REPORT UAG - 64

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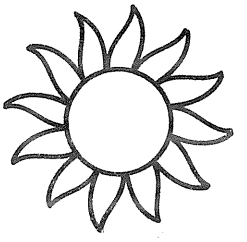
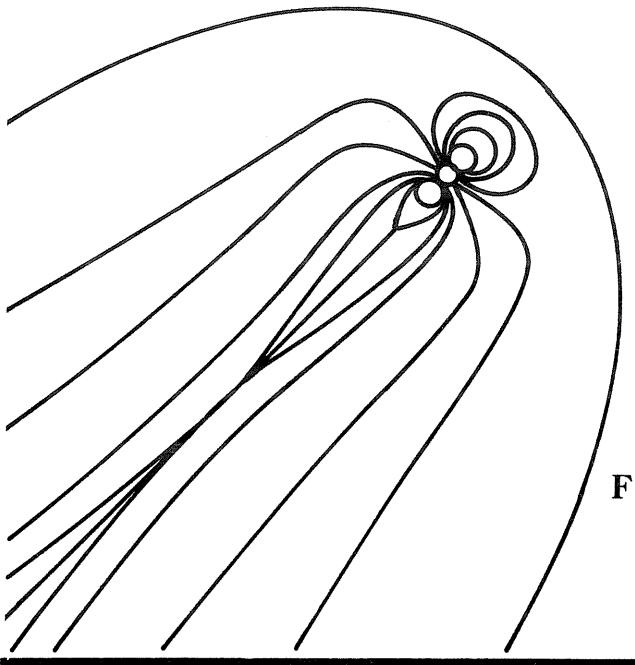


GEOMAGNETIC DATA FOR APRIL 1976

(AE (8) INDICES AND STACKED MAGNETOGRAMS)



February 1978

IMS DATA PUBLICATION No. 4

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WORLD DATA CENTER A
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REPORT UAG - 64

GEOMAGNETIC DATA FOR APRIL 1976
(AE (8) INDICES AND STACKED MAGNETOGRAMS)

by

J. H. Allen, C. C. Abston, and L. D. Morris
National Geophysical and Solar-Terrestrial Data Center
Boulder, Colorado 80303 USA

February 1978

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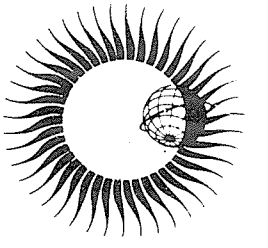

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TABLE OF CONTENTS

GEOMAGNETIC DATA FOR APRIL 1976
(AE(8) INDICES AND STACKED MAGNETOGRAMS)

by

J. H. Allen, C. C. Abston and L. D. Morris
NGSDC/EDS/NOAA
Boulder, Colorado 80303 USA

SECTION I. GENERAL DISCUSSION

1. Introduction

This is the fourth of a series of data reports in support of the International Magnetospheric Study (IMS) and includes selected geomagnetic variation data for April 1976; the series began with *UAG-60*, which presented data for January 1976 (see Section I(5) below). Included herein are analog records from eight auroral zone stations; preliminary AE indices based on these data; and various related tables, graphs, and statistics. It is expected that this series will continue on an increasingly timely schedule and will contain data from additional stations which may be processed in time for publication.

2. Data Selection and Processing

The eight observatories supplying data for this report are shown in figure 1. These are Leirvogur (LR), Narssarssuaq (NAS), Fort Churchill (FC), College (CO), Barrow (BW), Tixie Bay (TI), Dixon Island (DI), and Abisko (AI). They were chosen from among the list of 12 observatories whose records are now routinely used by WDC-A for Solar-Terrestrial Physics in the derivation of Auroral

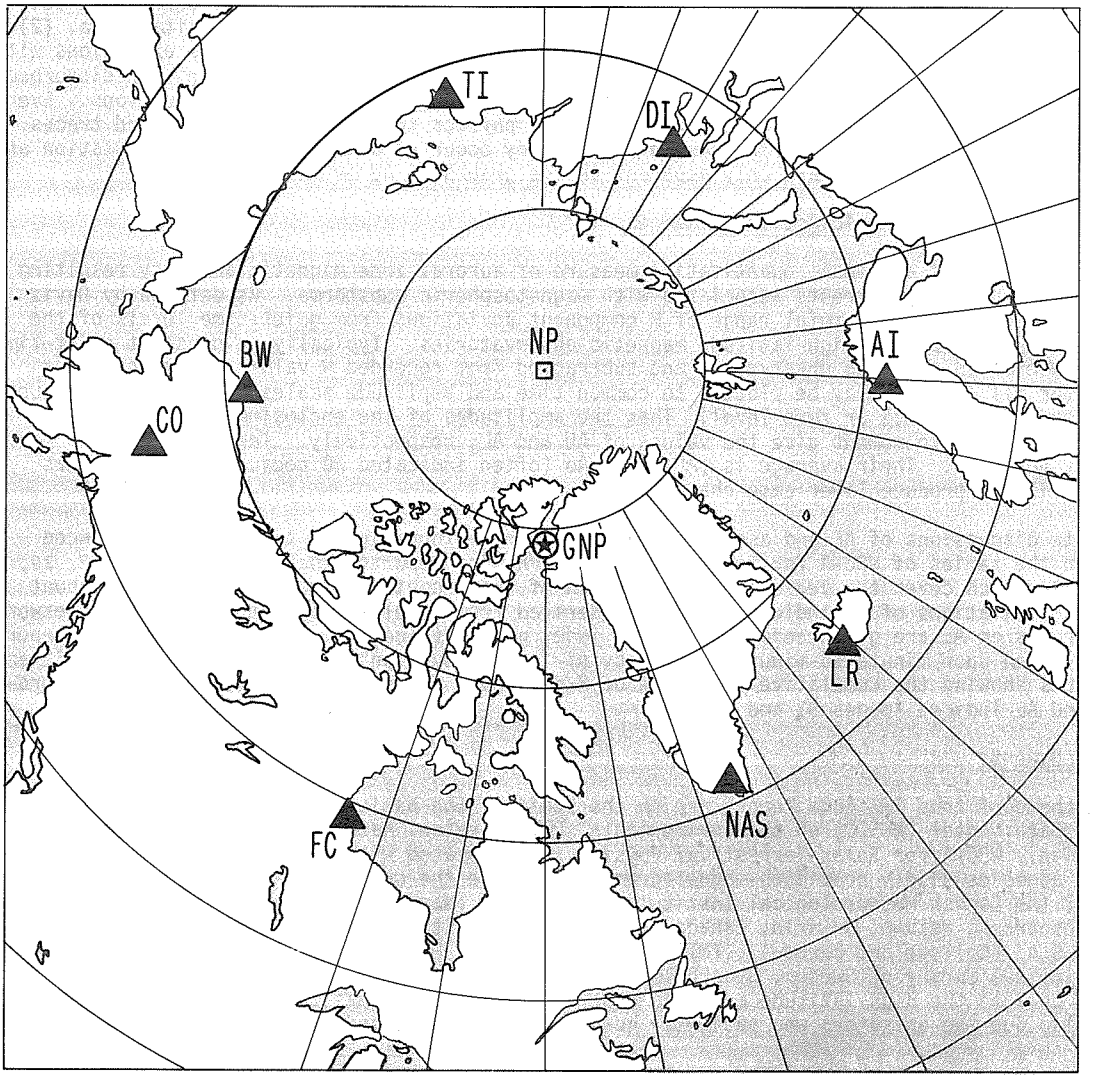

Figure 1. Provisional AE(8) network.

Electrojet (AE) magnetic activity indices. Reasons for their selection were (1) records from these sites are most promptly available, (2) the sites are about evenly spaced in longitude, and (3) each location has demonstrated its importance in the prior derivation of AE indices [Allen and Kroehl, 1975]. We hope that as digital data processing from other observatories becomes more routine the network can be expanded and we can include data from Great Whale River and Yellowknife to improve the station distribution for these prompt indices.

Among the stations supplying data for this publication, only Fort Churchill and Barrow are presently recording digital variations on-site. Both observatories use flux-gate instruments supplemented by proton precession magnetometers and generate more or less routine absolute observations. Each component's amplitude is recorded every 10 s (20 s for BW) on magnetic tape, and analog chart records are prepared as backup data. These high-time-resolution digital data are processed at central facilities responsible for each observatory. Obvious errors (usually spikes) are corrected and 1-min average values are computed. These preliminary data are sent on tape to WDC-A for Solar-Terrestrial Physics where they are plotted and checked for stability of quiet-time levels (baseline drift), presence of noise, and day-to-day continuity. As necessary, remaining spikes are removed, and "temporary" baselines are adopted to compensate for data problems that would affect derivation of AE indices.

All the other observatories record magnetic variations photographically. Their magnetograms are copied on 35-mm microfilm for transfer to WDC-A for Solar-Terrestrial Physics together with calibration information. Here they are reproduced as almost original size magnetograms and digitized at 1-min intervals using semiautomatic scaling equipment. Resulting digital tapes of component amplitudes relative to baselines are passed through the same plotting and other quality control processes as the original digital data described above.

After completion of quality control checks, all digital records are merged and replotted to common time and amplitude scales. These are the monthly H, Z, and D components and daily H (or X) component stacked plots included in this report. For most observatories intervals of missing data are apparent in one or more components. Gaps may arise from (1) loss of on-site digital data, (2) noise in original digital data, (3) movement of traces off magnetograms during large excursions with no secondary trace for that component, (4) lack of low-sensitivity storm magnetograms for disturbed periods, and (5) loss of intermixing of analog traces during large, rapid field fluctuations. Every reasonable effort is made at WDC-A for Solar-Terrestrial physics to curve-follow disturbed traces. Effects of data gaps are seen in AE indices only when they occur at a critically located station and in the H component. Often they are only apparent in the graphs of AU or AL.

3. Auroral Electrojet Magnetic Activity Indices

The AE index gives a global, quantitative measure of auroral zone magnetic activity resulting from enhanced ionospheric currents associated with magnetospheric substorms. As defined by Davis and Sugiura [1966], AE is the total range of H component deviations from quiet-time levels of the field at a selected group of high-latitude magnetic observatories. Typically, a constant quiet-time H value is determined for each observatory and subtracted from recorded H values. The resultant deviations for all stations may be plotted to common time and amplitude scales and graphically superposed on a common reference or zero level. Then the amplitudes of the enclosing upper and lower envelopes from moment-to-moment give the values of AU and AL, respectively. The range between them is AE, i.e., AU-AL=AE. Their average is (AU+AL)/2=Ao (often indicated AO because many computers lack the ability to produce lower case characters).

Complete discussions of AE and associated indices can be found in the two papers referenced above and in the series of WDC-A for Solar-Terrestrial Physics Reports *UAG-22, 29, 31, 33, 37, 39, 45, 47,* and *59* which cover the years 1966-1974. Each of these contains precautionary notes about the inherent limitations of AE indices, even when derived from a relatively complete station network. Additional notes on AE are given before the daily index graphs (page 39). Also given in this report are figures based upon minute-to-minute "frequency of index provision" by each station (pages 52 and 54) and graphs showing the cumulative amplitude of H deviation for times when each station was providing AU and AL indices (pages 53 and 55).

4. Acknowledgments

The authors of this IMS data report are on the staff of the National Geophysical and Solar-Terrestrial Data Center (NGSDC) of the Environmental Data Service, National Oceanic and Atmospheric Administration. WDC-A for Solar-Terrestrial Physics is collocated with NGSDC and shares the same staff. The agencies kindly providing magnetogram records are the University of Iceland, Reykjavik (Leirvogur); the Danish Meteorological Institute, Copenhagen (Narssarssuaq); the Department of Energy, Mines and Resources, Ottawa, Ontario, Canada (Fort Churchill); the U.S. Geological Survey, Denver, Colorado, U.S.A. (College and Barrow); IZMIRAN, Moscow Region, U.S.S.R. (Tixie Bay and Dixon Island); and the Geological Survey of Sweden, Stockholm (Abisko). We wish to recognize the efforts of those persons who operate the high-latitude magnetic observatories and process the data from them. Recognition is also due the operators who patiently curve-follow, check, and correct the data from which

this report is compiled. W. I. Paddock has carefully adopted the temporary baseline values and checked each stage of the digitization. We hope that IMS participants who find this report useful or who can suggest improvements will correspond with the authors.

5. The Series of IMS Data Publication Reports

The publication series listed below, and to which this issue belongs, presents analog records of geomagnetic variations from selected auroral zone stations in support of the International Magnetospheric Study (IMS). The IMS period (January 1976 to December 1979) marks an interval during which extensive simultaneous observations of the magnetosphere will be made from the ground to satellite altitudes. Investigators will treat this region of near-earth space as a single system of interacting plasmas, fields, waves, and energetic charged particles. A massive, internationally coordinated, interdisciplinary program has been assembled -- one focusing on well-defined problems of the magnetosphere and one designed to achieve a quantitative understanding of the cause-and-effect relationships among its many dynamic processes.

IMS Data Publication Reports are for sale by World Data Center A for Solar-Terrestrial Physics, NOAA, Boulder, Colorado 80303, U.S.A. Single copy prices vary; a check or money order should be made payable to the Department of Commerce, NOAA.

IMS-1 "Geomagnetic Data for January 1976 (AE(7) Indices and Stacked Magnetograms)" by J. H. Allen, C. C. Abston and L. R. Morris, NGSDC/EDS/NOAA, *Report UAG-60*, July 1977, 57 pages, price $1.07.

IMS-2 "Geomagnetic Data for February 1976 (AE(7) Indices and Stacked Magnetograms)" by J. H. Allen, C. C. Abston and L. R. Morris, NGSDC/EDS/NOAA, *Report UAG-62*, September 1977, 55 pages, price $1.11.

IMS-3 "Geomagnetic Data for March 1976 (AE(7) Indices and Stacked Magnetograms)" by J. H. Allen, C. C. Abston and L. R. Morris, NGSDC/EDS/NOAA, *Report UAG-63*, September 1977, 57 pages, price $1.11.

6. References

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ALLEN, J. H., C. C. ABSTON, and L. D. MORRIS 1973 Auroral Electrojet Magnetic Activity Indices AE(11) for 1968, World Data Center A for Solar-Terrestrial Physics, *Report UAG-29*.

ALLEN, J. H., C. C. ABSTON, and L. D. MORRIS 1974a Auroral Electrojet Magnetic Activity Indices AE(11) for 1969, World Data Center A for Solar-Terrestrial Physics, *Report UAG-31*.

ALLEN, J. H., C. C. ABSTON, and L. D. MORRIS 1974b Auroral Electrojet Magnetic Activity Indices AE(10) for 1967, World Data Center A for Solar-Terrestrial Physics, *Report UAG-33*.

ALLEN, J. H., C. C. ABSTON, and L. D. MORRIS 1974c Auroral Electrojet Magnetic Activity Indices AE(10) for 1966, World Data Center A for Solar-Terrestrial Physics, *Report UAG-37*.

ALLEN, J. H., C. C. ABSTON, and L. D. MORRIS 1975a Auroral Electrojet Magnetic Activity Indices AE(11) for 1971, World Data Center A for Solar-Terrestrial Physics, *Report UAG-39*.

ALLEN, J. H., C. C. ABSTON, and L. D. MORRIS 1975b Auroral Electrojet Magnetic Activity Indices AE(11) for 1972, World Data Center A for Solar-Terrestrial Physics, *Report UAG-45*.

ALLEN, J. H., C. C. ABSTON, and L. D. MORRIS 1975c Auroral Electrojet Magnetic Activity Indices AE(11) for 1973, World Data Center A for Solar-Terrestrial Physics, *Report UAG-47*.

ALLEN, J. H., C. C. ABSTON, and L. D. MORRIS 1976 Auroral Electrojet Magnetic Activity Indices AE(11) for 1974, World Data Center A for Solar-Terrestrial Physics, *Report UAG-59*.

ALLEN, J. H. and H. W. KROEHL 1975 Spatial and Temporal Distributions of Magnetic Effects as Derived from AE Indices, *J. Geophys. Res. 80*, 3667-3677.

DAVIS, T. N. and M. SUGIURA 1966 Auroral Electrojet Activity Index AE and Its Universal Time Variations, *J. Geophys. Res. 71*, 785-801.

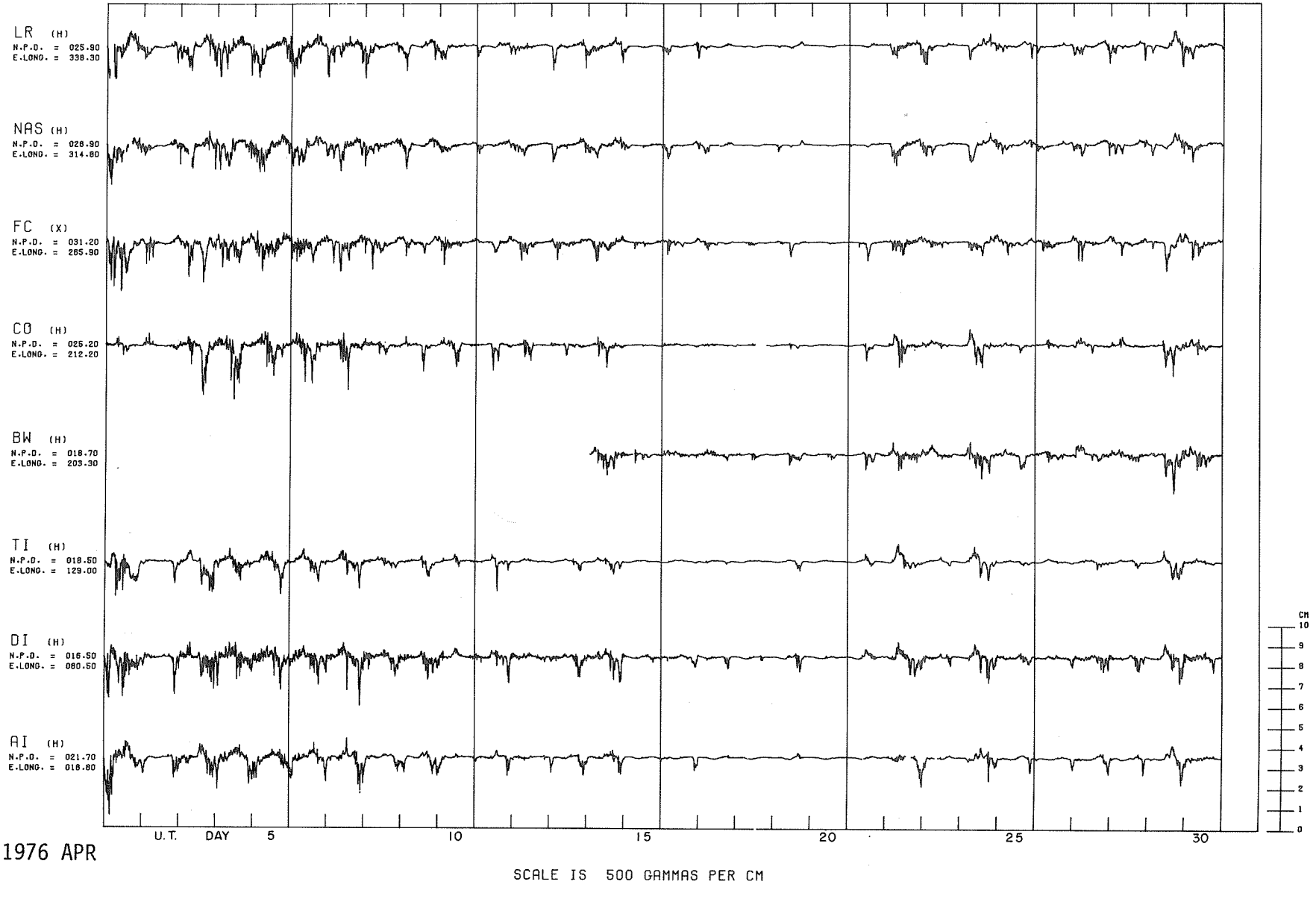
SECTION II. COMMON SCALE MAGNETOGRAMS

1. Stacked Common Scale Magnetograms for Whole Month (H, Z, and D Variations)

The following three graphs display condensed stacked plots of the H, Z, and D variations, respectively, for eight stations minute-by-minute over the entire month. Component intensities are to the nearest 1 gamma, and declination changes are to the nearest 0.1 minute of arc. Positive H, Z, and D changes are north, down, and east, respectively. Amplitude scales given at the bottom of each figure correspond to the original centimeter scale reproduced at lower right. For each station the North Polar Distance (N.P.D.) and East Longitude (E. Long.) are given in degrees.

COMMON SCALE MAGNETOGRAMS - H Variations

APRIL 1976

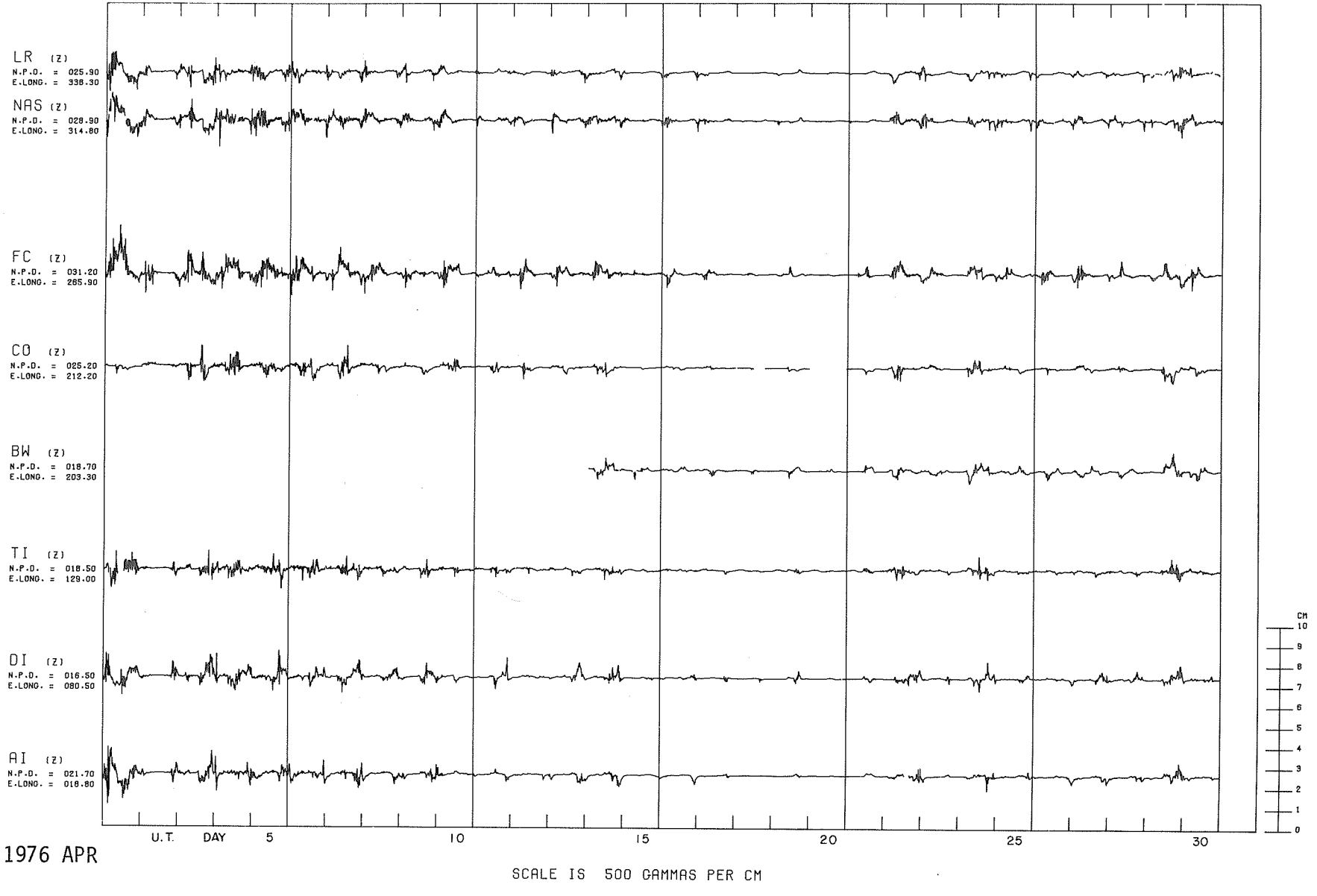


1976 APR

SCALE IS 500 GAMMAS PER CM

COMMON SCALE MAGNETOGRAMS - Z Variations

APRIL 1976



1976 APR

SCALE IS 500 GAMMAS PER CM

COMMON SCALE MAGNETOGRAMS - D Variations

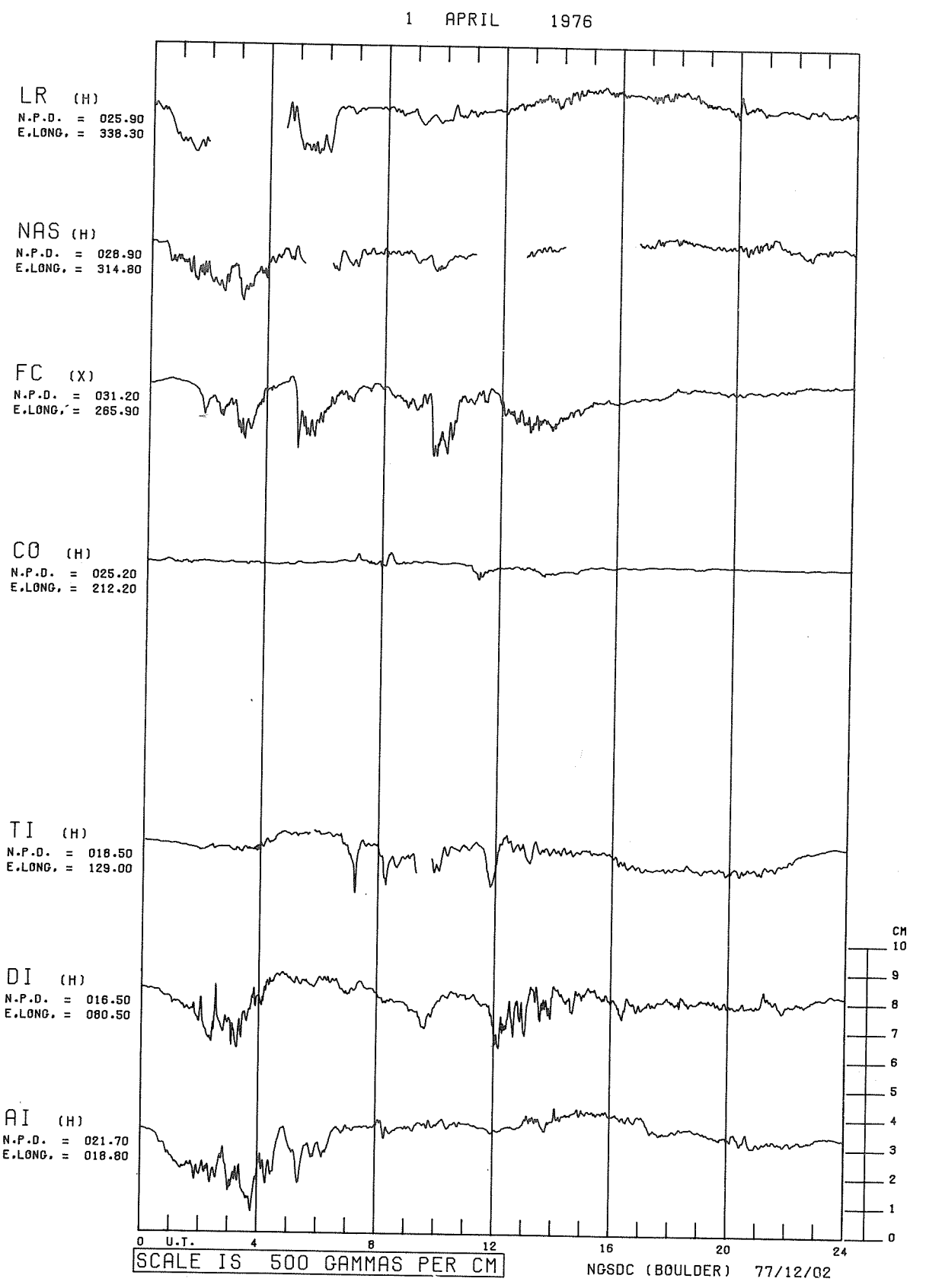
APRIL 1976

SCALE IS 120 MINUTES PER CM

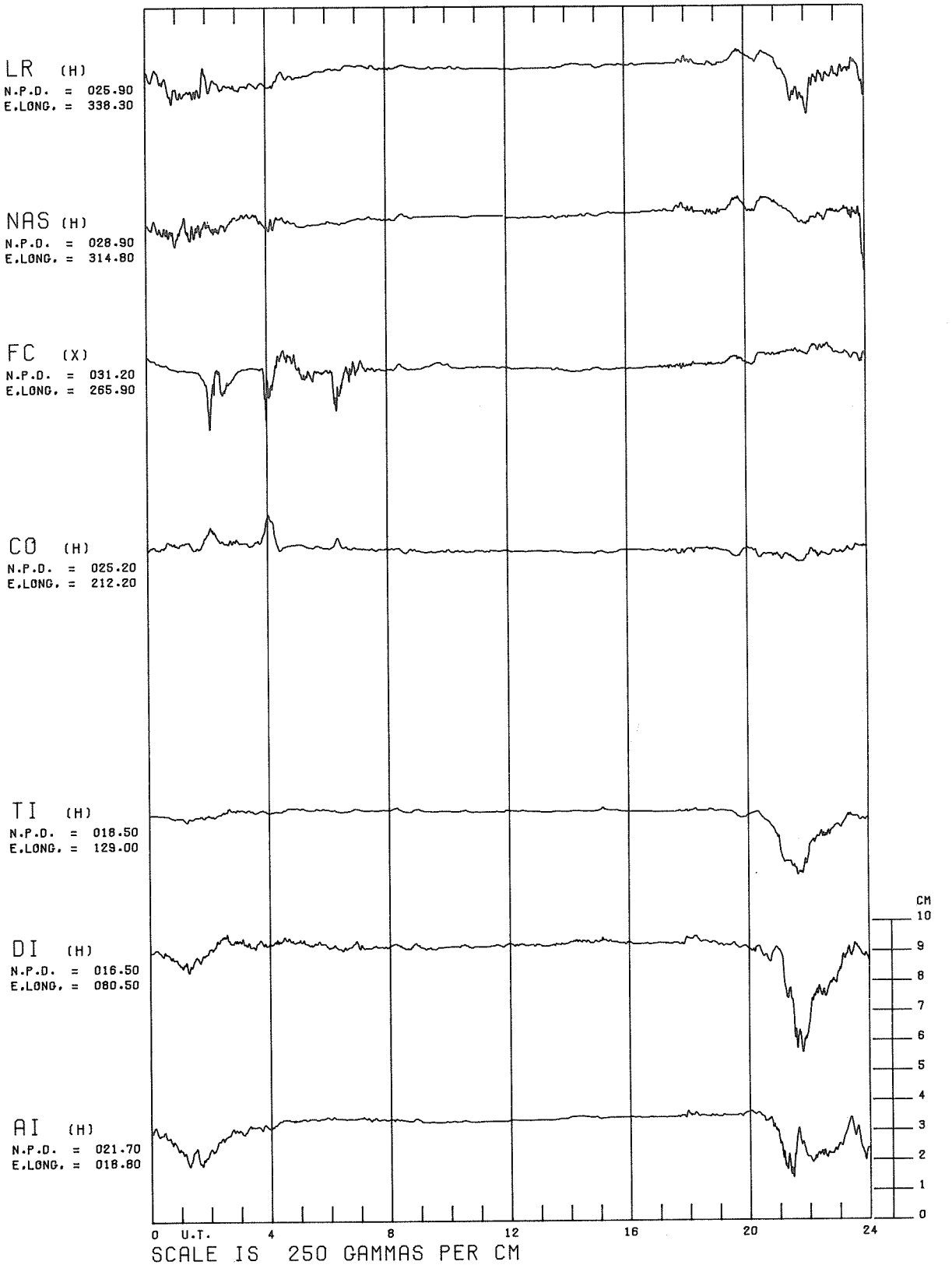
2. Stacked Common Scale Magnetograms by Station Day (H Variations)

The following stacked plots of H (or X) common scale magnetograms are reproduced from the digital magnetic variations data obtained as described on page 2. Each station is identified by the abbreviation from figure 1 and two coordinates: North Polar Distance (N.P.D.) and East Longitude (E. Long.). The amplitude scale is given at lower left of each figure and corresponds to the centimeter scale at lower right. The amplitude scale is the same for each day except when the range of deviation would cause a trace to exceed the space reserved for it. For such days (see, for example, 1 April 1976) the scale is increased in uniform steps to assure nonoverlapping traces. To call attention to the scale change (similar to switching to storm magnetograms), the new value is enclosed in a box.

