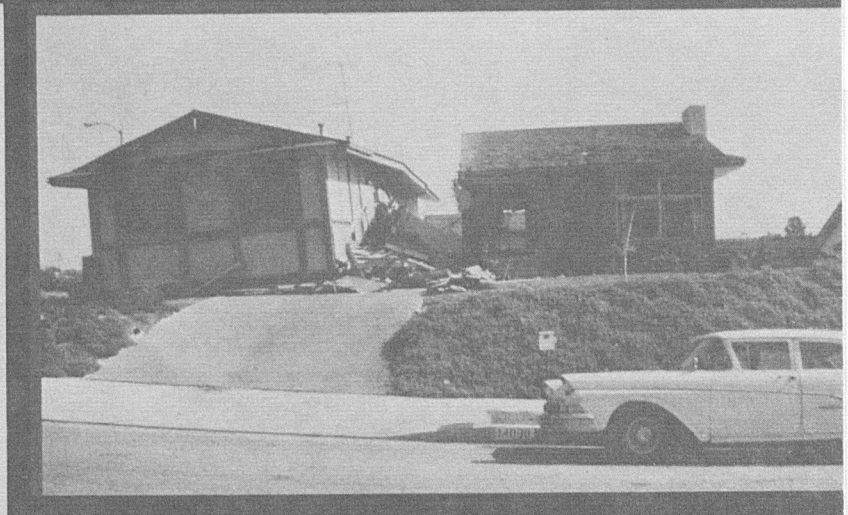
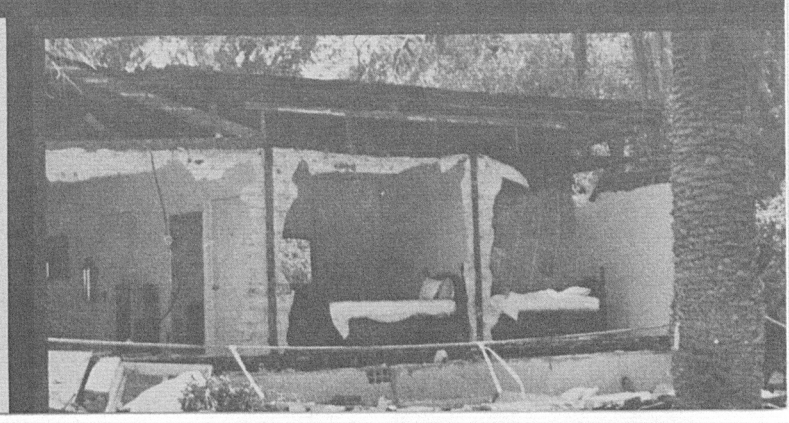
EARTHQUAKE DATA SERVICES AND PUBLICATIONS (including Tsunami)

Key to Geophysical Records
Documentation No. 15 (REVISED)





U.S. DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE

NATIONAL GEOPHYSICAL DATA CENTER / WORLD DATA CENTER A
BOULDER, COLORADO

1983

KGRD CATALOG SERIES

Listed below are catalogs published in the Key to Geophysical Records Documentation (KGRD) series. Those without an asterisk (*) may be obtained from the National Geophysical Data Center, NOAA, Code E/GC1, 325 Broadway, Boulder, Colorado, USA, 80303; if preceded by an asterisk, from the National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia, USA, 22161.

KGRD No. 1, Marine Geophysical Data Catalog (superseded by KGRD No. 4).

*KGRD No. 2, Catalog of Strong-Motion Seismograph Stations and Records (NTIS No. COM-74-10714).

KGRD No. 3, Catalog of Earthquake Photographs (superseded by KGRD No. 7).

KGRD No. 4, Marine Geophysical Data Catalog--1975 (superseded by KGRD No. 11).

*KGRD No. 5, Earthquake Data File Summary (NTIS No. PB-265445).

*KGRD No. 6, Bibliography and Index to Literature on Manganese Nodules (1874-1975) (NTIS No. PB-257218).

KGRD No. 7, Catalog of Earthquake Photographs (superseded by KGRD No. 20).

*KGRD No. 8, Catalog of Digital Bathymetric Data for the United States Coastal Regions (NTIS No. PB81 133258).

KGRD No. 9, Catalog of Seismogram Archives.

KGRD No. 10, The Marine Geophysical Data Exchange Format--"MGD77".

KGRD No. 11, Summary of Digital Marine Geophysical Data Holdings (Bathymetric, Magnetic, and Gravimetric Data).

KGRD No. 12, Thermal Springs List for the United States.

KGRD No. 13, Catalog of Tsunami Photographs (superseded by KGRD No. 20).

KGRD No. 14, Marine Geology and Geophysics Data Services and Publications.

KGRD No. 15, Earthquake Data Services and Publications (including Tsunami).

KGRD No. 16, Catalog of Geological and Geophysical Data for the National Petroleum Reserve in Alaska.

KGRD No. 17, Terrestrial Geophysics Data Services and Publications.

KGRD No. 18, U.S. Land Gravity.

KGRD No. 19, Summary of Earthquake Intensity File.

KGRD No. 20, Natural Hazards Photograph Catalog.

Cover photos: Damage from February 9, 1971, San Fernando, California earthquake.

(top) Olive View Hospital, medical treatment and care unit. View of north side, looking east, from first-floor level. Floor slope is result of collapsed columns below and is emphasized by walkway canopy in background.

(middle) Left section of this dwelling was originally two stories (over garage) and attached to one-story section on right.

(bottom) Veterans Administration Hospital, unit 28, west elevation.

U.S. DEPARTMENT OF COMMERCE
Malcolm Baldrige, Secretary

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
John V. Byrne, Administrator

NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE
John H. McElroy, Assistant Administrator

EARTHQUAKE
DATA SERVICES AND PUBLICATIONS (including Tsunami)

Key to Geophysical Records Documentation No. 15 (REVISED)

National Geophysical Data Center
World Data Center A for Solid Earth Geophysics
Boulder, Colorado
1983

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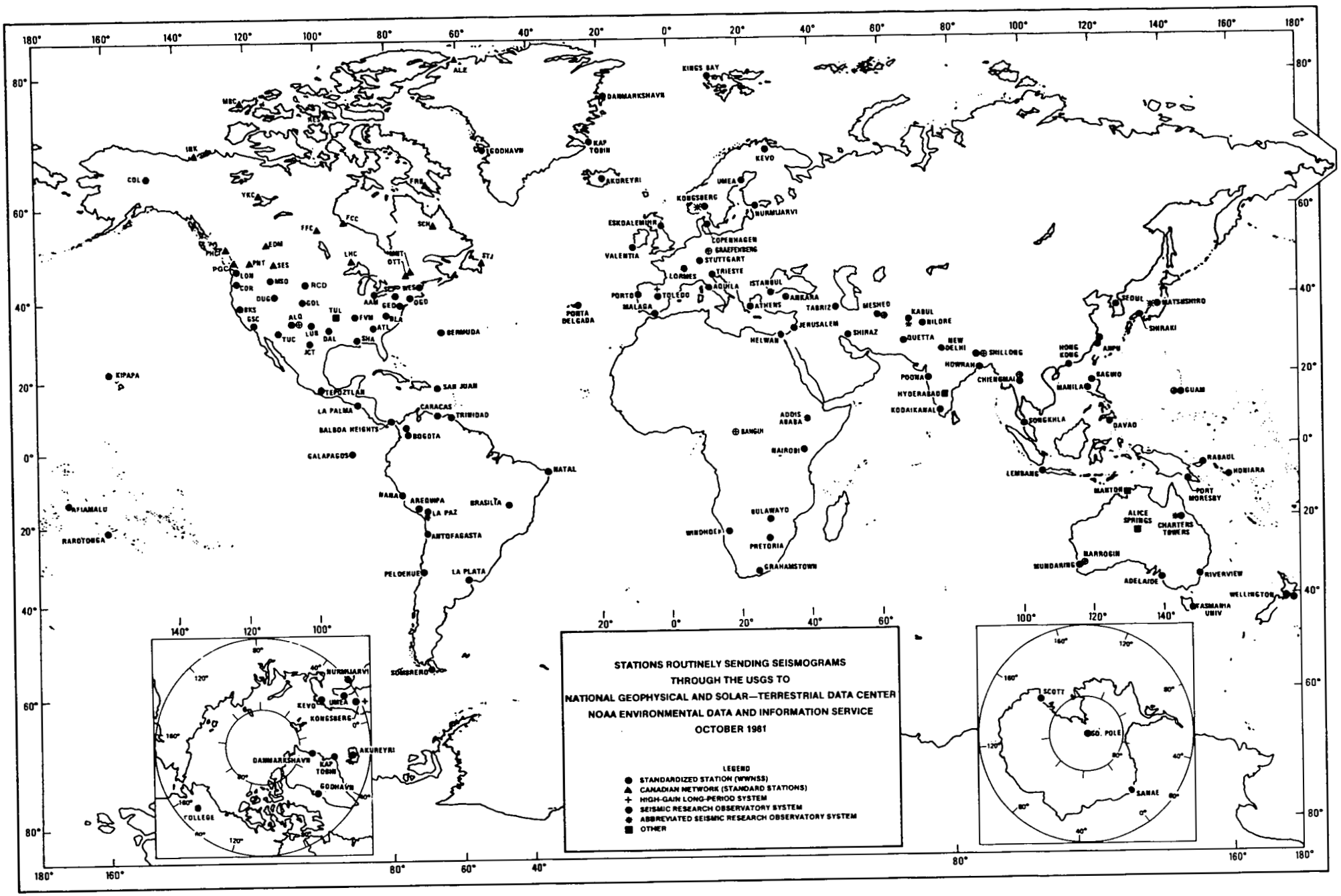

