DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

United States Earthquakes, 1979

By

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and

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Introduction

This publication describes all earthquakes that were reported felt in the United States and nearby territories in 1979. It has been compiled by the U.S. Geological Survey (USGS) and published jointly with NOAA, Environmental Data and Information Service (EDIS). Its purpose is to provide a continuous history of U.S. earthquakes for studying seismic risk, evaluating nuclear powerplant sites, designing earthquake-resistive structures, and answering inquiries from the scientific and general public.

The publication is composed of four major chapters: "Earthquake Descriptions," which includes a summary of macroseismic data reported for each earthquake and a chronological list of earthquakes by State (table 1); "Network Operations," which summarizes the results from local seismic networks; "Miscellaneous Activities," which contains information on crustal movement studies, tsunamis, and principal earthquakes of the world (table 8), and "Strong-Motion Seismograph Data" (table 9). The intensity and macroseismic data in "Earthquake Descriptions" are compiled from questionnaire canvasses (see next paragraph), newspaper articles, and reports prepared by other government organizations, State institutions, local organizations, and individuals. Each description includes date, origin time, hypocenter, and the source of the hypocenter computation, maximum intensity (Modified Mercalli), and macroseismic effects reported in the area.

The USGS collects intensity information primarily by mailing questionnaires, "Earthquake Report" forms, to postmasters in the earthquake area. Postmasters complete the forms and return them to the USGS, where they are evaluated and intensities are assigned. For damaging earthquakes, the questionnaires are supplemented by USGS field investigations. The USGS publishes preliminary intensity data in its quarterly circular, Earthquakes in the United States. The final information is published in the United States Earthquakes series, issued annually since 1928.

DISCUSSION OF TABLES

The earthquake parameters in tables 1 and 8 include date, origin time, hypocenter (epicenter and focal depth), and magnitude. Table 1 also contains the maximum observed Modified Mercalli (MM) intensity. The origin time and date are listed in Universal Coordinated Time (UTC). The epicenters were taken principally from the USGS Preliminary Determination of Epicenters, Monthly Listings or Earthquakes in the United States[2]. The accuracy of the epicenters is that claimed by the institution supplying the hypocenter and is not necessarily the accuracy indicated by the number of decimals listed. The epicenters located by the USGS have a varying degree of accuracy, usually two-tenths of a degree or less, depending on their continental or oceanic location. The oceanic hypocenters are less accurate than those on the continent, even though both are listed to two decimals. Depths are listed to the nearest kilometer.

Magnitudes listed in the tables were furnished by cooperating institutions or determined by the USGS. The computational sources are indicated by letter codes identified in headnotes to the tables.

EPICENTER AND ISOSEISMAL MAPS

Figures 1-3 are computer plots of all earthquake epicenters in the conterminous United States, Alaska, and Hawaii listed in table 1. Each earthquake epicenter is indicated by a small circle or square.

Figures 4-6 are computer plots of 1979 earthquake epicenters in the conterminous United States, Alaska, and Hawaii by Modified Mercalli (MM) intensity. Maximum intensities are represented by Arabic numerals at the epicentral locations. Earthquakes of intensity I-IV are represented by solid circles.

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[1]For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

[2]Copies of these reports are available free on application to Branch of Distribution, U.S. Geological Survey, 1200 South Eads Street, Arlington, Va. 22202.

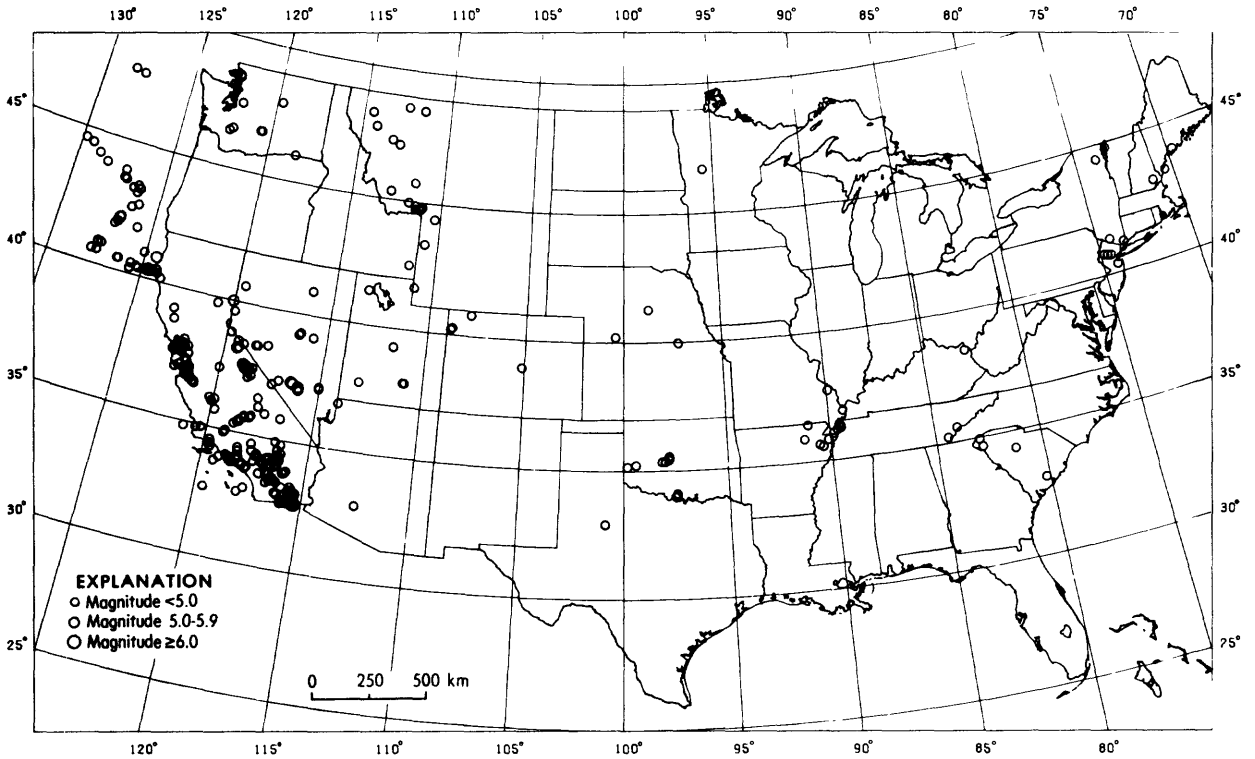

FIGURE 1.--Earthquake epicenters in the conterminous United States for 1979.

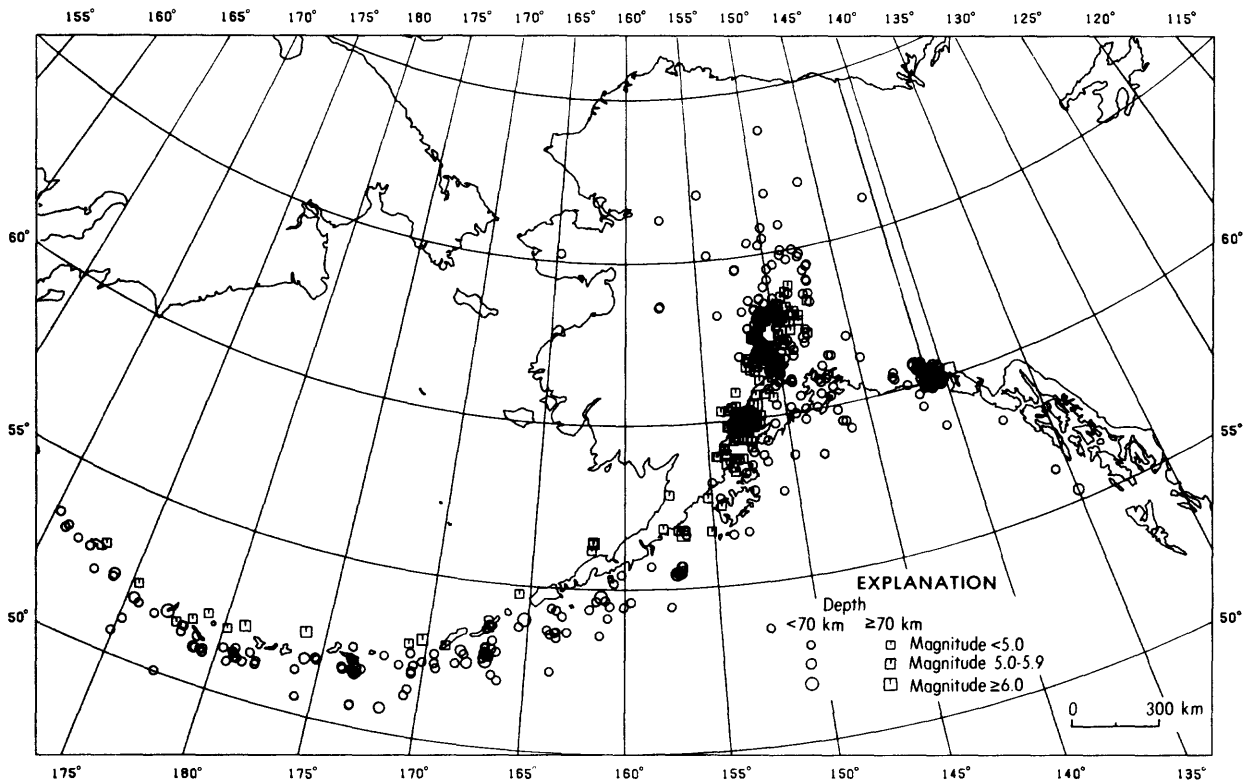

FIGURE 2.--Earthquake epicenters in Alaska for 1979.

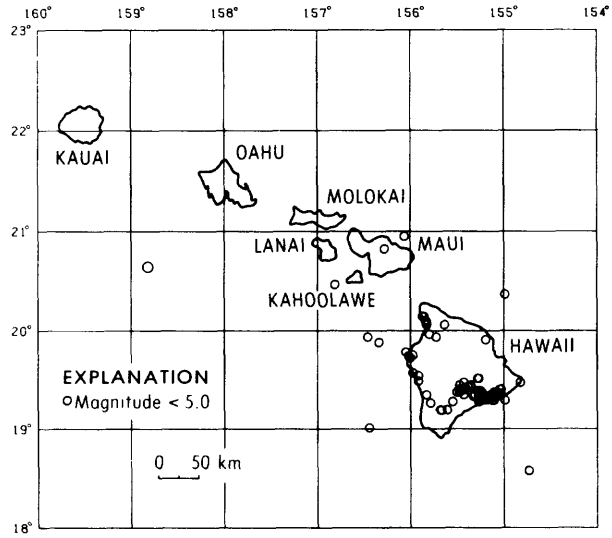

FIGURE 3.--Earthquake epicenters in Hawaii for 1979.

The USGS coordinates the collection of all types of earthquake information, with the special objective of correlating instrumentally determined earthquake locations with noninstrumental locations indicated by intensity data. This correlation is achieved through regional investigations of earthquakes by local organizations and the USGS. Primary data are gathered by a canvass of the epicentral area using questionnaire cards. When returned and analyzed, this information is used to prepare isoseismal maps which show the areal pattern of intensity associated with individual earthquakes.

The selection of intensity or isoseismal maps shown in the Earthquake Descriptions is governed largely by the size of the area affected. This means that sharp, localized shocks of intensity VI (which often occur in California) may not be represented by these maps, whereas more widely felt earthquakes of intensity V and VI (which are characteristic of the Eastern and Central States) often will be illustrated because of the larger felt areas. Arabic numerals on these computer-plotted maps represent the maximum MM intensities at sampled localities. Isoseismal contours are a generalization of intensity data and are extrapolated in regions that have few observations. The contours do not include each intensity observation.

EARTHQUAKE INFORMATION SERVICES

The National Geophysical and Solar-Terrestrial Data Center (NGSDC), one of the five major facilities of NOAA's Environmental Data and Information Service, is responsible for data activities in seismology. Its services include preparing local and regional seismic histories for engineers, actuaries, and other scientists and answering direct inquiries from the public on all aspects of historical earthquakes. Additional services and products include publishing annual earthquake summaries and revised historical earthquake reports; and making available copies of seismograms, accelerograms, displacement meter records, digitized strong-motion seismograms, and epicenter lists in several formats. Many of these products and services are based on seismic records or other data that have originated with USGS recording networks or with USGS data-reduction facilities. Information concerning services and products of NGSDC may be obtained from the National Geophysical and Solar-Terrestrial Data Center, NOAA/EDIS, Boulder, CO 80303.

MAGNITUDE AND INTENSITY RATINGS

Magnitude, a measure of the "size" of an earthquake, is roughly related to the energy release at the focus of an earthquake. Although the magnitude scale has neither "top" nor "bottom" values the highest ever recorded was magnitude 8.9 and the lowest about -3. On this logarithmic scale, a magnitude 6 shallow-focus earthquake represents elastic-wave energy about 30 times greater than that generated by a magnitude 5 earthquake, 900 times greater than that of a magnitude 4 shock, and so forth. Many factors enter into the determination of earthquake magnitude, including earthquake focal depth, frequency content of the sampled energy, and the earthquake radiation pattern. Magnitude values calculated by the USGS are based on the following formulas:

$$MS = \log (A/T) + 1.66 \log D + 3.3, \quad (1)$$

as adopted by the International Association of Seismology and Physics of the Earth's Interior (IASPEI; Bath, 1966, p. 153), where A is the maximum vertical surface-wave ground amplitude, in micrometers; T is the period, in seconds, and $18 \leq T \leq 22$; and D is the distance in geocentric degrees (station to epicenter), and $20° \leq D \leq 160°$. No depth correction is made for depth less than 50 km, and no MS magnitudes are computed for depths greater than 50 km.

$$mb = \log (A/T) + Q(D,h), \quad (2)$$

as defined by Gutenberg and Richter (1956), except that T, the period in seconds, is restricted to $0.1 \leq T \leq 3.0$, and A, the ground amplitude in micrometers, is not necessarily the maximum of the P-wave group. Q is a function of distance D and depth h, where $D \geq 5°$.

$$ML = \log A - \log A_0, \quad (3)$$

as defined by Richter (1958, p. 340), where A is the maximum trace amplitude in millimeters, written by a Wood-Anderson torsion seismometer,

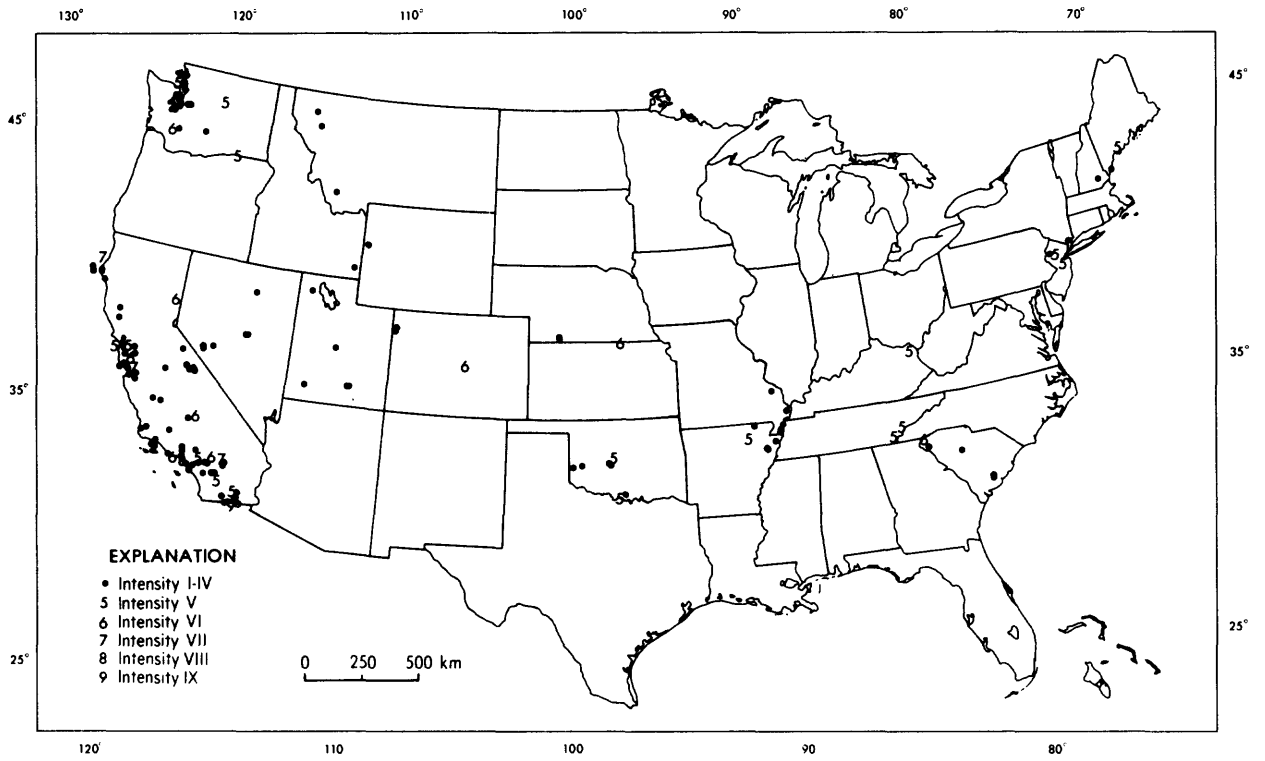

FIGURE 4.--Plot of earthquakes in the conterminous United States that were felt or caused damage in 1979.

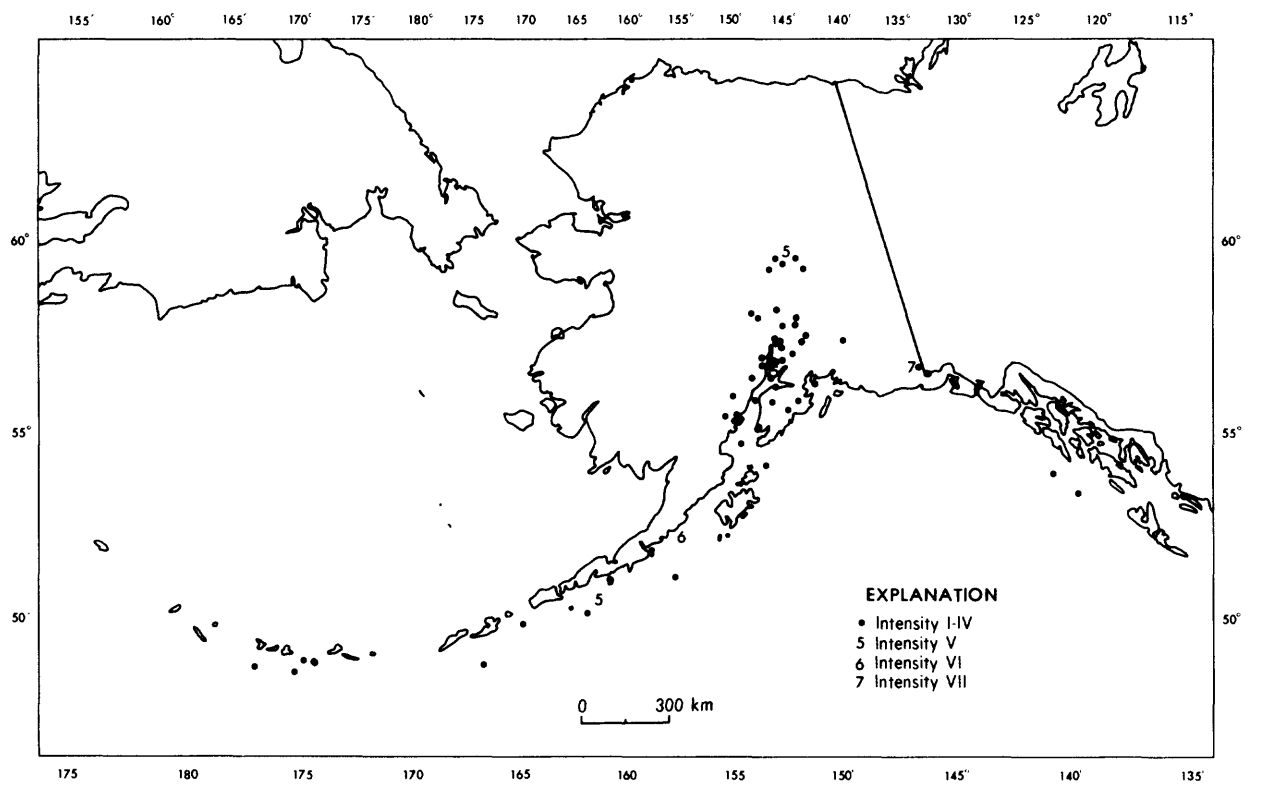

FIGURE 5.--Plot of earthquakes in Alaska that were felt or caused damage in 1979.

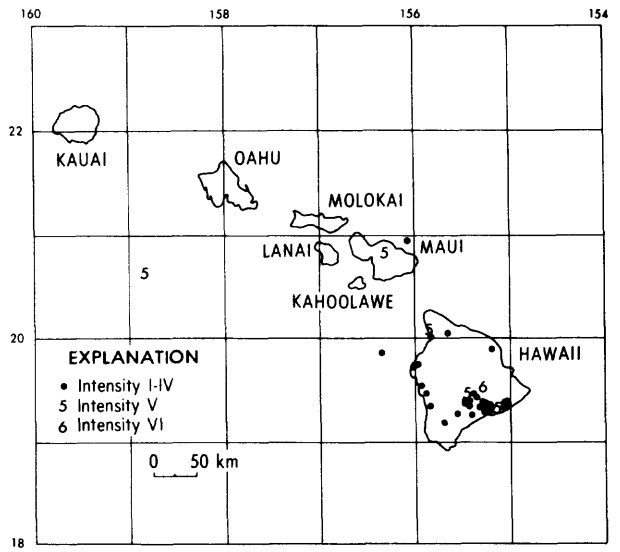

FIGURE 6.--Plot of earthquakes in Hawaii that were felt or caused damage in 1979.

and log A_o is a standard value as a function of distance, where the distance is $\leq$600 km. ML values are also calculated from other seismometers by conversion of recorded ground motion to the expected response of the torsion seismometer:

$$mbLg = 3.75 + 0.90(\log D) + \log (A/T) \quad 0.5° \leq D \leq 4°, \tag{4}$$

$$mbLg = 3.30 + 1.66(\log D) + \log(A/T) \quad 4° \leq D \leq 30°,$$

as proposed by Nuttli (1973), where A/T is expressed in micrometers per second, calculated from the vertical-component 1-second Lg waves, and D is the distance in geocentric degrees.

MD is used in this publication for the duration or coda length magnitude. MD is usually computed from the difference, in seconds, between Pn or Pg-wave arrival time and the time the final coda amplitude decreases to the background-noise amplitude. These magnitudes are normally correlated with ML or mbLg so that resulting magnitudes are compatible. Thus the formulas vary for different geographic regions and seismograph systems.

Intensity, as applied to earthquakes, represents a quantity determined from the effects on people, manmade objects, and the earth's surface (landslides, ground fissures). Intensities are assigned according to the descriptions listed in the Modified Mercalli Intensity Scale of 1931 (Wood and Neumann, 1931). There are 12 discrete steps in the MM scale (see next section). An earthquake in a populated area will have different intensities at different localities, owing to the distance from the focus of the earthquake, type of focal mechanism, local geological conditions, structural design of buildings, and the earthquake magnitude.

The text of this publication gives the intensity at locations where the earthquake was reported felt and summaries of the strongest effects. Each earthquake is further characterized by its maximum intensity, which is given in the text and in table 1.

Although the Modified Mercalli Intensity Scale is in many instances inadequate for present-day requirements, the scale has been the guide used by the USGS and NOAA and will continue to be so used until a new scale has been devised and has acceptance in the engineering and seismological communities. Questions concerning the interpretation of historical earthquake intensities should be referred to the USGS.

MODIFIED MERCALLI INTENSITY SCALE OF 1931

Adapted from Sieberg's Mercalli-Cancani scale, modified and condensed.

I. Not felt - or, except rarely under especially favorable circumstances. Under certain conditions, at and outside the boundary of the area in which a great shock is felt: sometimes birds, animals, reported uneasy or disturbed; sometimes dizziness or nausea experienced; sometimes trees, structures, liquids, bodies of water, may sway--doors may swing, very slowly.

II. Felt indoors by few, especially on upper floors, or by sensitive, or nervous persons. Also, as in grade I, but often more noticeably: sometimes hanging objects may swing, especially when delicately suspended; sometimes trees, structures, liquids, bodies of water, may sway, doors may swing, very slowly; sometimes birds, animals, reported uneasy or disturbed; sometimes dizziness or nausea experienced.

III. Felt indoors by several, motion usually rapid vibration. Sometimes not recognized to be an earthquake at first. Duration estimated in some cases. Vibration like that due to passing of light, or lightly loaded trucks, or heavy trucks some distance away. Hanging objects may swing slightly. Movements may be appreciable on upper levels of tall structures. Rocked standing motor cars slightly.

IV. Felt indoors by many, outdoors by few. Awakened few, especially light sleepers.

Frightened no one, unless apprehensive from previous experience. Vibration like that due to passing of heavy or heavily loaded trucks. Sensation like heavy body striking building or falling of heavy objects inside. Rattling of dishes, windows, doors; glassware and crockery clink and clash. Creaking of walls, frame, especially in the upper range of this grade. Hanging objects swung, in numerous instances. Disturbed liquids in open vessels slightly. Rocked standing motor cars noticeably.

V. Felt indoors by practically all, outdoors by many or most: outdoors direction estimated. Awakened many, or most. Frightened few--slight excitement, a few ran outdoors. Buildings trembled throughout. Broke dishes, glassware, to some extent. Cracked windows--in some cases, but not generally. Overturned vases, small or unstable objects, in many instances, with occasional fall. Hanging objects, doors, swing generally or considerably. Knocked pictures against walls, or swung them out of place. Opened, or closed, doors, shutters, abruptly. Pendulum clocks stopped, started or ran fast, or slow. Moved small objects, furnishings, the latter to slight extent. Spilled liquids in small amounts from well-filled open containers. Trees, bushes, shaken slightly.

VI. Felt by all, indoors and outdoors. Frightened many, excitement general, some alarm, many ran outdoors. Awakened all. Persons made to move unsteadily. Trees, bushes, shaken slightly to moderately. Liquid set in strong motion. Small bells rang--church, chapel, school, etc. Damage slight in poorly built buildings. Fall of plaster in small amount. Cracked plaster somewhat, especially fine cracks chimneys in some instances. Broke dishes, glassware, in considerable quantity, also some windows. Fall of knick-knacks, books, pictures. Overturned furniture in many instances. Moved furnishings of moderately heavy kind.

VII. Frightened all--general alarm, all ran outdoors. Some, or many, found it difficult to stand. Noticed by persons driving motor cars. Trees and bushes shaken moderately to strongly. Waves on ponds, lakes, and running water. Water turbid from mud stirred up. Incaving to some extent of sand or gravel stream banks. Rang large church bells, etc. Suspended objects made to quiver. Damage negligible in buildings of good design and construction, slight to moderate in well-built ordinary buildings, considerable in poorly built or badly designed buildings, adobe houses, old walls (especially where laid up without mortar), spires, etc. Cracked chimneys to considerable extent, walls to some extent. Fall of plaster in considerable to large amount, also some stucco. Broke numerous windows, furniture to some extent. shook down loosened brickwork and tiles. Broke weak chimneys at the roof-line (sometimes damaging roofs). Fall of cornices from towers and high buildings. Dislodged bricks and stones. Overturned heavy furniture, with damage from breaking. Damage considerable to concrete irrigation ditches.

VIII. Fright general--alarm approaches panic. Disturbed persons driving motor cars. Trees shaken strongly--branches, trunks, broken off, especially palm trees. Ejected sand and mud in small amounts. Changes: temporary, permanent; in flow of springs and wells; dry wells renewed flow; in temperature of spring and well waters. Damage slight in structures (brick) built especially to withstand earthquakes. Considerable in ordinary substantial buildings, partial collapse: racked, tumbled down, wooden houses in some cases; threw out panel walls in frame structures, broke off decayed piling. Fall of walls. Cracked, broke, solid stone walls seriously. Wet ground to some extent, also ground on steep slopes. Twisting, fall, of chimneys, columns, monuments, also factory stacks, towers. Moved conspicuously, overturned, very heavy furniture.

IX. Panic general. Cracked ground conspicuously. Damage considerable in (masonry) structures built especially to withstand earthquakes: Threw out of plumb some wood-frame houses built especially to withstand earthquakes; great in substantial (masonry) buildings, some collapse in large part; or wholly shifted frame buildings off foundations, racked frames; serious to reservoirs; underground pipes sometimes broken.

X. Cracked ground, especially when loose and wet, up to widths of several inches; fissures up to a yard in width ran parallel to canal and stream banks. Landslides considerable from river banks and steep coasts. Shifted sand and mud horizontally on beaches and flat land. Changed level of water in wells. Threw water on banks of canals, lakes, rivers, etc. Damage serious to dams, dikes, embankments. Severe to well-built wooden structures and bridges, some destroyed. Developed dangerous cracks in excellent brick walls. Destroyed most masonry and frame structures, also their foundations. Bent railroad rails slightly. Tore

apart, or crushed endwise, pipe lines buried in earth. Open cracks and broad wavy folds in cement pavements and asphalt road surfaces.

XI. Disturbances in ground many and widespread, varying with ground material. Broad fissures, earth slumps, and land slips in soft, wet ground. Ejected water in large amounts charged with sand and mud. Caused sea-waves ("tidal" waves) of significant magnitude. Damage severe to wood-frame structures, especially near shock centers. Great to dams, dikes, embankments often for long distances. Few, if any (masonry) structures remained standing. Destroyed large well-built bridges by the wrecking of supporting piers, or pillars. Affected yielding wooden bridges less. Bent railroad rails greatly, and thrust them endwise. Put pipe lines buried in earth completely out of service.

XII. Damage total—practically all works of construction damaged greatly or destroyed. Disturbances in ground great and varied, numerous shearing cracks. Landslides, falls of rock of significant character, slumping of river banks, etc., numerous and extensive. Wrenched loose, tore off, large rock masses. Fault slips in firm rock, with notable horizontal and vertical offset displacements. Water channels, surface and underground, disturbed and modified greatly. Dammed lakes, produced waterfalls, deflected rivers, etc. Waves seen on ground surfaces (actually seen, probably, in some cases). Distorted lines of sight and level. Threw objects upward into the air.

COLLABORATORS

Active cooperation in earthquake investigations in the United States is provided by several seismological collaborators. The following served as collaborators to the USGS and NOAA during 1979.

Alabama.—L. J. Eisele, Spring Hill College, Mobile.

Alaska.--Staff of NOAA-Alaska Tsunami Warning Center, Palmer.

Arizona.--Marc Sbar, University of Arizona, Tucson.

California (northern).--Bruce A. Bolt, University of California, Berkeley.

California (southern).--Clarence R. Allen, California Institute of Technology, Pasadena.

Connecticut.--Robert Miller, University of Connecticut, Groton.

Delaware.--Kenneth D. Woodruff, University of Delaware, Newark.

Florida and Georgia.--Leland T. Long, Georgia Institute of Technology, Atlanta.

Hawaii.--Robert Koyanagi, USGS, Hawaiian Volcano Observatory, Hawaii National Park.

Idaho.--James K. Applegate, Boise State University, Boise.

Indiana.--Robert F. Blakely, Department of Natural Resources, Geological Survey, Bloomington.

Iowa.--J. P. Kopp, Loras College, Dubuque.

Kansas.--Henry V. Beck, Kansas State University, Manhattan, and Don W. Steeples, Kansas Geological Survey, Lawrence.

Kentucky.--Ronald L. Street, University of Kentucky, Lexington.

Michigan.--F. Mauk, University of Michigan, Ann Arbor.

Minnesota.--Harold Mooney, University of Minnesota, Minneapolis.

Missouri, Illinois, Arkansas area.--Otto Nuttli and Robert B. Herrmann, Saint Louis University, Saint Louis.

Montana.--Anthony Qamar, University of Montana, Missoula.

New England.--John E. Ebel, Boston College, Weston, Mass.

New York.--Lynn R. Sykes and Yash P. Aggarwal, Lamont-Doherty Geological Observatory, Palisades.

Ohio.--Edward J. Walter, John Carroll University, Cleveland.

Oklahoma.--James E. Lawson, Jr., Oklahoma Geological Survey, Leonard.

Oregon.--Richard W. Couch, Oregon State University, Corvallis.

Pennsylvania.--Benjamin F. Howell, Jr., Pennsylvania State University, University Park.

South Carolina.--Pradeep Talwani, University of South Carolina, Columbia, and Joyce Bagwell, Baptist College at Charleston, Charleston.

Tennessee.--Berlen C. Moneymaker, Knoxville, and Arch C. Johnston, Tennessee Earthquake Information Center, Memphis.

Texas.--G. R. Keller, University of Texas, El Paso.

Utah.--Kenneth Cook, University of Utah, Salt Lake City.

Virginia.--G. A. Bollinger, Virginia Polytechnic Institute and State University, Blacksburg.

Washington.--Robert S. Crosson, University of Washington, Seattle.

West Virginia.--R. W. Laird, West Virgina University, Morgantown.

Wisconsin.--David E. Willis, University of Wisconsin, Milwaukee.

Wyoming--R. A. Hutchinson, National Park Service, Yellowstone National Park.

Earthquake Descriptions

This section lists all earthquakes alphabetically by State. The origin time of earthquake occurrences is given in Universal Coordinated Time (UTC). Times are expressed continuously from midnight to midnight, or 0 to 24 hours.

Sources of noninstrumental information (macroseismic data) in this publication include questionnaire canvasses conducted by the USGS; newspaper articles; bulletins of the Seismological Society of America; and special earthquake reports of other organizations. Instrumental data are provided by the USGS, National Earthquake Information Service.

Roman numerals in the earthquake descriptions refer to the Modified Mercalli Intensity Scale of 1931 (see page 2), which gives about equal weight to the disturbance of inanimate objects and to personal reactions. When more than one degree of intensity is reported from a town, the town is assigned the highest intensity reported. All earthquake reports or press reports that contain only minimal information which preludes the assignment of an intensity are listed as "Felt."

[The following symbols are used to indicate authority for arrival or origin times, epicenters, and/or magnitudes: (B) University of California, Berkeley; (D) University of Montana, Missoula; (E) U.S. Department of Energy, Las Vegas, Nevada; (F) Bollinger and Mathena, 1980; (G) U.S. Geological Survey, National Earthquake Information Service, Golden, Colo.; (H) U.S. Geological Survey, Hawaiian Volcano Observatory, Hawaii National Park; (J) Weston Observatory, Weston, Mass.; (K) Kansas Geological Survey, Lawrence; (L) Lamont-Doherty Geological Observatory, Palisades, N.Y.; (M) NOAA, Alaska Tsunami Warning Center, Palmer; (O) Earth Physics Branch, Ottawa, Canada; (P) California Institute of Technology, Pasadena; (S) St. Louis University, St. Louis, Mo.; (T) University of Oklahoma, Leonard; (U) University of Utah, Salt Lake City; (V) Virginia Polytechnic Institute and State University, Blacksburg; (W) University of Washington, Seattle; (Y) University of Kentucky, Lexington; (Z) Stephens and others, 1980]

Alaska

4 January (G) Southern Alaska
Origin time: 15 35 04.0
Epicenter: 61.73 N., 150.04 W.
Depth: 34 km
Magnitude: 3.4 ML(M)

Felt at Eagle River and Willow.

8 January (G) Southern Alaska
Origin time: 10 11 00.8
Epicenter: 61.77 N., 150.08 W.
Depth: 45 km

Alaska--Continued

Magnitude: 2.5 ML(M)
Intensity II: Palmer.

10 January (G) Southern Alaska
Origin time: 00 34 48.1
Epicenter: 61.58 N., 150.06 W.
Depth: 42 km
Magnitude: 3.0 ML(M)
Intensity II: Palmer.

25 January (G) Central Alaska
Origin time: 02 49 03.5
Epicenter: 63.32 N., 151.16 W.
Depth: Normal.
Magnitude: 3.5 ML(M)
Intensity III: Fairbanks (M).

25 January (G) Southern Alaska
Origin time: 19 30 06.1
Epicenter: 60.13 N., 153.12 W.
Depth: 105 km
Magnitude: 5.5 mb(G)

Felt from Kodiak Island to Fairbanks (M).

Intensity IV: Anchorage, Clam Gulch, Cooper Landing, Homer, Kenai, Larsen Bay, Seldovia, Seward, Soldotna, Sterling, Tyonek.
Intensity III: Karluk, Nikishka, Olga Bay, Pedro Bay.
Felt: Kodiak, Palmer, Talkeetna (press reports).

27 January (G) Southern Alaska
Origin time: 16 48 11.5
Epicenter: 60.96 N., 149.38 W.
Depth: 49 km
Magnitude: 3.6 mb(G), 3.2 ML(M)
Intensity IV: Anchorage, Chugiak, Clam Gulch, Sutton, Talkeetna.
Intensity III: Skwentna.
Intensity II: Kenai.

27 January (G) Alaska Peninsula
Origin time: 18 57 55.0
Epicenter: 54.77 N., 161.25 W.
Depth: 17 km
Magnitude: 6.0 mb(G), 6.0 MS(G), 5.8 MS(B), 5.8 MS(L)
Intensity V:
Cold Bay (hairline cracks in exterior walls; unconfirmed report of a building

moved on its foundation; light furniture shifted, small objects fell and overturned; windows, doors, and dishes rattled; felt by many).
Sand Point (small objects fell; buildings creaked and shook; windows, doors, and dishes rattled; felt by many).
Intensity IV: King Cove, Perryville.
Intensity III: False Pass.

31 January (G) Andreanof Islands, Aleutian Islands
Origin time: 03 07 32.0
Epicenter: 51.72 N., 175.81 W.
Depth: 64 km
Magnitude: 5.0 mb(G)
Intensity III: Adak (M).

1 February (G) Southern Alaska
Origin time: 12 29 05.4
Epicenter: 60.24 N., 152.84 W.
Depth: 109 km
Magnitude: 4.8 mb(G)
Intensity IV: Kenai (M), Seward (M), Soldotna (M).
Intensity III: Homer (M), Anchorage (M).

6 February (G) Kenai Peninsula
Origin time: 22 52 00.6
Epicenter: 60.72 N., 151.77 W.
Depth: 87 km
Magnitude: None computed.

Felt at Kenai and Soldotna (M).

7 February (G) Southern Alaska
Origin time: 13 33 29.1
Epicenter: 61.03 N., 150.15 W.
Depth: 32 km
Magnitude: 3.0 ML(M)

Felt at Anchorage (M).

9 February (G) Southern Alaska
Origin time: 18 49 25.1
Epicenter: 60.06 N., 152.59 W.
Depth: 88 km
Magnitude: 4.8 mb(G)

Felt at Anchorage and on the Kenai Peninsula (M).

13 February (G) Alaska Peninsula region
Origin time: 05 34 25.9
Epicenter: 55.45 N., 157.16 W.
Depth: Normal.
Magnitude: 5.9 mb(G), 6.7 MS(G), 6.6 MS(B), 6.8 mb(P), 6.5 MS(P)
Intensity IV: Chignik, Perryville, Pilot Point, Port Heiden.

Alaska--Continued

Intensity III: Egegik, King Salmon, Sand Point.
Intensity II: Naknek.

17 February (G) Southern Alaska
Origin time: 08 01 24.6
Epicenter: 62.80 N., 148.28 W.
Depth: 95 km
Magnitude: None computed.
Intensity II: Palmer (M).

17 February (G) Southern Alaska
Origin time: 10 48 08.7
Epicenter: 62.31 N., 149.50 W.
Depth: 54 km
Magnitude: 4.9 mb(G)

Felt from Talkeetna to Anchorage and at Valdez (M).

Intensity IV: Palmer (M).
Intensity III: Talkeetna.

23 February (G) Central Alaska
Origin time: 09 42 03.6
Epicenter: 64.98 N., 147.85 W.
Depth: 24 km
Magnitude: 4.3 mb(G), 4.2 ML(M)
Intensity V: Fairbanks (small objects fell).

23 February (G) Central Alaska
Origin time: 18 14
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.
Intensity III: Fairbanks.

27 February (G) Southern Alaska
Origin time: 14 42 45.2
Epicenter: 62.29 N., 149.81 W.
Depth: 34 km
Magnitude: 2.7 ML(M)

Felt at Talkeetna.

28 February (G) Fox Islands, Aleutian Islands
Origin time: 02 47 10.4
Epicenter: 52.94 N., 169.06 W.
Depth: 79 km
Magnitude: 4.5 mb(G)

Felt at Nikolski.

28 February (G) Southeastern Alaska
Origin time: 21 27 06.1
Epicenter: 60.64 N., 141.59 W.
Depth: 15 km
Magnitude: 6.4 mb(G), 7.1 MS(G), 7.4 MS(P), 7.3 MS(B), 6.9 ML(M)

The information on the effects of this earthquake was collected by the U.S. Geological Survey and Lamont-Doherty Geological Observatory in the United States, and by the Earth Physics Branch in Canada. The descriptions listed below were taken from Stover and others (1980). This earthquake was felt over an area of approximately 500,000 sq km of Alaska and western Canada (fig. 7). The lack of major damage was due to the epicenter being in an unpopulated area of ice fields near the eastern end of the Chugach Mountains and in the vicinity of Mt. St. Elias. It is the first major earthquake since 1899 to occur between Yakutat Bay and Prince William Sound. Lahr and others (1980) determined 102 aftershocks with magnitudes greater than 2.5 within 6 days following this event, and Stephens and others (1980) located 308 aftershocks that occurred between 28 February and 31 March 1979.

Porcella (1979) reported ground accelerations recorded on strong motion accelerographs at Icy Bay (73 km distant), Munday Creek (92 km distant), and Yakutat (161 km distant), were 0.16 g, 0.06 g, and 0.09 g respectively.

Intensity VII:

United States--

Alaska--

Icy Bay Lumber Camp (A heavy logging truck on the road just west of the camp had just stopped when the earthquake was first felt. The motion bounced the truck sideways across the road so strongly that the driver was unable to descend from the truck. The reports from the camp described books shaken from shelves to the floor, minor cracking in a concrete slab floor, people had difficulty in standing, trees and bushes shaken strongly, overhead electric lines whipped back and forth.)

Intensity VI:

United States--

Alaska--

Border City (building foundation cracked, plaster cracked, a wooden building on permafrost moved on its foundation).