The label "NGSDC (BOULDER) yy/mm/dd" at the bottom of the first day plot identifies the source of the published data and the day on which the plots were prepared. The difference between data recording date and its preparation date provides an indication of the time required to collect the records, initiate program development, and process the data.

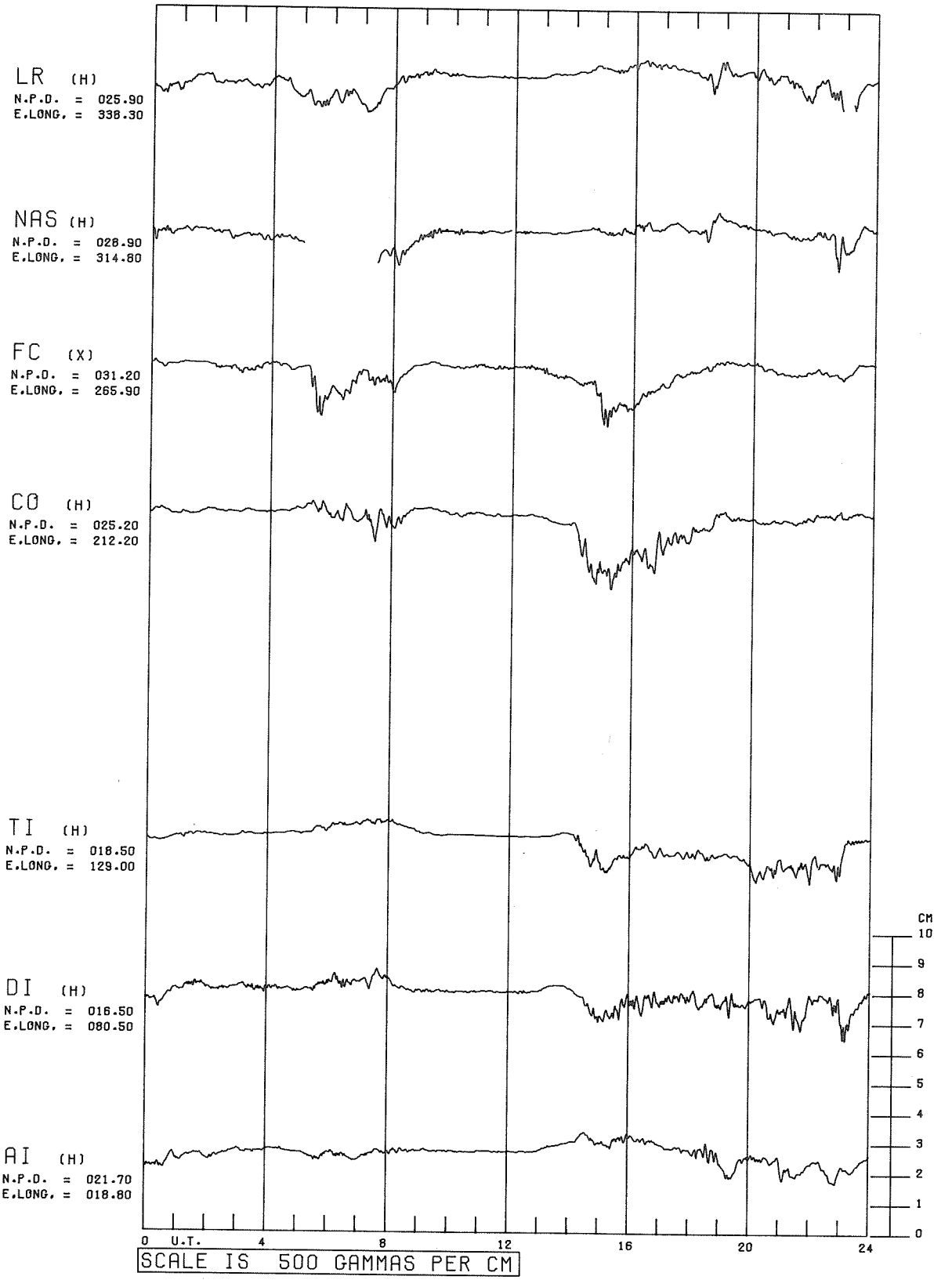

COMMON SCALE MAGNETOGRAMS
BY STATION DAY
1 APRIL 1976
LR (H)
N.P.D. = 025.90
E.LONG. = 338.30
NAS (H)
N.P.D. = 028.90
E.LONG. = 314.80
FC (X)
N.P.D. = 031.20
E.LONG. = 265.90
CO (H)
N.P.D. = 025.20
E.LONG. = 212.20
TI (H)
N.P.D. = 018.50
E.LONG. = 129.00
DI (H)
N.P.D. = 016.50
E.LONG. = 080.50
AI (H)
N.P.D. = 021.70
E.LONG. = 018.80
CM
10
9
8
7
6
5
4
3
2
1
0
0 U.T.
4
8
12
16
20
24
SCALE IS 500 GAMMAS PER CM
NGSDC (BOULDER) 77/12/02