STATIONS ROUTINELY SENDING SEISMOGRAMS
THROUGH THE USGS TO
NATIONAL GEOPHYSICAL AND SOLAR—TERRESTRIAL DATA CENTER
NOAA ENVIRONMENTAL DATA AND INFORMATION SERVICE
OCTOBER 1981
LEGEND
STANDARDIZED STATION (WWNSS)
CANADIAN NETWORK (STANDARD STATIONS)
HIGH-GAIN LONG-PERIOD SYSTEM
SEISMIC RESEARCH OBSERVATORY SYSTEM
ABBREVIATED SEISMIC RESEARCH OBSERVATORY SYSTEM
OTHER
ALE
KIRUNA
DANMARKSHAVN
KAP TOBIN
GODHAVN
KEVO
AKUREYRI
UMEA
KONGSBERG
NURMIJARVI
ESKDALEMUIR
COPENHAGEN
GRAEFENBERG
STUTTGART
VALENTIA
TRIESTE
LORMES
AQUILA
ISTANBUL
ANKARA
TABRIZ
MESHED
PORTO
TOLEDO
MALAGA
ATHENS
PONTA DELGADA
JERUSALEM
HELWAN
SHIRAZ
KABUL
QUETTA
NEW DELHI
SHILLONG
HOWRAH
POONA
HYDERABAD
KODAIKANAL
CHIENGMAI
HONG KONG
MANILA
BAGUIO
GUAM
SEOUL
MATSUSHIRO
SHIRAKI
ADDIS ABABA
BANGUI
NAIROBI
BULAWAYO
WINDHOEK
PRETORIA
GRAHAMSTOWN
SORONGKLA
DAVAO
LEMBANG
MANTOK
RABAUL
HONIARA
PORT MORESBY
ALICE SPRINGS
CHARTERS TOWERS
BARROGIN
MUNDARING
ADELAIDE
RIVERVIEW
WELLINGTON
TASMANIA UNIV
BERMUDA
SAN JUAN
CARACAS
TRINIDAD
LA PALMA
BALBOA HEIGHTS
BOGOTA
GALAPAGOS
NATAL
BRASILIA
NANA
AREQUIPA
LA PAZ
ANTOFAGASTA
PELDEHUE
LA PLATA
SOMBRERO
KIPAPA
RAROTONGA
APIAMALU
COL
IBK
YKC
FBK
FCC
FFC
SCH
EDM
PNT
SES
LHC
OTT
STJ
POC
LON
COR
MSO
RCD
DUG
GOL
BRS
GSC
ALQ
LUB
TUC
DAL
JCT
TUL
FVN
BLA
ATL
SHA
AAM
GED
OGD
WES
COLLEGE
SCOTT
SCO. POLE
SANAE

INTRODUCTION

The National Environmental Satellite, Data, and Information Service (NESDIS) has the role of collecting, managing, and disseminating the great mass of information produced by the scientific observation of interplanetary space and the physical world. Data activities in seismology, gravity, geomagnetism, marine geology and geophysics, geothermics, and solar-terrestrial physics are directed by NESDIS' National Geophysical Data Center (NGDC) in Boulder, Colo. NGDC also operates World Data Centers (WDC-A) for Marine Geology and Geophysics, for Solar-Terrestrial Physics, for Solid Earth Geophysics, and for Glaciology under the auspices of the National Academy of Sciences. This catalog briefly describes the products and services in seismology.

NGDC is a focal point for disseminating historical earthquake data and information to both technical and general users. Information on recently occurring earthquakes, however, is initially disseminated by the U.S. Geological Survey (USGS) in Golden, Colo., which operates the National Earthquake Information Service--a service for rapid location of, and for gathering data about, earthquakes. This information is then released to NGDC for further dissemination. From this data NGDC prepares seismic histories of local and regional areas; answers public inquiries on all aspects of historical earthquakes; publishes historical compilations and annual earthquake summaries (jointly with USGS); and makes available seismograms, strong-motion earthquake records, computer listings of earthquake locations, and other data in many formats.

The following sections describe seismology products and services available from NGDC. Copies of primary data and data products are available at the cost of copying or on an exchange basis. Forward requests for information on prices and services to: National Geophysical Data Center, NOAA, Code E/GC1, 325 Broadway, Boulder, CO 80303; or call one of the "Key Contacts" listed inside backcover.

Slumping due to soil liquefaction during March 27, 1964, earthquake in Anchorage Alaska.

DATA SERVICES

Routine earthquake data services provided by NGDC include searches or magnetic tape copies of the Intensity and Epicenter Files, copies of seismograms and strong-motion records, photographs of earthquake and tsunami damage, and copies of intensity and seismicity maps. Brief descriptions are given of each data set and of the general formats in which the data are available. For magnetic tapes please specify 7- or 9-track mode and 556, 800, or 1,600 bpi density.

Earthquake Data File

The Earthquake Data File contains locations of almost 500,000 earthquakes, known or suspected explosions and associated collapse phenomena, coal bumps, rockbursts, quarry blasts, and other earth disturbances recorded worldwide. The file has been formed from data furnished by the U.S. Geological Survey (earlier Coast and Geodetic Survey and NOAA), California Institute of Technology (Pasadena), University of California (Berkeley), and about 20 other sources worldwide, which includes the Canadian Earth Physics Branch, the Institute of Physics of the Earth of USSR, and the Earthquake Research Institute of Japan. Large historical earthquakes are included for earlier years (about 2100 B.C. to A.D. 1897). The file can be provided in the following formats:

- Computer listings of file search (see example below) by any combination of the following parameters:
  1. Geographic coordinates (e.g., events at specific point or within radius of point)
  2. Time period (e.g., 1930-40)
  3. Date and time of occurrence
  4. Modified Mercalli intensity
  5. Depth
  6. Magnitude range
- Magnetic tape or microfilm (16-mm) in:
  1. Chronological sort
  2. Geographical sort (9-track, 1,600 bpi ASCII or EBCDIC only).
- Computer-drawn plots (on mylar)
- Page-size plots
- Punched cards
  1. By monthly subscription
  2. Yearly (all data in one shipment)

Significant Earthquakes Data File

This file includes information on about 2,500 earthquakes (recorded in 114 scientific or scholarly sources) that meet one or more of these criteria: $1 million (1979 dollars) or more damage, at least 10 deaths, magnitude 7.5 or greater, or Modified Mercalli intensity X or greater. Given for each earthquake are date and time of occurrence, latitude and longitude, depth, magnitude, number of casualties, damage, references, and political geography. This file is available in publication format as "Catalog of Significant Earthquakes, 2,000 B. C.-A. D. 1979," Report SE-27, 1981. It is also available on magnetic tape in either ASCII or EBCDIC format.

Earthquake Intensity File

This file contains about 140,000 earthquake intensity observations (from 1638) gathered from many sources. Each listing contains date, time, and location of earthquake; name of reporting towns and their geographic locations; and Modified Mercalli intensity at each town. The file can be furnished in the following formats:

- Computer listings of file search by any combination of the following parameters:
  1. Geographic coordinates (e.g., events at specific point or radius about point)
  2. Time period (e.g., 1930-40)
  3. Date and time of occurrence
  4. Modified Mercalli intensity
  5. City or State
- Magnetic tape
- Microfilm (16-mm); raw data (felt and not-felt reports, newspaper clippings, and others)

EARTHQUAKE DATA FILE

TEST SEARCH — 50-KM RADIUS OF BOULDER, CO, 40.03N, 105.29W, MAGNITUDE 4.0+ — 81/09/18 08.28.24

SOURCE	YEAR	MO	DA	HR	MN	SEC	LAT	LONG	DEPTH (KM)	MAGNITUDES BODY	MAGNITUDES SURF	MAGNITUDES OTHER	MAGNITUDES LOCAL	INT MAX	PHENOM DTSVNO	RN	CE	Q/S	DIST (KM)
CGS	1965	02	16	20	17	53.5	39.900N	105.100W	005	4.60MB				IV		479	F	006	22
USE	1970	05	23	08	55	09.4	39.900N	105.100W	005G	4.10MB			3.20ML GOL	V		479	F	007	22
CGS	1965	02	16	22	21	43.7	39.900N	105.000W	005	4.90MB				VI		479	D	006	29
CGS	1965	09	29	18	59	56.1	39.800N	105.100W	005	4.70MB				VI		479	D	011	30
CGS	1967	04	10	20	11	14.6	39.858N	104.913W	005G	4.80MB				III		479	F	006	37
CGS	1965	11	21	05	00	27.3	39.800N	104.900W	005	4.70MB						479	F	007	42
CGS	1967	04	10	23	58	40.8	39.923N	104.791W	005G	4.30MB						479	F	010	44

Seismograms from Global Seismograph Networks

Analog seismograms are available from the 105-station Worldwide Network of Standard Seismographs (WWNSS) as well as high-gain long-period (HGLP) stations; the 12-station Seismic Research Observatory network (SRO); the 5-station Abbreviated Seismic Research Observatory (ASRO) network; and from most of the 17-standard-station Canadian Seismograph Network (CSN) (see map, p. iv). They are copied using special high-resolution cameras that accurately preserve scale. Basic calibration information and other documentation are provided. WWNSS and CSN stations produce three components each from long- and short-period seismographs daily; HGLP stations also produce three components each of long-period data recorded at two different gain levels; SRO stations produce three components of long-period data and event-detected vertical component short-period data; ASRO stations produce six components of long-period data and one component of vertical short-period data. Most data are photographed within several months of observation. Network-Day digital data (usually for 15 or more stations) can now be provided from March 1977 for the HGLP, SRO, ASRO, and several WWNSS stations (see map below). Data are available in the following formats:

- Microfiche
- 70-mm film chips
- 35-mm microfilm
- Magnetic tape (only Network-Day digital data from March 1977; digital data for earlier periods are available from Seismic Data Analysis Center, 312 Montgomery St., Alexandria, VA, 22714.)