Cape Yakataga (drywall cracked, a few windows cracked, small objects broken, hanging objects swung violently, some hanging pictures fell, trees and bushes shaken strongly, felt by all).

Haines (plaster cracked, heavy furniture and appliances shifted, cracks in the exterior concrete wall near the roof of the office of the Thunderbird Motel, small exterior cracks in the exterior wall of the bank).

Juneau Airport (deplaning passengers had difficulty standing and needed support to remain upright; in the terminal building a heavy desk was bounced away from a wall and back again; heavy fire extinguishers hanging on a wall swung about 15 cm).

Mendenhall subdivision--north of Juneau (many instances of cracked plaster, furniture shifted, and a double-width mobile home separated at the joint).

Valdez Airport--5 km east of Valdez (The terminal, which is an earthquake-resistant building, suffered no damage to exterior walls. There were many instances of cracked wallboard on the inside walls at corners, doorways, and windows. People in the terminal had difficulty standing and described the motion as long, slow, and rolling.).

Yakutat (The city hall on Monti Bay was shaken strongly enough to cause people to be nauseous and leave the building. Outside they had difficulty standing alone and had to hang onto each other to remain upright. Trucks near the building were rocked back and forth and open truck doors swung. There were many reports of parked cars being moved back and forth. Electric power lines were whipped back and forth. The concrete slab floor of a restaurant was cracked in two separate areas across its length.).

Canada--

Yukon Territory--

Beaver Creek (cracked plaster in the upper floor of a two-story house, hanging lamps swung violently, school teachers evacuated the school, cracks widened in the wall of the school along the base with numerous vertical cracks appearing, one well went dry for a day and a half).

Burwash Landing (people had difficulty in standing, dishes broken, liquid spilled, fresh cracks in the exterior walls of the Aeradio station building).

Destruction Bay (residents at the Talbot Arm Lodge reported that water

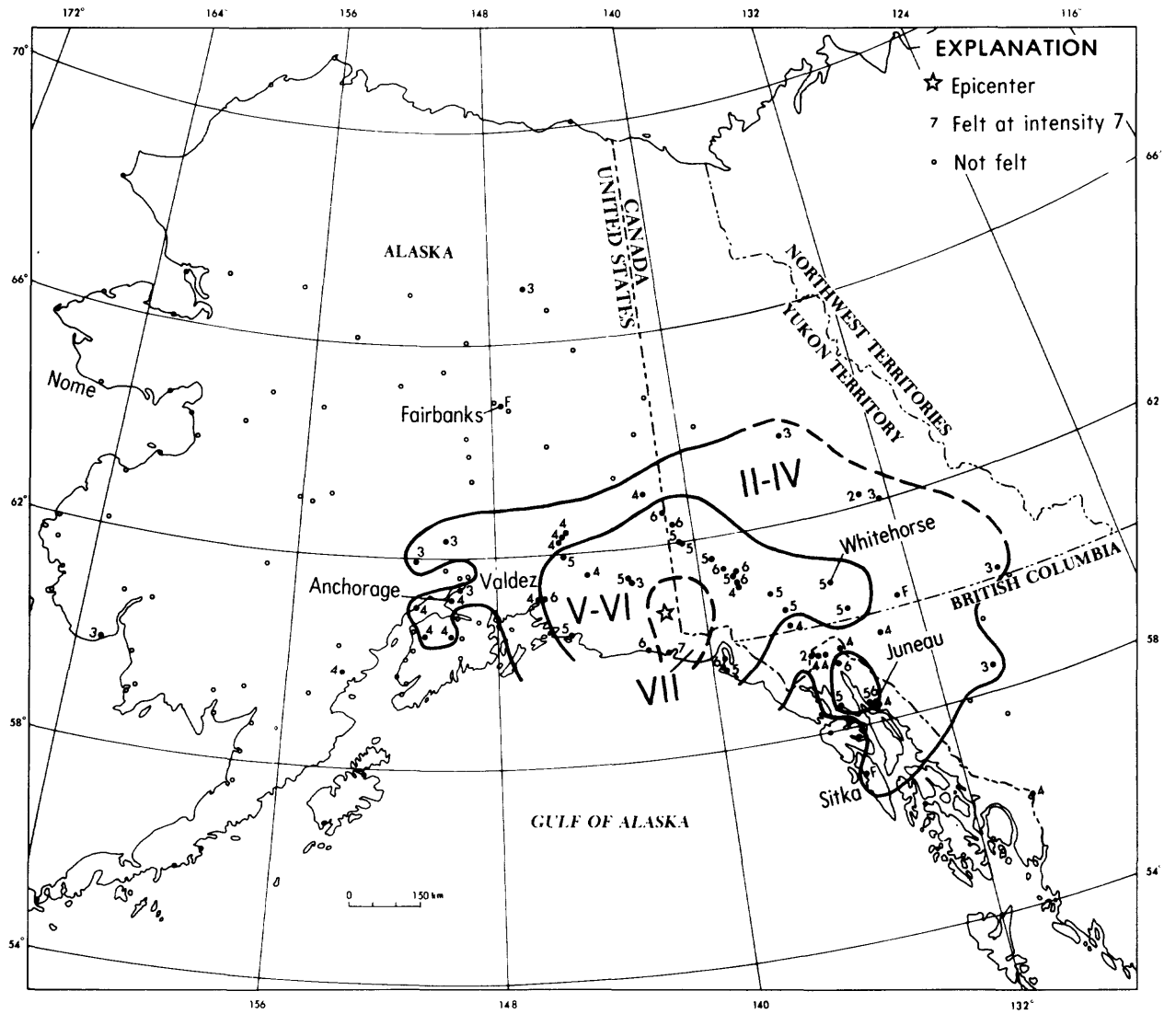

FIGURE 7.--Isoseismal map for the St. Elias earthquake of 28 February 1979, 21 27 06.1 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

Alaska--Continued

splashed out of the kitchen sink, the canopy over the grill moved, cracks appeared in the plaster walls, and pictures swung).

Kluane Lake Fishing Camp (The owners noticed vertical motion of trees and vehicles and the log cabin walls whipped violently up and down. They left their cabin in a panic and were afraid that their truck would be overturned by the tremor. In the cabin, taxidermic displays fell and water splashed out of a large kettle on the stove.).

Alaska--Continued

Intensity V:
United States--
Alaska--Auke Bay, Cordova, Gustavus, McCarthy, Yakutat Airport.
Canada--
Yukon Territory--Bayshore Esso, Carcross, Dezadeash, Haines Junction, Kluane Wilderness Village, Koidern, Whitehorse, White River.

Intensity IV:
United States--
Alaska--Anchorage, Chitina, Cooper Landing, Copper Center, Gakona, Glennallen, Gulkana (FAA Airport), Juneau,

Klukwan, Northway, Pedro Bay, Skagway, Sterling, Tyonek, Valdez, 33 Mile Cafe.
Canada--
British Columbia--Atlin, Stewart.
Yukon Territory--Arctic Institute, DPW.

Intensity III:
United States--
Alaska--Chugiak, Kontiginak, May Creek, Skwentna, Talkeetna, Venetie.
Canada--
British Columbia--Dease Lake.
Yukon Territory--Mayo, Ross River, Watson Lake.

Intensity II:
Canada--
Yukon Territory--Customs, Faro.

Felt, but not enough data to evaluate the intensity:
United States--
Alaska--Fairbanks, Sitka.
Canada--
Yukon Territory--Teslin.

1 March (Z) Southeastern Alaska
Origin time: 07 08 53.7
Epicenter: 60.63 N., 141.24 W.
Depth: 11 km
Magnitude: 5.4 mb(G), 4.7 MS(G)
4.9 ML(Z), 5.3 ML(M)

Felt at Cape Yakataga (M).

2 March (Z) Southeastern Alaska
Origin time: 09 34 45.4
Epicenter: 60.38 N., 140.69 W.
Depth: 1 km
Magnitude: 5.4 mb(G), 5.2 ML(M),
5.0 ML(Z)

Felt at Cape Yakataga and Icy Bay Lumber Camp (M).

14 March (G) Cook Inlet
Origin time: 07 56 31.4
Epicenter: 59.79 N., 151.92 W.
Depth: 87 km
Magnitude: 3.4 mb(G)

Felt at Anchor Point and Homer (M).

14 March (G) Kenai Peninsula
Origin time: 13 31 34.5
Epicenter: 60.98 N., 149.39 W.
Depth: 41 km
Magnitude: 4.0 mb(G), 3.8 ML(M)
Intensity IV: Anchorage (M), Hope (M), Palmer (M).

24 March (G) Southern Alaska
Origin time: 18 37 41.8
Epicenter: 61.53 N., 149.93 W.
Depth: 52 km
Magnitude: None computed.

Felt in the Anchorage area (M).

26 March Southern Alaska
Origin time: 23 11
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.
Intensity III: Fish Lake (M), Talkeetna (M).

27 March (G) Andreanof Islands, Aleutian Islands
Origin time: 11 39 09.0
Epicenter: 51.82 N., 175.33 W.
Depth: 43 km
Magnitude: 5.0 mb(G), 4.4 MS(G)
Intensity IV: Adak (M).

27 March (G) Southern Alaska
Origin time: 18 38 42.2
Epicenter: 60.49 N., 148.98 W.
Depth: 26 km
Magnitude: 2.9 ML(M)

Felt at Girdwood and Portage. A snowslide was reported at Alyeska resort (M).

2 April (G) Central Alaska
Origin time: 02 15 31.4
Epicenter: 64.81 N., 147.43 W.
Depth: 10 km
Magnitude: 3.1 ML(M)

Felt at Fairbanks (M).

4 April (G) Southern Alaska
Origin time: 08 16 15.3
Epicenter: 60.32 N., 153.59 W.
Depth: 174 km
Magnitude: 4.5 mb(G)

Felt at Chugiak (M).

17 April (G) Southern Alaska
Origin time: 02 59 20.3
Epicenter: 61.68 N., 150.12 W.
Depth: Normal.
Magnitude: 2.7 ML(M)
Intensity II: Palmer (M).

18 April (G) Southern Alaaka
Origin time: 17 06 19.5
Epicenter: 62.16 N., 149.52 W.
Depth: 79 km
Magnitude: None computed.
Intensity II: Palmer (M).

20 April (G) Southeastern Alaska
Origin time: 12 49 06.5
Epicenter: 60.28 N., 140.78 W.

Depth: 8 km
Magnitude: 5.3 mb(G), 4.9 MS(G), 5.0 ML(Z)
Intensity IV: Cape Yakataga, Icy Bay, Yakutat.

25 April (G) Central Alaska
Origin time: 00 27 57.6
Epicenter: 63.35 N., 149.50 W.
Depth: 119 km
Magnitude: 3.9 mb(G)

Felt at Curry and Gold Creek (M).

25 April (G) Central Alaska
Origin time: 09 39 00.0
Epicenter: 64.88 N., 148.83 W.
Depth: 11 km
Magnitude: 3.3 ML(M)
Intensity III: Fairbanks.

28 April (G) Central Alaska
Origin time: 07 33 06.0
Epicenter: 64.61 N., 149.46 W.
Depth: 28 km
Magnitude: 3.0 ML(M)

Felt at Fairbanks and Nenana (M).

5 May (G) Southern Alaska
Origin time: 06 50 38.8
Epicenter: 62.97 N., 148.23 W.
Depth: 77 km
Magnitude: 4.6 mb(G)

Felt at Anchorage and Palmer (M).

9 May (G) Southern Alaska
Origin time: 14 22 21.0
Epicenter: 61.93 N., 148.92 W.
Depth: 12 km
Magnitude: 2.9 ML(M)
Intensity III: Palmer (M).

13 May Andreanof Islands, Aleutian Islands
Origin time: 18 51
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.

Felt on Adak.

14 May (G) Southern Alaska
Origin time: 20 14 36.0
Epicenter: 61.73 N., 150.89 W.
Depth: 45 km
Intensity II: Palmer (M).

18 May (G) Central Alaska
Origin time: 05 35 22.6
Epicenter: 64.41 N., 147.08 W.
Depth: 28 km
Magnitude: 3.2 ML(M)
Intensity III: Fairbanks, Harding Lake, and Salcha River areas (M).

20 May (G) Alaska Peninsula area
Origin time: 08 14 00.1
Epicenter: 56.65 N., 156.73 W.
Depth: 71 km
Magnitude: 6.4 mb(G), 6.5 mb(P), 6.1 MS(P), 6.2 mb(B)

Felt strongly at Dillingham (press report).

Intensity VI: Larsen Bay (plaster and dry wall cracked; hairline cracks in exterior walls, small objects shifted and fell, hanging pictures fell, felt by all, awakened many).
Intensity V:
Chignik (small objects fell, hanging objects swung violently, hanging pictures swung, water splashed onto sides of lakes and ponds, vehicles rocked strongly, felt by and awakened many).
Ivanof Bay (light furniture shifted, small objects fell, water spilled from containers, felt by all).
Kodiak (light and heavy furniture shifted, water spilled from small containers, hanging pictures fell, small landslides, standing vehicles rocked moderately).
Perryville (water spilled from small containers, many awakened, felt by all).
Intensity IV: Akhiok, Egegik, King Salmon, Pilot Point, Port Heiden, Port Lions, Sand Point.

20 May (G) Southern Alaska
Origin time: 22 28 38.1
Epicenter: 62.83 N., 149.17 W.
Depth: 95 km
Magnitude: None computed.

Felt along the Alaska Railroad at Gold Creek and Chulitna (M).

21 May (G) Central Alaska
Origin time: 10 05 11.6
Epicenter: 64.71 N., 148.43 W.
Depth: Normal.
Magnitude: 3.0 ML(M)
Intensity II: Fairbanks (M).

25 May (G) Fox Islands, Aleutian Islands
Origin time: 16 45 27.3
Epicenter: 52.61 N., 167.02 W.
Depth: 23 km
Magnitude: 6.0 mb(G), 6.2 MS(G), 6.0 MS(B),
Intensity IV: Nikolski (M).

28 May (G) Southern Alaska
Origin time: 17 50 14.3
Epicenter: 61.64 N., 150.02 W.
Depth: 45 km
Magnitude: None computed.
Intensity II: Anchorage, Palmer, Wasilla (M).

31 May (G) Southern Alaska
Origin time: 04 22 54.3
Epicenter: 61.74 N., 149.88 W.
Depth: 55 km
Magnitude: 3.4 mb(G)

Felt in the Anchorage area (M).

20 June (G) Southern Alaska
Origin time: 08 18 30.8
Epicenter: 60.88 N., 147.69 W.
Depth: Normal.
Magnitude: 3.3 ML(M)

Felt at mile 2 of Parks Highway and at Goat Creek (M).

23 June (G) Southern Alaska
Origin time: 10 46 58.6
Epicenter: 61.87 N., 150.28 W.
Depth: Normal.
Magnitude: 3.1 mb(G), 3.1 ML(M)
Intensity IV: Willow (M).

23 June (G) Southern Alaska
Origin time: 18 39 32.2
Epicenter: 58.03 N., 134.91 W.
Depth: 15 km
Magnitude: 3.8 mb(G)
Intensity IV: Juneau-Douglas area (M)

26 June (G) Southern Alaska
Origin time: 19 08 21.3
Epicenter: 62.36 N., 147.83 W.
Depth: 86 km
Magnitude: 3.8 mb(G)
Intensity IV: Palmer-Talkeetna area (M).

10 July (G) Southern Alaska
Origin time: 04 04 20.5
Epicenter: 63.20 N., 150.72 W.
Depth: 130 km
Magnitude: 4.9 mb(G)
Intensity II: Anchorage (M).

11 July (G) Southeastern Alaska
Origin time: 12 28 02.9
Epicenter: 55.32 N., 134.97 W.
Depth: 10 km
Magnitude: 5.1 mb(G), 5.1 MS(G), 5.1 MS(B), 5.8 ML(M)
Intensity IV: Craig, Hydaburg, Klawock (M), Metlakatla, Petersburg, Port Alexander.
Intensity II: Ketchikan, Sitka.

16 July (G) Southern Alaska
Origin time: 23 45 58.5
Epicenter: 60.86 N., 153.02 W.
Depth: 141 km
Magnitude: 4.6 mb(G)

Felt at Anchorage (M).

17 July (G) Southern Alaska
Origin time: 20 44 29.5
Epicenter: 62.27 N., 148.14 W.
Depth: 58 km
Magnitude: 5.3 mb(G), 5.0 mb(B)
Intensity IV: Anchorage, Chickaloon (telegraphic report), Chugiak, Girdwood, Moose Pass, Sutton, Whittier.
Intensity III: Palmer, Skwentna, Willow.
Intensity II: Fairbanks (telegraphic report).
Felt: Glennallen, Talkeetna, Valdez.

23 July (G) Southern Alaska
Origin time: 08 38 13.0
Epicenter: 58.63 N., 151.51 W.
Depth: Normal.
Magnitude: 4.4 mb(G), 4.6 ML(M)
Intensity II: Kodiak.

23 July (G) Southern Alaska
Origin time: 09 07 07.7
Epicenter: 61.64 N., 150.51 W.
Depth: 49 km
Magnitude: 2.9 ML(M)
Intensity II: Palmer area.

30 July (G) Southern Alaska
Origin time: 02 24 04.6
Epicenter: 62.04 N., 145.44 W.
Depth: 14 km
Magnitude: 3.5 ML(M)
Intensity II: Glennallen (M).

4 August (G) Southern Alaska
Origin time: 20 12 10.6
Epicenter: 62.49 N., 149.77 W.
Depth: 99 km
Magnitude: 4.1 mb(G)
Intensity III: Gold Creek (M), Talkeetna (M).
Intensity II: Palmer (M).

7 August (G) Andreanof Islands, Aleutian Islands
Origin time: 18 15 09.5
Epicenter: 51.32 N., 176.11 W.
Depth: Normal.
Magnitude: 4.6 mb, 4.0 ML(M)
Intensity III: Adak (M).

10 August (G) Southern Alaska
Origin time: 00 02 25.4
Epicenter: 61.97 N., 150.94 W.

Depth: 81 km
Magnitude: 4.3 mb(G)
Intensity III: Talkeetna.

27 August Andreanof Islands, Aleutian Islands
Origin time: 18 15
Epicenter: Not located.
Depth: None computed.
Magnitude: 4.0 ML(M)
Intensity III: Adak (M).

29 August (G) Southern Alaska
Origin time: 19 38 11.4
Epicenter: 61.91 N., 150.80 W.
Depth: 88 km
Magnitude: 3.9 mb(G)
Intensity III: Hatcher Pass (M), Wasilla (M).

31 August (G) Alaska Peninsula
Origin time: 20 42 27.4
Epicenter: 54.39 N., 161.84 W.
Depth: 20 km
Magnitude: 5.1 mb(G), 4.3 MS(G)
Intensity III: Cold Bay (M).

1 September (G) Fox Islands, Aleutian Islands
Origin time: 05 27 17.6
Epicenter: 53.98 N., 165.20 W.
Depth: 69 km
Magnitude: 5.8 mb(G), 6.4 mb(B), 6.3 mb(P)
Intensity IV: Dutch Harbor (M).

14 September Near Islands, Aleutian Islands
Origin time: 07 29
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.
Intensity III: Shemya Island (M).

23 September (G) Near Islands, Aleutian Islands
Origin time: 10 17 20.8
Epicenter: 52.29 N., 174.03 E.
Depth: 43 km
Magnitude: 5.8 mb(G), 5.6 MS(G)
Intensity IV: Shemya (M).

24 September (G) Near Islands, Aleutian Islands
Origin time: 03 19 56.7
Epicenter: 52.19 N., 174.02 E.
Depth: Normal.
Magnitude: 4.8 mb
Intensity IV: Shemya (M).

Alaska--Continued

26 September Andreanof Islands, Aleutian Islands
Origin time: 07 18
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.
Intensity III: Adak (M).

27 September Andreanof Islands, Aleutian Islands
Origin time: 22 18
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.
Intensity III: Adak (M).

7 October (G) Southern Alaska
Origin time: 05 59 21.8
Epicenter: 61.22 N., 150.43 W.
Depth: 9 km
Magnitude: 3.1 ML(M)

Felt at Anchorage (M).

10 October (G) Southeastern Alaska
Origin time: 23 36 45.1
Epicenter: 56.15 N., 135.75 W.
Depth: Normal
Magnitude: 4.4 mb(G)

Felt at Sitka (M).

15 October (G) Andreanof Islands, Aleutian Islands
Origin time: 06 24 01.2
Epicenter: 51.77 N., 175.24 W.
Depth: 54 km
Magnitude: 4.8 mb(G)
Intensity IV: Adak (M).

16 October (G) Rat Islands, Aleutian Islands
Origin time: 21 16 05.2
Epicenter: 51.85 N., 175.36 E.
Depth: 34 km
Magnitude: 5.3 mb(G), 5.2 MS(G)
Intensity II: Shemya (M).

18 October (G) Rat Islands, Aleutian Islands
Origin time: 03 35 26.9
Epicenter: 51.86 N., 177.13 E.
Depth: 62 km
Magnitude: 6.0 mb(G)
Intensity III: Shemya (M).

27 October (G) Southern Alaska
Origin time: 06 32 02.3
Epicenter: 61.70 N., 149.58 W.

Alaska--Continued

Depth: 44 km
Magnitude: 3.0 ML(M)
Intensity II: Palmer (M).

27 October (G) Southern Alaska
Origin time: 22 16 59.2
Epicenter: 59.38 N., 152.90 W.
Depth: 77 km
Magnitude: 4.1 mb(G)

Felt in the Homer area (M).

28 October (G) Southern Alaska
Origin time: 06 24 09.8
Epicenter: 59.86 N., 151.67 W.
Depth: 82 km
Magnitude: None computed.

Felt in the Homer area (M).

2 November (G) Andreanof Islands, Aleutian Islands
Origin time: 03 21 04.1
Epicenter: 51.16 N., 178.05 W.
Depth: Normal.
Magnitude: 4.8 mb(G), 4.6 MS(G)
4.3 ML(M)
Intensity III: Adak (M).

7 November (G) Southern Alaska
Origin time: 03 14 36.1
Epicenter: 60.59 N., 150.68 W.
Depth: 90 km
Magnitude: None computed.
Intensity III: Naptown (M).
Intensity II: Soldotna (M), Sterling (M).

14 November (G) Southern Alaska
Origin time: 23 00 42.8
Epicenter: 61.38 N., 150.09 W.
Depth: 57 km
Magnitude: 5.1 mb(G)
Intensity V:
Spenard (light furniture and small objects moved; hanging pictures swung; buildings shook strongly; windows, doors and dishes rattled; felt by several).
Wasilla (light furniture and small objects moved, hanging pictures knocked out of place; buildings creaked and shook, felt by several).
Intensity IV: Anchorage, Chugiak, Skwenta, Sutton, Whittier.
Intensity III: Anchorage--Mountain View, Big Lake Area, Kenai, North Kenai, Palmer (M).
Intensity II: Willow.

15 November (G) Southern Alaska
Origin time: 02 08 34.8
Epicenter: 61.26 N., 150.00 W.
Depth: 49 km

Alaska--Continued

Magnitude: 3.8 ML(M)
Intensity IV: Anchorage.

15 November (G) Kenai Peninsula
Origin time: 07 15 13.2
Epicenter: 60.18 N., 149.68 W.
Depth: 69 km
Magnitude: None computed.
Intensity IV: Seward.

26 December (G) Southern Alaska
Origin time: 13 12 16.7
Epicenter: 61.42 N., 151.62 W.
Depth: 111 km
Magnitude: 4.1 mb(G)
Intensity II: Anchorage (M).

Arizona

15 March (P) Southern California
Origin time: 21 07 16.5

See California listing.

15 October (P) Imperial Valley area
Origin time: 23 16 54.5

See California listing.

11 December Central Arizona
Origin time: 20 30
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.

Felt by many in the Theodore Roosevelt Lake area.

Intensity IV: Roosevelt (press report).

21 December (P) Imperial Valley area
Origin time: 20 40 25.3

See California listing.

Arkansas

5 February (S) Northeastern Arkansas
Origin time: 05 31 09.3
Epicenter: 35.84 N., 90.08 W.
Depth: 14 km
Magnitude: 3.2 mbLg(T)
Intensity IV:
Arkansas--Blytheville, Manila.
Missouri--Whiteoak.
Intensity III:
Arkansas--Dell.

Intensity II:
Arkansas--Burdette.
Missouri--Arbyrd.
Tennessee--Tipton.

27 February Southeastern Arkansas
Origin time: 08 25
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.
Intensity IV: Pine Bluff (two windows cracked), Moscow.

27 February (S) Northeastern Arkansas
Origin time: 22 54 54.0
Epicenter: 35.92 N., 91.24 W.
Depth: 9 km
Magnitude: 3.1 mbLg(S), 3.4 mbLg(T)
Intensity V:
Ravenden Springs (unconfirmed reports of slightly cracked streets, sidewalks, and brick fences; light furniture and small objects shifted).
Tuckerman (light furniture and small objects shifted).
Intensity IV: Alicia, Calamine, Cash, Cave City, Newark, O'Kean, Portia (telephone report), Poughkeepsie, Powhatan, Ravenden, Saffell, Smithville, Strawberry, Swifton.
Intensity III: Imboden.
Intensity II: Sulphur Rock, Walnut Ridge (telephone report), Weiner.

27 February (S) Northeastern Arkansas
Origin time: 22 55 12.0
Epicenter: 35.93 N., 91.24 W.
Depth: 10 km
Magnitude: None computed.
Intensity IV: Powhatan (S).

11 June (S) New Madrid region
Origin time: 04 12 16.9

See Missouri listing.

25 June (S) Northeastern Arkansas
Origin time: 17 11 13.4
Epicenter: 35.53 N., 90.43 W.
Depth: 11 km
Magnitude: 3.0 mbLg(T), 3.2 mbLg(S)

Felt throughout Poinsett County (press report).

Intensity IV: Lepanto, Marked Tree, Paynesway, Tyronza.
Intensity III: Gilmore.

26 August Northern Arkansas
Origin time: 11 28
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.

Intensity IV: Hardy (two windows were broken and the earthquake noise was described as similar to a sonic boom--press report).
Intensity III: Salem (press report).

5 November (S) Northern Arkansas
Origin time: 16 35 26.0
Epicenter: 36.44 N., 91.01 W.
Depth: 8 km
Magnitude: 2.9 mbLg(S)
Intensity IV: Biggers, Dalton (S), Maynard.
Intensity III: Reyno, Success.

California

1 January (P) Southern California
Origin time: 23 14 38.9
Epicenter: 33.95 N., 118.68 W.
Depth: 11 km
Magnitude: 5.1 mb(G), 4.7 MS(G), 5.0 ML(P), 4.9 ML(B)

The press reported a few broken store windows in the Malibu area, shattered store windows in Culver City at Exposition and Sepulveda Boulevard, one broken store window in Santa Monica, and cracked store windows in Buena Park and Seal Beach. The press also reported slight damage in North Hollywood and Toluca Lake areas. The California Highway Patrol reported a number of boulders fell onto Pacific Coast Highway in the Malibu area, closing one lane of the highway. Mud and boulders also fell across other roads in Malibu. The Los Angeles sheriff's office reported no injuries or damage except for objects falling from shelves and windows broken. California Institute of Technology recorded about 50 aftershocks by 5:30 p.m. local time. The earthquake was felt over an area of approximately 21,500 sq km (fig. 8).

Porcella (1979) reported that 23 accelerograms were recovered for this earthquake in the Los Angeles and San Fernando Valley areas; 8 of these recorded peak accelerations greater than 5% g. Topanga Fire Station recorded the peak horizontal acceleration at 0.09 g at a distance of 20 km from the epicenter. Eleven additional accelerograms were recovered by the State of California.

Intensity VI:
Culver City (shattered store windows--press report).
La Mirada (plaster cracked; small objects

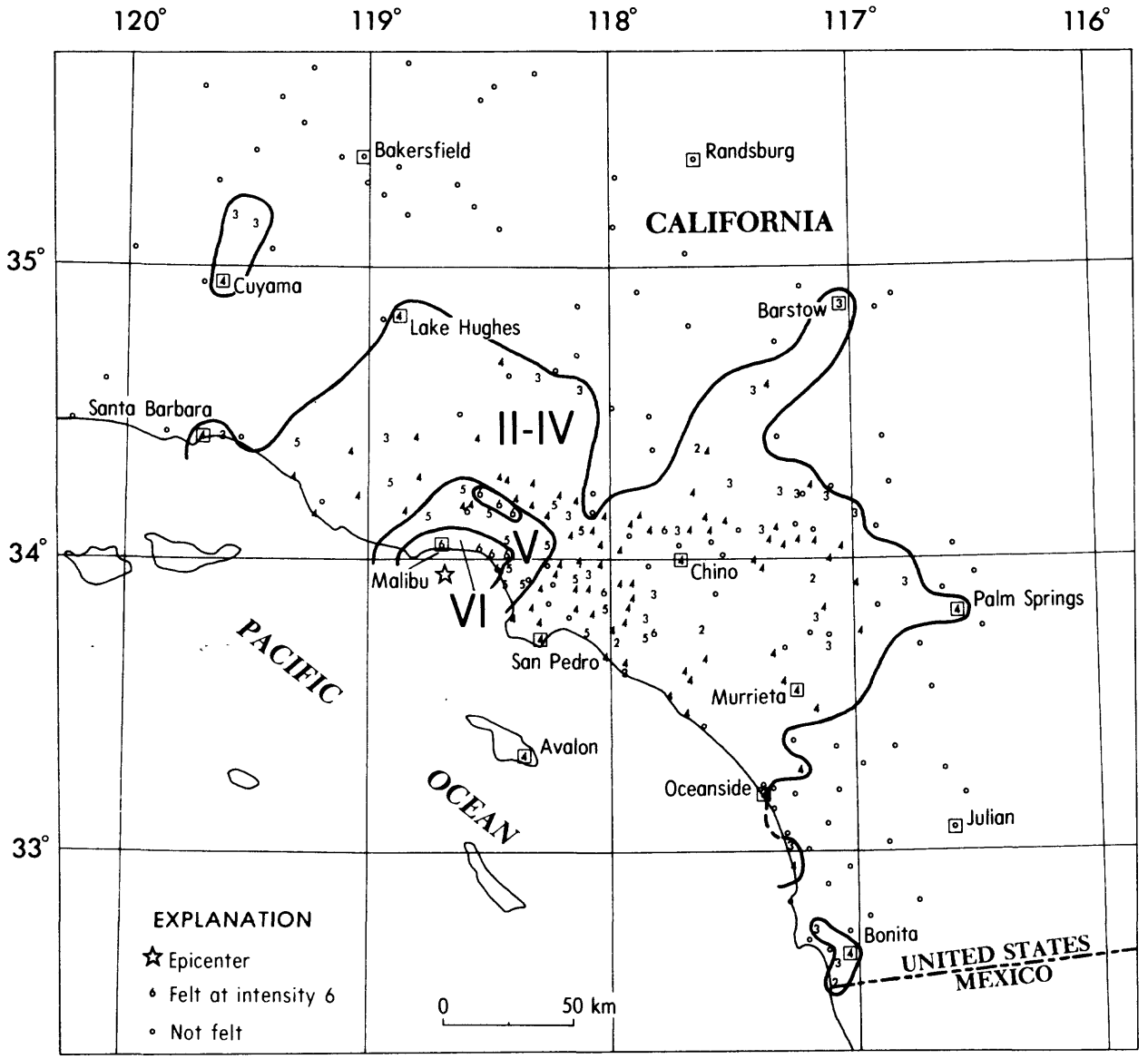

FIGURE 8.--Isoseismal map for the southern California earthquake of 1 January 1979, 23 14 38.9 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

California--Continued

and light furniture shifted; windows, doors, and dishes rattled; hanging pictures and lamps swung; felt by many).

La Verne (plaster cracked; windows, doors, and dishes rattled; hanging pictures swung; felt by many).

Malibu (few broken windows; boulders fell onto highway; mud and rock slides--press report).

Northridge (plaster cracked in interior walls; hairline cracks in exterior

California--Continued

walls; light furniture and small objects shifted; hanging pictures swung; windows, doors, and dishes rattled; small landslides; felt by all).

Pacific Palisades (floor of home cracked; resident held a television on the stand to keep it from falling).

Santa Monica (one broken store window--press report).

Sherman Oaks (plaster cracked and broken; small objects shifted; hanging objects

swung moderately; windows, doors, and dishes rattled; felt by many).
Studio City (interior walls cracked and split; hairline cracks in exterior walls; light furniture and small objects shifted; hanging objects swung moderately; windows, doors, and dishes rattled; felt by all).
Tustin (some windows broken; small objects shifted; hanging pictures swung; windows, doors, and dishes rattled; small landslides; cracks in wet ground; felt by many).
Venice (some windows broken; small objects broken; hanging pictures swung out of place; windows, doors, and dishes rattled; felt by many).
Woodland Hills (three-year-old post office showed cracks and chips of concrete broken off, felt by many).

Intensity V:
Agoura (light furniture shifted, small objects fell).
Beverly Hills (Near Beverly Boulevard and Santa Monica Boulevard, a man sitting in a chair experienced movement of the chair in an east-west direction; at the same residence the metal shelf holders for the lower three shelves of the refrigerator were broken off.).
Buena Park (store windows cracked--press report).
Chatsworth (few windows cracked, felt by all).
Cypress (report of a resident holding his television so that it would not be shaken from its stand, small objects fell).
Downey (small objects fell and broke, felt by all).
El Segundo (hairline cracks in exterior walls, felt by all).
Encino (light furniture and small objects shifted, felt by all).
Hawthorne (small objects fell, small mudslides, felt by all).
Los Angeles (small objects fell, small landslides, felt by many).
Marina Del Rey (small objects fell, felt by many).
Montrose (light furniture shifted, felt by many).
Moorpark (light furniture shifted).
Oak View (light and heavy furniture shifted, felt by many).
San Gabriel (less than ten items fell from shelves in a grocery store, light furniture shifted, felt by many).
Santa Ana (few cracked windows, felt by all).
Seal Beach (store windows cracked, felt by many).

California--Continued

Intensity IV: Alhambra, Alta Loma, Altadena, Anaheim, Arcadia, Avalon, Azusa, Beaumont, Bellflower, Bonita, Bonsall, Brea, Bryn Mawr, Burbank, Calimesa, Camarillo, Canoga Park, Capistrano Beach, Carson, Chino, Colton, Costa Mesa, Cucamonga, Cuyama, Del Mar, Duarte, El Toro, Etiwanda, Fullerton, Garden Grove, Gardena, Glendale, Glendora, Granada Hills, Harbor City, Hemet, Huntington Beach, La Canada, La Habra, La Puente, Laguna Beach, Lake Arrowhead, Lake Elsinore, Lake Hughes, Lakeview, Lakewood, Lebec, Loma Linda, Lomita, Long Beach, Long Beach Veterans Hospital, Los Alamitos, Manhattan Beach, Mar Vista, Maywood, Mentone, Midway City, Mission Viejo, Monrovia, Montebello, Montecito, Mt. Baldy, Murrieta, Norwalk, Oro Grande, Pacoima, Palm Springs, Palos Verdes Estates, Panorama City, Phelan, Piru, Placentia, Port Hueneme, Redlands, Reseda, Riverside, Rosemead, Rossmoor, Rubidoux, San Bernardino, San Dimas, San Jacinto, San Pedro, Santa Barbara, Santa Paula, Saugus, Simi Valley, Skyforest, Solana Beach, South El Monte, South Gate, South Whittier, Sun Valley, Sunland, Sunset Beach, Surfside, Sylmar, Temecula, Temple City, Thousand Oaks, Torrance, Trabuco Canyon, Upland, Ventura, Whittier, Wildomar, Wilmington, Yucaipa.

Intensity III: Adelanto, Angelus Oaks, Barstow, Cabazon, Cardiff by the Sea, Chula Vista, Claremont, Crestline, Etiwanda (Rancho Cucamonga), Fellows, Fillmore, Laguna Hills, Leona Valley, Los Nietos, Los Serranos, Lytle Creek, Newport Beach, Nuevo, Oceanside, Orange, Palmdale, Pasadena, Rialto, Running Springs, San Diego, San Diego Navy Amphibious Base, Santa Fe Springs, Summerland, Taft, Twin Peaks, West Hollywood, Winchester, Yorba Linda.

Intensity II: Fountain Valley, Moreno, Nestor, Silverado, Wrightwood.

1 January (P) Southern California
Origin time: 23 22 14.3
Epicenter: 33.93 N., 118.70 W.
Depth: 12 km
Magnitude: 3.4 ML(P)

Felt at Malibu (P).

1 January (P) Southern California
Origin time: 23 29 25.0
Epicenter: 33.95 N., 118.67 W.
Depth: 2 km
Magnitude: 4.1 mb(G), 3.9 ML(P)
Felt at Downey, Malibu, Monrovia, and Pasadena (P).

1 January (P) Southern California
Origin time: 23 49 58.8
Epicenter: 33.93 N., 118.67 W.
Depth: 6 km
Magnitude: 3.7 ML(P)

Felt at Malibu (P).

2 January (P) Southern California
Origin time: 07 41 14.1
Epicenter: 33.95 N., 118.70 W.
Depth: 6 km
Magnitude: 3.7 ML(P)

Felt at Downey, Malibu, and the San Fernando Valley (P).

2 January (P) Southern California
Origin time: 18 16 31.4
Epicenter: 33.95 N., 118.70 W.
Depth: 15 km
Magnitude: 3.4 ML(P)

Felt at Malibu (P).

2 January (P) Southern California
Origin time: 22 29 57.9
Epicenter: 33.93 N., 118.68 W.
Depth: 6 km
Magnitude: 2.5 ML(P)

Felt at Malibu (P).

2 January (P) Southern California
Origin time: 22 43 27.1
Epicenter: 33.95 N., 118.68 W.
Depth: 11 km
Magnitude: 2.6 ML(P)

Felt at Malibu (P).

3 Janaury (P) Southern California
Origin time: 00 20 52.4
Epicenter: 33.90 N., 118.68 W.
Depth: 6 km
Magnitude: 2.8 ML(P)

Felt at Mailibu (P).

3 January (P) Southern California
Origin time: 16 54 16.5
Epicenter: 33.95 N., 118.70 W.
Depth: 11 km
Magnitude: 3.0 ML(P)

Felt at Malibu (P).

3 January (P) Southern California
Origin time: 20 00 43.0
Epicenter: 35.02 N., 119.13 W.
Depth: 5 km
Magnitude: 3.4 ML(P)

Intensity IV: Santa Barbara.
Intensity III: Bakersfield.

7 January (B) Central California
Origin time: 11 37 32.3
Epicenter: 36.10 N., 120.21 W.
Depth: 4 km
Magnitude: 3.9 mb(G), 3.8 ML(B), 3.9 ML(P)
Intensity IV: Avenal, Coalinga.
Intensity II: San Joaquin.

11 January (B) Central California
Origin time: 19 57 26.6
Epicenter: 37.00 N., 121.72 W.
Depth: 9 km
Magnitude: 3.1 ML(B)

Felt at Morgan Hill and Watsonville (B).

11 January (B) Central California
Origin time: 20 39 23.8
Epicenter: 37.39 N., 121.75 W.
Depth: 1 km
Magnitude: 3.6 ML(B)

Felt at San Jose and in the Santa Clara Valley (B).

Intensity IV: Blossom Hill, Cupertino.
Intensity III: Mount Hamilton.
Intensity II: Mission.

13 January (P) Southern California
Origin time: 11 07 29.4
Epicenter: 33.95 N., 118.68 W.
Depth: 13 km
Magnitude: 2.8 ML(P)

Felt at Malibu (P).

15 January (P) Southern California
Origin time: 12 41 18.7
Epicenter: 33.97 N., 118.72 W.
Depth: 10 km
Magnitude: 3.7 ML(P)
Intensity IV: Rancho Park.
Felt: Canoga Park (P), Malibu (P), North Hollywood (P), Pasadena (P), Santa Monica (P), Temple City (P), Woodland Hills (P).

19 January (B) Central California
Origin time: 13 59 55.4
Epicenter: 37.34 N., 121.72 W.
Depth: 8 km
Magnitude: 3.1 ML(B)

Felt in east San Jose (B).

19 January (B) Owens Valley area
Origin time: 18 10 42.0

Epicenter: 37.55 N., 118.63 W.
Depth: 9 km
Magnitude: 4.1 ML(B), 4.2 ML(P)
Intensity IV: Benton, Big Creek, Bishop, Crowley Lake, Crowley Lake Dam, Tom's Place.
Intensity III: Grant Grove.

24 January (B) Owens Valley area
Origin time: 21 14 27.2
Epicenter: 37.52 N., 118.60 W.
Depth: 10 km
Magnitude: 4.6 ML(B), 4.4 ML(P)
Intensity IV:
California--Big Pine, Bishop Airport, Crowley Lake, Crowley Lake Dam, El Portal, Fresno (Ashlan Park), Groveland, Lake Shore, Lemoncove, Long Barn, Mammoth Lakes, Murphys, Yosemite Lodge.
Intensity III:
California--Bass Lake, June Lake, Sultana.
Intensity II:
California--Fresno.
Nevada--Tonopah.

29 January (P) Southern California
Origin time: 04 59 22.7
Epicenter: 33.95 N., 118.67 W.
Depth: 6 km
Magnitude: 3.1 ML(P)

Felt at Malibu (P).

5 February (B) Northern California
Origin time: 02 08 19.6
Epicenter: 37.77 N., 122.17 W.
Depth: 8 km
Magnitude: 2.7 ML(B)

Felt widely in the East Bay.

Intensity V: East Oakland (few windows broken--press report).
Intensity III: Oakland, San Leandro (press report).

5 February (B) Northern California
Origin time: 07 22 41.3
Epicenter: 37.32 N., 121.67 W.
Depth: 8 km
Magnitude: 3.4 ML(B)

Felt at San Jose (B).

12 February (P) Southern California
Origin time: 04 48 42.3
Epicenter: 33.45 N., 116.43 W.
Depth: 4 km
Magnitude: 4.2 ML(P)

This earthquake was felt over an area of approximately 12,300 sq km of Imperial, Orange, Riverside, San Bernardino, and San Diego Counties (fig. 9).

