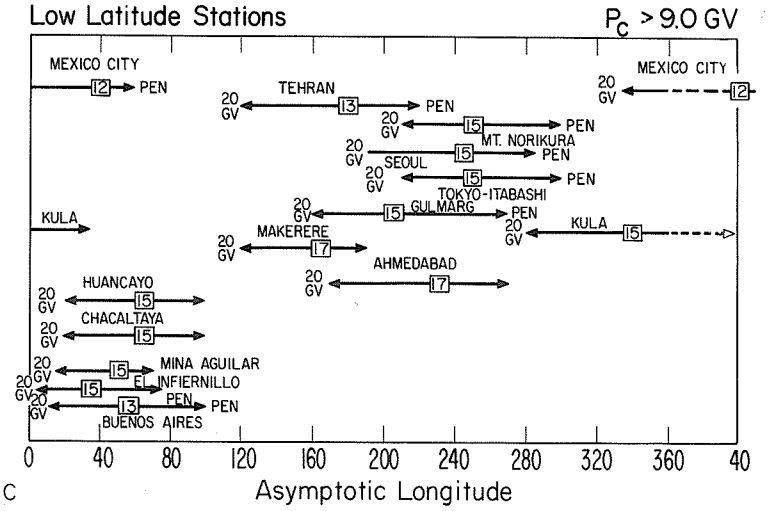

Fig. C

AT BOULDER

NEUTRON MONITOR DATA

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	CUT-OFF RIGIDITY
VOSTOK	78S	106									B3	B3	A3	A3	A3	Q	Q	Q	Q	00.00
RESOLUTE	74N	265	B1	A1	A1	A1	A1	A1	A1	A1	B1	B1	S+							00.00
THULE	76N	292	C2	A2	A2	A2	A2	A2	A1	B1	S+									00.00
CASEY	66S	110													A1	S				00.01
DUMONT D URVILLE	66S	140											C1	C1	S+					00.01
MCMURDO	77S	166				B1	A1	A1	A1	B1	S+									00.01
WILKES	66S	110						B2	A2	A1	A2	A1	A2	C2	C1	S				00.01
CAPE HALLETT	72S	170					C2	A2	S											00.04
MIRNY	66S	93			A1	A1	A1	A1	A1	A1	P		A3	A3	A3	A3	Q	Q	Q	00.04
MURCHISON BAY	80N	18	C1	A1	C1	S														00.06
HEISS IS	80N	57		B1	A3	A1	A1	A2	A2	A2	A1	A1	Q	Q	C2	Q	Q	Q	Q	00.09
SOUTH POLE	90S	360								B1	A1	A1	A1	A1	A1	A1	A1	B1	Q	00.11
CHURCHILL	58N	266	B1	A1	A1	A1	A1	A1	A1	A1	S+									00.21
MAWSON	67S	62	A1	A1	A1	A1	A2	A2	A2	A2	A2	A2	A2	A1	A1	A1	A1	Q	Q	00.22
SYOWA BASE	69S	39				B2							S+							00.42
MURMANSK	68N	33		C2	A1	A3	A3	S												00.50
COLLEGE	64N	213	C1	B1	C1	B1	A1	A1	A1	A1	B1	A1	A1	C1	S					00.54
CAPE SCHMIDT	68N	180											C1	B2	QS					00.60
APATITY	67N	33						B2	A2	A1	A2	A2	A2	B2	S+					00.65
ELLSWORTH	77S	319			B2			S												00.79
DEEP RIVER	46N	283	B1	A1	A1	A1	A1	A1	S+											01.02
OTTAWA	45N	285	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	B1	Q	01.08
BERGEN	60N	5									Q	Q	A2	A2	Q	Q	Q	Q	Q	01.13
SULPHUR MT	51N	245	B1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	B1	Q	Q	01.14
MT WASHINGTON	44N	289	B2	A2	A2	A1	A1	A1	A1	A1	A2	A1	A2	A2	A2	A2	A2	B2	Q	01.24
NORTHFIELD	44N	267		A1	S															01.43
UPPSALA	59N	17	A2	A1	A1	A1	A1	A1	A2	A2	Q	C2	A2	A2	A2	A2	B2	C2	S	01.43
YAKUTSK	62N	129	B1	A1	A1	A2	A2	A2	A2	A1	A2	A2	A1	B2	B2	S				01.70
CHICAGO	41N	273	B1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	C1	S		01.72
AWARUA	46S	168	C1	A1	A1	C1	S													01.86
HOBART	42S	147											B1	A1	A1	A1	A1	Q	Q	01.89
MT WELLINGTON	42S	147	A2	A2	A2	A2	A2	A2	B2	A2	A2	A2	C2	S+						01.89
LEEDS	53N	359	B2	A2	A2	A2	A2	A2	A2	A2	C2	S+								02.20
LINCOLN	40N	264	B1	A1	A1	A3	A3	B3	S											02.22
KIEL	54N	10	B1	A1	A1	A1	A1	A1	A1	B1	S+									02.29
KUHLUNGSBORN	54N	11								A1	B1	A2	B2	S						02.43
MOSCOW	55N	37		B2	B2	B2	B2	A2	A2	A2	A1	C1	S+							02.46
LONDON	51N	360				C2	A2	A2	A2	A1	C1	S								02.73
NEDERHORSTDENBERG	52N	5		B1	A1	A1	A1	A1	B1	A1	B1	S								02.76
DENVER	39N	255								A1	A1	A1	Q	Q	Q	Q	S+			02.91
HERSTMONCEJX	50N	0	B1	A1	A1	B1	S													02.92
GOTTINGEN	51N	9	B1	A1	C1	S														03.00
LINDAU	51N	10			B1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A3	Q	Q	03.00
CLIMAX	39N	254	B1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A2	C1		03.03
HALLE	51N	12					A2	A2	A2	A2	A2			A2	A2	A2	C2	S		03.07
DOURBES	50N	4													A2	C2	S+			03.24
WELLINGTON	41S	174	B1	B1	S															03.42
PRAGUE	50N	14			B3	A3	B3	B3	S											03.53
IRKUTSK	52N	104		B1	B1	B3	B3	B3	A3	A2	A2	A2	S+							03.74
LOMNICKY STIT	49N	20		A1	B1	C3	S			B2	A2	A2	A2	B3	B3	Q	Q	Q	Q	04.00
FREIBURG	48N	0	B2	A2	A2	A2	S													04.10

Cont'd.

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months
+ = Continued with Super Neutron Monitor See Super NM listing.

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

1 = Both corrected and uncorrected data
2 = Pressure-corrected data only
3 = Uncorrected data only

COSMIC RAY DATA. PHYSICS DEPARTMENT, UNIVERSITY OF TASMANIA.

STATION: MAWSON, ANTARCTICA. (67° 36'S, 62° 53'E). Sea Level. OCTOBER, 1964.
RECORDER: TRIPLEX NEUTRON MONITOR. Exponential correction, attenuation length 138 gm/cm^2.
TABULATED: Hourly count totals corrected to standard pressure of 990 millibars.
REAL COUNTS = 64 x tabulated counts.

Hour GMT.	Date. 01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
01	589	608	604	593	597	595	602	604	593	607	605	598	599	599	607	591	602	598	600	590	598	597	599	596	597	597	595	602	603	600	595
02	607	601	599	588	590	595	602	605	598	605	599	603	601	606	601	608	607	605	599	599	590	597	605	604	599	596	591	607	602	604	593
03	595	603	602	591	590	596	587	600	587	609	600	597	599	596	599	589	606	595	598	591	592	597	594	605	599	598	602	600	604	601	599
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05	589	604	594	590	597	597	601	600	587	600	609	595	594	603	599	595	603	591	597	597	604	598	599	601	599	607	594	598	596	595	603
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14	600	605	605	595	593	601	607	604	593	606	599	598	[illegible]01	600	600	603	607	602	600	603	600	601	601	597	592	595	596	595	603	601	598
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Σ	14393	14428	14323	14406	14329	14400	14405	14422	14436	14324	14325	14426	14357	14345	14414	14436															
M	599.7	601.2	596.8	600.3	597.0	600.0	600.2	600.9	601.5	596.8	596.9	601.1	598.2	597.7	600.6	601.5															
	14488	14324	14324	14427	14448	14371	14417	14386	14323	14291	14392	14378	14299	14372	14421															
	603.7	596.8	596.8	601.1	602.0	598.8	600.7	599.4	596.8	595.5	599.7	599.1	595.8	598.8	600.9															

Normalizing factor = 0·9966.

AT BOULDER

NEUTRON MONITOR DATA

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	CUT-OFF RIGIDITY
MUNICH	48N	11			B1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	S				04.14
WEISSENAU	47N	9	B1	A1	C1	S														04.16
ZUGSPITZE	47N	11	B1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	Q	04.24
JUNGFRAUJOCH	46N	8		C1	A2	A2	B2	B2	B2	A2	A1	A1	A1	A1	A1	B1	A1	B1	Q	04.48
WHITE MOUNTAIN	37N	242									C2	A2	A1	A1	A1	S				04.48
BERKELEY	37N	238	B2	A2	B2	S														04.54
SYDNEY	33S	151	A2	A2	A2	S														04.69
HERMANUS	34S	19	B1	A1	A1	A1	A2	B2	B2	C2	S+									04.90
PIC DU MIDI	42N	0	C1	B1	A1	A2	A2	A2	A2	P	S+									05.36
SIMFEROPOL	44N	34					B2			B2	S									05.51
USHUAIA	54S	292	B1	B2	B2			B2	A2	A2	C2	B2	A2	A2	A2	B2	A2	B2	Q	05.68
ROME	41N	12	B1	A1	A1	A1	A1	A1	A1	A1	A1	A3	S+							06.32
MUSSALA	42N	23									Q	Q	Q	Q	A3	Q	Q	Q		06.45
TBILISI	42N	44					C2		B2	A2	A2	A2	B2	A1	B2	Q	A	A2	Q	06.67
ALMA ATA	43N	76	B1	A1	A1	B3	A2	A2	A2	A2	A2	A2	A1	A1	A1	A2	A2	B2	Q	06.69
BRISBANE	27S	152												A1	A1	A1	A1	Q	Q	07.21
POTCHEFSTROOM	27S	27															B1	A1	Q	07.30
MEXICO CITY	19N	261													A1	A1	A1	Q	Q	09.53
MORIOKA	39N	141														Q	Q			10.16
BUENOS AIRES	34S	302	B2	A2	A2	A2	B2	A2	B2	A2	C2	B2	S+							10.63
MT NORIKURA	36N	137	A2	A2	A1	A2	A2	A2	A2	A2	A2	A2	A2	B2	S+					11.39
CORDOBA	31S	296								B1	A1	A1	A1	A1	B1	B1	C1	Q	Q	11.45
EL INFIERNILLO	33S	289												Q	Q	Q	Q	Q		11.45
RIO DE JANEIRO	22S	317	C1	A1	A1	A1	A1	A2	S											11.73
GULMARG	34N	74												Q	Q	Q	Q	Q		11.91
MINA AGUILAR	23S	295	B2	A2	A2	A2	A2	A2	A2	A2	A2	A2	A2	A2	A1	Q	Q	Q	Q	12.51
CHACALTAYA	16S	292							B1						S+					13.10
MAKAPUU PT	21N	203	B1	A1	A1	A1	A1	A1	B1	S										13.23
HALEAKALA	20N	204	B1	A1	A1	A1	A1	A1	A1	A1	A1	A1	C1	S						13.30
HUANCAYO	12S	285	A2	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A2	B2	Q	13.45
ALIGARH	28N	78																Q	Q	14.85
MAKERERE	00N	32	C1	A1	A1				B2	B2	B2	B1	C2	C2	Q	Q	Q	Q	Q	14.98
LAE	06S	147	B1	A1	B1	B3		C3	B3	B3	A3	C3			S					15.52
AHMEDABAD	23N	73	B1	A1	C1	A3	B3	A3	A3	B3	S			+						15.94
DACCA	23N	90										B2	B2	B2	Q	Q	Q	Q		16.22
KODAIKANAL	10N	77	B1	A1	A1	A3	A3	A3	A3	B1	S									17.47

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S = Program STOPPED operations (see MASTER STATION LIST for actual date)

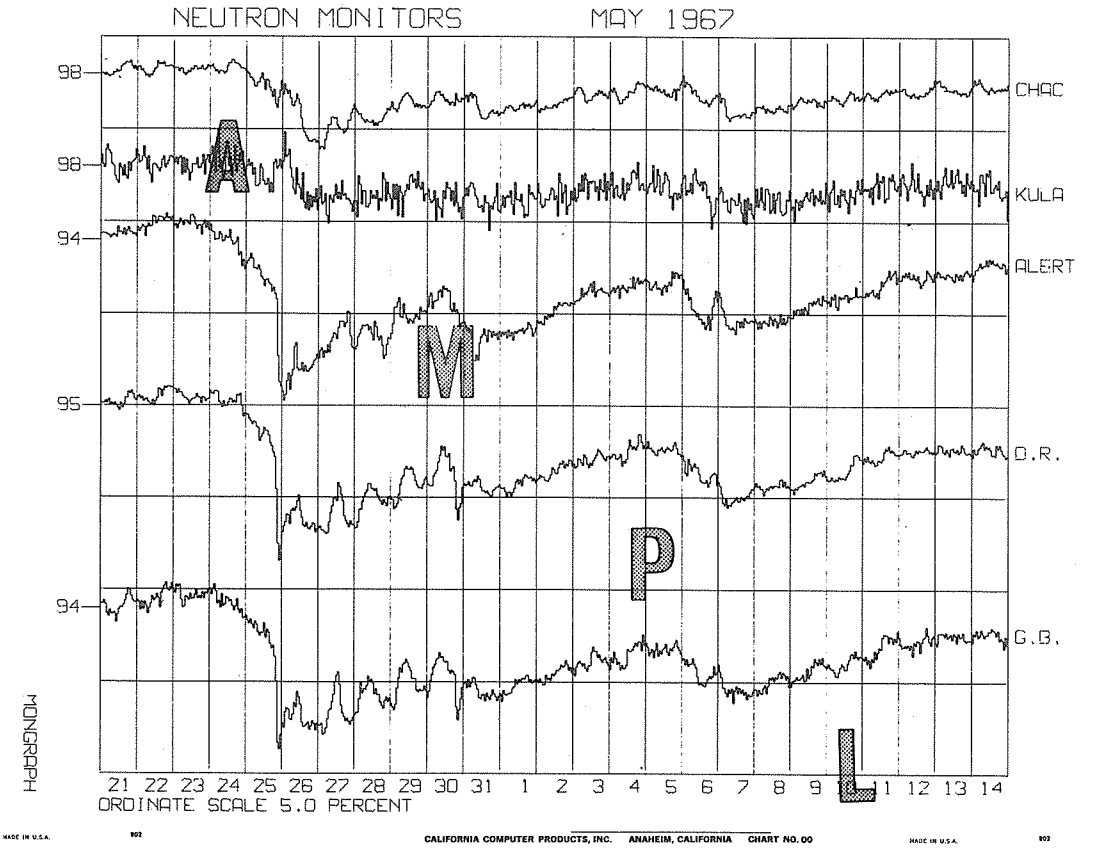
1 = Both corrected and uncorrected data
2 = Pressure-corrected data only
3 = Uncorrected data only

PUBLICATIONS:

1. *Ground-based cosmic ray instrumentation catalog*, by M. A. Shea, *AFCRL-72-0411*, 17 July 1972, (A comprehensive listing of ground-based cosmic ray detectors in operation from 1932 through 1971, giving pertinent information and data availability for each sensor. Includes neutron monitors, muon, detectors and ionization chambers.)