COMMON SCALE MAGNETOGRAMS
BY STATION DAY
2 APRIL 1976

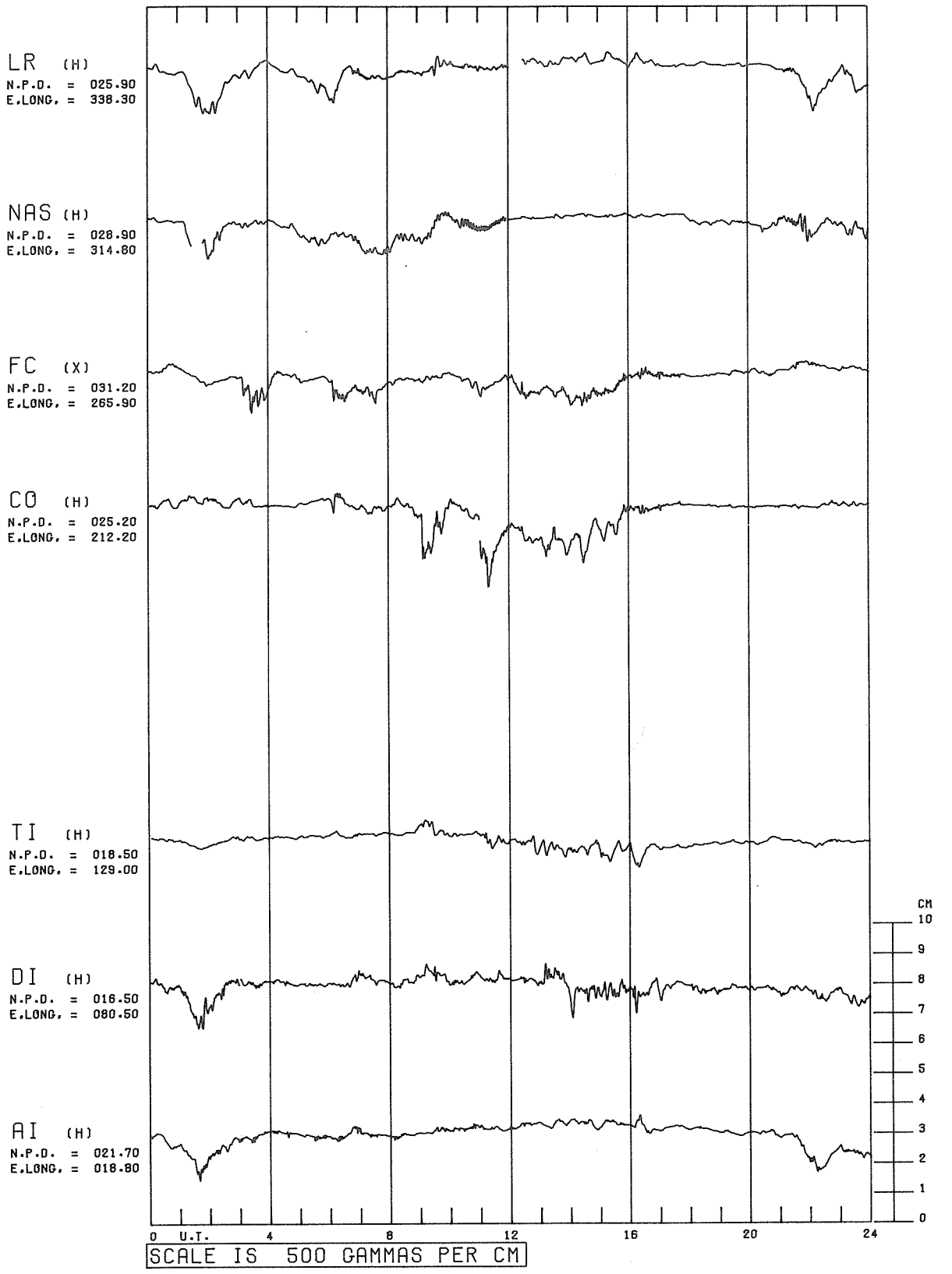


SCALE IS 250 GAMMAS PER CM

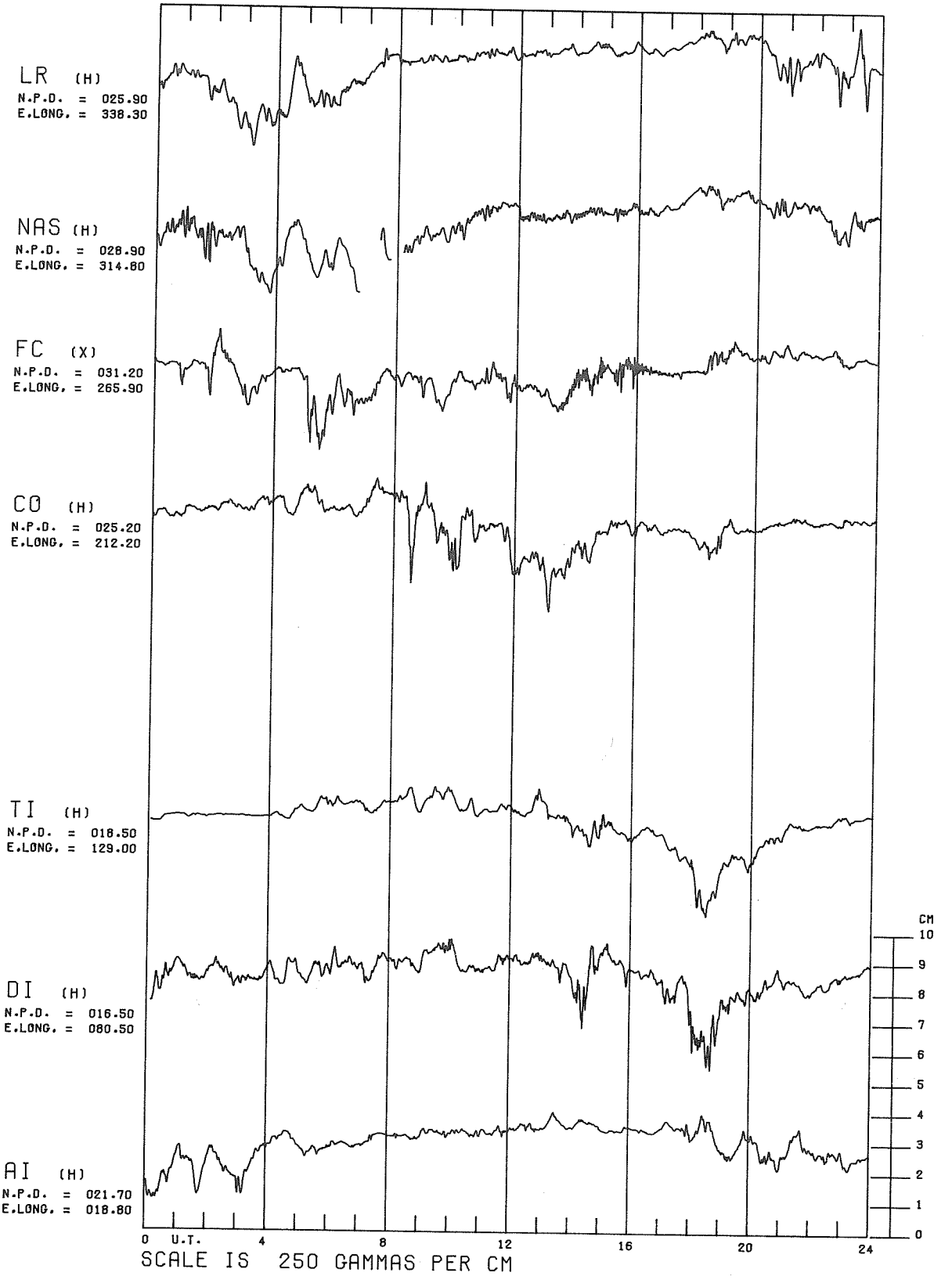
COMMON SCALE MAGNETOGRAMS
BY STATION DAY
3 APRIL 1976



COMMON SCALE MAGNETOGRAMS
BY STATION DAY
4 APRIL 1976



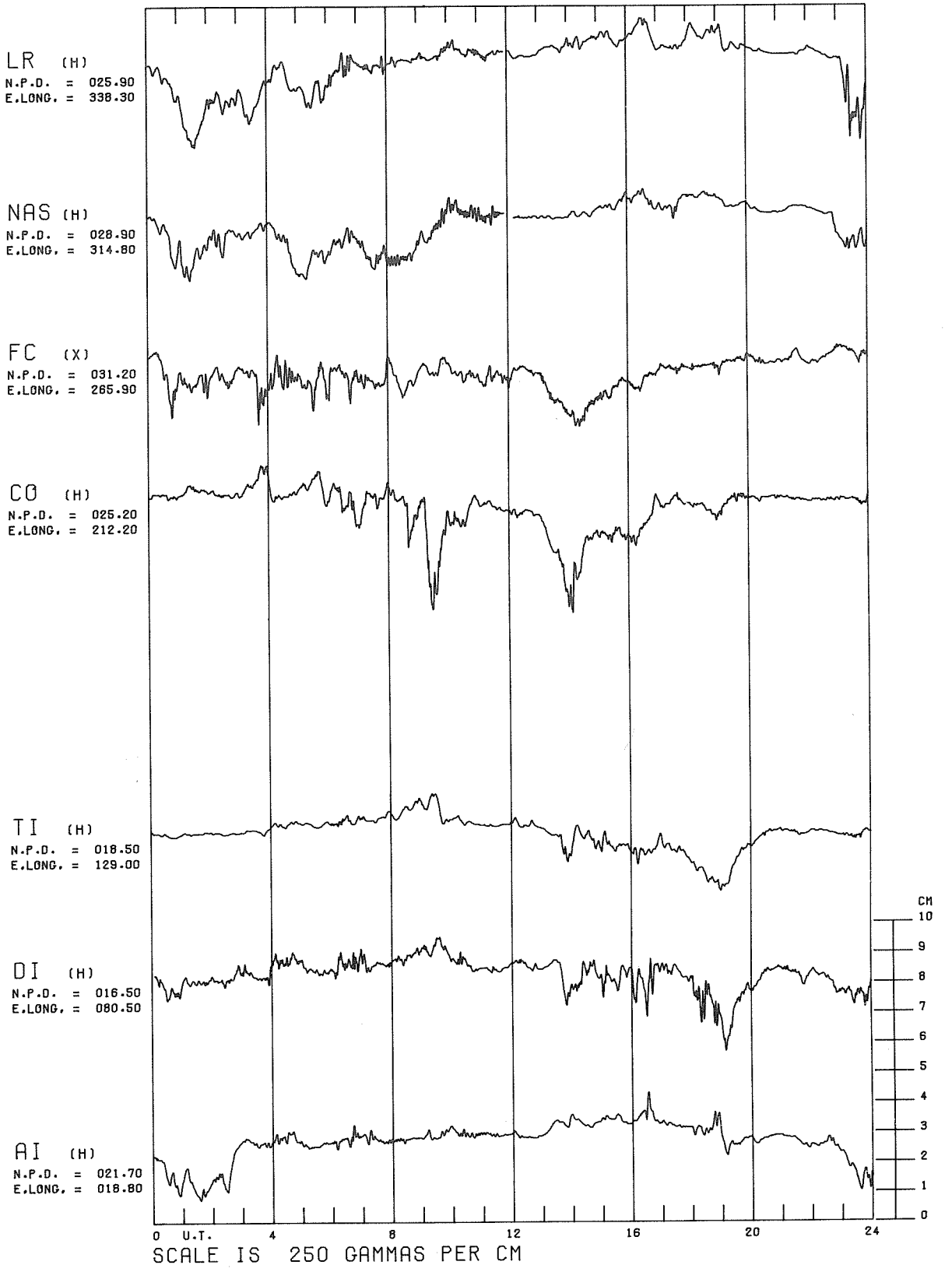
COMMON SCALE MAGNETOGRAMS
BY STATION DAY
5 APRIL 1976



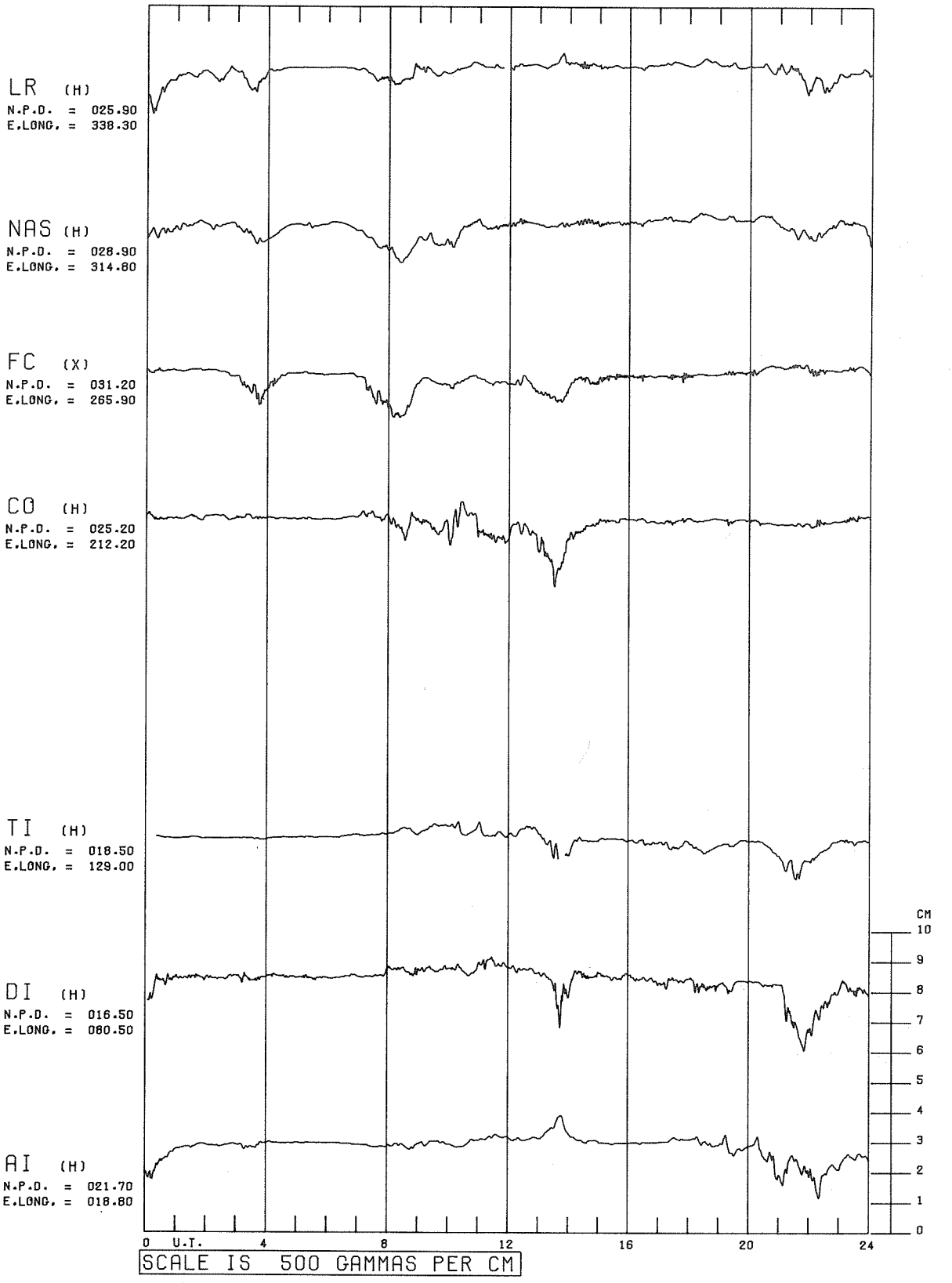
SCALE IS 250 GAMMAS PER CM

COMMON SCALE MAGNETOGRAMS
BY STATION DAY

6 APRIL 1976

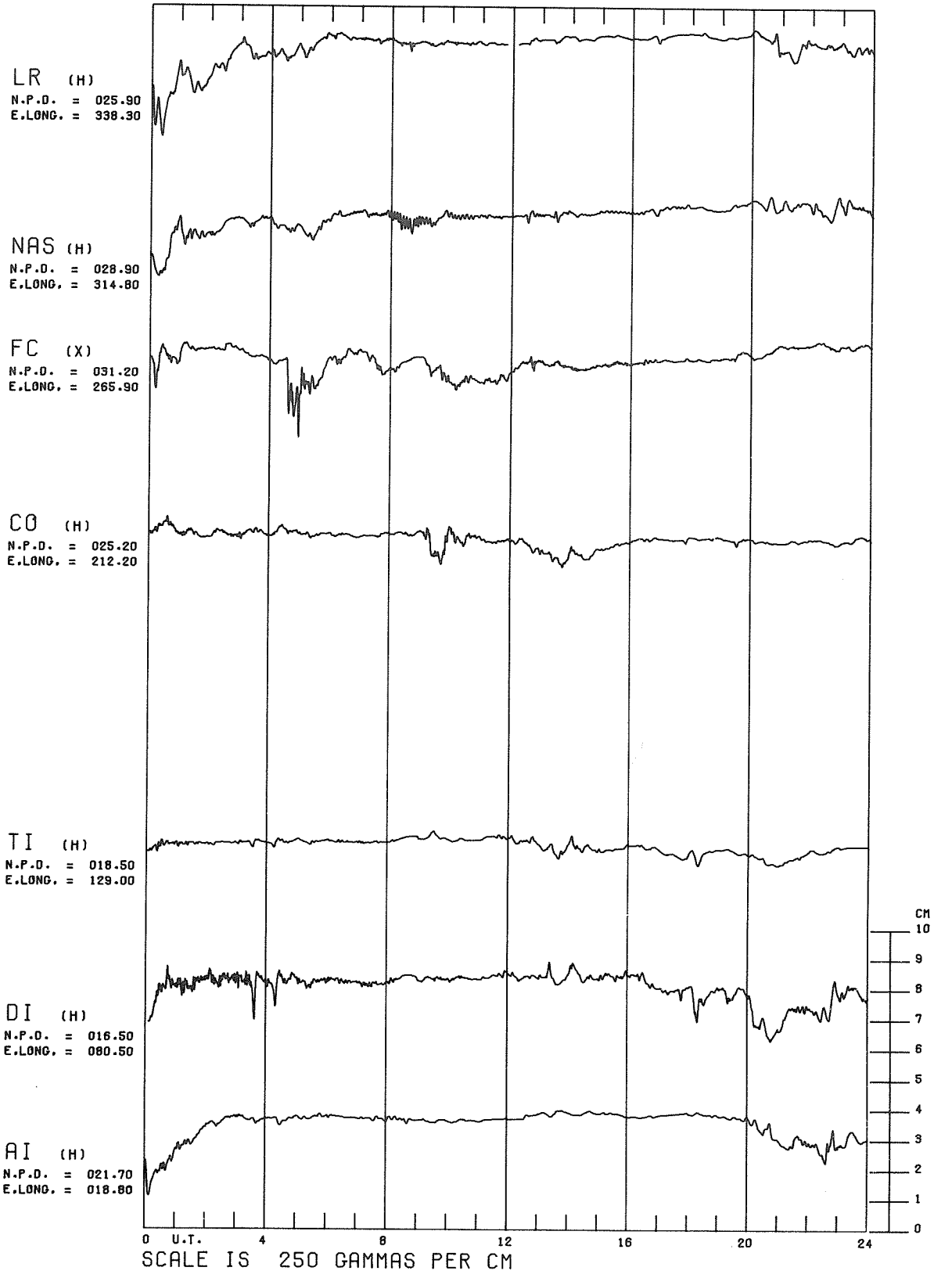


COMMON SCALE MAGNETOGRAMS
BY STATION DAY
7 APRIL 1976



COMMON SCALE MAGNETOGRAMS
BY STATION DAY

8 APRIL 1976



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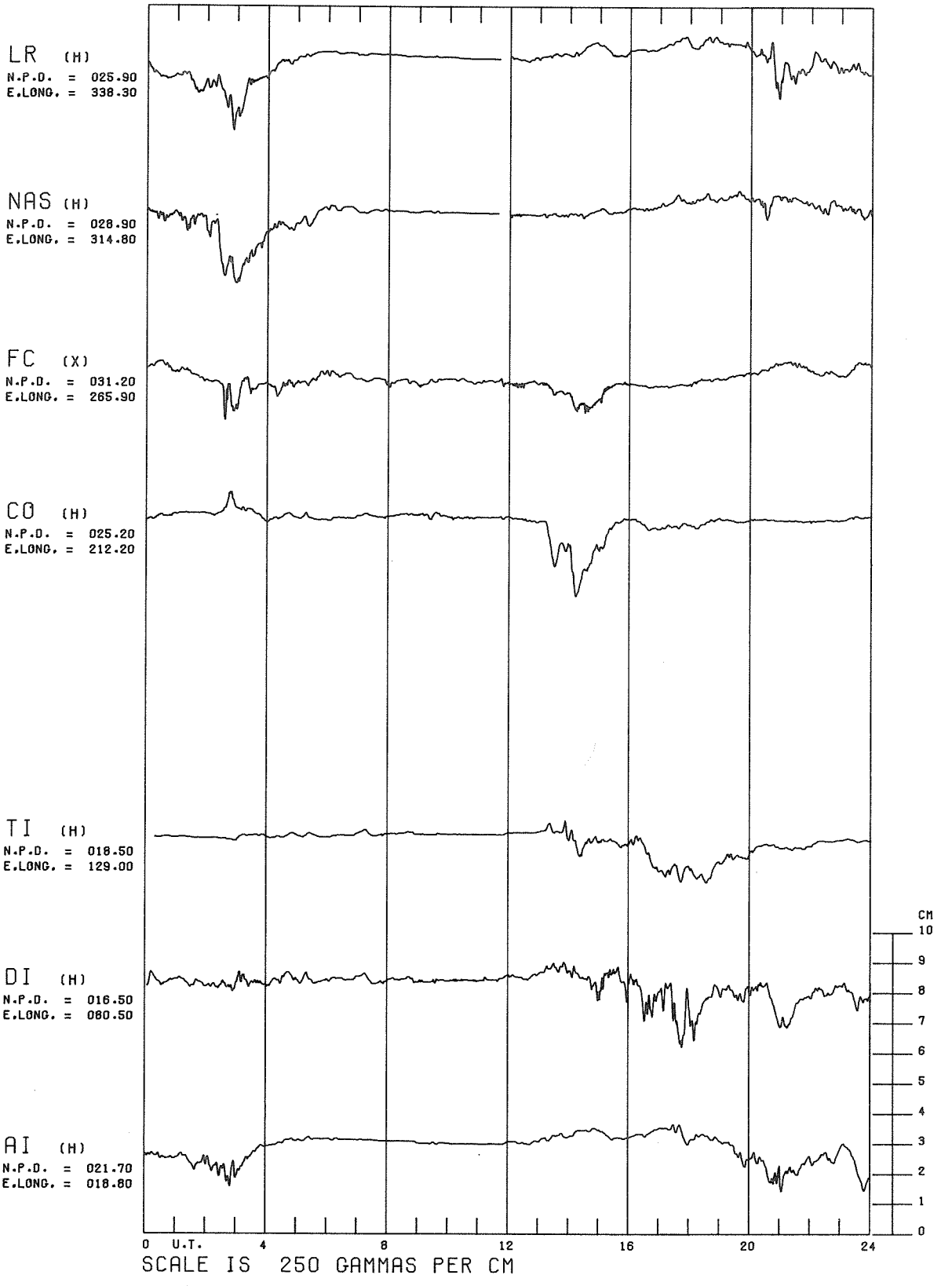
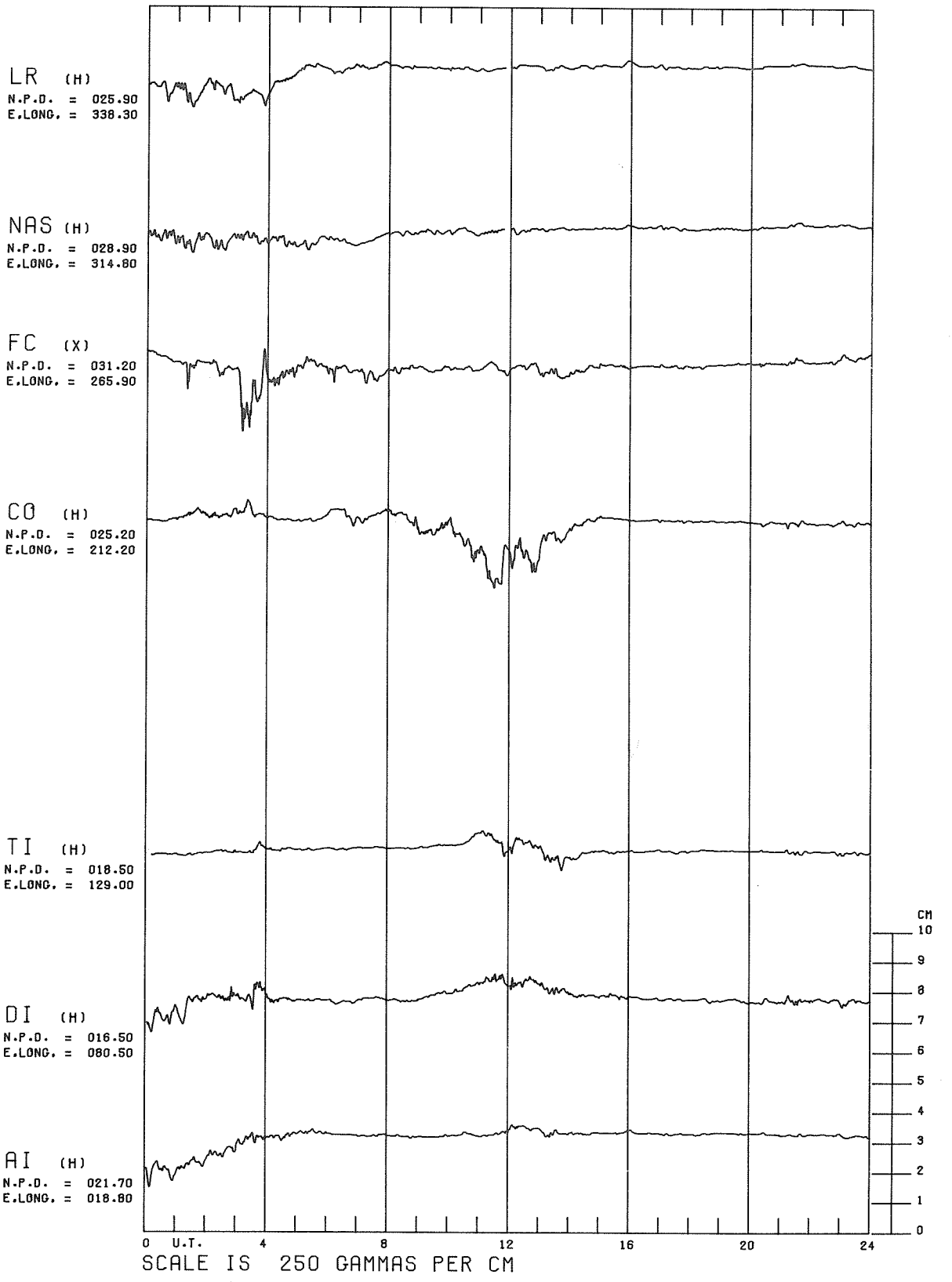
COMMON SCALE MAGNETOGRAMS
BY STATION DAY

9 APRIL 1976

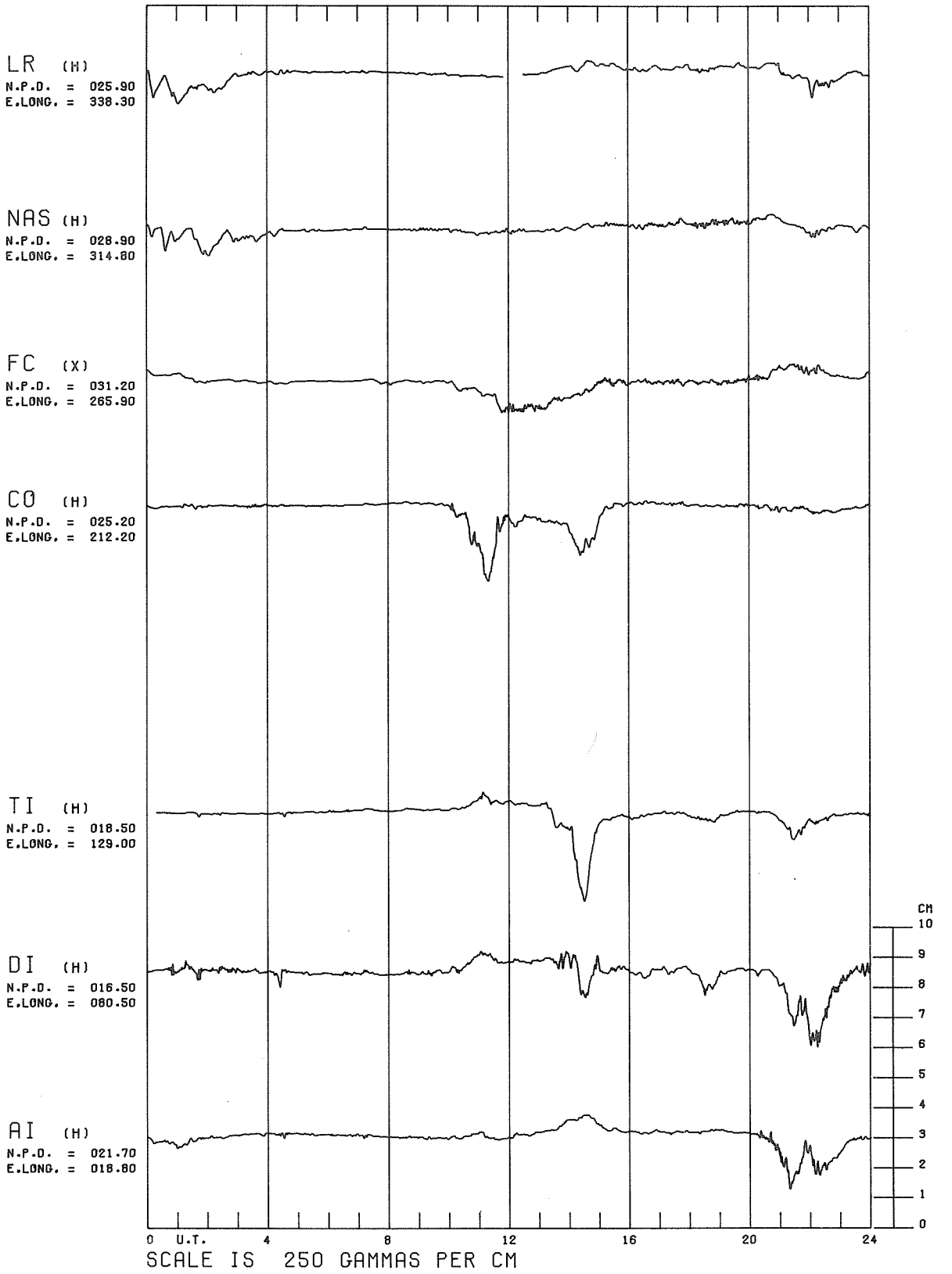


COMMON SCALE MAGNETOGRAMS
BY STATION DAY
10 APRIL 1976

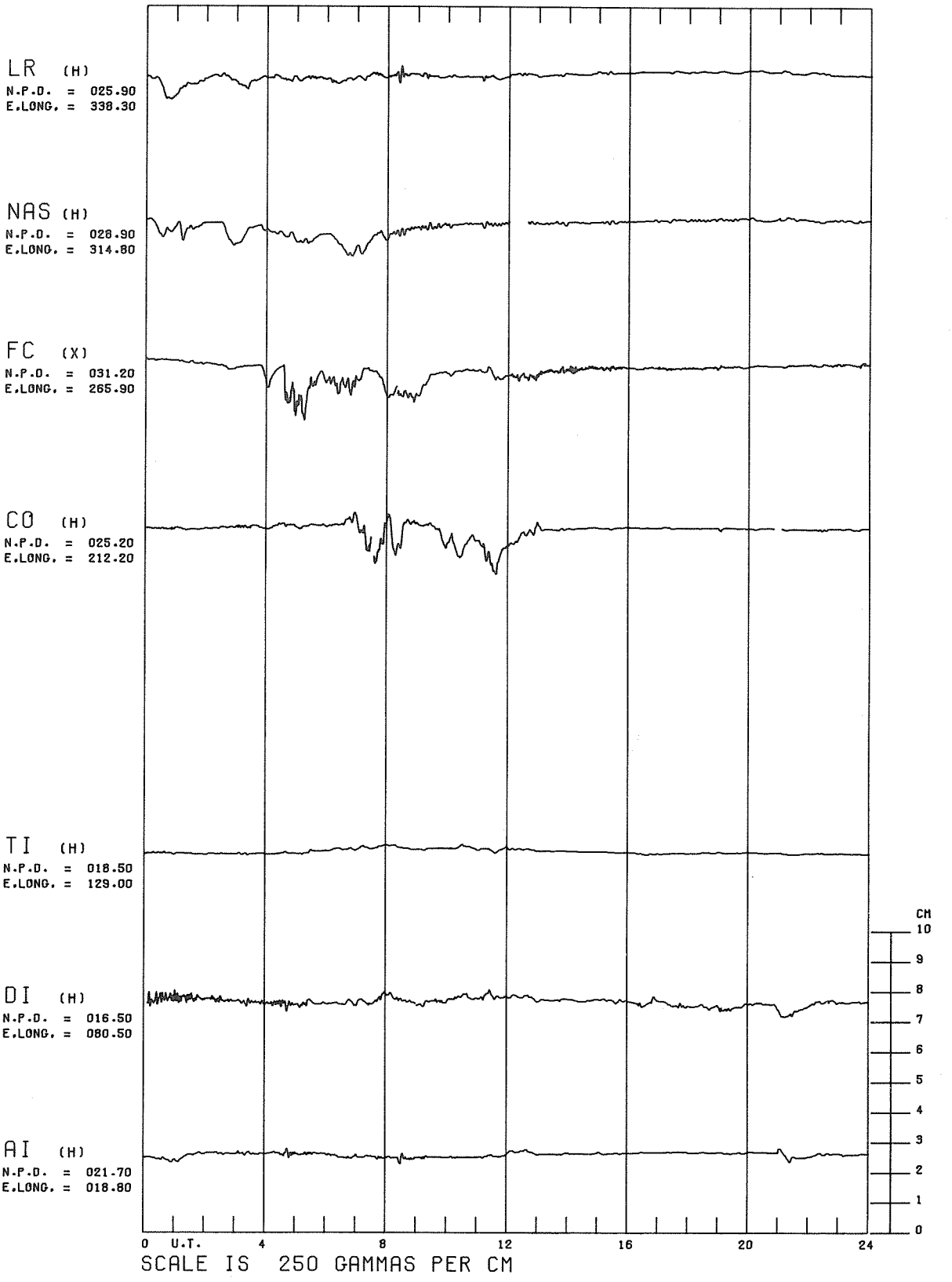


SCALE IS 250 GAMMAS PER CM

COMMON SCALE MAGNETOGRAMS
BY STATION DAY
11 APRIL 1976

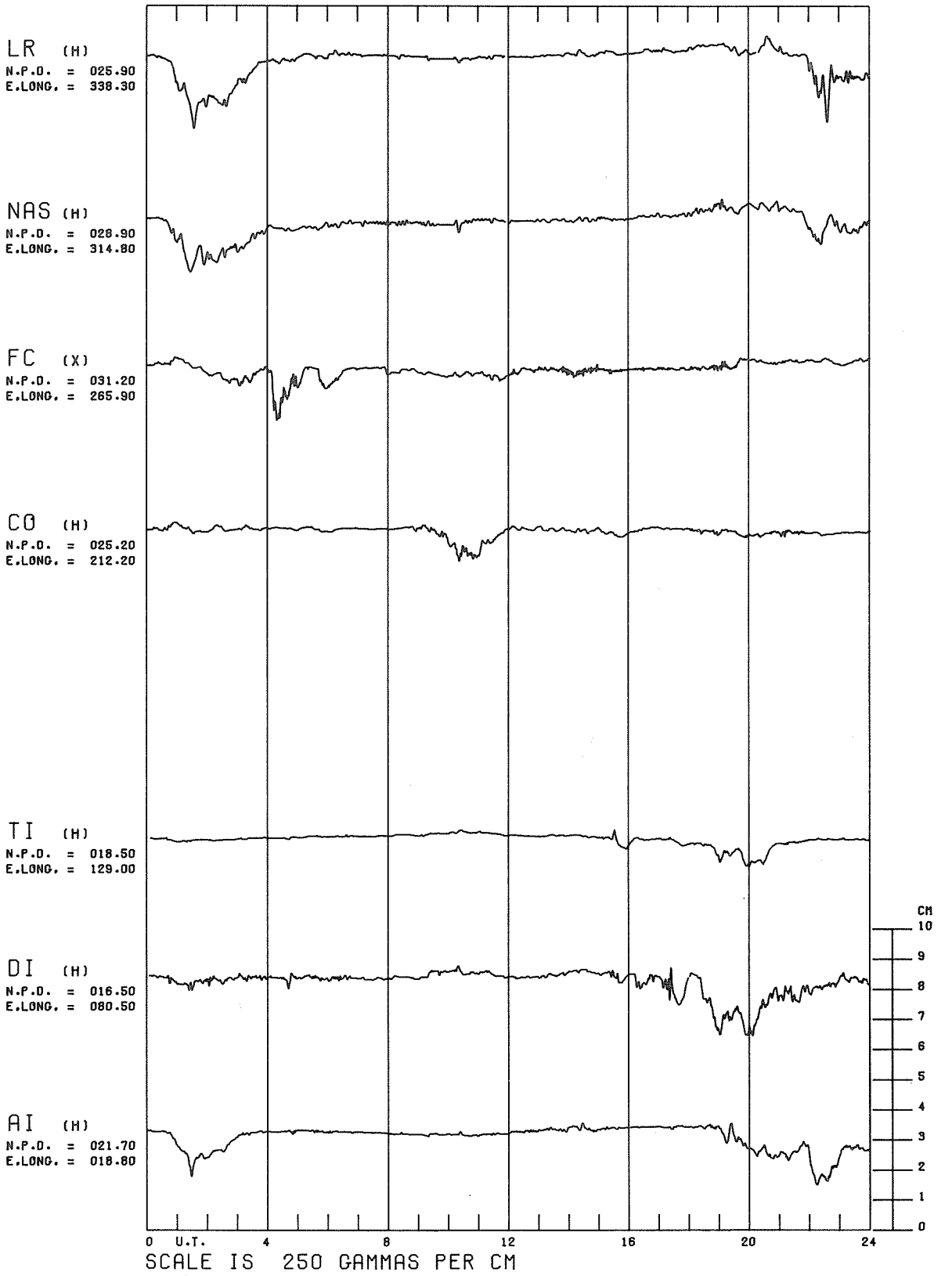


COMMON SCALE MAGNETOGRAMS
BY STATION DAY
12 APRIL 1976



SCALE IS 250 GAMMAS PER CM

COMMON SCALE MAGNETOGRAMS
BY STATION DAY
13 APRIL 1976



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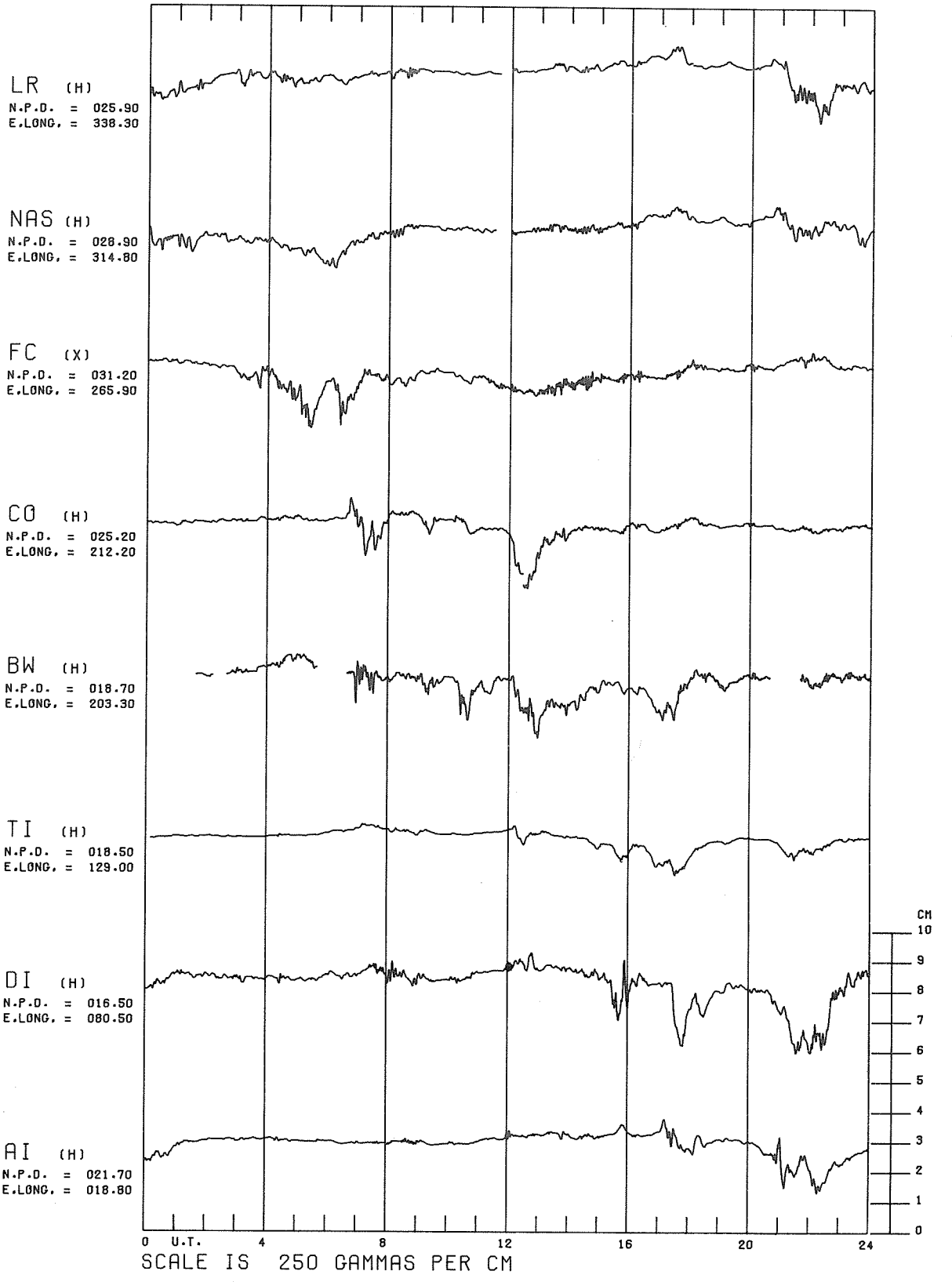
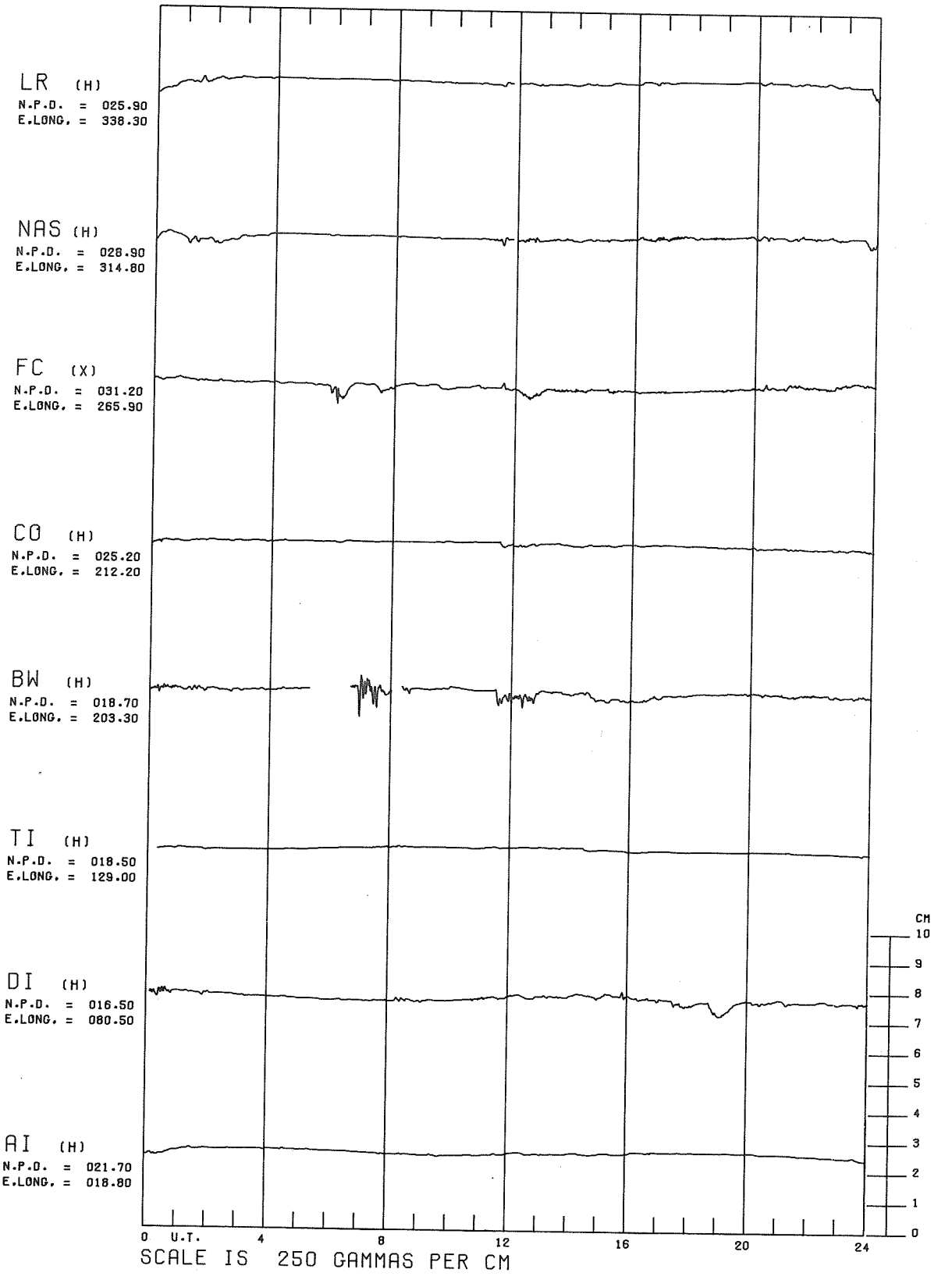
COMMON SCALE MAGNETOGRAMS
BY STATION DAY
14 APRIL 1976