California--Continued

Intensity V:
Agua Caliente Springs (small objects fell; hanging objects swung moderately; windows, doors, and dishes rattled).
Palm Desert (report of cracked drywall; hanging pictures swung; windows, doors, and dishes rattled).
Intensity IV: Aguanga, Anza, Boulevard, Desert Hot Springs, El Cajon, Fallbrook, Idyllwild, Indio, Jamul, Julian, Lucerne Valley, Mecca, Mount Laguna, Mountain Center, Nestor, Palm Springs, Potrero, Ranchita, Salton City, Santa Ysabel, Santee, Thermal, Valley Center, Warner Springs, Winchester.
Intensity III: Cathedral City, Chula Vista, Coachella, Cuyamaca, Laguna Beach, Lincoln Acres, Lytle Creek, Nuevo, Rancho Del Rey, Riverside.
Intensity II: Escondido, San Diego (P), Santa Ana.

12 February (B) Central California
Origin time: 20 26 22.1
Epicenter: 36.66 N., 121.34 W.
Depth: 7 km
Magnitude: 3.6 ML(B)
Intensity IV: Hollister, Paicines.

15 February (P) Santa Barbara Channel
Origin time: 03 05 16.6
Epicenter: 34.27 N., 119.72 W.
Depth: 5 km
Magnitude: 3.5 ML(P)
Intensity III: Goleta-Santa Barbara area (press report).

15 February (P) Santa Barbara Channel
Origin time: 03 19 32.9
Epicenter: 34.27 N., 119.70 W.
Depth: 5 km
Magnitude: 3.4 ML(P)
Intensity III: Goleta-Santa Barbara area (press report).

21 February (B) Central California
Origin time: 12 56 47.9
Epicenter: 37.83 N., 121.77 W.
Depth: 12 km
Magnitude: 3.5 ML(B)
Intensity IV: Brentwood (Marsh Creek Trailer Park), Clayton, Livermore.

22 February (B) Northern California
Origin time: 15 57 28.8
Epicenter: 40.00 N., 120.09 W.
Depth: 5 km
Magnitude: 5.0 mb(G), 4.6 MS(G), 5.3 ML(B)

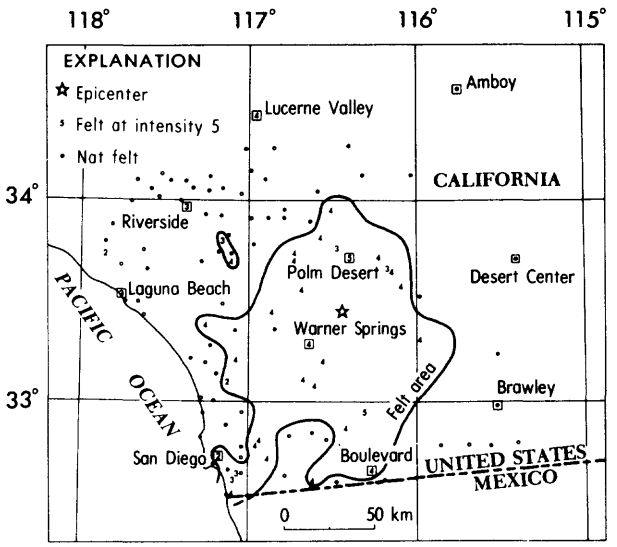

FIGURE 9.--Isoseismal map for the southern California earthquake of 12 February 1979, 04 48 42.3 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

California--Continued

The epicenter was located in the southeast portion of Honey Lake Valley of Lassen County. It was preceded by a foreshock at 07 16 56.1 UTC and followed by aftershocks that lasted until February 23. The largest aftershock occurred on the 23rd at 03 40 52.2 UTC. Bryant (1979) indicates that this region has a history of earthquakes of this magnitude extending back to 1875. This earthquake caused only minor damage in the epicentral area and disrupted telephone service. It was felt over an area of approximately 46,000 sq km of California and Nevada (fig. 10).

Intensity VI:
California--Doyle (drywall cracked; desks moved; small objects shifted; hanging pictures swung out of place; windows, doors, and dishes rattled; felt by all).

Intensity V:
Each place listed below reported one or more effects such as small objects or pictures fell, light or heavy furniture moved, hairline cracks in exterior walls:
California--Chilcoot, Clio, Cromberg, Portola, Sattley, Sierraville, Vinton.

Intensity IV:
California--Alleghany, Alta, Arnold, Baxter, Beale AFB, Beckworth, Berry Creek, Blairsden, Calpine, Camino, Camptonville, Chicago Park, Crescent Mills, Dobbins, Downieville, Dutch Flat, Emigrant Gap, Fiddletown, Forbestown, Foresthill, Glencoe, Gold Run, Goodyears Bar, Graeagle, Greenville, Grimes, Grizzly Flats, Herlong, Iowa Hill, Janesville, Keddie, Kyburz, La Porte, Loyalton, Milford, Nevada City, Norden, Oroville, Pollock Pines, 10 km east of Sheridan, Sierra City, Smithflat, Soda Springs, Spring Garden, Standish, Strawberry Valley, Washington, Weimar, Wendel, Westwood.
Nevada--Carson City, Fernley, Genoa, Gerlach, Incline Village, Nixon, Reno, Silver City, Silver Springs, Sparks, Verdi.

Intensity III:
California--Clipper Mills, Quincy, Robbins, Sacramento, Sheep Ranch, Storrie, Taylorsville, Twin Bridges.
Nevada--French Gulch.

Intensity II:
California--Murphys, Pacific House.
Nevada--Empire, Minden, Wadsworth.

27 February (P) Southern California
Origin time: 07 07 38.6
Epicenter: 33.95 N., 118.32 W.
Depth: 5 km
Magnitude: 3.0 ML(P)
Intensity IV: El Segundo, Los Angeles.
Intensity III: Southgate.
Felt: Inglewood (P), Hawthorne (P), Lawndale (P), downtown Los Angeles (P).

27 February (P) Central California
Origin time: 15 36 32.4
Epicenter: 36.08 N., 119.95 W.
Depth: 5 km
Magnitude: 3.3 ML(P)
Intensity IV: Avenal.

1 March (P) Southern California
Origin time: 12 26 03.4
Epicenter: 34.32 N., 118.35 W.
Depth: 5 km
Magnitude: 2.3 ML(P)

Felt at Woodland Hills (P).

5 March (P) Southern California
Origin time: 10 49 31.0
Epicenter: 33.95 N., 118.70 W.
Depth: 13 km
Magnitude: 3.7 ML(P)

Felt in the Los Angeles Basin and at Pasadena (P). Also felt at Malibu and

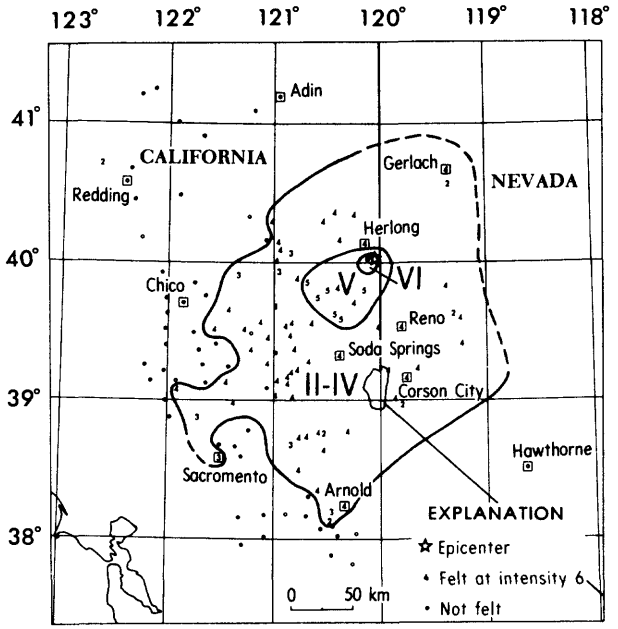

FIGURE 10.--Isoseismal map for the northern California earthquake of 22 February 1979, 15 57 28.8 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

California--Continued

part of the San Fernando Valley (press report).

Intensity IV: Los Angeles.

5 March (P) Southern California
Origin time: 12 11 53.0
Epicenter: 34.37 N., 119.75 W.
Depth: 5 km
Magnitude: 2.8 ML(P)

Felt at Santa Barbara (P).

8 March (P) Southern California
Origin time: 18 21 37.8
Epicenter: 34.12 N., 118.33 W.
Depth: 4 km
Magnitude: 2.0 ML(P)

Felt in the downtown area of Los Angeles (P).

11 March (P) Southern California
Origin time: 10 54 31.9
Epicenter: 33.70 N., 116.77 W.
Depth: 5 km
Magnitude: 3.0 ML(P)

Felt at Idyllwild (P).

California--Continued

12 March (B) Central California
Origin time: 12 06 09.6
Epicenter: 37.57 N., 121.69 W.
Depth: 7 km
Magnitude: 3.2 ML(B)

Felt near Pleasanton (B).

15 March (P) Southern California
Origin time: 20 17 49.8
Epicenter: 34.30 N., 116.43 W.
Depth: 1 km
Magnitude: 5.0 mb(G), 4.9 MS(G), 5.3 ML(B), 4.9 ML(P)

This is the first earthquake of a series in this area. It was followed 50 minutes later by a larger event at 21 07 16.5. The damage and felt data could not be differentiated between the two earthquakes therefore, the data were combined and are listed below with the largest magnitude event. The third largest event at 23 07 58.4 was felt nearly as strongly as the two earlier earthquakes. Many of the aftershocks were felt in the epicentral area.

Felt in Los Angeles, Orange, Riverside, San Bernardino, and San Diego Counties (P).

15 March (P) Southern California
Origin time: 21 07 16.5
Epicenter: 34.32 N., 116.45 W.
Depth: 1 km
Magnitude: 5.5 mb(G), 5.6 MS(G), 5.7 ML(B), 5.2 ML(P)

This is the largest of a series of earthquakes in this area, the two largest occurring on this date. A surface rupture occurred in the Homestead Valley area (Hawkins and McNey, 1979) along the east bank of Pipes Wash and in three locations west of Pipes Wash fault. The maximum intensity of VII was observed at Landers where electric and telephone services were disrupted for several hours and moderate damage to buildings and their contents was reported (press report). This earthquake was felt over an area of approximately 76,800 sq km of California, Arizona, and Nevada (fig. 11).

Intensity VII:
California--
Landers (a chimney was knocked down, walls cracked, many windows broken, dishes and merchandise broken and strewn about throughout the area. The Halliday Liquor Store reported $1000 damage to merchandise (press report). Hawkins and McNey (1979) reported that

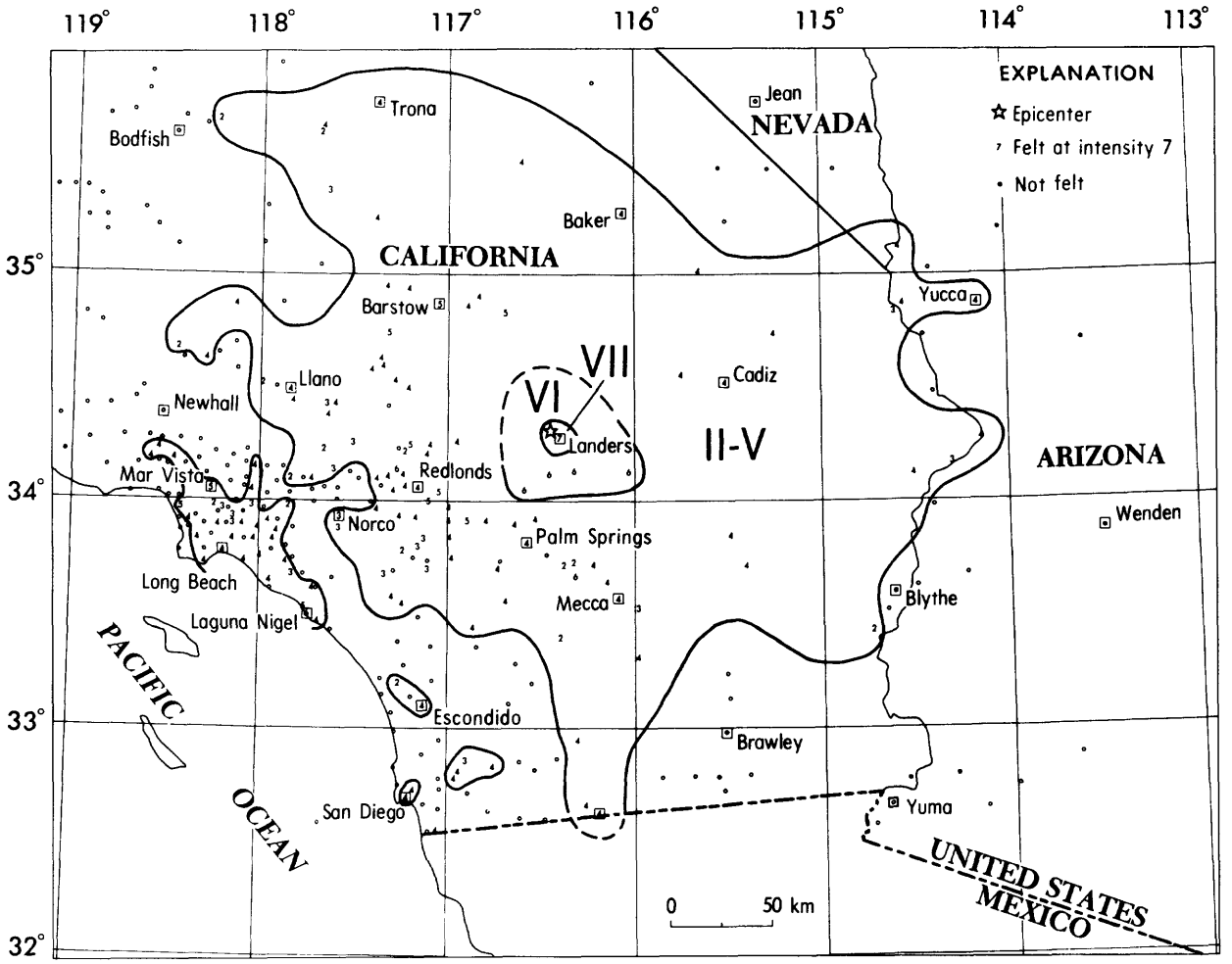

FIGURE 11.--Isoseismal map for the southern California earthquake of 15 March 1979, 21 07 16.5 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

California--Continued

a Franklin stove moved about 15 cm southwest and telephone poles moved about 7 cm northwest. In homes, items were thrown from shelves and cabinets to the floor and were broken.).

Intensity VI:

California--

Del Rosa (plaster cracked in interior walls and hairline cracks in exterior walls, light furniture and small objects shifted, a few windows cracked, water splashed onto sides of pools, felt by many).

Joshua Tree (plaster cracked in interior walls and hairline cracks in exterior walls, small objects shifted, water splashed out of the Joshua Tree Inn's swimming pool, felt by all).

California--Continued

La Quinta (plaster cracked in interior walls, foundation cracked, hairline cracks in exterior walls, felt by many).

Laguna Niguel (plaster cracked and fell on the first and fourth floors of the Laguna Federal Building and a cinder block wall cracked on the first floor, felt by all).

Morongo Valley (plaster cracked in interior walls, hairline cracks in exterior brick walls, small objects shifted, felt by many).

Twentynine Palms (There were several reports of fallen plaster and overturned furniture. At the Marine Corps Station a beam cracked in a building and it was evacuated--press report.).

Yucca Valley (The press reported the Flamingo Grocery Store lost a considerable amount of wine, soft drinks, and various glass items, and Von's Market had $500 damage due to broken bottles and jars.).

Intensity V:

California--Banning, Barstow, Calimesa, Helendale, Laguna Beach, Lake Arrowhead (one report of plaster walls cracked), Mar Vista, Marina Del Rey, Newberry Springs, Yucaipa.

Intensity IV:

Arizona--Bullhead City, Dolan Springs, Mohave Valley, Riviera.

California--Adelanto, Agua Caliente Springs, Aguanga, Alpine, Amboy, Anaheim, Angelus Oaks, Anza, Apple Valley, Arcadia, Argus, Baker, Beaumont, Boulevard, Bryn Mawr, Buena Park, Cabazon, Cadiz, Capistrano Beach, Cherry Valley, China Lake, Claremont, Compton, Costa Mesa, Cypress, Daggett, Del Rosa (San Bernardino), Desert Center, Eagle Mountain, El Cajon, El Monte, Escondido (press report), Essex, Fawnskin, Fort Irwin, George AFB, Gilman Hot Springs, Green Valley Lake, Hemet, Highland, Hinkley, Hollywood, Indio, Jacumba, Kelso, La Habra, Laguna Hills, Lakewood, Leona Valley, Lindbergh Field (San Diego), Llano, Loma Linda, Long Beach, Lost Lake, March AFB, Mecca, Mentone, Midway City, Moreno, Morongo Valley, Mountain Center, Murrieta, North Inglewood, North Palm Springs, Northridge, Norton AFB, Norwalk, Oro Grande, Palm Springs, Parker Dam, Phelan, Placentia, Redlands, Reseda, Rialto, Rimforest, Riverside, Rosamond, Running Springs, Salton City, San Bernardino (Downtown, Base Line, Westside), San Diego, San Diego (Naval Hospital), San Jacinto, San Pedro, San Ysidro, Santa Ana, Santee, Sherman Oaks, Sunnymead, Sunset Beach, Surfside, Thermal, Torrance, Trona, University City, Valyermo, Victorville (press report), Vidal, White Water, Wildomar, Wrightwood, Yermo.

Intensity III:

Arizona--Parker.

California--Alta Loma, Bailey, Bell, Bellflower, Corona, Earp, Encanto, Irvine, Johannesburg, Lake Elsinore, Lakeside, Lakeview, Lytle Creek, Maywood, Needles, Norco, North Shore, Nuevo, Oak View, Pinon Hills, Seal Beach, South Downey, Winchester.

Nevada--Las Vegas.

Intensity II:

California--Arlington, Diamond Bar, Indian Wells, Lake Hughes, Littlerock, Los Angeles, Mt. Baldy, Onyx, Palm City, Palm Desert, Palo Verde, Perris, Randsburg, Ridgecrest, San Dimas, Twin Peaks, Vista, Whittier.

California--Continued

15 March (P) Southern California
Origin time: 21 34 25.5
Epicenter: 34.35 N., 116.45 W.
Depth: 1 km
Magnitude: 4.5 ML(P), 4.3 ML(B)

Felt in Los Angeles and San Bernardino Counties.

15 March (P) Southern California
Origin time: 23 07 58.4
Epicenter: 34.33 N., 116.43 W.
Depth: 5 km
Magnitude: 4.5 mb(G), 4.4 MS(G), 4.8 ML(P), 5.0 ML(B)

Felt in Los Angeles, Orange, Riverside, and San Bernardino Counties.

15 March (P) Southern California
Origin time: 23 16 38.1
Epicenter: 34.30 N., 116.43 W.
Depth: 1 km
Magnitude: 3.9 ML(P)

Felt in Los Angeles and San Bernardino Counties.

16 March (P) Southern California
Origin time: 05 54 00.5
Epicenter: 34.30 N., 116.43 W.
Depth: 2 km
Magnitude: 3.7 ML(P)

Felt at Landers (P).

16 March (P) Southern California
Origin time: 06 22 03.1
Epicenter: 34.32 N., 116.42 W.
Depth: 1 km
Magnitude: 2.4 ML(P)

Felt at Landers (P).

16 March (P) Southern California
Origin time: 06 40 18.8
Epicenter: 34.32 N., 116.42 W.
Depth: 3 km
Magnitude: 2.7 ML(P)

Felt at Landers (P).

16 March (P) Southern California
Origin time: 06 42 46.2
Epicenter: 34.30 N., 116.43 W.
Depth: 2 km
Magnitude: 3.0 ML(P)

Felt at Landers (P).

16 March (P) Southern California
Origin time: 07 06 33.0
Epicenter: 34.30 N., 116.43 W.
Depth: 1 km
Magnitude: 2.5 ML(P)

Felt at Landers (P).

16 March (P) Southern California
Origin time: 07 52 09.1
Epicenter: 34.32 N., 116.43 W.
Depth: 2 km
Magnitude: 3.5 ML(P)

Felt at Landers and Pasadena (P).

16 March (P) Southern California
Origin time: 09 33 49.6
Epicenter: 34.32 N., 116.43 W.
Depth: 1 km
Magnitude: 2.6 ML(P)

Felt at Landers (P).

16 March (P) Southern California
Origin time: 13 41 20.5
Epicenter: 34.32 N., 116.42 W.
Depth: 1 km
Magnitude: 2.8 ML(P)

Felt at Landers (P).

16 March (P) Southern California
Origin time: 14 10 57.5
Epicenter: 34.33 N., 116.40 W.
Depth: 1 km
Magnitude: 3.2 ML(P)

Felt at Landers (P).

16 March (P) Southern California
Origin time: 17 36 59.1
Epicenter: 34.33 N., 116.40 W.
Depth: 5 km
Magnitude: 4.0 ML(P), 4.1 ML(B)

Felt at Landers (P).

18 March (P) Southern California
Origin time: 22 53 02.6
Epicenter: 34.22 N., 116.35 W.
Depth: 5 km
Magnitude: 4.2 ML(P), 4.1 ML(B)
Intensity III: Morongo Valley.
Felt: Landers (P), Joshua Tree (P).

26 March (P) Southern California
Origin time: 15 04 29.0
Epicenter: 34.87 N., 120.50 W.
Depth: 5 km

Magnitude: 2.8 ML(P)

Felt at Santa Maria (press report).

26 March (P) Southern California
Origin time: 15 22 23.5
Epicenter: 34.87 N., 120.50 W.
Depth: 10 km
Magnitude: 3.6 ML(P)
Intensity IV: Halcyon, Orcutt, Santa Maria.

31 March (P) Off the Coast of Baja California
Origin time: 21 36 57.0
Epicenter: 31.80 N., 117.42 W.
Depth: 5 km
Magnitude: 4.3 mb(G), 4.7 ML(P)
Intensity IV: Ocean Beach.
Intensity III: San Diego (Lindbergh Field).
Intensity II: Escondido, San Diego Naval Air Station, University City.

19 April (P) Southern California
Origin time: 14 22 47.3
Epicenter: 34.10 N., 118.33 W.
Depth: 7 km
Magnitude: 2.5 ML(P)

Felt at Alhambra (P).

19 April (P) Southern California
Origin time: 22 39 56.8
Epicenter: 34.37 N., 119.73 W.
Depth: 4 km
Magnitude: 3.3 ML(P)
Intensity III: Santa Barbara (press report).

21 April (P) Southern Caliiornia
Origin time: 06 00 38.3
Epicenter: 33.78 N., 118.07 W.
Depth: 5 km
Magnitude: 3.1 ML(P)
Intensity IV: Long Beach.

22 April (B) Central California
Origin time: 06 23 25.2
Epicenter: 36.83 N., 121.40 W.
Depth: 10 km
Magnitude: 3.1 ML(B)

Felt at Hollister (B).

28 April (B) Central California
Origin time: 00 44 44.8
Epicenter: 37.65 N., 122.46 W.
Depth: 13 km
Magnitude: 4.4 ML(B)

This earthquake knocked out traffic signals

in western San Francisco and disrupted telephone service. A power pole fell on Market Street. The BART underground transportation system was halted 10 minutes for emergency checks. The press reported cans and boxes tumbled from shelves in some markets in the San Francisco area. It was felt over an area of approximately 6,300 sq km in the San Francisco Bay area of Central California (fig. 12).

Intensity V:
Daly City (felt strongly in the Westlake District, one person ran out of a restaurant without finishing his food, buildings shook strongly--press report).
Petaluma (few windows cracked, light furniture and small objects moved, hanging pictures swung).
South San Francisco (small objects overturned and broken, hanging pictures fell, felt by many).

Intensity IV: Alameda (press report), Berkeley (press report), Bolinas, Burlingame (press report), El Granada, Emeryville, Fairfax, Forest Knolls, Half Moon Bay, La Honda, Millbrae, Montara, Novato, Pacifica, Redwood City, Ross, San Anselmo, San Francisco (Embarcadero Center, Mission District), San Francisco International Airport, Sausalito, Woodacre.

Intensity III: Alamo, Albany (press report), Belmont, Benicia, Concord (press report), Danville, El Cerrito, Inverness, Larkspur, Livermore, Marshall, Mill Valley, Moraga, Moss Beach, Nicasio, Oakland, Orinda, Palo Alto, Point Reyes Station, Port Costa, Richmond, San Bruno, San Carlos, San Leandro, San Lorenzo, San Mateo, Stinson Beach, Union City, Vallejo.

Intensity II: San Jose (press report), Santa Rosa (press report).

2 May (P) Imperial Valley
Origin time: 22 22 52.7
Epicenter: 33.00 N., 115.57 W.
Depth: 5 km
Magnitude: 2.9 ML(P)

Felt at Brawley (P).

8 May (B) Central California
Origin time: 05 11 07.7
Epicenter: 37.30 N., 121.68 W.
Depth: 6 km
Magnitude: 4.3 mb(G), 4.0 MS(G), 4.8 ML(B)

The press reported this earthquake was felt most strongly in east San Jose where pictures fell from walls, one refrigerator

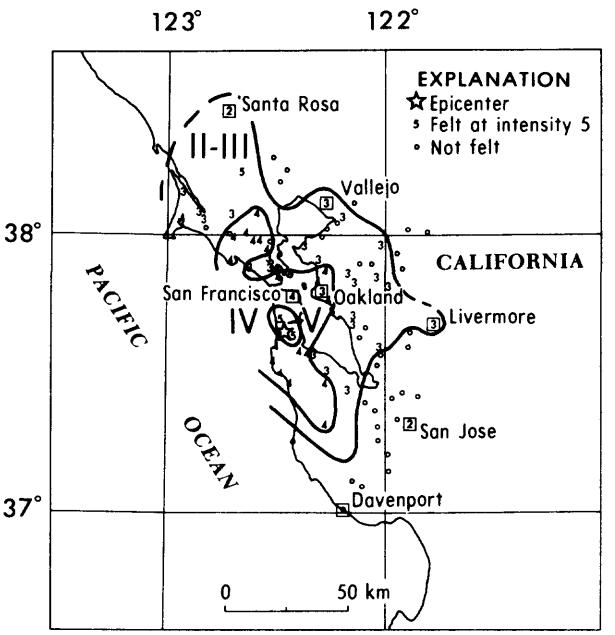

FIGURE 12.--Isoseismal map for the central California earthquake of 28 April 1979, 00 44 44.8 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

fell over, and objects fell from table tops. It was felt over an area of approximately 9,800 sq km of the coastal area around San Francisco Bay (fig. 13).

Intensity VI:
East San Jose (cracked plaster on walls, windows broken, hanging pictures fell, one refrigerator fell over, felt by many).

Intensity V:
Alviso (light and heavy furniture moved; small objects moved; hanging pictures out of place; windows, doors, and dishes rattled).
Larkspur (light furniture and small appliances moved; liquid spilled from small containers; windows, doors, and dishes rattled; felt by many).
Los Gatos (windows broken; small objects moved; hanging pictures out of place; windows, doors, and dishes rattled; felt by many).
Pescadero (light furniture and small objects moved; hanging pictures out of place; windows, doors, and dishes rattled; felt by many).

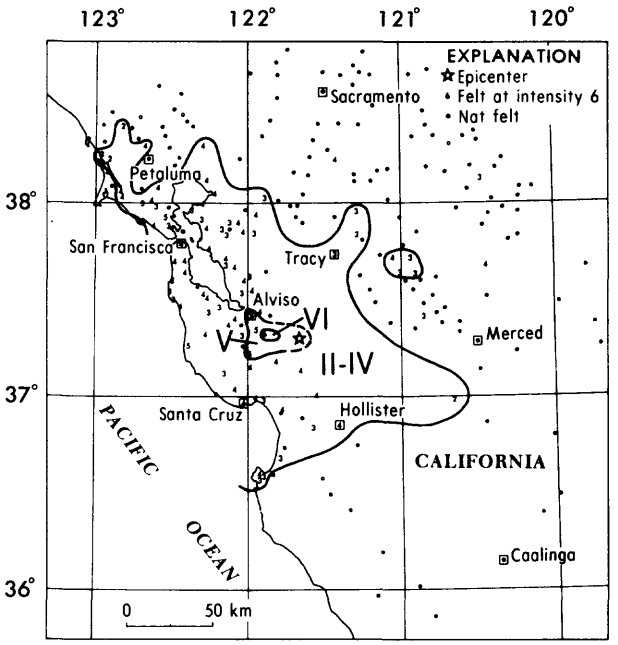

FIGURE 13.--Isoseismal map for the central California earthquake of 8 May 1979, 05 11 07.7 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

California--Continued

Santa Clara (light and heavy furniture or appliances moved; small objects moved; buildings shook strongly; windows, doors, and dishes rattled; felt by many).

Intensity IV: Alameda, Alamo, Belmont, Berkeley, Brisbane, Capitola, Clayton, Crockett, Daly City, El Sobrante, Felton, Freedom, Fremont, Gilroy (12.8 km northeast), Half Moon Bay, Hayward, Hollister, Holy City, La Grange, La Honda, Los Altos, Los Osos, Milpitas, Morgan Hill (press report), Mountain View, Mount Hermon, Napa, New Almaden, Novato, Olema, Pacific Grove, Penngrove, Point Reyes Station, Redwood Estates, Ross, Salida, San Carlos, San Francisco, San Jose, San Leandro, San Mateo, Santa Cruz, Sausalito, Soquel, South San Francisco, Stinson Beach, Thornton, Union City, Vallejo, Walnut Creek, Woodacre.

Intensity III: Aptos, Boulder Creek, Cupertino (press report), Diablo, Dillon Beach, El Cerrito, El Granada, Empire, Fairfax, Forest Knolls, Hilmar, Lafayette, Marina, Menlo Park, Mill Valley, Modesto (press report), Montara, Monterey (press report),

California--Continued

Moraga, Murphys, Newark, Orinda, Pacifica, Palo Alto, Pebble Beach, Pittsburg, Redwood City, Richmond, Riverbank, San Juan Bautista, San Lorenzo, Stockton, Tracy.

Intensity II: Albany, Dos Palos, Lathrop, Sebastopol, Tomales.

16 May (P) Southern California
Origin time: 03 25 23.6
Epicenter: 33.85 N., 118.55 W.
Depth: 5 km
Magnitude: 2.7 ML(P)

Felt at Redondo Beach (P).

20 May (P) Southern California
Origin time: 12 04 47.9
Epicenter: 34.07 N., 116.37 W.
Depth: 5 km
Magnitude: 3.7 ML(P)
Intensity III: Morongo Valley.
Felt: Yucca Valley (P).

21 May (P) Southern California
Origin time: 05 19 04.0
Epicenter: 34.10 N., 116.37 W.
Depth: 8 km
Magnitude: 3.0 ML(P)
Intensity III: Morongo Valley.
Felt: Yucca Valley (P).

1 June (B) Central California
Origin time: 23 58 26.3
Epicenter: 37.87 N., 122.21 W.
Depth: 10 km
Magnitude: 2.6 ML(B)

Felt on the University of California-Berkeley campus and in the Concord-Pittsburg area (B).

3 June (B) Northern California
Origin time: 04 07 29.4
Epicenter: 40.34 N., 124.23 W.
Depth: 12 km
Magnitude: 3.2 ML(B)
Intensity III: Rio Dell.

11 June (B) Central California
Origin time: 11 51 56.8
Epicenter: 37.97 N., 122.05 W.
Depth: 12 km
Magnitude: 2.8 ML(B)
Intensity IV: Clayton, Concord, Martinez, Orinda, Walnut Creek.
Intensity III: Pittsburg (press report), Port Costa.
Felt: Berkeley (B), Oakland (B).

13 June (P) Imperial Valley
Origin time: 07 09 58.1
Epicenter: 33.08 N., 115.62 W.

Depth: 6 km
Magnitude: 3.7 ML(P)

Felt at Brawley (P).

13 June (P) Imperial Valley
Origin time: 19 46 45.9
Epicenter: 33.10 N., 115.65 W.
Depth: 6 km
Magnitude: 4.1 (P)

This is the largest of a swarm of earthquakes in the Imperial Valley.

Intensity V: Brawley (concrete-slab porch floor cracked, small objects overturned, felt by all).
Intensity IV: Westmorland (felt by all).
Intensity III: Auga Caliente Springs (Canebrake Canyon), Palo Verde.
Intensity II: Aguanga.

13 June (P) Imperial Valley
Origin time: 20 21 11.3
Epicenter: 33.12 N., 115.62 W.
Depth: 6 km
Magnitude: 3.3 ML(P)

Felt at Brawley (P).

14 June (P) Central California
Origin time: 07 39 27.9
Epicenter: 35.72 N., 118.02 W.
Depth: 5 km
Magnitude: 4.2 mb(G), 4.4 ML(B), 4.6 ML(P)
Intensity VI: Onyx (large cracks in plaster walls, open cracks in brick fences and walks, small objects moved, a few people awakened, felt by many).
Intensity IV: Inyokern, Lake Isabella, Ridgecrest, Weldon, Wofford Heights.
Intensity III: Randsburg.
Felt: Kernville (P).

16 June (B) California-Nevada border region
Origin time: 22 44 59.5
Epicenter: 37.58 N., 118.92 W.
Depth: 13 km
Magnitude: 4.2 ML(P), 4.3 ML(B)
Intensity IV: Benton, Mammoth Lakes.
Intensity III: Crowley Lake, Mono Hot Springs.

17 June (B) Central California
Origin time: 03 59 45.8
Epicenter: 37.97 N., 122.04 W.
Depth: 18 km
Magnitude: 2.7 ML(B)

Felt at Concord and Walnut Creek (B).

California--Continued

17 June (B) Central California
Origin time: 04 01 34.9
Epicenter: 38.10 N., 122.04 W.
Depth: 16 km
Magnitude: 2.9 ML(B), 3.7 ML(P)

Felt at Concord and Walnut Creek (B).

17 June (B) Central California
Origin time: 18 06 37.7
Epicenter: 37.34 N., 119.98 W.
Depth: 5 km
Magnitude: 3.1 ML(B)
Intensity IV: Mariposa.

20 June (P) Southern California
Origin time: 05 30 35.8
Epicenter: 34.03 N., 118.35 W.
Depth: 5 km
Magnitude: 3.0 ML(P)

Felt at Beverly Hills, Compton, and Culver City (P).

Intensity III: Los Angeles area.

22 June (P) Central California
Origin time: 06 54 58.4
Epicenter: 34.95 N., 120.27 W.
Depth: 4 km
Magnitude: 2.5 ML(P)

Felt at Santa Maria (P).

26 June (B) Owens Valley
Origin time: 14 28 55.6
Epicenter: 37.52 N., 118.58 W.
Depth: 10 km
Magnitude: 3.7 ML(B), 3.3 ML(P)

Felt north of Bishop (P).

26 June (B) Owens Valley
Origin time: 15 13 58.2
Epicenter: 37.53 N., 118.58 W.
Depth: 10 km
Magnitude: 3.4 ML(B), 3.3 ML(P)

Felt north of Bishop (P).

29 June (P) Southern California
Origin time: 05 53 20.5
Epicenter: 34.25 N., 116.90 W.
Depth: 6 km
Magnitude: 4.1 mb(G), 4.5 ML(P)

Felt strongly in the Big Bear Lake recreation area. Also felt in the Los Angeles Basin and as far away as Sacramento and San Diego. It was felt over an area of approximately 13,000 sq km of southern California (fig. 14).

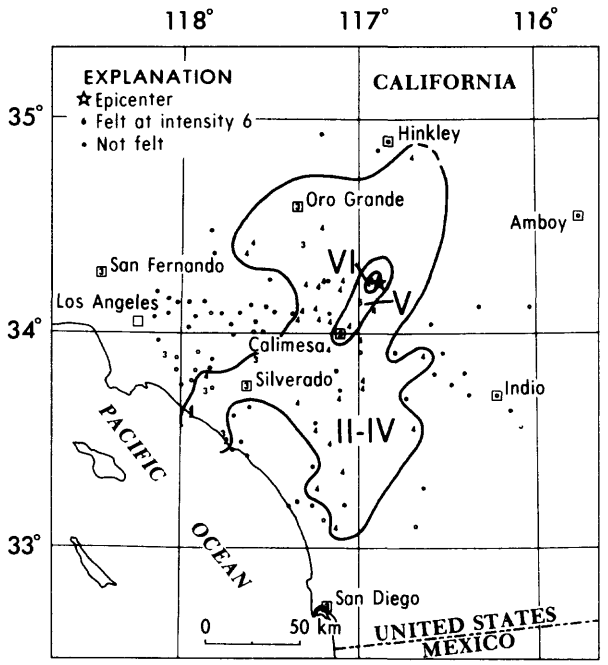

FIGURE 14.--Isoseismal map for the southern California earthquake of 29 June 1979, 05 53 20.5 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

California--Continued

Intensity VI: Big Bear Lake (several burglar alarms triggered, a plate glass window shattered in a bank--press report, large cracks in plaster, foundation cracked, few windows cracked, liquid spilled from small containers, several awakened, felt by many).

Intensity V:

Angelus Oaks (light furniture and small objects moved; hanging pictures swung; windows, doors, and dishes rattled; awakened and felt by many).

Calimesa (bricks in chimney loosened, light furniture and small objects moved, few windows cracked, liquid spilled from small containers, awakened and felt by many).

Intensity IV: Anza, Apple Valley, Bonsall, Cherry Valley, Colton, Costa Mesa, Crestline, Escondido, Fawnskin, Forest Falls, Green Valley Lake, Hemet (press report), Highland, Lake Arrowhead, Lake Elsinore, Mentone, Moreno, Murrieta, Newberry Springs, Orange, Pala, Perris, Phelan, Redlands, Running Springs, San Bernardino, San Jacinto, Temecula, Twin Peaks, White Water, Winchester, Wrightwood, Yucaipa.

California--Continued

Intensity III: Corona Del Mar, Crest Park, Hesperia, Laguna Beach (P), Norwalk (P), Oro Grande, Sacramento (press report), San Diego (press report), San Fernando (press report), Santa Ana (P), Silverado.

Intensity II: Laguna Niguel, Newport Beach.

30 June (P) Southern California

Origin time:	00 34 11.6
Epicenter:	34.25 N., 116.90 W.
Depth:	10 km
Magnitude:	4.6 mb(G), 4.8 ML(B), 4.9 ML(P)

This is the largest of a series of earthquakes in the Big Bear Lake area. It caused minor damage on the south shore of the lake and was felt over an area of approximately 20,300 sq km of southern California (fig. 15).

Intensity VI:

Big Bear City (walls were cracked, several windows broken, mirrors fell from walls and broke, large section of acoustic-tile ceiling in the sheriff's station shook down).

Sugarloaf (bricks loosened on chimneys, ceiling tile cracked, foundation cracked, light and heavy furniture moved, small objects overturned and broken, few windows cracked, felt by all).

Intensity V:

Angelus Oaks (small landslides, standing vehicles rocked moderately, light furniture and small objects moved, few windows cracked, liquid spilled from small containers, felt by many).

Calimesa (few windows cracked, small objects moved, hanging pictures swung, felt by many).

Fawnskin (light furniture or small appliances moved, small objects overturned or broken, few windows cracked, liquid spilled from small containers, felt by many).

Forest Falls (small landslides, light furniture and small objects moved, standing and moving vehicles rocked slightly, hanging pictures out of place, felt by all).

Westside, San Bernardino (bricks loosened in chimney, few windows cracked, hanging pictures swung, felt by many).

Intensity IV: Adelanto, Anza, Beaumont, Cabazon, Colton, Crest Park, Crestline, Cucamonga, El Cajon, Escondido, Fallbrook, Green Valley Lake, Hesperia, Highland, Indio, Lake Arrowhead, Lakeside, Loma Linda, Long Beach, Lytle Creek, Mead Valley, Murrieta, Norco, North Palm Springs,

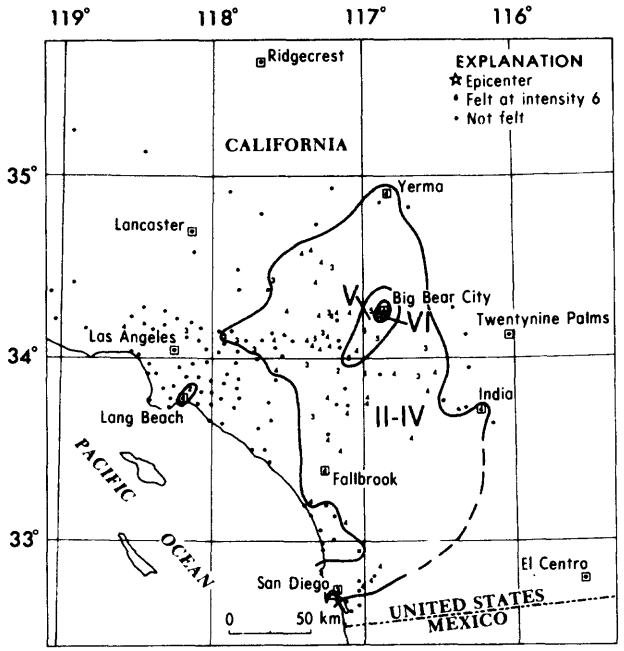

FIGURE 15.--Isoseismal map for the southern California earthquake of 30 June 1979, 00 34 11.6 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

California—Continued

Oro Grande, Palm Springs, Palm Springs (Smoke Tree), Perris, Redlands, Rialto, San Bernardino, San Jacinto, San Luis Rey, Skyforest, Spring Valley, Temecula, Twin Peaks, Victorville (press report), Winchester, Woodland Hills, Yale, Yermo, Yucaipa.

Intensity III: Apple Valley, Azusa (P), Blue Jay, Cedar Glen, Del Rosa, La Jolla (press report), Lake Elsinore, Morongo Valley, Norton AFB, Pasadena (P), Patton, Phelan, Pomona, San Diego (press report), San Dimas, White Water, Riverside (Magnolia Center).

Intensity II: Lakewood, Moreno.

30 June (P) Southern California
Origin time: 07 03 52.9
Epicenter: 34.25 N., 116.90 W.
Depth: 10 km
Magnitude: 4.0 mb(G), 4.4 ML(P)

This earthquake is one of a series in the Big Bear Lake area beginning on June 29.

Felt at Redlands, San Bernardino, and Pasadena (P).

California--Continued

1 July (P) Southern California
Origin time: 09 29 28.0
Epicenter: 34.22 N., 116.92 W.
Depth: 6 km
Magnitude: 3.2 ML(P)

Felt at Big Bear (P).