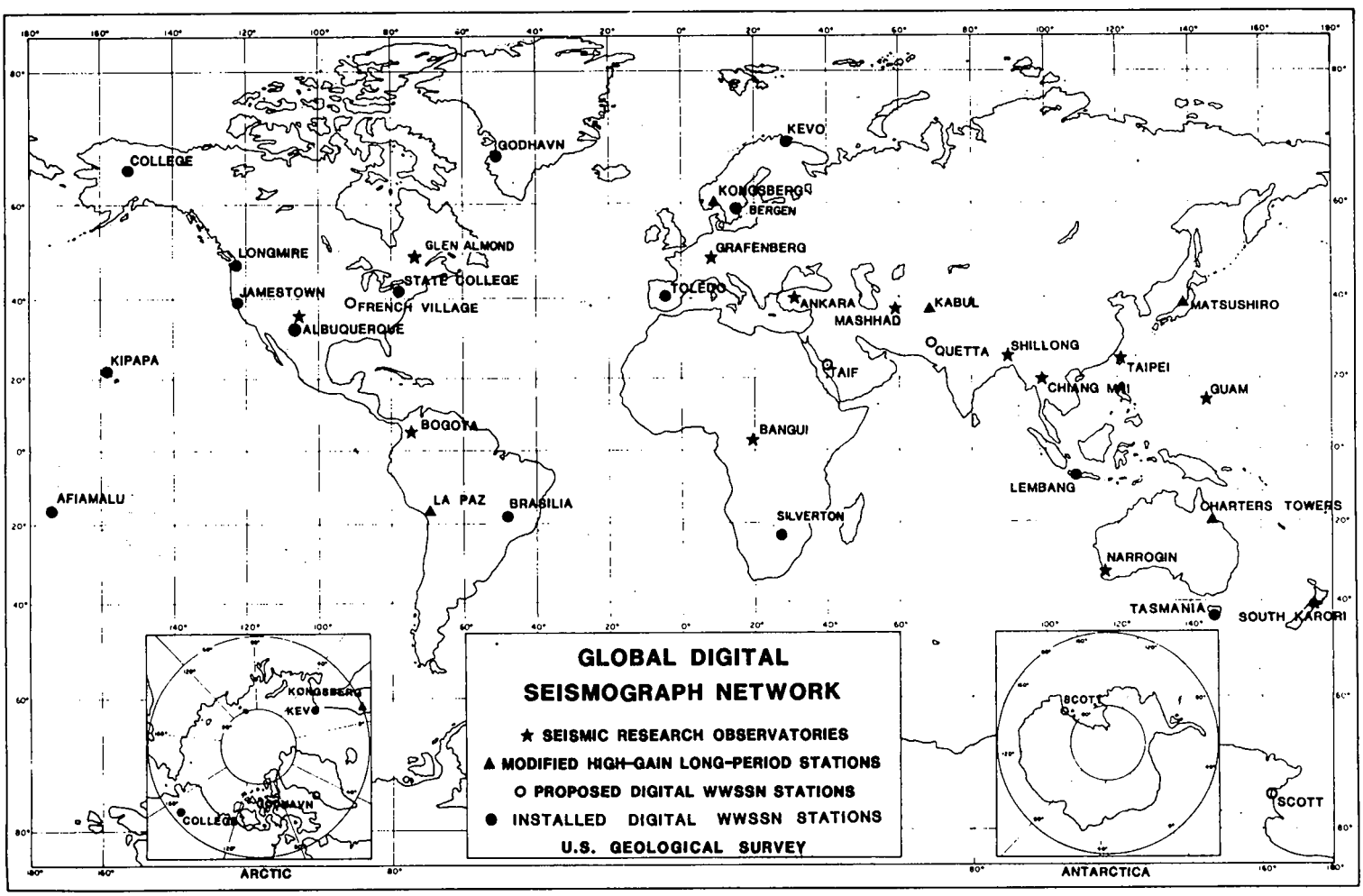
NOTES:

1. Basic calibration information and other documentation are included.

2. CSN records are available only (from 1962) on 35-mm film. Pre-1962 records are available from Earth Physics Branch, Dept. of Energy, Mines and Resources, Ottawa, Canada K1A OY3.

3. A current list of seismograms in the file is available on request.

4. Additional information is given in "Catalog of Seismogram Archives," KGRD 9, 1977.



JANUARY 1983

Seismograms from International Data Exchange (IDE)

Seismograms for earthquakes of magnitude 7.5+ and for other selected events are available for seismograph stations that participate in this data-exchange program. The data exchange is conducted under the provisions of the ICSU Guide to International Data Exchange through World Data Centers. Formats include:

- Microfiche (but some events may include 70-mm and 35-mm microfilm)

NOTE: A current list of IDE earthquakes and seismograms is available upon request. Additional information is given in "Catalog of Seismograms and Strong-Motion Records," Report SE-6, 1977.

Historical Seismograms

This file contains about 300,000 historical seismograms (from 1903) from selected United States stations. Seismograms from stations in other countries will be copied in the future. Formats include:

- 35- and 16-mm microfilm

NOTE: Lists of earthquakes and stations for which seismograms are available are given in "Historical Seismogram Filming Project: Fourth Progress Report," Report SE-33, December 1982.

Strong-Motion Earthquake Data

This file contains the most significant strong-motion records from the U.S. and other areas of the world for 1933-83. Most of the records have been digitized and are available only on magnetic tape. Records produced in the U.S. have been further corrected and processed to obtain Fourier response spectra. All the tapes in the Strong-Motion Tape Library have been standardized to be compatible with most computer tape drives. Strong-motion records are available from the following areas:

1. Western Pacific Ocean: Japan, Taiwan, New Guinea, and New Zealand.

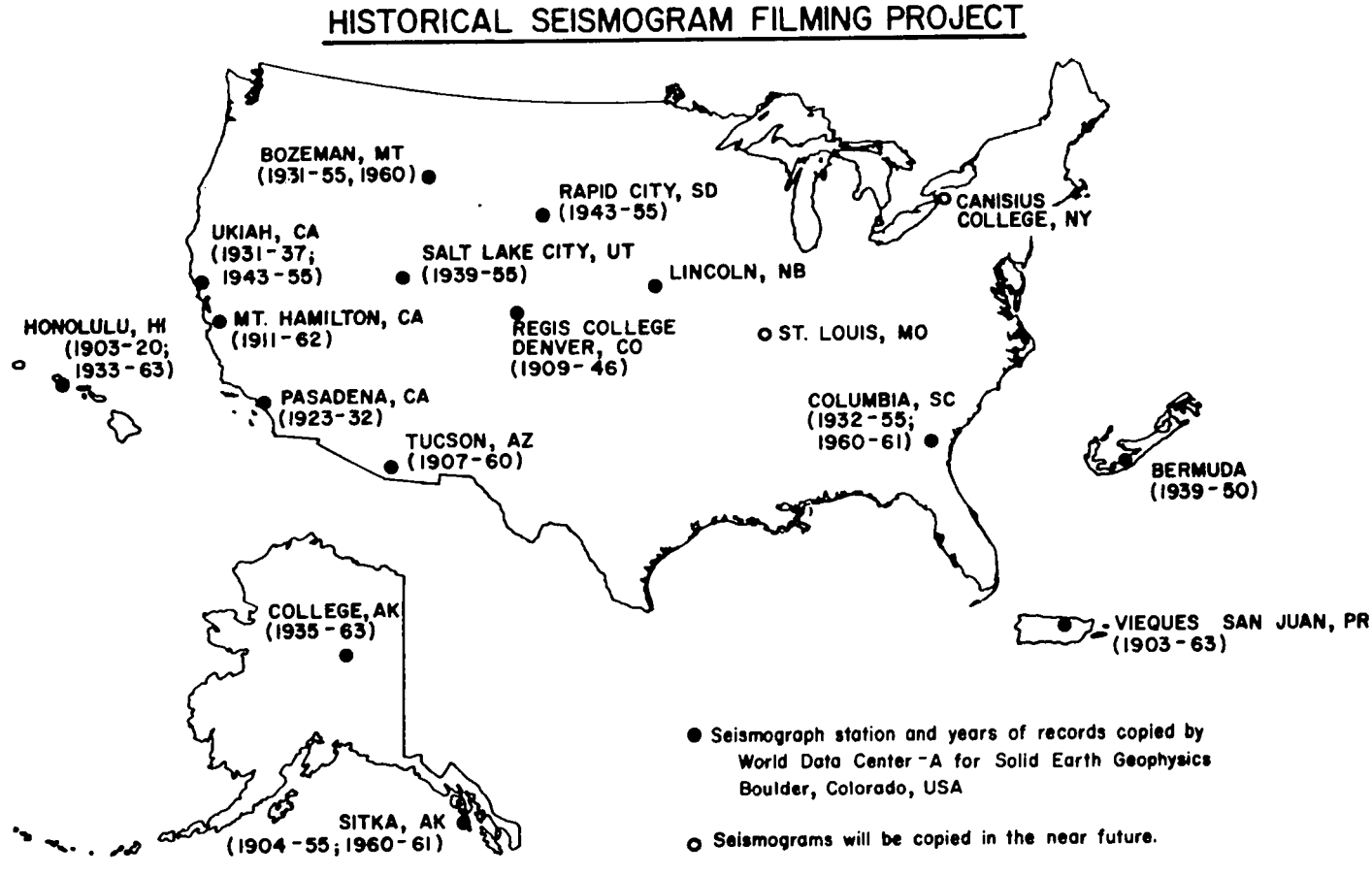
2. Western Hemisphere: United States, Mexico, El Salvador, Nicaragua, Peru, and Chile.