COMMON SCALE MAGNETOGRAMS
BY STATION DAY
15 APRIL 1976



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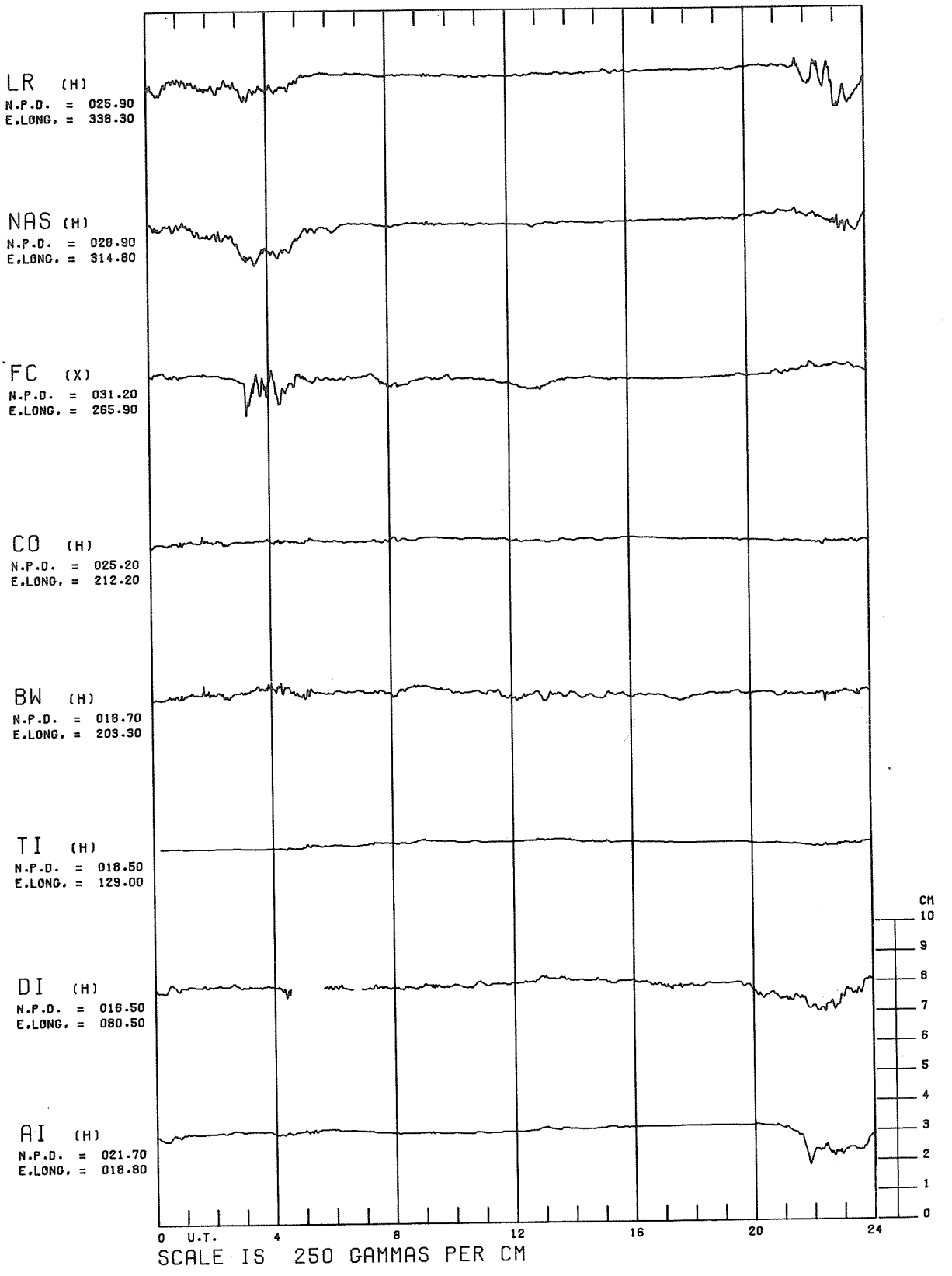
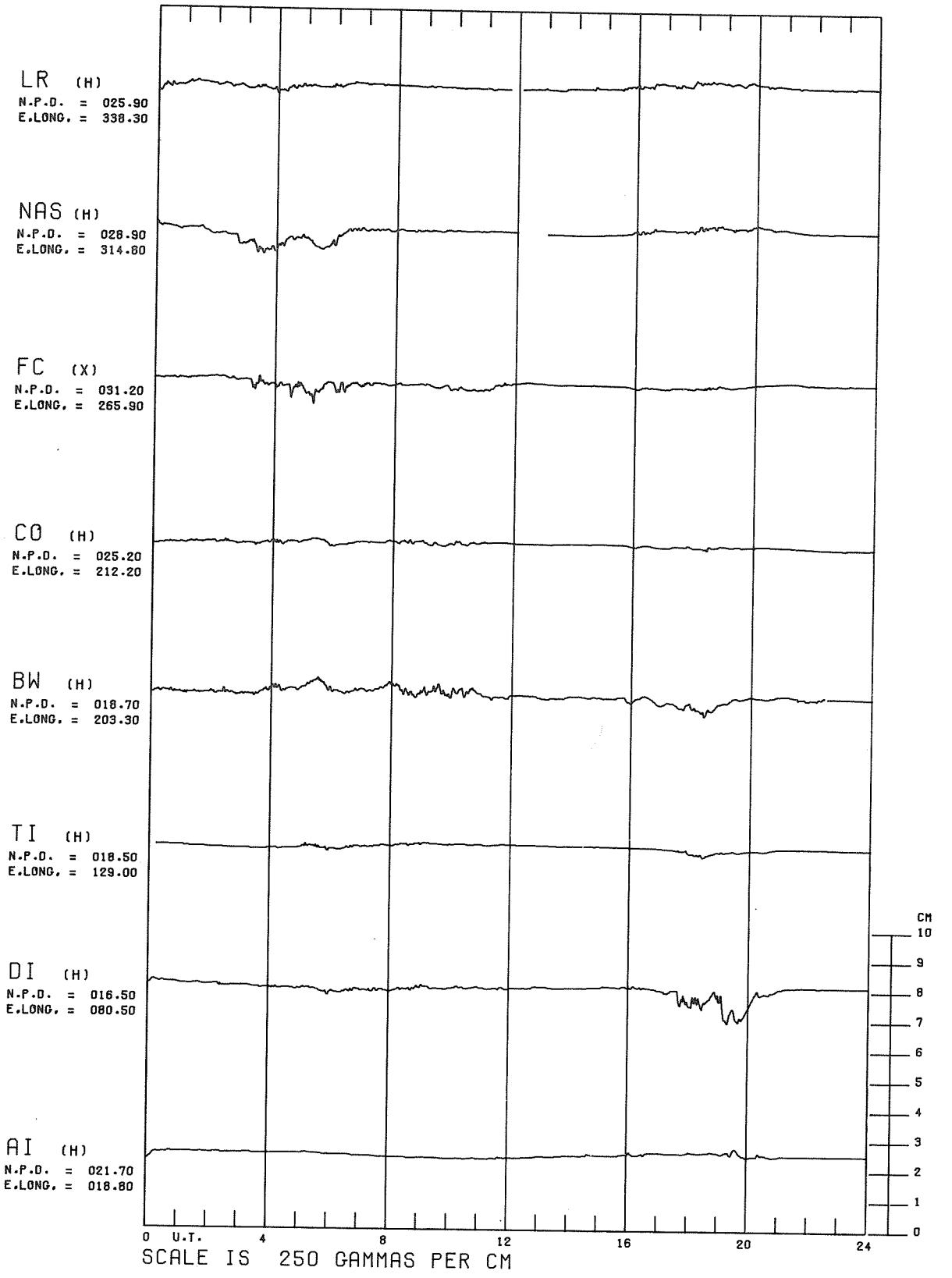
16 APRIL 1976

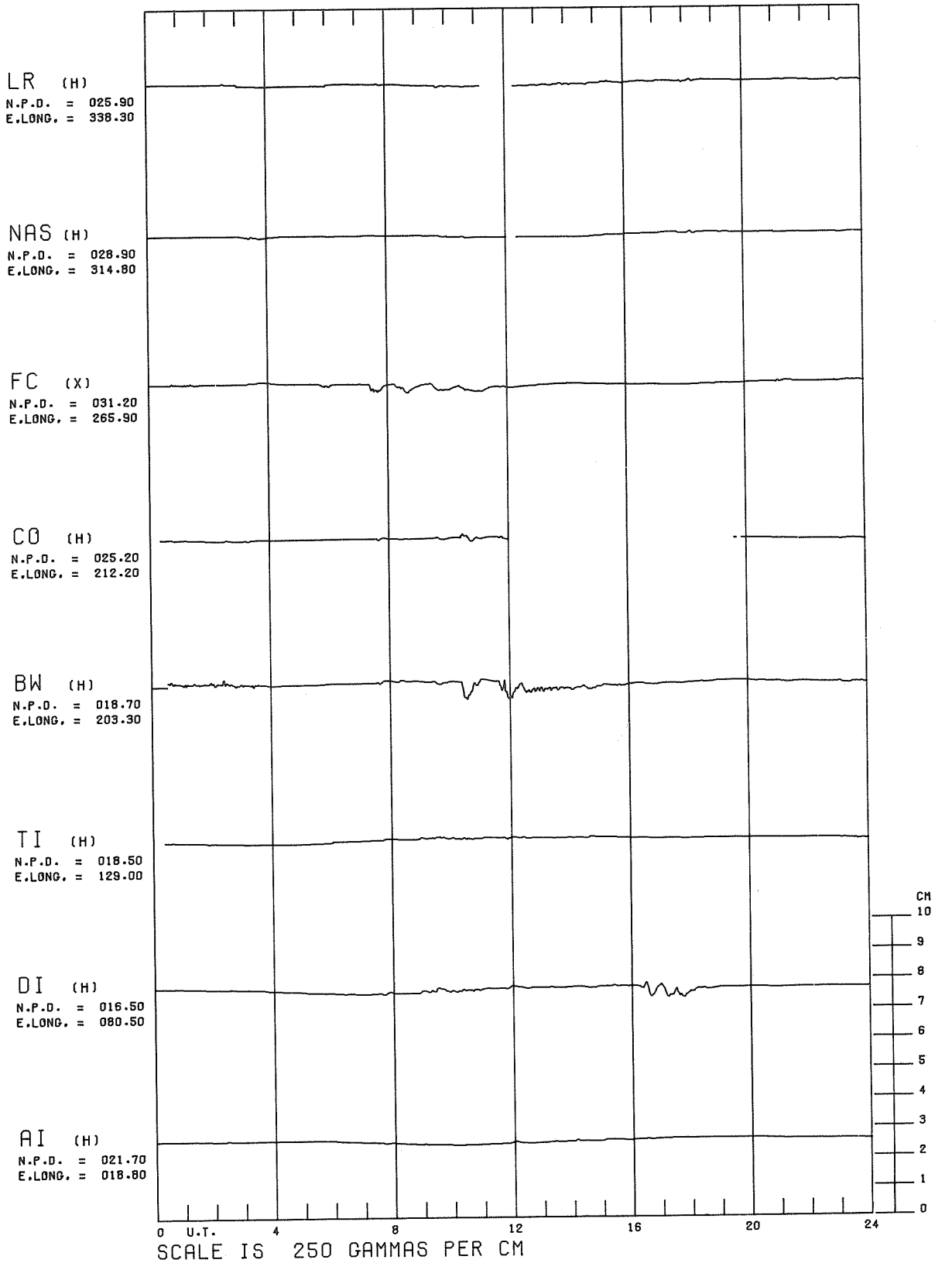


SCALE IS 250 GAMMAS PER CM

COMMON SCALE MAGNETOGRAMS
BY STATION DAY
17 APRIL 1976

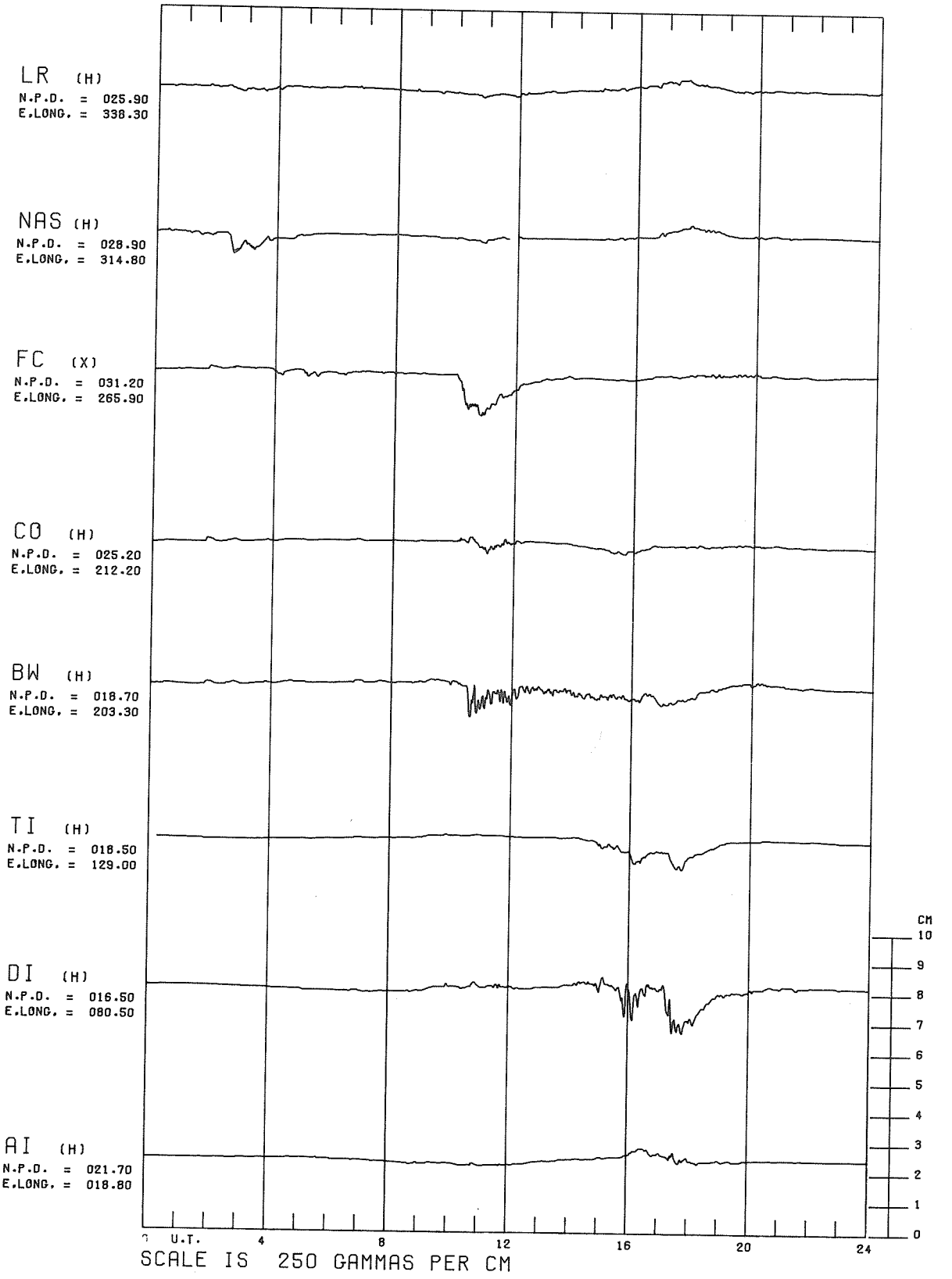


COMMON SCALE MAGNETOGRAMS
BY STATION DAY
18 APRIL 1976

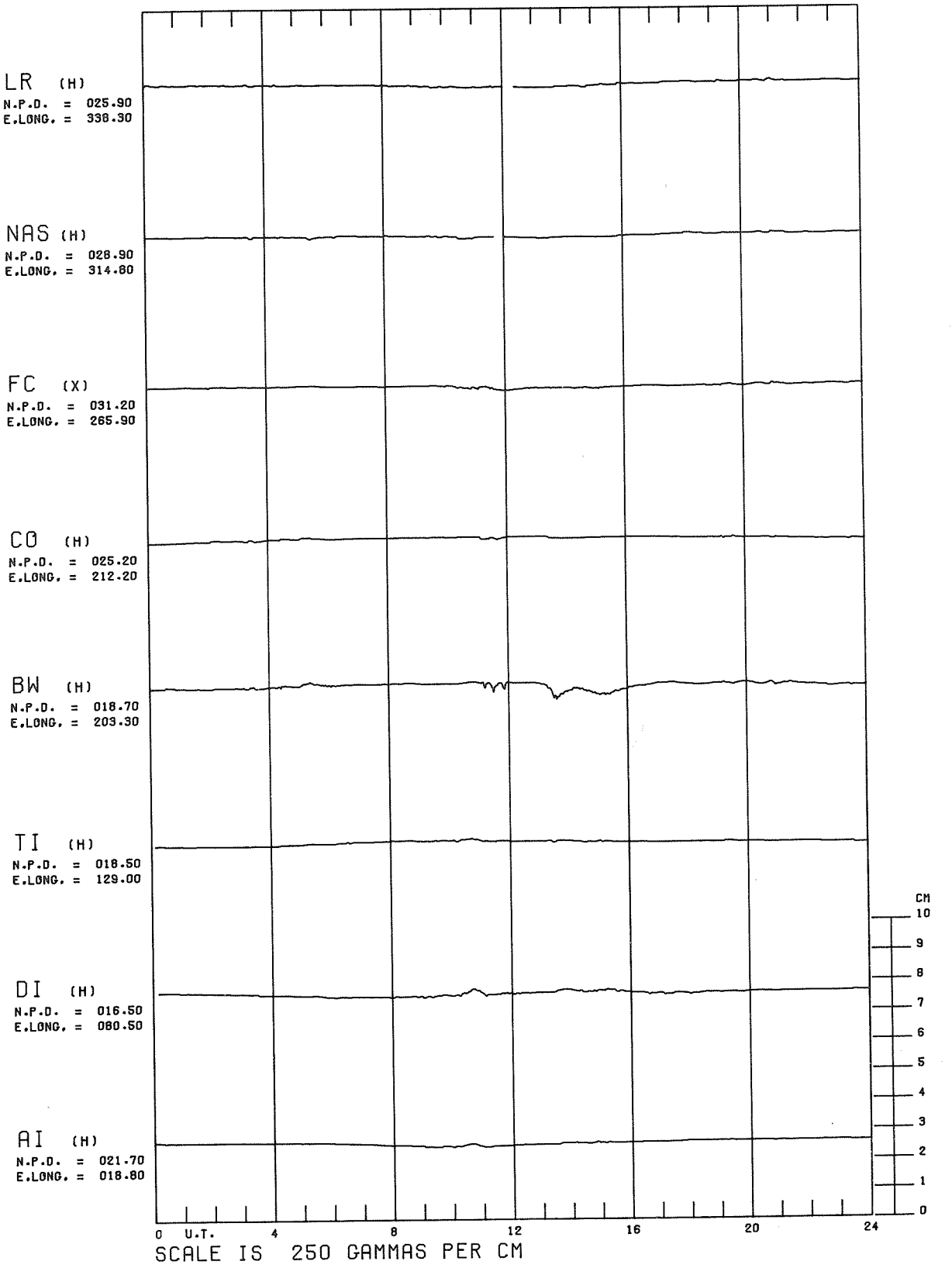


SCALE IS 250 GAMMAS PER CM

COMMON SCALE MAGNETOGRAMS
BY STATION DAY
19 APRIL 1976

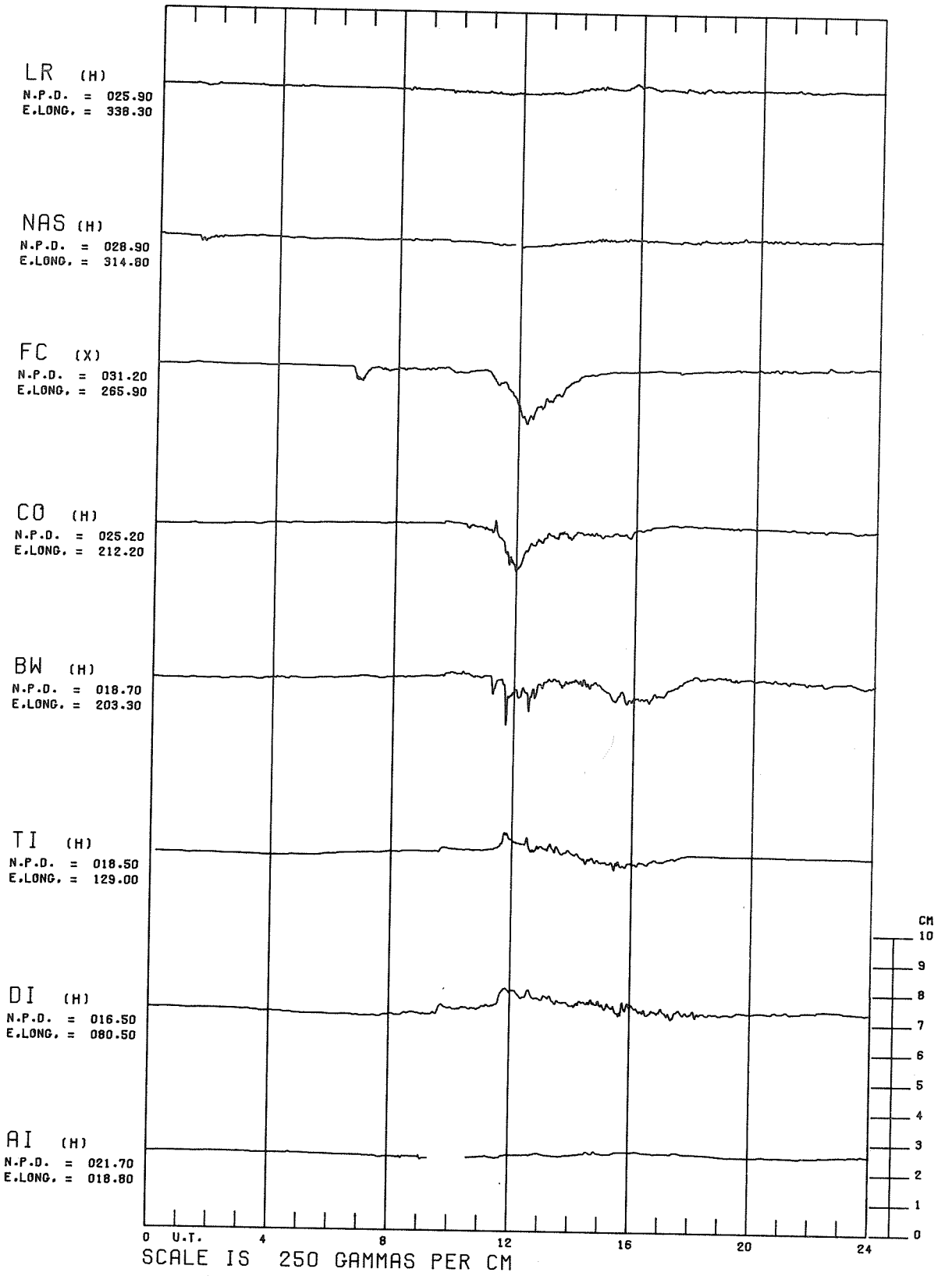


COMMON SCALE MAGNETOGRAMS
BY STATION DAY
20 APRIL 1976

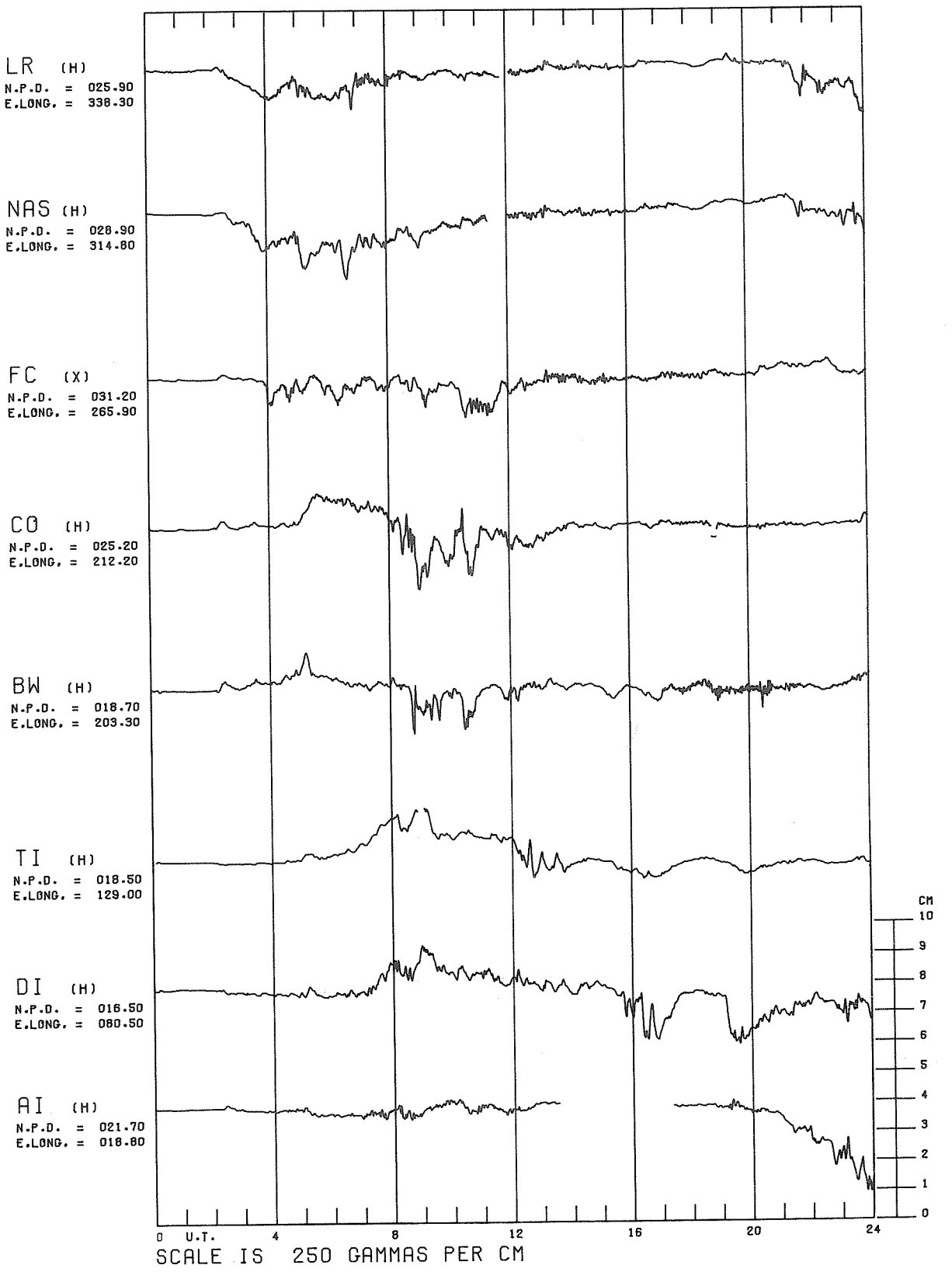


SCALE IS 250 GAMMAS PER CM

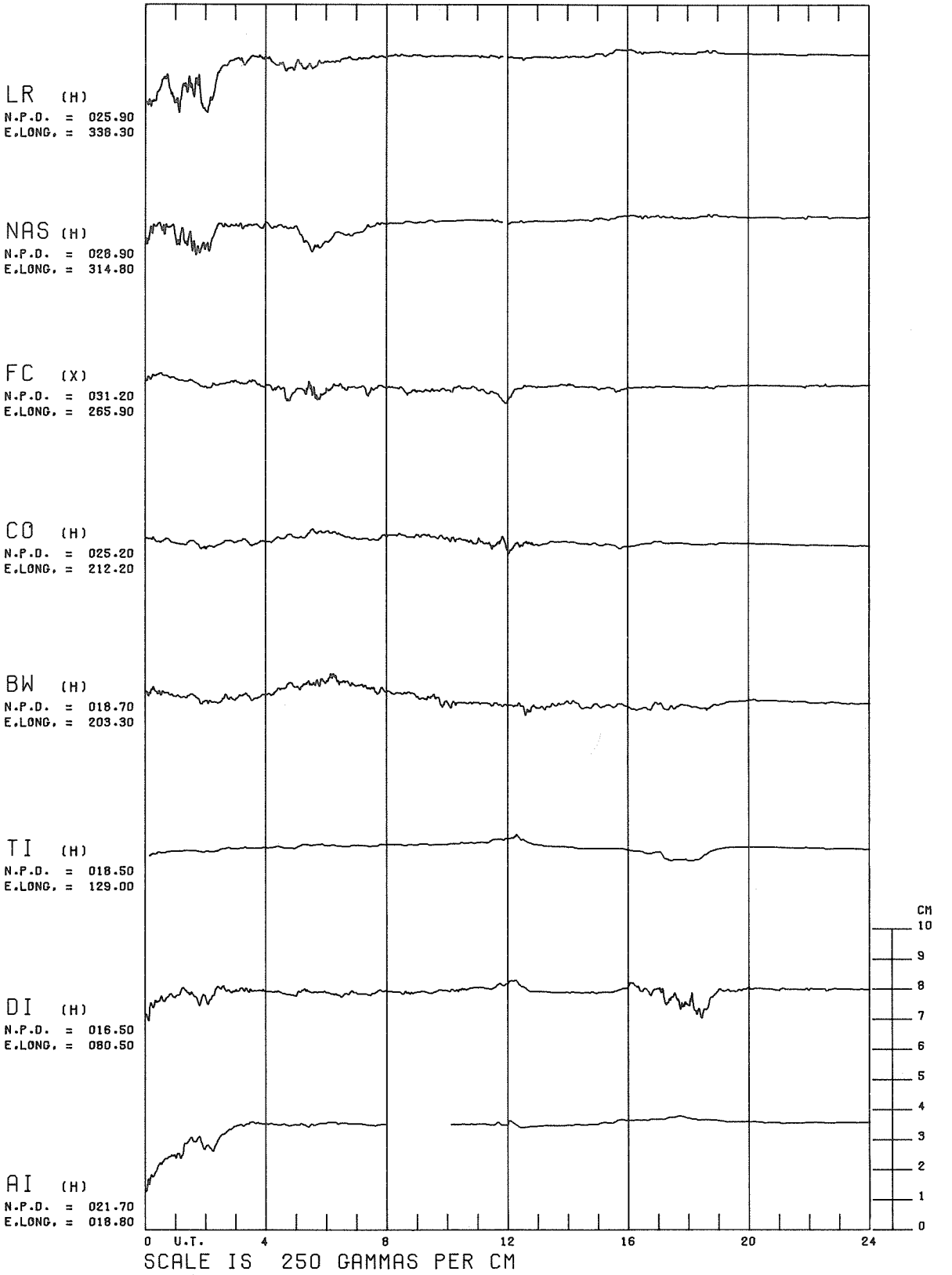
COMMON SCALE MAGNETOGRAMS
BY STATION DAY
21 APRIL 1976



COMMON SCALE MAGNETOGRAMS
BY STATION DAY
22 APRIL 1976



COMMON SCALE MAGNETOGRAMS
BY STATION DAY
23 APRIL 1976



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BY STATION DAY
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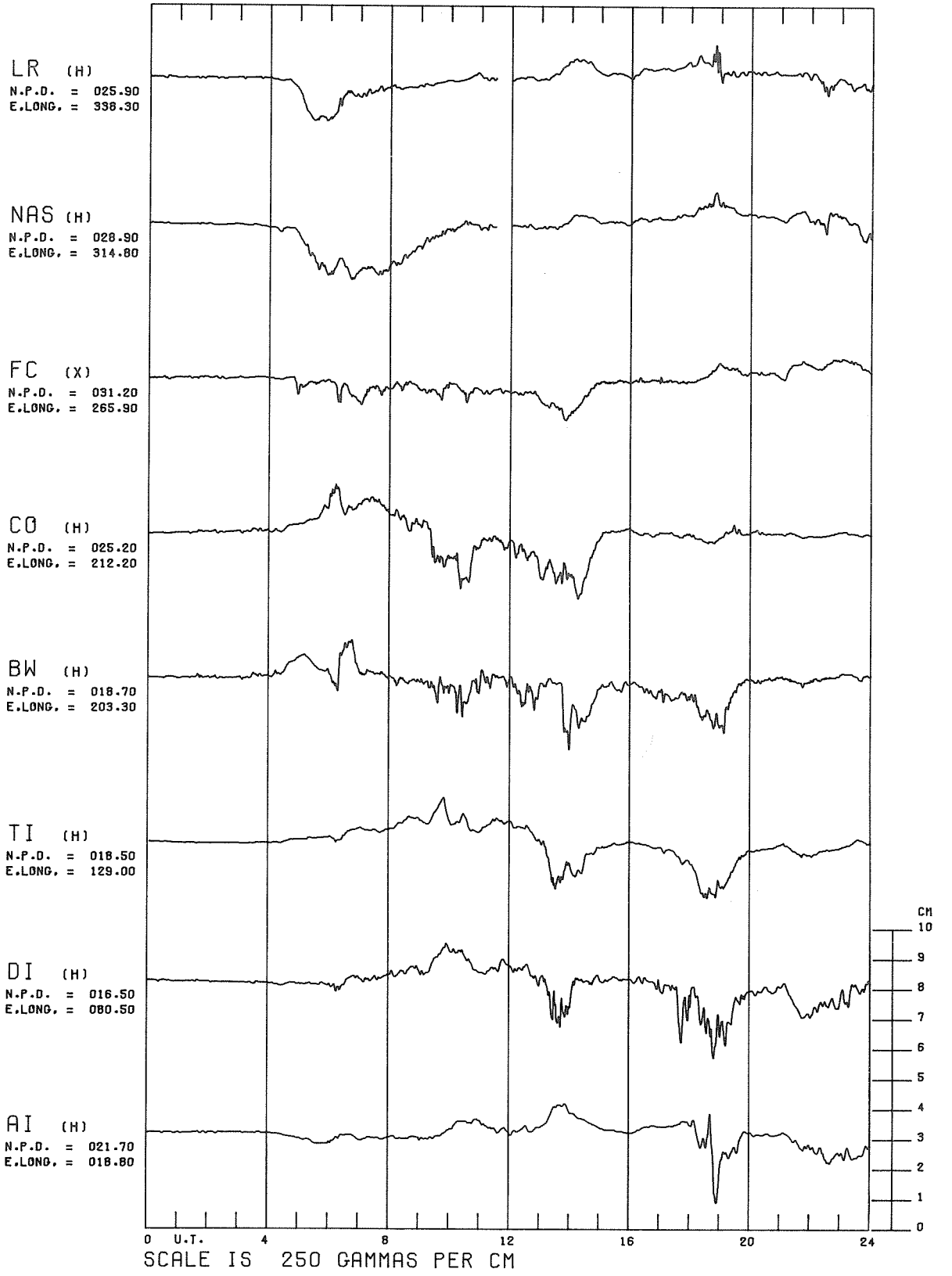