2 July (P) Southern California
Origin time: 06 51 40.7
Epicenter: 34.05 N., 117.55 W.
Depth: 14 km
Magnitude: 2.5 ML(P)

Felt at Riverside (P).

2 July (P) Southern California
Origin time: 11 51 55.2
Epicenter: 33.50 N., 116.49 W.
Depth: 16 km
Magnitude: 3.7 ML(P)

Felt at Anza-Borrego Desert State Park, Borrego Springs, Coachella (P), Indio (P), Palm Springs, San Diego, and other areas of San Diego County. No damage was reported (press report).

2 July (P) Southern California
Origin time: 12 42 37.0
Epicenter: 33.52 N., 116.49 W.
Depth: 17 km
Magnitude: 3.6 ML(P)

Felt at Anza-Borrego Desert State Park, Borrego Springs, Coachella (P), Indio (P), San Diego, and other areas of San Diego County. No damage was reported (press report).

3 July (P) Southern California
Origin time: 13 03 01.3
Epicenter: 34.38 N., 119.78 W.
Depth: 4 km
Magnitude: 3.0 ML(P)
Intensity III: Santa Barbara (press report).

3 July (B) Central California
Origin time: 13 25 45.5
Epicenter: 37.60 N., 121.98 W.
Depth: 8 km
Magnitude: 3.4 ML(B)
Intensity IV: Hayward, Mount Eden, Sunol.
Intensity III: Fremont, La Honda, Newark, San Francisco (press report), San Leandro.
Intensity II: San Lorenzo.
Felt: Oakland (B).

3 July (P) Southern California
Origin time: 13 35 04.3

Epicenter: 34.37 N., 119.78 W.
Depth: 4 km
Magnitude: 3.3 ML(P)
Intensity III: Goleta, Santa Barbara (press report).

10 July (B) Central California
Origin time: 08 23 23.2
Epicenter: 37.86 N., 121.98 W.
Depth: 17 km
Magnitude: 3.7 ML(B)
Intensity V: Diablo (few windows cracked, hanging pictures out of place, and small objects moved), Danville (felt by all, many awakened, sidewalks slightly cracked).
Intensity IV: Alamo, Antioch, Clayton, Martinez, Pittsburg, Pleasant Hill, San Leandro, San Ramon.
Felt: Berkeley (B), Concord (B), Livermore (B), Moraga (B), Oakland (B), Walnut Creek (B).

13 July (P) Southern California
Origin time: 02 26 03.4
Epicenter: 34.27 N., 116.43 W.
Depth: 5 km
Magnitude: 4.0 ML(P)
Intensity IV: Morongo Valley, San Bernardino.
Intensity III: Joshua Tree, Lake Elsinore, Twentynine Palms, Yucca Valley.
Intensity II: Indio.

13 July (P) Southern California
Origin time: 03 51 23.5
Epicenter: 34.27 N., 116.43 W.
Depth: 5 km
Magnitude: 4.2 mb, 3.9 ML(P)
Intensity III: Joshua Tree (press report), Twentynine Palms (press report), Yucca Valley (press report).
Felt: San Bernardino (P).

13 July (B) Central California
Origin time: 10 57 38.2
Epicenter: 37.57 N., 122.39 W.
Depth: 6 km
Magnitude: 2.2 ML(B)

Felt at Burlingame, Hillsborough, and San Mateo (B).

27 July (B) Owens Valley Area
Origin time: 23 23 08.0
Epicenter: 37.63 N., 118.92 W.
Depth: 10 km
Magnitude: 3.2 ML(B), 3.4 ML(P)

Felt in the Mammoth Lakes area (B).

California--Continued

31 July (P) Southern California
Origin time: 12 51 11.9
Epicenter: 33.83 N., 118.10 W.
Depth: 7 km
Magnitude: 2.7 ML(P)

Felt in the Los Angeles area. Thousands of southeast residents were awakened (press report).

Intensity IV: Bellflower, Long Beach.

2 August (G) Northern California
Origin time: 12 18 45.4
Epicenter: 40.17 N., 123.98 W.
Depth: 5 km
Magnitude: 3.5 ML(B)
Intensity III: Rio Dell.

2 August (B) Central California
Origin time: 20 41 35.5
Epicenter: 36.78 N., 121.57 W.
Depth: 3 km
Magnitude: 3.1 ML(B)
Intensity III: Hollister (press report), San Juan Bautista (B).

2 August (B) Central California
Origin time: 21 43 16.3
Epicenter: 36.78 N., 121.57 W.
Depth: 3 km
Magnitude: 3.9 ML(B)

In Hollister, the press reported a few boxes of rice fell at the Gonzalez Market and some rolls of tissue fell to the floor at the Nob Hill Market. No damage reported.

Intensity IV: Hollister, San Juan Bautista.
Felt: Carmel (B), Monterey (B), North of Morgan Hill (B), Pacific Grove (B).

6 August (P) Southern California
Origin time: 07 03 15.5
Epicenter: 33.87 N., 118.08 W.
Depth: 3 km
Magnitude: 2.0 ML(P)

Felt at Los Angeles.

6 August (B) Central California
Origin time: 17 05 22.7
Epicenter: 37.10 N., 121.50 W.
Depth: 6 km
Magnitude: 5.4 mb(G), 5.7 MS(G), 5.9 ML(B)

This earthquake, the Coyote Lake earthquake, was generally felt over an area of approximately 63,200 sq km from about 60 km

north of Bakersfield, north to Sacramento, east to the Reno-Lake Tahoe area, and westward to the Pacific Ocean (fig. 16). There were no fatalities but 16 injuries were reported by the press in Hollister and Gilroy. Most injuries were caused by flying glass. There were also unconfirmed reports of heart attacks. Damage in Gilroy and Hollister was estimated at $500,000 (press report). The damage consisted mainly of broken store windows, broken glassware in grocery and liquor stores, some damaged chimneys, and some structural damage to five buildings in Gilroy. Ground displacement was observed along the Calaveras fault zone from Hollister northward to the area of Anderson Lake, a distance of 39 km (Armstrong, 1979). The maximum horizontal displacement observed on August 6 was 5-6 mm located about 10 km east of Gilroy where the Calaveras fault zone intersects Highway 152. Continued movement along the fault zone was observed in the days following the main shock. Ground lurching, settlement, and slumping as a result of the ground shaking was observed at many locations between Anderson Lake and Hollister (Armstrong, 1979).

Uhrhammer (1980) located 31 aftershocks ($2.4 \leq ML \leq 4.4$) during August 1979, most of which were located south of the main shock with a concentration of epicenters about 10 km south on the Calaveras fault zone.

All accelerographs within a radius of approximately 40 km from the epicenter were triggered along with some at greater distances (Porcella, 1980). The maximum acceleration of 0.44 g was recorded on the instrument at the San Ysidro School in Gilroy located about 9 km south of the main shock. A much lower acceleration of 0.23 g was recorded near the epicenter on the Coyote Creek accelerograph. The intensities were also lower on the west side of Coyote Lake which is much nearer the epicenter than Gilroy or Hollister. The maximum intensity determined for the Coyote Lake area appears to be about V along the west shore.

Intensity VII:

California--

Casa de Fruta--At the Shell service station, located about 3.2 km (2 mi) northeast of the junction of Highways 152 and 156, there was extensive damage to the building's inside and outside walls and roof. Bricks fell from the chimney, exterior walls bulged outward, interior walls separated from

California--Continued

the ceiling or floors, ceiling tiles fell, hanging pictures fell, small objects and merchandise overturned and broke.

Gilroy--Five buildings reported some structural damage. Fords Department store, which had damage in the second floor to beams and uprights, was deemed unsafe and closed. Also on the second floor of the Ford building there were numerous cracks in plaster walls and much china and crystal glassware smashed to the floor. There were many reports of cracks in the exterior of office buildings in Gilroy. At the San Martin vineyards wine tasting room, adobe walls cracked and stacks of wine cases came tumbling down. Many chimneys were damaged, mostly in 75-year-old or older homes near the downtown area. A new crack split a wall in the City Hall buildings and a ceiling in a court room of the Municipal Courthouse caved in. Most of the damage in stores, bars, and homes came when dishes, bottles, and goods were thrown off shelves and out of cupboards. Supermarkets especially, had their shelves virtually emptied in some areas of town. Sparks from three PG&E gas lines that were snapped started grass fires. Motorists on Highway 101 overpasses reported being tossed from lane to lane as the quake swayed the support pillars (press reports).

Hollister--A runway was reported cracked at Hollister airport. A roof caved in at the Walker and Lee Real Estate office when a 136 kg (300 lb) parapet toppled. The quake knocked a 3 m (10 ft) hole in the plaster ceiling of the J. C. Penney building and there were extensive cracks in the ceiling throughout the store. The ceiling partly collapsed at the new Employment Development Department building on San Felipe Road. The walls of the Hollister Travel Service were also cracked. At Northern California Savings extremely heavy files of safety deposit boxes were moved several inches. At a Texaco distribution plant an empty 11,360 liter (3000 gallon) gasoline tank was rolled around. A nearly life-size statue toppled inside Sacred Heart Church. The San Benito County Library was closed temporarily after book stacks were tilted dangerously and books were strewn all over the floor. Grocery and liquor stores suffered much damage. The Gonzalez Market (1280 San Juan Highway) had a

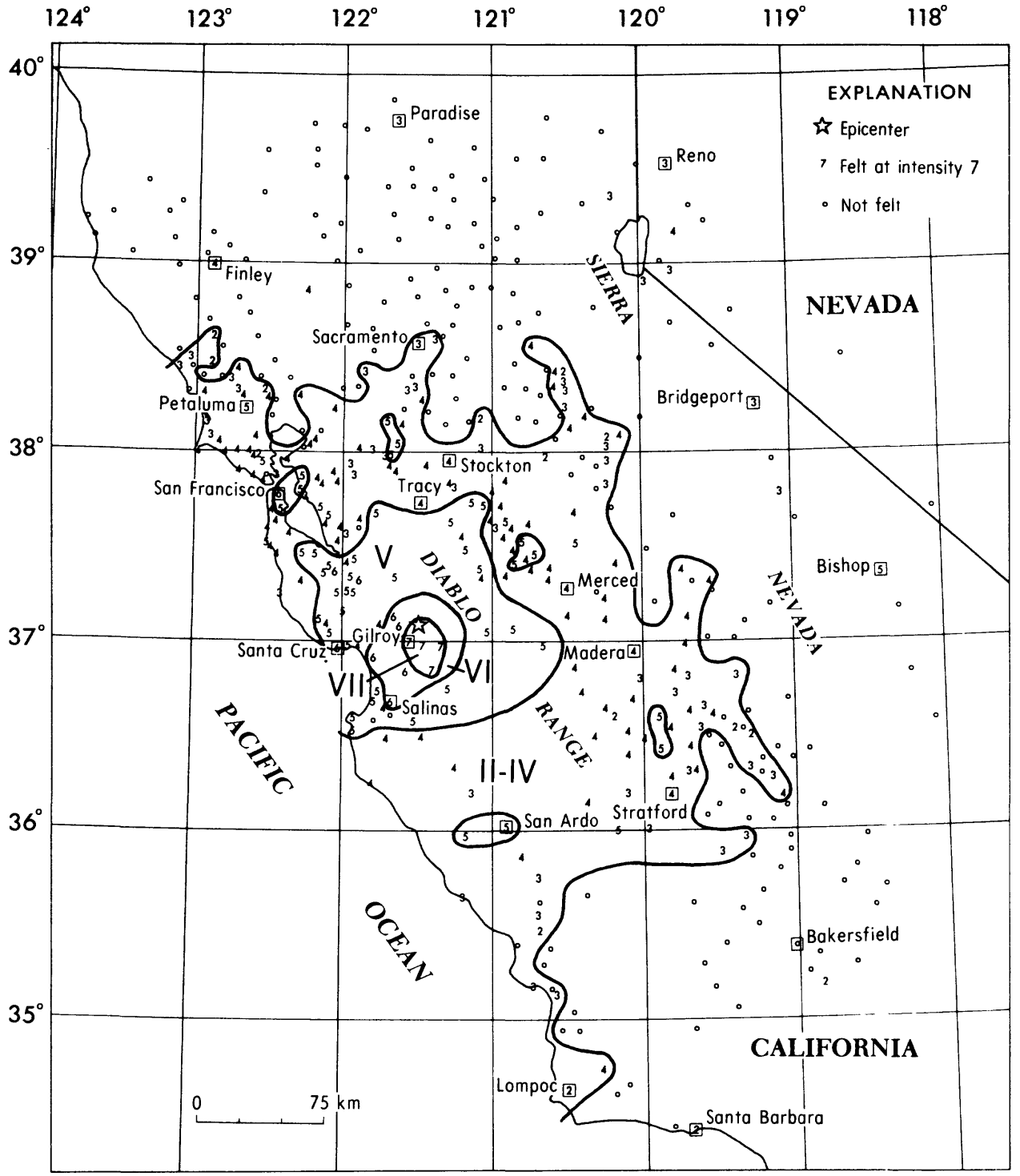

FIGURE 16.--Isoseismal map for the central California earthquake of 6 August 1979, 17 05 22.7 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

gaping hole in the ceiling where a light fixture had ripped loose and the aisles were filled with toppled bottles, cans, and cartons. Gonzalez Liquors next door estimated $15,000-20,000 loss due to smashed bottles that filled the aisles with shattered glass. A home located at 1181 South Street reported a hutch filled with dishes was toppled to the floor, paintings were ripped off the walls, and a dresser overturned. There was considerable roof and wall damage at the testing room of the Almaden Vineyard on Pacheco Pass Highway and much of its stock of wine crashed to the floor. The power lines were down in the downtown area, and 600 customers were temporarily without electricity. There were also unconfirmed reports of broken water lines in the downtown area. No apparent damage was reported to any of the dams and reservoirs in the area (press reports).

Pacheco Pass--At the state fire station, about 16 km (10 mi) northeast of Hollister, the lids of the toilet tanks were thrown off and crashed to the floor, pictures fell off the walls, and a 45 kg (100 lb) filing cabinet bounced 0.3 m (1 ft) from the wall. The Pacheco Peak lookout station near the firehouse suffered some structural damage and was vacated. The fire station was reported to have suffered extensive damage (press report).

Intensity VI:

California--

Milpitas--large cracks in plaster walls, trees and bushes shook strongly, standing vehicles rocked moderately, buildings shook strongly.

Morgan Hill--cracks in interior walls and dry wall, plaster fell, light and heavy furniture moved, small objects overturned and some fell, buildings shook strongly, felt by all.

Salinas--There were reports of cracked foundations of reinforced concrete, cracks in exterior brick walls, large cracks in interior dry wall and plaster walls, light and heavy furniture moved, some windows cracked and broke, pictures out of place and some fell, felt by all. The press reported that many items were thrown from shelves and there was much broken glassware at the Mid-Town Market.

San Francisco--The press reported two 0.9-m (3 ft) long cracks in the exterior brick work of the Adams Grant Building at 114 Sansome Street. At 40 Westwood Drive the walls were cracked

California--Continued

throughout a house, one crack penetrated completely through both sides of the wall. Scores of people ran out of the San Francisco City Hall where plaster was shaken loose from a hallway ceiling on the second floor. Birds were knocked from their roof-top perches, tall buildings were rocked so strongly that people crawled under desks for protection, and cars in the streets were shaken.

San Juan Bautista--The north wall of Mission San Juan Bautista cracked and plaster fell. In the mission gift shop, figurines crashed to the floor. At San Juan Bautista State Historic Park walls of several buildings were cracked and plaster fell. In city shops there were reports of objects falling from shelves and plaster falling from ceilings (press reports). Bricks of chimneys were loosened, light and heavy furniture moved, small objects were overturned and some broke, a few windows cracked, hanging pictures out of place, felt by and frightened all.

San Martin--Some windows and underground pipes broke, heavy furniture moved, light furniture overturned and damaged, small objects overturned and broke, hanging pictures fell, water splashed onto sides of pools, felt by and frightened all.

Santa Cruz—The press reported an apartment building had large cracks and bowed walls, windows were broken throughout Santa Cruz County, and the Santa Cruz County Center had its support beams slightly separated in some rooms.

Sunnyvale--At 1188 Bardeaux Drive a one-story office building of prestressed concrete walls and floor had several cracks in the exterior walls, the doors were put ajar, a 90 kg (200 lb) drafting table moved, and the suspended ceiling buckled.

Watsonville--There were reports of cracked chimneys, hairline cracks in exterior walls, interior walls separated from the ceiling or floor, light furniture moved, few windows cracked, small objects overturned and broke, felt by many. The police department reported that some older buildings suffered wall and roof cracks (press report).

Intensity V:

California--

Avenal--light furniture or small appliances moved, small objects moved, felt by many.

Ballico--light and heavy furniture moved, water splashed onto sides of swimming pools, hanging pictures swung, felt by many.
Berkeley--light furniture or small appliances moved, felt by many.
Bethel Island--light furniture or small appliances moved, small objects overturned, hanging pictures out of place, felt by many.
Bishop--few windows cracked, windows, doors, and dishes rattled, felt by many.
Blossom Hill--light and heavy furniture moved, small objects moved, liquid spilled from small containers, hanging pictures out of place, felt by many.
Boulder Creek--light and heavy furniture moved, water splashed onto sides of swimming pools, small objects moved, few windows cracked, hanging pictures fell, felt by many.
Brisbane--light furniture and small objects moved, trees and bushes shook moderately, buildings shook strongly, felt by many.
Cambrian Park (San Jose)--unconfirmed report of some windows broken, hanging pictures swung, felt by all.
Campbell--light furniture moved, small objects broke, hanging pictures out of place, buildings shook strongly, felt by many.
Capitola--light furniture and small objects moved, liquid spilled from containers, hangings pictures out of place, building shook strongly, felt by many.
Castroville--small objects overturned, trees and bushes shook moderately, hanging pictures swung, felt by all.
Chular--heavy furniture and small objects moved, hanging objects swung violently, buildings shook strongly, felt by all.
Crows Landing--light and heavy furniture moved, small objects moved, hanging objects swung violently, water splashed onto sides of swimming pools, felt by all.
Denair--light furniture and small objects moved, water splashed onto sides of swimming pools, felt by many.
Dos Palos--light furniture and small objects moved, few windows cracked, liquid spilled from small containers, hanging pictures fell, felt by all.
Empire--light furniture moved, few windows cracked, water splashed onto sides of swimming pools, hanging pictures out of place, felt by many.
Gustine--few windows cracked, light furniture and small objects moved, water splashed onto sides of swimming pools, felt by many.
Hayward--light and heavy furniture moved, small objects moved, hanging pictures swung, buildings shook strongly, trees and bushes shook moderately, felt by many.
Hilmar--light furniture and small objects moved, water splashed onto sides of swimming pools, hanging pictures swung, felt by many.
Jolon--light furniture and small objects moved, hanging pictures swung, felt by many.
Knightson--light furniture and small objects moved, hanging pictures swung, felt by several.
Laurel--furniture shifted, small objects fell, hanging objects swung moderately.
Livermore--light furniture and small objects moved, few windows cracked, hanging pictures swung, felt by all.
Los Altos--light furniture and small objects moved, hanging pictures swung, felt by all.
Los Banos--some goods fell from grocery shelves, few windows cracked, light furniture moved, hanging pictures out of place, felt by many.
Los Gatos--light furniture and small objects moved, hanging pictures swung, felt by many.
Marina--light furniture and small appliances moved, hanging pictures out of place, standing vehicles rocked moderately, felt by many.
Menlo Park--few windows cracked, buildings creaked, trees and bushes shook moderately, felt by many.
Moss Beach--light furniture and small objects moved, hanging pictures swung, felt by many.
Mount Hamilton--light furniture and small objects moved, hanging pictures out of place, buildings shook strongly, one report of a cracked foundation, felt by many.
Mount Herman--hanging objects swung violently, trees and bushes shook strongly, water splashed onto sides of swimming pools, buildings shook strongly, felt by many.
Mountain View--light furniture damaged, small objects moved, pendulum clocks stopped, felt by many.
Pacific Grove--few windows cracked, hanging pictures out of place, water splashed onto sides of swimming pools, felt by many.
Pebble Beach--light furniture and small objects moved, few windows cracked, water splashed onto sides of swimming

pools, felt by many.
Oakland--furniture moved, ceiling tiles cracked, telephone service interrupted, buildings swayed, felt by many.
Paicines--light and heavy furniture moved, small objects moved, trees and bushes shook moderately, felt by all.
Patterson--light furniture and small objects moved, hanging objects swung moderately, felt by many.
Petaluma--few windows cracked, light furniture and small objects moved, water splashed onto sides of swimming pools, felt by many.
Raisin--light furniture and small objects moved, hanging pictures swung, felt by several.
Redwood City--few windows cracked, one report of cracked plaster, light furniture and small objects moved, water splashed onto sides of swimming pools, felt by many, people ran into the street.
Redwood Estates--hanging objects swung violently, water splashed onto sides of swimming pools, trees and bushes shook moderately, buildings shook strongly, felt by all.
Rio Vista--light furniture and small objects moved, hanging pictures out of place, felt by many.
Ripon--light furniture moved, small objects overturned, few windows cracked, underground pipes broke, hanging objects swung violently, felt by many.
Riverdale--light furniture and small objects moved, trees and bushes shook moderately, hanging pictures swung, felt by many.
Ross--hanging pictures fell, small objects moved, buildings shook strongly, felt by several.
Salida--light furniture and small objects moved, hanging pictures out of place, felt by many.
San Ardo--few windows cracked, small objects moved, hanging pictures swung, felt by many.
San Francisco International Airport--few windows cracked, hanging objects swung violently, buildings shook strongly, felt by all.
San Jose--There were reports of light and heavy furniture moved, small objects moved, buildings shook strongly, and felt by all. The press described the shaking as violent and a police dispatcher said his room moved 4 or 5 in. (10-13 cm) up and down.

California--Continued

San Leandro--small objects broke, hanging objects swung moderately, felt by many.
Santa Clara--few windows cracked, small objects moved, buildings shook strongly, felt by many.
Saratoga--There were reports of light furniture moved and hanging pictures swung. The postmaster described it as a "very good shake" that moved the whole Post Office building back and forth.
Snelling--light furniture and small objects moved, hanging pictures swung, buildings shook strongly, felt by all.
South Dos Palos--cracks in interior walls, small objects moved, buildings shook strongly, felt by all.
Vernalis--few windows cracked, small objects moved, water splashed onto sides of swimming pools, felt by many.

Intensity IV:

California--Ahwanee, Alamo, Alviso, Aptos, Atwater, Bass Lake, Ben Lomond, Benicia, Big Sur, Bolinas, Bradley, Brentwood, Brookdale, Burlingame, Burrel, Byron, Cantua Creek, Carmel, Carmel Valley, Caruthers, Castro Valley, Catheys Valley, Chowchilla, Coalinga, Crockett, Daly City, Danville, Davenport, Delhi, El Granada, El Nido, El Verano, Escalon, Fairfax, Fairfield, Farmington, Felton, Finley, Firebaugh, Five Points, Forest Knolls, Fort Ord, Fowler, Fresno, Friant, Glencoe, Gonzales, Greenfield, Half Moon Bay, Hanford, Hathaway Pines, Helm, Hernandez, Hickman, Holt, Holy City, Hughson, Isleton, Keyes, La Grange, La Honda, Lagunitas, Layton, Le Grand, Lemoore NAS, Limington, Lindsay, Livingston, Long Barn, Los Alamos, Madera, Mendota, Merced, Modesto, Monte Sereno, Monterey, Moraga, Mt. Aukum, Mount Eden, Murphys, Myers Flat, New Almaden, Newark, Newman, Novato, Olema, O'Neals, Orinda, Pacific Grove, Pacifica, Parlier, Penngrove, Petrolia, Pinedale, Pioneer, Pittsburg, Pleasanton, Oakland International Airport, Point Reyes Station, Port Costa, Richmond, River Pines, Riverbank, San Bruno, Santa Rosa, Sequoia National Park, South San Francisco, Stevinson, Stinson Beach, Stockton, Stratford, Tracy, Tranquillity, Turlock, Union City, Valley Ford, Valley Home, Walnut Creek, Walnut Grove, Westley, Winton, Woodacre.
Nevada--Carson City.

Intensity III:

California--Alameda, Alpaugh, Antioch, Armona, Arroyo Grande, Avila Beach,

Belvedere-Tiburon, Biola, Bridgeport, Ceres, Clayton, Clovis, Concord, (press report), Corte Madera, Courtland, Del Ray, Diablo, Dixon, Exeter, Fremont, Fulton, Groveland, Guerneville, Healdsburg (press report), Hood, Huron, Inverness, Jenner, June Lake, Kettleman City, King City, Larkspur, Linden, Manteca, Marshall, Martinez (press report), Mountain Ranch, Napa, Oakley, Paradise, Pescadero, Piedra, Pixley, Rail Road Flat, Rohnert Park, Sacramento, San Lorenzo, San Mateo, San Miguel, San Simeon, Santa Clara, Selma, South Lake Tahoe, Sunnyvale, Templeton, Truckee, Tuolumne, Twain Harte, Visalia, Waterford, Wilseyville.

Nevada--Minden, Reno.

Intensity II:

California--Arvin, Atascadero, Clements, Copperopolis, Cutler, Davis (press report), Dinuba, Eldridge, Forest Knolls, Lompoc, Mi-wuk Village, San Anselmo, San Joaquin, Santa Barbara, West Point.

Felt:

California--Coyote.

Nevada--Lake Tahoe area (press report).

6 August (B) Central California
Origin time: 17 10 43.3
Epicenter: 37.09 N., 121.48 W.
Depth: 6 km
Magnitude: 3.8 ML(B)

Felt in the epicentral area (B). Aftershock of the August 6, 17 05 22.7 earthquake.

6 August (B) Central California
Origin time: 17 22 47.6
Epicenter: 37.04 N., 121.48 W.
Depth: 7 km
Magnitude: 3.2 ML(B)

Felt in the epicentral area (B). Aftershock of the August 6, 17 05 22.7 earthquake.

6 August (P) Southern California
Origin time: 18 04 57.4
Epicenter: 34.42 N., 118.40 W.
Depth: 6 km
Magnitude: 2.8 ML(P)

Felt at San Fernando (P).

6 August (B) Central California
Origin time: 22 21 01.7
Epicenter: 37.03 N., 121.47 W.
Depth: 6 km
Magnitude: 3.6 ML(B)

Felt in the epicentral area (B). Aftershock of the August 6, 17 05 22.7 earthquake.

6 August (B) Central California
Origin time: 22 33 55.4
Epicenter: 37.00 N., 121.48 W.
Depth: 4 km
Magnitude: 4.4 ML(B)

Felt in the epicentral area (B). Aftershock of the August 6, 17 05 22.7 earthquake.

Intensity IV: Campbell.

6 August (B) Central California
Origin time: 22 35 57.6
Epicenter: 36.98 N., 121.49 W.
Depth: 5 km
Magnitude: 2.9 ML(B)

Felt in the epicentral area (B). Aftershock of the August 6, 17 05 22.7 earthquake.

6 August (B) Central California
Origin time: 22 36 04.9
Epicenter: 36.99 N., 121.48 W.
Depth: 1 km
Magnitude: 3.8 ML(B)

Felt in the epicentral area (B). Aftershock of the August 6, 17 05 22.7 earthquake.

7 August (B) Central California
Origin time: 05 56 51.6
Epicenter: 37.06 N., 121.49 W.
Depth: 4 km
Magnitude: 3.1 ML(B)

Felt in the epicentral area (B). Aftershock of the August 6, 17 05 22.7 earthquake.

7 August (B) Central California
Origin time: 19 11 25.7
Epicenter: 36.98 N., 121.47 W.
Depth: 2 km
Magnitude: 3.2 ML(B)

Felt in the epicentral area (B). Aftershock of the August 6, 17 05 22.7 earthquake.

8 August (B) Central California
Origin time: 22 56 07.9
Epicenter: 37.03 N., 121.47 W.
Depth: 4 km
Magnitude: 3.4 ML(B)

Felt in the epicentral area (B). Aftershock of the August 6, 17 05 22.7 earthquake.

9 August (B) Central California
Origin time: 07 03 20.2
Epicenter: 37.01 N., 121.45 W.
Depth: 6 km
Magnitude: 4.2 ML(B)

The press reported that this earthquake was felt at Alameda, East San Jose, Fremont, Gilroy, Hollister, Monterey, Morgan Hill, Newark, San Francisco, San Leandro, Santa Clara, Tiburon, and Union City. Aftershock of the August 6, 17 05 22.7 earthquake.

9 August (B) Central California
Origin time: 12 49 27.5
Epicenter: 36.98 N., 121.46 W.
Depth: 3 km
Magnitude: 3.5 ML(B)

Felt in Hollister (press report). Aftershock of the August 6, 17 05 22.7 earthquake.

10 August (B) Central California
Origin time: 00 25 20.8
Epicenter: 37.02 N., 121.46 W.
Depth: 5 km
Magnitude: 3.7 ML(B)

Felt in the epicentral area (B). Aftershock of the August 6, 17 05 22.7 earthquake.

10 August (B) Central California
Origin time: 04 50 40.0
Epicenter: 36.96 N., 121.48 W.
Depth: 5 km
Magnitude: 3.0 ML(B)

Felt in the epicentral area (B). Aftershock of the August 6, 17 05 22.7 earthquake.

11 August (B) Central Califonia
Origin time: 20 29 35.2
Epicenter: 37.14 N., 121.52 W.
Depth: 5 km
Magnitude: 3.4 ML(B)

Felt in the epicentral area (B). Aftershock of the August 6, 17 05 22.7 earthquake.

13 August (B) Central California
Origin time: 19 02 52.5
Epicenter: 37.88 N., 122.21 W.
Depth: 13 km
Magnitude: 2.3 ML(B)

Felt at Orinda (B).

13 August (B) Central California
Origin time: 19 18 46.8
Epicenter: 37.86 N., 122.17 W.

California--Continued

Depth: 9 km
Magnitude: 3.5 ML(B)
Intensity IV: Moraga (press report), Rheem Valley, Walnut Creek.
Intensity III: Alamo, Berkeley, Martinez (press report), San Francisco (press report).
Intensity II: Port Costa.
Felt: Oakland (B), Orinda (B).

14 August (B) Central California
Origin time: 03 15 57.0
Epicenter: 36.99 N., 121.47 W.
Depth: 4 km
Magnitude: 3.6 ML(B)

Felt in the epicentral area (B). Aftershock of the August 6, 17 05 22.7 earthquake.

14 August (P) Southern California
Origin time: 04 20 18.6
Epicenter: 33.80 N., 117.80 W.
Depth: 6 km
Magnitude: 2.1 ML(P)

Felt at Brea (P).

17 August (B) Central California
Origin time: 15 43 03.3
Epicenter: 37.84 N., 122.23 W.
Depth: 8 km
Magnitude: 2.9 ML(B)

Felt in Berkeley Hills (B), in parts of Oakland, and as far east as Moraga (press report).

19 August (P) Southern California
Origin time: 03 13 51.2
Epicenter: 34.08 N., 117.22 W.
Depth: 5 km
Magnitude: 2.7 ML(P)

Felt at Redlands (P).

19 August (B) Central California
Origin time: 08 45 50.8
Epicenter: 36.97 N., 121.46 W.
Depth: 5 km
Magnitude: 2.3 ML(B)

Aftershock of the August 6, 17 05 22.7 earthquake

Intensity IV: San Jose.

21 August (P) Southern California
Origin time: 13 18 07.0
Epicenter: 34.55 N., 119.72 W.
Depth: 6 km
Magnitude: 3.1 ML(P)

Intensity IV: Carpenteria, San Roque, Santa Barbara.
Intensity III: Goleta.

22 August (P) Southern California
Origin time: 02 01 36.4
Epicenter: 33.70 N., 116.85 W.
Depth: 16 km
Magnitude: 4.0 ML(P)
Intensity IV: Aguanga, Bloomington, Bonsall, Cabazon, Hemet, Indio, Palm Springs, Vista.
Intensity III: Beaumont, Cedar Glen, Highland, Indio (press report), Lake Elsinore (press report), Lakeview, North Palm Springs, Perris, Sunnymead, Temecula, Thousand Palms, Twin Peaks, White Water.
Felt: San Bernardino (P).

24 August (B) Central California
Origin time: 04 46 51.6
Epicenter: 37.84 N., 122.25 W.
Depth: 7 km
Magnitude: 2.9 ML(B)
Intensity IV: San Francisco.
Felt: Albany (B), Berkeley (B), El Cerrito (B), Emeryville (B), Lafayette (press report), Oakland (B), Orinda (press report), Richmond (B).

27 August (P) Imperial Valley area
Origin time: 07 23 53.5
Epicenter: 32.70 N., 115.90 W.
Depth: 5 km
Magnitude: 3.5 ML(P)

Felt at El Centro (P).

28 August (P) Southern California
Origin time: 08 57 56.3
Epicenter: 34.42 N., 117.73 W.
Depth: 9 km
Magnitude: 3.9 ML(P)
Intensity IV: Lytle Creek, Mt. Baldy, Pinon Hills, Wrightwood.
Intensity III: Blue Jay, Cedar Glen.
Intensity II: Action, Valyermo.
Felt: Los Angeles (P), Palmdale (P), Pasadena (P).

29 August (P) Southern California
Origin time: 09 19 24.9
Epicenter: 33.97 N., 118.70 W.
Depth: 7 km
Magnitude: 2.7 ML(P)

Felt at Malibu (P).

31 August (B) Central California
Origin time: 18 53 45.1
Epicenter: 37.84 N., 122.03 W.

California--Continued

Depth: 8 km
Magnitude: 2.7 ML(B)

Felt at Danville (press report).

2 September (B) Northern Califonia
Origin time: 07 38 00.1
Epicenter: 39.20 N., 122.86 W.
Depth: 22 km
Magnitude: 2.6 ML(B)
Intensity III: Potter Valley, Redwood Valley, Ukiah (press report).

5 September (P) Southern California
Origin time: 17 11 07.1
Epicenter: 34.07 N., 118.90 W.
Depth: 7 km
Magnitude: 3.4 ML(P)

Felt at Chatsworth and Thousand Oaks (P).

7 September (B) Owens Valley area
Origin time: 09 43 47.3
Epicenter: 37.62 N., 118.91 W.
Depth: 3 km
Magnitude: 4.2 ML(B), 4.2 ML(P)
Intensity IV: Big Creek, Bridgeport, Crowley Lake, Lake Shore, Mammoth Lakes, Mono City.
Intensity III: June Lake.

9 September (B) Central California
Origin time: 20 48 30.7
Epicenter: 37.84 N., 121.95 W.
Depth: 1 km
Magnitude: 2.9 ML(B)

Felt in Contra Costa County (press report).

10 September (P) Owens Valley area
Origin time: 19 26 52.6
Epicenter: 37.55 N., 118.68 W.
Depth: 5 km
Magnitude: 2.7 ML(P)

Felt at Mammoth Lakes (P).

14 September (B) Central California
Origin time: 01 04 05.0
Epicenter: 37.11 N., 121.94 W.
Depth: 15 km
Magnitude: 3.2 ML(B)

Felt at Santa Cruz (B).

20 September (B) Central California
Origin time: 03 05 24.8
Epicenter: 37.88 N., 122.30 W.
Depth: 10 km
Magnitude: 2.5 ML(B)

Felt at Berkeley (B).

24 September (B) Owens Valley area
Origin time: 13 05 03.2
Epicenter: 37.66 N., 118.94 W.
Depth: 5 km
Magnitude: 4.1 ML(B), 4.4 ML(P)
Intensity IV: Mammoth Lakes, Lake Shore.

24 September (B) Owens Valley area
Origin time: 14 26 18.5
Epicenter: 37.66 N., 118.94 W.
Depth: 5 km
Magnitude: 3.6 ML(B), 3.9 ML(P)

Felt at Mammoth Lakes (P).

27 September (B) Central California
Origin time: 06 14 50.2
Epicenter: 36.79 N., 121.59 W.
Depth: 2 km
Magnitude: 2.9 ML(B)

Felt at San Juan Bautista (B).

28 September (P) Southern California
Origin time: 20 08 26.2
Epicenter: 34.02 N., 118.32 W.
Depth: 6 km
Magnitude: 2.2 ML(P)

Felt at Hollywood (P).

1 October (B) Owens Valley area
Origin time: 11 52 00.7
Epicenter: 37.60 N., 118.86 W.
Depth: 10 km
Magnitude: 2.9 ML(B)

Felt at Mammoth Lakes (B).

1 October (B) Owens Valley area
Origin time: 11 52 20.6
Epicenter: 37.54 N., 118.82 W.
Depth: 10 km
Magnitude: 3.2 ML(B), 3.4 ML(P)

Felt at Mammoth Lakes (B).

1 October (B) Owens Valley area
Origin time: 12 37 02.3
Epicenter: 37.60 N., 118.85 W.
Depth: 12 km
Magnitude: 3.0 ML(B), 3.4 ML(P)

Felt at Mammoth Lakes.

3 October (B) Owens Valley area
Origin time: 08 54 24.8
Epicenter: 37.63 N., 118.91 W.
Depth: 12 km
Magnitude: 3.0 ML(B), 3.3 ML(P)

Felt at Mammoth Lakes (B).

California--Continued

3 October (B) Owens Valley area
Origin time: 08 58 30.8
Epicenter: 37.62 N., 118.91 W.
Depth: 10 km
Magnitude: 3.1 ML(B), 3.3 ML(P)

Felt at Mammoth Lakes (B).

4 October (B) Southern California
Origin time: 13 44 17.8
Epicenter: 33.60 N., 117.23 W.
Depth: 5 km
Magnitude: 3.4 ML(P)
Intensity III: Lake Elsinore, Lakeland Village, Murrieta, Rancho California, Sedco Hills, Sun City, Temecula, Wildomar (all from press reports).

7 October (B) California-Nevada border region
Origin time: 20 54 41.4
Epicenter: 38.22 N., 119.35 W.
Depth: 9 km
Magnitude: 4.1 mb(G), 5.0 ML(B)
Intensity IV: Bridgeport, Friant, Midpines, Mountain Ranch, Murphys, Sonora, Strawberry, Yosemite National Park Lodge, Wawona.
Intensity III: Soulsbyville, Topaz.
Intensity II: El Portal, Pacific House.

7 October (B) California-Nevada border region
Origin time: 21 20 53.0
Epicenter: 38.23 N., 119.36 W.
Depth: 11 km
Magnitude: 4.4 ML(B)

Felt at Bridgeport (B).

8 October (B) California-Nevada border region
Origin time: 03 34 24.0
Epicenter: 38.21 N., 119.32 W.
Depth: 9 km
Magnitude: 4.6 ML(B)

Felt at Bridgeport (B).

15 October (P) Imperial Valley area
Origin time: 23 16 54.5
Epicenter: 32.63 N., 115.33 W.
Depth: 12 km
Magnitude: 5.7 mb(G), 6.9 MS(G), 6.6 ML(P), 7.0 ML(B)

The felt area in the United States, covering parts of Arizona, California, and Nevada, was approximately 128,000 sq km (fig. 17). The total felt area cannot be computed because of lack of intensity data from Mexico and because the western boundary of the limit of perceptibility extends to the

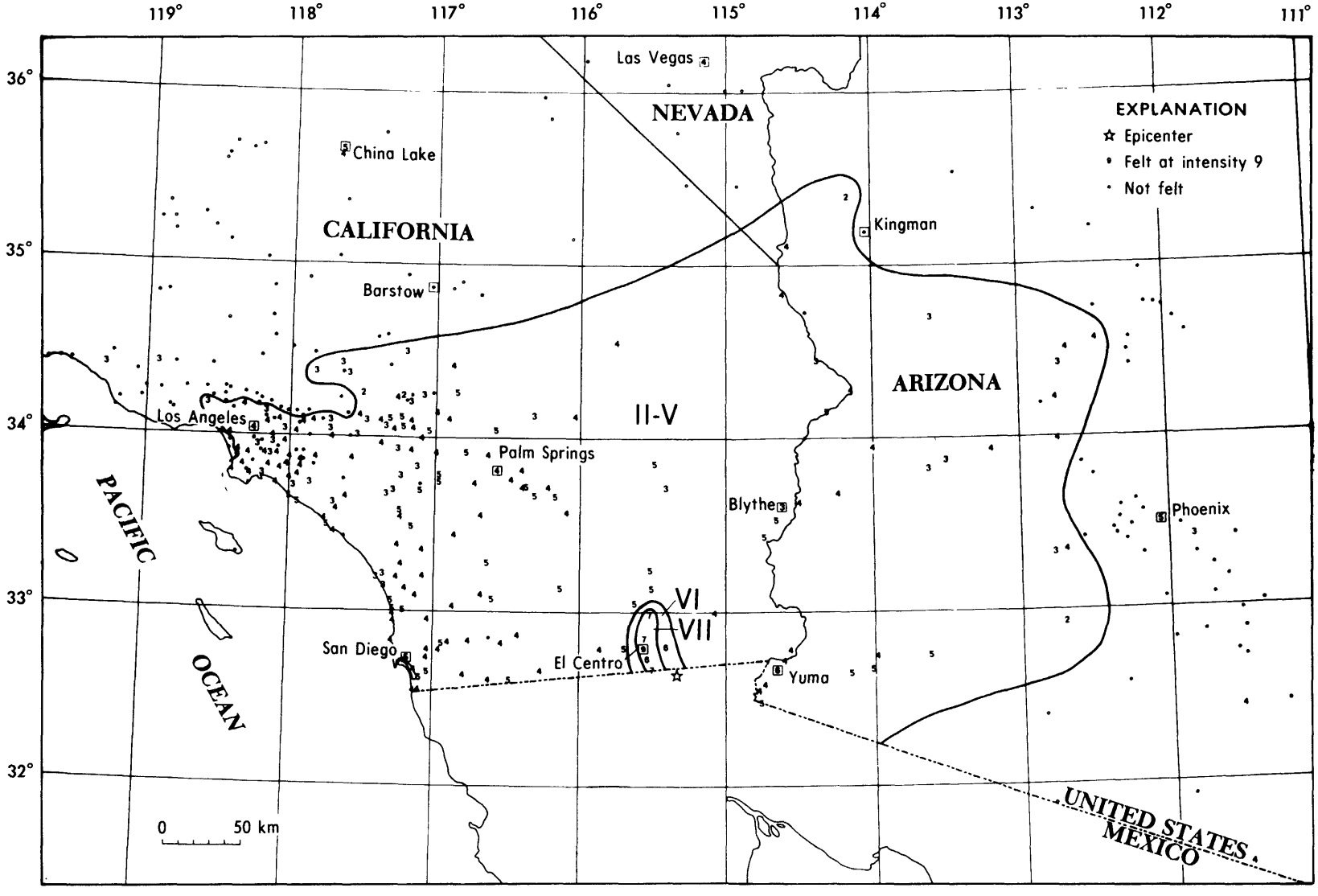

FIGURE 17.--Isoseismal map for the Imperial Valley, California earthquake of 15 October 1979, 23 16 54.5 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

coast line of California. The press reported 91 people injured, mostly cuts from flying glass or bruises from falling objects; two homes destroyed, 1565 homes damaged; 11 businesses destroyed, and 440 businesses damaged; all in the Imperial Valley. There were also numerous bridges with cracked abutments and shifted roadbeds due to slumping or faulting. Extensive lateral slope failure occurred along many irrigation canals, including the All-American Canal.