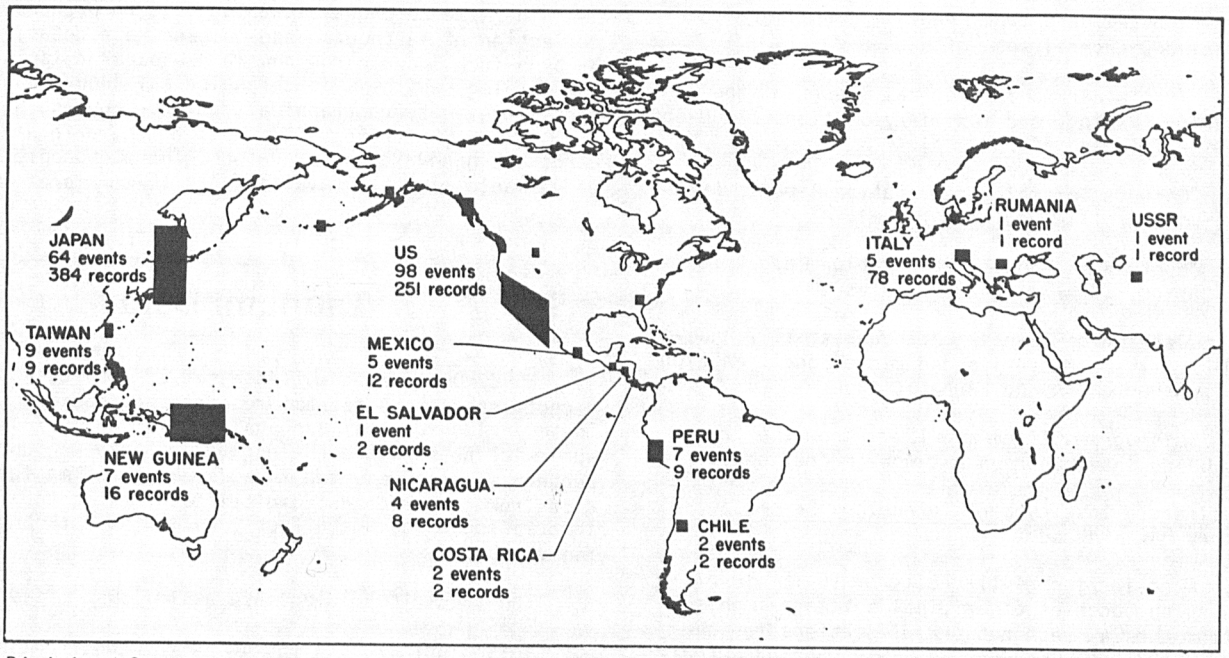
3. Europe: Italy, Yugoslavia, Rumania, and U.S.S.R.

In addition, this file contains preliminary, uncorrected records in the following formats:

- 35-mm microfilm
- 70-mm film chips
- Paper copy

NOTE: A list of most available records is included in "Catalog of Seismogram and Strong-Motion Records," Report SE-6, 1977. A current list is available on request.





Digitized Strong-Motion Records Available from the National Geophysical Data Center, December 1982.

International Deployment of Accelerometers (IDA)

A world wide network of digitally recording LaCoste-Romberg gravimeters furnishes data for the IDA file, which contains ultra long-period digital records of earth tides and normal modes of the Earth (data cover the years 1975-82). Data are available only on magnetic tape (copies of archive tape).

Global Digital Seismic Network (GDSN)

The USGS has installed 12 Seismic Recording Observatories, 5 Abbreviated Seismic Recording Observatories, and upgraded 14 Worldwide Standard Seismic Network Stations to digital recording format. The stations provide high-quality digital signals sampled at 1-second intervals for the long-period components and 20 samples per second for short-period vertical signal windows. NGDC has a complete archive of these digital recordings from March 1977 through March 1983.

Station day tapes consisting of 26 hours of recording from all reporting stations are prepared by the USGS and archived at NGDC. Complete copies of the tapes may be prepared at 800 or 1,600 bpi. The tapes contain only ASCII headers and binary data.

Other Seismological Data

The Preliminary Determination of Epicenters Montly listing,[1] a chronological listing of worldwide earthquakes, contains for each event the date of occurrence, origin time, geographic location, epicentral region, felt and damage data, focal depth, magnitude, and number of seismic stations used in computing each epicenter. Formats include:

- Punched cards of current data from USGS file:
  1. By monthly subscription
  2. Yearly (all data in one shipment)
- 16-mm microfilm of data from 1965
- Custom plots
- Magnetic tape

The Earthquake Data Report,[1] a monthly compilation of data used in the computation of the above listing, contains station arrival times, directions of first motion, individual distances, azimuths, and traveltime residuals. Available on 16-mm microfilm (from 1969 to 1977).

The Natural Hazards Photograph Catalog, KGRD 20, contains about 2,000 photographs depicting effects of earthquakes, tsunamis, and volcanic eruptions. This catalog is available from NGDC.

Leaning apartment houses produced by soil liquefaction during June 16, 1964, earthquake in Niigata, Japan.

[1]Data in these files were produced by elements originally in the Coast and Geodetic Survey, the National Ocean Survey, and, more recently, NOAA's Environmental Research Laboratories. All of these functions now are part of the U.S. Department of the Interior, Geological Survey, Golden, Colo. The Monthly listings are available only from the Superintendent of Documents (address inside back cover).

Seismological Data from People's Republic of China includes several sets of data:

1. "Preliminary Seismological Report of the Central Station, Peking, and Auxiliary Stations, 1960-65" (16-mm microfilm and microfiche).

2. "Chinese Seismological Station Report, 1971-73" (16-mm microfilm and microfiche).

3. "Monthly Earthquake Observation Report for Peking Station, 1975-77" (paper copies).

4. "Catalog of Chinese Earthquakes, 1177 B.C.-A.D. 1949" (16-mm microfilm and microfiche); catalog data on punched cards and magnetic tape.

5. Seismograms (from mid-1980) from the 17-station Chinese seismograph network (microfiche).

California Institute of Technology Seismological Laboratory Data include:

1. A collection of 112 rolls of 16-mm microfilm containing photocopies of original seismogram phase cards from the Cal Tech network of stations for the October 1, 1931, to December 31, 1969, period. Individual microfilm rolls contain several months of data from as many as 18 stations. Available in individual rolls or as a complete set. In addition, one reel of 16-mm microfilm containing Dr. Charles F. Richter's notes on Southern California local shocks, 1926-39, and the Long Beach, California, series, 1933-35, is available.

2. A collection of microfiche copies of the Regular Bulletin of Pasadena and Auxiliary Stations for 1931-1957; Preliminary Bulletin 1957-1968; Provisional Readings 1966-1974; and Airletters 1974-1979.

Bulletin of Seismographic Stations, University of California, Berkeley is a collection of 46 "volumes" of network data for Oct. 30, 1910, to Dec. 31, 1976. Each volume includes several microfiche covering a 1-year period (except the following: Vol. 1, Oct. 30, 1910-Sept. 30, 1920; Vol. 2., Oct. 1, 1920-March 31, 1931; Vol. 3, April 1, 1931-March 31, 1933; Vol. 4, April 1, 1933-March 31, 1935; Vol.5, April 1-Dec. 31, 1935). Available in individual volumes or as a complete set.

The Reid Earthquake Catalog is a comprehensive collection of earthquake and volcano data detailed on 3- by 5-inch index cards and in newspaper clippings. The catalog, which is in chronological sequence and cross-indexed by geographical regions, covers the time from before Christ to 1931. Many of the original cards are handwritten; therefore, the photocopies are of variable clarity. Available on 16-mm microfilm.

Tsunami Data

NGDC/WDC-A has compiled a set of data bases of direct interest to tsunami research and operations. These include digital and analog seismograms from a worldwide network and the derived information on epicenters, magnitudes, and focal mechanisms; marigraphic data from tide records; digital bathymetric data; and information on damage effects, including a photograph file.