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BY STATION DAY
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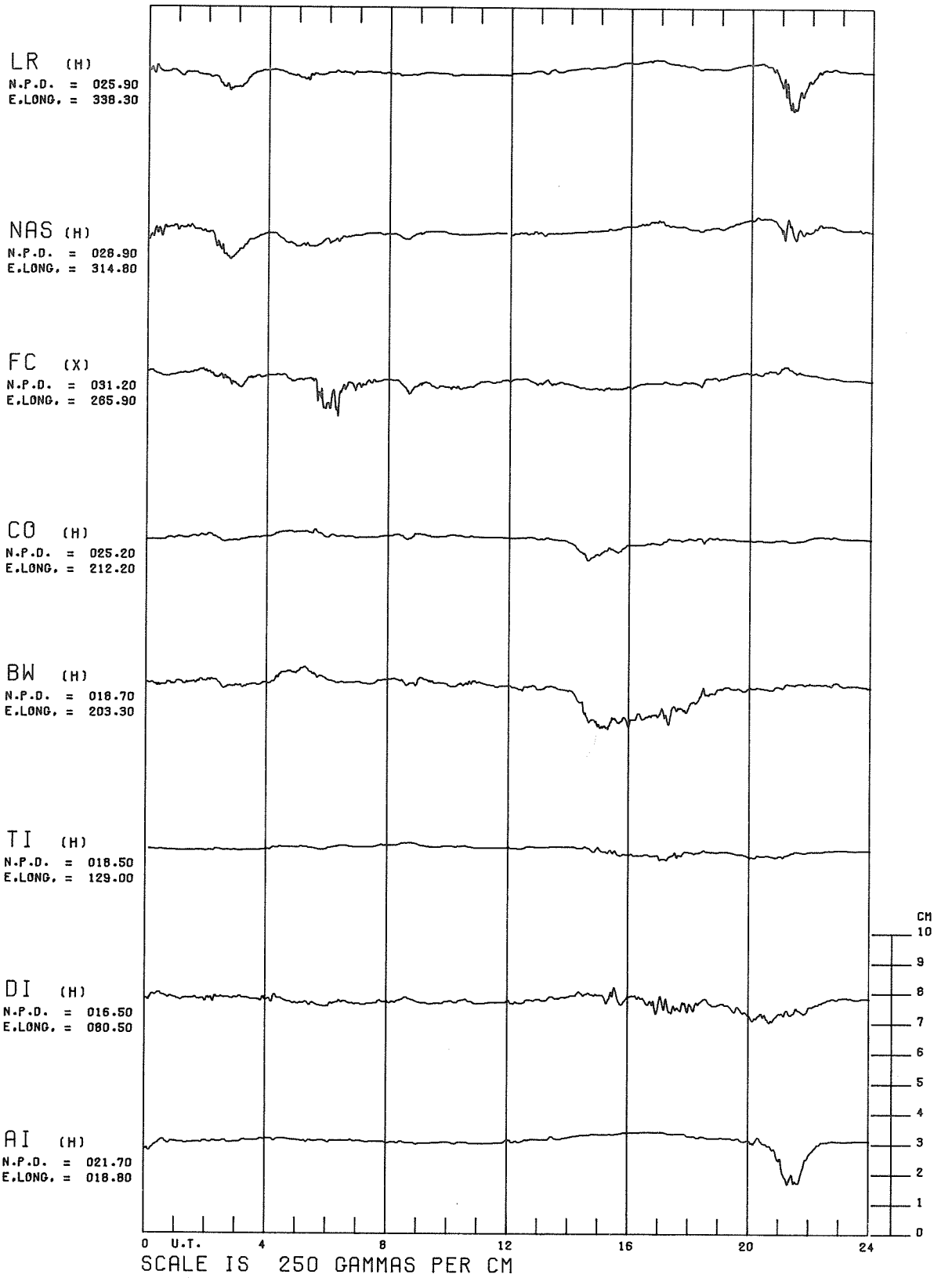

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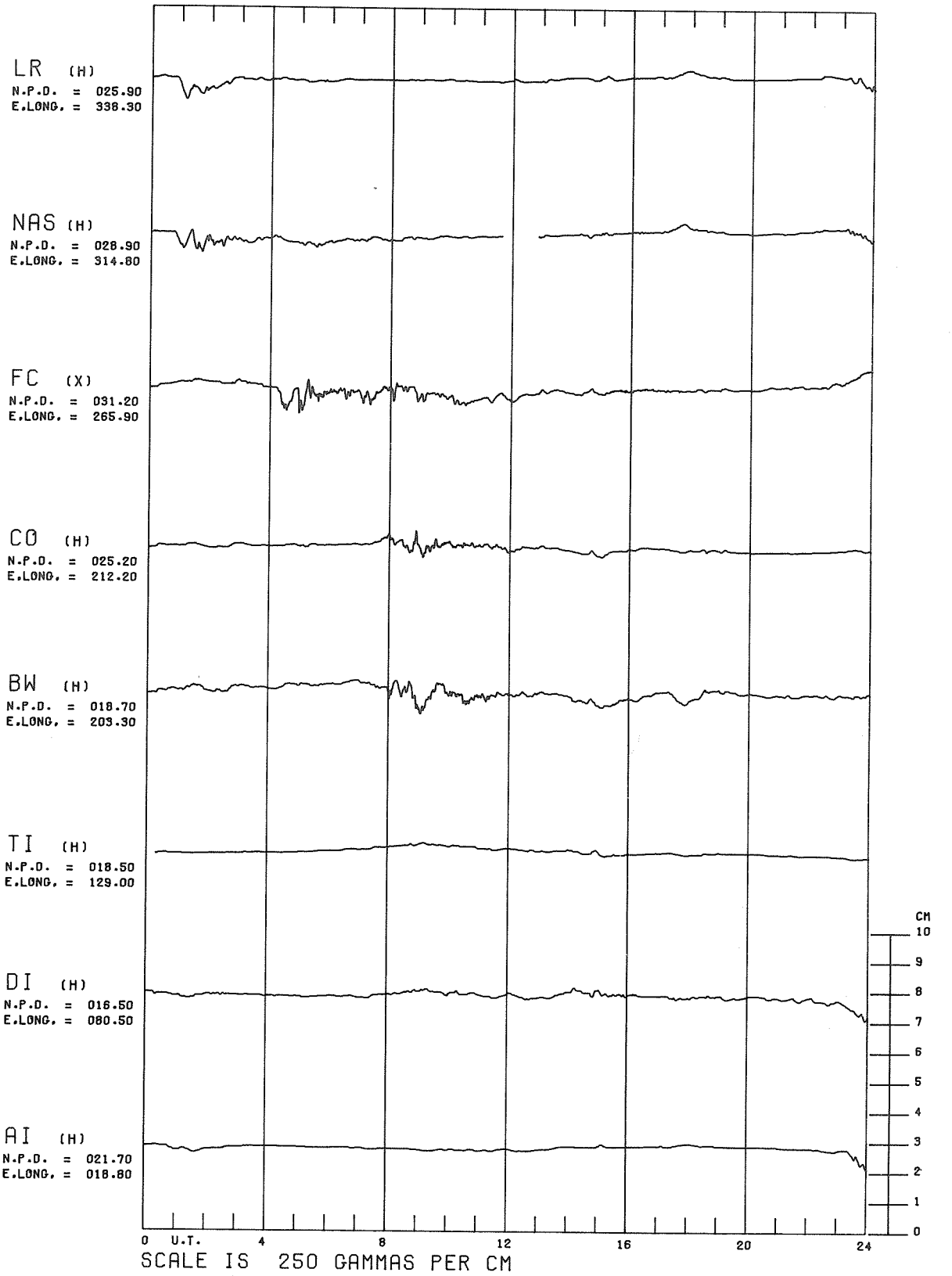
BY STATION DAY
26 APRIL 1976



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BY STATION DAY
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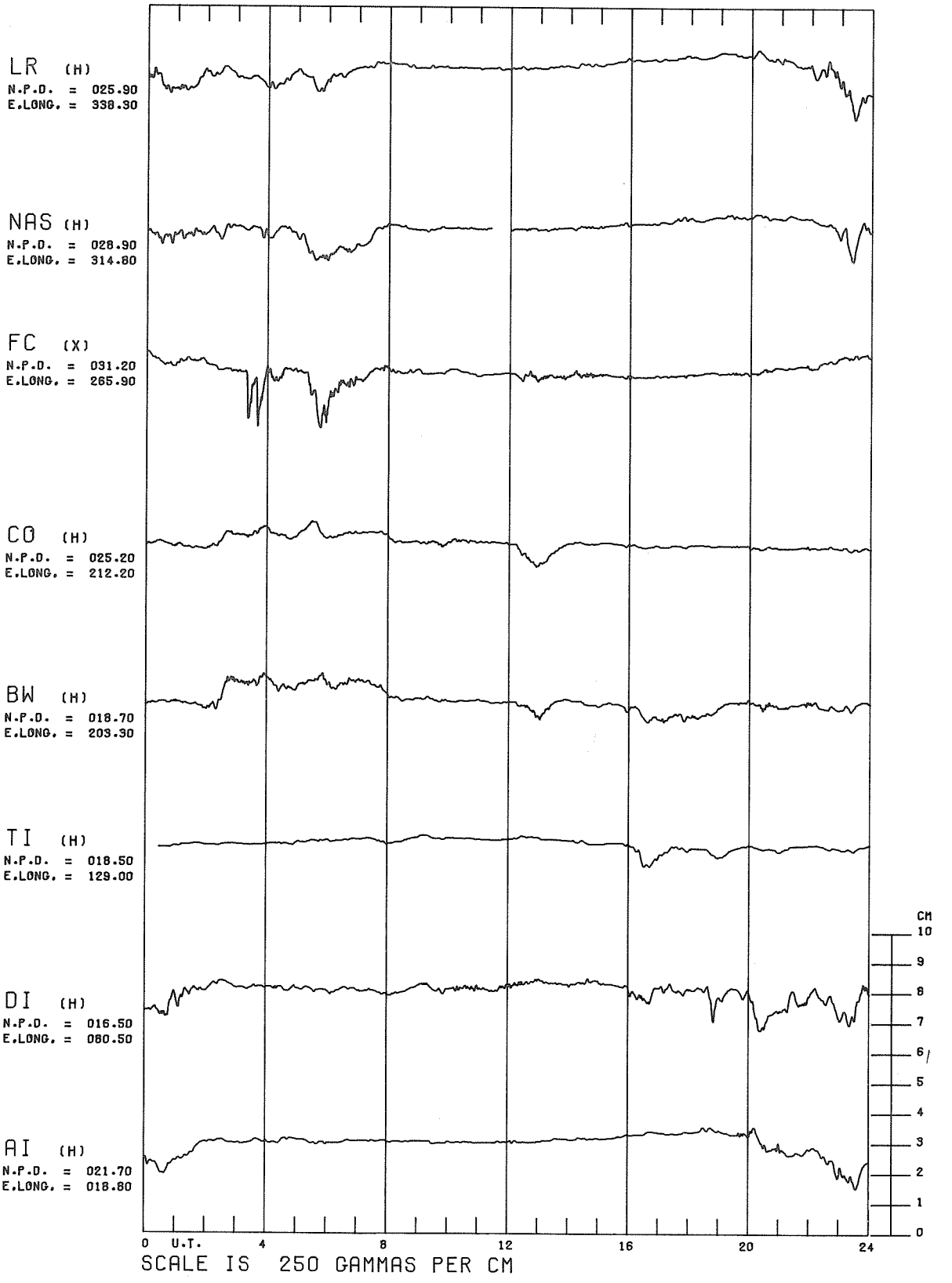

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BY STATION DAY
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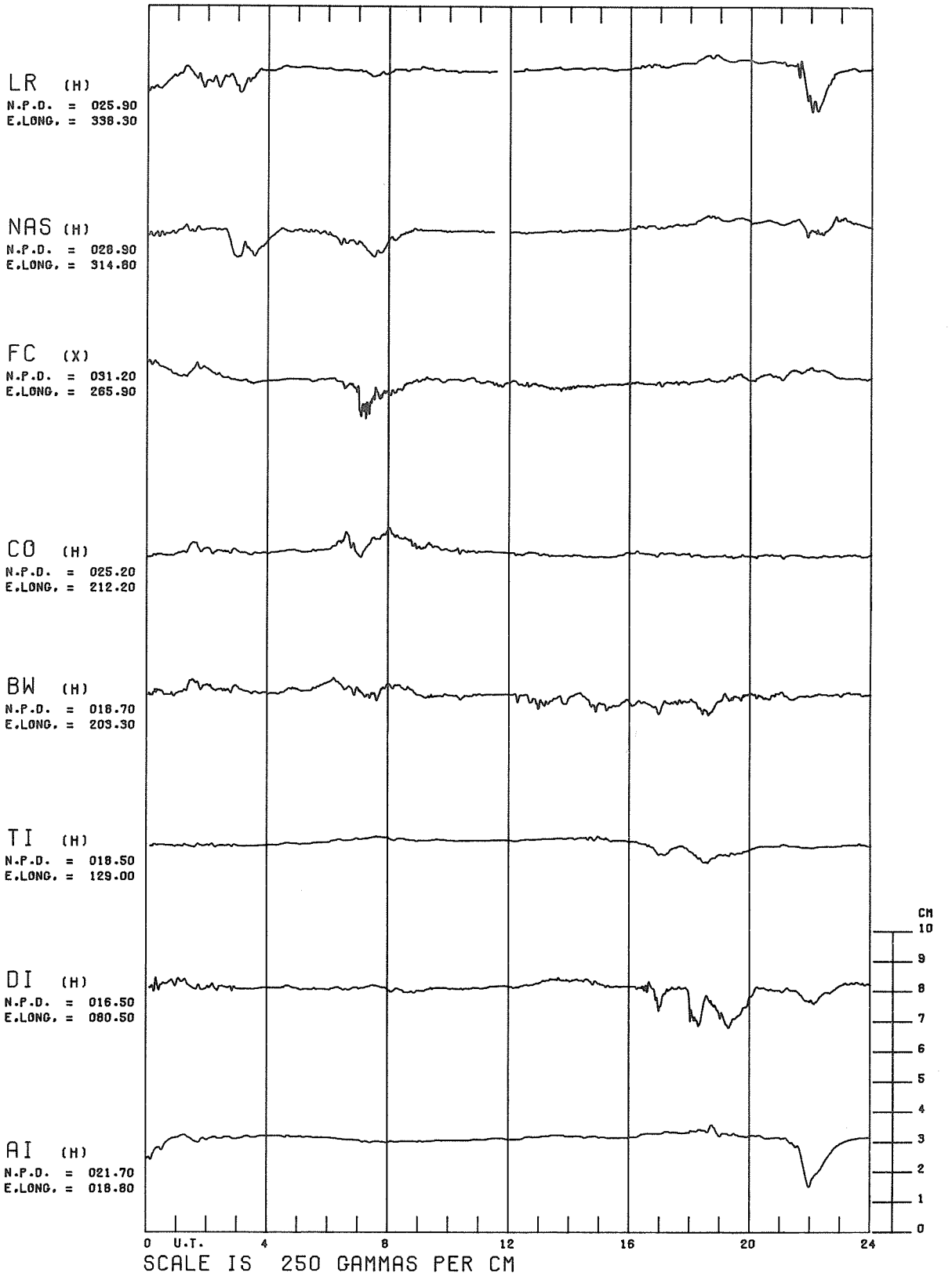

SCALE IS 250 GAMMAS PER CM

COMMON SCALE MAGNETOGRAMS
BY STATION DAY
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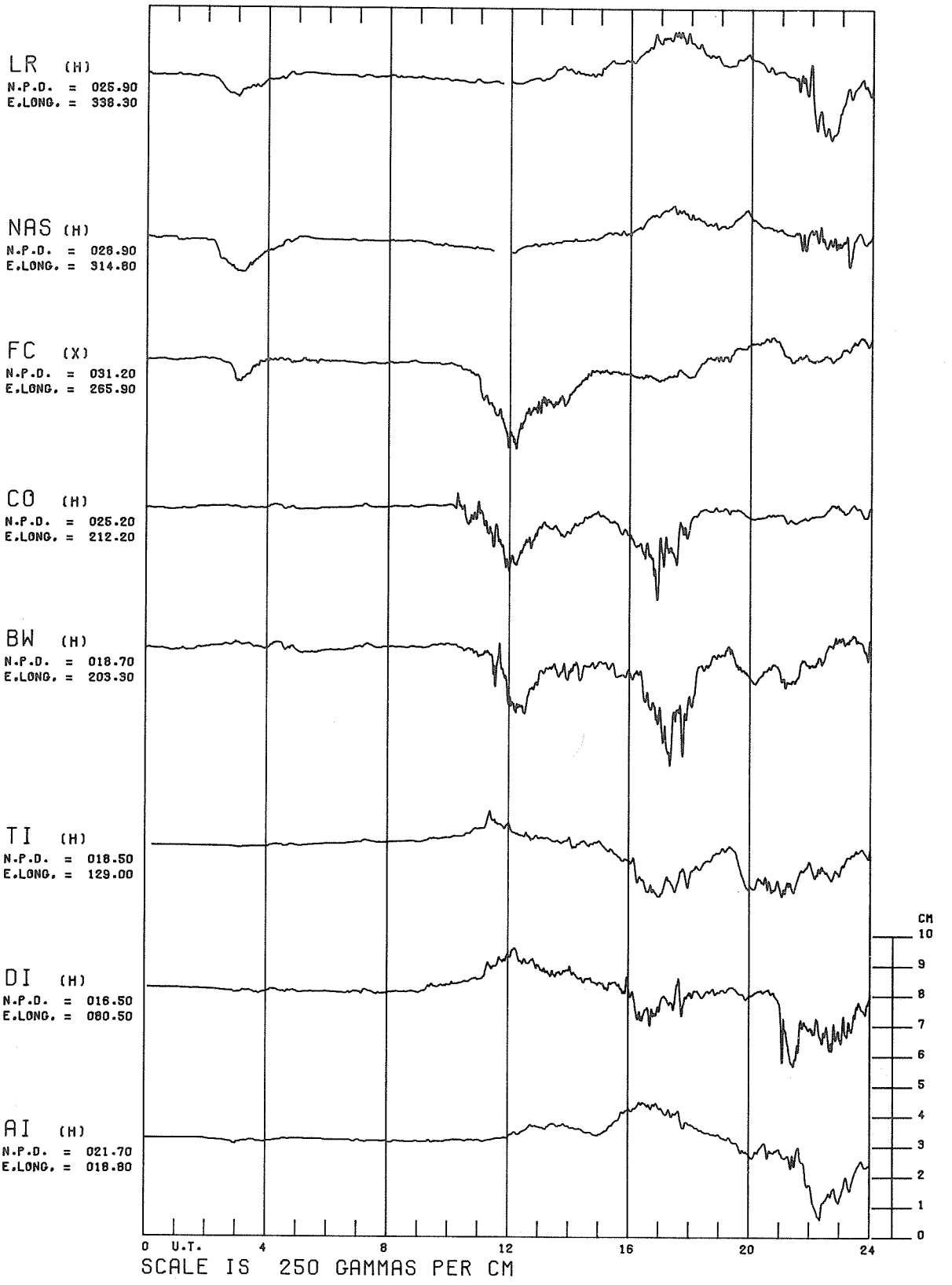
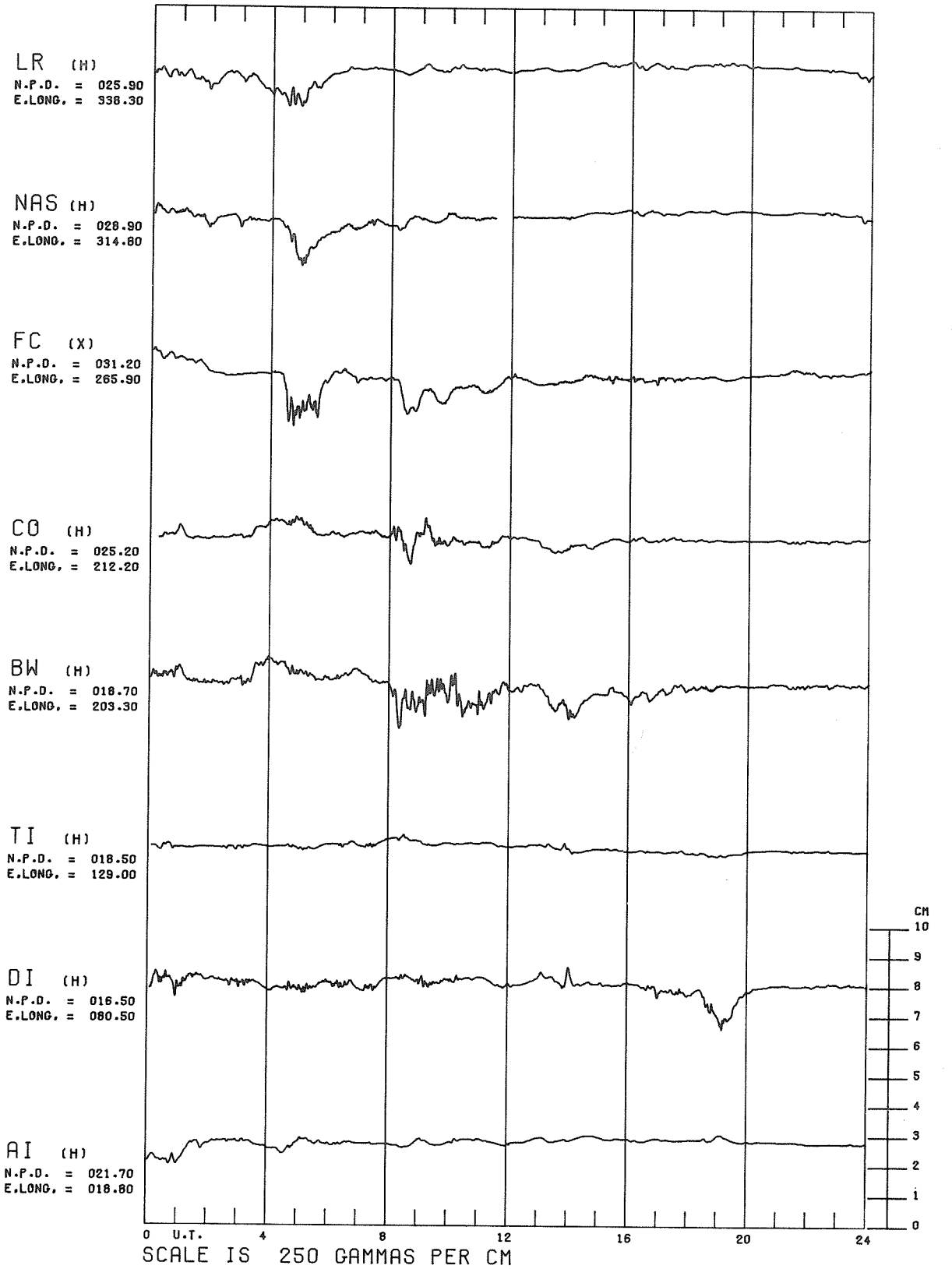


COMMON SCALE MAGNETOGRAMS
BY STATION DAY
30 APRIL 1976



SECTION III. PRELIMINARY AE(8) INDICES, APRIL 1976

1. Discussion of Graphs, Tables, and Statistical Information

The following figures display the familiar AU, AL, AE, and AO graphs for each day of the month and are based upon 1-min data samples. As indicated at the top of each frame, these indices are derived from data from only eight auroral zone observatories and, as such, are considered "provisional." WDC-A for Solar-Terrestrial Physics intends to update these indices during and after the IMS and to publish "final" graphs and summary tables in the usual UAG Report format for each year.

Following the pages of AE graphs are tables 1-4 (pages 45-48) containing the index (AE, AO, AU, AL) amplitudes for each hour of each UT day of the month, the monthly averages for each hour and for the hours of the designated 5Q and 5D days, and the average amplitudes for each day and for the whole month. Tables 5-6 (pages 49-50) give the station having the largest hourly average positive and negative deviations (hourly AU and AL) for each hour of each day in the month. These provide a key to the graphs of AU and AL by usually indicating which station's magnetogram provided the extreme deviations giving AU or AL for that hour. Sometimes the most extreme deviation during an hour will have occurred at another station. The general patterns, however, of UT time of AU and AL provision by each station are the same whether based on hourly averages or on minute-by-minute extremes.

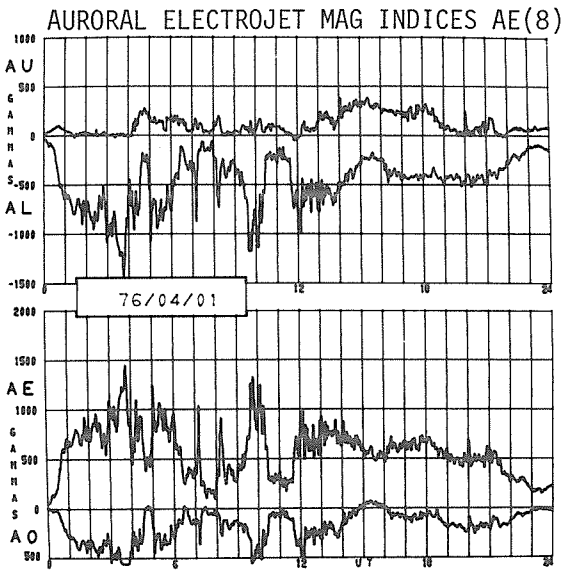
Table 7 (page 51) gives the number of times (1-min intervals) during the month when the indicated station provided the AU and AL index in each hour of the UT day. For the relatively sparse station distribution used in this AE(8) derivation, it is not surprising that each station could produce at least one extreme positive and negative deviation in almost every hour of the day. The overall pattern, however, is for the most frequent observation of the maximum positive H deviation to occur around 6 hours before Local Geomagnetic Midnight (LGM) and the most negative H deviation to occur around 3 hours after LGM [Allen and Kroehl, 1975]. Individual station deviations from this pattern may be due to the dominant influence of a few isolated large substorms during a relatively quiet month. This should become apparent as more months of data are similarly analyzed.