Neal and others (1979) estimated the damage from the earthquake at $30 million with the worst damage occurring in southern Imperial County and northeastern Baja California. This figure encompasses both buildings and their contents and agricultural losses. The greatest single structure loss was to the Imperial County Services Building in El Centro, a six-story building whose support pillars failed and allowed partial collapse of the east portion of the building (fig. 18). Press accounts estimated the preliminary replacement cost at about $7 million. The agriculture industry suffered losses due to damage to the irrigation system which included damage to canals and irrigation ditches and damage to subsurface drain tiles which were disturbed by the movement along the Imperial Fault. The worst damage was to the All-American Canal which brings Colorado River water into the Imperial Valley. The earthquake shook down levees on both sides of the canal along a 13-km stretch of the canal east of Calexico. In some places the banks settled by more than 1 m.

Mexicali, Mexico, suffered the same type of damage as the urban centers in California. The press reported about 100 homes, mostly adobe huts, were heavily damaged as was the airport terminal, and several buildings suffered ceiling cave-ins. There were also reports of walls collapsing, bricks falling from fronts of stores, glass breakage, merchandise falling from shelves, debris littered sidewalks, and several breaks in water mains.

Reagor and others (1980) described the damage and effects of this earthquake and its aftershocks in the Imperial Valley as consisting of partially collapsed unreinforced brick walls; isolated instances of cracked or fallen cornices, parapets, and gables; a few chimneys damaged; display windows broken or shattered; plaster cracked and fallen; sections of suspended

California--Continued

ceiling tiles with framework displaced or fallen; shelves or counters shifted or overturned with merchandise thrown from shelves in many instances; all types of furniture moved with lighter furniture, bookcases, and table lamps overturned; pictures and mirrors fallen; considerable quantities of glassware, dishes, and other small objects fallen and broken. In the older section of the business districts, porticos were often extensively cracked as were their support columns. Many people found it difficult to stand or to walk and, if sitting, had difficulty arising.

Neal and others (1979) compared the May 18, 1940 and October 15, 1979 Imperial Valley earthquakes as follows: "Although of lesser extent, the October 15, 1979 ground rupture followed the same trace as the 1940 event, and showed many of the same features and characteristics. Both ruptures appeared to have maximum lateral displacements near the International Border, and predominant vertical displacement near the Mesquito Depression east of Imperial. Activity shifted to the north with both events having damaging aftershocks near Brawley. Also, like the 1979 event there is evidence that the Brawley fault under went sympathetic movement in 1940. The similiarities also extend to the distribution and types of damage as described for the 1940 earthquake. In the 1940 event the structural damage was most severe in Brawley, and probably would have been so in the 1979 earthquake if it were not for the failure of the multi-million dollar County Services Building in El Centro."

Neal and others (1979) also described the rupture on the Imperial Fault as extending from about 4 km north of the International Border to about 4 km south of Brawley. Maximum lateral displacement was about 55 cm in Heber Dunes and the maximum vertical displacement was 19 cm southeast of Brawley. Lateral displacements were characterized by left stepping en echelon cracks and mole tracks. Vertical offsets showed a clean scarp at the base of the preexisting Imperial fault scarps. Secondary features observed by Neal and others (1979) included sand boils and lateral spreading along the southern extent of the fault.

This earthquake triggered all of the USGS accelerographs within about 100 km of the epicenter and one as far away as 196 km. The maximum acceleration recorded was 1.74

g on the vertical component of El Centro Station No. 6 located about 27 km from the epicenter and about 1 km from the nearest point on the Imperial fault trace (Porcella and Matthiesen, 1979).

Many of the aftershocks were felt in the Imperial Valley, especially the one on October 16 at 06 58 43.2, to which the press attributes additional damage in the Brawley area. Table 1 does not list all of the aftershocks of magnitude $\geq$ 3.0 that were recorded.

Reagor and others (1980) pointed out that the maximum intensity assigned to this earthquake was VII with the exception of the Imperial County Services Building at El Centro which was assigned intensity IX. This building, a six-story reinforced concrete-frame structure which was designed under the 1967 provisions of the Uniform Building Code, suffered significant structural damage and was torn down after the earthquake.

Most of the damage descriptions for El Centro, Brawley, Calexico, and Imperial, California, listed below, were taken from Reagor and others (1980).

Intensity IX:

California--

El Centro--Although the general level of earthquake damage in El Centro is a VII, the Imperial County Services Building (ICSB), located on Main Street between Ninth and Eleventh Streets, has been given an intensity of IX (fig. 18). This six-story reinforced concrete-frame and shear-wall structure, completed in 1971 at a construction cost of $1.87 million (Rojahn and Ragsdale, 1980), was designed to be earthquake resistant. Although severely damaged, the building did not collapse. The major damage to the building was the failure of the four reinforced concrete support columns on the east side of the building (fig. 19). The concrete, at the base of the columns along the east side, was shattered and the vertical reinforced bars were severely bent. The partial collapse of these support columns allowed the eastern extremity of the building to sag about 30 cm (1 ft) (Rojahn and Ragsdale, 1980). In the upper levels of the building, the south-facing exterior wall was extensively cracked near the window frames. Also, in several instances partial

California--Continued

separation occurred between the floors, walls, and ceilings. Fallen suspended ceiling tiles, damage to interior walls, and shifted or overturned office furniture were some of the effects reported to have occurred inside the building.

Intensity VII:

California--

Brawley--Many buildings were damaged in the business district along Main Street between the 500 and 900 blocks. Damage at Brawley was further enhanced by aftershocks, which occurred near midnight on October 15. The aftershocks, according to several people, were responsible for additional building damage, window breakage, and the shaking of large quantities of merchandise from shelves.

McMahn's Furniture Store (500 block)--An estimated 15-m (50-ft) long crack about 2.5 cm (1 in) wide occurred in the west wall. Concrete columns which supported the balconies were moderately cracked at the ceiling connection. Ceiling tiles were dislodged and some fell. The dry wall was split and one section was thrown down from the south-facing wall. The building cornice cracked but did not fall. The east side of the metal sign, which covered the upper level store front, was shaken down.

Newberry Department Store (500 block)--The west brick wall was knocked away from the roof and partially collapsed. Twelve wooden support trusses were broken. Bricks fell from the roof and caused considerable damage to the interior of the store.

National Department Store (600 block)--There was some collapse of the roof. Fallen bricks caused dry-wall ceilings to split and fall. The cement floor in the storage area was cracked in a few places. Metal shelves that were bolted to concrete walls were thrown down.

Fire Station (800 block)--This building was a reinforced concrete structure with the roof supported by wooden beams. A few of these beams were reported to be cracked along their length. In the firehouse living quarters, a metal support bracket for one of the east-west beams was slightly twisted. A metal hose rack bolted to the west wall was thrown down. Roof tiles were dislodged and some fell.

FIGURE 18.--Photograph of damage to the Imperial County Services Building in Imperial, Calif.

During the initial tremor, according to a fireman, "the trucks inside the garage were shaken so strongly they nearly touched each other."

Victory Market (900 block)--The one-story building was a steel-frame and brick structure. The northeast corner of the east facing brick wall partially collapsed. There were 2.5-to-5.0-cm (1-to-2-in) open cracks in the west-facing brick wall in several places. In the middle of the 900 block the portico roof partially collapsed. In this area, according to the owner of the Victory Market, some of the buildings were condemned before the earthquake.

Several homes in the 200 block of G Street were damaged. A stucco-covered chimney on the west side of the house shifted about 5 cm (2 in) from the wall. An attached wooden porch roof was shaken down from a wood-frame house across the street to the north. On Third Street, one block south, a few chimneys were either broken at the roof line or the upper tiers of bricks were thrown down to the west.

The press reported extensive damage to Tacos Pancho (201 Main Street) and

FIGURE 19.--Support pillar failure at the east end of the Imperial County Services Building in El Centro, California caused by the earthquake on October 15, 1979.

California--Continued

about $200,000 damage to the Elk's Lodge (196 State Street). There were also reports of an arcade broken off in front of Desert Shoes Store and a portion of the roof fallen inside Ellis' Department Store and lying on shelves.

New River Bridge (on State Highway 86 west of the city)--The abutments at each end of the bridge were cracked and chipped to the extent that the reinforcement bars were exposed at bridge level. Many of the support columns were cracked at the bridge deck connection. The asphalt road had settled about 12.5 cm (5 in) relative to the bridge.

Two and one-half kilometers south of Main Street on Dogwood Road an elevated water tower collapsed.

Calexico--Damage to several buildings occurred in the business district along Second and Third Streets. Many of the buildings' store fronts along

California--Continued

Second Street exhibited large vertical and horizontal cracks in the exterior stucco walls.

McMahn's Furniture Store (104 East Second Street)--Partial collapse of the second-story west brick wall and parapet (fig. 20) caused the roof of the portico to cave-in. The upper story was condemned before the earthquake.

International Music Store (Third Street and Paulin Avenue)--The building was damaged by the partial collapse of the east brick fire wall which caved in the roof of the store, damaging merchandise and equipment.

The Port of Entry was damaged when the brick facade tumbled to the floor. It also suffered many plaster cracks (press report).

El Camino Real Hotel (Second Street and Paulin Avenue)--The press reported the roof had collapsed.

San Diego State University's main building, which was built in 1915 and lost

FIGURE 20.--Damage to a wall of the McMahn's Furniture Store in Calexico, Calif.

the second floor to an earthquake in 1927, suffered severe structural damage and was later condemned. There was no steel in several of the bearing walls which were severely damaged. Also, a basement support was cracked on both sides (press report).

Other effects reported by the press were as follows: The Unified School District buildings suffered damage to walls, fallen light fixtures, broken glass and overturned furniture; several street lights were knocked down; extensive merchandise damage in grocery and drug stores; many buildings sustained cracked and fallen plaster with a few porches damaged; along with broken water mains, leaks in gas lines, and electric lines knocked down.

El Centro--In the older business district most of the building damage was along Main and State Streets between Fourth and Eighth Streets, and in the 400 and 500 blocks on Broadway.

The newer shopping centers, located along Imperial Avenue and to the west of the older business district, appeared to have sustained only minor damage such as small plaster cracks and some fallen plaster, merchandise damage due to fall from shelves, and the displacement and occasional fall of suspended ceiling tiles with framework slightly bent or hanging down.

Hoffman Music Store (534 Main Street)--The brick and stucco veneer store front over the building was extensively fractured.

Deluxe Cleaners (119 North Fifth Street)--The two-story wood-frame and brick building was damaged by the partial collapse of the west facing parapet and by the fall of brick veneer from the second-story walls (fig. 21). The roof over the second story was reported to have collapsed. The upper story had been condemned before the earthquake.

Mayan Hotel (595 State Street)--The two-story steel frame and brick building with stucco veneer was moderately damaged. Along the length of the east wall, there was about 2.5 cm (1 in) of separation at the connections of the

FIGURE 21.--Damage to the cornice of the Deluxe Cleaners building in El Centro, Calif.

California--Continued

ceilings and floors. There was also considerable fallen and cracked plaster from ceilings and walls in all the rooms and in the lobby.

A duplex home (547 Vine Street) was declared structurally unsound according to the press due to a collapsed porch and structural damage to the interior.

The Firestone Tire building (Fourth and Main Streets) sustained separated walls and damage to the foundation (press report).

The Imperial Valley College (north of El Centro) had reported damage of about $151,000. There was structural damage to the library building, much glass breakage in laboratories and classrooms, and some kind of damage to nearly all of the buildings (press report).

The city water storage tower (Third and Commercial Streets) was condemned due to damage to the bracing of the tower and bending of some of the steel support girders (press report).

California--Continued

Green's Custom Jewelry (113 North 5th Street)--Most of the brick facade fell onto the sidewalk (press report).

At Gio's Mobile Home Estates, on Lincoln Avenue, a large number of the nearly 90 mobile homes were damaged when they were shaken from their metal support stands. A concrete-block masonry fence, standing in an east-west direction, was partially thrown down at the south entrance to the mobile home park.

Other effects in and around El Centro--North of El Centro an oil tank split 15 cm (6 in) along a seam near the base at the Southern Pacific Pipeline tank farm. Underground water pipes were broken in many places; however, utilities were interrupted for only a short period of time. Asphalt roads cracked, buckled, and slumped in many places, especially where the fault trace crossed the roadway. The San Diego and Arizona Eastern Railroad tracks were offset about 23 cm where they crossed the Imperial fault east of El Centro near Meloland.

Imperial--The press reported that more than 80 percent of the buildings in the downtown area had been condemned after sustaining damage estimated at $1.8 million. Most of the damage occurred on the west side of Imperial Avenue. Several sewer pipes were also reported broken.

Lydia's Cafe (133 S. Imperial)--The one-story, wood-frame and brick structure was damaged by the partial collapse of the south wall. Part of the roof was knocked out.

Imperial Hardware Store (125 Imperial) --The rear wall of the brick building was severely cracked and the top part of the building was pushed toward the west.

The police chief reported damage to the residential area of Imperial consisted of many stucco homes that moved on their foundations and others that had lateral cracks near their foundations. A masonry fence supporting a carport partially collapsed. Chimney bricks were loosened. At the police station, the plastered wall between the chief's office and the jail area cracked vertically and opened to a width of 2.5 cm (1 in). The police chief said, "I was in a doctor's office at the time of the initial tremor and I could not get up out of the chair due to the building moving in all directions at once. A loud roaring sound preceded the earthquake."

Intensity VI:

Arizona--

Yuma--The quake was reported felt much more strongly and did more damage in the Yuma Valley than on the Yuma Mesa about 15-30 m above the valley.

The press reported three pencil-wide cracks in the Juvenile Court Center (2849 Avenue B), a masonry building; one water main was broken; the roof of the Stardust Hotel was cracked; and windows cracked and goods were knocked off of shelves at the Yuma Marine Corps Air Station.

Other effects reported were cracks in plaster walls, light and heavy furniture moved, hanging pictures fell, felt by all.

California--

Heber--cracked foundation and reports of interior walls separated from ceiling to floor, light and heavy furniture moved, few windows cracked, hanging pictures fell, felt by all.

California--Continued

Holtville--Store front windows in occupied building on Fifth and Holt Avenue were broken, a number of buildings sustained cracks in their exterior walls, many homes in the Ralph Simpson subdivision were damaged when brick fireplaces pulled away from the walls, the Barbara Worth Country Club had most of their dishes broken, and one house shifted off its foundation--type of foundation unknown (all from press reports).

Intensity V:

Arizona--Dateland, Parker, Phoenix, San Luis, Tacna, Wellton.

California--Big Bear City, Bonita, Cabazon, Campo, Cardiff by the Sea, China Lake, Chula Vista, Coachella, Eagle Mountain, Earp, Encinitas, Hemet, Highland, Huntington Beach, Jacumba, Julian, La Quinta, Laguna Niguel, Morongo Valley, Newport Beach, Niland, Ocotillo, Palm Desert, Palo Verde, Rancho Santa Fe, Redlands, Ripley, San Bernardino, San Diego, San Jacinto, Santee, Seeley, Temecula, Warner Springs, Westmorland, Wildomar, Winchester, Yucaipa.

Intensity IV:

Arizona--Aguila, Bouse, Bullhead City, Ehrenberg, Gadsden, Glendale (press report), Palo Verde, Prescott, Quartzsite, Roll, Scottsdale (press report), Silver Bell, Skull Valley, Somerton, Wickenburg, Yarnell.

California--Aguanga, Alhambra, Alpine, Amboy, Anaheim, Angelus Oaks, Anza, Bard, Beaumont, Bonsall, Boulevard, Bryn Mawr, Buena Park, Burbank, Calimesa, Calipatria, Cathedral City, Chino, City of Industry, Corona, Costa Mesa, Covina, Crestline, Culver City, Cypress, Dana Point, Del Mar, Dulzura, East Highlands, El Cajon, Escondido, Etiwanda, Fallbrook, Forest Falls, Fullerton, Garden Grove, Glamis, Hawthorne, Idyllewild, Imperial Beach, Indio, La Jolla, La Mesa, La Puente, Laguna Beach, Lakeside, Lakewood, Lemon Grove, Loma Linda, Los Alamitos, Los Angeles, Lucerne Valley, Mecca, Mentone, Midway City, Mission Viejo, Montebello, Moreno, Mount Laguna, Murrieta, National City, Needles, Nestor, North Palm Springs, Norwalk, Pala, Palm Springs, Palos Verdes Peninsula, Parker Dam, Patton, Penasquitos (press report), Pine Valley, Plaster City, Potrero, Poway, Ramona, Rancho Mirage, Redondo Beach, Rialto, Ridgecrest,

Riverside, Rosemead, San Dimas, San Marcos, Santa Ysabel, Solano Beach, Surfside, Thousand Palms, Torrance, Trabuco Canyon, Twentynine Palms, Valley Center, Vista, Westminster, White Water, Whittier, Wilmington, Winterhaven, Yorba Linda, Yucca Valley (press report).
Nevada--Las Vegas.

Intensity III:
Arizona--Arlington, Kirkland, Lake Havasu City, Mesa, Salome, Sasabe, Tucson (press report), Wenden, Wikieup.
California--Apple Valley, Bellflower, Blythe, Carlsbad, Claremont, Colton, Coronado (press report), Desert Center, El Monte, El Toro, Fillmore, Fontana, Fountain Valley, Gardena, Green Valley Lake, Joshua Tree, Lake Elsinore, Lakeview, Long Beach, Mira Loma, Oak View, Oceanside, Paramount, Pasadena, Perris, Phelan, Pico Rivera, Pinon Hills, Pomona, Reseda, Running Springs, San Luis Rey, Santa Ana, South Gate, Stanton, Sun City, Sunnymead, Valyermo.

Intensity II:
Arizona--Chloride, Gila Bend.
California--Blue Jay, Lytle Creek.

Felt:
Arizona--Kingman (press report).
California--Santee (press report).

16 October (P) Imperial Valley
Origin time: 06 58 43.2
Epicenter: 33.02 N., 115.58 W.
Depth: 5 km
Magnitude: 5.2 mb(G), 5.7 MS(G), 5.4 ML(P), 6.1 ML(B)

Based on interviews with residents in Imperial and Brawley, Reagor and others (1980) pointed out that aftershocks caused additional damage. The press described one instance in which an aftershock was more strongly felt than the main shock. In the case cited, a home in Imperial (321 Main Street), the main shock caused very little damage but an aftershock that occurred near midnight buckled the floor, caused walls to move so that none were left vertical, steps to the porch to crumple, doors to jam shut, and a 16-year-old girl to be thrown out of the top of a bunk bed.

Intensity VI: Brawley, Imperial.

17 October (P) Imperial Valley
Origin time: 19 14 38.1
Epicenter: 32.97 N., 115.60 W.

Depth: 7 km
Magnitude: 4.1 ML(P)

Felt at El Centro (press report).

17 October (P) Southern California
Origin time: 20 52 36.8
Epicenter: 33.90 N., 118.63 W.
Depth: 6 km
Magnitude: 4.5 mb(G), 4.2 ML(P), 4.0 ML(B)

This earthquake occurred in the same area as the one on January 1, 1979, 23 14 38.9 UTC which caused minor damage. The press reports that this shock widened a 2-foot crevice in the Big Rock slide area by about 5 cm above the Pacific Coast Highway in Malibu. The highway was closed temporarily because rocks had rolled down onto the roadway. Other minor rockslides were reported near a tunnel in Malibu Canyon. It was felt over an area of approximately 5,200 sq km (fig. 22).

Intensity V:
Compton (few windows cracked; hanging pictures swung; windows, doors, and dishes rattled; felt by many).
La Costa (few windows cracked; small objects moved, buildings creaked; windows, doors, and dishes rattled; felt by many).
Los Angeles--Ladera Heights (small objects were moved and overturned; standing vehicles rocked moderately; moving vehicles rocked slightly; windows, doors, and dishes rattled; felt by many).
Los Angeles--Rancho Park (small objects fell; buildings trembled and creaked; windows, doors, and dishes rattled; moderate earth noise; felt by many).
Malibu (rock slides on the Pacific Coast Highway, buildings shook strongly, house under construction almost collapsed--press report, felt by many).
Marina del Rey (few windows cracked; hanging pictures knocked out of place; buildings creaked; windows, doors, and dishes rattled; felt by many).
Monrovia (light furniture moved; buildings creaked; windows, doors, and dishes rattled; felt by many).
Monterey Park (light furniture and small objects moved, water splashed onto sides of swimming pools, hanging pictures knocked out of place, felt by many).
Pacific Palisades (at Palisades Valley School desks were shaken and some books knocked off shelves; in a liquor store bottles rattled and shook; in a drug store a few plastic bottles were shaken

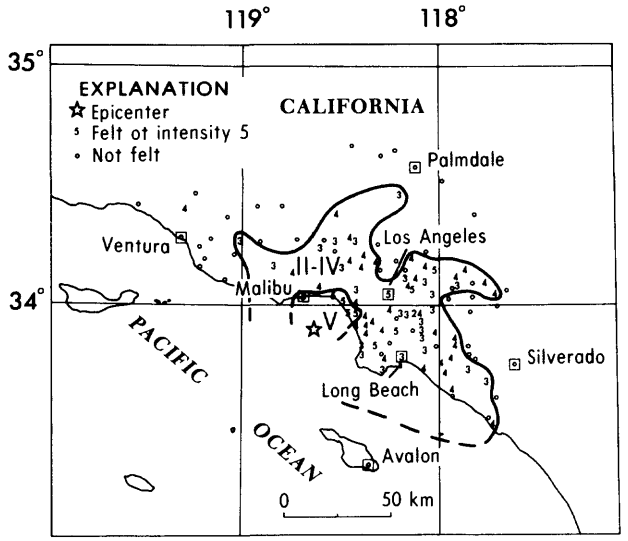

FIGURE 22.--Isoseismal map for the southern California earthquake of 17 October 1979, 20 52 36.8 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

California--Continued

from shelves--press report).
Santa Monica (light and heavy furniture moved; buildings shook strongly; windows, doors and dishes rattled; felt by few).
Santa Monica--Will Rogers area (hanging pictures fell; small objects moved; windows, doors, and dishes rattled; felt by several).
Venice (one crack reported in the post office ceiling where support pillars join the ceiling).
Walteria (light furniture moved, hanging pictures knocked out of place, felt by many).

Intensity IV: Agoura, Alhambra, Anaheim, Anaheim—Brookhurst Center, Arcadia (press report), Azusa, Barrington, Burbank, Canoga Park, Costa Mesa (press report), Crenshaw, Culver City, East Long Beach, Echo Park (press report), El Segundo, Figueroa, Florence, Fountain Valley, Fullerton, Garden Grove, Gardena, Gateway, Glendora, Hawthorne, Huntington Park, Inglewood, Inglewood--Morningside Park, La Mirada, La Verne, Laguna Niguel, Lawndale, Lennox, Lincoln Heights, Los Angeles, Los Angeles--West Adams, Midway City, Newhall (press report), North Inglewood, North Hollywood, North Hollywood--Victory

California--Continued

Center, North Torrance, Oakview, Ocean Park, Palms, Playa del Rey, Pomona—Central District, San Marino, Seal Beach, Sierra Madre, Sun Valley, Sunset Beach, Surfside, Sylmar, Topanga, Torrance, Van Nuys, Vernon, Wilmington, Yorba.

Intensity III: Acton, Anaheim—Federal, Bell, Beverly Hills, Buena Park, Cerritos, Chatsworth, Covina, Cudahy, Diamond, East Irvine, El Monte, Encino, Granada Hills, Griffith, Huntington Park—State Street area, Kester, Laurel Canyon, Long Beach, Los Alamitos, Los Angeles--Broadway Manchester area, Los Angeles--Farmers Market area, Los Angeles--Veterans Administration area, Maywood, Mission Hills, North Hollywood--Valley Plaza area, North Hollywood--Valley Village area, Norwalk, Norwood Center, Orangehurst, Pacoima, Palos Verdes Peninsula, Panorama City, Perry, Preuss, Redondo Beach, Resada, Rosemead, San Gabriel, Santa Fe Springs, Somis, South El Monte, South Pasadena, Studio City, Sunkist, Tarzana, Terminal Island, Thousand Oaks, Westminster, Whittier, Van Nuys--Civil Center.

Intensity II: Pico Rivera, South Whittier.

17 October (P) Imperial Valley
Origin time: 22 45 33.4
Epicenter: 33.10 N., 115.55 W.
Depth: 5 km
Magnitude: 4.8 mb(G), 4.5 ML(P), 5.0 ML(B)

Felt in the Imperial Valley (press report).

18 October (P) Southern California
Origin time: 04 25 43.2
Epicenter: 33.93 N., 118.65 W.
Depth: 16 km
Magnitude: 3.0 ML(P)

Felt at Pacific Palisades and in the San Fernando Valley (press report).

19 October (P) Southern California
Origin time: 12 22 37.7
Epicenter: 34.20 N., 117.53 W.
Depth: 7 km
Magnitude: 4.1 ML(P), 4.2 ML(B)

Intensity V:
Lytle Creek (hanging pictures fell, small objects moved, buildings creaked and shook, awakened and felt by all).

Intensity IV: Alta Loma, Apple Valley, Azusa, Chino, Claremont, Cucamonga, Devore, Etiwanda, Fawnskin, Fontana, Green Valley Lake, Lake Arrowhead, La Puente, Mt. Baldy, Norco, Ontario, Perris, Phelan, Pinon Hills, Pomona, Rancho Cucamonga

(press report), Redlands, Rialto, Riverside, San Bernardino, San Dimas, Upland, Wrightwood.
Intensity III: Arcadia, Corona, San Bernardino--West Side, Victorville.
Intensity II: Colton.
Felt: Montclair.

23 October (B) Northern California
Origin time: 10 55 37.9
Epicenter: 40.43 N., 124.27 W.
Depth: 19 km
Magnitude: 4.0 ML(B)

Felt in the Scotia area (B).

24 October (P) Southern California
Origin time: 13 32 50.0
Epicenter: 34.18 N., 116.42 W.
Depth: 8 km
Magnitude: 3.4 ML(P)

Felt at Yucca Valley (P).

Intensity IV: Morongo Valley.

28 October (P) Owens Valley area
Origin time: 23 12 25.7
Epicenter: 37.50 N., 118.80 W.
Depth: 5 km
Magnitude: 3.0 ML(P)

Felt at Mammoth Lakes (P).

31 October (P) Imperial Valley
Origin time: 11 43 46.4
Epicenter: 32.88 N., 115.48 W.
Depth: 5 km
Magnitude: 3.4 ML(P)

Felt at Brawley and El Centro (P).

4 November (P) Imperial Valley
Origin time: 17 13 30.8
Epicenter: 33.08 N., 115.55 W.
Depth: 5 km
Magnitude: 3.6 ML(P)
Intensity IV: Brawley.

6 November (P) Southern California
Origin time: 04 30 59.0
Epicenter: 32.92 N., 116.20 W.
Depth: 7 km
Magnitude: 3.2 ML(P)
Intensity IV: Julian.

7 November (B) Owens Valley area
Origin time: 06 27 24.0
Epicenter: 37.62 N., 118.91 W.
Depth: 11 km
Magnitude: 3.8 ML(B), 3.7 ML(P)

Felt at Mammoth Lakes and Lake Crowley (P).

California--Continued

9 November (B) Owens Valley area
Origin time: 09 00 52.8
Epicenter: 37.62 N., 118.89 W.
Depth: 7 km
Magnitude: 3.3 ML(B), 3.3 ML(P)

Felt at Mammoth Lakes (B).

9 November (B) Owens Valley area
Origin time: 10 12 53.3
Epicenter: 37.61 N., 118.90 W.
Depth: 5 km
Magnitude: 4.0 ML(B), 4.0 ML(P)

Felt at Mammoth Lakes (B).

9 November (B) Owens Valley area
Origin time: 17 46 58.3
Epicenter: 37.62 N., 118.88 W.
Depth: 14 km
Magnitude: 4.0 ML(B), 4.1 ML(P)

Felt at Mammoth Lakes (B).

9 November (B) Owens Valley area
Origin time: 17 54 15.0
Epicenter: 37.60 N., 118.88 W.
Depth: 3 km
Magnitude: 4.3 ML(B), 4.4 ML(P)
Intensity IV: June Lake.
Intensity III: Big Creek.
Felt: Mammoth Lakes.

9 November (B) Owens Valley area
Origin time: 21 04 49.2
Epicenter: 37.62 N., 118.90 W.
Depth: 13 km
Magnitude: 3.6 ML(B), 3.2 ML(P)

Felt at Mammoth Lakes (B).

9 November (B) Owens Valley area
Origin time: 22 26 54.4
Epicenter: 37.62 N., 118.90 W.
Depth: 14 km
Magnitude: 3.4 ML(B), 3.2 ML(P)

Felt at Mammoth Lakes (B).

9 November (B) Owens Valley area
Origin time: 22 59 33.3
Epicenter: 37.63 N., 118.90 W.
Depth: 16 km
Magnitude: 3.6 ML(B), 3.6 ML(P)

Felt at Mammoth Lakes (B).

10 November (B) Owens Valley area
Origin time: 09 45 08.9
Epicenter: 37.62 N., 118.91 W.
Depth: 17 km
Magnitude: 4.0 ML(B), 4.2 ML(P)
Felt at Mammoth Lakes (B).

14 November (B) Owens Valley area
Origin time: 01 05 44.7
Epicenter: 37.61 N., 118.92 W.
Depth: 10 km
Magnitude: 3.4 ML(B), 3.2 ML(P)

Felt at Mammoth Lakes (B).

15 November (B) Owens Valley area
Origin time: 20 51 33.8
Epicenter: 37.61 N., 118.87 W.
Depth: 17 km
Magnitude: 3.3 ML(B), 3.5 ML(P)

Felt at Mammoth Lakes (B).

16 November (B) Owens Valley area
Origin time: 21 48 25.6
Epicenter: 37.60 N., 118.87 W.
Depth: 18 km
Magnitude: 3.8 ML(B), 3.6 ML(P)

Felt at Mammoth Lakes (B).

17 November Southern California
Origin time: 05 25
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.
Intensity III: Etiwanda.

20 November (B) Owens Valley area
Origin time: 17 23 59.0
Epicenter: 37.61 N., 118.88 W.
Depth: 14 km
Magnitude: 4.2 ML(B), 4.2 ML(P)

Felt at Mammoth Lakes (B).

25 November (B) Owens Valley area
Origin time: 06 47 00.1
Epicenter: 37.60 N., 118.86 W.
Depth: 6 km
Magnitude: 2.9 ML(B)

Felt at Mammoth Lakes (B).

26 November (B) Central California
Origin time: 12 40 08.6
Epicenter: 37.86 N., 121.99 W.
Depth: 7 km
Magnitude: 3.0 ML(B)

Felt at Danville (B).

26 November (B) Central California
Origin time: 12 43 57.6
Epicenter: 37.86 N., 122.00 W.
Depth: 5 km
Magnitude: 2.8 ML(B)

Felt at Danville (B).

California--Continued

28 November (P) Southern California
Origin time: 10 53 18.0
Epicenter: 33.97 N., 118.65 W.
Depth: 12 km
Magnitude: 2.7 ML(P)

Felt at Woodland Hills (P).

29 November (P) Central California
Origin time: 15 09 41.0
Epicenter: 35.63 N., 118.38 W.
Depth: 3 km
Magnitude: 2.7 ML(P)

Felt at Lake Isabella (P).

2 December (P) Southern California
Origin time: 00 46 27.7
Epicenter: 32.63 N., 116.02 W.
Depth: 13 km
Magnitude: 3.9 ML(P)

Felt in portions of Imperial and San Diego Counties.

Intensity III: Campo, Julian (Cuyamaca area).
Intensity II: Painted Gorge Valley.

2 December (P) Southern California
Origin time: 18 09 21.1
Epicenter: 33.93 N., 118.65 W.
Depth: 7 km
Magnitude: 2.7 ML(P)

Felt in West Los Angeles (P).

6 December (B) Owens Valley area
Origin time: 19 32 38.9
Epicenter: 37.60 N., 118.87 W.
Depth: 15 km
Magnitude: 4.2 ML(B), 4.3 ML(P)

Felt at Mammoth Lakes (B).

8 December (B) Owens Valley area
Origin time: 21 38 52.4
Epicenter: 37.60 N., 118.90 W.
Depth: 16 km
Magnitude: 4.3 ML(B), 4.3 ML(P)

Felt at Mammoth Lakes (B).

9 December (B) Owens Valley area
Origin time: 02 08 16.8
Epicenter: 37.61 N., 118.86 W.
Depth: 14 km
Magnitude: 3.5 ML(B), 3.5 ML(P)

Felt at Mammoth Lakes (B).

California--Continued

11 December (B) Central California
Origin time: 12 05 02.2
Epicenter: 37.74 N., 122.13 W.
Depth: 6 km
Magnitude: 2.5 ML(B)

Felt at Castro Valley and East Oakland (B).

12 December (P) Baja California, Mexico
Origin time: 21 37 41.0
Epicenter: 32.20 N., 116.23 W.
Depth: 5 km
Magnitude: 4.0 ML(P)

Felt in the Imperial Valley, California.

16 December (P) Southern California
Origin time: 06 00 54.3
Epicenter: 33.97 N., 118.67 W.
Depth: 9 km
Magnitude: 3.2 ML(P)

Felt in West Los Angeles and Pacific Palisades (P).

16 December (B) Owens Valley area
Origin time: 06 29 27.0
Epicenter: 37.59 N., 118.86 W.
Depth: 2 km
Magnitude: 3.6 ML(B), 3.6 ML(P)

Felt at Mammoth Lakes (B).

Intensity III: June Lake.

16 December (B) Owens Valley area
Origin time: 10 44 15.8
Epicenter: 37.60 N., 118.87 W.
Depth: 13 km
Magnitude: 3.4 ML(B), 3.2 ML(P)

Felt at Mammoth Lakes (B).

17 December (B) Central California
Origin time: 06 54 53.1
Epicenter: 37.06 N., 121.50 W.
Depth: 11 km
Magnitude: 2.9 ML(B)
Intensity IV: Residents awakened near the epicenter (B).

18 December (P) Southern California
Origin time: 11 59 48.5
Epicenter: 34.07 N., 117.15 W.
Depth: 6 km
Magnitude: 2.7 ML(P)
Intensity IV: Redlands
Felt: San Bernardino (P).

18 December (P) Southern California
Origin time: 12 00 16.5
Epicenter: 34.07 N., 117.13 W.

California--Continued

Depth: 2 km
Magnitude: 2.9 ML(P)

Felt at Redlands and San Bernardino (P).

18 December (P) Southern California
Origin time: 15 37 13.8
Epicenter: 34.02 N., 117.12 W.
Depth: 8 km
Magnitude: 3.3 ML(P)

Felt at Redlands and San Bernardino.

19 December (P) Southern California
Origin time: 18 11 05.2
Epicenter: 34.02 N., 117.12 W.
Depth: 5 km
Magnitude: 2.7 ML(P)

Felt at Redlands (P).

20 December (B) Northern California
Origin time: 05 02 19.6
Epicenter: 38.80 N., 122.80 W.
Depth: 4 km
Magnitude: 3.0 ML(B)

Felt at Cobb (B).

20 December (B) Central California
Origin time: 12 29 56.1
Epicenter: 37.59 N., 122.37 W.
Depth: 15 km
Magnitude: 2.0 ML(B)

Felt at San Jose (B).

21 December (P) Imperial Valley area
Origin time: 20 40 25.3
Epicenter: 32.78 N., 115.38 W.
Depth: 5 km
Magnitude: 4.5 mb(G), 4.6 ML(P)
Intensity VI:
California--Imperial (large cracks in exterior walls, cracks in stone or brick fences, few windows cracked, light furniture moved, small objects overturned, hanging pictures out of place, felt by many).
Intensity V:
California--El Centro (few windows cracked, light furniture and small objects moved, felt by all).
Intensity IV:
Arizona--Somerton, Wellton, Yuma.
California--Bard, Calexico, Heber.
Intensity III:
Arizona--Gadsden, San Luis, Yuma Marine Corps Air Station.
California--Holtville, Plaster City, Ripley, Seeley.

Intensity II:
California--Salton City.
Felt:
California--San Diego (P).

24 December (B) Central California
Origin time: 13 09 40.1
Epicenter: 36.98 N., 122.20 W.
Depth: 8 km
Magnitude: 3.8 ML(B)

Felt at Bonnie Doon, Boulder Creek, Felton, Monterey Bay, and Santa Cruz (B).

26 December (B) Owens Valley area
Origin time: 08 09 04.4
Epicenter: 37.53 N., 118.80 W.
Depth: 19 km
Magnitude: 3.9 ML(B)

Felt at Mammoth Lakes (B).

28 December (B) Owens Valley area
Origin time: 03 29 49.5
Epicenter: 37.66 N., 118.87 W.
Depth: 15 km
Magnitude: 3.7 ML(B)

Felt at Mammoth Lakes (B).

31 December (P) Southern California
Origin time: 06 03 40.3
Epicenter: 33.65 N., 117.90 W.
Depth: 7 km
Magnitude: 2.7 ML(P)

Felt at Costa Mesa (P).

31 December (B) Western Nevada
Origin time: 08 27 51.9

See Nevada listing.

California--Off the coast

3 February (B) Northern California
Origin time: 09 58 16.0
Epicenter: 40.92 N., 124.42 W.
Depth: 22 km
Magnitude: 5.2 mb(G), 4.6 MS(G), 5.2 ML(B)

The press reported numerous store windows broken and merchandise spilled from shelves in the downtown areas of both Arcata and Eureka. Police responded to a number of burglar alarms set off by the quake. There was no damage to bridges reported. The earthquake was felt over an area of approximately 11,200 sq km of Del Norte, Humboldt, Mendocino, Siskiyou, and Trinity Counties, California, and in southwestern Oregon near the California border (fig. 23).

Intensity VII:
California--
Eureka (windows broken in office supply, furniture, insurance, and variety stores along Fifth Street in the downtown area. Many stores had merchandise spilled from shelves. The Safeway store at 930 W. Harris St. had an estimated $2000 damage due to broken glassware. Other stores in the area suffered the same type of damage. Ceiling tiles and light fixtures fell in some stores. The county courthouse had some broken windows on the second floor and cracks appeared on freshly painted walls. Three broken water mains were reported and a leak in a 6-inch low-pressure gas line. A city building inspector noted some additional damage to previously damaged masonry buildings on Fourth Street. A chimney on Myrtle Avenue fell with part of it crashing through the roof and part falling on a vehicle parked alongside--press report. There were reports of hairline cracks in exterior walls, cracked plaster and drywall, cracked and broken chimneys, felt by and awakened all, trees and bushes shaken moderately, and standing and moving vehicles rocked slightly.).
Intensity VI:
California--
Arcata (The press reported store windows broke in the downtown plaza and that some stores had shelves nearly emptied by the shaking. Liquor stores had considerable damage due to glassware falling and breaking. Other reports consisted of cracked plaster and drywall, small objects overturned and fell, hanging pictures fell, felt by all and many awakened.).
Intensity V:
California--
Fields Landing (furniture shifted, small objects overturned, hanging pictures swung, felt by and awakened many).
Fortuna (small objects fell; windows, doors, and dishes rattled; felt by and awakened many).
Trinidad (small objects fell; windows, doors, and dishes rattled; felt by and awakened many).
Westhaven (light furniture and small objects shifted, hanging pictures swung, felt by and awakened all).

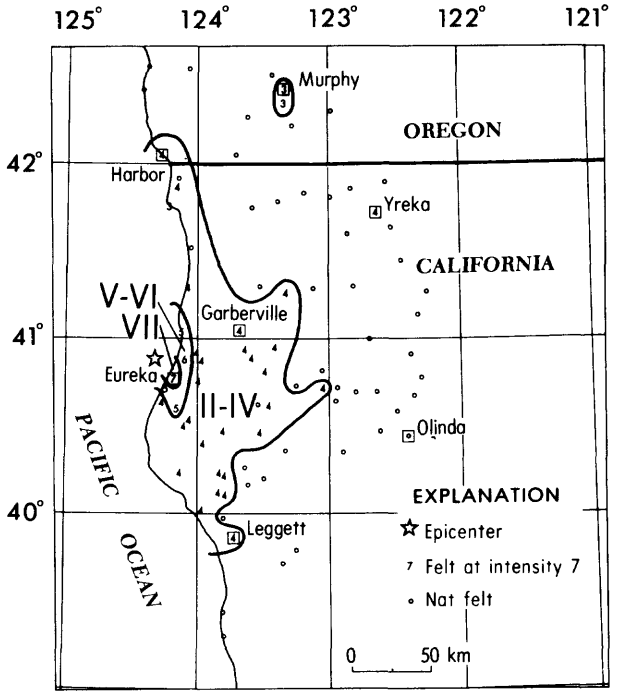

FIGURE 23.--Isoseismal map for the northern California earthquake of 3 February 1979, 09 58 16.0 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

California--Off the coast--Continued

Intensity IV:
California--Blue Lake, Bridgeville, Burnt Ranch, Carlotta, Denny, Forks of Salmon, Fort Dick, Fortuna, Garberville, Honeydew, Hoopa, Hyampon, Junction City, Kneeland, Korbel, Leggett, Loleta, Mad River, Miranda, Orick, Phillipsville, Redcrest, Redway, Rio Dell, Salyer, Scotia, Whitehorn, Willow Creek, Yreka.
Oregon--Brookings, Harbor.
Intensity III:
California--Crescent City.
Oregon--Grants Pass, Murphy.