2. The Science Council of Japan has published tables and graphs of neutron intensities and meson intensities from July 1, 1957 through December 1967 in a series of 15 bulletins entitled *COSMIC RAY INTENSITY*. WDC-C2 for Cosmic Rays, Cosmic Ray Laboratory, Institute of Physical and Chemical Research, Itabashi, Tokyo 173, Japan, prepared these publications.

F.1 S


NEUTRON MONITORS MAY 1967
98
98
94
95
94
CHAC
KULA
ALERT
D.R.
G.B.
21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 7 8 9 10 11 12 13 14
ORDINATE SCALE 5.0 PERCENT
MONOGRAPH
MADE IN U.S.A.
802
CALIFORNIA COMPUTER PRODUCTS, INC. ANAHEIM, CALIFORNIA CHART NO. 00
MADE IN U.S.A.
802

A M P L E

AT BOULDER

SUPER NEUTRON MONITOR DATA

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	CUT-OFF RIGIDITY
ALERT	82N	298									C1	A1	A1	A1	A1	A1	A1	C2	Q	00.00
RESOLUTE	74N	265										B1	A1	A1	A1	B1	Q	QS		00.00
THULE	76N	292								C1	A1	A1	A1	A1	A1	A1	A1	B1	Q	00.00
DUMONT D URVILLE	66S	140												B2	A2	A2	A2	A2	C2	00.01
MCMURDO	77S	166								B1	A1	A1	A1	A1	A1	A1	A1	B1	Q	00.01
INUVIK	68N	227								B1	A1	A1	A1	A1	A1	A1	A1	C1	Q	00.18
CHURCHILL	58N	266								B1	A1	A1	A1	A1	A1	A1	A1	B1	Q	00.21
SYOWA	69S	39											Q	Q	Q	Q	Q	Q	Q	00.42
GOOSE BAY	53N	300								C1	A1	A1	A1	A1	A1	A1	A1	C1	Q	00.52
TIXIE BAY	71N	128										C1	A1	A1	A1	A1	C1	C2	Q	00.53
KIRUNA	67N	20														A2	B2	C2	Q	00.54
NORILSK	69S	88															C2	C2	Q	00.63
APATITY	67N	33												C2	B2	B2	B2	B2	Q	00.65
GENERAL BELGRANO	77S	321															Q	Q	Q	00.77
OULU	65N	25								B1	A1	A1	A1	A1	A1	A1	A1	B1	C1	00.81
DEEP RIVER	46N	283						B1	A1	A1	A1	A1	A1	A1	A1	A1	A1	C2	Q	01.02
SANAE BASE	70S	358								B1	A1	A1	A1	A1	A1	A1	A1	Q	Q	01.02
CALGARY	51N	246								A2	A2	A1	A1	A1	A1	A1	B1	A1	Q	01.09
SULPHUR MT	51N	245								A2	A2	A1	A1	A1	A1	A1	B1	A1	Q	01.14
PORT AUX FRANCAIS	49S	70								A2	A2	A2	A2	A2	A2	A2	A2	A2	C2	01.19
DURHAM	43N	290								B2	A2	A2	A2	B2	A2	A2	A2	B1	Q	01.41
VICTORIA	48N	237								C1	A1	A1	A1	A2	B2	Q	Q	S		01.86
MT WELLINGTON	42S	147														Q	Q	Q		01.89
BELFAST	54N	355										Q	Q	Q	Q	Q	Q	Q	P	01.92
SWARTHMORE	39N	285								B1	A1	A1	A1	A1	A1	A1	A1	B1	Q	01.92
MAGADAN	60N	151															A2	Q	Q	02.10
LEEDS	53N	359									B1	A2	A2	A2	A1	A1	Q	Q	Q	02.20
KIEL	54N	10									C1	A1	A1	A1	A1	A1	A1	A1	C1	02.29
MOSCOW	55N	37										B2	A1	B1	A1	A2	A2	A2	Q	02.46
UTRECHT	52N	4													B1	A1	B1	Q	Q	02.69
DENVER	39N	255											A1	A1	A1	A1	Q	Q	Q	02.91
LINDAU	51N	10									A2	A2	A2	A2	A2	A2	B2	Q	Q	03.00
DOURBES	50N	5													A2	A2	B2	B2	C2	03.24
GIF SUR YVETTE	48N	2										Q	Q	Q	Q	Q	Q	Q		03.61
KIEV	51N	30															A2	A2	A2	Q	03.62
IRKUTSK	52N	104											B1	A1	A1	A2	B2	C2	Q	03.74
PREDIGTSTUHL	48N	13													A1	A1	B1	A1	Q	04.30
DALLAS	32N	264								B1	A1	A1	A1	A1	A1	A1	A1	A1	Q	04.35
HAFELEKAR	47N	11												B2	A2	A1	C2	Q	Q	04.37
HERMANUS	34S	19								C1	A1	A1	A1	B1	A1	A1	A1	B1	Q	04.90
PIC DU MIDI	42N	0								A2	A2	A2	A2	A2	A2	A2	A2	B2	C2	05.36
KHABAROVSK	48N	135															A2	A2	Q	05.54
ROME	41N	12										B3	B3	A2	A2	A2	A2	Q	Q	06.32
ATHENS	38N	23													Q	C1	B1	B1	Q	08.72
MEXICO CITY	19N	261															Q	Q	Q	09.53
FUKUSHIMA	37N	140															Q	Q	Q	10.55
TEHRAN	35N	51														Q	Q	Q		10.56
BUENOS AIRES	34S	302												B2	A2	B2	Q	Q	Q	10.63
MT NORIKURA	36N	137												C2	A2	A2	A2	C2	C2	11.39
TOKYO-ITABASHI	35N	139													Q	Q	Q	Q	Q	11.61
CHACALTAYA	16S	292										C1	A1	A1	A1	A1	Q	Q	Q	13.10
KULA	20N	203										B1	A1	A1	A1	A1	A1	Q	Q	13.30
AHMEDABAD	23N	72												Q	Q	Q	Q	Q	Q	15.94

PUBLICATIONS:

1. *Solar-Geophysical Data*, NOAA

   Daily average counting rates per hour
   - Climax - 9/1960 to date
   - Deep River - 1/1960 to date
   - Dallas - 1/1964 to date
   - Churchill - 5/1964 to date
   - Calgary - 1/1971 to date
   - Sulphur Mt.- 1/1971 to date

   Graphical hourly rates
   - Deep River - 1/1959 to date
   - Alert - 7/1965 to date
   - Calgary - 1/1971 to date
   - Sulphur Mt.- 1/1971 to date

2. *World Data Center A Report UAG-9*, Data on Cosmic Ray Event of November 18, 1968 and Associated Phenomena, April 1970.

NEUTRON MONITORS AND SUPERMONITORS

MAGNETIC TAPE

Scientists transmitting computer-usable data to the World Data Center are asked to use the following procedure:

Data supplied on magnetic tape will be on standard 7 track, 1/2 inch width tape. Tape densities are optional at either 200 BPI, 556 BPI or 800 BPI. It is recommended that 556 BPI be used for tapes transmitted through the mails. The data will be written on the tape in Binary Coded Decimal (BCD) even parity with one card image comprising one logical and physical record on the tape. A physical record on the magnetic tape supplied to stations by World Data Center-A will consist of the 80 characters of the card image. However, tapes sent to World Data Center-A may have the 80 characters of the card image plus as many characters as are necessary to make one physical record (i.e., tapes from experimenters having IBM 700/7000 series equipment will have 80 plus 4 characters per physical record).

A logical file normally consists of a year's data. The first seven card images on every file will always contain alphabetic characters (header cards). The end of every file will be marked by seven blank (or zero) card images, the equivalent of one day's data, followed by an end of file mark. This will facilitate recognition of the beginning and ending of files.

The first file of any data tape (both tapes sent by the experimenter to the data center and those sent by the data center in answer to a specific request) will contain the seven header cards previously described, seven blank (or zero) card images (indicating an end of file) and an end of file mark. Thus, this first file contains a total of 14 card images. The second and succeeding data files will contain the seven data header cards followed by a year, or less, of data. One year's data is the maximum to be contained in one file, but it may be less. A file mark should be inserted whenever significant changes (i.e., scaling factor, barometric coefficient, monitor configuration) occur. The start of the next file will be another seven card header group reflecting these changes. It would be preferred that at least one month's data be contained in a data file, and that whenever possible the file mark occur at the end of a month. To indicate the end of data on a tape, the last seven cards (normally blank or zero cards to indicate an end of file) will contain a "blank-999" in the columns where pressure, uncorrected and corrected data would appear if these were a data set. The columns reserved for the identification number, year, day number and card number should still contain blanks or zeros.

Following a WDC-A Upper Atmosphere Geophysics Circular Letter to Cosmic Ray Scientists (No. 2 of April 5, 1968) many groups have supplied their data to WDC-A in the recommended standard format. The essentials of this format are repeated below for convenience of the user:

HEADER CARDS - Header information on seven cards in alphabetic form will appear at the beginning of each year of data and whenever a significant change (i.e., scaling factor, barometric coefficient, monitor configuration) occurs:

Card 1 -	Station Identification (code name)	Columns 1-4
	Station name	Columns 7-36
	Station latitude	Columns 37-41
	North or South latitude specifications	Columns 43-47
	Station longitude	Columns 49-54
	East or West longitude specifications	Columns 56-59
	Station altitude	Columns 61-66
	Units of altitude	Columns 67-78
Card 2 -	Description of instrument	Columns 1-80
Card 3 -	Scaling factor	Columns 13-18
	(Explanatory text can appear anywhere else on the card except columns 13-18 which are reserved for the numbers.)	
Card 4 -	Standard station pressure	Columns 61-66
	(Explanatory text, including units, can appear anywhere else on the card except columns 61-66 which are reserved for the numbers.) The pressure may be given in any scientifically acceptable units; however, please specify the units.	
Card 5 -	Barometric coefficients	Columns 13-18
	(Explanatory text can appear anywhere else on the card except columns 13-18 which are reserved for the numbers.) Please give units.	
Card 6 -	Credit statement (any text)	Columns 1-80
Card 7 -	Period of data covered	
	Starting month (up to 6 alphabetic characters)	Columns 7-12
	Starting day of month	Columns 13-14
	Ending month (up to 6 alphabetic characters)	Columns 19-24
	Ending day of month	Columns 25-26
	Year (4 digits)	Columns 29-32

Cont'd. on p. 292.

F.1 NEUTRON MONITORS AND SUPERMONITORS

AT BOULDER

COMPUTER-USABLE DATA

STATION	COMPUTER CODE	PERIOD	FORMAT	FORM
ALERT	ALE2	10/1965 - 12/1970	STD	MAGNETIC TAPE
BRISBANE	BRI1	7/1968 - 12/1970	STD	MAGNETIC TAPE
CASEY	CAS1	4/1969 - 12/1969	STD	MAGNETIC TAPE
CHACALTAYA	CHA2	10/1966 - 12/1970	STD	MAGNETIC TAPE
CHICAGO	CHI1	1/1966 - 12/1967	STD	PUNCHED CARDS
CHURCHILL	CHU2	1/1967 - 12/1967	STD	PUNCHED CARDS
CHURCHILL	CHU2	5/1968 - 9/1968	STD	PUNCHED CARDS
COLLEGE	COL1	8/1962 - 11/1962	STD	PUNCHED CARDS
COLLEGE	COL1	1/1964 - 12/1964	STD	PUNCHED CARDS
COLLEGE	COL1	1/1967 - 12/1967	STD	PUNCHED CARDS
DALLAS	DAL2	5/1968 - 9/1968	STD	PUNCHED CARDS
DEEP RIVER	DEE2	1/1966 - 12/1970	STD	MAGNETIC TAPE
DEEP RIVER		7/1957 - 12/1962	STD	MAGNETIC TAPE
DENVER	DEN2	1/1967 - 12/1968	STD	MAGNETIC TAPE
DUMONT D URVILLE	DUM2	9/1970 - 1/1971	STD	PUNCHED CARDS
GOOSE BAY	GOO2	11/1964 - 12/1970	STD	MAGNETIC TAPE
HALEAKALA	HAK1	7/1957 - 4/1967	STD	MAGNETIC TAPE
HOBART	HOB1	3/1967 - 12/1970	STD	MAGNETIC TAPE
INUVIK	INU2	7/1964 - 12/1970	STD	MAGNETIC TAPE
KIEL	KIE2	1/1966 - 5/1967	STD	PUNCHED CARDS
KULA	KUL2	7/1966 - 12/1970	STD	MAGNETIC TAPE
MAKAPUU POINT	MAK1	7/1957 - 6/1963	STD	MAGNETIC TAPE
MAKERERE	MAR1	10/1967 - 4/1968	STD	PUNCHED CARDS
MAWSON	MAW1	1/1966 - 12/1967	STD	PUNCHED CARDS
MAWSON	MAW1	1/1968 - 12/1970	STD	MAGNETIC TAPE
MINA AGUILAR	MIN1	8/1962 - 11/1962	STD	PUNCHED CARDS
MINA AGUILAR	MIN1	1/1964 - 12/1964	STD	PUNCHED CARDS
MINA AGUILAR	MIN1	1/1967 - 12/1967	STD	PUNCHED CARDS
MINA AGUILAR	MIN1	5/1968 - 7/1968	STD	PUNCHED CARDS
MT WASHINGTON	MTW1	11/1955 - 12/1966	STD	MAGNETIC TAPE
MT WELLINGTON	MTZ1	1/1966 - 1/1967	STD	PUNCHED CARDS
OTTAWA	OTT1	1/1968 - 12/1971	STD	MAGNETIC TAPE
PIC DU MIDI	PIC2	9/1970 - 1/1971	STD	PUNCHED CARDS
PORT AUX FRANCAIS	POR2	9/1970 - 1/1971	STD	PUNCHED CARDS
PREDIGSTUHL	PRE2	1/1969 - 12/1969	STD	MAGNETIC TAPE
PREDIGTSTUHL	PRE2	1/1969 - 12/1972	STD	PUNCHED CARDS
RESOLUTE BAY	RES2	6/1965 - 12/1965	STD	MAGNETIC TAPE
RESOLUTE BAY	RES2	1/1967 - 12/1968	STD	MAGNETIC TAPE
SWARTHMORE	SWA2	7/1964 - 3/1966	STD	PUNCHED CARDS
THULE	THU1	1/1964 - 9/1964	STD	PUNCHED CARDS
THULE	THU2	10/1964 - 12/1965	STD	PUNCHED CARDS
VICTORIA	VIC2	9/1964 - 7/1967	STD	PUNCHED CARDS
WHITE MOUNTAIN	WHI1	8/1965 - 12/1969	STD	PUNCHED CARDS
WHITE MOUNTAIN	WHI1	1/1969 - 12/1969	STD	MAGNETIC TAPE
WILKES	WIL1	1/1968 - 4/1969	STD	MAGNETIC TAPE

Format "STD" refers to the internationally accepted format explained on pp. 290 and 292.