Table 8 (page 51) gives the monthly average of quiet-time H for each observatory. This is computed from the 1-min H scalings on the 5 quiet days of the month, using known or assumed H baselines.

Figures 2-5 (pages 52-55) graphically display the details suggested by the tabulation of hourly station frequency of AU and AL contribution. The "frequency of 1-min AU provision by station" (figure 2) for the month is a smoothed curve showing the number of times that each station contributed the extreme positive deviation from minute-to-minute, N(AU). An 11-point running mean was used on the raw numbers of contributions for the 1440 1-min intervals of the UT day. Data for the UT day are duplicated (0000-2400 UT shown twice) so that the end of the day will not interrupt the regular pattern of progressive index contribution as each station rotates into the critical region around 1800 Local Geomagnetic Time (LGT). Arrows mark UT times of LGM for each station. Figure 3, on the opposite page, shows the "total amplitude of most positive H variations." This is a smoothed graph for each station's cumulative amplitude of deviation for each minute when it was providing the AU index. Each scale division on the right side represents +500 gammas. Comparison of these curves with the N(AU) graphs of figure 2 shows that the largest magnitude positive excursions generally occur at the same time when the stations most often provide AU indices. Occasional postmidnight minor peaks result from disturbances for which the H component at one site is first a negative extreme (giving AL) for several minutes and then swings briefly to a positive extreme before recovery. Such events are infrequently observed in AE indices derived from 10 to 12 stations because usually another station is in position to monitor the true eastward electrojet effect rather than having oscillatory variations near LGM providing AU.

The graph "frequency of 1-min AL provision by station" (figure 4) shows the smoothed curve for the number of times in the month that each station provided AL during each minute of the UT day, N(AL). Evidently the pattern is for a station to rotate into the most probable region for encountering extreme negative H deviations some hours after LGM. Unusual, asymmetric peaks in frequency of AL provision by any station may be attributed to disturbances on only a few days of the month. Such unevenness due to a few isolated events should average out over the course of a year. Figure 5 shows the corresponding "total amplitude of most negative H variations." This is the cumulative amplitude of negative H observed by each station during those minutes when they were providing AL. Each scale division on the right side is -1000 gammas. Again, the comparison of cumulative amplitudes and N(AL) curves can indicate the most probable time of occurrence of larger amplitude events.

For figures 2-5 slightly elevated levels of the curve for any station during normally quiet hours indicate possible difficulty with the quiet-time level for some days of the month. This information will be used as a quality control check for the final derivations of AE(12) indices at a later date.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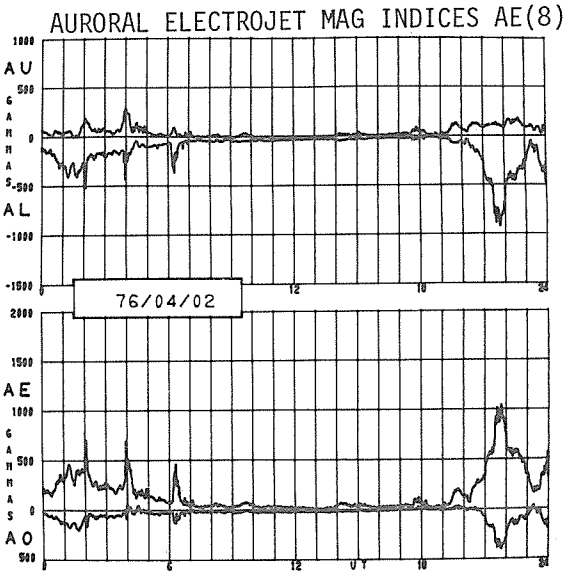
AU
AL
76/04/01
AE
AO
UT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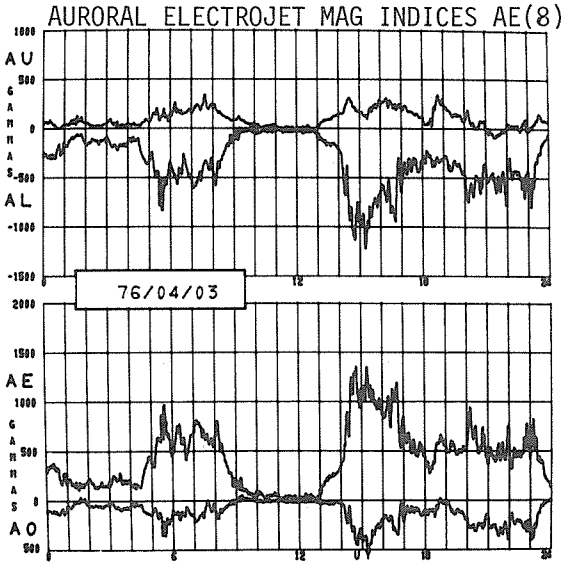
UT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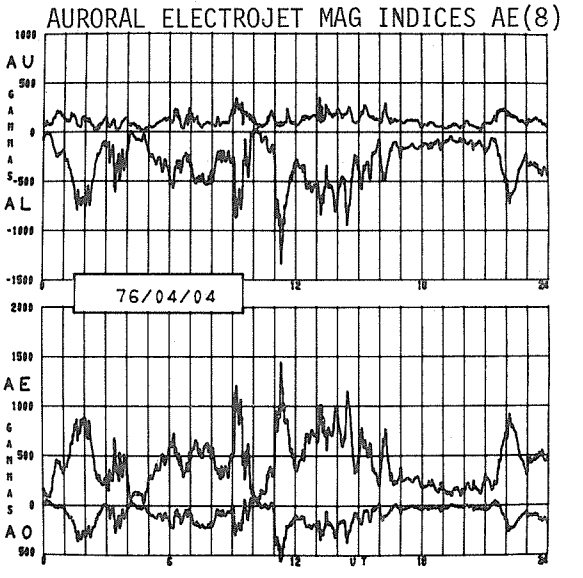
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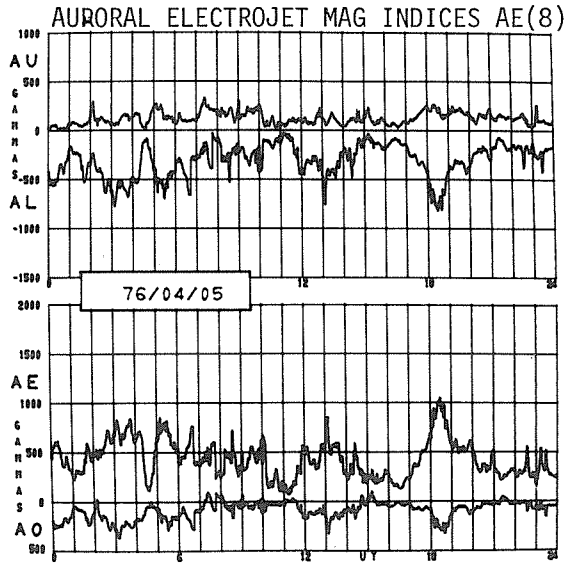
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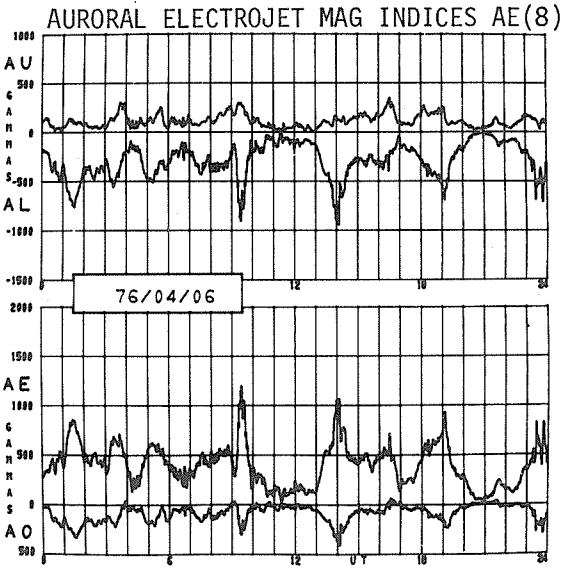
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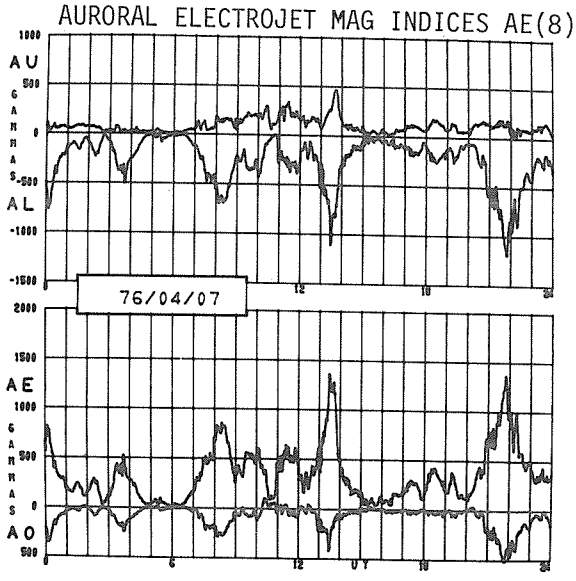
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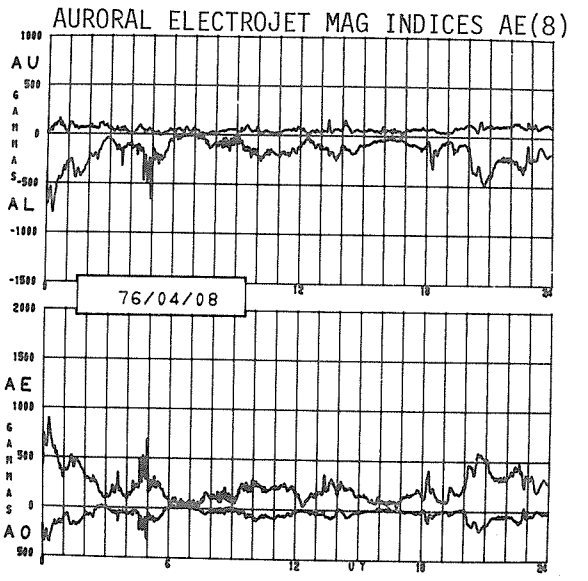
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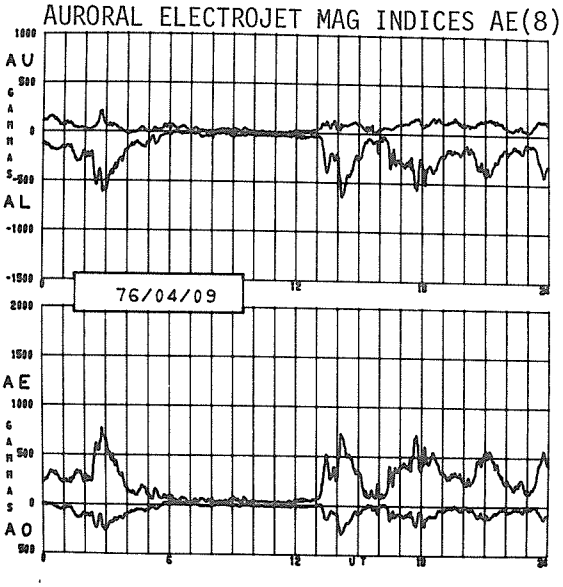
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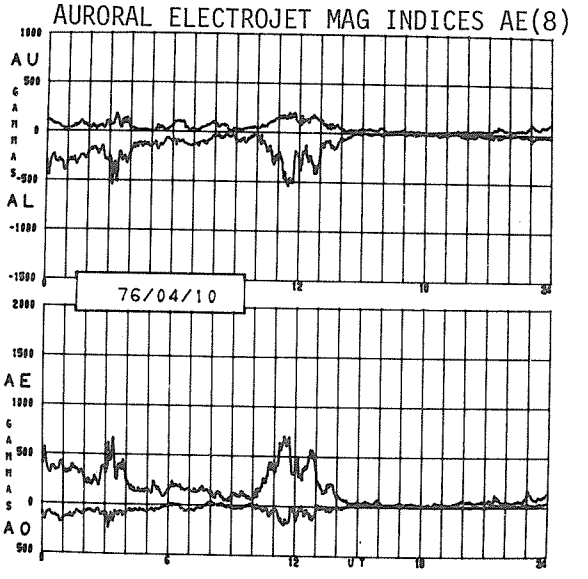
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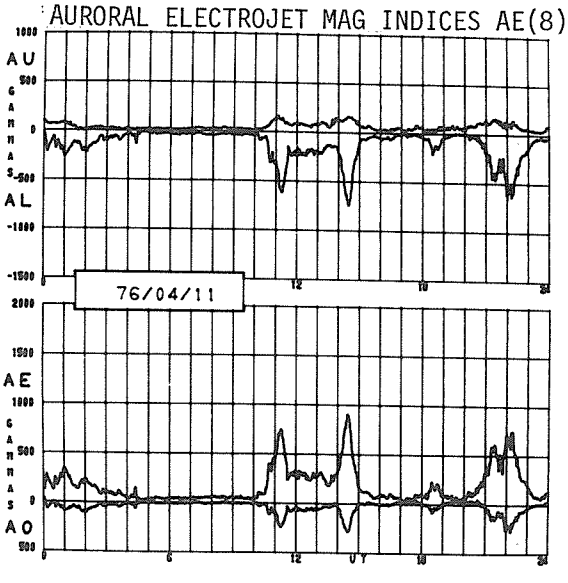
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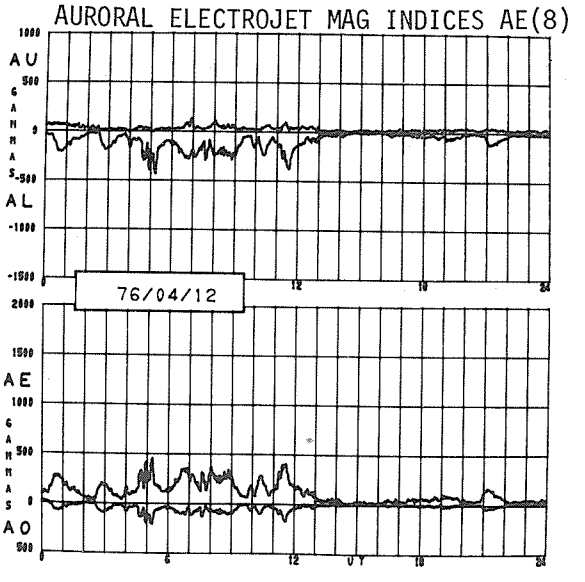
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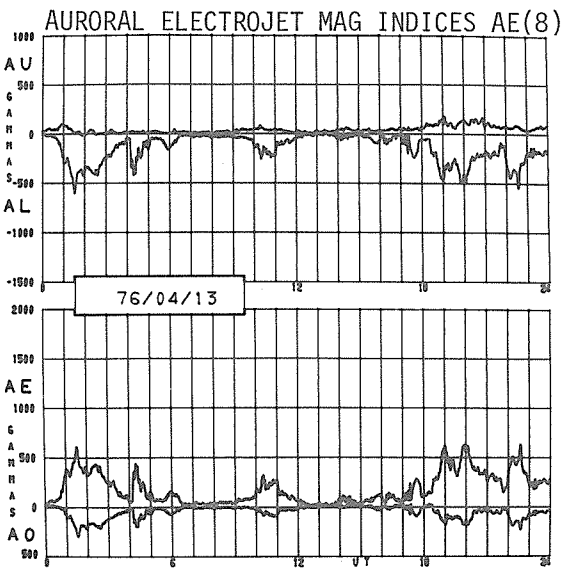
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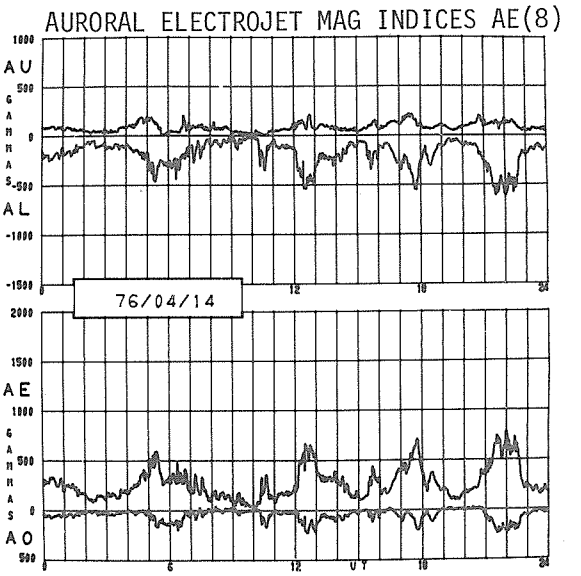
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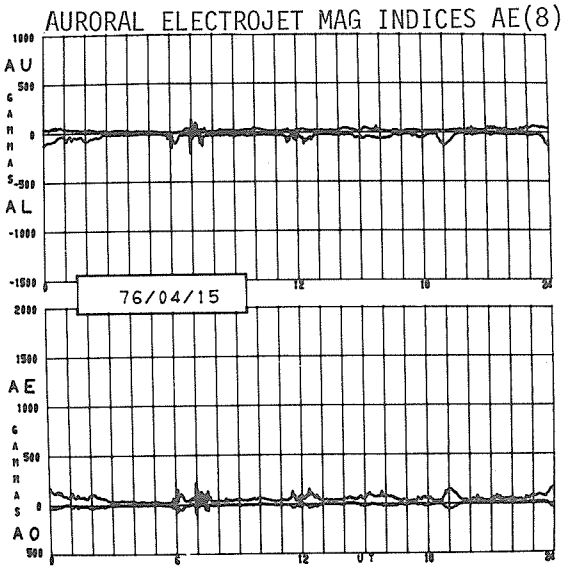
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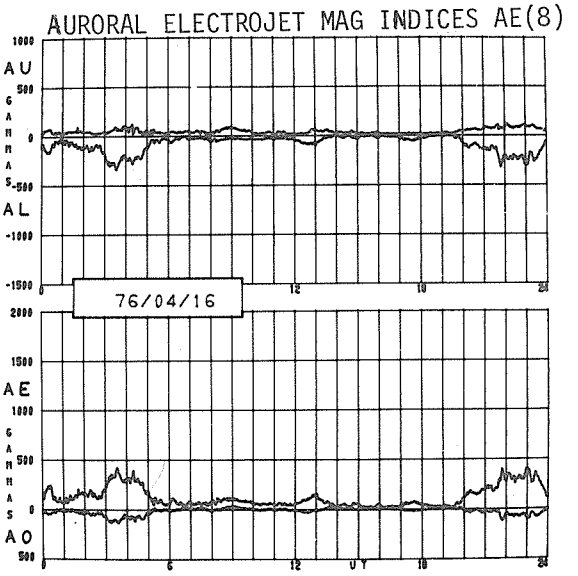
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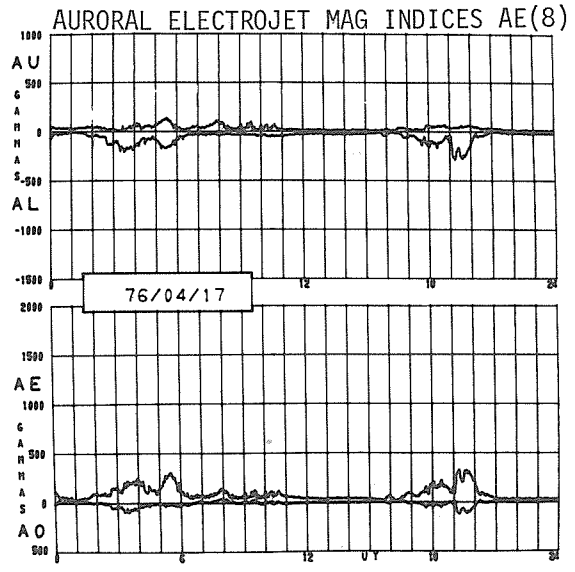
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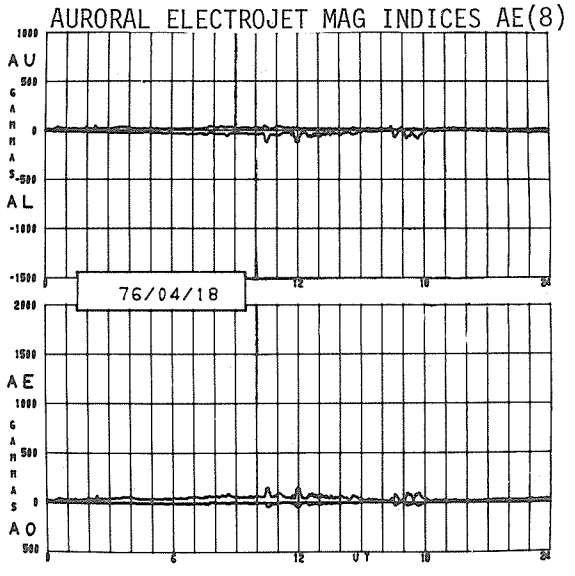
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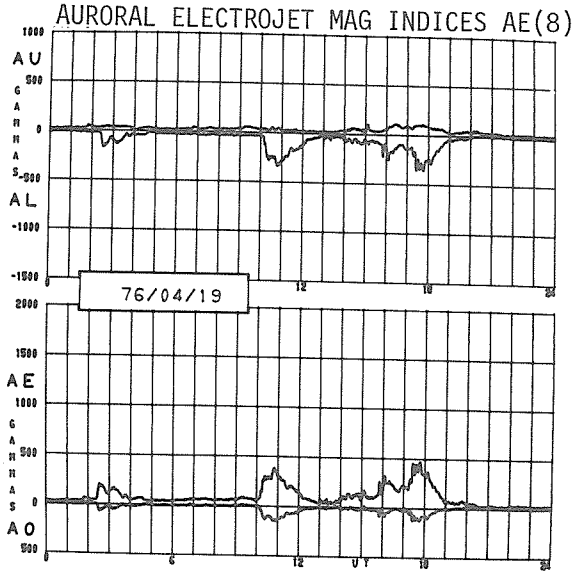
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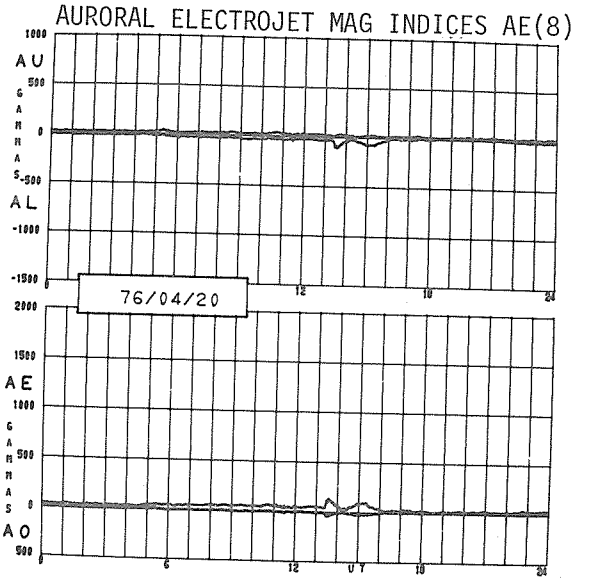
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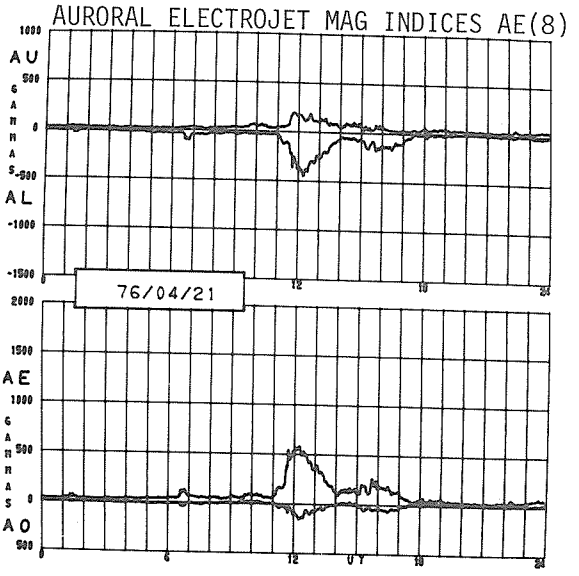
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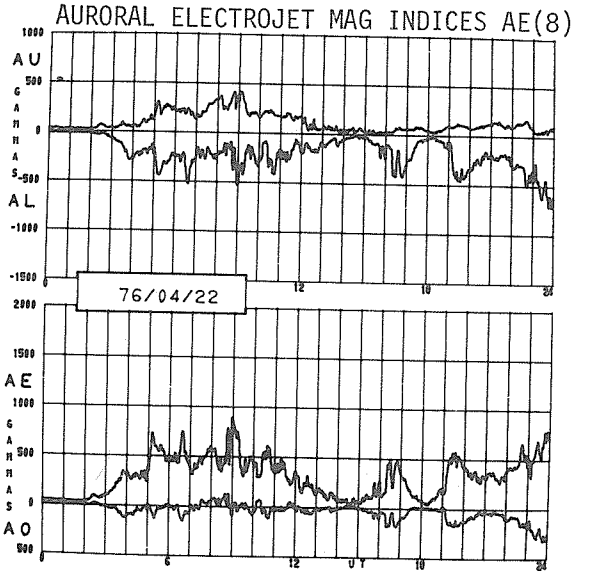
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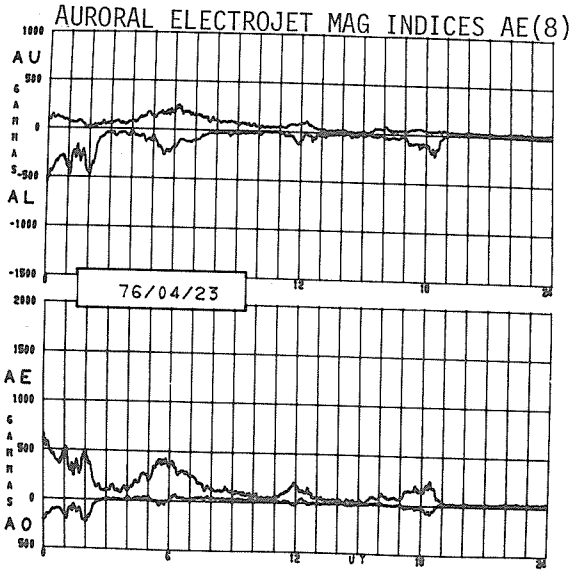
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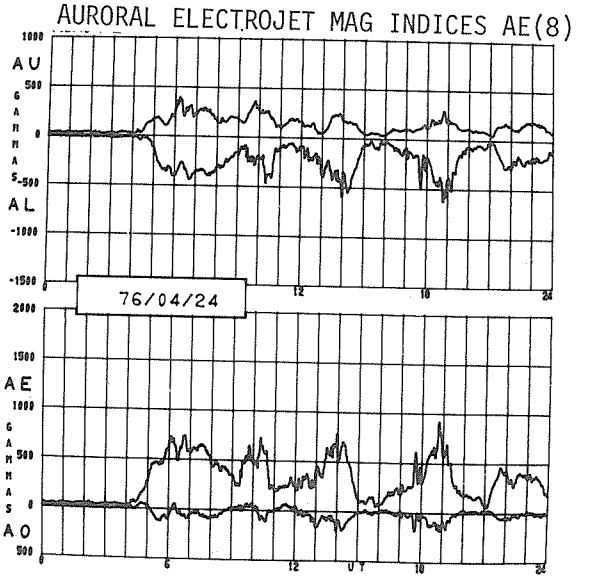
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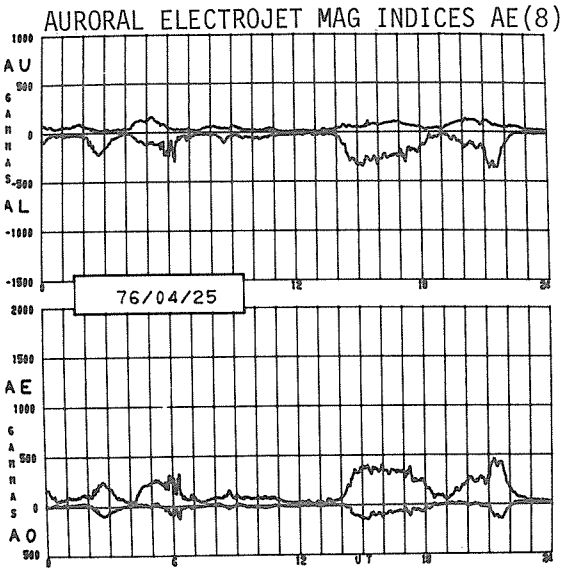
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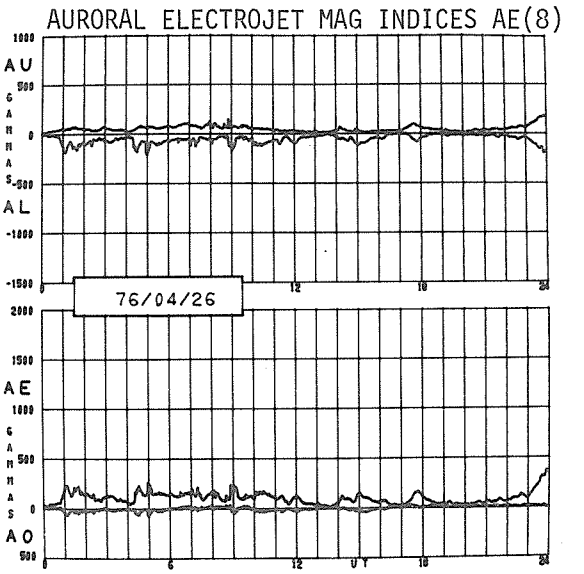
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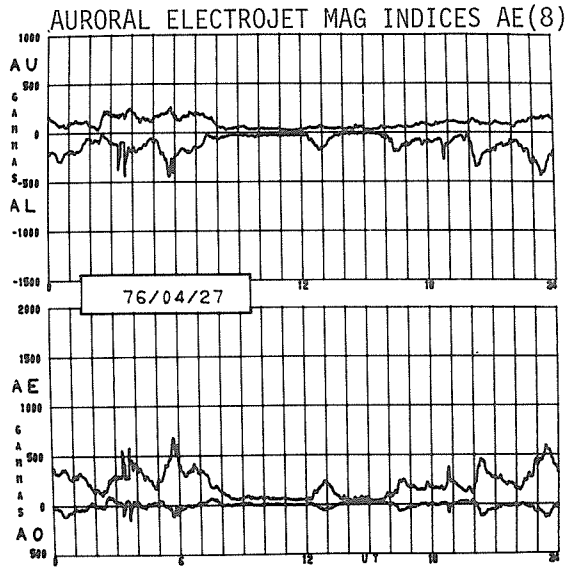
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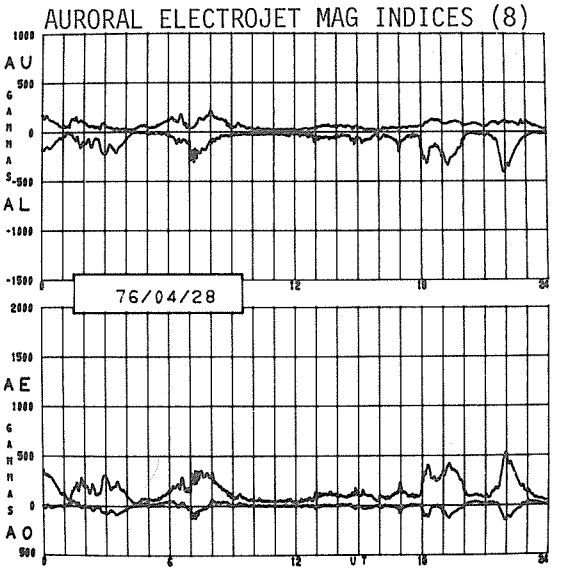
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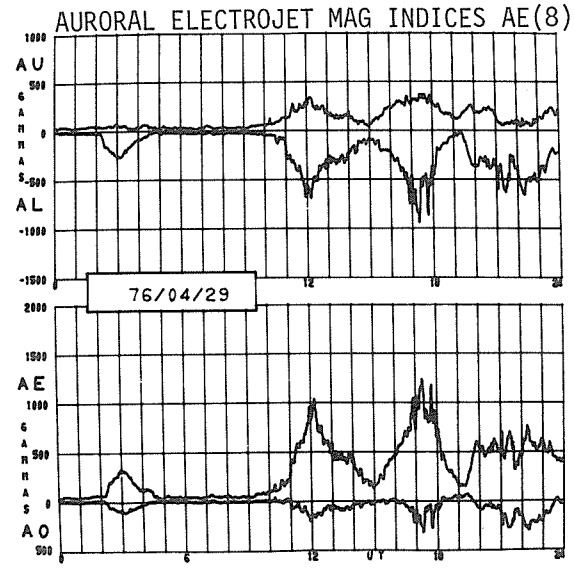
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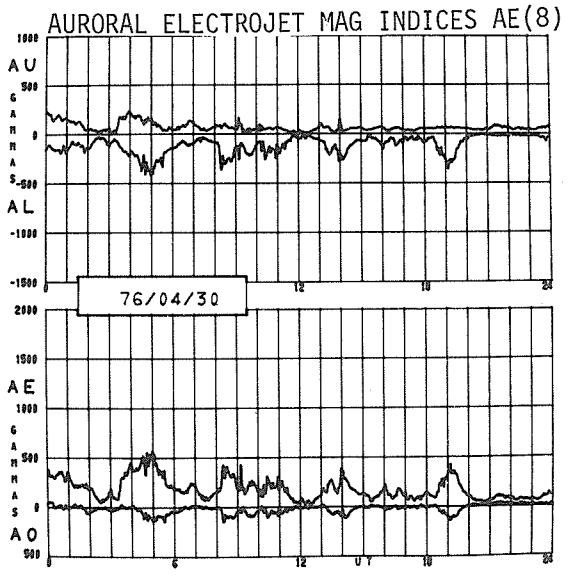
AU
AL
76/04/29
AE
AO
GAMMAS
UT