18 March (B) Northern California
Origin time: 16 18 31.2
Epicenter: 40.34 N., 124.71 W.
Depth: 10 km
Magnitude: 4.0 mb(G), 4.1 ML(B)
Intensity IV: Ferndale (press report), Rio Dell, Scotia (press report)
Intensity III: Miranda.

California--Off the coast--Continued

8 August (B) Northern California
Origin time: 10 24 57.6
Epicenter: 40.31 N., 124.68 W.
Depth: 29 km
Magnitude: 3.8 mb(G), 4.3 ML(B)
Intensity IV: Blocksburg, Honey Dew, Leggett, Miranda, Scotia.
Intensity III: Zenia.

24 October (B) Northern California
Origin time: 15 23 50.6
Epicenter: 40.43 N., 124.70 W.
Depth: 24 km
Magnitude: 4.8 mb(G), 4.5 ML(B)
Intensity IV: Arcata, Bayside, Eureka, Fields Landing, Garberville, Loleta, Miranda, Phillipsville, Rio Dell, Weott.
Intensity III: Blue Lake, Hoopa, Hydesville, Korbel, Redway, Scotia.
Intensity II: Carlotta.
Felt: Ferndale, Fortuna.

Colorado

6 January (G) Central Colorado
Origin time: 01 58 55.3
Epicenter: 38.96 N., 105.16 W.
Depth: 5 km
Magnitude: 2.9 ML(G), 3.3 mbLg(T)
Intensity VI: Cripple Creek (plaster cracked; light furniture shifted; small objects fell; hanging pictures swung; windows, doors and dishes rattled; felt by many).
Intensity V: Florissant (Thirteen reports were received from Florissant and its adjoining rural areas which used the post office as a mailing address. Four were evaluated at intensity V and nine at intensity IV. Some of the effects listed were small and heavy furniture shifted, small objects and dishes fell, hanging pictures swung, windows and dishes rattled.
Intensity IV: Cascade, Divide (13 reports), Divide (Broken Wheel Village), Divide (Crescent Ranch), Divide (Highland Lakes), Guffey, Green Mountain Falls (ice cracked on two reservoirs on Pikes Peak Toll Road), Lake George, Royal Gorge, Victor, Woodland Park (six reports).
Intensity III: Pine.
Intensity II: Colorado Springs, Hartsel.

19 March (G) Northwestern Colorado
Origin time: 14 59 29.7
Epicenter: 40.18 N., 108.90 W.
Depth: 2 km
Magnitude: 3.1 ML(G), 3.3 ML(U)
Intensity IV: Rangely.

Colorado--Continued

29 March (G) Northwestern Colorado
Origin time: 22 07 13.3
Epicenter: 40.27 N., 108.81 W.
Depth: 2 km
Magnitude: 2.6 ML(G)
Intensity IV: Rangely (light furniture and small objects shifted; windows, doors, and dishes rattled; felt by many).

Connecticut

30 December (J) Southeastern New York
Origin time: 14 15 11.9

See New York listing.

Georgia

13 August (G) Southeastern Tennessee
Origin time: 05 18 56.0

See Tennessee listing.

26 August (G) Northwestern South Carolina
Origin time: 01 31 45.0

See South Carolina listing.

Hawaii

2 January (H) North of Maui Island
Origin time: 06 31 25.2
Epicenter: 20.95 N., 156.06 W.
Depth: 12 km
Magnitude: 3.5 ML(H)

Felt on Maui and Oahu Islands.

Intensity III: Haleakala National Park Headquarters, Hana, Kihei Heights, Kula, Maalaea, Makawao, Makena, Maui Meadows, Olinda, Pukalani, Ulupalakua, (all from press reports).
Intensity II: Windward of Oahu Island.

15 January (H) Island of Hawaii
Origin time: 07 12 36.5
Epicenter: 19.37 N., 155.08 W.
Depth: 9 km
Magnitude: 3.1 ML(H)
Intensity III: Hilo.

20 January (H) Island of Hawaii
Origin time: 00 19 15.4
Epicenter: 19.33 N., 155.20 W.

Hawaii--Continued

Depth: 10 km
Magnitude: 3.0 ML(H)
Intensity III: Pahala, Volcano.

3 February (H) Island of Hawaii
Origin time: 12 49 04.3
Epicenter: 19.34 N., 155.20 W.
Depth: 9 km
Magnitude: 3.5 ML(H)
Intensity III: Mountain View, Volcano.

14 February (H) Island of Hawaii
Origin time: 02 52 51.0
Epicenter: 19.34 N., 155.07 W.
Depth: 9 km
Magnitude: 3.9 ML(H)
Intensity IV: Hilo.
Intensity III: Hamakua, Puna, Volcano.
Intensity II: Ninole.

18 February (H) Island of Hawaii
Origin time: 14 45 44.1
Epicenter: 19.45 N., 155.48 W.
Depth: 11 km
Magnitude: 3.2 ML(H)
Intensity III: Pahala.

2 March (H) Island of Hawaii
Origin time: 12 27 18.2
Epicenter: 19.33 N., 155.11 W.
Depth: 10 km
Magnitude: 3.6 ML(H)
Intensity III: Hilo, Papaikou, Mountain View.
Intensity II: Volcano.

6 March (H) Island of Hawaii
Origin time: 06 41 58.6
Epicenter: 19.35 N., 155.10 W.
Depth: 9 km
Magnitude: 3.3 ML(H)
Intensity III: Hilo, Volcano.

6 March (H) Island of Hawaii
Origin time: 12 59 50.1
Epicenter: 19.33 N., 155.12 W.
Depth: 10 km
Magnitude: 3.7 ML(H)
Intensity III: Greenwood, Hilo.
Intensity II: Volcano.

6 March (H) Island of Hawaii
Origin time: 15 07 58.5
Epicenter: 19.52 N., 155.27 W.
Depth: 27 km
Magnitude: 5.0 mb(G), 4.3 MS(G), 4.7 ML(H)

Felt on the islands of Hawaii, Maui, and Oahu (press report).

Intensity VI: Hilo.

Intensity V: Hamakua, Kona, Puna, Volcano.
Intensity IV: Captain Cook, Honokaa, Honomu, Kalaupapa, Kamuela, Kapaau, Kealakekua, Keeau, Kohala, Kualapuu, Kurtistown, Laupahoehoe, Mountain View, Naalehu, Ninole, Ookala, Paauhau, Pahala, Pahoa, Papaaloa, Pepeeko.

10 March (H) Island of Hawaii
Origin time: 13 55 14.6
Epicenter: 19.33 N., 155.11 W.
Depth: 10 km
Magnitude: 4.8 mb(G), 4.5 ML(H)
Intensity IV: Hilo, Puna, Volcano.
Intensity III: Hawaiian Ocean View Estates, Kona.

10 March (H) Island of Hawaii
Origin time: 14 54 49.3
Epicenter: 19.20 N., 155.68 W.
Depth: 7 km
Magnitude: 3.3 ML(H)
Intensity III: Hawaiian Ocean View Estates, Kali.

11 March (H) Island of Hawaii
Origin time: 10 14 56.5
Epicenter: 19.29 N., 159.10 W.
Depth: 11 km
Magnitude: 3.4 ML(H)
Intensity III: Hilo, Keaau.

12 March (H) Island of Hawaii
Origin time: 03 28 05.2
Epicenter: 19.52 N., 155.28 W.
Depth: 24 Km
Magnitude: 3.4 ML(H)
Intensity III: Volcano.

13 March (H) Island of Hawaii
Origin time: 19 57 08.8
Epicenter: 19.35 N., 155.43 W.
Depth: 11 km
Magnitude: 3.5 ML(H)
Intensity III: Hawaiian Ocean View Estates, Pahala.
Intensity II: Hilo, Volcano.

15 March (H) Island of Hawaii
Origin time: 18 55 01.1
Epicenter: 19.37 N., 155.10 W.
Depth: 1 km
Magnitude: 3.4 ML(H)
Intensity III: Hilo.

15 March (H) Island of Hawaii
Origin time: 20 10 14.7
Epicenter: 19.38 N., 155.10 W.
Depth: 0 km
Magnitude: 3.4 ML(H)
Intensity III: Hilo.

Hawaii--Continued

20 March (H) Island of Hawaii
Origin time: 23 03 09.9
Epicenter: 19.35 N., 155.13 W.
Depth: 9 km
Magnitude: 3.3 ML(H)
Intensity III: Volcano.

22 March (H) Island of Hawaii
Origin time: 06 46 59.8
Epicenter: 20.10 N., 155.84 W.
Depth: 16 km
Magnitude: 4.5 ML(H), 4.6 mb(G)
Intensity V: Hawi, Kapaau.
Intensity IV: Honokaa, Honomu, Kamuela, Kohala, Laupahoehoe, Papaaloa, Ookala.
Intensity III: Hilo, Kona, Peepeekeo, Volcano.
Intensity II: Hakalau, Ninole.

26 March (H) Island of Hawaii
Origin time: 23 41 25.5
Epicenter: 19.35 N., 155.14 W.
Depth: 7 km
Magnitude: 3.2 ML(H)
Intensity III: Hilo, Hawaii Volcanoes National Park (press report), Volcano.

28 March (H) Island of Hawaii
Origin time: 07 30 09.8
Epicenter: 20.09 N., 155.83 W.
Depth: 12 km
Magnitude: 4.9 ML(H)
Intensity V: Kamuela.
Intensity IV: Holualoa, Honokaa, Kawaihae, Kohala, Kona, Laupahoe.hoe
Intensity III: Hilo, Volcano.

28 March (H) Island of Hawaii
Origin time: 07 34 44.9
Epicenter: 20.07 N., 155.82 W.
Depth: 10 km
Magnitude: 3.1 ML(H)
Intensity III: Kamuela.
Intensity II: Honokaa, Kohala.

28 March (H) Island of Hawaii
Origin time: 15 54 50.6
Epicenter: 19.36 N., 155.08 W.
Depth: 9 km
Magnitude: 3.0 ML(H)
Intensity III: Hilo.

30 March (G) Southwest of Oahu
Origin time: 09 06 40.7
Epicenter: 20.65 N., 158.82 W.
Depth: 19 km
Magnitude: 4.7 mb(G), 3.9 MS(G), 5.5 ML(H)
Intensity V:
Oahu--
Kaimuki (light furniture and small

objects moved; hanging pictures swung; windows, doors, and dishes rattled; felt by many).
Pearl City (light furniture and small objects moved; few windows cracked; pendulum clocks stopped; liquid spilled from small containers; felt by many).

Intensity IV:
Hawaii--Hawi, Honomu, Papaikou.
Kauai--Kealia, Koloa, Lawai, Lihue.
Maui--Hoolehua, Kualapuu.
Oahu--Aiea, Hickman AFB, Honolulu, Honolulu International Airport, Kaaawa, Kailua, Waimanalo, Waimea, Wainae.

Intensity III:
Kauai--Kekaha.
Oahu--University of Hawaii, Waikiki.

30 March (H) Island of Hawaii
Origin time: 22 56 21.1
Epicenter: 20.06 N., 155.83 W.
Depth: 22 km
Magnitude: 3.1 ML(H)
Intensity III: Spencer Beach Park.

5 April (H) Island of Hawaii
Origin time: 06 14 58.7
Epicenter: 19.35 N., 155.02 W.
Depth: 7 km
Magnitude: 3.3 ML(H)
Intensity III: Hilo.

14 April (H) Island of Hawaii
Origin time: 13 31 12.7
Epicenter: 19.40 N., 155.27 W.
Depth: 5 km
Magnitude: 3.4 ML(H)
Intensity III: Hawaii Volcanoes National Park, Volcano.

17 April (H) Island of Hawaii
Origin time: 06 29 53.9
Epicenter: 19.26 N., 155.40 W.
Depth: 47 km
Magnitude: 3.6 ML(H)
Intensity III: Hawaiian Ocean View Estates, Kona, Pahala.
Intensity II: Ainaloa, Mountain View, Volcano.

11 May (H) Island of Hawaii
Origin time: 23 59 37.3
Epicenter: 19.34 N., 155.07 W.
Depth: 9 km
Magnitude: 3.3 ML(H)
Intensity III: Glenwood, Hilo.

17 May (H) Island of Hawaii
Origin time: 15 30 52.3
Epicenter: 19.47 N., 155.40 W.
Depth: 10 km

Hawaii--Continued

Magnitude: 3.4 ML(H)
Intensity III: Volcano.

22 May (H) Island of Hawaii
Origin time: 07 42 26.2
Epicenter: 19.33 N., 155.20 W.
Depth: 9 km
Magnitude: 3.2 ML(H)
Intensity II: Volcano.

25 May (H) Island of Hawaii
Origin time: 02 26 06.1
Epicenter: 19.38 N., 155.25 W.
Depth: 3 km
Magnitude: 3.2 ML(H)
Intensity III: Hawaii Volcanoes National Park, Volcano.

29 May (H) Island of Hawaii
Origin time: 04 50 33.8
Epicenter: 19.37 N., 155.08 W.
Depth: 9 km
Magnitude: 3.0 ML(H)
Intensity III: Glenwood.

30 May (H) Island of Hawaii
Origin time: 03 43 55.4
Epicenter: 19.37 N., 155.21 W.
Depth: 7 km
Magnitude: 3.0 ML(H)
Intensity III: Hawaii Volcanoes National Park, Volcano.

30 May (H) Island of Hawaii
Origin time: 03 44 55.0
Epicenter: 19.37 N., 155.21 W.
Depth: 5 km
Magnitude: 3.1 ML(H)
Intensity III: Hawaii Volcanoes National Park, Volcano.

30 May (H) Island of Hawaii
Origin time: 03 48 07.5
Epicenter: 19.37 N., 155.22 W.
Depth: 0 km
Magnitude: 3.1 ML(H)
Intensity III: Hawaii Volcanoes National Park, Volcano.

30 May (H) Island of Hawaii
Origin time: 03 52 17.0
Epicenter: 19.36 N., 155.22 W.
Depth: 7 km
Magnitude: 3.2 ML(H)
Intensity III: Hawaii Volcanoes National Park, Volcano.

5 June (H) Island of Hawaii
Origin time: 22 16 36.5
Epicenter: 19.36 N., 155.08 W.
Depth: 9 km
Magnitude: 3.1 ML(H)

Intensity III: Kalalua.
Intensity II: Kalapana.

20 June (H) Island of Hawaii
Origin time: 01 17 38.3
Epicenter: 19.33 N., 155.18 W.
Depth: 10 km
Magnitude: 3.2 ML(H)
Intensity III: Hilo, Volcano.

27 June (H) Island of Hawaii
Origin time: 07 47 59.8
Epicenter: 19.48 N., 155.87 W.
Depth: 10 km
Magnitude: 3.4 ML(H)
Intensity III: Kona.

3 July (H) Island of Hawaii
Origin time: 04 42 44.8
Epicenter: 19.40 N., 155.45 W.
Depth: 11 km
Magnitude: 3.3 ML(H)
Intensity IV: Ahualoa
Intensity III: Glenwood, Honokaa, Volcano.

5 July (H) Island of Hawaii
Origin time: 03 27 15.9
Epicenter: 19.35 N., 155.13 W.
Depth: 9 km
Magnitude: 3.4 ML(H)
Intensity III: Hawaii Volcanoes National Park.

16 July (H) Island of Hawaii
Origin time: 02 42 07.3
Epicenter: 19.38 N., 155.09 W.
Depth: 1 km
Magnitude: 3.6 ML(H)
Intensity IV: Hilo, Puna.

16 July (H) Island of Hawaii
Origin time: 14 13 15.7
Epicenter: 19.40 N., 155.03 W.
Depth: 9 km
Magnitude: 3.5 ML(H)
Intensity III: Ainaloa, Kurtistown.

21 July (H) Island of Hawaii
Origin time: 09 22 30.2
Epicenter: 19.41 N., 155.46 W.
Depth: 11 km
Magnitude: 3.6 ML(H)
Intensity IV: Pahala.

25 July (H) Island of Hawaii
Origin time: 04 07 38.3
Epicenter: 19.33 N., 155.14 W.
Depth: 10 km
Magnitude: 3.5 ML(H)
Intensity III: Volcano.

26 July (H) Island of Hawaii
Origin time: 19 50 41.6

Hawaii--Continued

Epicenter: 19.76 N., 155.97 W.
Depth: 20 km
Magnitude: 3.6 ML(H)
Intensity III: Holualoa, Kealakekua.

27 July (H) Island of Hawaii
Origin time: 18 56 33.6
Epicenter: 19.33 N., 155.13 W.
Depth: 9 km
Magnitude: 3.5 ML(H)
Intensity IV: Hilo.

31 July (H) Island of Hawaii
Origin time: 13 30 51.3
Epicenter: 19.47 N., 155.43 W.
Depth: 12 km
Magnitude: 4.3 ML(H), 4.5 mb(G)
Intensity V: Pahala.
Intensity IV: Kona, Puna Areas, Waimea.
Intensity III: Hamakua, Hawaii Volcanoes National Park, Hawi, Hilo, Volcano.

1 August (H) Island of Hawaii
Origin time: 16 14 11.8
Epicenter: 19.39 N., 155.28 W.
Depth: 3 km
Magnitude: 3.0 ML(H)
Intensity III: Hawaii Volcanoes National Park, Volcano.

3 August (H) Island of Hawaii
Origin time: 13 30 06.3
Epicenter: 19.33 N., 155.21 W.
Depth: 10 km
Magnitude: 3.3 ML(H)
Intensity III: Hawaii Volcanoes National Park, Mountain View, Volcano.

6 August (H) Island of Hawaii
Origin time: 03 03 34.8
Epicenter: 19.28 N., 155.54 W.
Depth: 10 km
Magnitude: 3.5 ML(H)
Intensity IV: Kapapala, Pahala.
Intensity III: Kona, Volcano.

13 August (H) Island of Hawaii
Origin time: 16 03 40.6
Epicenter: 19.30 N., 155.26 W.
Depth: 10 km
Magnitude: 3.4 ML(H)
Intensity III: Glenwood, Mountain View, Volcano.

14 August (H) Island of Maui
Origin time: 12 51 42.2
Epicenter: 20.82 N., 156.29 W.
Depth: 24 km
Magnitude: 4.5 ML(H), 4.1 mb(G)

Felt in Kahoolawe, Lanai, Maui, Molokai, and Oahu Islands. Most strongly felt on the eastern half of Maui Island.

Intensity V:
Maui Island--
Haliimaile--hanging pictures fell; windows, doors, and dishes rattled; felt by and awakened many.
Kahului--shook one house so strongly the owner thought the house would fall down (press report).
Kula.
Makawao--house rattled and shook back and forth (press report).
Olinda--house rattled and shook (press report).
Intensity IV:
Hawaii Island--Captain Cook, Honokaa, Pahala, Volcano.
Maui Island--Hoolehua, Kihei, Kualapuu, Kula, Lahaina, Lanai City, Makawao, Pukalani, Waikapu, Wailuku.
Oahu Island--Aiea.
Intensity III:
Hawaii Island--Hamakua District, Kohala District, Papaikou.
Kahoolawe Island (press report).
Lanai Island.
Maui Island--Hana.
Molokai Island.
Oahu Island--Honolulu.

16 August (H) Island of Hawaii
Origin time: 23 04 19.4
Epicenter: 19.38 N., 155.47 W.
Depth: 11 km
Magnitude: 3.9 ML(H)
Intensity IV: Kapapala.
Intensity III: Hawaii Volcanoes National Park, Hawaiian Oceanview Estates, Mauna Loa Observatory.
Intensity II: Papaikou.

26 August (H) Island of Hawaii
Origin time: 07 08 14.6
Epicenter: 19.35 N., 155.22 W.
Depth: 10 km
Magnitude: 3.3 ML(H)
Intensity II: Papaikou, Volcano.

28 August (H) Island of Hawaii
Origin time: 15 21 59.1
Epicenter: 19.31 N., 155.22 W.
Depth: 11 km
Magnitude: 3.5 ML(H)
Intensity III: Glenwood, Hawaii Volcanoes National Park, Hilo, Mountain View.

28 August (H) Island of Hawaii
Origin time: 15 47 24.8
Epicenter: 19.32 N., 155.22 W.
Depth: 11 km
Magnitude: 3.4 ML(H)
Intensity III: Glenwood, Hawaii Volcanoes National Park, Hilo, Mountain View.

Hawaii--Continued

28 August (H) Island of Hawaii
Origin time: 16 55 13.2
Epicenter: 19.31 N., 155.22 W.
Depth: 11 km
Magnitude: 3.8 ML(H)
Intensity III: Glenwood, Hawaii Volcanoes National Park, Hilo, Mountain View Volcano.

1 September (H) Island of Hawaii
Origin time: 22 16 33.5
Epicenter: 19.37 N., 155.08 W.
Depth: 10 km
Magnitude: 3.8 ML(H)
Intensity IV: Hilo, Kalapana.
Intensity III: Olaa, Pahoa, Volcano.

4 September (H) Island of Hawaii
Origin time: 11 30 09.2
Epicenter: 19.74 N., 156.02 W.
Depth: 9 km
Magnitude: 3.2 ML(H)
Intensity IV: Kailua.

6 September (H) Island of Hawaii
Origin time: 12 24 48.0
Epicenter: 19.33 N., 155.12 W.
Depth: 10 km
Magnitude: 3.4 ML(H)
Intensity III: Volcano.
Intensity II: Papaikou.

8 September (H) Island of Hawaii
Origin time: 23 34 42.2
Epicenter: 19.32 N., 155.23 W.
Depth: 11 km
Magnitude: 3.4 ML(H)
Intensity III: Ainaloa, Volcano.
Intensity II: Pepeekeo.

14 September (H) Island of Hawaii
Origin time: 14 32 17.4
Epicenter: 19.39 N., 155.28 W.
Depth: 3 km
Magnitude: 3.0 ML(H)
Intensity III: Hawaii Volcanoes National Park, Volcano.

14 September (H) Island of Hawaii
Origin time: 17 35 18.7
Epicenter: 19.33 N., 155.20 W.
Depth: 10 km
Magnitude: 3.2 ML(H)
Intensity III: Hilo, Volcano.

15 September (H) Island of Hawaii
Origin time: 01 31 48.0
Epicenter: 19.35 N., 155.82 W.
Depth: 11 km
Magnitude: 3.8 ML(H)
Intensity IV: Honaunau, Kealakekua.

16 September (H) Island of Hawaii
Origin time: 19 51 36.7
Epicenter: 19.40 N., 155.04 W.
Depth: 9 km
Magnitude: 3.2 ML(H)
Intensity III: Hilo.

21 September (H) Island of Hawaii
Origin time: 11 29 24.1
Epicenter: 19.33 N., 155.20 W.
Depth: 10 km
Magnitude: 3.4 ML(H)
Intensity III: Volcano.

22 September (H) Island of Hawaii
Origin time: 07 59 37.6
Epicenter: 19.35 N., 155.07 W.
Depth: 9 km
Magnitude: 5.7 mb(G), 4.8 MS(G), 5.5 ML(H)

The press reported this earthquake was felt over the whole island of Hawaii and was the most damaging since the November 29, 1975 shock. According to the press several hundred homes in the Hilo area were damaged and several businesses suffered losses. Damage was reported heaviest in the Ainaka, Wainaku, and Wailuku Drive neighborhoods of Hilo. There were no reports of injuries.

Intensity VI: Hilo area (many windows broke, water lines ruptured, dishes and household effects broke, store merchandise damaged, some foundations damaged--press reports). Reeds Island (foundation and fireplace damage to homes--press report).
Intensity V: Glenwood, Hamakua, Honomu, Kurtistown, Laupahoehoe, Mountain View, Papaikou, Volcano.
Intensity IV: Captain Cook, Honokaa, Kau District, Ninole, Keaau, Naalehu, Ookala, Pahala, Waimea.
Intensity III: Holualoa, Papaaloa, Kamuela, Kona District, Kohala District, Paauhau.

22 September (H) Island of Hawaii
Origin time: 09 29 12.3
Epicenter: 19.35 N., 155.03 W.
Depth: 9 km
Magnitude: 4.8 mb(G), 4.3 ML(H)
Intensity IV: Hilo.
Intensity III: Glenwood, Mountain View, Puna District, Volcano.

22 September (H) Island of Hawaii
Origin time: 09 36 17.3
Epicenter: 19.35 N., 155.04 W.
Depth: 8 km
Magnitude: 3.2 ML(H)
Intensity III: Hilo, Puna District, Volcano.

Hawaii--Continued

23 September (H) Island of Hawaii
Origin time: 11 28 19.9
Epicenter: 19.38 N., 155.07 W.
Depth: 9 km
Magnitude: 3.3 ML(H)
Intensity III: Hilo, Keaau, Volcano.

25 September (H) Island of Hawaii
Origin time: 03 50 23.1
Epicenter: 19.37 N., 155.08 W.
Depth: 9 km
Magnitude: 3.6 ML(H)
Intensity III: Hawaii Volcanoes National Park, Hilo, Honomu, Volcano.

27 September (H) Island of Hawaii
Origin time: 01 01 32.4
Epicenter: 19.54 N., 155.92 W.
Depth: 11 km
Magnitude: 3.2 ML(H)
Intensity III: Captain Cook, Kainaliu.

27 September (H) Island of Hawaii
Origin time: 15 35 45.5
Epicenter: 19.33 N., 155.12 W.
Depth: 10 km
Magnitude: 4.7 mb(G), 4.3 ML(H)
Intensity V: Hilo.
Intensity IV: Captain Cook, Honokaa, Kamuela, Kurtistown, Laupahoehoe, Mountain View, Ookala, Pahala, Papaikou, Volcano.
Intensity III: Kau District, Kohala District, Kona District, Papaaloa.

27 September (H) Island of Hawaii
Origin time: 15 38 31.2
Epicenter: 19.33 N., 155.13 W.
Depth: 9 km
Magnitude: 3.2 ML(H)
Intensity IV: Hilo.
Intensity III: Glenwood, Kalapana, Volcano.

30 September (H) Island of Hawaii
Origin time: 00 02 26.3
Epicenter: 19.37 N., 155.11 W.
Depth: 8 km
Magnitude: 3.2 ML(H)
Intensity II: Hilo.

6 October (H) Island of Hawaii
Origin time: 10 46 12.2
Epicenter: 19.33 N., 155.22 W.
Depth: 10 km
Magnitude: 3.9 ML(H)
Intensity IV: Keaau.
Intensity III: Hawaii Volcanoes National Park, Papaikou, Volcano.

9 October (H) Island of Hawaii
Origin time: 02 40 19.8
Epicenter: 19.33 N., 155.19 W.
Depth: 10 km

Magnitude: 3.7 ML(H)
Intensity III: Hilo.

13 October (H) Island of Hawaii
Origin time: 01 59 25.8
Epicenter: 19.38 N., 155.25 W.
Depth: 4 km
Magnitude: 3.0 ML(H)
Intensity II: Hilo.

13 October (H) Island of Hawaii
Origin time: 11 16 26.0
Epicenter: 19.44 N., 155.35 W.
Depth: 8 km
Magnitude: 3.8 ML(H)
Intensity III: Hawaii Volcanoes National Park, Hilo, Keaau, Pohakuloa, Volcano.

13 October (H) Island of Hawaii
Origin time: 12 58 51.0
Epicenter: 19.45 N., 155.36 W.
Depth: 7 km
Magnitude: 3.1 ML(H)
Intensity II: Kilauea Military Camp.

14 October (H) Island of Hawaii
Origin time: 17 37 16.9
Epicenter: 19.91 N., 155.18 W.
Depth: 41 km
Magnitude: 4.0 ML(H)
Intensity IV: Kohala.
Intensity III: Hawaii Volcanoes National Park, Honomu, Mountainview.

21 October (H) Island of Hawaii
Origin time: 05 57 02.0
Epicenter: 19.32 N., 155.20 W.
Depth: 10 km
Magnitude: 3.5 ML(H)
Intensity III: Papaikou, Puna areas, Volcano.

31 October (H) Island of Hawaii
Origin time: 05 35 11.7
Epicenter: 19.88 N., 156.34 W.
Depth: 0 km
Magnitude: 4.2 ML(H)
Intensity IV: Holualoa, Kona.

4 November (H) Island of Hawaii
Origin time: 04 09 51.6
Epicenter: 20.06 N., 155.64 W.
Depth: 13 km
Magnitude: 3.0 ML(H)
Intensity III: Waimea.

11 November (H) Island of Hawaii
Origin time: 10 25 33.6
Epicenter: 19.36 N., 155.25 W.
Depth: 11 km
Magnitude: 3.5 ML(H)
Intensity III: Glenwood, Volcano.

15 November (H) Island of Hawaii
Origin time: 14 13 00.9
Epicenter: 19.38 N., 155.24 W.
Depth: 4 km
Magnitude: 3.4 ML(H)
Intensity IV: Hawaii Volcanoes National Park.

16 November (H) Island of Hawaii
Origin time: 09 54 29.5
Epicenter: 19.35 N., 155.23 W.
Depth: 1 km
Magnitude: 3.4 ML(H)
Intensity III: Hawaii Volcanoes National Park.

17 November (H) Island of Hawaii
Origin time: 16 11 59.5
Epicenter: 19.35 N., 155.22 W.
Depth: 10 km
Magnitude: 3.3 ML(H)
Intensity IV: Pauahi Crater.

21 November (H) Island of Hawaii
Origin time: 07 29 38.0
Epicenter: 19.38 N., 155.24 W.
Depth: 3 km
Magnitude: 3.2 ML(H)
Intensity III: Hawaii Volcanoes National Park, Hawaiian Volcano Observatory.

23 November (H) Island of Hawaii
Origin time: 16 41 34.0
Epicenter: 19.38 N., 155.25 W.
Depth: 4 km
Magnitude: 3.4 ML(H)
Intensity IV: Hawaii Volcanoes National Park, Kilauea Military Camp, Volcano.
Intensity III: Hawaii Ocean View Estates.

23 November (H) Island of Hawaii
Origin time: 20 45 38.0
Epicenter: 19.36 N., 155.25 W.
Depth: 1 km
Magnitude: 3.5 ML(H)
Intensity IV: Hawaiian Volcano Observatory.

25 November (H) Island of Hawaii
Origin time: 07 31 06.8
Epicenter: 19.40 N., 155.45 W.
Depth: 13 km
Magnitude: 3.5 ML(H)
Intensity IV: Volcano.
Intensity III: Hilo.

25 November (H) Island of Hawaii
Origin time: 10 50 01.9
Epicenter: 19.32 N., 155.19 W.
Depth: 9 km
Magnitude: 3.4 ML(H)
Intensity IV: Ainaloa, Hilo.

Hawaii--Continued

30 November (H) Island of Hawaii
Origin time: 10 55 47.9
Epicenter: 19.58 N., 155.98 W.
Depth: 11 km
Magnitude: 3.1 ML(H)
Intensity IV: Donkey Mill, Kealakekua.

30 November (H) Island of Hawaii
Origin time: 20 15 41.8
Epicenter: 19.39 N., 155.25 W.
Depth: 3 km
Magnitude: 3.0 ML(H)
Intensity IV: Hawaii Volcanoes National Park, Hawaiian Volcano Observatory, Keanakakoi, Volcano.

6 December (H) Island of Hawaii
Origin time: 01 32 27.2
Epicenter: 19.41 N., 155.47 W.
Depth: 11 km
Magnitude: 3.8 ML(H)
Intensity IV: Hawaiian Ocean View Estates, Kona.
Intensity III: Volcano.

14 December (H) Island of Hawaii
Origin time: 03 44 03.1
Epicenter: 19.42 N., 155.41 W.
Depth: 11 km
Magnitude: 4.0 ML(H)
Intensity IV: Hawaiian Ocean View Estates, Kona.
Intensity III: Hilo, Papaikou, Volcano.

16 December (H) Island of Hawaii
Origin time: 03 45 13.1
Epicenter: 19.35 N., 155.31 W.
Depth: 14 km
Magnitude: 3.6 ML(H)
Intensity IV: Glenwood.

28 December (H) Island of Hawaii
Origin time: 21 25 49.9
Epicenter: 19.30 N., 155.24 W.
Depth: 10 km
Magnitude: 3.1 ML(H)
Intensity III: Hilo.

Idaho

3 June (U) Southeastern Idaho
Origin time: 04 58 25.4
Epicenter: 42.51 N., 111.36 W.
Depth: 5 km
Magnitude: 3.7 ML(U)
Intensity IV: Georgetown.
Intensity III: Montpelier (telephone report).

Kansas

30 June (K) Northeastern Kansas
Origin time: 20 46 41.3
Epicenter: 39.94 N., 97.27 W.
Depth: 5 km
Magnitude: 3.3 mbLg(G)

Intensity VI:
Kansas--
Mahaska (foundation of a cinderblock building cracked, plaster cracked and fell in large amounts, small objects broken, felt by many).
Intensity V:
Kansas--
Haddam (few windows cracked, small objects moved, hanging pictures swung, felt by many).
Norka (few windows cracked, standing and moving vehicles rocked slightly, small objects and hanging pictures moved, felt by many).
Morrowville (foundation of wood building cracked, light furniture and small objects moved, felt by several).
Intensity IV:
Kansas--Cuba, Hollenberg, Washington.
Nebraska--Chester, Reynolds.
Intensity III:
Kansas--Munden.
Intensity II:
Kansas--Belleville, Linn.

Kentucky

9 November (G) Northeastern Kentucky
Origin time: 21 29 59.1
Epicenter: 38.42 N., 82.88 W.
Depth: 10 km
Magnitude: 3.5 mbLg(S), 3.5 mbLg(V)

Felt in parts of Kentucky, Ohio, and West Virginia.

Intensity V:
Kentucky--
Flatwoods (few windows cracked; hanging pictures swung; buildings creaked and shook; windows, doors, and dishes rattled; felt by all).
Rush (few windows cracked; buildings shook; windows, doors, and dishes rattled; felt by many).
Intensity IV:
Kentucky—Ashland (Y), Catlettsburg, Grayson, Greenup, Worthington.
Ohio--Franklin, Furnace, Kitts Hill, Haverhill, Lucasville, South Webster, Wheelersburg.

West Virginia--Ona.

Intensity III:
Kentucky--Hitchins, South Portsmouth, South Shore, West Liberty.

Intensity II:
Ohio--Friendship.

Felt:
Kentucky--Ironville (Y), Louisa (Y), Raceland (Y), Summit (Y).
Ohio--Ironton (Y).

Maine

18 April (J) Southern Maine
Origin time: 02 34 14.4
Epicenter: 43.95 N., 69.75 W.
Depth: 4 km
Magnitude: 3.8 mbLg(G), 4.1 mbLg(O), 4.0 MD(J)

The press reported windows and dishes broken in the epicentral area. Eleven aftershocks were recorded by Weston Observatory, ten on April 18 and one on April 19. The magnitudes ranged from 3.0 to less than 1.0. This earthquake was felt over an area of approximately 55,500 sq km along the coasts of Maine, Massachusetts, and New Hampshire (fig. 24). Some of the data listed below are from a questionnaire canvass made by the Maine Geological Survey and evaluated by the USGS.

Intensity V:
Maine--
Auburn (few windows cracked; hanging pictures swung; windows, doors, and dishes rattled; felt by many).
Augusta (few windows cracked; hanging pictures swung; windows, doors, and dishes rattled; felt by all).
Belfast (few windows cracked; windows, doors, and dishes rattled; felt by many).
Buckfield (few windows cracked; hanging pictures swung; windows, doors, and dishes rattled; felt by many).
Damariscotta (few windows cracked; hanging pictures out of place; windows, doors, and dishes rattled; felt by many).
Dresden (few windows broken; liquid spilled from small containers; windows, doors, and dishes rattled; people awakened; felt by all).
East Vassalboro (few windows cracked; hanging pictures swung; windows, doors, and dishes rattled; felt by many).

Freedom (few windows cracked; light furniture or small appliances moved; small objects moved; hanging pictures swung; windows, doors, and dishes rattled; felt by many).
Gray (few windows cracked, light furniture or small appliances moved, small objects moved, chimney bricks loosened, felt by many).
Hallowell (few windows broken; small objects moved; hanging pictures swung; windows, doors, and dishes rattled; several awakened; felt by many).
Lebanon (light furniture or small appliances moved; small objects moved; windows, doors, and dishes rattled; few awakened; felt by many).
Lisbon Falls (few windows cracked; hanging pictures swung; windows, doors, and dishes rattled; few awakened; felt by many).
Livermore Falls (light furniture or small appliances moved; small objects moved; windows, doors, and dishes rattled; felt by all).
Lovell (few windows cracked; small objects moved; hanging pictures out of place; windows, doors, and dishes rattled; few awakened; felt by many).
Mount Vernon (small objects broken; windows, doors, and dishes rattled; few awakened; felt by many).
Old Orchard Beach (few windows cracked; small objects moved; hanging pictures out of place; windows, doors, and dishes rattled; several awakened; felt by many).
Scarborough (few windows cracked; small objects moved; windows, doors, and dishes rattled; several awakened).
South Paris (few windows cracked; windows, doors, and dishes rattled; felt by many).
Topsham (few windows cracked; small objects moved; hanging pictures swung; building shook strongly; felt by all).
Troy (few windows cracked; small objects moved; hanging pictures out of place; windows, doors, and dishes rattled; few awakened; felt by many).
West Bowdoin (few windows cracked, light furniture or small appliances moved, small objects moved, hanging pictures out of place, felt by all).
West Peru (few windows cracked; small objects moved; hanging pictures swung; windows, doors, and dishes rattled; felt by many).
Wiscasset (small objects moved and fell; small cracks in house foundation; hanging objects swung moderately; house vibrated; felt by all).

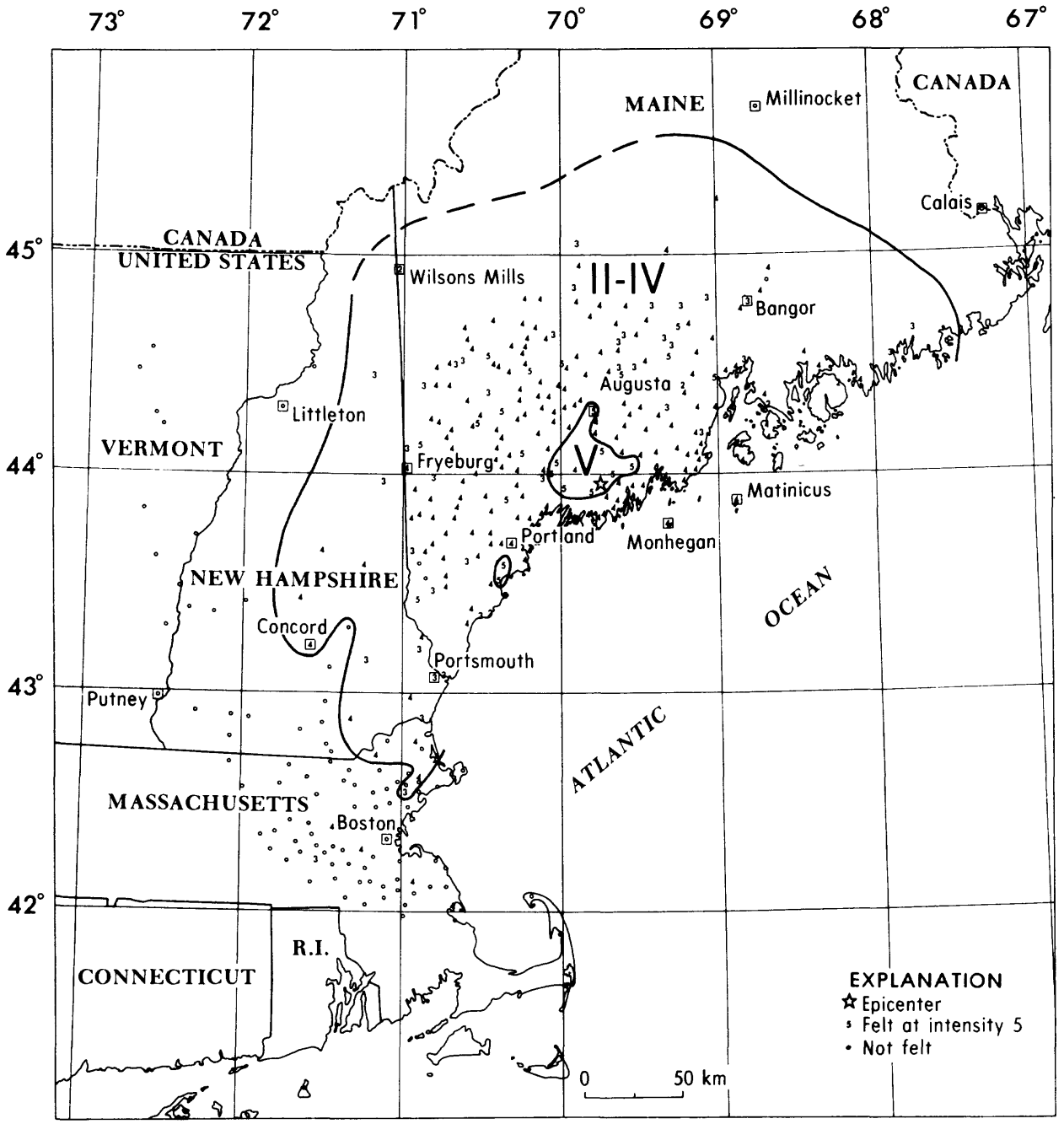

FIGURE 24.--Isoseismal map for the southern Maine earthquake of 18 April 1979, 02 34 14.4 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

Woolwich (some windows broken; small objects moved; hanging pictures out of place; water splashed onto sides of lakes and ponds; well water muddied; buildings shook strongly; windows, doors, and dishes rattled; felt by all).