Data can be furnished on magnetic tape, cards, or listings by month or days.

COMPUTER-USABLE STANDARD FORMAT (CONT'D.)

DATA CARDS

Column Assignments: Data Cards 1-6

Station Identification (code name)	Columns 1-4
Year (last two digits)	Columns 5-6
Day of year (001-365 or 001-366)	Columns 7-9
Card number (1-6)	Column 10
Data Quality Tags	Columns 11-12
First Data Group Pressure (e.g., 01 UT)	Columns 13-17
Uncorrected Counting Rate	Columns 18-23
Corrected Counting Rate	Columns 24-29
Second Data Group (e.g., 02 UT)	
Pressure	Columns 30-34
Uncorrected Counting Rate	Columns 35-40
Corrected Counting Rate	Columns 41-46
Third Data Group (e.g., 03 UT)	
Pressure	Columns 47-51
Uncorrected Counting Rate	Columns 52-57
Corrected Counting Rate	Columns 58-63
Fourth Data Group (e.g., 04 UT)	
Pressure	Columns 64-68
Uncorrected Counting Rate	Columns 69-74
Corrected Counting Rate	Columns 75-80

NOTE: All numbers are right adjusted in their fields.

Column Assignments: Data Card 7

Station Identification (code name)	Columns 1-4
Year (last two digits)	Columns 5-6
Day of year (001-365 or 001-366)	Columns 7-9
Card number (7)	Column 10
Normalizing factor multiplied by 10,000 (integer format)	Columns 11-17
Optional special data factors	Columns 18-51
(no special column assignments, but it would be convenient if column assignments of the first six cards could be retained)	
Daily sum of the uncorrected counting rate	Columns 52-57
Daily sum of the corrected counting rate	Columns 58-63
Daily average pressure (for the hours corrected data are present)	Columns 64-68
The number of hours of data present	Columns 69-74
Daily average corrected counting rate	Columns 75-80

NOTE 1: All numbers are right adjusted in their fields.

NOTE 2: The only data on this card that the experimenters are required to supply is the normalizing factor and optional special data factors. The daily sums and averages can be calculated by the data center when the card is entered into the computer.

It should be mentioned that occasionally an experimenter's equipment will be inoperative for a day or two. In this case the data cards, with zero for the counting rate, should still be included in order to preserve the original sequence and so that the data center and potential data user will know that no data are available instead of questioning whether or not a day was accidentally missed in supplying the data.

F.2 IONIZATION CHAMBERS

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	CUT-OFF RIGIDITY
GODHAVN	69N	307	B2	A2	32	P	P	P	P	P	P	P	P	P	P	S				00.03
MIRNY	66S	93	B2	C2	A2	B2	A2	B2	A2	A1	A1	P	S							00.04
SYOWA BASE	69S	39	B2	C2	S											Q				00.42
TIXIE	71N	128	C2	A2	A3	A3	B3	B3	A2	A2	B2	A2	C3	C1	Q	Q	Q	Q	Q	00.53
CAPE SCHMIDT	68N	180		C3	A3					B2	A2	A2	B2		S					00.60
DEEP RIVER	46N	283	C2	A2	B2	S														01.02
YAKUTSK	62N	129	B2	A2	A1	A2	A2	A2	A2	A2	A1	A2	A1	C1	Q	Q	Q	Q	Q	01.70
FREDRICKSBURG	38N	283	B2	A2	A2	C2	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	02.18
SVERDOLOVSK	56N	61	C2	A2	B1	A2	A2	A2	A2	A1	A2	A2	A1	B1	Q	Q	Q	Q	Q	02.30
KUHLUNGSBORN	54N	11	B1	A1	A1	A2	A2	A2	A2	A1	B1	A2	B2	S						02.43
MOSCOW	55N	37	B2	B1	B2	A2	A2	A2	A2	A2	A2	B2	Q	Q	Q	S				02.46
AMSTERDAM	52N	4	B2	A2	A2	A2	A2	B2	S											02.69
CHRISTCHURCH	43S	172	B3	A3	B2	B3	A3							Q	Q	Q	Q	Q	Q	02.71
HALLE	51N	12	B1	A1	A1	A1	A1	A1	A1	A1	A1	P	P	P	A2	Q	Q	Q	Q	03.07
IRKUTSK	52N	104		B3	A3	B3	S													03.74
FREIBURG	48N	7	B1	A1	A3	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q		04.10
HAFELEKAR	47N	11	B3	A3	A3	A3	A3	A3	A3	A3	A3	C3	Q	Q	Q	Q	Q	Q	Q	04.37
TBILISI	42N	44	C2	B2	C2	A2	B2		B2	A2	B2	A2	B2	S						06.67
SAPPORO	43N	141	B1	A1	A1									Q	Q	Q	Q	Q	Q	08.22
CIUDAD UNIV	19N	261	B2	A2	S															09.53
MEXICO CITY	19N	261	B2	A2	S															09.53
MT NORIKURA	36N	137	B2	A2	B2	A2	A2	A2	A2	A2	A2	A2	B2	C2	Q	Q	Q	Q	Q	11.39
TOKYO KOENJI	35N	139									A2	B2	A2	B2	A2	C2	Q	Q	Q	11.58
TOKYO ITABASHI	35N	139	B2	A2	B2	A2	A2	A2	B2	A2	A2	A2	A2	B2	A2	C2	C2	Q	Q	11.61
TOKYO MABASHI	35N	139			B2	B2	C1	C2	A2	A2	S									11.61
HUANCAYO	12S	285	B2	A2	A2	A2	A2	A2	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	13.45
HONG KONG	22N	114														C2	Q	Q	Q	16.23
HOWRAH	22N	88	B2	A2	S															16.43

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months

1 = Both corrected and uncorrected data
2 = Pressure-corrected data only
3 = Uncorrected data only

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED TO EXIST BUT NOT HELD AT WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

3806-VII
m. 64

МЕЖДУНАРОДНЫЙ ГЕОФИЗИЧЕСКИЙ ГОД

Научно-исследовательский институт земного магнетизма, ионосферы и распространения радиоволн

Академии наук СССР, Москва 17, по Ватутинки

Moscow Cubical Meson T.

Космические лучи — кубический телескоп

Станция Ст. Пахра (Москва) Географическая широта 55,5° N Долгота 37,3° E Месяц, год Январь 1963 JAN

Геомагнитная широта _____ Пересчетный коэффициент 0,90 Высота над уровнем моря 200

Барометрический коэффициент −0,16 %/мб Введены поправки на давление

Дни	Двухчасовые значения по мировому времени												Сумма
	0—2	2—4	4—6	6—8	8—10	10—12	12—14	14—16	16—18	18—20	20—22	22—24	
1	1051	1052	1052	1052	1052	1053	1054	1056	1052	1054	1054	1054	
2	1052	1050	1050	1056	1054	1050	1056	1058	1051	1053	1055	1064	
3	1048	1047	1047	[1049]	1047	1045	1044	1051	1040	1043	1041	1045	
4	1043	1043	1038	1041	1038	1042	1044	1041	1041	1043	1039	1038	
5	1039	1034	1030	1036	1028	1043	1044	1040	1038	1043	1041	1042	
6	1043	1044	1041	1041	1042	1035	1039	1034	1041	1043	1041	1036	
7	1038	1037	1037	1027	1033	1028	1029	1026	1031	1036	1028	1028	
8	1040	1037	1031	1031	1033	1038	1039	1037	1038	1038	1035	1031	
9	1038	1033	1031	1026	1035	1030	1028	1038	1037	1032	1037	1034	
10	1031	1032	1037	1037	1037	1043	1031	1039	1034	1039	1038	1040	
11	1031	1043	1040	1046	1030	1039	1041	1041	1041	1042	1041	1039	
12	1037	1043	1032	1043	1051	1040	1044	1046	1040	1042	1047	1040	
13	1044	1043	1047	1043	1048	1044	1048	1038	1038	1038	1040	1044	
14	1036	1040	1043	1041	1027	1043	1044	1041	1041	1040	1040	1029	
15	1039	1042											
16							1037	1033	1044	1046	1050		
17	1034	1032	1032	1031	1027	1032	1038	1036	1038	1042	1042	1032	
18	1039	1037	1041	1039	1051	1044	1040	1047	1046	1033	1033	1035	
19	1034	1027	1030	1028	1028	1036	1028	1028	1025				
20	1031	1043	1043	1050	1053		1045	1052	1052	1043	1044	1048	
21	1044	1041	1046	1055	1049	1046	1043	1046	1046	1044	1046	1040	
22	1038	1042	1042	1050	1048	1045	1051	1044	1049	1044	1043	1046	
23	1041	1045	1045	1046		1045	1044						
24					1049	1044	1050	1049	1048	1051	1040	1045	
25	1040	1035	1036	1037	1048	1054	1042	1048			1042	1036	
26	1037	1025	1032	1036	1034	1030	1032	1022	1026			1022	
27	1022	1012	1018	1016	1018	1030	1029	1028	1029	1031	1032	1029	
28	1022	1018	1021	1029	1036	1040	1031	1036		1030		1029	
29	1025	1021	1018					1029	1035	1028	1028	1025	
30	1032	1020	1026	1030	1025	1028	1038	1039	1024	1021	1020	1021	
31	1025	1025	1025	1026	1019	1024	1027	1021	1017	1019	1017		

Ответственное лицо: Я. Л. Блох

Тип. производственного комбината ВИО 5-517

MESON TELESCOPE

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	CUT-OFF RIGIDITY
ALERT	82N	298									C2	A2	A2	A2	Q	Q	Q	Q	Q	00.00
RESOLUTE	74N	265	B1	A1	A1	A1	A1	A1	A1	A1	B1	B1	S							00.00
THULE	76N	292		A2	B2	B2	B2	B2	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	00.00
MCMURDO	78S	167					Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	00.01
WILKES	66S	110	C3	B1	S															00.01
MURCHISON BAY	80N	18	C3	A3	C3	S														00.06
HEISS IS	80N	57		B3	A3	A2	A2	A2	B1	A2	B1	A1	S				Q	Q	Q	00.09
SOUTH POLE	90S	0								Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	00.11
INUVIK	68N	226								B2	A2	A2	A2	A2	A2	Q	Q	Q	Q	00.18
CHURCHILL	58N	266	B1	A1	A1	A1	B1	A1	A1	A2	S									00.21
MAWSON	67S	62	A3	A3	A3	A3	A3	A3	A3	A3	A3	A3	A3	Q	Q	Q	Q	Q	Q	00.22
SYOWA	69S	40														Q	Q	Q		00.42
GOOSE BAY	53N	300								C2	A2	A2	A2	A2	A2	Q	Q	Q	Q	00.52
KIRUNA	67N	20	B3	A3	A3	A3	A3	A2	A2	A2	A2	A2	P	S						00.54
MACQUARIE IS	54S	159	B1	A1	C1	S														00.55
APATITY	67N	33									B2	B2	B2	B2	Q	Q	Q	Q	Q	00.65
OULU	65N	25								B3	B3	C3		Q	Q	Q	Q	Q	Q	00.81
DEEP RIVER	46N	283									A2	A2	A2	A2	A2	Q	Q	Q	Q	01.02
OTTAWA	45N	285	B1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	B1	S		01.08
BERGEN	60N	5	B3	A3	A3	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	01.13
SULPHUR MT	51N	245	B1	A1	A1	A1	A1	A1	A1	B2				C2	A2	B2	Q	Q	Q	01.14
KERGUELEN	49S	70	Q	Q	Q	Q	Q	S												01.19
UPPSALA	59N	17	B3	A3	A3	A3	A3	A2	A2	A2	A2	Q	Q	Q	Q	Q	Q	Q	Q	01.43
AWARUA	46S	168		B3	S															01.86
HOBART	42S	147	B3	A3	A3	A3	A3	A3	A3	A3	A3	A3	A3	Q	Q	Q	Q	Q	Q	01.89
BELFAST	55N	354											Q	Q	Q	Q	Q	Q	Q	01.92
SWARTHMORE	40N	285								Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	01.92
LINCOLN	40N	264	B3	A3	B3	A3	A3	B3	S											02.22
KIEL	54N	10	B1	A1	A1	B1	A1	A1	A1	A1	A1	A1	A1	A1	A1	C1	S			02.29
KUHLUNGSBORN	54N	11	B1	A1	A1	A2	A2	A2	A2	A1	A3	A2	B2	S						02.43
MOSCOW	55N	37	B3	A3	B1	A2	A2	B2	A2	A2	A2	B2	B2	Q	Q	Q	Q	Q	Q	02.46
CHRISTCHURCH	43S	172	C3	B3	C2	S														02.71
LONDON	51N	360	B2	A2	S															02.73
DENVER	40N	255									Q	Q	A2	A2	A2	Q	Q	Q	Q	02.91
HERSTMONCEUX	50N	0	B2	A1	A1	S														02.92
LINDAU	51N	10			B1	A1	A1	A1	A1	A1	A1	A1	B1	Q	Q	Q	Q	Q	Q	03.00
BELSK	52N	21										A1	A1	A1	A1	A1	A1	A1	Q	03.18
DOURBES	50N	5													Q	Q	Q	Q	Q	03.24
WELLINGTON	41S	174								C2	C1	S								03.42
PRAGUE	50N	14		A3	A3	A3	B3	S												03.53
MEUDON	49N	2					Q	Q	Q	S										03.60
IRKUTSK	52N	104	C3	A3	B3	B3	B3	B2	A2	A2	A2	B2	C2	B2	Q	Q	Q	Q	Q	03.74
LOMNICKY STIT	49N	20		A3	A3	C3				B2	A2	A2	B2	A3	Q	Q	Q	Q	Q	04.00
SCHAUINSLAND	48N	8													Q	Q	Q	Q	Q	04.10
WEISSENAU	47N	9	B1	A1	C1	S														04.16
ZUGSPITZE	47N	11	B3	A3	A3	C3	S													04.24
PREDIGTSTUHL	47N	13										Q	Q	Q	Q	Q	Q	Q		04.30
HAFELEKAR	47N	11	C3	A3	A3	A3	A3	A3	A3	A3	A3	C3	Q	Q	Q	Q	Q	Q	Q	04.37
BERKELEY	37N	238	B3	A3		S														04.54
MONT BLANC TUNNEL	46N	5												Q	Q	Q	Q	Q		04.65
HERMANUS	34S	19	B1	A1	A1	A1	A1	C2	S											04.90
COLLEGE STATION	31N	263												Q	Q	Q	Q	Q	Q	04.95
CAPETOWN	34S	18	C3	B3	S															04.96
BOLOGNA	44N	11	B3	A3	A3	A3	B2	A2	A2	A2	A2	A2	A2	A2	A2	A2	Q	Q	Q	05.22
PIC DU MIDI	42N	0	C3	B3	A3	Q	Q	Q	Q	Q	Q	S								05.36
SIMFEROPOL	44N	34		B3	A3		B2			A2	S									05.51
ROME	41N	12		A2	B2	A2	A2	A2	B2	B2	S									06.32
LISBON	38N	351	C3	A3	A3	S														06.65
TBILISI	42N	44				B3	B3		B2	B2	B2	B2	B2	C1	Q	Q	Q	Q	Q	06.67
ALMA ATA	43N	76						B3		A3	A2	A1	A2	Q	Q	Q	Q	Q	Q	06.69
MEXICO CITY	19N	261															Q	Q	Q	09.53
BUENOS AIRES	34S	302	C3	S																10.63
SEOUL	37N	127								C3	B3	S								10.79
HAIFA	32N	35		B3	C3	S														10.96
MT NORIKURA	35N	138													Q	Q	Q	Q	Q	11.39