AURORAL ELECTROJET MAG INDICES AE(8)
AU
AL
76/04/30
AE
AO
GAMMAS
UT

3. Tables of AE, AO, AU, and AL Indices

Table 1. AE Indices

APRIL 1976

VALUES ARE EXPRESSED IN GAMMAS

	UT	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
D	01	309	728	782	1032	657	886	465	288	420	728	572	387	711	758	682	548	607	656	616	490	510	433	269	186	572
	02	230	375	309	256	228	110	145	044	045	056	034	030	019	018	050	037	032	060	036	116	209	736	535	284	166
D	03	295	175	165	210	252	618	603	680	422	106	055	032	036	229	910	1059	904	559	475	523	634	495	498	405	431
D	04	258	653	466	371	125	396	480	571	393	618	190	806	594	795	698	498	388	265	195	142	180	359	623	468	439
D	05	458	374	568	711	428	670	495	422	401	446	251	244	452	526	315	240	187	440	838	553	378	288	301	314	429
D	06	391	669	450	550	321	536	306	413	505	620	214	127	149	523	606	447	448	287	602	467	115	145	204	523	401
	07	462	177	161	324	127	050	070	412	663	463	314	517	347	887	248	081	121	222	316	213	338	935	657	348	352
	08	587	423	229	161	276	197	060	086	124	188	223	226	120	227	207	120	086	166	183	170	456	369	378	283	231
	09	276	272	472	393	140	095	055	048	043	051	038	037	058	283	498	166	237	472	457	311	346	416	215	333	238
	10	390	341	262	408	159	145	179	152	091	105	248	521	422	194	061	047	028	027	024	034	049	064	056	107	171
	11	211	211	150	086	048	043	045	054	059	051	196	465	279	256	556	104	080	065	141	074	144	473	458	105	181
	12	185	133	095	103	187	209	250	232	280	133	169	265	131	043	021	022	038	050	065	080	050	119	041	045	123
	13	106	418	356	164	208	095	066	038	047	082	225	117	034	029	062	078	083	164	281	468	414	264	424	244	186
	14	285	216	127	167	285	401	317	204	146	077	153	166	510	327	210	231	259	510	274	142	245	567	496	199	271
Q	15	118	086	073	040	031	029	074	061	046	055	049	059	078	042	061	086	056	045	058	078	041	054	050	097	061
	16	143	128	156	324	272	085	071	063	096	090	058	055	099	077	047	033	029	059	032	045	162	250	318	273	124
	17	058	057	105	182	145	223	075	089	073	073	083	052	039	040	038	033	050	100	157	255	083	032	032	031	088
Q	18	025	032	039	051	043	042	051	058	069	058	079	073	068	053	049	028	031	062	024	021	018	024	025	030	044
Q	19	029	042	108	111	054	044	054	063	061	074	255	217	078	055	114	133	229	331	211	065	039	029	034	032	103
Q	20	032	033	034	032	031	046	044	049	052	055	058	050	052	078	054	070	023	025	014	018	020	019	026	030	039
Q	21	029	040	030	035	038	044	074	061	055	073	076	277	481	255	136	175	158	060	053	041	031	032	041	057	098
	22	044	040	076	214	300	554	513	457	533	524	441	348	224	134	070	124	319	189	107	441	347	332	475	597	308
	23	474	369	216	113	201	351	312	182	118	086	056	119	109	046	035	053	080	140	145	023	024	026	032	033	139
	24	037	042	039	043	118	473	638	601	419	420	468	248	294	536	458	108	170	312	591	383	157	292	359	316	313
	25	094	096	181	094	155	243	129	060	098	081	077	038	032	044	244	364	338	273	110	138	251	356	084	037	151
	26	055	181	117	105	137	159	145	142	127	133	143	094	065	034	096	093	046	099	060	037	040	061	096	239	104
	27	326	258	188	364	277	433	351	236	082	076	065	055	135	111	055	056	176	171	195	164	329	228	258	467	211
	28	240	161	188	193	059	089	193	300	182	081	053	052	063	114	107	093	106	112	305	325	102	221	292	081	155
	29	049	061	188	222	085	050	049	061	055	075	158	601	724	446	246	310	685	947	385	325	532	514	598	480	327
	30	327	228	111	243	441	314	188	122	294	215	203	121	062	205	197	109	134	092	171	254	062	085	066	085	180
	MEAN	217	234	215	243	194	254	217	208	200	196	173	213	216	246	238	185	204	232	237	213	210	274	265	224	221
5Q	MEAN	047	047	057	054	039	041	059	058	057	063	103	135	151	097	083	098	099	105	072	045	030	032	035	049	068
5D	MEAN	342	520	486	575	357	621	470	475	428	504	256	319	388	566	642	558	507	441	545	435	363	344	379	379	454

Table 2. AO Indices

APRIL 1976 VALUES ARE EXPRESSED IN GAMMAS

	UT	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
D	01	-091	-341	-376	-512	-179	-303	-108	-069	-143	-299	-196	-161	-295	-211	-057	044	-056	-091	-098	-190	-182	-154	-069	-019	-173
	02	-071	-142	-062	-045	001	-028	-042	-013	-012	-014	-019	-018	-019	-018	-011	-005	-002	007	006	013	-009	-256	-124	-057	-039
D	03	-109	-021	-050	-062	-076	-184	-127	-112	-069	016	-004	-009	-011	-023	-239	-341	-200	-107	-071	-106	-245	-286	-222	-132	-116
D	04	005	-203	-148	-101	-009	-102	-112	-182	-088	-100	014	-297	-160	-215	-179	-074	-053	-022	-022	-009	-019	-025	-162	-119	-099
D	05	-197	-119	-161	-246	-094	-164	-142	004	-029	-032	-033	-037	-117	-159	-051	000	-028	-068	-220	-078	-044	-001	-033	-057	-088
D	06	-118	-238	-164	-102	-071	-125	-048	-105	-079	-104	-020	-022	-026	-168	-174	-060	-006	-034	-095	-112	-001	011	-012	-133	-084
	07	-166	-016	-030	-129	-034	-002	000	-121	-194	-051	018	-020	-019	-181	-033	006	-008	-012	-021	-017	-032	-320	-248	-059	-070
	08	-219	-133	-034	-036	-090	-072	019	-015	-016	-035	-077	-054	-013	-048	-028	000	011	-008	-031	-002	-118	-071	-061	-024	-048
	09	-019	-076	-157	-153	-059	-010	019	000	005	000	-006	-006	-003	-056	-156	-026	-048	-105	-099	-024	-056	-071	-037	-051	-050
	10	-123	-106	-073	-104	-055	-036	-015	-015	007	-009	-032	-099	-071	-015	004	020	015	009	006	010	007	016	018	030	-025
	11	-032	-068	-049	-025	-009	-001	-002	001	004	000	-037	-124	-060	-029	-141	006	003	020	-022	029	026	-107	-135	002	-031
	12	-027	-020	-025	-036	-069	-083	-071	-073	-081	-036	-042	-083	-019	-001	004	008	005	003	000	-001	010	-018	009	010	-027
	13	001	-176	-167	-066	-088	-032	-014	-004	-002	-003	-064	-029	000	008	011	-004	004	-030	-041	-122	-074	-041	-140	-055	-047
	14	-053	-037	-018	-024	-011	-102	-090	-019	005	-004	-049	-021	-132	-073	-042	-029	-017	-093	-052	004	001	-160	-139	-033	-050
Q	15	-013	-012	-012	000	000	-003	-017	-003	001	001	002	-009	-012	001	003	-007	-010	-003	-012	-014	007	010	006	006	-004
	16	-023	-014	-039	-096	-073	-004	008	008	015	019	002	001	-014	009	010	008	006	-007	007	010	-021	-043	-064	-054	-015
	17	010	011	-017	-063	-017	-019	-002	018	010	005	000	-004	000	-003	-002	000	002	-020	-022	-077	001	010	000	001	-007
Q	18	006	003	001	002	-001	-004	-008	-003	-001	-002	-014	-007	-013	-009	-004	006	002	-014	007	014	008	005	001	004	-001
Q	19	006	007	-016	-021	-002	-001	002	000	001	009	-089	-079	-015	-002	-008	-019	-024	-069	-037	007	022	012	007	004	-013
Q	20	005	003	004	003	007	006	000	000	003	-002	003	000	002	-013	-009	-014	006	008	008	012	012	008	005	005	003
Q	21	002	004	002	000	000	-005	-011	-003	006	015	014	-032	-098	-029	011	-034	-043	004	021	019	018	012	015	013	-004
	22	008	006	007	-052	-052	-031	-051	015	052	-007	-019	000	-030	-010	010	-033	-106	-025	005	-114	-071	-041	-106	-233	-037
	23	-130	-128	-063	011	025	-006	035	038	033	026	020	008	015	003	000	008	005	-017	-030	021	020	014	014	010	-003
	24	009	009	007	010	026	-066	-032	-052	-029	034	-026	038	-034	-090	-091	-002	002	-042	-099	-045	017	-013	-025	-006	-021
	25	010	023	-049	-015	016	-010	-028	006	001	000	-009	-004	000	003	-063	-108	-072	-060	-012	012	-010	-090	014	009	-018
	26	004	-030	-010	-005	-014	-011	016	012	013	004	-021	-012	-008	005	-008	-021	006	020	017	006	007	010	013	011	000
	27	-061	-021	026	011	010	-021	-005	040	007	010	007	000	-017	-008	022	015	-030	-008	-005	023	-060	-019	-023	-074	-008
	28	-004	020	-027	-057	014	028	018	-037	034	014	003	003	000	003	004	-015	-016	-004	-048	-065	026	-020	-049	024	-006
	29	014	014	-043	-068	003	008	004	008	007	010	012	-065	-105	-071	-024	000	-056	-144	014	021	-059	-173	-219	-056	-041
	30	015	-004	-015	-003	-055	-082	-008	001	-072	-054	-044	-025	-004	-042	-041	-003	-016	-004	-027	-064	015	025	016	012	-020
	MEAN	-045	-060	-059	-066	-032	-049	-027	-023	-020	-020	-024	-040	-043	-048	-043	-022	-024	-031	-032	-028	-027	-059	-058	-034	-038
5Q	MEAN	001	001	-004	-003	001	-001	-007	-002	002	004	-017	-025	-027	-010	-001	-014	-014	-015	-003	008	013	009	007	006	-003
5D	MEAN	-102	-184	-180	-205	-086	-176	-107	-093	-082	-104	-048	-105	-122	-155	-140	-086	-069	-064	-101	-099	-098	-091	-100	-092	-112

Table 3. AU Indices

APRIL 1976

VALUES ARE EXPRESSED IN GAMMAS

UT	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
D 01	062	022	014	003	148	139	124	074	066	064	089	031	059	167	283	319	247	236	209	054	072	062	065	073	112
02	043	045	092	082	116	026	030	008	010	013	-002	-003	-009	-009	013	012	013	038	025	071	094	111	142	085	044
D 03	038	066	032	043	049	123	173	227	141	069	023	006	007	090	215	187	251	171	166	155	071	-039	025	070	098
D 04	135	122	084	084	053	095	127	102	108	209	109	105	136	182	169	174	140	109	075	061	070	154	149	114	119
D 05	031	067	122	109	119	170	105	215	171	190	092	084	108	103	105	120	064	151	198	198	145	143	117	099	126
D 06	077	095	060	172	088	142	104	101	172	205	086	041	048	092	128	162	217	108	205	121	056	084	089	128	116
07	064	072	049	032	029	023	034	084	137	179	176	238	154	262	090	048	051	098	136	089	136	146	079	114	105
08	073	077	080	043	047	025	049	027	045	057	034	058	046	064	075	059	054	074	060	083	109	113	128	116	067
09	118	059	078	043	010	036	047	024	027	025	012	011	026	085	092	056	070	131	128	131	116	136	069	114	069
10	071	063	057	099	023	036	074	060	052	043	091	161	139	081	035	044	029	022	019	028	032	049	047	083	060
11	073	036	025	017	014	020	020	029	034	025	060	107	079	098	135	058	043	053	048	067	098	129	093	055	059
12	065	046	021	015	024	020	053	042	057	030	042	049	045	019	015	020	025	028	033	038	036	040	030	033	034
13	054	032	010	015	015	014	018	014	020	037	048	029	017	023	043	035	046	051	099	111	133	090	071	066	045
14	089	070	045	058	131	097	067	083	078	034	027	061	122	090	062	085	112	161	084	075	124	123	108	065	085
Q 15	045	031	023	021	016	010	019	027	024	029	027	020	026	022	034	035	017	019	016	024	028	038	032	054	027
16	048	049	038	065	063	038	044	040	063	065	031	029	034	048	034	025	021	021	023	033	059	081	094	082	047
17	039	040	035	027	054	092	034	063	047	042	042	021	018	016	016	016	027	029	055	050	043	027	017	017	036
Q 18	019	019	021	028	019	016	017	025	033	026	025	029	019	017	020	020	017	016	020	025	018	018	014	020	021
Q 19	021	029	037	034	024	020	029	031	032	046	038	029	023	025	048	047	090	095	067	040	042	027	025	020	038
Q 20	021	020	021	020	022	029	022	024	029	025	032	024	028	025	017	020	018	021	015	021	022	018	018	020	022
Q 21	017	024	018	017	019	016	025	027	034	051	053	105	141	098	080	053	035	034	048	040	034	029	036	042	045
22	031	027	045	054	097	246	205	244	319	255	201	174	081	056	046	027	053	069	059	105	102	124	130	064	117
23	106	055	044	068	126	169	191	130	092	069	049	068	070	027	018	035	045	053	042	034	033	027	031	027	067
24	028	031	027	032	085	170	286	247	180	244	207	163	111	178	137	052	087	113	196	146	096	133	153	151	136
25	057	071	040	031	094	110	036	037	050	040	029	014	016	026	058	073	096	075	042	082	115	087	056	028	057
26	032	059	048	047	053	068	088	084	076	071	050	034	024	022	040	025	029	069	048	025	028	041	061	131	052
27	101	107	120	193	149	195	170	159	048	048	041	028	050	047	050	043	057	077	092	106	104	094	105	158	098
28	115	101	066	038	044	073	115	112	126	055	030	030	032	060	057	030	037	051	104	096	077	089	096	065	071
29	039	045	050	043	046	034	029	039	035	048	091	214	256	151	097	155	286	328	206	184	206	083	079	183	122
30	179	109	039	117	165	074	085	062	074	052	056	035	026	059	057	051	050	041	058	062	046	068	050	055	070
MEAN	063	056	048	055	065	078	081	081	079	078	063	067	064	074	076	070	078	085	086	079	078	078	074	078	072
5Q MEAN	025	025	024	024	020	018	022	027	030	035	035	041	047	037	040	035	035	037	033	030	029	026	025	031	030
5D MEAN	069	074	062	082	091	134	127	144	132	147	080	053	072	127	180	192	184	155	171	118	083	081	089	097	114

Table 4. AL Indices

APRIL 1976 VALUES ARE EXPRESSED IN GAMMAS

	UT	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
D	01	-247	-705	-768	-1028	-509	-747	-340	-213	-353	-663	-482	-355	-651	-590	-398	-229	-360	-419	-406	-436	-437	-370	-204	-112	-459
	02	-187	-329	-216	-173	-112	-084	-115	-035	-035	-042	-037	-033	-029	-028	-037	-024	-019	-022	-011	-044	-114	-625	-392	-199	-123
D	03	-257	-109	-132	-167	-202	-494	-429	-452	-281	-036	-032	-026	-029	-138	-695	-871	-652	-387	-309	-368	-562	-534	-472	-335	-332
D	04	-123	-530	-381	-287	-072	-301	-352	-469	-285	-409	-080	-700	-458	-613	-529	-324	-247	-155	-120	-080	-109	-204	-474	-353	-319
D	05	-426	-306	-446	-602	-308	-499	-390	-206	-230	-255	-159	-159	-344	-423	-209	-120	-122	-289	-640	-355	-233	-145	-184	-215	-303
D	06	-314	-573	-390	-377	-232	-393	-202	-312	-332	-414	-128	-086	-101	-430	-477	-284	-231	-179	-396	-346	-059	-061	-114	-394	-284
	07	-397	-104	-112	-291	-098	-027	-036	-328	-526	-283	-138	-278	-192	-624	-157	-033	-069	-123	-180	-123	-201	-788	-577	-233	-247
	08	-513	-345	-148	-117	-229	-171	-010	-058	-079	-130	-189	-167	-073	-162	-132	-061	-031	-092	-122	-087	-346	-256	-250	-167	-164
	09	-157	-212	-393	-350	-129	-058	-007	-024	-015	-025	-025	-025	-032	-198	-405	-109	-167	-341	-328	-179	-229	-279	-145	-218	-169
	10	-318	-277	-205	-309	-135	-109	-105	-091	-038	-062	-156	-360	-282	-113	-026	-002	001	-004	-005	-006	-017	-015	-009	-023	-111
	11	-137	-174	-124	-069	-033	-022	-025	-025	-025	-026	-135	-357	-200	-158	-420	-046	-035	-012	-093	-007	-045	-344	-365	-049	-122
	12	-119	-086	-073	-088	-163	-188	-196	-189	-222	-103	-127	-216	-085	-023	-006	-002	-013	-021	-032	-042	-013	-078	-010	-012	-088
	13	-051	-385	-346	-148	-193	-081	-047	-023	-026	-044	-177	-087	-017	-005	-019	-043	-037	-112	-181	-357	-281	-174	-353	-177	-140
	14	-195	-145	-082	-108	-153	-303	-249	-121	-067	-043	-125	-105	-388	-237	-148	-145	-147	-348	-189	-066	-121	-444	-387	-133	-185
Q	15	-073	-055	-049	-019	-014	-018	-054	-034	-021	-025	-021	-039	-052	-020	-027	-050	-039	-025	-041	-053	-012	-015	-017	-042	-034
	16	-095	-078	-118	-259	-209	-047	-027	-022	-033	-024	-027	-025	-065	-029	-012	-007	-007	-037	-008	-011	-103	-168	-224	-191	-076
	17	-018	-016	-070	-154	-090	-131	-040	-026	-025	-030	-041	-030	-021	-024	-021	-016	-022	-070	-101	-205	-040	-005	-015	-014	-051
Q	18	-005	-012	-018	-023	-023	-026	-034	-033	-035	-032	-054	-043	-048	-036	-029	-007	-013	-045	-004	004	000	-006	-010	-010	-023
Q	19	-008	-013	-070	-077	-030	-023	-025	-031	-029	-027	-217	-188	-055	-030	-066	-086	-139	-235	-143	-025	003	-002	-009	-012	-064
Q	20	-010	-012	-012	-012	-008	-017	-022	-024	-022	-030	-025	-025	-023	-052	-037	-049	-004	-004	001	003	002	-001	-007	-010	-017
Q	21	-011	-016	-012	-017	-019	-028	-049	-034	-021	-021	-023	-171	-339	-157	-056	-122	-122	-026	-004	-001	003	-003	-005	-014	-053
	22	-013	-012	-030	-159	-202	-308	-308	-213	-213	-269	-240	-173	-142	-078	-023	-096	-266	-119	-048	-335	-245	-207	-344	-532	-191
	23	-368	-313	-171	-045	-075	-182	-120	-052	-025	-016	-007	-051	-039	-019	-016	-017	-034	-087	-103	010	008	001	-001	-006	-072
	24	-008	-011	-012	-011	-032	-303	-351	-353	-238	-175	-260	-085	-182	-358	-320	-056	-082	-198	-395	-237	-061	-159	-206	-164	-177
	25	-036	-024	-140	-063	-061	-132	-093	-023	-047	-040	-048	-023	-015	-018	-186	-291	-241	-197	-067	-056	-135	-269	-027	-008	-093
	26	-022	-121	-069	-058	-083	-091	-056	-058	-050	-062	-093	-060	-041	-011	-056	-068	-016	-029	-011	-011	-012	-019	-034	-107	-052
	27	-225	-150	-068	-170	-127	-238	-181	-077	-033	-028	-024	-026	-085	-063	-005	-012	-118	-093	-103	-058	-225	-134	-153	-308	-113
	28	-124	-059	-121	-154	-014	-016	-077	-188	-056	-025	-023	-022	-031	-053	-049	-062	-069	-060	-200	-228	-025	-131	-195	-016	-083
	29	-009	-016	-137	-179	-038	-016	-019	-022	-019	-027	-066	-386	-467	-294	-148	-154	-399	-618	-178	-141	-325	-430	-519	-297	-204
	30	-148	-118	-071	-125	-275	-239	-102	-060	-219	-162	-146	-085	-036	-145	-140	-058	-084	-050	-113	-192	-015	-016	-016	-029	-110
	MEAN	-154	-177	-166	-188	-129	-176	-135	-127	-120	-118	-110	-146	-151	-171	-162	-115	-126	-147	-151	-134	-132	-196	-191	-146	-149
5Q	MEAN	-021	-022	-032	-030	-019	-022	-037	-031	-026	-027	-068	-093	-103	-059	-043	-063	-063	-067	-038	-014	-001	-005	-010	-018	-038
5D	MEAN	-273	-445	-423	-492	-265	-487	-343	-330	-296	-355	-176	-265	-317	-439	-462	-366	-322	-286	-374	-317	-280	-263	-290	-282	-339

4. Tables of Observatories Supplying Hourly AU and AL

Table 5. Observatories Supplying Hourly AU Based on Mean Values

APRIL 1976 AU = MAXIMUM DELTA H

UT	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D 1	FC	CO	CO	CO	DI	TI	DI	CO	CO	AI	AI	AI	LR	LR	AI	LR	LR	LR	LR	LR	NAS	NAS	FC	FC
2	CO	CO	CO	CO	CO	CO	CO	CO	TI	FC	FC	FC	TI	DI	DI	DI	NAS	NAS	NAS	NAS	NAS	FC	FC	FC
D 3	CO	DI	CO	DI	CO	CO	TI	TI	TI	CO	LR	LR	LR	AI	AI	AI	LR	LR	NAS	NAS	LR	NAS	CO	CO
D 4	FC	CO	CO	CO	DI	CO	CO	DI	TI	DI	DI	DI	AI	AI	AI	AI	LR	NAS	LR	LR	FC	FC	FC	FC
D 5	CO	CO	CO	CO	CO	CO	TI	CO	TI	TI	TI	NAS	DI	AI	AI	DI	LR	NAS	NAS	NAS	FC	FC	FC	FC
D 6	CO	CO	CO	CO	DI	CO	TI	TI	TI	DI	TI	TI	TI	AI	LR	LR	LR	NAS	LR	NAS	FC	FC	FC	FC
7	FC	FC	CO	CO	DI	FC	CO	CO	DI	TI	TI	DI	DI	AI	LR	LR	NAS	LR	NAS	NAS	FC	FC	FC	FC
8	CO	FC	FC	CO	CO	CO	LR	CO	TI	TI	DI	TI	DI	AI	DI	DI	LR	NAS	NAS	NAS	NAS	FC	FC	FC
9	FC	FC	CO	CO	CO	LR	FC	CO	CO	CO	TI	TI	TI	DI	AI	LR	AI	LR	LR	NAS	FC	FC	FC	FC
10	FC	CO	CO	CO	CO	CO	CO	CO	CO	TI	DI	DI	DI	DI	DI	CO	NAS	CO	CO	FC	FC	FC	FC	FC
11	FC	FC	FC	FC	CO	FC	FC	CO	CO	CO	DI	DI	DI	DI	AI	LR	CO	NAS	NAS	NAS	NAS	FC	FC	FC
12	FC	FC	DI	CO	CO	CO	CO	TI	TI	TI	DI	DI	DI	DI	DI	DI	LR	NAS	NAS	NAS	NAS	NAS	FC	FC
13	FC	FC	CO	CO	CO	CO	LR	CO	TI	TI	TI	TI	CO	AI	DI	AI	AI	NAS	NAS	NAS	NAS	NAS	FC	FC
14	FC	FC	FC	BW	BW	BW	CO	TI	CO	TI	TI	DI	DI	DI	DI	AI	LR	LR	NAS	NAS	NAS	FC	FC	FC
Q15	FC	FC	FC	FC	FC	BW	BW	TI	BW	BW	BW	TI	TI	DI	DI	DI	AI	NAS	NAS	NAS	NAS	FC	FC	FC
16	FC	FC	FC	BW	BW	BW	BW	BW	BW	BW	BW	TI	DI	DI	DI	DI	CO	LR	LR	LR	NAS	NAS	FC	FC
17	DI	FC	FC	BW	BW	BW	BW	BW	BW	BW	BW	CO	TI	CO	CO	DI	LR	LR	LR	NAS	NAS	FC	FC	FC
Q18	FC	BW	FC	FC	FC	CO	BW	BW	BW	BW	CO	TI	TI	TI	TI	DI	TI	NAS	NAS	BW	BW	FC	FC	FC
Q19	FC	FC	FC	FC	BW	BW	BW	BW	BW	BW	TI	TI	TI	DI	DI	AI	AI	LR	NAS	BW	BW	DI	DI	DI
Q20	FC	FC	FC	FC	FC	BW	BW	BW	BW	BW	BW	TI	BW	DI	DI	DI	CO	BW	BW	BW	FC	FC	FC	FC
Q21	FC	FC	FC	FC	FC	FC	BW	BW	BW	BW	BW	DI	DI	DI	DI	DI	AI	AI	BW	BW	BW	FC	FC	FC
22	FC	FC	FC	BW	BW	CO	CO	TI	TI	TI	TI	TI	DI	AI	LR	LR	LR	NAS	NAS	NAS	NAS	FC	FC	FC
23	FC	BW	FC	BW	BW	BW	BW	BW	BW	CO	TI	TI	TI	FC	FC	LR	LR	AI	LR	NAS	BW	DI	NAS	NAS
24	FC	FC	FC	FC	BW	CO	CO	CO	TI	TI	DI	TI	TI	AI	LR	LR	LR	LR	NAS	NAS	NAS	FC	FC	FC
25	FC	FC	DI	DI	BW	BW	BW	BW	BW	BW	BW	BW	TI	DI	DI	LR	LR	LR	LR	NAS	NAS	FC	NAS	DI
26	FC	FC	FC	BW	BW	BW	BW	BW	TI	TI	TI	TI	TI	TI	DI	NAS	NAS	NAS	NAS	NAS	NAS	FC	FC	NAS	FC
27	FC	FC	BW	BW	BW	BW	BW	BW	BW	TI	TI	TI	TI	DI	DI	LR	LR	NAS	LR	LR	NAS	NAS	FC	FC
28	FC	FC	BW	BW	BW	BW	BW	CO	CO	CO	TI	TI	TI	DI	DI	TI	NAS	NAS	NAS	NAS	NAS	FC	FC	NAS
29	FC	FC	BW	BW	BW	FC	FC	BW	BW	BW	TI	DI	DI	DI	DI	AI	AI	LR	LR	NAS	FC	FC	FC	FC
30	FC	FC	DI	BW	BW	BW	BW	BW	TI	TI	DI	TI	DI	DI	AI	LR	NAS	NAS	LR	LR	NAS	FC	NAS	FC

IDENTIFICATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG	GEOMAGNETIC LAT	GEOMAGNETIC LONG
* AI = ABISKO	68 21.5	18 49.4	66.0	114.9
* BW = BARROW	71 18.2	-156 44.9	68.5	241.1
CC = C.CHELYUSKIN	77 43.0	104 17.0	66.2	176.4
* CO = COLLEGE	64 51.6	-147 50.2	64.6	256.5
GWR= GREAT WHALE R.	55 16.0	-77 47.0	66.5	347.4
* DI = DIXON ISLAND	73 32.6	80 33.7	63.0	161.5
* FC = FT.CHURCHILL	58 48.0	-94 06.0	68.7	322.8
* LR = LEIRVOGUR	64 11.0	-21 42.0	70.2	71.0
* NAS= NARSSARSSUAQ	61 06.0	-45 12.0	71.0	37.0
* TI = TIXIE BAY	71 35.0	129 00.0	60.4	191.4
UE = CAPE WELLEN	66 09.8	-169 50.1	61.7	237.0

* The eight observatories providing data for this report. Remaining stations will be added as their records become available in time for processing.