Intensity IV:

Maine--Albion, Alfred, Alna, Bath, Belgrade, Belgrade Lakes, Bethel, Boothbay, Boothbay Harbor, Bowdoin, Bowdoinham, Bremen, Bristol, Brooks, Brooksville, Brownfield, Brunswick, Burnham, Buxton, Canaan, Canton, Cape Elizabeth, Casco, Castine, Chebeague Island, Chesterville, Clinton, Coopers Mills, Cornish, Cumberland Center, Cumberland Mills, Cundys Harbor, Danville, Deer Isle, Dexter, Dixmont, Dryden, East Baldwin, East Boothbay, East Dixfield, East Livermore, East Poland, East Peru, East Sebago, East Stoneham, East Waterford, East Wilton, East Winthrop, Edgecomb, Ellsworth, Farmington, Farmington Falls, Five Islands, Freeport, Friendship, Frye, Fryeburg, Gardiner, Georgetown, Glen Cove, Gorham, Greene, Hampden, Hanover, Harpswell, Harrison, Hebron, Hinckley, Hiram, Islesboro, Jay, Jefferson, Kennebunk, Kents Hill, Kezar Falls, Lamoine, Leeds, Lewiston, Liberty, Limerick, Limington, Lincolnville, Lincolnville Center, Lisbon, Lisbon Center, Litchfield, Little Deer Isle, Livermore, Locke Mills, Long Island, Lyman, Madison, Manchester, Matinicus, Mechanic Falls, Mexico, Milo, Minot, Monhegan, Monmouth, Monroe, Morrill, Naples, New Gloucester, New Harbor, New Vineyard, Newcastle, Newfield, Newagen, Newry, Nobleboro, Norridgewock, North Edgecomb, North Jay, North Leeds, North Monmouth, North Sebago, North Turner, North Waterboro, North Waterford, North Whitefield, North Windham, Norway, Oakland, Old Town, Orrs Island, Owls Head, Palermo, Paris, Permaquid Harbor, Peru, Phippsburg, Poland, Poland Spring, Porter, Portland, Pownal, Raymond, Readfield, Richmond, Rockland, Round Pond, Roxbury, Rumford, Sabattus, Saco, Saint George, Salem, Searsmont, Searsport, Skowhegan, Small Point, Solon, Somerville, South Bristol, South Freeport, South Gardiner, South Harpswell, South Hiram, South Portland, South Thomaston, South Waterford, South Windham, Southport, Spruce Head, Standish, Stockton Springs, Stonington, Strong, Sunset, Temple, Tenants Harbor, Thomaston, Turner, Turner Center, Union, Vassalboro, Veazie, Vienna, Vinalhaven, Waldoboro, Walpole, Warren, Washington,

Maine--Continued

Waterboro, Waterford, Waterville, Wayne, Weld, Wells, West Baldwin, West Boothbay, West Farmington, West Kennebunk, West Minot, West Paris, West Poland, West Rockport, Westbrook, Westport, Whitefield, Windsor, Winslow, Winter Harbor, Winthrop, Yarmouth.

Massachusetts--Duxbury, Lawrence, Needham, Newburyport, Rockland, South Hamilton, Sudbury.

New Hampshire--Concord, Derry, Exeter, Franklin, Meredith, Somersworth, Wolfeboro.

Intensity III:

Maine--Anson, Bangor, Biddeford, Bingham, Bristol Mills, Brunswick, Burkettville, Carmel, China, Cliff Island, Columbia Falls, Denmark, Dixfield, Durham, Fairfield, Georgetown, Hollis Center, Kennebunkport, Kittery, Maplewood, Milbridge, Milford, New Sharon, North Anson, North Bridgton, North Fryeburg, North Haven, North Vassalboro, North Yarmouth, Parson Field, Pittsfield, Plymouth, Rockport, Rumford Center, Rumford Point, Sandy Point, Sebago Lake, Shawmut, South China, Springvale, Steep Falls, Thorndike, Unity, Wales, Weeks Mills, West Bethel, West Newfield, West Southport, West Sumner, Wilton.

Massachusetts--Hopkinton, Peabody.

New Hampshire--Berlin, Conway, Deerfield, Dover (press report), Portsmouth (press report), Seabrook (press report).

Intensity II:

Maine--Bar Harbor, Cape Porpoise, North Searsmont, Sargentville, Wilsons Mills.

28 July (J) Southwestern Maine

Origin time: 23 29 12.3
Epicenter: 43.29 N., 70.44 W.
Depth: 11 km
Magnitude: 3.5 mbLg(G), 3.5 mbLg(J)

The intensities listed below are a combination of USGS and Maine Geological Survey questionnaires which were evaluated by the USGS. The maximum effects reported were small objects moved; windows, doors, and dishes rattled; hanging pictures out of place; loud earth noises; felt by many.

Intensity IV:

Maine--Kennebunkport, Moody, North Berwick, Onunquit, Saco, Scarborough, South Berwick, Wells, York, York Harbor.

New Hampshire--Milton, Rollinsford.

Intensity III:

Maine--Acton, Bar Mills, Berwick, Biddeford, Cape Elizabeth, East Waterboro, Hollis Center, Kittery Point, Portland, Springvale.

New Hampshire--New Castle, Somersworth.

Maine--Continued

Intensity II:
Maine--Biddeford Pool, Eliot, Kittery.
New Hampshire--Greenland.

19 August (O) Southern Quebec, Canada
Origin time: 22 49 31.0
Epicenter: 47.64 N., 69.96 W.
Depth: 18 km
Magnitude: 4.6 mb(G), 4.5 MS(G), 5.4 mbLg(O)

Felt at maximum intensity V in the St. Simeon area in Canada.

Intensity IV: Saint Francis.
Intensity III: Lille.

Massachusetts

18 April (J) Southern Maine
Origin time: 02 34 14.4

See Maine listing.

23 April (J) Southern New Hampshire
Origin time: 00 05 45.7

See New Hampshire listing.

Missouri

5 February (S) Northeastern Arkansas
Origin time: 05 31 09.3

See Arkansas listing.

3 June (S) Eastern Missouri
Origin time: 05 50 24.6
Epicenter: 38.61 N., 90.52 W.
Depth: 5 km
Magnitude: 2.1 mbLg(S)

Felt in southwest Ladue and at Jennings (S).

11 June (S) New Madrid region
Origin time: 04 12 16.9
Epicenter: 36.17 N., 89.65 W.
Depth: 12 km
Magnitude: 3.8 mbLg(S)
Intensity IV:
Arkansas--Armorel.
Missouri--Cooter, Deering, Marston, Rives.
Tennessee--Bogota, Elbridge, Finley, Hornbeak, Lenox, Ridgely, Samburg.
Intensity III:
Missouri--Car, Gideon, Pascola.
Tennessee--Caruthersville (press report), Dyersburg.

Missouri--Continued

8 July (S) Southeast Missouri
Origin time: 12 35 15.1
Epicenter: 36.89 N., 89.29 W.
Depth: 3 km
Magnitude: 3.1 mbLg(S)
Intensity IV: Wyatt (windows, doors, dishes rattled and small objects moved).
Intensity III: Charleston.

13 July (S) New Madrid region
Origin time: 07 29 39.0
Epicenter: 36.08 N., 89.77 W.
Depth: 11 km
Magnitude: 2.7 mbLg(T), 2.8 mbLg(S)
Intensity IV:
Missouri--Campbell, Clarkton.
Tennessee--Bogota.
Intensity III:
Missouri--Wardell, Whiteoak.
Intensity II:
Missouri--Braggadocio (press report), Marston.
Tennessee--Ridgely.
Felt:
Missouri--Caruthersville.

12 September (S) Eastern Missouri
Origin time: 10 59 46.2
Epicenter: 37.74 N., 89.95 W.
Depth: 3 km
Magnitude: 2.5 mbLg(S)

Felt in the Perryville area (S).

26 November (S) New Madrid Region
Origin time: 04 43 19.0
Epicenter: 36.36 N., 89.52 W.
Depth: 10 km
Magnitude: 2.7 mbLg(S)

Felt in western Kentucky (S).

Montana

7 May (G) Hebgen Lake region
Origin time: 17 15 43.4
Epicenter: 44.76 N., 111.14 W.
Depth: 5 km
Magnitude: 3.2 ML(G), 3.6 ML(D)
Intensity III: Old Faithful, Wyoming.

8 May (G) Hebgen Lake region
Origin time: 00 56 34.1
Epicenter: 44.77 N., 111.12 W.
Depth: 5 km
Magnitude: 3.3 ML(G), 3.5 ML(D)
Intensity III: West Yellowstone.

8 May (G) Hebgen Lake region
Origin time: 00 57 42.9

Montana--Continued

Epicenter: 44.74 N., 111.20 W.
Depth: 5 km
Magnitude: 3.9 ML(G), 4.2 ML(D)

Intensity IV:
Montana--West Yellowstone.
Wyoming--Madison Junction.
Intensity III:
Wyoming--Mammoth Hot Springs, Old Faithful.

8 May (G) Hebgen Lake region
Origin time: 00 58 44.8
Epicenter: 44.75 N., 111.38 W.
Depth: 5 km
Magnitude: 4.6 ML(G), 4.7 ML(D)
Intensity IV:
Montana--West Yellowstone (cars rocked noticeably, doors swung, windows rattled, few books fell from shelves, felt by many).
Wyoming--Madison Junction (windows rattled, house plants vibrated).
Intensity III:
Wyoming--Canyon Village, Old Faithful.
Intensity II:
Wyoming--Mammoth Hot Springs.

8 May (G) Hebgen Lake region
Origin time: 01 23 18.3
Epicenter: 44.78 N., 111.08 W.
Depth: 5 km
Magnitude: 3.4 ML(G), 3.5 ML(D)
Intensity III: West Yellowstone.

10 May Hebgen Lake region
Origin time: 13 24
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.
Intensity III: West Yellowstone.

22 June (G) Southwestern Montana
Origin time: 12 02 26.8
Epicenter: 45.32 N., 112.83 W.
Depth: 5 km
Magnitude: 4.5 ML(D), 4.4 ML(G)
Intensity IV: Dillon, Polaris.

21 July (G) Northwestern Montana
Origin time: 22 18 47.3
Epicenter: 47.72 N., 114.15 W.
Depth: 5 km
Magnitude: 3.5 ML(G)

Felt along the south shore area of Flathead Lake and at Dayton and Ronan (press report).

16 October (G) Northwestern Montana
Origin time: 18 33 44.6
Epicenter: 48.24 N., 114.54 W.

Montana--Continued

Depth: 5 km
Magnitude: 3.1 ML(G), 2.7 ML(D)

Felt in the Kalispell Valley (press report).

21 November Northwestern Montana
Origin time: 19 00
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.
Intensity II: Kalispell.

Nebraska

6 June (K) Southwestern Nebraska
Origin time: 16 16 22.4
Epicenter: 40.14 N., 100.41 W.
Depth: 2 km
Magnitude: 2.7 mbLg(G)

Felt at Bartly and 11 km south of Bartly (telephone report).

Intensity III: 6.5 km south of Indianola (K).

30 June (G) Northeastern Kansas
Origin time: 20 46 41.3

See Kansas listing.

16 July (K) Southwestern Nebraska
Origin time: 00 03 47.8
Epicenter: 40.18 N., 100.35 W.
Depth: 14 km
Magnitude: 3.2 mbLg(T)
Intensity III: Indianola (telephone report).

2 August (K) Southwestern Nebraska
Origin time: 04 16 22.2
Epicenter: 40.17 N., 100.40 W.
Depth: 1 km
Magnitude: 2.5 MD(K)
Intensity III: 6.5 km south of Indianola (K).

31 August (K) Southwestern Nebraska
Origin time: 08 00 11.6
Epicenter: 40.16 N., 100.33 W.
Depth: 12 km
Magnitude: 2.2 MD(K)
Intensity IV: 6.5 km south of Indianola (K).

Nevada

6 January (G) Central Nevada
Origin time: 01 20 35.1
Epicenter: 39.24 N., 116.38 W.

Depth: 5 km
Magnitude: 4.2 ML(B)
Intensity IV: Austin.
Intensity II: Yerington.

24 January (E) Southern Nevada
Origin time: 18 00 00.099
Epicenter: 37.10 N., 116.01 W.
Depth: 0 km
Magnitude: 4.5 mb(G), 4.5 ML(B)

Nevada Test Site explosion "BACCARAT" at 37°06'19.48" N., 116°00'42.01" W., surface elevation 1338 m, depth of burial 326 m.

24 January (B) Owens Valley Area
Origin time: 21 14 25.9

See California Listing.

8 February (E) Southern Nevada
Origin time: 20 00 00.089
Epicenter: 37.10 N., 116.06 W.
Depth: 0 km
Magnitude: 5.5 mb(G), 4.1 MS(G), 5.2 ML(B)

Nevada Test Site explosion "QUINELLA" at 37°06'08.93" N., 116°03'17.43" W., surface elevation 1268 m, depth of burial 579 m.

13 February (G) Northern Nevada
Origin time: 15 52 48.5
Epicenter: 40.93 N., 116.16 W.
Depth: 5 km
Magnitude: 4.1 mb(G), 3.6 ML(G)
Intensity IV: Carlin, Carlin Gold Mine.
Intensity III: Tuscarora.

15 February (E) Southern Nevada
Origin time: 18 05 00.164
Epicenter: 37.15 N., 116.07 W.
Depth: 0 km
Magnitude: 4.8 mb(G), 4.7 ML(B)

Nevada Test Site explosion "KLOSTER" at 37°09'07.24" N., 116°04'18.61" W., surface elevation 1324 m, depth of burial 536 m.

22 February (B) Northern California
Origin time: 15 57 28.1

See California Listing.

14 March (E) Southern Nevada
Origin time: 18 30 00.095
Epicenter: 37.03 N., 116.04 W.
Depth: 0 km
Magnitude: 4.3 mb(G), 4.2 ML(B)

Nevada Test Site explosion "MEMORY" at 37°01'40.18" N., 116°02 23.10" W., surface elevation 1217 m, depth of burial 366 m.

Nevada--Continued

15 March (P) Southern California
Origin time: 21 07 16.5

See California Listing.

18 March (G) Central Nevada
Origin time: 21 06 11.0
Epicenter: 39.25 N., 116.36 W.
Depth: 5 km
Magnitude: 3.5 ML(G)
Intensity IV: Austin.

6 June (B) Western Nevada
Origin time: 01 49 56.4
Epicenter: 38.49 N., 118.42 W.
Depth: 12 km
Magnitude: 4.3 mb(G), 4.2 ML(B)
Intensity IV: Luning.
Intensity III: Babbitt, Hawthorne, Mina.

8 June (G) Western Nevada
Origin time: 05 44 03.6
Epicenter: 38.51 N., 117.88 W.
Depth: 5 km
Magnitude: 4.0 ML(G)
Intensity IV: Gabbs, Luning, Mina.

11 June (E) Southern Nevada
Origin time: 14 00 00.170
Epicenter: 37.29 N., 116.45 W.
Depth: 0 km
Magnitude: 5.5 mb(G), 4.4 MS(G), 5.4 ML(B)

Nevada test site explosion "PEPATO" at 37°17'22.88" N., 116°27'18.91" W., surface elevation 1941 m, depth of burial 681 m.

20 June (E) Southern Nevada
Origin time: 15 00 13.542
Epicenter: 37.11 N., 116.02 W.
Depth: 0 km
Magnitude: 4.0 mb(G), 4.3 ML(B)

Nevada test site explosion "CHESS" at 37°06'27.46" N., 116°00'54.31" W., surface elevation 1336 m, depth of burial 335 m.

28 June (E) Southern Nevada
Origin time: 14 44 00.168
Epicenter: 37.14 N., 116.09 W.
Depth: 0 km
Magnitude: 5.0 mb(G), 5.0 ML(B)

Nevada test site explosion "FAJY" at 37°08'35.39" N., 116°05'15.06" W., surface elevation 1330 m, depth of burial 537 m.

3 August (E) Southern Nevada
Origin time: 15 07 30.163
Epicenter: 37.08 N., 116.07 W.
Depth: 0 km
Magnitude: 4.5 mb(G), 4.6 ML(B)

Nevada Test Site explosion "BURZET" at 37°05'02.22" N., 116°04'11.59" W., surface elevation 1262 m, depth of burial 450 m.

6 August (B) Central California
Origin time: 17 05 22.7

See California listing.

8 August (E) Southern Nevada
Origin time: 15 00 00.112
Epicenter: 37.02 N., 116.01 W.
Depth: 0 km
Magnitude: 4.8 mb(G), 4.6 ML(B)

Nevada Test Site explosion "OFFSHORE" at 37°00'53.09" N., 116°00'28.82" W., surface elevation 1209 m, depth of burial 396 m.

29 August (E) Southern Nevada
Origin time: 15 08 00.171
Epicenter: 37.12 N., 116.07 W.
Depth: 0 km
Magnitude: 4.7 mb(G), 5.0 ML(B)

Nevada Test Site explosion "NESSEL" at 37°07'16.39" N., 116°03'59.71" W, surface elevation 1286 m, depth of burial 464 m.

6 September (E) Southern Nevada
Origin time: 15 00 00.089
Epicenter: 37.09 N., 116.05 W.
Depth: 0 km
Magnitude: 5.8 mb(G), 4.1 MS(G), 5.5 ML(B)

Nevada Test Site explosion "HEARTS" at 37°05'17.20" N., 116°03'10.02" W., surface elevation 1259 m, depth of burial 640 m.

8 September (E) Southern Nevada
Origin time: 17 02 00.090
Epicenter: 37.15 N., 116.04 W.
Depth: 0 km
Magnitude: 3.8 mb(G), 3.7 ML(B)

Nevada Test Site explosion "PERA" at 37°09'17.98" N., 116°02'17.48" W., depth of burial 200 m.

26 September (E) Southern Nevada
Origin time: 15 00 00.091
Epicenter: 37.23 N., 116.36 W.
Depth: 0 km
Magnitude: 5.6 mb(G), 4.1 MS(G), 5.4 ML(B)

Nevada Test Site explosion "SHEEPSHEAD" at 37°13'44.64" N., 116°21'50.59" W., surface elevation 2060 m, depth of burial 640 m.

15 October (P) Imperial Valley area
Origin time: 23 16 54.5

See California listing.

29 November (E) Southern Nevada
Origin time: 15 00 0.096
Epicenter: 36.99 N., 116.02 W.
Depth: 0 km
Magnitude: 3.8 mb(G)

Nevada Test Site explosion "BACKGAMMON" at 36°59'38.25" N., 116°01'26.79" W., surface elevation 1203 m, depth of burial 229 m.

14 December (E) Southern Nevada
Origin time: 18 00 00.091
Epicenter: 37.14 N., 116.06 W.
Depth: 0 km
Magnitude: 3.6 ML(B)

Nevada Test Site explosion "AZUL" at 37°08'14.54" N., 116°03'47.06" W., surface elevation 1302 m, depth of burial 205 m.

31 December (B) Western Nevada
Origin time: 08 27 51.9
Epicenter: 38.40 N., 118.40 W.
Depth: 5 km
Magnitude: 4.2 mb(G), 4.9 ML(B), 4.8 ML(P)

Intensity IV:
California--Mammoth Lakes, Topaz.
Nevada--Babbitt, Hawthorne, Luning, Mina.

New Hampshire

18 April (J) Southern Maine
Origin time: 02 34 14.4

See Maine listing.

23 April (J) Southern New Hampshire
Origin time: 00 05 45.7
Epicenter: 43.04 N., 71.24 W.
Depth: 0 km
Magnitude: 3.1 mbLg(J), 2.9 mbLg(L)

Intensity IV:
Massachusetts--West Boxford, West Newbury.
New Hampshire--Candia, Derry, East Candia, East Rochester, Exeter, Gilmanton Iron Works, Greenland, Hampton Falls, Milton, Portsmouth, Rochester, Rye Beach, Salem.
Intensity III:
Massachusetts--Haverhill.
New Hampshire--Alton Bay, Brentwood (press

New Hampshire--Continued

report), Epping, Gonic, Hooksett (press report), Raymond, Rollinsford.

Intensity II:
Massachusetts--Ward Hill.
New Hampshire--East Derry, Farmington, Kingston, Newmarket, Ward Hill.

28 July (J) Southwestern Maine
Origin time: 23 29 12.3

See Maine listing.

New Jersey

30 January (L) Central New Jersey
Origin time: 16 30 52.1
Epicenter: 40.32 N., 74.26 W.
Depth: 5 km
Magnitude: 3.0 mbLg(L), 3.3 mbLg(V)

The press reported the earthquake was felt from southwest of Trenton, New Jersey, to the middle of Fairfield County, Connecticut, a distance of 160 km; and extended over an area of approximately 2,800 sq km (fig. 25). In New Jersey, frightened people made thousands of calls to police in Monmouth and Middlesex Counties complaining of shaking walls and rattling dishes. In New York City, the police were flooded with calls from Brooklyn, Manhattan, and Staten Island residents.

Intensity V:
New Jersey--
Cheesequake (a foot-long crack in the exterior wall of an elementary school building, objects fell from shelves, shaking described as being so strong that the building seemed as if it would fall, everyone ran into the streets--press report).
Cranbury (light furniture and small objects shifted, buildings trembled).
Middletown (a few windows cracked; hanging pictures swung out of place; buildings creaked and shook; windows, doors, and dishes rattled; standing and moving vehicles rocked slightly; felt by many).
Milltown (light furniture and small objects shifted; hanging pictures swung; windows, doors, and dishes rattled; standing and moving vehicles rocked slightly).
New York--
Rockville Centre (light furniture and small objects shifted; buildings creaked and shook; windows, doors, and dishes rattled; felt by many).

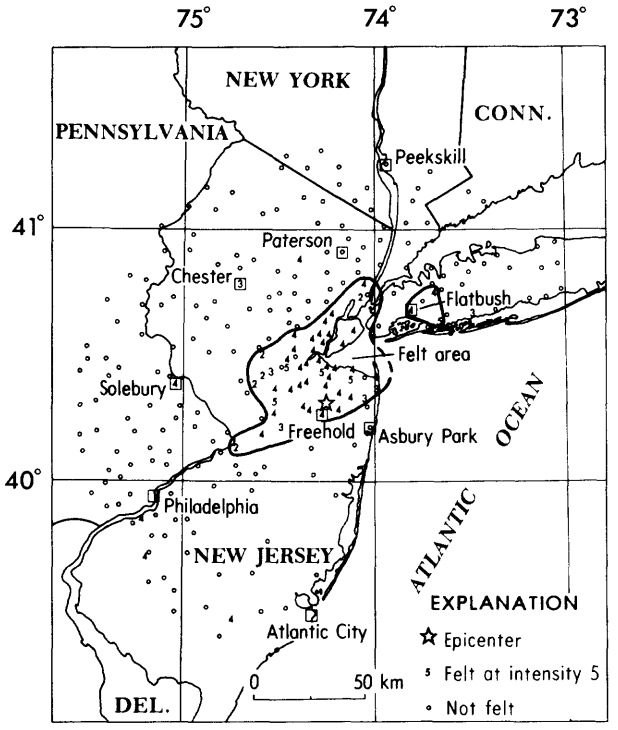

FIGURE 25.--Isoseismal map for the central New Jersey earthquake of 30 January 1979, 16 30 52.1 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

New Jersey--Continued

Intensity IV:
New Jersey--Allentown, Avenel, Browntown, Carteret, Cliffwood, Colts Neck, Dayton, East Keansburg, Edison, Elizabeth, Englishtown, Ewan, Freehold, Helmetta, Hightstown, Holmdel, Iselin, Keasbey, Keyport, Lake Hiawatha (press report), Laurence Harbor, Lincroft, Linden, Marlboro, Matawan, Mays Landing, Morganville, New Brunswick, North Bergen (press report), Parlin, Perth Amboy, Sayreville, Sewaren, South Amboy, South Plainfield, South River, Spotswood, Tennent, Thorofare, Wickatunk, Woodbridge.
New York--Brooklyn (Bay Ridge--press report), Brooklyn (Bensonhurst--press report), Flatbush (press report), New Dorp (press report), New Hyde Park, Staten Island, Tottenville.
Pennsylvania--Solebury.

Intensity III:
New Jersey--Belford, Chester, Franklin Park, Hazlet, Little Silver, Rahway,

New Jersey--Continued

Roosevelt, Sea Bright, Shrewsbury.
New York--Massapequa.
Intensity II:
New Jersey--Bordentown, East Millstone, Jamesburg, Jersey City, Kendall Park, Kingston.

2 February (L) Northern New Jersey
Origin time: 02 26 13.3
Epicenter: 40.77 N., 74.66 W.
Depth: 0 km
Magnitude: 1.9 mbLg(L)
Intensity III: Chester (press report).

23 February (L) Northern New Jersey
Origin time: 10 23 57.2
Epicenter: 40.80 N., 74.81 W.
Depth: 13 km
Magnitude: 2.9 mbLg(L)
Intensity IV: Chester, Ironia.

10 March (L) Northern New Jersey
Origin time: 04 49 39.7
Epicenter: 40.72 N., 74.50 W.
Depth: 3 km
Magnitude: 2.2 ML(L)

Felt in Hunterdon, Middlesex, Morris, Somerset, and Union Counties. At Bernardsville a 1.3 cm wide crack was observed in a driveway (press report).

Intensity V: Basking Ridge (small objects and hanging pictures fell; windows, doors, and dishes rattled; felt by many).
Intensity IV: Bedminster, Bernardsville (press report), Chester, Far Hills, Gillette, Ironia, Liberty Corner, Middlesex, New Vernon, Peapack.
Intensity III: Bridgewater (press report), East Millstone, Gladstone, Tabor, Warren.
Intensity II: Avenal, Green Village, Rockaway.
Felt: Mendham (L), Morristown (L), New Brunswick (press report).

New York

30 January (L) Central New Jersey
Origin time: 16 30 52.1

See New Jersey Listing.

30 December (L) Southeastern New York
Origin time: 14 15 12.3
Epicenter: 41.16 N., 73.71 W.
Depth: 4 km
Magnitude: 2.0 mbLg(L)

New York--Continued

This earthquake was reported heard at New Canaan, Ridgefield, and Welton, Connecticut.

Intensity IV:
Connecticut--Cos Cob, Greenwich.
New York--Armonk, Bedford, Purchase, Valhalla.
Intensity III:
Connecticut--Stamford (press report).
New York--Bedford Hills, Briarcliff Manor, Maryknoll, Pleasantville, Pound Ridge, Thornwood, White Plains.
Felt:
New York--Greenburgh (press report), Ossining (press report).

North Carolina

13 August (G) Southeastern Tennessee
Origin time: 05 18 56.0

See Tennessee Listing.

26 August (G) Northwestern South Carolina
Origin time: 01 31 45.0

See South Carolina listing.

12 September (G) Eastern Tennessee
Origin time: 06 24 03.6

See Tennessee listing.

Ohio

9 November (G) Northeastern Kentucky
Origin time: 21 29 59.1

See Kentucky listing.

Oklahoma

13 March (T) Central Oklahoma
Origin time: 23 29 22.6
Epicenter: 35.42 N., 97.85 W.
Depth: 5 km
Magnitude: 1.7 mbLg(T)
Intensity II: Southwestern Yukon (T).

14 March (T) Central Oklahoma
Origin time: 03 10 56.8
Epicenter: 35.50 N., 97.83 W.

Oklahoma--Continued

Depth: 5 km
Magnitude: 1.9 mbLg(T)
Intensity IV: Mustang (T), northern and western Yukon (T).
Intensity III: Union City.

14 March (T) Central Oklahoma
Origin time: 04 37 15.3
Epicenter: 35.52 N., 97.78 W.
Depth: 5 km
Magnitude: 2.2 mbLg(T)
Intensity V: Northern and western Yukon (T).
Intensity IV: Mustang (T).
Intensity III: Union City (T).

18 March (T) Central Oklahoma
Origin time: 20 44 19.5
Epicenter: 35.38 N., 98.12 W.
Depth: 5 km
Magnitude: 2.9 mbLg (T)
Intensity III: 17 km west of Union City (T).

18 March (T) Southern Oklahoma
Origin time: 23 19 01.3
Epicenter: 34.10 N., 97.45 W.
Depth: 5 km
Magnitude: 2.3 mbLg(T)
Intensity III: 5 km south of Wilson.

22 May (T) Southern Oklahoma
Origin time: 03 49 23.8
Epicenter: 34.03 N., 97.47 W.
Depth: 4 km
Magnitude: 1.9 mbLg(T)
Intensity III: Wilson.

7 June (T) Western Oklahoma
Origin time: 07 39 35.6
Epicenter: 35.19 N., 99.81 W.
Depth: 5 km
Magnitude: 3.0 mbLg(T)
Intensity IV: Texola.
Intensity III: Sayre (T).

25 July (T) Southern Oklahoma
Origin time: 03 15 37.3
Epicenter: 33.97 N., 97.55 W.
Depth: 5 km
Magnitude: 2.7 mbLg(T)
Intensity V: Near Wilson (T).

13 September (T) Western Oklahoma
Origin time: 00 49 23.0
Epicenter: 35.22 N., 99.36 W.
Depth: 15 km
Magnitude: 3.4 mbLg(T)
Intensity IV: Carter (small objects moved, dishes rattled, buildings shook slightly, felt by many).
Intensity III: Sentinel, Willow.
Felt: Retrop (T).

Oklahoma--Continued

16 September (T) Central Oklahoma
Origin time: 15 57 20.8
Epicenter: 35.34 N., 98.00 W.
Depth: 5 km
Magnitude: 2.5 mbLg(T)
Intensity IV: Minco (T).

17 September (T) Central Oklahoma
Origin time: 20 41 50.5
Epicenter: 35.32 N., 97.97 W.
Depth: 5 km
Magnitude: 2.5 mbLg(T)
Intensity IV: Minco (T).

9 December (T) Southern Oklahoma
Origin time: 23 12 58.7
Epicenter: 33.99 N., 97.35 W.
Depth: 5 km
Magnitude: 2.5 mbLg(T)
Intensity III: 20 km southeast of Wilson (T).

Oregon

3 February (B) Northern California
Origin time: 09 58 16.1

See California--Off the coast listing.

11 March (W) Southwestern Washington
Origin time: 14 39 33.0

See Washington listing.

8 April (W) Oregon-Washington border
Origin time: 07 29 37.8

See Washington listing.

Pennsylvania

30 January (L) Central New Jersey
Origin time: 16 30 52.1

See New Jersey Listing.

Puerto Rico

23 March (G) Dominican Republic Region
Origin time: 19 32 31.1
Epicenter: 17.99 N., 69.04 W.
Depth: 80 km
Magnitude: 6.1 mb(G), 6.4 mb(P)

Felt in the Dominican Republic, Puerto Rico, and in parts of Colombia, Haiti, and

Venezuela. Minor damage was reported in Santo Domingo (press report).

Intensity V: Morovis, Puerto Rico.
Intensity IV: Ponce and San Juan, Puerto Rico (press report).
Felt: Mayaguez, Puerto Rico (press report).

3 October (G) Mona Passage
Origin time: 00 31 56.8
Epicenter: 18.98 N., 67.85 W.
Depth: 42 km
Magnitude: 5.0 mb(G)

Felt on Puerto Rico.

5 November (G) Mona Passage
Origin time: 01 51 12.9
Epicenter: 17.83 N., 68.62 W.
Depth: 104 km
Magnitude: 5.9 mb(G), 6.2 mb(P)

Felt in eastern Dominican Republic, western Puerto Rico, and northern Venezuela.

Intensity V: Ponce and Mayaguez, Puerto Rico (press report).
Intensity IV: San Juan, Puerto Rico (press report).

South Carolina

19 January (G) Northwestern South Carolina
Origin time: 08 55 36.9
Epicenter: 34.64 N., 82.84 W.
Depth: 1 km
Magnitude: 2.8 mbLg(G), 3.4 mbLg(V)

The press reported that the earthquake rattled windows and shook walls in the Lake Keowee area prompting numerous telephone calls to local radio stations and police departments. It was reported felt at Clemson, Salem, Walhalla, and at the Oconee Nuclear Power Station.

Intensity IV: Newry, Seneca, Six Mile.

11 August (F) Eastern South Carolina
Origin time: 02 11 56.6
Epicenter: 32.99 N., 80.22 W.
Depth: 10 km
Magnitude: 2.5 mb(F)
Intensity III: Summerville.

26 August (G) Northwestern South Carolina
Origin time: 01 31 45.0
Epicenter: 34.93 N., 82.97 W.

Depth: 2 km
Magnitude: 3.7 mbLg(V)

This earthquake was felt over an area of approximately 11,400 sq km of Georgia, North Carolina, and South Carolina (fig. 26). The University of South Carolina recorded about 20 aftershocks. The largest aftershock, approximately magnitude 2.2 mbLg, occurred on August 27 at 05 07 UTC. Some of the intensities listed below were evaluated by the USGS from a newspaper questionnaire published by the University of South Carolina in the Transylvania Times of Brevard, N.C.; the Seneca Journal of Seneca, S.C.; and the Anderson Independent of Anderson, S.C.

Intensity VI:
South Carolina--
Tamasee--dry wall cracked and fell, concrete basement floor cracked, small objects fell but did not break.

Intensity V:
North Carolina--
Naples--small objects and light furniture moved; trees and bushes shook moderately; windows, doors, and dishes rattled.
Rosman--small objects and light furniture moved, few windows cracked, hanging pictures swung, felt by several.
Sylva--moved a large business desk and rattled windows (press report).
Zirconia--few windows cracked, small objects moved, water splashed onto sides of lake or swimming pools, hanging pictures swung, felt by several.
South Carolina--
Central--furniture moved; hanging objects swung moderately; windows, doors, and dishes rattled; sounded like an explosion.
Greenville--few windows cracked; hanging pictures swung; windows, doors, and dishes rattled.
Newry--light furniture and small objects moved; hanging pictures swung; windows, doors, and dishes rattled; felt by several.

Intensity IV:
Georgia--Mountain City, Turnerville.
North Carolina--Almond, Arden, Barnardsville, Brevard, Cashiers, Cedar Mountain, Dillsboro, Hendersonville, Highlands, Horse Shoe, Lake Junaluska, Lake Toxaway, Otto, Sapphire, Scaly Mountain, Toxaway Falls (press report), Tuckasegee, Waynesville, Webster.
South Carolina--Anderson (press report), Clemson, Cleveland, Easley, Gray Court,

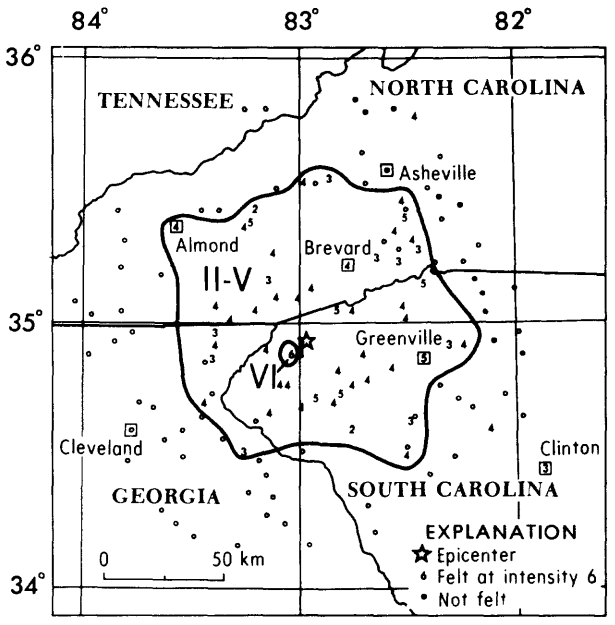

FIGURE 26.--Isoseismal map for the northwestern South Carolina earthquake of 26 August 1979, 01 31 45.0 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

South Carolina--Continued

Greer, Liberty, Marietta, Mountain Rest, Norris, Pickens, Salem, Seneca, Six Mile, Walhalla, West Union, Westminster.

Intensity III:
Georgia--Clayton, Eastanollee, Rabun Gap.
North Carolina--Canton, Flat Rock, Glenville, Penrose, Tuxedo.
South Carolina--Clinton, Taylors, Williamston.

Intensity II:
Georgia--Dillard.
North Carolina--Balsam.
South Carolina--Cateechee, Sandy Springs.

8 October (G) Central South Carolina
Origin time: 23 20 10.1
Epicenter: 34.31 N., 81.36 W.
Depth: 5 km
Magnitude: 2.9 mbLg(G)

Felt at V. C. Summer Nuclear Power Plant (telephone report).

7 December (G) Summerville area
Origin time: 05 43 35.0
Epicenter: 33.01 N., 80.17 W.
Depth: 6 km

South Carolina--Continued

Magnitude: 2.9 mbLg(G), 2.8 mbLg(V)
Intensity IV: Lincolnville, Summerville (Twin Oaks).
Intensity II: Charleston.

Tennessee

2 February (S) Western Tennessee
Origin time: 11 17 04.9
Epicenter: 36.27 N., 89.47 W.
Depth: 2 km
Magnitude: 2.0 mbLg(S)
Intensity III: Ridgely (S).

2 February (S) Western Tennessee
Origin time: 18 49 33.0
Epicenter: 36.26 N., 89.45 W.
Depth: 3 km
Magnitude: 1.9 mbLg(S)
Intensity II: Ridgely (S).

2 February (S) Western Tennessee
Origin time: 18 50 18.9
Epicenter: 36.27 N., 89.46 W.
Depth: 4 km
Magnitude: 2.0 mbLg(S)
Intensity III: Ridgely (S).

3 February (S) Western Tennessee
Origin time: 06 56 42.3
Epicenter: 36.26 N., 89.47 W.
Depth: 4 km
Magnitude: 2.0 mbLg(S)

Felt near Ridgely (S).

5 February (S) Northeastern Arkansas
Origin time: 05 31 09.3

See Arkansas listing.

11 June (S) New Madrid region
Origin time: 04 12 16.9

See Missouri listing.

13 July (S) New Madrid Region
Origin time: 07 29 39.0

See Missouri listing.

13 August (G) Southeastern Tennessee
Origin time: 05 18 56.0
Epicenter: 35.24 N., 84.38 W.
Depth: 5 km
Magnitude: 3.7 mbLg(V)

Intensity V:
Georgia--
Cisco--few windows cracked, felt by and

Tennessee--Continued

awakened many.
Varnell--small objects overturned, felt by many and awakened several.
North Carolina--
Murphy-few windows cracked, pendulum clocks stopped, felt by and awakened several.
Tennessee--
Chattanooga--few windows cracked, small objects moved, hanging picture swung, felt by many.
Cleveland--dishes fell (telephone report), hanging pictures out of place, felt by and awakened many.

Intensity IV:
Georgia--Blue Ridge, Cedartown, Chatsworth, Cherrylog, Cohutta, Ellijay, Epworth, Eton, Hiwassee, Marietta, McCaysville, Mineral Bluff, Morganton, Tennga, Tunnel Hill (press report).
North Carolina--Andrews, Aquone, Brasstown, Robbinsville, Suit, Topton, Unaka.
Tennessee--Apison, Athens, Benton, Calhoun, Charleston, Coker Creek, Conasauga, Copperhill, Daisy, Delano, Ducktown, Etowah, Farner, Harrison, Hixson, Isabella, Madisonville, McDonald, Mount Vernon, Nashville (press report), Niota, Ocoee, Oldfort, Ooltewah, Postelle, Reliance, Riceville, Tellico Plains, Townsend, Turtletown.

Intensity III:
Georgia--Rome, Sandy Springs (press report).
Tennessee--Shelbyville.

Intensity II:
Georgia--Decatur.
Tennessee--Decatur.

Felt:
Georgia--Atlanta (telephone report).
North Carolina--Asheville, Cherokee, Clay.

12 September (G) Eastern Tennessee
Origin time: 06 24 03.6
Epicenter: 35.59 N., 83.90 W.
Depth: 5 km
Magnitude: 3.2 mbLg(V)

Intensity V:
Tennessee--Maryville (small objects overturned, windows, doors, and dishes rattled, felt by many).

Intensity IV:
North Carolina--Fontana Dam.
Tennessee--Alcoa, Friendsville, Greenback, Knoxville, Louisville, Madisonville, Tallassee, Townsend, Walland.

Texas

5 July (G) West Texas
Origin time: 01 05 01.0

Texas--Continued

Epicenter: 32.95 N., 100.90 W.
Depth: 4 km
Magnitude: 2.7 mbLg(T)

Heard but not felt at Snyder.

Utah

12 January (U) Southwestern Utah
Origin time: 09 29 00.1
Epicenter: 37.73 N., 113.13 W.
Depth: 0 km
Magnitude: 3.5 ML(G)

Southern Utah State College at Cedar City recorded about 50 aftershocks (press report).

Intensity IV: Cedar City, Parowan.

25 March (U) Northwestern Utah
Origin time: 21 41 55.7
Epicenter: 41.34 N., 113.29 W.
Depth: 7 km
Magnitude: 3.2 ML(U)

Felt in parts of Davis and Weber Counties.

Intensity III: Ogden (press report).
Intensity II: Salt Lake City (press report).

30 April (U) Southern Utah
Origin time: 02 07 10.3
Epicenter: 37.88 N., 111.02 W.
Depth: 7 km
Magnitude: 3.8 ML(G)
Intensity III: Boulder.

6 October (U) Central Utah
Origin time: 10 12 35.2
Epicenter: 39.29 N., 111.69 W.
Depth: 7 km
Magnitude: 3.2 ML(U)

Felt at Ephraim (telephone report).

23 October (U) Southern Utah
Origin time: 04 17 19.9
Epicenter: 37.89 N., 110.93 W.
Depth: 7 km
Magnitude: 3.5 ML(U)

Felt in the epicentral area (telephone report).

Vermont

29 January (L) Northwestern Vermont
Origin time: 06 35 46.2
Epicenter: 44.82 N., 73.19 W.

Vermont--Continued

Depth: 9 km
Magnitude: 2.5 mbLg(L)
Intensity II: North Hero (J).

Washington

19 January (W) Central Washington
Origin time: 14 55 16.0
Epicenter: 47.90 N., 119.69 W.
Depth: 7 km
Magnitude: 3.6 ML(G), 4.0 ML(W)
Intensity V: Bridgeport (small objects fell; hanging pictures swung; windows, doors, and dishes rattled).
Intensity IV: Ardenvoir, Brewster, Chelan, Coulee Dam, Electric City, Grand Coulee, Marlin, Methow, Okanogan, Omak, Pateros, Twisp.
Intensity III: Entiat (press report), Manson.
Intensity II: Mansfield, Orondo.
Felt: Chief Joseph Dam (W).

21 January Central Washington
Origin time: 20 35
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.
Intensity III: Brewster (press report), Bridgeport, Pateros (press report).

1 February (W) Central Washington
Origin time: 20 18 28.1
Epicenter: 47.53 N., 121.92 W.
Depth: 9 km
Magnitude: 3.6 ML(G), 3.4 ML(W)
Intensity IV: Fall City, Mercer Island, Ravensdale, Renton, Snoqualmie.
Intensity III: Issaquah, Retsil.