Continued

F.3

CUBICAL MUON MONITOR 4-MT-64 * GOOSE BAY * 53 16 N, 60 24 W, 46 M, CANADA

10000 EQUALS 658500 COUNTS PER HOUR

CORRECTED FOR TEMPERATURE BY MAEDA FORMULA

ROTATION NO. 1840

	DATE U.T.		DAY	01 UT 13	02 14	03 15	04 16	05 17	06 18	07 19	08 20	09 21	10 22	11 23	12 24	DAILY AVERAGE
1	JANUARY 19, 1968	*	19	9788	9781	9773	9762	9742	9746	9744	9758	9742	9752	9772	9763	
		*		9779	9767	9804	9812	9820	9812	9815	9824	9788	9789	9799	9784	9779.7
2	JANUARY 20, 1968	*	20	9755	9796	9788	9761	9758	9787	9753	9765	9763	9742	9763	9772	
		*		9759	9786	9794	9823	9810	9827	9836	9799	9836	9828	9803	9811	9788.1
3	JANUARY 21, 1968	*	21	9786	9783	9774	9785	9791	9770	9778	9774	9767	9781	9788	9779	
		*		9805	9820	9819	9852	9836	9849	9840	9843	9816	9781	9805	9817	9801.6
4	JANUARY 22, 1968	*	22	9812	9810	9806	9811	9786	9789	9797	9778	9774	9787	9774	9785	
		*		9790	9781	9786	9807	9803	9805	9826	9810	9820	9819	9801	9798	9798.1
5	JANUARY 23, 1968	*	23	9814	9790	9793	9814	9781	9806	9787	9764	9773	9775	9760	9780	
		*		9784	9768	9795	9791	9766	9794	9814	9832	9802	9800	9797	9772	9789.7
6	JANUARY 24, 1968	*	24	9798	9788	9795	9808	9777	9778	9764	9768	9757	9751	9750	9772	
		*		9752	9747	9743	9747	9759	9747	9727	9728	9743	9722	9736	9707	9756.8
7	JANUARY 25, 1968	*	25	9731	9749	9751	9778	9748	9763	9776	9743	9749	9731	9781	9804	
		*		9810	9822	9806	9834	9847	9813	9805	9805	9792	9788	9781	9775	9782.6
8	JANUARY 26, 1968	*	26	9776	9821	9781	9791	9805	9796	9744	9751	9780	9772	9747	9724	
		*		9704	9775	9786	9832	9847	9847	9828	9812	9788	9782	9715	9705	9779.5
9	JANUARY 27, 1968	*	27	9661	9583	9569	9598	9597	9629	9580	9566	9575	9577	9589	9611	
		*		9630	9659	9634	9666	9672	9662	9666	9646	9668	9638	9654	9631	9623.4
10	JANUARY 28, 1968	*	28	9639	9611	9625	9643	9666	9677	9656	9701	9689	9711	9679	9708	
		*		9706	9701	9737	9743	9712	9718	9736	9731	9751	9730	9754	9758	9698.2
11	JANUARY 29, 1968	*	29	9748	9764	9771	9765	9752	9760	9764	9753	9758	9743	9754	9750	
		*		9769	9798	9800	9774	9810	9787	9787	9754	9780	9764	9758	9750	9765.7
12	JANUARY 30, 1968	*	30	9737	9733	9735	9729	9722	9724	9706	9707	9687	9714	9714	9738	
		*		9760	9762	9773	9757	9752	9746	9777	9760	9773	9759	9750	9765	9740.8
13	JANUARY 31, 1968	*	31	9753	9770	9754	9767	9750	9753	9736	9756	9768	9754	9764	9756	
		*		9800	9775	9776	9794	9752	9753	9747	9741	9766	9799	9768	9788	9764.2
14	FEBRUARY 1, 1968	*	32	9776	9772	9760	9768	9763	9760	9766	9724	9771	9753	9764	9766	
		*		9772	9770	9775	9773	9775	9790	9762	9763	9762	9744	9730	9700	9760.8
15	FEBRUARY 2, 1968	*	33	9699	9687	9657	9646	9645	9621	9654	9663	9668	9679	9704	9703	
		*		9686	9695	9674	9682	9655	9677	9693	9685	9688	9699	9718	9736	9680.2
16	FEBRUARY 3, 1968	*	34	9749	9749	9780	9773	9773	9748	9770	9780	9770	9791	9779	9801	
		*		9748	9757	9735	9723	9728	9703	9727	9732	9727	9739	9740	9724	9751.9
17	FEBRUARY 4, 1968	*	35	9729	9760	9766	9763	9776	9795	9750	9764	9765	9727	9710	9702	
		*		9723	9719	9722	9691	9673	9693	9711	9725	9724	9708	9717	9678	9728.7
18	FEBRUARY 5, 1968	*	36	9679	9704	9687	9702	9699	9699	9701	9703	9699	9710	9716	9700	
		*		9698	9688	9657	9650	9668	9702	9724	9750	9764	9729	9731	9731	9703.8
19	FEBRUARY 6, 1968	*	37	9702	9691	9709	9730	9726	9727	9705	9705	9725	9711	9729	9692	
		*		9674	9669	9688	9630	9649	9708	9688	9701	9727	9722	9735	9749	9703.7
20	FEBRUARY 7, 1968	*	38	9719	9753	9765	9795	9773	9776	9777	9774	9767	9763	9734	9713	
		*		9687	9652	9724	9732	9754	9764	9777	9791	9799	9812	9802	9809	9758.9
21	FEBRUARY 8, 1968	*	39	9808	9800	9792	9789	9807	9811	9828	9824	9822	9806	9802	9806	
		*		9780	9792	9789	9794	9822	9831	9822	9816	9823	9812	9847	9822	9810.5
22	FEBRUARY 9, 1968	*	40	9829	9805	9861	9842	9851	9857	9872	9862	9863	9853	9854	9856	
		*		9842	9850	9860	9848	9839	9869	9869	9843	9828	9832	9812	9804	9845.9
23	FEBRUARY 10, 1968	*	41	9811	9800	9808	9811	9802	9823	9820	9820	9820	9836	9837	9843	
		*		9852	9878	9860	9882	9866	9874	9879	9853	9857	9851	9851	9845	9840.7
24	FEBRUARY 11, 1968	*	42	9843	9846	9838	9820	9831	9840	9836	9872	9876	9852	9840	9806	
		*		9822	9791	9797	9812	9830	9823	9869	9866	9843	9845	9837	9840	9836
25	FEBRUARY 12, 1968	*	43	9848	9836	9824	9815	9816	9816	9823	9849	9835	9829	9834	9828	
		*		9818	9770	9781	9769	9784	9791	9810	9815	9820	9825	9780	9784	9812
26	FEBRUARY 13, 1968	*	44	9775	9794	9775	9804	9780	9773	9781	9787	9763	9757	9724	9742	
		*		9775	9778	9780	9783	9791	9800	9797	9787	9783	9762	9780	9763	9776.3
27	FEBRUARY 14, 1968	*	45	9742	9743	9775	9751	9740	9760	9759	9750	9783	9758	9788	9787	
		*		9812	9794	9820	9804	9833	9811	9814	9801	9780	9791	9776	9758	9780.4
	27 DAY AVERAGES	*		97594	97600	97582	97637	97576	97628	97566	97580	97595	97563	97574	97588	
		*		97607	97616	97665	97705	97723	97777	97831	97782	97796	97728	97695	97631	9765.2

AT BOULDER

MESON TELESCOPE Cont'd.

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	CUT-OFF RIGIDITY
			YEAR																	
MACUL STATION	33S	290		Q	Q	Q	Q	Q	Q	Q	Q	Q	S							11.41
LOS CERRILLOS	34S	353											Q	Q	Q	Q	Q	Q	Q	11.44
EL INFIERNILLO	33S	290								Q		Q	S							11.45
TOKYO ITABASHI	35N	139	B2	A2	B1	A2	A2	A2	A2	A2	A2	A2	C2	S						11.61
TOKYO MABASHI	35N	139		B3	B3	S														11.61
GULMARG	34N	74		C3	S															11.91
CHACALTAYA	16S	292	C3	A3	C3	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	13.10
MAKAPUU PT	21N	203	B3	A3	S															13.23
KULA	21N	204										B2	A2	A2	A2	Q	Q	Q	Q	13.30
MAKERERE	00N	32	B1	A1	A1					B3	B3	B3			S					14.98
DARJEELING	27N	88	C2	S																15.35
LAE	06S	147	B3	A3	A3	B3		C3	A3	A3	A3	C3	S							15.52
AHMEDABAD	23N	73	B3	A3	A3	A3	A3	A3	S					Q	Q	Q	Q	Q		15.94
DACCA	24N	90										Q	Q	Q	Q	Q	Q	Q	Q	16.22
MACAU	22N	113	B3	A3	A3	C3	S											Q	Q	16.28
COLOMBO	06N	79	B3	S																17.46
KODAIKANAL	10N	77	B3	A3	A3	A3	B3	A3	B3	S										17.47
UTRECHT	52N	5													B3	A3	B3	Q		
YAKUTSK	62N	129														Q	Q	Q	Q	
NAGOYA	35N	137															Q	Q		

UNDERGROUND

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	CUT-OFF RIGIDITY
			YEAR																	
YAKUTSK	62N	129	B2	A2	A1	A2		A3	A2	B2	B1	B2	B1	C2	A2	A2	B2	Q	Q	01.70
CAMBRIDGE TUNNEL	43S	147	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	S						01.91
MOSCOW UNIV	55N	37		B2	A2	A2	A2	A2	A2	B2	B2	B2	Q	Q	Q	Q	Q	Q		02.46
EMBUDO	35N	253													Q	Q	Q	Q	Q	04.36
BUDAPEST	47N	18		B3	A3	B3	B3	A3	B3	S		Q	Q	Q	Q	Q	Q	Q	Q	04.44
SOCORRO	34N	253												Q	Q	Q	Q	Q	Q	04.73
MONTE DEI CAPPUCCINI	45N	8											C2	B2	Q	B2	P	P	P	04.94
TORINO	45N	8											Q	Q	Q	Q	Q	Q	Q	04.94
MATSUMOTO	36N	138															Q	Q	Q	11.31
TAKEYAMA	35N	139												Q	Q	Q	Q	Q	Q	11.77
CHACALTAYA	16S	292								Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	13.10
MAKERERE	00N	30													Q	Q	Q	Q	Q	14.84

NARROW ANGLE

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	CUT-OFF RIGIDITY
			YEAR																	
BERGEN	60N	5	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	01.13
LINCOLN	40N	264	B3	A3	A3	A3	A3	B3	S											02.22
MOSCOW	55N	37	B3	B2	A2	Q	Q	Q	Q	S										02.46
WELLINGTON	41S	174							C2	B2	S									03.42
BUENOS AIRES	34S	312	Q	Q	Q	Q	Q	S												10.63
SANTIAGO	33S	290		B3	A3	A3	A3	A3	A3	Q	Q	Q	S							11.43
EL INFIERNILLO	33S	290								Q		Q	Q	S						11.45
TOKYO MABASHI	35N	139		B3	B3	S														11.61
CHACALTAYA	16S	292		B3	C3	S														13.10
DACCA	24N	90										C2	B2	B2	Q	Q	Q	Q	Q	16.22

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months

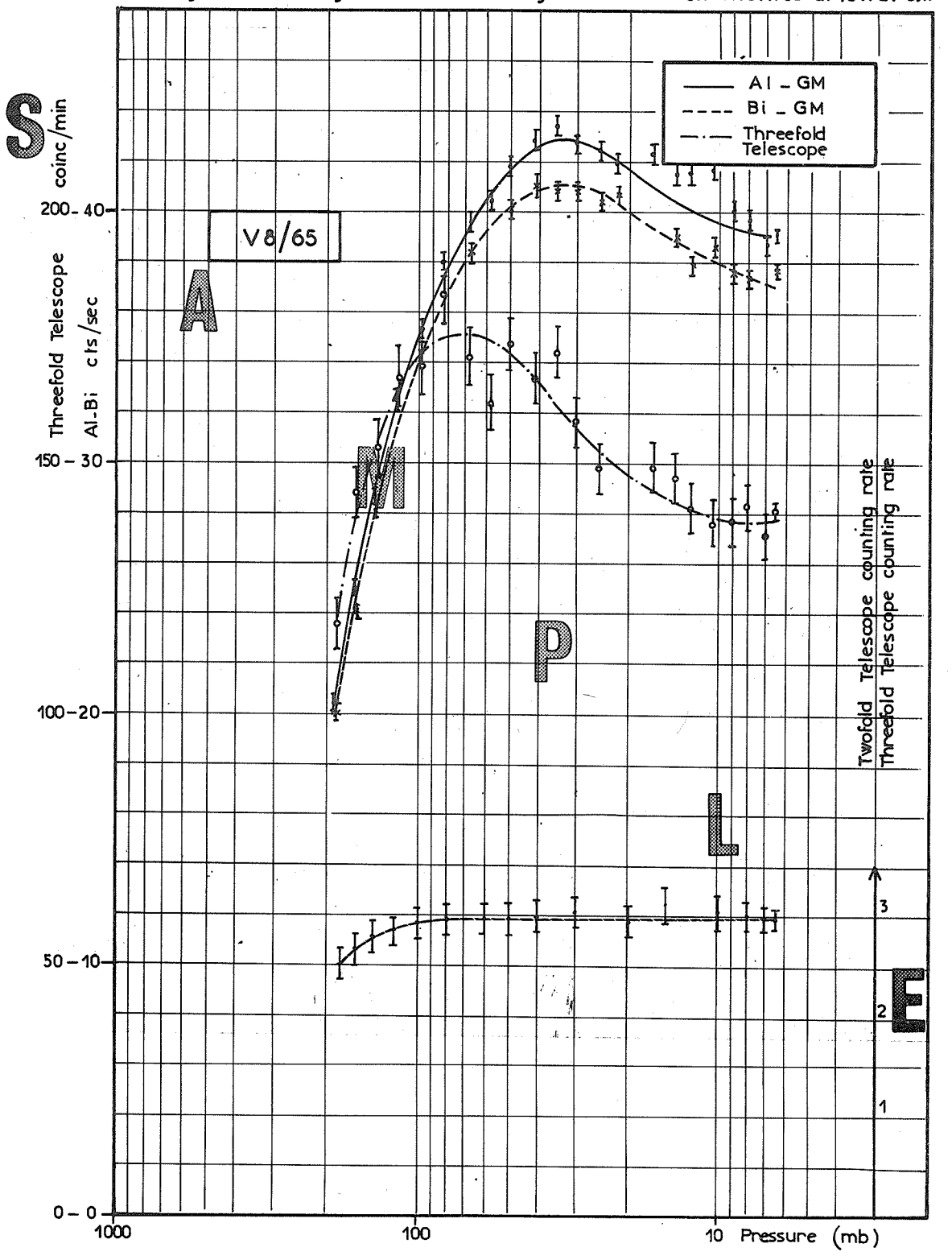
1 = Both corrected and uncorrected data
2 = Pressure-corrected data only
3 = Uncorrected data only

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED TO EXIST BUT NOT HELD AT WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

LABORATOIRE DE PHYSIQUE COSMIQUE

Station IVALO (FINLAND)

Counting rates during the SPARMO flight launched on 14.8.1965 at 15 h 27 U.T.