Table 6. Observatories Supplying Hourly AL Based on Mean Values

APRIL 1976 AL = MINIMUM DELTA H

UT	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D 1	LR	AI	AI	AI	AI	LR	NAS	TI	TI	FC	FC	DI	DI	FC	FC	FC	TI	TI	TI	TI	TI	TI	DI	AI
2	AI	AI	AI	LR	LR	NAS	FC	NAS	AI	AI	AI	AI	NAS	NAS	FC	FC	TI	CO	TI	TI	TI	DI	DI	AI
D 3	AI	AI	LR	LR	LR	LR	LR	NAS	NAS	NAS	DI	DI	DI	FC	CO	CO	CG	CO	TI	TI	TI	TI	TI	DI
D 4	AI	AI	LR	FC	NAS	NAS	FC	NAS	NAS	CO	FC	CO	CO	CO	CO	CO	TI	TI	TI	TI	DI	AI	AI	AI
D 5	AI	AI	LR	LR	LR	NAS	NAS	NAS	NAS	FC	FC	CO	CO	CO	CO	TI	TI	TI	TI	TI	TI	DI	AI	AI
D 6	AI	LR	LR	LR	NAS	NAS	NAS	NAS	NAS	CO	CO	FC	CO	CO	CO	CO	CO	TI	TI	DI	DI	AI	DI	'R
7	LR	LR	LR	FC	NAS	NAS	NAS	NAS	FC	NAS	NAS	CO	CO	CO	CO	TI	TI	TI	TI	DI	AI	DI	AI	AI
8	LR	LR	LR	LR	FC	FC	NAS	FC	NAS	FC	FC	FC	CO	CO	CO	CO	TI	TI	DI	DI	DI	DI	AI	AI
9	LR	LR	NAS	NAS	NAS	NAS	DI	DI	DI	DI	AI	AI	NAS	CO	CO	CO	DI	TI	TI	TI	AI	DI	AI	AI
10	AI	AI	LR	LR	LR	NAS	NAS	NAS	NAS	CO	CO	CO	CO	CO	TI	TI	TI	TI	DI	DI	DI	DI	CO	DI
11	LR	LR	LR	NAS	DI	DI	DI	DI	DI	AI	CO	CO	FC	FC	TI	TI	TI	TI	DI	TI	AI	DI	DI	AI
12	LR	LR	NAS	NAS	FC	FC	NAS	NAS	FC	FC	CO	CO	FC	FC	FC	TI	TI	DI	DI	DI	DI	DI	TI	TI
13	LR	LR	LR	NAS	FC	NAS	FC	DI	AI	FC	CO	CO	FC	FC	FC	TI	DI	DI	DI	DI	DI	AI	AI	LR
14	LR	LR	NAS	NAS	NAS	FC	NAS	CO	FC	BW	BW	FC	CO	BW	BW	TI	BW	TI	DI	DI	DI	DI	DI	LR
Q15	LR	NAS	NAS	TI	TI	DI	FC	DI	DI	AI	AI	LR	FC	LR	LR	BW	BW	DI	DI	DI	DI	CO	CO	LR
16	LR	LR	NAS	NAS	NAS	NAS	DI	DI	FC	AI	AI	AI	FC	FC	BW	FC	BW	BW	DI	DI	DI	DI	AI	LR
17	LR	NAS	NAS	NAS	NAS	NAS	DI	DI	AI	AI	FC	AI	AI	NAS	NAS	BW	BW	BW	BW	DI	DI	CO	CO	CO
Q18	TI	TI	TI	TI	TI	DI	DI	DI	DI	AI	AI	AI	BW	BW	BW	BW	DI	DI	DI	CO	CO	CO	CO	CO
Q19	TI	TI	NAS	NAS	NAS	DI	DI	DI	DI	AI	FC	FC	FC	BW	BW	BW	TI	DI	DI	DI	CO	CO	CO	CO
Q20	CO	TI	TI	TI	DI	DI	DI	DI	DI	AI	LR	AI	LR	BW	BW	BW	NAS	DI	DI	DI	TI	CO	CO	CO
Q21	CO	NAS	TI	TI	TI	DI	DI	DI	DI	AI	LR	CO	FC	FC	CO	BW	BW	BW	DI	DI	TI	CO	CO	CO
22	CO	TI	TI	NAS	NAS	NAS	NAS	NAS	NAS	CO	CO	FC	CO	TI	TI	TI	DI	DI	DI	DI	DI	AI	AI	AI
23	AI	LR	LR	NAS	LR	NAS	NAS	NAS	NAS	FC	AI	FC	BW	AI	BW	BW	BW	TI	DI	CO	CO	CO	CO	CO
24	CO	TI	TI	TI	NAS	LR	NAS	NAS	NAS	CO	CO	FC	CO	CO	CO	BW	BW	BW	TI	DI	DI	DI	DI	AI
25	AI	AI	NAS	NAS	NAS	NAS	FC	DI	FC	FC	FC	AI	BW	FC	BW	BW	BW	BW	BW	DI	DI	AI	AI	TI
26	TI	LR	NAS	NAS	FC	NAS	NAS	NAS	NAS	FC	FC	FC	FC	FC	BW	BW	BW	BW	TI	DI	CO	DI	DI	DI
27	AI	LR	LR	LR	LR	NAS	NAS	NAS	DI	AI	AI	AI	CO	CO	FC	FC	TI	BW	BW	TI	DI	DI	AI	AI
28	LR	LR	LR	NAS	NAS	DI	NAS	NAS	FC	AI	AI	LR	FC	FC	FC	BW	BW	TI	DI	DI	TI	AI	AI	AI
29	TI	TI	NAS	NAS	NAS	DI	DI	DI	AI	NAS	NAS	FC	FC	FC	BW	BW	CO	BW	BW	TI	TI	DI	AI	AI
30	AI	LR	LR	LR	LR	NAS	NAS	NAS	FC	FC	BW	BW	FC	BW	BW	BW	BW	DI	DI	DI	DI	TI	TI	LR

IDENTIFICATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG	GEOMAGNETIC LAT	GEOMAGNETIC LONG
* AI = ABISKO	68 21.5	18 49.4	66.0	114.9
* BW = BARROW	71 18.2	-156 44.9	68.5	241.1
CC = C.CHELYUSKIN	77 43.0	104 17.0	66.2	176.4
* CO = COLLEGE	64 51.6	-147 50.2	64.6	256.5
GWR= GREAT WHALE R.	55 16.0	-77 47.0	66.5	347.4
* DI = DIXON ISLAND	73 32.6	80 33.7	63.0	161.5

IDENTIFICATION	GEOGRAPHIC LAT	GEOGRAPHIC LONG	GEOMAGNETIC LAT	GEOMAGNETIC LONG
* FC = FT.CHURCHILL	58 48.0	-94 06.0	68.7	322.8
* LR = LEIRVOGUR	64 11.0	-21 42.0	70.2	71.0
* NAS= NARSSARSSUAQ	61 06.0	-45 12.0	71.0	37.0
* TI = TIXIE BAY	71 35.0	129 00.0	60.4	191.4
UE = CAPE WELLEN	66 09.8	-169 50.1	61.7	237.0

* The eight observatories providing data for this report. Remaining stations will be added as their records become available in time for processing.

Table 7. Station Frequency of AU and AL Contribution.

APRIL 1976

STA	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
AU- LR	9	4	8	24	11	31	89	37	13	30	51	47	82	91	293	625	766	731	613	352	214	67	28	11
AL- LR	643	824	731	484	374	150	79	27	14	58	116	115	139	128	40	9	0	5	2	0	1	12	76	267
AU- NAS	54	6	0	6	2	3	14	4	4	9	32	51	6	10	30	187	383	688	811	1013	871	465	296	139
AL- NAS	60	222	549	816	812	871	798	729	551	227	126	5	93	96	100	57	28	4	13	14	20	0	12	23
AU- FC	1359	1214	850	530	397	315	218	150	30	82	89	75	84	50	57	15	7	4	61	166	486	1125	1287	1469
AL- FC	0	0	28	155	196	301	328	266	407	388	526	687	625	503	357	229	175	65	44	42	0	0	0	0
AU- CO	200	364	505	552	422	528	458	454	539	375	252	144	102	136	91	118	148	52	37	1	1	13	51	27
AL- CO	228	30	0	0	0	3	20	54	38	294	424	440	520	569	484	345	124	75	35	122	254	372	410	353
AU- BW	43	96	232	527	709	687	720	660	562	494	324	182	68	29	14	5	13	79	132	237	220	45	27	30
AL- BW	30	0	0	1	0	2	6	12	34	86	129	109	204	352	588	707	581	455	172	29	8	22	28	26
AU- TI	0	0	0	12	44	115	192	377	546	572	639	734	669	215	90	73	15	2	9	0	0	0	0	0
AL- TI	242	405	342	283	198	7	19	16	48	5	1	17	5	48	178	386	502	587	595	489	483	248	199	171
AU- DI	135	116	205	112	176	56	102	109	92	196	332	493	690	879	875	530	138	6	14	4	8	79	111	124
AL- DI	10	17	24	16	167	458	516	623	373	136	35	55	77	42	27	60	286	599	920	1014	824	723	434	235
AU- AI	0	0	0	37	39	65	7	9	14	42	81	74	99	390	350	247	330	238	123	27	0	6	0	0
AL- AI	587	302	126	45	53	8	34	73	335	606	443	372	137	62	26	7	4	10	19	90	210	423	641	725

Table 8. Monthly Quiet-Time H Reference Values.

Station	April 1976
LR	12334 gammas
NAS	11950
FC	7335
CO	13041
BW	9842
TI	7947
DI	6493
AI	11825

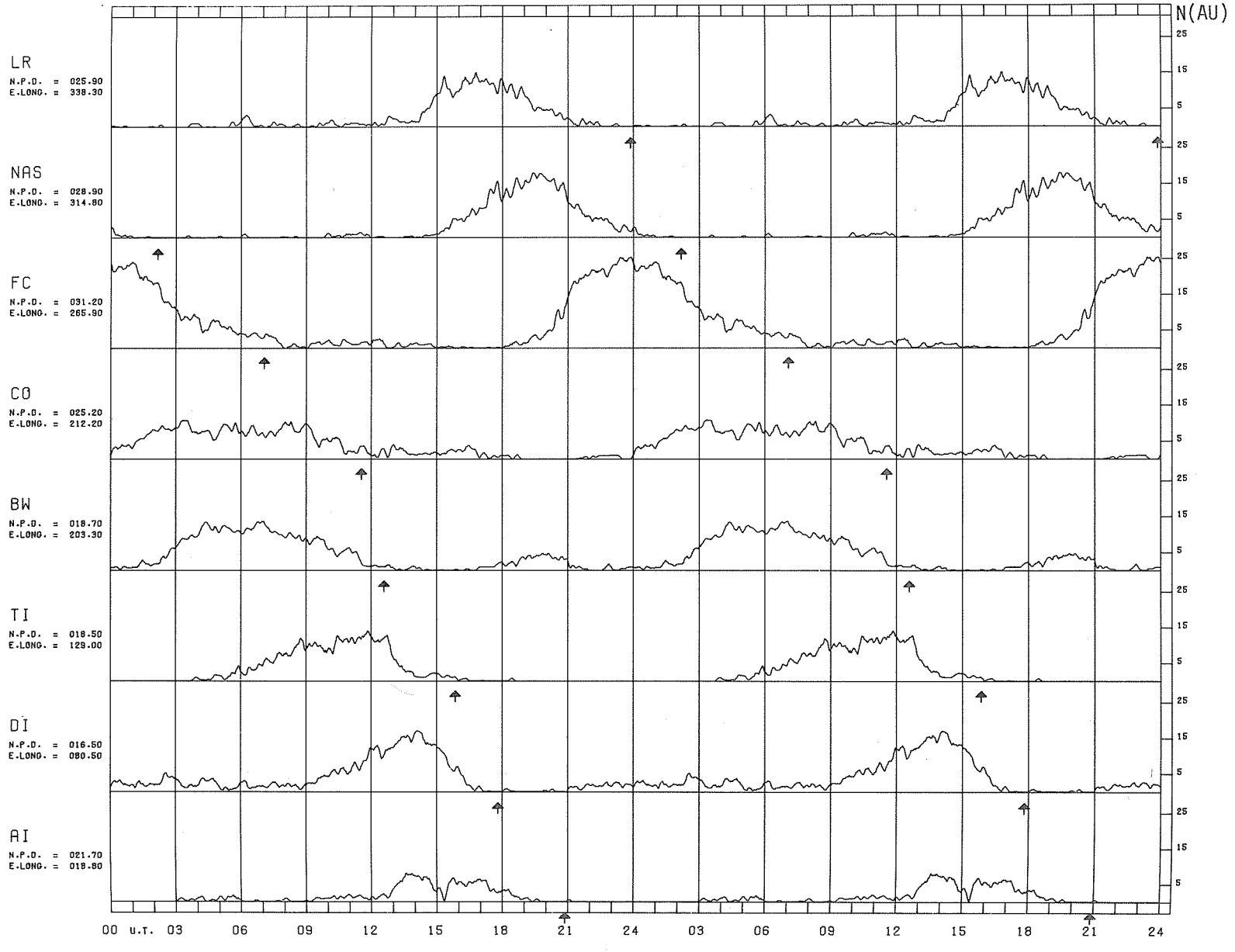


Figure 2. Frequency of 1-min AU provision by station for April 1976. For each station an arrow marks the UT time of Local Geomagnetic Midnight.

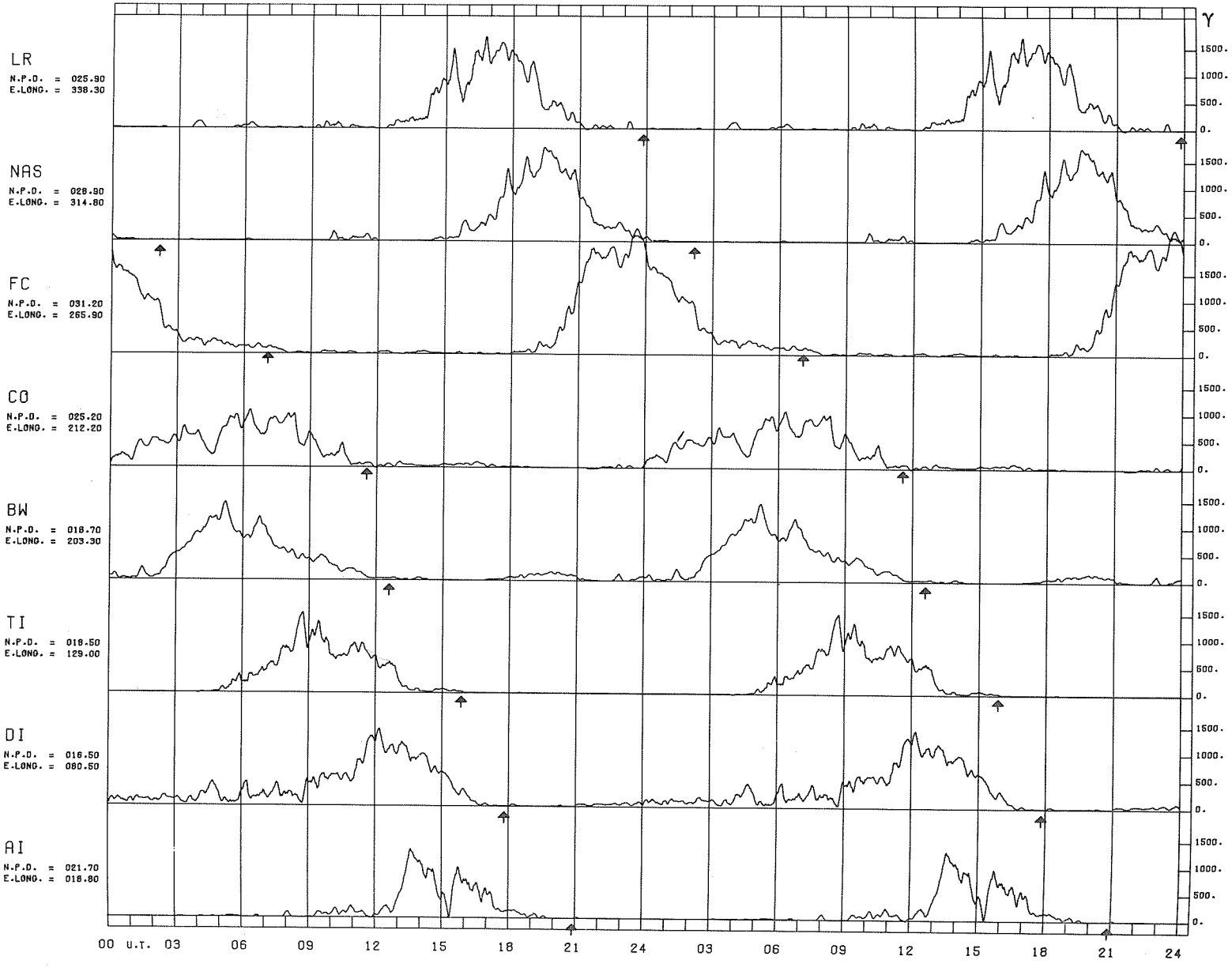


Figure 3. Total amplitude of most positive H variations for April 1976. For each station an arrow marks the UT time of Local Geomagnetic Midnight.

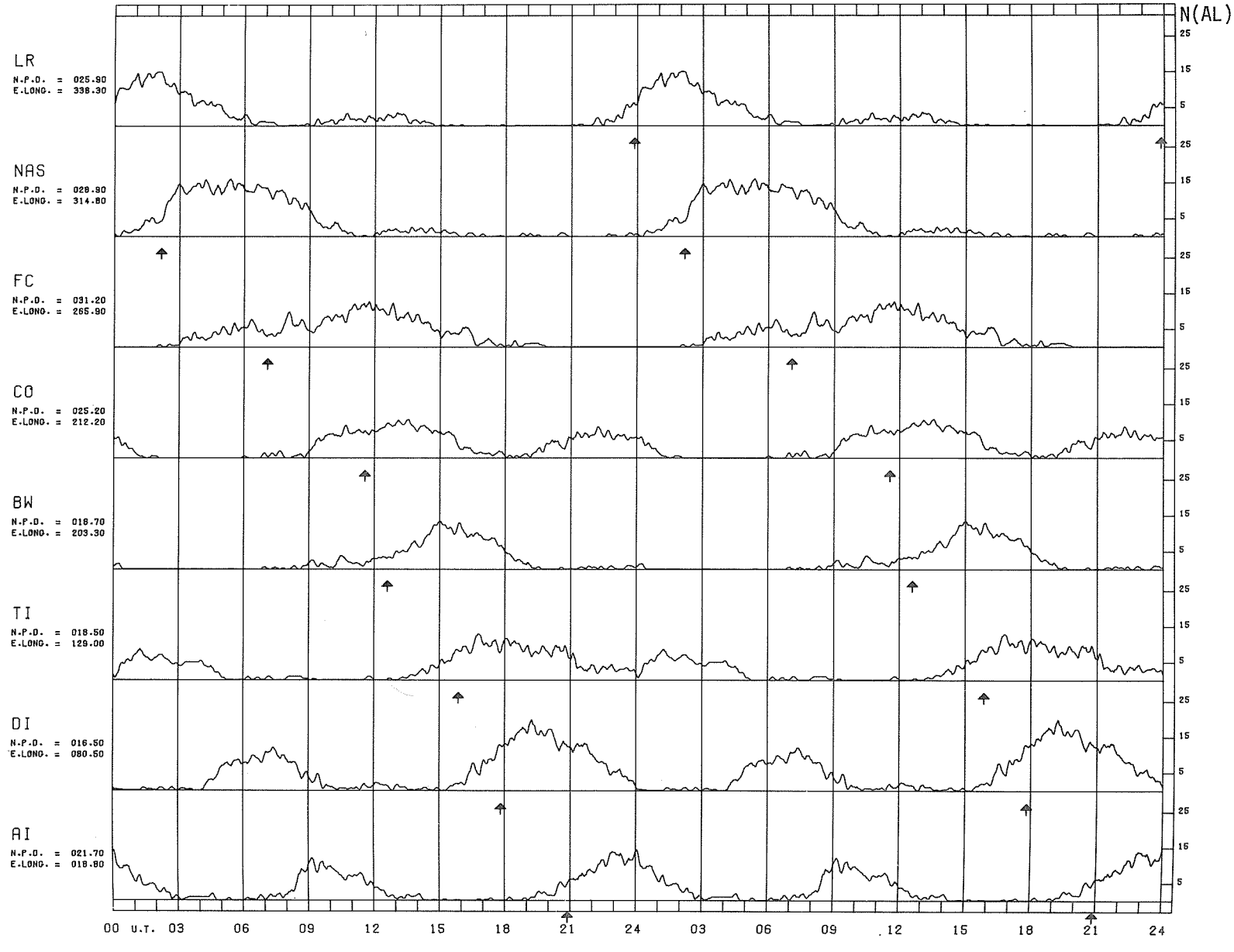


Figure 4. Frequency of 1-min AL provision by station for April 1976. For each station an arrow marks the UT time of Local Geomagnetic Midnight.

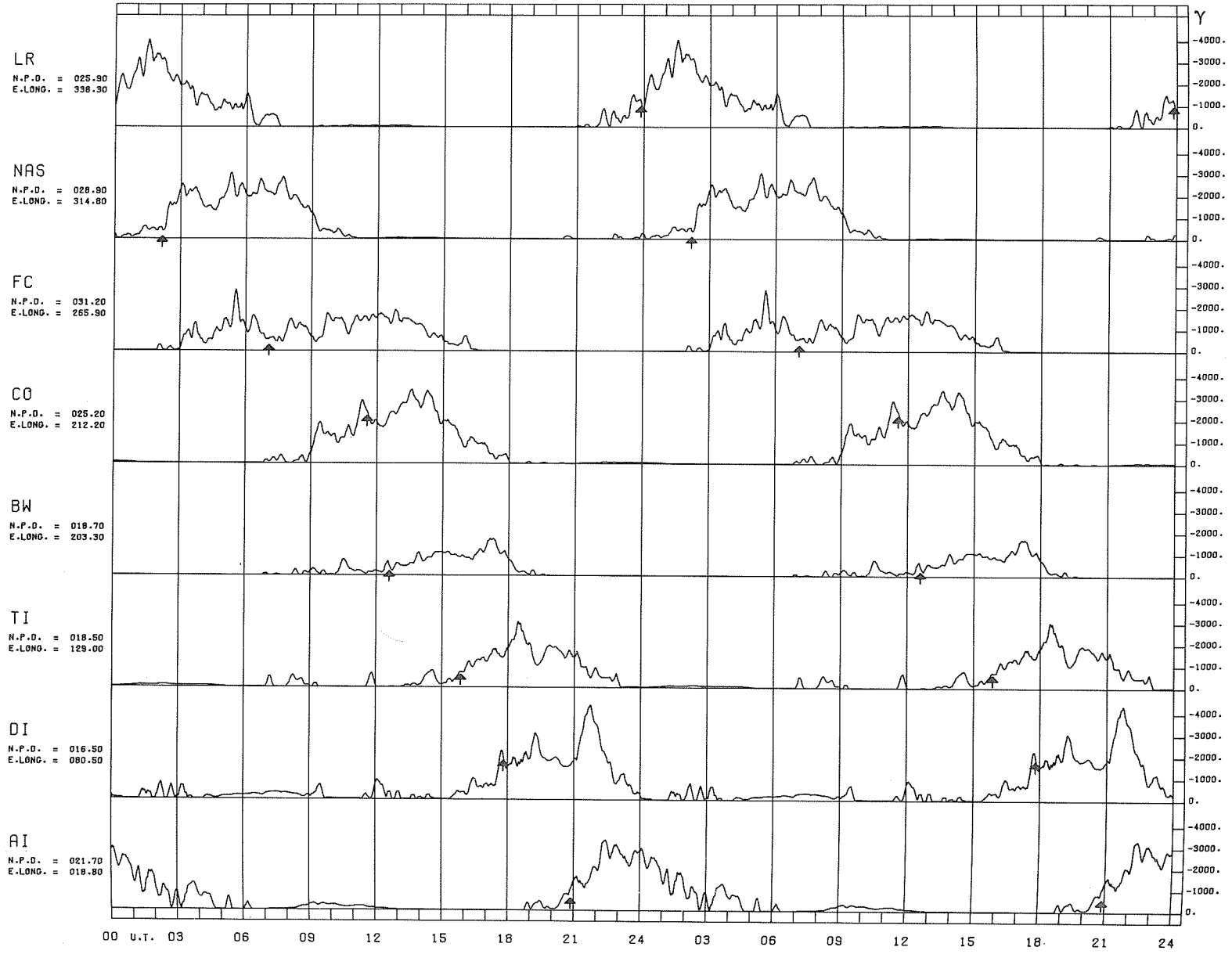


Figure 5. Total amplitude of most negative H variations for April 1976. For each station an arrow marks the UT time of Local Geomagnetic Midnight.

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UAG-30 "Catalogue of Data on Solar-Terrestrial Physics", price $1.75.

UAG-31 "Auroral Electrojet Magnetic Activity Indices AE (11) for 1969", price 75 cents.
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