The specific holdings are as follows:

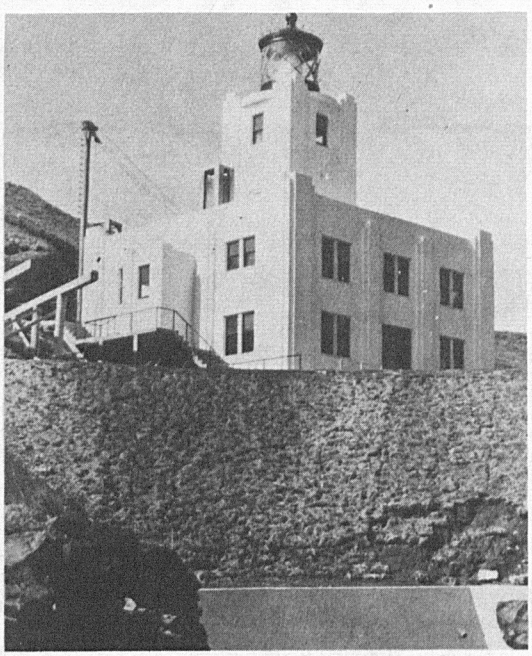
Seismological Data including records from the WWNSS; digital data from the long-period gravimeter network (see IDA, p. 5), the SRO, and HGLP networks (see p. 3); and the digital Earthquake Data File (which gives information on whether a tsunami was generated).

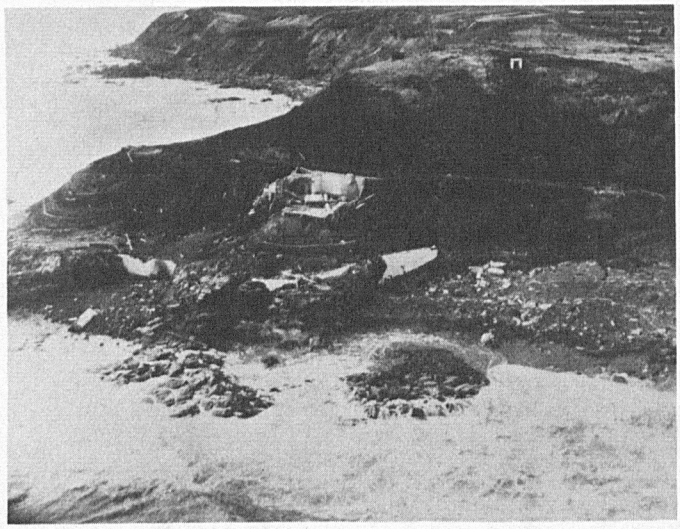
Tide records (since 1850) from Pacific tide stations that show tsunami activity. 3000 station events are available on microfilm.

Bathymetric Data (on magnetic tape) of 30 million U.S. coastal bathymetric observations collected since 1930. These tapes can be formatted for specific needs.

A Pacific Tsunami Historic File - Some or all of the following parameters are included for each event listed: event date of tsunamigenic earthquake, source region, validity rating, latitude, longitude, depth, and magnitude of generating earthquake, tsunami magnitude and intensity, and literature citations.

Photographic Data including more than 700 photographs of tsunami wave activity and damage. Request Natural Hazards Photograph Catalog, KGRD 20, for descriptions and examples of tsunami, earthquake, and volcanoe photographs.





Damage from tsunami of April 1, 1946, at Unimak Island, Alaska. Before and after views of Scotch Cap Lighthouse.

SPECIAL SERVICES

Custom Plots

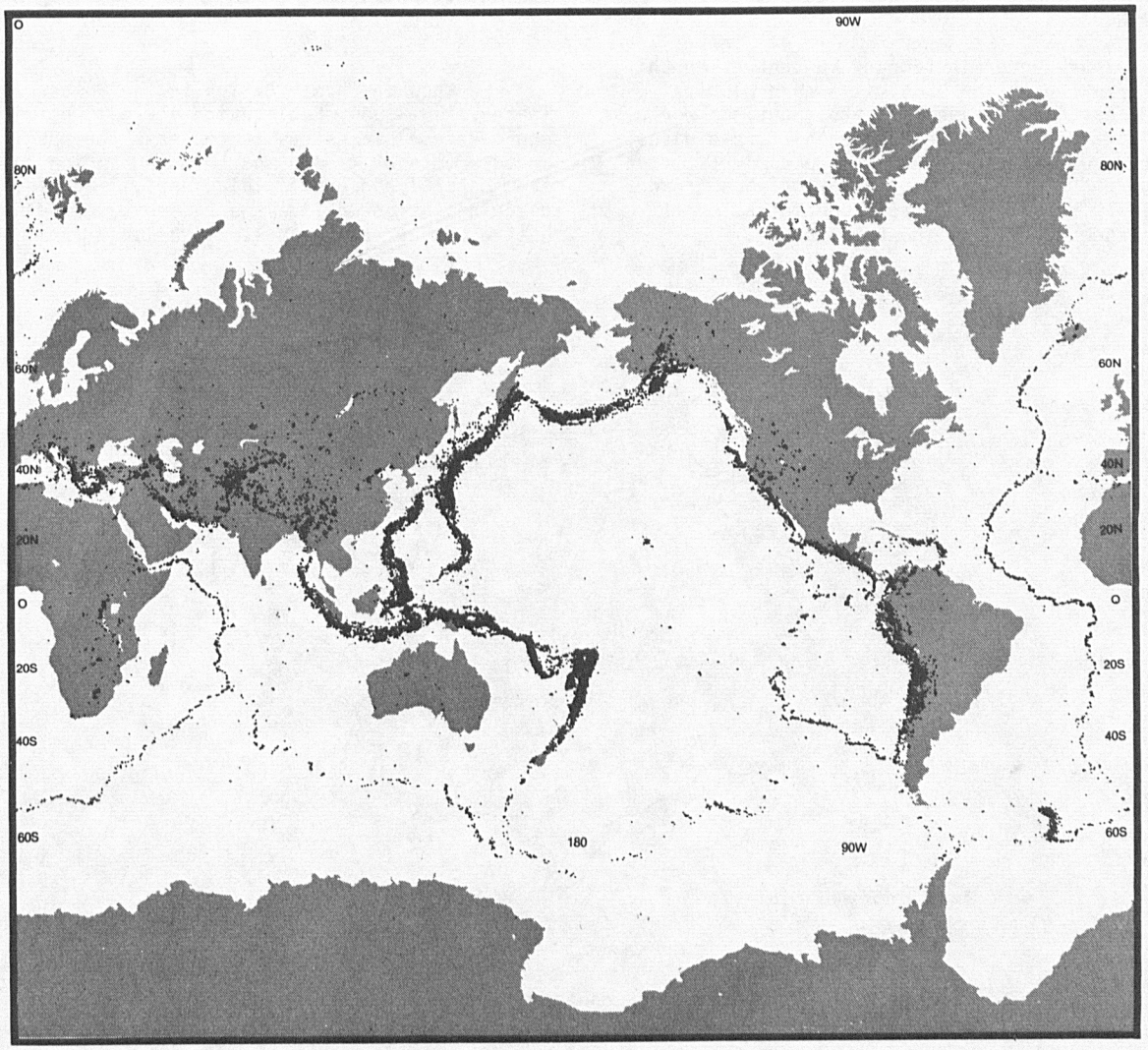
The National Geophysical Data Center produces earthquake maps of specific areas and specified projections on request. Costs depend on the complexity and the computer time required. (See plot below.)

Visiting Scientists

NGDC operates a modest guest-worker program and provides space, access to computers, digitizers, plotters, and data files to researchers who need to access large amounts of data. Contact NGDC for details.

Requests Through World Data Center A

World Data Center A for Solid Earth Geophysics assists scientists to obtain copies of original or calibrated data held by other scientists or other World Data Centers. Requests should be sent to World Data Center A for Solid Earth Geophysics, National Geophysical Data Center, NOAA, Code E/GC1, 325 Broadway, Boulder, CO 80303.



Earthquake Epicenters for Magnitudes > 4.5, 1963–1977

PUBLICATIONS

The following data publications have been prepared by components of the National Oceanic and Atmospheric Administration and the U.S. Geological Survey, some jointly. They are presented in six categories: regular, periodic, reports on damaging earthquakes, popular, miscellaneous, and tsunamis. Although partially technical in character, most can be understood by the layman or educator interested in the general aspects of earthquake information and present-day research. The "popular" section contains brochures and leaflets prepared in a nontechnical manner especially for the general public.

Regular Reports

United States Earthquakes (1928 through 1980) is an annual summary of all earthquakes in the United States and nearby territories. It gives brief descriptions of all felt and damaging tremors and lists those that were recorded by a sufficient number of seismograph stations to be located, but went unobserved by residents in the area. Other sections describe geodetic work of seismological interest tsunamis (earthquake-induced seawaves), and principal world earthquakes.

Preliminary Determination of Epicenters Monthly Listing, prepared by the USGS, is a chronological listing of earthquakes located throughout the world. It gives time of occurrence, geographic coordinates, region of occurrence, felt and damage comments, depth, magnitude, and other pertinent data for each tremor. (Available by subscription from Superintendent of Documents, see address inside back cover).