F.3 MESON TELESCOPE

AT BOULDER

SHOWER APPARATUS

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	CUT-OFF RIGIDITY
YAKUTSK	62N	129	B3	A3	33	P	P	P	P	P	P	P	P	P	P	P	P			01.70
WELLINGTON	41S	174							C3	B2	C1	S								03.42
SANTA BARBARA	34N	241	C3	A3	A3	A3	C3	P	P	P	P	P	P	P	P	P	P			05.50
CHACALTAYA	16S	292	B3	B1	P	P	P	P	P	P	P	P	P	P	P	P	P			13.10

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months

1 = Both corrected and uncorrected data
2 = Pressure-corrected data only
3 = Uncorrected data only

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

F.4 BALLOON MEASUREMENTS

AT BOULDER

Results published in SPARMO Bulletins from

SPARMO launching stations:

Ivalo	68N	27E
Kiruna	67N	20E
Sodankyla	67N	20E
Lindau	51N	10E
Reykjavik	64N	21W
Aire/Adour	43N	00W
Dakar	14N	17W
Buenos Aires	34S	58W
Port Aux Francais	49S	70E
Utrecht	52N	05E
Potchefstroom	26S	27E
Roi Baudouin	70S	23E

Other known launching sites:

Churchill	58N	95W
College	64N	148W
Bombay	19N	13E

PUBLICATIONS:

Summary reports of balloon flights from Northern Norway for July-Aug., Nov. 1969
August 1970
Summer 1971
Keflavik for Jan.-Feb. 1969

F.5 AIRCRAFT AND SHIP MEASUREMENTS

AT BOULDER

No data currently held, but institutions are asked to provide information as outlined in STP NOTES No. 6, p. 48.

SPACECRAFT COMMON NAME- GRS-A NSSDC ID 69-097A
ALTERNATE NAMES- PL-694D, AZUR,GERMAN RESEARCH SAT, GRS-A1

LAUNCH DATE- 11/08/69 SPACECRAFT WEIGHT IN ORBIT- 70.7 KG

FUNDING AGENCY- DFVLR
FUNDING AGENCY- NASA-OSS

DATE LAST USABLE SPACECRAFT DATA RECORDED-070170
SPACECRAFT STATUS OF OPERATION- INOPERABLE

EPOCH DATE-00/19/70 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 121.8 MIN
APOAPSIS- 3139.00 KM ALT PERIAPSIS- 385.000 KM ALT INCLINATION- 102.976 DEG

SPACECRAFT BRIEF DESCRIPTION
THE MAGNETICALLY ALIGNED SPACECRAFT WAS LAUNCHED INTO A NEAR POLAR ORBIT. THE SPACECRAFT WAS A PRODUCT OF A JOINT EFFORT BY NASA-GSFC AND THE GERMAN BUNDESMINISTERIUM FUR WISSENSCHAFTLICHE FORSCHUNG (BMWF) AND HAD AS ITS PRIMARY PURPOSE THE ACQUISITION OF TERRESTRIAL RADIATION BELT DATA. SPECIFICALLY, THE SCIENTIFIC MISSION OF THE SPACECRAFT WAS AS FOLLOWS - 1) TO SCAN THE ENERGY SPECTRA OF INNER ZONE PROTONS AND ELECTRONS, 2) TO MEASURE THE FLUXES OF ELECTRONS OF ENERGY GREATER THAN 40 KEV THAT ARE PARALLEL, ANTIPARALLEL, AND PERPENDICULAR TO THE MAGNETIC LINES OF FORCE OVER THE AURORAL ZONE AND TO MEASURE ASSOCIATED OPTICAL EMISSION, AND 3) TO RECORD SOLAR PROTONS ON ALERT. AFTER ABOUT 24 HOURS IN ORBIT, A COMMAND SYSTEM INSTABILITY DEVELOPED AND PERSISTED INTERMITTENTLY THROUGHOUT THE FLIGHT. THE TAPE RECORDER FAILED ON DECEMBER 8, 1969. PRIOR TO THIS FAILURE, THE GERMAN PROJECT OFFICE ESTIMATED 85-90 PERCENT OF THE EXPECTED DATA HAD BEEN OBTAINED. ALL EXPERIMENTS WERE OPERATING NORMALLY UNTIL THE SPACECRAFT TELEMETRY SYSTEM MALFUNCTIONED IN EARLY JULY 1970.

EXPERIMENT NAME- PROTON TELESCOPE NSSDC ID 69-097A-03

ORIGINAL EXPERIMENT INSTITUTION- U OF KIEL

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - J. MORITZ U OF KIEL KIEL, W. GERMANY

DATE LAST USABLE EXPERIMENT DATA RECORDED-062870
EXPERIMENT STATUS OF OPERATION- INOPERABLE

EXPERIMENT BRIEF DESCRIPTION
TWO SOLID-STATE DEVICES WERE USED IN CONJUNCTION WITH FOUR PULSE HEIGHT DISCRIMINATORS TO DETECT TRAPPED AND SOLAR PROTONS USING COINCIDENCE TECHNIQUES. THE DETECTOR HAD SIX ENERGY CHANNELS - PROTONS 0.25-1.65, 0.25-12.5, 0.5-1.65, 1.0-1.65, 1.65-13.5 MEV AND ALPHA PARTICLES 2.0-6.4 MEV. ELECTRONS WERE ELIMINATED FROM THE INCIDENT BEAM USING A BROOM MAGNET. THE ACCEPTANCE CONE WAS 20.4 DEG FULL ANGLE. THE EXPERIMENT WORKED NORMALLY UNTIL THE SPACECRAFT TELEMETRY SYSTEM MALFUNCTIONED IN EARLY JULY 1970.

F.6 SATELLITE MEASUREMENTS OF COSMIC RAYS

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
EXPLORER 6, PROPORTIONAL COUNTER TELESCOPE SIMPSON (59-004A-01)	080759	100559 ,	080759
EXPLORER 7, HEAVY PRIMARY COSMIC-RAY POMERANTZ (59-009A-03)	101359	053160 ,	101359
PIONEER 5, PROPORTIONAL COUNTER TELESCOPE SIMPSON (60-001A-01)	031160	051660 ,	031160
EXPLORER 12, CHARGED PARTICLES VAN ALLEN (61-020A-03)	081661	120661 ,	081661
OSO 1, BF-3 PROPORTIONAL COUNTER NEUTRON DETECTOR, HESS (62-006A-10)	030062	071463 ,	030762
ARIEL 1, COSMIC-RAY DETECTOR ELLIOTT (62-015A-03)	042762	071262 ,	042662
MARINER 2, COSMIC RAY IONIZATION ANDERSON (62-041A-04)	082852	123062 ,	082762
INJUN 3, PROTON SPECTROMETER O'BRIEN (62-067B-07)	121462	103163 ,	121362
EXPLORER 18, COSMIC-RAY RANGE VS ENERGY LOSS SIMPSON (63-046A-03)	112763	060864 ,	112763
EXPLORER 18, COSMIC RAYS MCDONALD (63-046A-04)	112763	052664 ,	112763
OGO 1, COSMIC-RAY SPECTRA AND FLUXES SIMPSON (64-054A-18)	090564	112567 ,	090564
EXPLORER 21, COSMIC-RAY RANGE VS ENERGY LOSS SIMPSON (64-060A-03)	100464	040965 ,	100464
EXPLORER 25, SOLID-STATE DETECTOR VAN ALLEN (64-076B-04)	112364	071966 ,	112164
MARINER 4, COSMIC-RAY TELESCOPE SIMPSON (64-077A-04)	112864	100165 ,	112864
EXPLORER 25, GEIGER-MUELLER COUNTER VAN ALLEN (64-076B-03)	021365	071966 ,	112164
EXPLORER 28, COSMIC-RAY RANGE VS ENERGY LOSS SIMPSON (65-042A-03)	052965	050267 ,	052965
OGO 1, SOLAR COSMIC RAYS ANDERSON (64-054A-12)	093065	050366 ,	090564
OGO 2, COSMIC-RAY IONIZATION ANDERSON (65-081A-06)	101465	040266 ,	101465
OGO 2, LOW-ENERGY PROTON, ALPHA PARTICLE MEASUREMENT, SIMPSON (65-081A-07)	101465	121366 ,	101465
OGO 2, GALACTIC AND SOLAR COSMIC RAY WEBBER (65-081A-08)	101565	102465 ,	101465
PIONEER 6, COSMIC RAY TELESCOPE FAN (65-105A-03)	121665	043071 ,	121665
PIONEER 6, COSMIC RAY ANISOTROPY DETECTION MCCRACKEN (65-105A-05)	121665	020667 ,	121665
OGO 3, COSMIC-RAY SPECTRA AND FLUXES SIMPSON (66-049A-03)	060966	120169 ,	060766
OGO 3, SOLAR COSMIC RAYS ANDERSON (66-049A-01)	062466	022767 ,	060766
PIONEER 7, COSMIC RAY ANISOTROPY MCCRACKEN (66-075A-05)	081766	013167 ,	081766
PIONEER 7, COSMIC-RAY TELESCOPE SIMPSON (66-075A-06)	081766	043071 ,	081766
EXPLORER 34, COSMIC-RAY PROTON (R VS DE/DX) SIMPSON (67-051A-03)	052467	050369 ,	052467
EXPLORER 34, COSMIC-RAY ANISOTROPY MCCRACKEN (67-051A-05)	052467	042069 ,	052467
OGO 4, LOW-ENERGY PROTON, ALPHA PARTICLE MEASUREMENT, SIMPSON (67-073A-08)	072967	122468 ,	072867
OGO 4, COSMIC RAY IONIZATION ANDERSON (67-073A-07)	073067	081167 ,	072867
OGO 4, GALACTIC AND SOLAR COSMIC RAY WEBBER (67-073A-09)	073067	082767 ,	072867

Continued

F.6

EXPERIMENT NAME- COSMIC-RAY TELESCOPE NSSDC ID 68-100A-06

ORIGINAL EXPERIMENT INSTITUTION- U OF MINNESOTA

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - W.R. WEBBER U OF NEW HAMPSHIRE DURHAM, NH

EXPERIMENT STATUS OF OPERATION- NORMAL

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT UTILIZED A TELESCOPE COMPRISED OF FIVE SOLID-STATE SENSORS, A CERENKOV DETECTOR, AND AN ANTICOINCIDENCE SHIELD. THE TELESCOPE AXIS WAS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. AS DETERMINED BY TWO COINCIDENCE MODES AND ELECTRONIC DISCRIMINATION OF SENSOR OUTPUT PULSES, PARTICLES MEASURED WERE ELECTRONS IN THREE CONTIGUOUS ENERGY INTERVALS BETWEEN 0.31 AND 5.1 MEV, PROTONS IN FIVE CONTIGUOUS ENERGY INTERVALS BETWEEN 2.2 AND 42 MEV, AND ALPHA PARTICLES IN THESE CONTIGUOUS ENERGY INTERVALS BETWEEN 5.8 AND 42 MEV/NUCLEON. A THIRD COINCIDENCE MODE MEASURED THE SUM OF COUNTS DUE TO ELECTRONS ABOVE 0.6 MEV AND NUCLEI ABOVE 14 MEV/NUCLEON. A FOURTH COINCIDENCE MODE MEASURED THE SUM OF NUCLEI ABOVE 42 MEV/NUCLEON AND ELECTRONS ABOVE 5.1 MEV. SPACECRAFT SPIN-INTEGRATED DIRECTIONAL FLUXES WERE MEASURED IN THE VARIOUS MODES. ACCUMULATION TIMES AND READOUT INTERVALS WERE DEPENDENT ON THE TELEMETRY BIT RATE AND WERE TYPICALLY IN TENS OF SECONDS. IN ALL CASES, THEY WERE LONGER THAN THE SPACECRAFT SPIN PERIOD. THE EXPERIMENT HAS FUNCTIONED WELL FROM LAUNCH THROUGH MARCH 1973, ALTHOUGH, AT THE PRESENT LOW TELEMETRY BIT RATES, THE DATA ARE RATHER SPARSE.

DATA SET NAME- PROTON COUNT RATES PUBLISHED IN 'SOLAR-GEOPHYSICAL DATA' NSSDC ID 68-100A-06A

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 120169 TO 033173 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 12 BOOK(S) OR BOUND VOLUME(S)

DATA SET BRIEF DESCRIPTION
THIS DATA SET CONSISTS OF MONTHLY TABULAR LISTINGS OF COUNT RATES OF PROTONS WITH ENERGIES ABOVE 13.9 AND 40 MEV. TYPICALLY, ONE OR TWO COUNT RATES PER ENERGY CHANNEL PER DAY WERE GIVEN IN THE EARLY LIFE OF THE SPACECRAFT. BY LATE 1971, ONLY A FEW COUNT RATES PER MONTH WERE GIVEN. DATA OBTAINED DURING A GIVEN MONTH ARE PUBLISHED (AS OF APRIL 1973) IN 'SOLAR-GEOPHYSICAL DATA (PROMPT REPORTS)' WITH A 1-MONTH LAG.