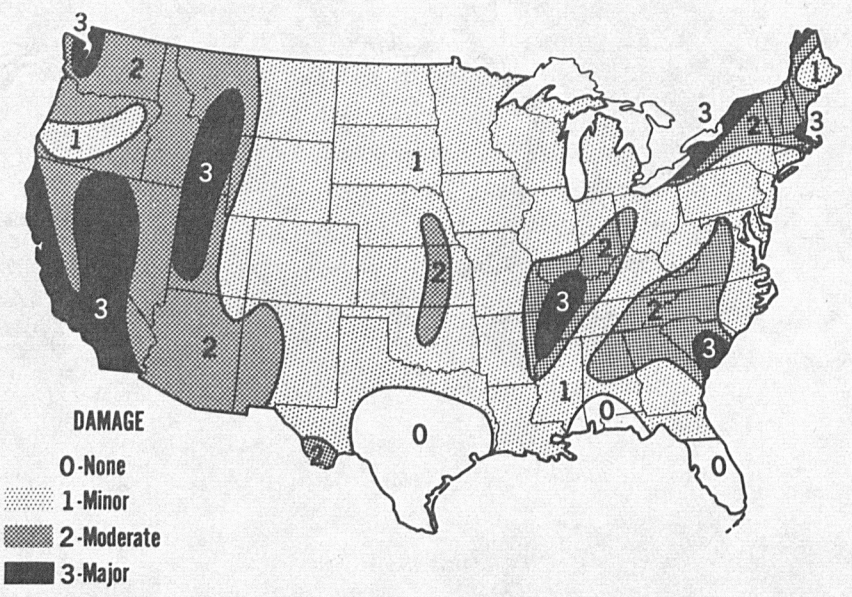
Periodic Reports

Earthquake History of the United States, Revised Edition (Through 1970), with Supplement (1971-80), Publication 41-1, is a catalog of all important U.S. earthquakes (generally intensity V and above) of historical record. It contains descriptive text on each tremor and regional tables of earthquake locations, affected areas, and intensities. (Available from NGDC.)

Seismic Engineering Program Report is a quarterly publication containing a list of accelerograph records and other information pertinent to the USGS strong-motion program. (Available from USGS, Arlington, address inside back cover.)

Earthquakes in the United States is a quarterly report containing hypocenter lists, magnitudes, intensities, felt information, isoseismal maps, and seismicity maps. (Available from USGS, Arlington, address inside back cover).

Earthquake Investigation in the Western United States, 1931-1964, Publication 41-2, is primarily of engineering interest as it concerns the precise measurements of ground and building motion resulting from natural and artificial causes. The report also describes structural damage caused by early Western United States earthquakes. (Available from NGDC.)



Seismic risk map for conterminous United States.

Reports on Damaging Earthquakes

The Prince William Sound, Alaska, Earthquake of 1964 and Aftershocks, Vol. I describes the equipment, survey systems, and specific procedures used in coordinated seismological, geodetic, photogrammetric, oceanographic, hydrographic, and cartographic studies directed toward determining both the causal factors and the associated effects of this earthquake and its aftershocks. (Available from National Technical Information Service [NTIS], address inside back cover.)

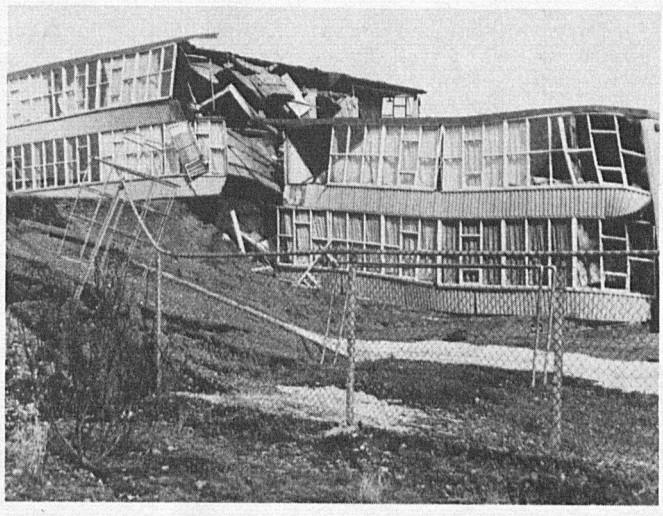
The Prince William Sound, Alaska, Earthquake of 1964 and Aftershocks, Vol. II. Part A is directed toward engineers, architects, builders, and all others seriously interested in the reasons for the extensive damage to buildings and other properties in Anchorage. Parts B and C deal with research studies in seismology and marine geology. (Available from NTIS, address inside back cover.)

The Prince William Sound, Alaska, Earthquake of 1964 and Aftershocks, Vol. III contains research papers that cover definitive geodetic studies and interpretive results from supporting photogrammetric surveys. (Available from NTIS, address inside back cover.)

San Fernando, California, Earthquake of February 9, 1971, Vol. I, Effects on Buildings, Part A and Part B (in two books) discusses damage to many types of structures and makes recommendations for improved performance of buildings in future earthquakes. A section on soils and foundations describes subsurface site conditions in the San Fernando earthquake area, slides in the San Fernando dams, and effects on foundations of structures. (Available from NGDC.)

San Fernando, California, Earthquake of February 9, 1971, Vol. II, Utilities, Transportation, and Sociological Aspects is an in-depth study of damage to Los Angeles area power, telephone, telegraph, gas, and nuclear reactor facilities; water and sewer systems; transportation systems; and sociological aspects of the earthquake. (Available from NGDC.)

San Fernando, California, Earthquake of February 9, 1977, Vol. III, Geological and Geophysical Studies includes papers on physical quantities that determine the earthquake's initial point of origin; the character and extent of ground rupture; aftershocks associated with the event; postearthquake geodetic surveys; and geophysical effects associated with the shock. (Available from NGDC.)



Damage from Mar. 27, 1964, Anchorage, AK, earthquake.

Tsunami Reports

Tsunami! The Great Waves describes the operation of the Tsunami Warning System in the Pacific areas, discusses methods used to warn coastal residents of a possible tsunami (popularly called "tidal waves"), and outlines cautionary steps to be taken when an alarm is sounded. (Available from NTIS, address inside back cover.)

Catalog of Tsunamis in Alaska, Report SE-1, lists tsunamis from July 1788 through December 1974 and gives a brief description of each. (Available from WDC-A for Solid Earth Geophysics, address inside back cover.)

Catalog of Tsunamis in Hawaii, Report SE-4, is a compilation of all data pertaining to tsunamis observed and instrumentally recorded in Hawaii from the early 1800s through December 1976. The list includes date, location, and magnitude of each earthquake and a brief description of tsunami effects. (Available from WDC-A for Solid Earth Geophysics, address inside back cover.)

Catalog of Tsunami Photographs, KGRD 13, contains descriptions and dates of about 650 photographs and shows some examples. (Available from NGDC.)

Regional Tsunami Warning System in Alaska describes briefly the phenomenon called "tsunami." The procedure for alerting Alaskan coastal communities when the tsunami danger exists is discussed, and a tsunami safety rules is provided. (Available from list from Oceanography Division, address inside back cover.)

Wave Reporting Procedures for Tide Observers in the Tsunami Warning System provides general information on instrument maintenance and gives specific instructions to aid tide observers in reporting tsunamis. (Available from Oceanography Division, address inside back cover.)

Popular Reports

Earthquake Information Bulletin is a bimonthly magazine that translates into understandable terms the techniques used in investigating and describing earthquakes, and that describes past and continuing studies in seismology. (Available by subscription from Superintendent of Documents, address inside back cover.)

Volcanoes tells what volcanoes are, their geographic distribution, and types of volcanic activity. (Available from USGS, Arlington, address inside back cover.)

Volcanoes of the United States describes volcanic activity, spectacular eruptions, and related phenomena. (Available from USGS, Arlington, address inside back cover.)

Active Faults of California describes the nature of faults and the earthquake activity related to them. A map shows locations of active faults. (Available from USGS, Arlington, address inside back cover.)

The San Andreas Fault describes the nature, behavior, and earthquake history of this famous California fault. (Available from USGS, Arlington, address inside back cover.)

The Interior of the Earth explains and graphically depicts the structure and nature of the Earth's crust, its mantle, and its core. (Available from USGS, Arlington, address inside back cover.)

Earthquakes explains the nature and causes of earthquakes and describes the techniques used to detect, record, and measure seismic disturbances. (Available from USGS, Arlington, address inside back cover.)

Goals, Strategy, and Tasks of the Earthquake Reduction Program (Circular 701) describes the National earthquake program of the U.S. Geological Survey. (Available from USGS, Arlington, address inside back cover.)

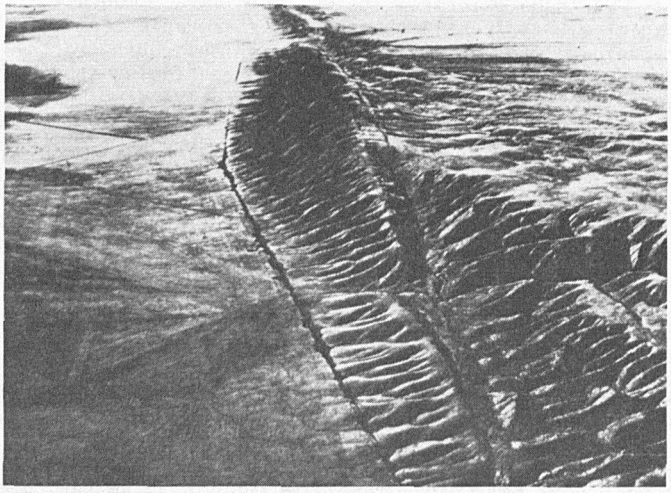
Seismic Hazards and Land-Use Planning (Circular 690) discusses seismic hazards and implications for land use, and earth science data needed to assess seismic hazards. It also gives principal sources of geologic and seismic data. (Available from USGS, Arlington, address inside back cover.)

Earthquake Prediction--Opportunity to Avert Disaster (Circular 729) summarizes results of a conference on earthquake warning and response held in San Francisco, Calif. on November 7, 1975. The report contains the texts of papers presented at the conference and the transcript of a panel discussion following the conference. (Available from USGS, Arlington, address inside back cover.)

Motion Picture Film Services provides an annotated list of motion picture films that describe earth science programs and USGS activities. (Available from USGS, Arlington, address inside back cover.)

NGDC, The National Geophysical Data Center defines the functions of NGDC and briefly describes its products and services. (Available from NGDC.)

Safety and Survival in an Earthquake describes the dangers from earthquakes and outlines actions that citizens can take to reduce the dangers. (Available from USGS, Arlington, address inside back cover.)



Aerial view of the San Andreas fault, California.

Inventory of Natural Hazards Data Resources in the Federal Government describes the holdings of Federal Government agencies--primarily the Executive Branch--who share data resources for public use. The major natural hazards covered are: avalanche, drought, earthquake, erosion, flood, landslide, lightning, severe storm, tornado, tropical cyclone, tsunami, volcano, and wildfire. (Available from WDC-A for Solid Earth Geophysics, address inside back cover.)

Miscellaneous Catalogs and Data Summaries

Earthquake Data File Summary, KGRD 5, describes the NGDC earthquake data file, which contains information on about 365,000 earthquakes (June 1638-1982). It gives a summary of the file's contents, typical searches of the file, data formats, and sources of data. (Available from NTIS, address inside back cover.)

Catalog of Earthquake Photographs, KGRD 7, contains descriptions and examples of about 750 earthquake photographs. (Available from NGDC.)

Catalog of Seismogram Archives, KGRD 9, is a comprehensive list of seismograms available from NGDC. It describes the many special seismogram services and the formats in which the records are available. (Available from NGDC.)

Summary of Earthquake Focal Mechanisms for the Western Pacific-Indonesian Region, 1929-1973, Report SE-3, is a catalog that lists 1,713 solutions from 48 earthquakes, most of which occurred since 1960. It includes for each the data source, date and time of occurrence, epicenter, and magnitude. (Available from NTIS, address inside back cover.)

Catalog of Seismograms and Strong-Motion Records, Report SE-6, lists the WDC-A holdings of seismograms and strong-motion records, provides price lists, and describes formats in which the records are available. Part 1 of the catalog contains a list of (1) stations that participate in the WDC-A program exchange on special request; (2) international data exchange (IDA) earthquakes, and (3) seismograms available for U.S.S.R. stations. Part 2 presents lists of triggering earthquakes and of strong-motion records that were written (by country and station). (Available from NTIS, address inside back cover.)

Directory of Seismograph Stations (Participating in International Seismogram Exchange through World Data Centres), Report SE-7, lists 247 seismograph stations (and their technical characteristics) that have agreed to participate in Category ii data exchange through the World Data Centers. The directory contains the following data for most stations: (1) general information, (2) site information, (3) instrumentation, (4) timing system, (5) type of reports, (6) references, and (7) comments. (Available from World Data Center A for Solid Earth Geophysics, address inside back cover.)

Survey of Practice in Determining Magnitudes of Near Earthquakes, Part 2: Europe, Asia, Africa, Australasia, the Pacific, Report SE-8, lists the methods used in determining magnitudes of near earthquakes at over 100 seismograph stations throughout the world. (Available from NTIS, address inside back cover.)

Survey of Practice in Determining Magnitudes of Near Earthquakes, Part 1: North, Central, and South America, Report SE-9, describes the methods used in determining magnitudes of near earthquakes at over 100 seismograph stations throughout the world. (Available from WDC-A for Solid Earth Geophysics, address inside back cover.)

Homogeneous Magnitude System of the Eurasian Continent: P-Waves, Report SE-18, is a four-section summary that establishes a new procedure for determining the magnitude of an earthquake; the first stage of the investigation is described in this report. (Available from WDC-A for Solid Earth Geophysics, address inside back cover.)

Manual of Seismological Observatory Practice, Report SE-20, outlines the basic duties of an observatory--how to maintain equipment, how to produce seismograms, and how to undertake preliminary readings. (Available from WDC-A for Solid Earth Geophysics, address inside back cover.)

Directory of World Seismograph Stations, Volume I, The Americas, Part 1, United States, Canada, Bermuda, Report SE-25, gives the location of seismological instruments, their technical characteristics, dates of operation, and availability of records. It is the first of a planned 6-volume set. (Available from WDC-A for Solid Earth Geophysics, address inside back cover.)

Catalog of Significant Earthquakes, 2000 B.C.-1979 [A.D.], Report SE-27, contains a list of 2,484 earthquakes that meet any of the following criteria: moderate property damage, at least 10 deaths, or magnitude 7.5 (or Modified Mercalli Intensity X) or more. (Available from WDC-A for Solid Earth Geophysics, address inside back cover.)

Catalog of Strong Earthquakes in the U.S.S.R. from Ancient Times Through 1977, Report SE-31, contains translations of the methodologies used to prepare the catalog, an extensive bibliography, and the geographic locations, origin times, and dates of about 6,000 strong earthquakes in the U.S.S.R. from 2100 B.C. through A.D. 1977. (Available from WDC-A for Solid Earth Geophysics, address inside back cover.)

Historical Seismogram Filming Project: Fourth Progress Report, Report SE-33, gives the status of the project for microfilming historical seimograms (1897-1963). Tables listing seismograph development history, seismograph stations and records filmed, and selected earthquake events are included. An appendix shows methods used for microfilming historical seimograms at Mt. Hamilton and Pasadena seismograph stations. (Available from WDC-A for Solid Earth Geophysics, address inside back cover.)

A Historical Summary of Earthquake Epicenters In and Near Alaska, NOAA Technical Memorandum EDS NGSDC-1, describes the Alaska Earthquake Data File, sources used in developing the file, and data limitations. It contains several useful tables and illustrations of Alaskan seismicity. (Available from WDC-A for Solid Earth Geophysics, address inside back cover.)

An Analysis of Earthquake Intensities With Respect to Attenuation, Magnitude, and Rate of Occurrence, NOAA Technical Memorandum EDS NGSDC-2, describes a method for determining the isoseismal areas and distances for many thousands of locations that experienced earthquakes in the United States during 1928-73. The intensity file on which this publication is based contains over 60,000 reports. (Available from NTIS, address inside back cover.)

An Analysis of Earthquake Intensities and Recurrence Rates In and Near Alaska, NOAA Technical Memorandum EDS NGSDC-3, describes the intensity file, the formats in which the data are available, and the sources and limitations of the data. (Available from NGDC.)

Reevaluation of Modified Mercalli Intensity Scale for Earthquakes Using Distance as Determinant, NOAA Technical Memorandum EDIS NGSDC-4, develops curves for each intensity element of the Modified Mercalli Intensity Scale of 1931 and fits them to a model. A revised intensity scale is assembled by reassigning the intensity elements in accordance with the results of the fitting process. (Available from NTIS, address inside back cover.)

Seismicity Maps

World Seismicity Map. This five-color map is 48 by 36 inches (at a scale of 1:39,000,000); it depicts patterns of global earthquake activity from July 1, 1963, through 1972. Dots show earthquake epicenters (body-wave magnitudes ≥ 4.5) whose locations were determined using 10 or more station observations. Three colors distinguish the principal depth-of-focus classes (0-70 km, 71-300 km, and 301-700 km). (Available from USGS, Denver Federal Center, address inside back cover.)

Significant Earthquakes, 1900-79 (Map). This four-color map is 54 by 41 inches (at a scale of 1:32,000,000); it shows the location and relative importance of 1,277 significant earthquakes from 1900-79. Of these earthquakes, 682 that caused moderate damage are described in a detailed listing on the map. (Available from NGDC.)