F.6 SATELLITE MEASUREMENTS OF COSMIC RAYS Cont'd.

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
PIONEER 8, COSMIC RAY GRADIENT DETECTOR WEBBER (67-123A-06)	121367	103171 ,	121367
OGO 5, COSMIC RAY ELECTRONS MEYER (68-014A-09)	030568	071372 ,	030468
OGO 5, MEASUREMENT OF THE ABSOLUTE FLUX AND ENERGY SPECTRUM OF ELECTRONS, VAN DE HULST (68-014A-12)	030568	083171 ,	030468
OGO 5, LOW ENERGY-HEAVY COSMIC RAY PARTICLES (HIGH-Z LOW E EXPERIMENT), SIMPSON (68-014A-27)	030568	092471 ,	030468
OGO 5, ENERGETIC RADIATIONS FROM SOLAR FLARES ANDERSON (68-014A-04)	030868	100469 ,	030468
EXPLORER 40, SOLID STATE PARTICLE DETECTOR VAN ALLEN (68-066B-03)	080968	052970 ,	080868
HEOS 1, COSMIC RAY PARTICLE FLUX LABEYRIE (68-109A-06)	010169	110671 ,	120568
OGO 6, COSMIC RAY EXPERIMENT STONE (69-051A-20)	060769	071869 ,	060569
EXPLORER 41, COSMIC-RAY PROTON (R VS DE/DX) SIMPSON (69-053A-03)	062169	073070 ,	062169
GRS-A, PROTON TELESCOPE MORITZ (69-097A-03)	110869	063070 ,	110869
PIONEER 9, COSMIC RAY TELESCOPE WEBBER (68-100A-06)	120169	093071 ,	110868

G. AIRGLOW

CONTENTS

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G.1 GROUND BASED OBSERVATIONS	305
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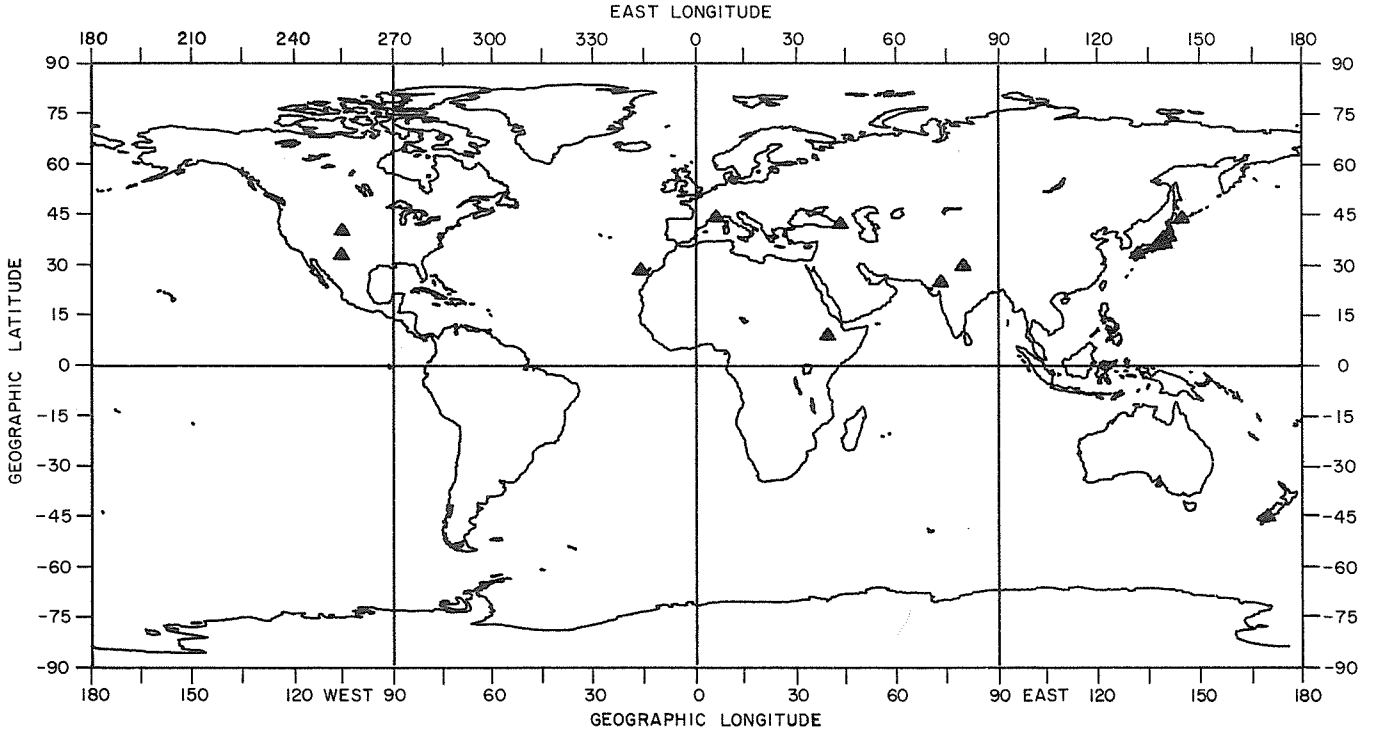
Airglow data listed are the results of photometric observations. The data in this catalogue are zenith intensities and ratio of intensities at equal angular distances north and south. The stations are by geographic latitude in descending order north to south with spectral wavelength in code.

AIRGLOW PHOTOMETER STATIONS 1973



AT BOULDER

STATION	GEOGRAPHIC LAT	LONG EAST	CODE	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
				YEAR																
THULE	76N	292	1		C	C	S													
THULE	76N	292	2													Q	Q	Q	S	
LOPARSKAYA	68N	33	1	C	A	C					C	C	S							
LOPARSKAYA	68N	33	2	C	C	C					C	C	S							
LOPARSKAYA	68N	33	3	C	C	C														
LOPARSKAYA	68N	33	4								C	S								
LOPARSKAYA	68N	33	5	C	C	C	S													
LOPARSKAYA	68N	33	6		C	C	S													
SHEPHERD BAY	68N	267	1							Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
SHEPHERD BAY	68N	267	6							Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
YAKUTSK	62N	129		Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
ZVENIGOROD	55N	36	1	C	B	B	S													
ZVENIGOROD	55N	36	2	C	B	B	S													
ZVENIGOROD	55N	36	3	C	B	B	S													
ZVENIGOROD	55N	36	7	C	B	B	S													
BIALKOW	51N	16	1		C	C	S													
BIALKOW	51N	16	3		C	C	S													
LOMNICKY STIT	49N	20	1	C	B	C	S													
LOMNICKY STIT	49N	20	2	C	A	B	S													
LOMNICKY STIT	49N	20	3	B	A	B	S													
ONDREJOV	49N	15	2	B	B	B	S													
ONDREJOV	49N	15	3	B	B	B	S													
RICHLAND	46N	240E	1												Q	Q	Q	Q	Q	Q
RICHLAND	46N	240E	2											Q	Q	Q	Q	Q	Q	Q
RICHLAND	46N	240E	6												Q	Q	Q	Q	Q	Q
RAPID CITY	44N	257	1	C	A	S														
RAPID CITY	44N	257	2	C	A	S														
RAPID CITY	44N	257	3		B	S														
SIMFEROPOL	44N	34	1	C	B	B	S													
SIMFEROPOL	44N	34	2	C	B	B	S													
SIMFEROPOL	44N	34	3	C	B	B	S													
SIMFEROPOL	44N	34	5	C	B	B	S													
HAUTE PROVENCE	43N	5	1	B	A	A					A	A	A	B	A	A	B	Q	Q	Q
HAUTE PROVENCE	43N	5	2	B	A	A					A	A	A	B	A	A	B	Q	Q	Q
HAUTE PROVENCE	43N	5	3	B	A	A														
HAUTE PROVENCE	43N	5	4	B	A	A					A	A	A	B	A	A	B	Q	Q	Q
HAUTE PROVENCE	43N	5	7	B	A	A					A	A	A	B	A	A	B	Q	Q	Q
MEMAMBETSU	43N	144	1	C	A	B	C	C			B	A	B	A	Q	Q	Q	Q	Q	Q
MEMAMBETSU	43N	144	2		B	B						B	C							
MEMAMBETSU	43N	144	3		B	B														
MEMAMBETSU	43N	144	5	C	A	B														
ABASTUMANI	41N	42	1	C	B	B					B	A								
ABASTUMANI	41N	42	2	C	C	B					C	A								
ABASTUMANI	41N	42	3	C	B	B					B	A								
ABASTUMANI	41N	42	4	C	B	B														
ABASTUMANI	41N	42	7	C	B	B					B	A								
FRITZ PEAK	39N	255	1	B	B	B	A	A	A		B	B		Q	Q	Q	Q	Q	Q	Q
FRITZ PEAK	39N	255	2	B	B	B	A	A	A		B	B		Q	Q	Q	Q	Q	Q	Q
FRITZ PEAK	39N	255	3			B	A	A	A		B	B		Q	Q	Q	Q	Q	Q	Q
FRITZ PEAK	39N	255	5						A					C	B					
SENDAI	39N	140	1	B	A	A	C	A	A	A	B	A	A	A	A	A	Q	Q	Q	Q
SENDAI	39N	140	2								B	B	B	A	A	A	Q	Q	Q	Q
SENDAI	39N	140	5	B	A	A	A				C	A	A	Q	Q	Q	Q	Q	Q	Q

Continued

Code	Wavelength	Code	Wavelength
1	5577A	5	Cont. at ~5300
2	6300/6364	6	3914/4278
3	5890/5896	7	Other
4	OH		

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

G.1

МЕЖДУНАРОДНЫЙ ГОД СПОКОЙНОГО СОЛНЦА.

СВОДКА ДАННЫХ НАБЛЮДЕНИЙ НОЧНОГО НЕБА ЗА НОЯБРЬ 1965 ГОД.

СТАНЦИЯ ЛОПАРСКАЯ — ЭМИССИЯ 5577 Å

$\varphi = 68^{0}\ 15'$, $\lambda = 33^{0}\ 05'$ — ИНТЕНСИВНОСТЬ В РЕЛЕЯХ

ЗЕНИТ

дата \ время GMT	20 h	21 h	22 h	23 h	00 h
28–29	–	670	–	310	350

75° N

дата \ время GMT	20 h	21 h	22 h	23 h	00 h
28–29	–	–	–	3700	2000

75° S

дата \ время GMT	20 h	21 h	22 h	23 h	00 h
28–29	–	2000	–	1400	1400

REC'D. WDC-A 500.16 JUL 18 '68

СОСТАВИЛ : РОЛДУГИН В. К.

Ролдугин

6300A RAYLEIGHS

MT. ABU (INDIA) ZENITH INTENSITIES — TIME ZONE 5H EAST

YR.	MO.	DA.	18	19	20	21	22	23	00	01	02	03	04	05	06	MEAN	STD DEV
65	1	26			96	65	93	80	54	37	39	42				63	2
65	1	27			105	87	90	60	39	42	39	45				63	25
65	1	28			94	64	82	74	62	42	46	65	71			67	15
65	1	29			89	85	107	90	84	74	83	87	85	93		88	8
65	1	30				96	80	65	75	85	85	75	61	87		79	10
65	1	31				101	68	62	43	27	32	39	45	47		52	21
65	2	1			96	203	85	65	65	45	33	38	53	38		72	48
65	2	2			117	123	57	24	20	30	23		35	50		53	38
65	2	3			77	60	45	33	38	30	42	57	94			53	20
65	2	4			125	96	62	41	30	11	44	84	50	52		60	32
65	2	6						37	23	34	100	59	54	52		51	23
65	2	7							24	41	77	95	67	95		67	26
65	2	8									43	55	54	42		49	6
65	2	9									69	122	147	123		115	29
65	2	10										79	84	82		82	2
HR	AVG				100	95	76	58	47	43	53	67	69	69			
			OBS	AVG	66		STD	DEV	29								

AT BOULDER

STATION	GEOGRAPHIC LAT	LONG EAST	CODE	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
								YEAR												
SENDAI	39N	140	7								B									
ASHKHABAD	37N	58	1								B	B	C							
ASHKHABAD	37N	58	2								C									
ASHKHABAD	37N	58	5								B									
NIIGATA	37N	138	1	B	A	B	C	B	B	B	A	B	B	B	B	B	Q	Q	Q	Q
NIIGATA	37N	138	5	B	A	B														
DODAIRA	36N	139	1								B	B	B	B	B	B	C	Q	Q	Q
DODAIRA	36N	139	2								B	B	B		B	B	Q	Q	Q	Q
DODAIRA	36N	139	4								C	A	B							
KAKIOKA	36N	140	1	B	A	A	S													
KAKIOKA	36N	140	4			B		B	B	B	C	S								
KAKIOKA	36N	140	5	B	A	A	S													
GIFU	35N	137	1	B	B	B	C	B	B	B	B	B	C							
GIFU	35N	137	2						B		B									
GIFU	35N	137	5	B	B	B														
MARUYAMA	35N	139	1	B	A	B	C	B	B	B	C	S								
MARUYAMA	35N	139	2		B	C	S													
MARUYAMA	35N	139	3		B	C	S													
MARUYAMA	35N	139	4	C	A	C	C	S												
MARUYAMA	35N	139	5	B	A	B	B	B	C	S										
SHODA JIMA	34N	134	4	C	A	C	S													
ASO	32N	131	1	C	A	B			B	C	B	C								
ASO	32N	131	2								C	C								
ASO	32N	131	5	C	A	B														
ASO	32N	131	7							C										
SACRAMENTO	32N	255	1	B	A	B	Q	Q	Q	Q	Q	S								
SACRAMENTO	32N	255	2	C	A	B	S													
SACRAMENTO	32N	255	3	B	A	B	S													
TUCSON	32N	250	1								B	B	S							
TUCSON	32N	250	2								B	B	S							
TUCSON	32N	250	3								B	B	S							
NAINITAL	29N	79	1									Q								
NAINITAL	29N	79	3									Q								
NAINITAL	29N	79	7									Q								
CANARY IS	28N	344	1														Q	Q	Q	Q
CANARY IS	28N	344	2														Q	Q	Q	Q
MT ABU	24N	72	1	C	B						C	B	B							
MT ABU	24N	72	2	C	B	B					C	B	B							
MT ABU	24N	72	3	C	B						C	B	B							
TAMANRASSET	22N	5	1	B	A	A	S													
TAMANRASSET	22N	5	2	B	A	A	S													
TAMANRASSET	22N	5	3	B	A	A	S													
TAMANRASSET	22N	5	4	B	A	A	S													
TAMANRASSET	22N	5	7	B	A	A	S													
HALEAKALA	20N	204	1					Q	Q	Q	B	A	S							
HALEAKALA	20N	204	2					Q	Q	Q	B	A	S							
HALEAKALA	20N	204	3					Q	Q	Q	B	A	S							
HALEAKALA	20N	204	5					Q	Q	Q	B	A	S							
POONA	18N	73	1		B		C		C		C	S								
POONA	18N	73	2						C		C	S								