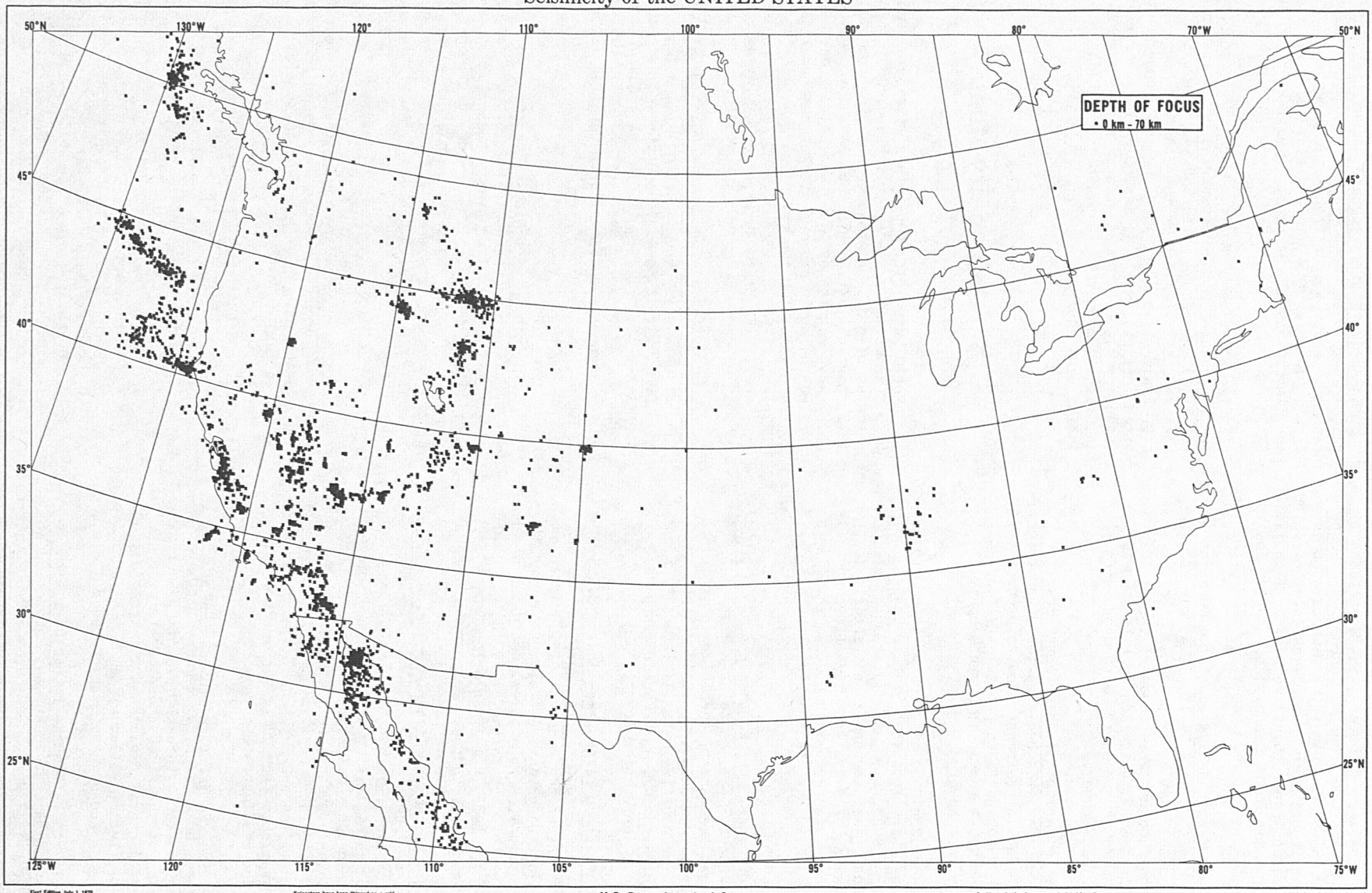
Seismicity Map of Middle America. This multicolor 41- by 35-inch map shows the locations of major earthquakes and many smaller events occurring in Middle America for 1900-79. It also includes important information about each major event in a table below the map. Earthquake locations are displayed on a Mercator projection at a scale of 1:8,000,000. (Available from NGDC.)

Regional Seismicity Maps. These 20- by 30-inch maps show patterns of regional seismicity of the Earth for 1962-69. An index map also is available. The maps, by region, are:

1. Southwest Pacific (NEIC 3008)
2. Southeast Asia (NEIC 3009)
3. Japan and Kuril Islands (NEIC 3010)
4. Alaska (NEIC 3011)
5. The United States (NEIC 3012)
6. Middle America (NEIC 3013)
7. South America (NEIC 3014)
8. Europe and the Middle East (NEIC 3015)
9. Central Asia (NEIC 3016)
10. North Atlantic Ocean (NEIC 3017)
11. South Atlantic Ocean (NEIC 3018)
12. Indian Ocean (NEIC 3019)
13. Arctic Region (NEIC 3020)
14. Antarctic Region (NEIC 3021)

(Available from National Ocean Service, address inside back cover. See sample on next page.)

Seismicity of the UNITED STATES



First Edition, July 1, 1970.
Lambert Conformal Conic Projection

Epicenters have been thinned on a grid composed of 0.02 inch squares.

Boundaries shown on this map should not be regarded as having official significance.

U.S. Department of Commerce
Environmental Science Services Administration
Coast and Geodetic Survey
National Earthquake Information Center

Positions of epicenters were calculated from the observations of 5 or more stations, and were reported in the following publications:

Seismological Bulletin January 1, 1962 to December 31, 1966
Preliminary Determination of Epicenters January 1, 1967 to December 31, 1969

NEIC 3012
Price 25 cents

☆U.S. GOVERNMENT PRINTING OFFICE: 1983—776-877/64

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Carl A. von Hake	Earthquake Information	6472
Dale P. Glover	Seismogram Services	6513
Carlos A. Angel	Strong-Motion Data	6764
Patricia A. Lockridge	Tsunami Data	6337

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325 Broadway
Boulder, CO 80303

World Data Center A for Solid Earth Geophysics
National Geophysical Data Center
NOAA, Code E/GC1
325 Broadway
Boulder, CO 80303

Branch of Distribution
U.S. Geological Survey
1200 S. Eads Street
Arlington, VA 22202

Oceanography Division (W6)
NOAA/National Weather Service
Silver Spring, MD 20910

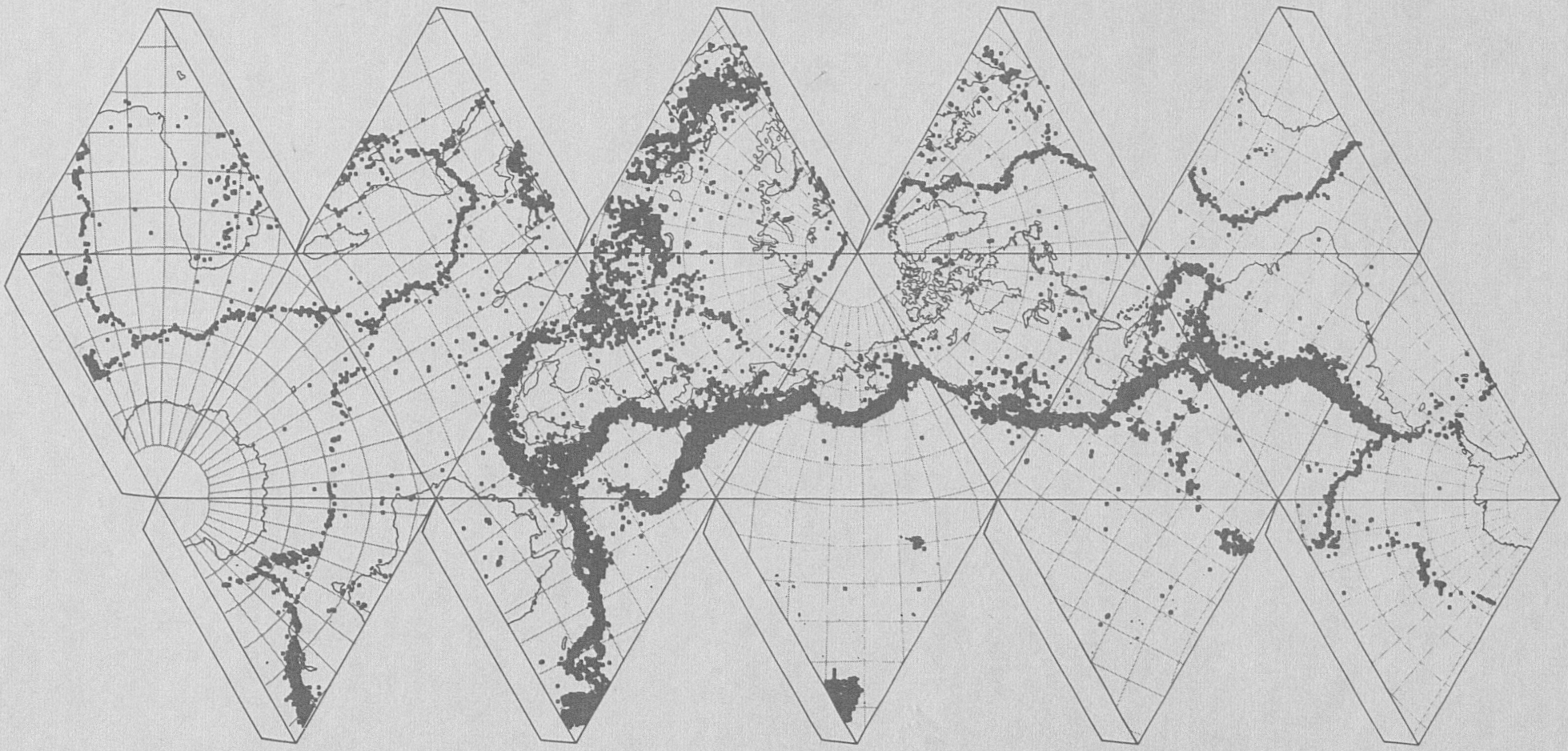
U.S. Geological Survey
Denver Federal Center, Bldg. 41
Denver, CO 80225

Distribution Division N/CG33
NOAA/National Ocean Service
Riverdale, MD 20840

Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161

...a do-it-yourself icosahedron globe



A 75% copy of the multicolor Earthquake Epicenters of the World do-it-yourself icosahedron globe available from NGSDC.