Continued

Code	Wavelength	Code	Wavelength
1	5577A	5	Cont. at ∿5300
2	6300/6364	6	3914/4278
3	5890/5896	7	Other
4	OH		

KEY TO SYMBOLS

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S = Program STOPPED operations (see MASTER STATION LIST for actual date)

OH RAYLEIGHS

SHAUTE PROVENCE ZENITH INTENSITIES 6700A TIME ZONE 0 HOUR

YR.	MO.	DA.	18	19	20	21	22	23	00	01	02	03	04	05	06	MEAN	STD. DEV.
64	10	9						90	75							83	8
64	10	10									75	85				80	5
64	10	12					85	70	70	75	75	90				78	8
64	10	13									80	80				80	0
64	10	15								100	80	75				85	11
64	10	16									35	45				40	5
64	10	17										100				100	0
HR	AVG			110	49	47	50	46	55	75	66	64					
			OBS	AVG	56		STD	DEV	26								
64	10	25		115												115	0
64	10	26		65	95											80	15
64	10	29		145	125	130	125	135	130							132	7
64	10	30		170	160	160	135	125	110							143	22
64	10	31						105	125	95	115					110	11
64	11	1		100	100	80	90	115	130	130	105	80				103	18
64	11	2		155	155	140	135	145	130	135						142	9
64	11	4									150		140			145	5
64	11	5		190	145	130	130	110	110	115	110	105				127	25
64	11	7				95	80									88	8
64	11	8				110	100	90	85	75						92	12
64	11	9				150	130	100	90			90	105			111	22
64	11	10					130	145	130	110	110	115	105			121	13
64	11	11						170	105	105	105	115	135			123	24
64	11	12							90	110	100	95	90			97	7
64	11	14									140	115	110			122	13
64	11	15											175			175	0
HR	AVG			134	130	124	117	124	112	109	116	102	122				
			OBS	AVG	119		STD	DEV	25								
64	11	22	110													110	0
64	11	23	50	60												55	5
64	11	24	65	80	85											77	8
64	11	25	125	105	105	95	100									106	10
64	11	26	95	95	100	120										103	10
64	11	27	95	90	130	115	125		100							109	15
64	11	29	165	110	120	120	100	95	100	115	130					117	20
64	11	30	135	115	105	100	80	80	95	100	125	125				106	18
64	12	1	90	85	80	80	55	60	70	80	70	80	80			75	10
64	12	2	90	90	110	95	90	95	85	95	90	90	80	95		92	7
64	12	3				65	50	65	70	85	80		65			69	11
64	12	4	105	120	135	135	160	170	155	145	120	110	150	120		135	2
64	12	5	165	140	120	130	150	165	155	155	155	135	125	125		143	1

AT BOULDER

STATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	CODE	YEAR 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
POONA	18N	73	3						C		C	S								
POONA	18N	73	5								C	S								
POONA	18N	73	7								C	S								
DEBRE ZEIT	08N	38	1										C	C						
DEBRE ZEIT	08N	38	2										C	C						
DEBRE ZEIT	08N	38	3										C	C						
DEBRE ZEIT	08N	38	4										C	C						
ZAMBOANGA CITY	06N	122	1			C	S													
LWIRO	02S	28	1	C	A	C	S													
LWIRO	02S	28	2	C	A	C	S													
LWIRO	02S	28	3	C	A	S														
LWIRO	02S	28	4	C	A	C	S													
LWIRO	02S	28	5	C	A	C	S													
HUANCAYO	12S	285	1		B	B														
HUANCAYO	12S	285	2		B	B														
HUANCAYO	12S	285	3		B	B														
MAKATEA	16S	212	1							B	A	B								
MAKATEA	16S	212	2							B	A	B								
MAKATEA	16S	212	4							B	A	B								
MAKATEA	16S	212	7							B	A	B								
TOWNSVILLE	19S	146	2								C	S								
TSUMEB	19S	17	1									C	S							
TSUMEB	19S	17	2									C	S							
TSUMEB	19S	17	3									C	S							
TSUMEB	19S	17	4									C	S							
TSUMEB	19S	17	6									C	S							
CAMDEN	34S	150	1	B	B	S														
CAMDEN	34S	150	2		B	S														
LAUDER	45S	169	7													Q	Q	Q	Q	Q
KERGUELEN	49S	70	1								B	A	B							
KERGUELEN	49S	70	2								B	A	B							
KERGUELEN	49S	70	3								B	A	B							
KERGUELEN	49S	70	4								B	A	B							
KERGUELEN	49S	70	7								B	A	B							
SOYA SHIP	60S		1	B	C	C	C	C	C	S										
SOYA SHIP	60S		2			C	C	C	C	S										
SOYA SHIP	60S		3			C	C	C	C	S										
SOYA SHIP	60S		4			C	C	C	C	S										
MIRNY	66S	92	1		B	S														
MIRNY	66S	92	2		B	S														
MIRNY	66S	92	3		B	S														
SYOWA BASE	69S	39	1			B	C	B	C	S										
SYOWA BASE	69S	39	2				C	B	C	S										
SYOWA BASE	69S	39	3				C		C	S										
SYOWA BASE	69S	39	4				C		C	S										
SYOWA BASE	69S	39	6					B	S											
SANAE	70S	357	1											C						
SANAE	70S	357	2											C						
SANAE	70S	357	6											C						
MCMURDO	77S	166	1												C	Q	Q	Q	Q	
MCMURDO	77S	166													C	Q	Q	Q	Q	

Code	Wavelength	Code	Wavelength
1	- 5577A	5	- Cont. at ∿5300
2	- 6300/6364	6	- 3914/4278
3	- 5890/5896	7	- Other
4	- OH		

KEY TO SYMBOLS

A = 12 Months
B = 6-11 Months
C = 1-5 Months

Q = Data exist but not held at WDC-A; QUERY WDC-A to assist in obtaining data
P = Data PRESUMED to exist but not held at WDC-A; WDC-A will attempt to ascertain availability
S = Program STOPPED operations (see MASTER STATION LIST for actual date)

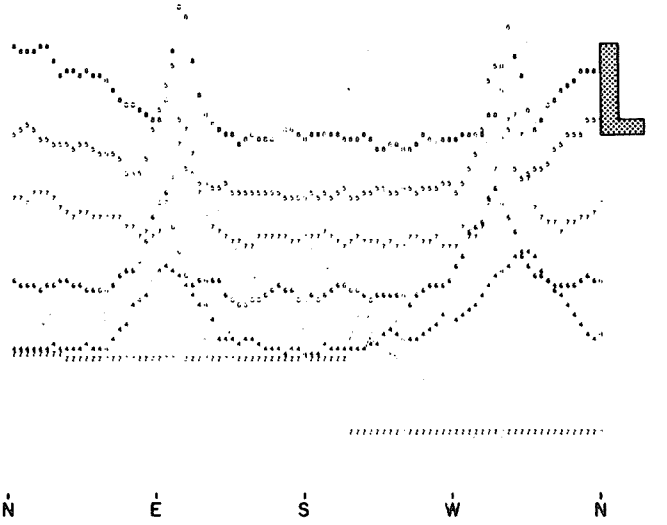
S

A

M

NOV 13/14, 1960 0155 MST
50K

P



L

E

G.1 AIRGLOW

MISCELLANEOUS:

The Data Center holds strip-chart records and observational logs for night airglow observations obtained on board the U.S.N.S. Croatan, February 18 - May 2, 1965. In the course of 63 nights observations were made of 4278, 5577 and 6300 Å emission, vertically and at 75° and 85° elevation, as the ship cruised from 35°N to 60°S along (approximately) the 75°W meridian.

PUBLICATIONS:

1. *World Data Center A, Report Series UAG-1*, IQSY Night Airglow Data, July 1968. (Data in this publication also available on punched cards).

2. *ESSA Technical Report, IER 16-ITSA-16* - "Fritz Peak Observations of Stable Auroral Red Arcs Summary 1955 - 1965", E. Marovich, December 1966.

G.2 SATELLITE MEASUREMENTS OF AIRGLOW

AT GREENBELT

SPACECRAFT, EXPERIMENT INVESTIGATOR, NSSDC ID	DATE SET AT NSSDC MONTH - DAY - YEAR FROM	TO	LAUNCH DATE
INJUN 3, AURORAL ANC AIRGLOW PHOTOMETERS O'BRIEN (62-067B-08)	121462	102863 ,	121362
OGO 4, LYMAN-ALPHA AND UV AIRGLOW STUDY MANGE (67-073A-13)	072967	021268 ,	072867
OGO 4, AIRGLOW PHOTOMETER REED (67-073A-12)	081967	012968 ,	072867
OGO 5, ULTRAVIOLET AIRGLOW THOMAS (68-014A-21)	030468	032870 ,	030468
OSO 5, ZODIACAL LIGHT MONITOR NEY (69-006A-07)	012769	031571 ,	012269
OGO 6, UV PHOTOMETER BARTH (69-051A-13)	060969	072470 ,	060569
MARINER 6, UV SPECTROMETER BARTH (69-014A-04)	073169	073169 ,	022469
MARINER 7, UV SPECTROMETER BARTH (69-030A-04)	080569	080569 ,	032769
MARINER 9, ULTRAVIOLET SPECTROMETER (UVS) BARTH (71-051A-02)	111271	020872 ,	053071

H. MISCELLANY

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H.1	NOCTILUCENT CLOUDS	313
H.2	METEOROLOGICAL ROCKETS	314
H.3	OZONE	317

These data are not the primary responsibility of the Solar-Terrestrial Physics disciplines, but because of close relationships to solar-terrestrial physics, are outlined here.

H.1 NOCTILUCENT CLOUDS

H.1 Responsibility for publication of noctilucent cloud data has been undertaken by the Meteorological Service of Canada.

For information on data available, contact:

Department of Transport
Meteorological Branch
Attn: Dr. A. D. Christie
315 Bloor Street West
Toronto 181, Canada

H.1 Observations were made at Mawson, Wilkes and Macquarie Island during February-April 1968 and 1969. Contact World Data Center-A, Boulder for information.

AT BOULDER

M I C R O F I L M:

1. IQSY (1964-1965) observations from the 202 stations of the Hydro-Meteorology Service of the USSR, the 7 stations of the All-Union Astronomical-Geodetical Society, and the station of the Institute of Physics and Astronomy of the Academy of Sciences, Estonian SSR, on 35 mm roll microfilm.

P U B L I C A T I O N S:

1. *Geophysical Institute, University of Alaska,* UAG-191, Summary of Noctilucent Cloud Data from Alaska, Canada, Greenland, Iceland and the Southern Hemisphere for the years 1885 - 1966.
2. *Department of Transport, Meteorological Branch, Canada,* Noctilucent Cloud Data for March - October, 1967; March - October, 1968 and March - October, 1969 from Alaska, Canada, Greenland, and Iceland.
3. *IQSY Notes, IQSY Secretariat, London* and *STP Notes, National Academy of Sciences, Washington, D. C., Solar-Geophysical Data, NOAA* - occurrences of noctilucent clouds over the N. Atlantic and western Europe in the abbreviated Calendar Records.
4. *World Meteorological Organization,* WMO-No. 250, TP. 138. "International Noctilucent Cloud Observation Manual".

METEOROLOGICAL ROCKET NETWORK SUMMARY

Page No.	Date GCT	Time GCT	Type Rocket	Wind Sensor	Temperature Sensor	Temp Track (10^1 M MSL)	Wind Track (10^1 M MSL)
AFETR, ANTIGUA AAFB, B.W.I.					Lat. 17° 09'N Long. 61° 47'W		
3	1 Mar 68	1429	Arcas	Chute	Arcasonde 1A	5608-2581	5775-2575
32	6 Mar 68	1700	Arcas	Chute	Arcasonde 1A	6264-2459	6150-2425
44	8 Mar 68	1503	Arcas	Chute	Arcasonde 1A	5900-2450	5900-2475
81	18 Mar 68	1550	Arcas	Chute	Arcasonde 1A	6100-2450	5975-2475
111	22 Mar 68	1445	Arcas	Chute	Arcasonde 1A	6100-2450	6000-2500
AFETR, ASCENSION ISLAND, AFB					Lat. 07° 59'S Long. 14° 25'W		
4	1 Mar 68	1445	Arcas	Chute	Arcasonde 1A	5800-2500	5875-2400
12	4 Mar 68	1445	Arcas	Chute	Arcasonde 1A	5950-2500	5975-2400
29	6 Mar 68	1445	Arcas	Chute	Arcasonde 1A	5200-2450	6275-2425
39	7 Mar 68	1445	Arcas	Chute	Arcasonde 1A	5825-2500	6325-2575
50	11 Mar 68	1455	Arcas	Chute	Arcasonde 1A	6350-2475	6100-2475

METEOROLOGICAL ROCKET SOUNDING DATA

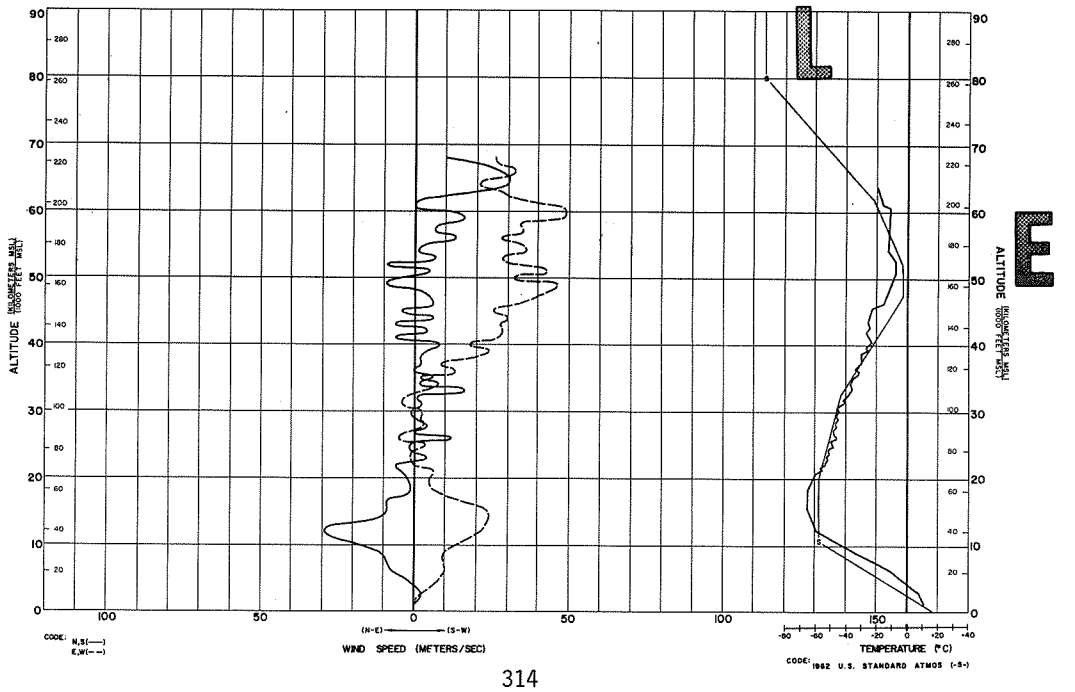
RP	RP NAME + PLACE	DATE Y M D	TIME Z	TR	RT	WS	TS	RP	IJ	QD	WHT	WHB	THT	THB	C
23039	NEW MEXICO	66 10 20	1320	+03	01	02	12								3

ROCKET WNDS — THERMODYNAMICS — COMPOSITION — RAOB

FV	A MSL	COMP	WNDS	A MSL	TDC	PMB	D	SOS	A MSL	O	ED	LAR	PMB	A MSL	COMP	WNDS	RH	TDC
123	6800	+010	+026	6370	-19.6	00.137	00.188	319					0009.2	3200	+002	+002		-41.3
152	6700	+020	+027	6102	-16.5	00.194	00.264	321					0011.5	3048	+001	-005		-42.7
165	6600	+027	+032	6066	-11.4	00.204	00.271	324					0014.4	2896	-002	+000		-44.7
170	6500	+030	+028	5403	-12.2	00.477	00.636	324					0018.0	2743	+001	+002		-46.3
169	6400	+030	+021	5261	-08.4	00.571	00.752	326					0022.7	2591	+004	-003		-48.0
163	6300	+022	+026	5077	-06.9	00.721	00.943	327					0028.6	2438	+001	-002		-50.7
155	6200	+005	+031	4634	-15.7	01.273	01.723	322					0045.9	2134	-003	+003		-57.9
146	6100	+000	+043	4539	-22.8	01.444	02.010	317					0074.7	1829	-001	+006		-65.6
138	6000	+011	+049	4345	-26.3	01.878	02.691	315					0123.0	1524	-009	+023		-65.5
128	5900	+016	+047	4276	-23.8	02.063	02.883	317					0201.9	1219	-029	+022		-59.3
119	5800	+008	+034	4201	-26.0	02.282	03.207	315					0319.8	0914	-012	+010	24	-35.0
111	5700	+007	+035	4041	-22.9	02.835	03.967	317					0484.3	0610	-008	+010	16	-10.8
103	5600	+013	+028	3977	-26.5	03.091	04.307	315					0709.3	0305	+002	+003	10	+07.2
097	5500	+005	+033	3911	-26.1	03.386	04.725	315					0884.6	0122	+000	+000	41	+11.0
092	5400	+001	+036	3863	-30.1	03.616	05.184	313					0010.0	3127	+002	-002		-41.4
087	5300	+007	+028	3738	-29.9	04.297	06.155	313					0050.0	2070	-004	+005		-59.2
081	5200	-009	+033	3638	-34.4	04.948	07.221	310					0100.0	1646	-009	+016		-65.3
077	5100	+005	+043	3590	-31.2	05.291	07.619	312					0500.0	0585	-007	+010	13	-08.8
070	5000	-005	+032	3544	-32.4	05.638	08.160	311					0700.0	0316	+002	+003	10	+06.5
066	4900	-009	+046	3492	-35.1	06.071	08.885	309										
061	4800	+002	+044	3406	-37.0	06.863	10.125	308										
053	4600	+006	+033	3373	-36.1	07.188	10.565	309										
049	4500	-004	+026	3326	-36.3	07.685	11.305	309										
046	4400	+006	+030	3285	-38.1	08.149	12.079	307										
043	4300	-006	+028	3212	-39.6	09.066	13.525	306										
040	4200	+004	+028	3181	-41.9	09.481	14.284	305										
038	4100	-006	+027	3139	-39.6	10.067	15.018	306										
035	4000	+008	+018	3109	-43.2	10.525	15.947	304										
032	3900	+005	+024	3047	-46.1	11.541	17.709	302										
030	3800	+002	+019	3018	-44.5	12.038	18.344	303										
028	3700	+002	+009	2951	-46.3	13.300	20.428	302										
026	3600	+000	+013	2892	-45.3	14.518	22.200	303										
024	3500	+006	+002	2838	-46.9	15.730	24.223	302										
022	3400	+002	+008	2787	-46.2	16.994	26.089	302										
020	3300	+016	+003	2710	-48.1	19.063	29.513	301										
019	3200	+001	-003	2660	-47.8	20.531	31.743	301										
018	3100	+002	-004	2642	-46.6	21.120	32.481	302										
016	3000	-001	+002	2589	-46.5	22.839	35.110	302										
015	2900	+000	+002	2532	-50.2	24.907	38.924	299										
014	2800	+004	+003	2467	-48.1	27.453	42.501	301										

ROCKET CONTINUED — THERMODYNAMICS CONTINUED

FV	A MSL	COMP	WNDS	A MSL	TDC	PMB	D	SOS
013	2700	+000	-001	2451	-50.9	28.121	44.084	299
011	2600	+012	-005	2409	-51.9	29.984	47.217	298
011	2500	-002	+003	2369	-50.2	31.905	49.860	299
010	2400	-001	-001	2333	-53.2	33.700	53.383	297
010	2300	+004	-001	2284	-51.7	36.350	57.192	298
009	2200	-006	+000	2263	-53.2	37.524	59.441	297
008	2100	-004	+006	2196	-53.7	41.623	66.084	297
				2153	-56.8	44.486	71.642	295
				2136	-55.5	45.697	73.152	296
				2075	-59.6	50.273	82.022	293



H.2 METEOROLOGICAL ROCKETS

The Meteorological Rocket Data Reports, issued monthly by World Data Center A for Meteorology, start with January 1964 data. Each report contains the wind and temperature measurements from all available meteorological sounding rocket firings for that particular month, along with computed values for pressure, density, and speed of sound. It also includes the local radiosonde observations nearest the time of firing. Release time of the radiosonde should be within ±6 hours of the time of firing. However, exceptions up to ±12 hours are made, particularly in tropical regions. Since only those firings which yield significant data are of interest here, the report does not include unsuccessful firings. Prior to January 1966, only data from stations cooperating in the current Meteorological Rocket Network (MRN) are available. Thus these first issues of the Meteorological Rocket Data Reports are essentially a reprint of the Data Report of the Meteorological Rocket Network Firings, IRIG Document 109-62, issued by the Meteorological Rocket Network Committee (MRNC). Other countries are encouraged to submit their observations to WDC-A for inclusion in this series. Meteorological Rocket Network Stations which have contributed data are listed in an addendum. Any data delayed and thus omitted from previous publications will appear in a second addendum.

The current Meteorological Rocket Network (MRN) combines the efforts of a number of meteorological organizations engaged in observations and studies of the upper atmosphere. The MRNC has played an active role in coordinating the planning, implementation, processing, and publication of the data acquired under the auspices of the MRN. Background information relative to the development of the MRN, the techniques employed, and the participants, is contained in IRIG Document 111-64, first published in February 1965. Familiarization with this document is urged as the details involved in the collection and reduction of MRN data are numerous and cannot be given in each data report. Additional information concerning computer techniques used in data reduction should be referred to the individual contributors.

Data gathered by the Meteorological Rocket Network prior to 1965 were uniformly reduced by United States Army Electronics Research and Development Activity, White Sands Missile Range, New Mexico, using graphical techniques. Beginning with the 1965 data, initial reduction is the responsibility of each contributing station. This change has been brought about primarily because the radar plots once used as a basis for all reduction are no longer available. Under this new reduction procedure, several of the MRN sites will be reducing wind data from digital radar position tapes using high-speed computers. The advantages in this method are obvious. The only change in the presentation of the data will be in the manner in which the position times are reported. Beginning with data for July 1965 fall rate is calculated for the user's convenience. Thus columns 16, 17, and 18 which formerly denoted time after firing in relation to altitude, now denote fall rate in whole meters per second.

A brief monthly summary has been initiated beginning with the 1965 data reports. This summary, found immediately before the addendum, is designed to compare the mean profile for the current month with long-term means for the same month. It is hoped that this summary will prove of value to the user and that its scope can be increased with time.

These World Data Center A Meteorology Data Reports "High Altitude Meteorological Data" (formerly Meteorological Rocket Network Firings) are published by, and are for sale through, the National Climatic Center, Asheville, North Carolina, U.S.A. 28801, Attn: Publications. The subscription price is $36.00 per year; $9.00 additional for foreign mailing; $3.00 single copy. Checks and money orders should be made payable to: Department of Commerce, NOAA.

S

WMO/OMM MSC/SMC

VERTICAL DISTRIBUTION OF OZONE
DISTRIBUTION VERTICALE D'OZONE

Country/pays FRANCE

Station VAL-JOYEUX

Date 1er AVRIL 1966 Time/heure 9h00

λ SΩΩΩ [illegible] $(\Omega\Omega\Omega)_p$ 5 (10mb)

Equipment/équipement

RADIOSONDE A. VASSY

A

PPPP	TT	$P_3P_3P_3$	fff	ddd
100	-56	245		
70	-55	200		
50	-54	37		
30	-50	100		
20	-47	25		
10	-35	100		
b 85	-55	262		
b 29	-50	100		
b 45	-54	32		
c 10	-35	100		

M

b MAXIMA ET MINIMA
c PRESSION MINIMALE

Form No. 0-3
MSC 63-9702

WMO/OMM MSC/SMC

VERTICAL DISTRIBUTION OF OZONE
DISTRIBUTION VERTICALE D'OZONE

Country/pays FRANCE

Station VAL-JOYEUX

Date 21 AVRIL 1966 Time/heure 9h00

λ SΩΩΩ 314 $(\Omega\Omega\Omega)_p$ 54 (26 mb)

Equipment/équipement

RADIOSONDE A. VASSY

PPPP	TT	$P_3P_3P_3$	fff	ddd
100	-58	215		
70	-54	136		
50	-50	225		
30	-48	168		
b 90	-56	232		
b 49	-50	226		
b 65	-53	130		
c [illegible]	-46	192		

P

L

b MAXIMA ET MINIMA
c PRESSION MINIMALE

Form No. 0-3
MSC 63-9702

E

H.2 METEOROLOGICAL ROCKETS

Reporting Points
AFETR, Antigua AAFB, B.W.I. (Lat. 17° 09'N Long. 61° 47'W)
AFETR, Ascension Island, AFB (Lat. 07° 59'S Long. 14° 25'W)
AFETR, Cape Kennedy, Florida (Lat. 28° 27'N Long. 80° 32'W)
AFETR, San Salvador Island AAFB (Lat. 24° 07'N Long. 74° 27'W)
AFWTR, Eniwetok, Marshall Islands (Lat. 11° 26'N Long. 162° 23'E)
AFWTR, Vandenberg AFB, California (Lat. 34° 40'N Long. 120° 36'W)
Carnavon, West Australia (Lat. 24° 53'S Long. 113° 40'E)
EL Arenosillo, Spain (Lat. 37° 06'N Long. 06° 44'W)
Fort Churchill, Canada (Lat. 58° 44'N Long. 93° 49'W)
Fort Greely, Alaska (Lat. 64° 00'N Long. 145° 44'W)
Fort Sherman, Canal Zone (Lat. 09° 20'N Long. 79° 59'W)
Gan, Maldive Island (Lat. 0° 41'S Long. 73° 09'E)
Green River, Utah (Lat. 38° 56'N Long. 110° 04'W)
Heiss Island USSR (Lat. 80° 37'N Long. 58° 03'E)
Kindley Air Force Base, Bermuda (Lat. 32° 21'N Long. 64° 39'W)
Mar Chiquita, Argentina (Lat. 37° 45'S Long. 57° 25'W)
Natal, Brazil (Lat. 5° 55'S Long. 35° 10'W)
PMR, Barking Sands (Kauai), Hawaii (Lat. 22° 02'N Long. 159° 47'W)
PMR, Point Mugu, California (Lat. 34° 07'N Long. 119° 07'W)
PMR, San Nicolas Island, California (Lat. 33° 14'N Long. 119° 25'W)
Primrose Lake, Alberta, Canada (Lat. 54° 45'N Long. 110° 03'W)
Ryori, Japan (Lat. 39° 02'N Long. 141° 50'E)
Thule AB, Greenland (Lat. 76° 33'N Long. 68° 49'W)
Thumba, India (Lat. 08° 30'N Long. 76° 52'E)
Uchinoura, Japan (Lat. 31° 15'N Long. 131° 05'E)
USAMC, Kwajalein, Marshall Islands (Lat. 08° 44'N Long. 167° 44'E)
Volgograd, USSR (Lat. 48° 41'N Long. 44° 21'E)
Wallops Island, Virginia (Lat. 37° 50'N Long. 75° 29'W)
West Geirinish, Scotland (Lat. 57° 21'N Long. 07° 22'W)
White Sands Missile Range, New Mexico (Lat. 32° 23'N Long. 106° 29'W)
Woomera, South Australia (Lat. 30° 56'S Long. 136° 31'E)
ZURF, White Sands Missile Range, New Mexico (Lat. 33° 46'N Long. 106° 36'W)

SHIPS:

Ship Sierra
Mobil Station (USSR) Area #1

List of Inactive Reporting Points	Date Inactive
AFMDC, Holloman AFB, New Mexico (Lat. 32° 51'N Long. 106° 06'W)	20 June 61
AFETR, Eleuthera Island AFB (Lat. 25° 16'N Long. 76° 19'W)	9 June 65
AFETR, Grand Turk Island AAFB (Lat. 21° 26'N Long. 71° 09'W)	2 Dec. 66
Eglin Air Force Base, Florida (Lat. 30° 23'N Long. 86° 42'W)	
Harp, Seawell, West Indies (Lat. 13° 06'N Long. 59° 37'W)	
Highwater Test Range, Canada (Lat. 45° 01'N Long. 72° 27'W)	
McMurdo Sound, Antarctica (Lat. 77° 53'S Long. 166° 44'E)	3 Oct. 63
Point Barrow, Alaska (Lat. 71° 21'N Long. 156° 59'W)	3 Aug. 61
Tartagal, Argentina (Lat. 22° 46'S Long. 63° 49'W)	
Tonopah Range, Nevada (Lat. 38° 00'N Long. 116° 30'W)	
Yuma Proving Ground, Arizona (Lat. 32° 52'N Long. 114° 19'W)	

H.3 OZONE

The ozone data from observations at ground stations throughout the world are published by the Department of Transport, Meteorological Branch, of Canada in cooperation with the World Meteorological Organization. There is a *Catalogue of Published Data up to the End of 1966, Index No. 2* available from: Director, Meteorological Service of Canada, 315 Bloor Street West, Toronto 181, Ontario, Canada.

For information on ozone data including that available from ozonesondes contact World Data Center-A, Meteorology, National Climatic Center, Asheville, North Carolina, U.S.A. 28801.

Publication Notice

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(Prepared by World Data Center A for Solar-Terrestrial Physics, NOAA, Boulder, Colorado)

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