11 March (W) Southwestern Washington
Origin time: 14 39 32.8
Epicenter: 46.45 N., 122.40 W.
Depth: 16 km
Magnitude: 3.8 mb(G), 3.8 ML(G), 3.9 ML(W)
Intensity VI:
Washington--Ariel (hairline cracks in exterior cinderblock wall, slightly cracked sidewalks and brick walls, chimneys cracked).
Intensity V:
Washington--Castle Rock (few cracked windows--press report).
Intensity IV:
Oregon--Portland.
Washington--Ashford, Chehalis, Cinebar, Cougar, Eatonville, Kelso, La Grande, Lexington (press report), Longview, Morton, Mossyrock, Olympia, Onalaska, Randle, Rochester, Ryderwood, Salkum,

Washington--Continued

Silver Creek, Silverlake, Toledo, Winlock.
Intensity III:
Oregon--Clatskanie (press report).
Washington--Woodland (press report).
Felt:
Washington--Riffe (W).

12 March (W) Northwestern Washington
Origin time: 12 41 37.0
Epicenter: 48.19 N., 122.76 W.
Depth: 24 km
Magnitude: 3.8 mb(G), 3.4 ML(G), 3.8 ML(W)
Intensity V:
Washington--Oak Harbor (few broken dishes and cracked windows--press report, light furniture and small objects shifted, felt by many).
Intensity IV:
Washington--Chimacum, Clearlake, Clinton, Conway, Coupeville, Edmonds, Freeland, Friday Harbour (press report), Hadlock, Hansville, La Conner, Langley, Lyman, Marysville, Mount Vernon, Port Ludlow, Port Townsend, Poulsbo, Silvana, Stanwood.
Intensity III:
Washington--Gold Bar, Nordland, Sultan.
Canada--Victoria, British Columbia.
Felt:
Washington--Everett (W), Kenmore (W), Mt. Vernon (W), North Seattle (W), Snohomish (W).

8 April (W) Oregon-Washington border
Origin time: 07 29 37.8
Epicenter: 46.00 N., 118.45 W.
Depth: 5 km
Magnitude: 3.2 ML(G), 4.1 ML(W)
Intensity V:
Washington--Walla Walla.
Intensity IV:
Oregon--Milton-Freewater.
Washington--College Place.
Intensity III:
Oregon--Athena, Weston.

7 July (G) Southwestern Washington
Origin time: 20 50 01.5
Epicenter: 46.52 N., 122.17 W.
Depth: 5 km
Magnitude: 3.8 ML(G)

Felt in Cowlitz, Lewis, and Pierce Counties.

Intensity IV: Glenoma, Mossyrock.
Intensity III: Ashford, Eatonville (press report), Kelso, Mt. St. Helens area, Morton, Rainier.
Intensity II: Elbe, Randle.

Washington--Continued

28 July (W) Southern Washington
Origin time: 02 19 06.9
Epicenter: 46.67 N., 120.59 W.
Depth: 0 km
Magnitude: 3.1 ML(G), 3.7 ML(W)
Intensity IV: Naches, Selah (W), Selah Firing Center (W), Yakima.

5 September (W) Northwestern Washington
Origin time: 03 49 59.4
Epicenter: 47.52 N., 122.00 W.
Depth: 7 km
Magnitude: 2.1 ML(W)

Felt at Issaquah.

15 November (Q) British Columbia, Canada
Origin time: 16 12 47.6
Epicenter: 49.24 N., 122.35 W.
Depth: 15 km
Magnitude: 3.6 ML(Q)

Felt from Hope, B.C. to Langley, B.C.

Intensity III:
Canada--West Vancouver, B.C.
United States--Sumas, Wash.

26 November (W) Northwest Washington
Origin time: 23 18 27.0
Epicenter: 48.54 N., 122.41 W.
Depth: 20 km
Magnitude: 4.1 mb(G), 3.9 ML(G)
Intensity IV: Acme, Bellingham (press report), Bow, Clearlake, Edison, Seattle, Sedro Woolley.
Intensity III: Anacortes, Clallam Bay, Lopez, Lyman, Sekiu.
Intensity II: Mount Vernon.
Felt: Burlington (W).

27 November (G) Northwestern Washington
Origin time: 02 13 46.5
Epicenter: 48.59 N., 122.41 W.
Depth: 20 km
Magnitude: 3.3 ML(G)
Intensity III: Acme, Bow.

10 December (W) Central Washington
Origin time: 05 40 07.5
Epicenter: 46.66 N., 120.58 W.
Depth: 5 km
Magnitude: 3.2 ML(G), 3.4 ML(W)
Intensity IV: Selah, Yakima.

West Virginia

9 November (G) Northeastern Kentucky
Origin time: 21 29 59.1

See Kentucky listing.

Wyoming

13 March Yellowstone National Park
Origin time: 02 44
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.
Intensity IV: Old Faithful Ranger Station.

17 March Yellowstone National Park
Origin time: 11 47
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.
Intensity III: Lake.

17 March Yellowstone National Park
Origin time: 20 59
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.
Intensity IV: Lake.

7 May (G) Hebgen Lake region
Origin time: 17 15 43.4

See Montana listing.

8 May (G) Hebgen Lake region
Origin time: 00 57 42.9

See Montana listing.

8 May (G) Hebgen Lake region
Origin time: 00 58 44.8

See Montana listing.

30 June Yellowstone National Park
Origin time: 06 55
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.
Intensity II: Old Faithful.

3 July (G) Northwestern Wyoming
Origin time: 09 57 23.9
Epicenter: 43.41 N., 110.71 W.
Depth: 5 km
Magnitude: 3.2 ML(U)
Intensity IV: Jackson (awakened some residents--press report).

6 September Yellowstone National Park
Origin time: 14 41
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.

This is one of a swarm of small earthquakes recorded by the seismograph at the Old Faithful Ranger Station.

Intensity III: Norris.

Wyoming--Continued

5 December Yellowstone National Park

Origin time: 20 00 34
Epicenter: Not located
Depth: None computed.
Magnitude: None computed.
Intensity III: Grant Village.

Wyoming--Continued

11 December Yellowstone National Park

Origin time: 20 08 10
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.
Intensity III: Old Faithful.

Table 1.--*Summary of U.S. earthquakes for 1979*

[The following symbols are used to indicate authority for arrival or origin times, epicenters, and/or magnitudes: (B) University of California, Berkeley; (C) University of Minnesota, Minneapolis; (D) University of Montana, Missoula; (E) U.S. Department of Energy, Las Vegas, Nevada; (F) Bollinger and Mathena, 1980; (G) U.S. Geological Survey, National Earthquake Information Service, Golden, Colo.; (H) U.S. Geological Survey, Hawaiian Volcano Observatory, Hawaii National Park; (J) Weston Observatory, Weston, Mass.; (K) Kansas Geological Survey, Lawrence; (L) Lamont-Doherty Geological Observatory, Palisades, N.Y.; (M) NOAA, Alaska Tsunami Warning Center, Palmer; (O) Earth Physics Branch, Ottawa, Canada; (P) California Institute of Technology, Pasadena; (S) St. Louis University, St. Louis, Mo.; (T) University of Oklahoma, Leonard; (U) University of Utah, Salt Lake City; (V) Virginia Polytechnic Institute and State University, Blacksburg; (W) University of Washington, Seattle; (Z) Stephens and others, 1980. N, Normal depth. Leaders (...) indicate information is not available]

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
ALASKA													
JAN. 2	10	58	05.0	51.59 N.	173.30 W.	35	4.8	4.3	...	...	G	JAN. 1	11 P.M. BST
JAN. 2	13	53	50.8	51.68 N.	173.38 W.	31	5.1	4.8	...	...	G	JAN. 2	02 A.M. BST
JAN. 2	13	55	51.5	51.60 N.	173.31 W.	33N	5.2	...	...	...	G	JAN. 2	02 A.M. BST
JAN. 2	15	26	26.8	51.79 N.	173.23 W.	35	4.6	...	...	...	G	JAN. 2	04 A.M. BST
JAN. 3	12	26	46.2	51.64 N.	173.29 W.	33N	4.8	...	...	...	G	JAN. 3	01 A.M. BST
JAN. 4	02	17	42.9	54.63 N.	161.52 W.	33N	...	...	4.1M	...	G	JAN. 3	03 P.M. BST
JAN. 4	15	35	04.0	61.73 N.	150.04 W.	34	...	...	3.4M	FELT	G	JAN. 4	05 A.M. AST
JAN. 5	13	57	01.4	60.26 N.	152.27 W.	116	...	...	...	...	G	JAN. 5	03 A.M. AST
JAN. 6	08	56	29.3	58.55 N.	140.76 W.	33N	...	...	4.1M	...	G	JAN. 5	11 P.M. YST
JAN. 8	10	11	00.8	61.77 N.	150.08 W.	45	...	...	2.5M	II	G	JAN. 8	12 P.M. AST
JAN. 8	11	04	08.5	56.83 N.	157.86 W.	105	4.1	...	...	...	G	JAN. 8	01 A.M. AST
JAN. 8	14	21	41.9	60.70 N.	151.16 W.	85	3.8	...	...	...	G	JAN. 8	04 A.M. AST
JAN. 8	16	01	49.5	51.64 N.	173.17 W.	43	4.8	4.6	...	...	G	JAN. 8	05 A.M. BST
JAN. 10	00	34	48.1	61.58 N.	150.06 W.	42	...	...	3.0M	II	G	JAN. 9	02 P.M. AST
JAN. 10	06	25	50.7	60.33 N.	150.53 W.	63	3.8	...	...	...	G	JAN. 9	08 P.M. AST
JAN. 10	09	16	25.6	62.58 N.	151.28 W.	49	...	...	...	...	G	JAN. 9	11 P.M. AST
JAN. 10	19	13	19.8	63.28 N.	153.69 W.	33N	...	...	3.1M	...	G	JAN. 10	09 A.M. AST
JAN. 12	04	18	32.3	59.95 N.	141.19 W.	59	3.9	...	...	...	G	JAN. 11	06 P.M. AST
JAN. 12	12	06	31.9	61.83 N.	150.80 W.	48	3.5	...	...	...	G	JAN. 12	02 A.M. AST
JAN. 12	19	01	55.0	63.61 N.	157.69 W.	62	...	...	...	...	G	JAN. 12	09 A.M. AST
JAN. 12	23	14	16.5	61.00 N.	149.42 W.	34	3.5	...	3.3M	...	G	JAN. 12	01 P.M. AST
JAN. 13	14	19	46.0	63.33 N.	151.18 W.	33N	...	...	3.1M	...	G	JAN. 13	04 A.M. AST
JAN. 13	19	21	38.0	63.28 N.	148.93 W.	96	...	...	...	...	G	JAN. 13	09 A.M. AST
JAN. 14	01	38	06.2	54.61 N.	159.67 W.	34	4.4	...	...	...	G	JAN. 13	03 P.M. AST
JAN. 14	15	13	08.7	53.30 N.	170.26 E.	35	4.9	4.6	...	...	G	JAN. 14	04 A.M. BST
JAN. 15	10	51	45.5	62.89 N.	149.55 W.	89	...	...	...	...	G	JAN. 15	12 P.M. AST
JAN. 15	20	09	29.5	66.97 N.	146.41 W.	60	...	...	...	...	G	JAN. 15	10 A.M. AST
JAN. 16	07	13	31.0	52.50 N.	167.92 W.	44	5.5	5.2	...	...	G	JAN. 15	08 P.M. BST
JAN. 18	20	39	28.2	52.74 N.	168.12 W.	33N	4.6	...	...	...	G	JAN. 18	09 A.M. BST
JAN. 22	17	51	36.1	51.13 N.	175.18 E.	33N	5.4	4.5	...	...	G	JAN. 22	06 A.M. BST
JAN. 24	19	12	42.5	63.35 N.	151.18 W.	33N	...	...	3.1M	...	G	JAN. 24	09 A.M. AST
JAN. 25	02	49	03.5	63.32 N.	151.16 W.	33N	...	...	3.5M	III	G	JAN. 24	04 P.M. AST
JAN. 25	17	05	44.7	52.51 N.	176.04 W.	156	5.1	...	...	...	G	JAN. 25	06 A.M. BST
JAN. 25	19	30	06.1	60.13 N.	153.12 W.	105	5.5	...	...	IV	G	JAN. 25	09 A.M. AST
JAN. 25	20	54	04.2	58.60 N.	148.16 W.	33N	...	...	3.4M	...	G	JAN. 25	10 A.M. AST
JAN. 25	22	12	05.0	62.48 N.	151.61 W.	113	...	...	...	...	G	JAN. 25	12 M. AST
JAN. 26	02	17	40.0	63.57 N.	147.67 W.	15	...	...	3.2M	...	G	JAN. 25	04 P.M. AST
JAN. 26	08	25	40.6	59.77 N.	150.80 W.	58	...	...	...	...	G	JAN. 25	10 P.M. AST
JAN. 27	00	35	59.3	61.96 N.	152.53 W.	33N	...	...	3.4M	...	G	JAN. 26	02 P.M. AST
JAN. 27	03	56	57.2	53.75 N.	165.49 W.	33N	4.4	...	...	...	G	JAN. 26	04 P.M. BST
JAN. 27	16	48	11.5	60.96 N.	149.38 W.	49	3.6	...	3.2M	IV	G	JAN. 27	06 A.M. AST
JAN. 27	18	57	55.0	54.77 N.	161.25 W.	17	6.0	6.0	...	V	G	JAN. 27	07 A.M. BST
JAN. 30	21	44	10.2	63.05 N.	150.92 W.	147	...	...	...	...	G	JAN. 30	11 A.M. AST
JAN. 31	01	21	33.9	53.59 N.	163.87 W.	36	4.7	...	...	...	G	JAN. 30	02 P.M. BST
JAN. 31	03	07	32.0	51.72 N.	175.81 W.	64	5.0	...	...	III	G	JAN. 30	04 P.M. BST
JAN. 31	16	37	57.9	51.76 N.	175.67 E.	42	4.8	3.9	...	...	G	JAN. 31	05 A.M. BST
JAN. 31	17	01	40.5	61.15 N.	151.43 W.	97	...	...	...	...	G	JAN. 31	07 A.M. AST
FEB. 1	04	29	57.1	51.88 N.	178.42 E.	110	...	...	...	...	G	JAN. 31	05 P.M. BST
FEB. 1	12	29	05.4	60.24 N.	152.84 W.	109	4.8	...	...	IV	G	FEB. 1	02 A.M. AST
FEB. 1	12	49	55.0	59.99 N.	152.19 W.	93	...	...	...	...	G	FEB. 1	02 A.M. AST
FEB. 4	06	34	39.7	51.27 N.	179.19 W.	33N	4.4	...	...	...	G	FEB. 3	07 P.M. BST
FEB. 4	07	56	24.2	51.15 N.	179.12 W.	33N	5.0	4.7	...	...	G	FEB. 3	08 P.M. BST
FEB. 4	20	26	56.6	53.59 N.	167.08 W.	33N	4.1	...	...	...	G	FEB. 4	09 A.M. BST
FEB. 4	22	05	46.0	62.07 N.	150.16 W.	33N	3.7	...	3.8M	...	G	FEB. 4	12 M. AST
FEB. 6	21	02	11.0	64.52 N.	149.90 W.	33N	...	...	3.6M	...	G	FEB. 6	11 A.M. AST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
ALASKA--Continued													
FEB. 6	22	21	54.7	56.69 N.	155.12 W.	100	...	...	...	...	G	FEB. 6	12 M. AST
FEB. 6	22	52	00.6	60.72 N.	151.77 W.	87	...	...	...	FELT	G	FEB. 6	12 M. AST
FEB. 7	13	33	29.1	61.03 N.	150.15 W.	32	...	...	3.0M	FELT	G	FEB. 7	03 A.M. AST
FEB. 8	19	24	10.3	52.18 N.	179.03 W.	156	5.0	...	...	...	G	FEB. 8	08 A.M. BST
FEB. 9	00	15	51.5	63.03 N.	150.01 W.	104	...	...	...	...	G	FEB. 8	02 P.M. AST
FEB. 9	14	13	56.2	62.06 N.	151.26 W.	107	3.5	...	...	...	G	FEB. 9	04 A.M. AST
FEB. 9	18	49	25.1	60.06 N.	152.59 W.	88	4.8	...	...	FELT	G	FEB. 9	08 A.M. AST
FEB. 10	05	36	01.2	59.79 N.	153.36 W.	133	...	...	...	...	G	FEB. 9	07 P.M. AST
FEB. 12	00	53	48.1	51.72 N.	173.94 W.	33N	4.4	...	...	...	G	FEB. 11	01 P.M. BST
FEB. 12	05	11	08.2	51.15 N.	179.00 W.	59	4.7	...	...	...	G	FEB. 11	06 P.M. BST
FEB. 12	15	44	30.0	55.50 N.	157.20 W.	33N	5.1	4.9	...	...	G	FEB. 12	05 A.M. AST
FEB. 12	23	30	34.3	51.43 N.	178.86 E.	66	4.8	...	...	...	G	FEB. 12	12 M. BST
FEB. 13	05	02	22.6	63.66 N.	157.61 W.	33N	...	...	...	...	G	FEB. 12	07 P.M. AST
FEB. 13	05	34	25.9	55.45 N.	157.16 W.	33N	5.9	6.7	...	IV	G	FEB. 12	07 P.M. AST
FEB. 13	06	24	00.8	55.56 N.	156.84 W.	33N	4.4	...	3.9M	...	G	FEB. 12	08 P.M. AST
FEB. 13	10	39	39.7	55.69 N.	156.84 W.	33N	4.8	...	4.7M	...	G	FEB. 13	12 P.M. AST
FEB. 13	11	32	12.0	55.69 N.	156.92 W.	33N	4.5	...	3.7M	...	G	FEB. 13	01 A.M. AST
FEB. 13	11	35	58.7	55.42 N.	157.05 W.	33N	5.0	...	4.6M	...	G	FEB. 13	01 A.M. AST
FEB. 13	20	13	54.6	55.47 N.	156.98 W.	33N	4.3	...	3.5M	...	G	FEB. 13	10 A.M. AST
FEB. 13	22	02	50.2	55.46 N.	156.87 W.	33N	4.4	...	4.8M	...	G	FEB. 13	12 M. AST
FEB. 14	04	50	37.9	55.44 N.	156.89 W.	33N	4.4	...	...	...	G	FEB. 13	06 P.M. AST
FEB. 17	02	17	04.1	55.52 N.	157.02 W.	33N	4.5	...	4.4M	...	G	FEB. 16	04 P.M. AST
FEB. 17	08	01	24.6	62.80 N.	148.28 W.	95	...	...	...	II	G	FEB. 16	10 P.M. AST
FEB. 17	10	48	08.7	62.31 N.	149.50 W.	54	4.9	...	...	IV	G	FEB. 17	12 P.M. AST
FEB. 18	00	03	20.9	62.96 N.	149.33 W.	82	...	...	...	...	G	FEB. 17	02 P.M. AST
FEB. 18	11	14	16.2	55.18 N.	160.57 W.	57	4.6	...	...	...	G	FEB. 18	01 A.M. AST
FEB. 20	11	39	38.1	61.73 N.	150.82 W.	33N	3.3	...	3.0M	...	G	FEB. 20	01 A.M. AST
FEB. 21	09	11	11.6	60.13 N.	152.76 W.	118	...	...	...	...	G	FEB. 20	11 P.M. AST
FEB. 22	10	37	15.7	63.20 N.	150.24 W.	129	...	...	...	...	G	FEB. 22	12 P.M. AST
FEB. 23	09	42	03.6	64.98 N.	147.85 W.	24	4.3	...	4.2M	V	G	FEB. 22	11 P.M. AST
FEB. 25	06	29	14.9	58.73 N.	149.86 W.	33N	...	...	3.8M	...	G	FEB. 24	08 P.M. AST
FEB. 27	14	42	45.2	62.29 N.	149.81 W.	34	...	...	2.7M	FELT	G	FEB. 27	04 A.M. AST
FEB. 27	17	12	42.4	62.98 N.	150.48 W.	120	...	...	...	...	G	FEB. 27	07 A.M. AST
FEB. 27	23	58	44.4	53.64 N.	163.61 W.	33N	4.8	4.0	...	...	G	FEB. 27	12 M. BST
FEB. 28	02	47	10.4	52.94 N.	169.06 W.	79	4.5	...	...	FELT	G	FEB. 27	03 P.M. BST
FEB. 28	21	27	06.1	60.64 N.	141.59 W.	15	6.4	7.1	6.9M	VII	G	FEB. 28	11 A.M. AST
FEB. 28	21	30	17.4	60.40 N.	141.16 W.	18	...	...	4.8Z	...	Z	FEB. 28	11 A.M. AST
FEB. 28	21	31	39.7	60.21 N.	140.75 W.	12	...	...	4.8Z	...	Z	FEB. 28	12 M. YST
FEB. 28	21	31	54.2	60.47 N.	141.55 W.	13	...	...	5.0Z	...	Z	FEB. 28	11 A.M. AST
FEB. 28	21	36	34.0	60.28 N.	140.42 W.	13	...	...	4.0Z	...	Z	FEB. 28	12 M. YST
FEB. 28	21	36	55.6	60.32 N.	140.72 W.	10	...	...	4.2Z	...	Z	FEB. 28	12 M. YST
FEB. 28	21	37	31.1	60.65 N.	141.19 W.	19	...	...	3.8Z	...	Z	FEB. 28	11 A.M. AST
FEB. 28	21	38	58.1	60.30 N.	140.71 W.	5	...	...	4.7Z	...	Z	FEB. 28	12 M. YST
FEB. 28	21	39	55.0	60.32 N.	140.14 W.	9	...	...	4.6Z	...	Z	FEB. 28	12 M. YST
FEB. 28	21	51	55.7	60.32 N.	140.57 W.	13	...	...	4.3Z	...	Z	FEB. 28	12 M. YST
FEB. 28	22	04	08.1	60.32 N.	140.76 W.	17	...	...	4.2Z	...	Z	FEB. 28	01 P.M. YST
FEB. 28	22	10	26.9	60.21 N.	140.71 W.	16	...	...	3.5Z	...	Z	FEB. 28	01 P.M. YST
FEB. 28	22	14	16.5	60.33 N.	140.81 W.	9	...	...	4.1Z	...	Z	FEB. 28	01 P.M. YST
FEB. 28	22	17	51.7	60.26 N.	140.40 W.	16	...	...	4.4Z	...	Z	FEB. 28	01 P.M. YST
FEB. 28	22	30	36.1	60.02 N.	140.07 W.	12	...	...	3.7Z	...	Z	FEB. 28	01 P.M. YST
FEB. 28	22	50	47.8	60.05 N.	140.17 W.	8	...	...	3.4Z	...	Z	FEB. 28	01 P.M. YST
FEB. 28	23	05	12.1	60.23 N.	140.80 W.	12	3.9	...	3.6Z	...	Z	FEB. 28	02 P.M. YST
FEB. 28	23	12	31.4	60.37 N.	140.71 W.	14	3.9	...	3.6Z	...	Z	FEB. 28	02 P.M. YST
FEB. 28	23	14	42.3	60.23 N.	140.81 W.	12	...	...	3.6Z	...	Z	FEB. 28	02 P.M. YST
FEB. 28	23	26	51.3	60.33 N.	140.76 W.	14	...	...	3.9Z	...	Z	FEB. 28	02 P.M. YST
FEB. 28	23	32	41.6	60.35 N.	140.72 W.	13	...	...	3.8Z	...	Z	FEB. 28	02 P.M. YST
FEB. 28	23	54	43.3	60.07 N.	140.66 W.	19	3.9	...	3.8Z	...	Z	FEB. 28	02 P.M. YST
MAR. 1	00	01	51.1	60.00 N.	140.63 W.	8	...	...	3.5Z	...	Z	FEB. 28	03 P.M. YST
MAR. 1	00	09	43.0	60.27 N.	140.67 W.	2	4.1	...	3.9Z	...	Z	FEB. 28	03 P.M. YST
MAR. 1	00	27	27.1	60.25 N.	141.30 W.	15	...	...	3.9Z	...	Z	FEB. 28	02 P.M. AST
MAR. 1	00	45	33.2	60.31 N.	140.77 W.	10	...	...	3.6Z	...	Z	FEB. 28	03 P.M. YST
MAR. 1	00	47	55.2	60.22 N.	140.90 W.	16	...	...	3.8Z	...	Z	FEB. 28	03 P.M. YST
MAR. 1	00	55	25.0	60.30 N.	140.73 W.	10	...	...	3.5Z	...	Z	FEB. 28	03 P.M. YST
MAR. 1	01	01	05.8	60.23 N.	140.85 W.	17	4.3	...	4.0Z	...	Z	FEB. 28	04 P.M. YST
MAR. 1	01	13	11.8	60.13 N.	140.95 W.	5	...	...	3.4Z	...	Z	FEB. 28	03 P.M. AST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)		Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date		Hour
						ALASKA--Continued									
MAR.	1	01	30	24.4	60.03 N.	140.15 W.	9	...	...	3.4Z	...	Z	FEB.	28	04 P.M. YST
MAR.	1	01	37	47.9	60.28 N.	140.75 W.	12	4.4	...	4.4Z	...	Z	FEB.	28	04 P.M. YST
MAR.	1	02	27	23.1	60.25 N.	140.60 W.	2	...	...	3.2Z	...	Z	FEB.	28	05 P.M. YST
MAR.	1	02	48	44.6	60.27 N.	140.79 W.	13	4.6	...	4.2Z	...	Z	FEB.	28	05 P.M. YST
MAR.	1	03	13	53.9	60.44 N.	141.16 W.	7	3.5	...	3.7Z	...	Z	FEB.	28	05 P.M. AST
MAR.	1	03	25	37.7	60.36 N.	140.73 W.	5	...	...	3.6Z	...	Z	FEB.	28	06 P.M. YST
MAR.	1	03	55	08.1	60.31 N.	140.71 W.	10	3.4	...	3.4Z	...	Z	FEB.	28	06 P.M. YST
MAR.	1	04	06	37.9	60.02 N.	140.08 W.	12	...	...	3.7Z	...	Z	FEB.	28	07 P.M. YST
MAR.	1	04	33	58.3	60.25 N.	140.80 W.	15	4.1	...	3.8Z	...	Z	FEB.	28	07 P.M. YST
MAR.	1	04	38	51.9	60.28 N.	141.02 W.	11	...	...	3.2Z	...	Z	FEB.	28	06 P.M. AST
MAR.	1	05	12	55.0	60.08 N.	140.65 W.	10	...	...	3.5Z	...	Z	FEB.	28	08 P.M. YST
MAR.	1	05	53	03.7	60.07 N.	140.98 W.	2	...	...	3.3Z	...	Z	FEB.	28	07 P.M. AST
MAR.	1	06	50	09.9	60.06 N.	140.66 W.	8	4.0	...	3.7Z	...	Z	FEB.	28	09 P.M. YST
MAR.	1	07	08	53.7	60.63 N.	141.24 W.	11	5.4	4.7	4.9Z	FELT	Z	FEB.	28	09 P.M. AST
MAR.	1	07	59	59.9	60.22 N.	140.77 W.	14	...	...	3.6Z	...	Z	FEB.	28	10 P.M. YST
MAR.	1	08	05	05.9	60.26 N.	141.05 W.	12	...	...	3.4Z	...	Z	FEB.	28	10 P.M. AST
MAR.	1	08	11	47.2	60.15 N.	141.09 W.	4	...	...	3.9Z	...	Z	FEB.	28	10 P.M. AST
MAR.	1	08	21	35.6	60.60 N.	141.23 W.	12	...	...	3.3Z	...	Z	FEB.	28	10 P.M. AST
MAR.	1	08	29	23.3	60.20 N.	140.83 W.	14	3.4	...	3.5Z	...	Z	FEB.	28	11 P.M. YST
MAR.	1	08	46	02.3	60.28 N.	140.90 W.	8	3.2	...	3.3Z	...	Z	FEB.	28	11 P.M. YST
MAR.	1	11	04	14.9	60.10 N.	141.18 W.	4	3.4	...	3.4Z	...	Z	MAR.	1	01 A.M. AST
MAR.	1	12	12	22.7	60.29 N.	140.95 W.	8	3.3	...	3.2Z	...	Z	MAR.	1	03 A.M. YST
MAR.	1	12	18	05.0	60.09 N.	141.18 W.	4	3.0	...	3.1Z	...	Z	MAR.	1	02 A.M. AST
MAR.	1	13	49	29.0	60.23 N.	140.81 W.	12	3.2	...	3.4Z	...	Z	MAR.	1	04 A.M. YST
MAR.	1	15	56	26.0	60.26 N.	140.52 W.	12	4.0	...	4.1Z	...	Z	MAR.	1	06 A.M. YST
MAR.	1	16	43	00.4	60.25 N.	140.88 W.	13	3.1	...	3.2Z	...	Z	MAR.	1	07 A.M. YST
MAR.	1	17	48	24.5	60.03 N.	140.58 W.	6	4.1	...	4.0Z	...	Z	MAR.	1	08 A.M. YST
MAR.	2	07	26	49.6	60.23 N.	140.59 W.	13	...	...	3.0Z	...	Z	MAR.	1	10 P.M. YST
MAR.	2	08	42	29.0	63.64 N.	151.48 W.	33N	...	...	3.0M	...	G	MAR.	1	10 P.M. AST
MAR.	2	08	59	37.3	59.97 N.	140.13 W.	11	3.4	...	3.7Z	...	Z	MAR.	1	11 P.M. YST
MAR.	2	09	12	57.3	60.25 N.	140.76 W.	1	...	...	3.1Z	...	Z	MAR.	2	12 P.M. YST
MAR.	2	09	34	45.4	60.38 N.	140.69 W.	1	5.4	...	5.0Z	FELT	Z	MAR.	2	12 P.M. YST
MAR.	2	10	00	10.4	60.24 N.	140.80 W.	10	3.1	...	3.6Z	...	Z	MAR.	2	01 A.M. YST
MAR.	2	12	55	32.0	59.97 N.	140.14 W.	11	4.3	...	4.3Z	...	Z	MAR.	2	03 A.M. YST
MAR.	2	15	07	07.0	59.93 N.	140.93 W.	7	...	...	3.1Z	...	Z	MAR.	2	06 A.M. YST
MAR.	2	16	26	20.4	60.65 N.	141.26 W.	6	...	...	3.4Z	...	Z	MAR.	2	06 A.M. AST
MAR.	2	18	48	16.0	60.12 N.	140.94 W.	12	...	...	3.8Z	...	Z	MAR.	2	02 A.M. YST
MAR.	2	21	57	54.8	60.26 N.	140.41 W.	15	3.1	...	3.5Z	...	Z	MAR.	2	12 M. YST
MAR.	3	15	49	22.7	60.27 N.	140.67 W.	1	...	...	3.5Z	...	Z	MAR.	3	06 A.M. YST
MAR.	3	17	18	39.5	60.24 N.	140.81 W.	13	3.3	...	3.4Z	...	Z	MAR.	3	08 A.M. YST
MAR.	3	17	23	11.0	60.38 N.	140.72 W.	2	3.7	...	3.6Z	...	Z	MAR.	3	08 A.M. YST
MAR.	4	02	44	10.8	60.26 N.	141.00 W.	16	...	...	3.4Z	...	Z	MAR.	3	04 P.M. AST
MAR.	4	05	50	08.4	60.07 N.	140.71 W.	8	...	...	3.0Z	...	Z	MAR.	3	08 P.M. YST
MAR.	4	11	00	30.7	60.23 N.	140.76 W.	8	...	...	3.2Z	...	Z	MAR.	4	02 A.M. YST
MAR.	4	13	52	21.7	60.24 N.	140.69 W.	14	3.8	...	3.7Z	...	Z	MAR.	4	04 A.M. YST
MAR.	4	16	43	40.0	60.24 N.	140.73 W.	4	...	...	3.1Z	...	Z	MAR.	4	07 A.M. YST
MAR.	4	21	31	13.8	60.35 N.	140.77 W.	18	3.7	...	3.5Z	...	Z	MAR.	4	12 M. YST
MAR.	5	03	23	37.6	60.33 N.	140.71 W.	11	4.2	...	4.0Z	...	Z	MAR.	4	06 P.M. YST
MAR.	5	17	14	00.0	60.29 N.	140.66 W.	1	...	...	3.0Z	...	Z	MAR.	5	08 A.M. YST
MAR.	5	17	40	02.7	60.30 N.	140.92 W.	8	...	...	3.3Z	...	Z	MAR.	5	08 A.M. YST
MAR.	5	22	20	39.7	60.41 N.	153.06 W.	169	...	...	...	...	G	MAR.	5	12 M. AST
MAR.	6	09	34	05.4	60.28 N.	140.79 W.	9	4.1	...	4.0Z	...	Z	MAR.	6	12 P.M. YST
MAR.	6	09	56	03.2	60.27 N.	140.77 W.	10	4.1	...	3.9Z	...	Z	MAR.	6	12 P.M. YST
MAR.	6	10	39	34.8	60.28 N.	140.79 W.	7	...	...	3.0Z	...	Z	MAR.	6	01 A.M. YST
MAR.	6	16	01	00.3	60.27 N.	140.89 W.	10	3.1	...	3.3Z	...	Z	MAR.	6	07 A.M. YST
MAR.	6	16	05	00.5	60.26 N.	140.89 W.	12	...	...	3.0Z	...	Z	MAR.	6	07 A.M. YST
MAR.	7	05	01	55.2	60.27 N.	140.88 W.	10	...	...	3.1Z	...	Z	MAR.	6	08 P.M. YST
MAR.	7	08	23	59.6	60.26 N.	140.97 W.	12	...	...	3.5Z	...	Z	MAR.	6	11 P.M. YST
MAR.	7	12	10	35.2	59.72 N.	153.11 W.	121	4.3	...	...	...	G	MAR.	7	02 A.M. AST
MAR.	7	15	12	44.1	60.07 N.	140.71 W.	10	...	...	2.9Z	...	Z	MAR.	7	06 A.M. YST
MAR.	8	00	28	01.9	50.68 N.	174.89 E.	33N	4.3	...	...	...	G	MAR.	7	01 P.M. BST
MAR.	8	00	58	29.8	62.14 N.	149.56 W.	33N	...	...	...	...	G	MAR.	7	02 P.M. AST
MAR.	8	09	04	14.8	60.65 N.	141.23 W.	12	...	...	3.1Z	...	Z	MAR.	7	11 P.M. AST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
ALASKA--Continued													
MAR. 8	09	39	04.0	60.30 N.	140.96 W.	9	...	...	3.5Z	...	Z	MAR. 8	12 P.M. YST
MAR. 8	16	07	06.8	60.30 N.	140.84 W.	8	...	...	3.1Z	...	Z	MAR. 8	07 A.M. YST
MAR. 8	21	53	05.0	58.01 N.	055.00 W.	33N	...	...	3.3M	...	G	MAR. 8	11 A.M. AST
MAR. 9	01	29	49.5	59.84 N.	141.41 W.	0	...	...	3.1Z	...	Z	MAR. 8	03 P.M. AST
MAR. 9	04	55	39.6	60.31 N.	140.94 W.	7	3.8	...	3.2Z	...	Z	MAR. 8	07 P.M. YST
MAR. 9	20	21	08.9	60.31 N.	140.83 W.	6	...	...	2.9Z	...	Z	MAR. 9	11 A.M. YST
MAR. 9	22	40	49.9	62.95 N.	150.70 W.	112	...	...	...	...	G	MAR. 9	12 M. AST
MAR. 6	14	42	50.8	60.38 N.	140.99 W.	0	3.8	...	3.4Z	...	Z	MAR. 16	05 A.M. YST
MAR. 10	03	26	03.8	60.20 N.	141.01 W.	13	...	...	3.3Z	...	Z	MAR. 9	05 P.M. AST
MAR. 10	05	45	15.5	60.26 N.	140.91 W.	16	...	...	3.3Z	...	Z	MAR. 9	08 P.M. YST
MAR. 10	09	16	52.0	59.90 N.	141.28 W.	5	3.9	...	3.8Z	...	Z	MAR. 9	11 P.M. AST
MAR. 10	10	17	17.2	51.64 N.	173.32 W.	33N	4.8	4.5	...	...	G	MAR. 9	11 P.M. BST
MAR. 10	11	07	16.8	51.59 N.	173.27 W.	33N	5.0	4.9	...	...	G	MAR. 10	12 P.M. BST
MAR. 10	17	22	39.6	60.28 N.	141.26 W.	13	...	...	3.3Z	...	Z	MAR. 10	07 A.M. AST
MAR. 10	20	47	29.9	60.27 N.	140.99 W.	12	...	...	3.4Z	...	Z	MAR. 10	11 A.M. YST
MAR. 11	00	12	29.3	59.98 N.	140.87 W.	8	...	...	3.1Z	...	Z	MAR. 10	03 P.M. YST
MAR. 11	03	51	09.7	60.25 N.	140.93 W.	13	...	...	3.0Z	...	Z	MAR. 10	06 P.M. YST
MAR. 11	07	30	06.1	60.34 N.	140.83 W.	0	3.8	...	3.7Z	...	Z	MAR. 10	10 P.M. YST
MAR. 11	11	50	03.6	60.24 N.	140.83 W.	14	4.2	...	4.2Z	...	Z	MAR. 11	02 A.M. YST
MAR. 11	12	13	13.9	60.08 N.	140.67 W.	11	...	...	2.9Z	...	Z	MAR. 11	03 A.M. YST
MAR. 11	14	47	31.3	60.27 N.	141.06 W.	11	...	...	3.1Z	...	Z	MAR. 11	04 A.M. AST
MAR. 11	16	02	38.7	59.93 N.	140.99 W.	11	...	...	3.3Z	...	Z	MAR. 11	07 A.M. YST
MAR. 11	18	18	35.8	58.15 N.	154.90 W.	33N	...	...	3.1M	...	G	MAR. 11	08 A.M. AST
MAR. 12	03	52	46.6	60.39 N.	141.02 W.	2	...	...	3.0Z	...	Z	MAR. 11	05 P.M. AST
MAR. 12	10	15	36.3	60.10 N.	141.20 W.	5	3.8	...	3.9Z	...	Z	MAR. 12	12 P.M. AST
MAR. 12	15	04	15.8	52.32 N.	172.02 W.	33N	4.4	...	...	...	G	MAR. 12	04 A.M. BST
MAR. 13	07	35	09.3	59.98 N.	140.91 W.	7	3.4	...	3.7Z	...	Z	MAR. 12	10 P.M. YST
MAR. 13	10	09	15.0	60.26 N.	140.67 W.	4	...	...	3.9Z	...	Z	MAR. 13	01 A.M. YST
MAR. 13	11	21	14.2	62.87 N.	150.88 W.	33N	...	...	3.1M	...	G	MAR. 13	01 A.M. AST
MAR. 13	13	31	42.5	60.00 N.	140.75 W.	8	...	...	3.5Z	...	Z	MAR. 13	04 A.M. YST
MAR. 14	07	56	31.4	59.79 N.	151.92 W.	87	3.4	...	...	FELT	G	MAR. 13	09 P.M. AST
MAR. 14	11	05	39.4	65.14 N.	154.14 W.	33N	...	...	...	...	G	MAR. 14	01 A.M. AST
MAR. 14	13	31	34.5	60.98 N.	149.39 W.	41	4.0	...	3.8M	IV	G	MAR. 14	03 A.M. AST
MAR. 15	05	31	09.6	60.23 N.	140.84 W.	17	...	...	3.5Z	...	Z	MAR. 14	08 P.M. YST
MAR. 15	07	50	21.8	60.03 N.	141.34 W.	5	4.0	...	4.4Z	...	Z	MAR. 14	09 P.M. AST
MAR. 15	09	46	52.6	60.56 N.	141.28 W.	11	3.1	...	2.8Z	...	Z	MAR. 14	11 P.M. AST
MAR. 15	23	15	41.3	59.96 N.	140.73 W.	10	...	...	3.2Z	...	Z	MAR. 15	02 P.M. YST
MAR. 16	00	22	03.6	60.28 N.	140.97 W.	14	...	...	3.4Z	...	Z	MAR. 15	03 P.M. YST
MAR. 16	02	47	08.2	61.28 N.	144.77 W.	15	...	...	3.2M	...	G	MAR. 15	04 P.M. AST
MAR. 16	10	41	49.0	60.27 N.	141.01 W.	10	3.8	...	4.0Z	...	Z	MAR. 16	12 P.M. AST
MAR. 16	12	42	22.0	60.27 N.	140.73 W.	6	...	...	3.2Z	...	Z	MAR. 16	03 A.M. YST
MAR. 17	14	10	05.9	60.29 N.	140.95 W.	8	...	...	2.7Z	...	Z	MAR. 17	05 A.M. YST
MAR. 17	21	10	37.7	63.09 N.	148.56 W.	104	5.4	...	...	...	G	MAR. 17	11 A.M. AST
MAR. 17	22	48	02.9	51.64 N.	176.57 E.	20	4.3	3.6	...	...	G	MAR. 17	11 A.M. BST
MAR. 18	05	11	53.9	51.82 N.	175.33 W.	57	4.8	...	...	...	G	MAR. 17	06 P.M. BST
MAR. 18	05	55	37.7	60.22 N.	141.03 W.	13	...	...	3.2Z	...	Z	MAR. 17	07 P.M. AST
MAR. 18	09	49	14.4	59.41 N.	152.86 W.	33N	...	...	3.3M	...	G	MAR. 17	11 P.M. AST
MAR. 18	11	41	57.2	60.07 N.	151.59 W.	83	3.7	...	...	...	G	MAR. 18	01 A.M. AST
MAR. 18	13	26	18.2	60.32 N.	147.12 W.	33N	3.6	...	3.5M	...	G	MAR. 18	03 A.M. AST
MAR. 18	14	00	53.5	59.84 N.	146.88 W.	33N	...	...	3.2M	...	G	MAR. 18	04 A.M. AST
MAR. 18	22	43	08.8	59.96 N.	152.89 W.	120	...	...	...	...	G	MAR. 18	12 M. AST
MAR. 19	07	56	49.4	60.03 N.	141.31 W.	4	...	...	2.7Z	...	Z	MAR. 18	09 P.M. AST
MAR. 20	02	04	09.9	50.67 N.	173.22 W.	33N	4.3	...	3.5M	...	G	MAR. 19	03 P.M. BST
MAR. 20	08	02	16.7	52.04 N.	173.58 W.	33N	4.6	...	3.4M	...	G	MAR. 19	09 P.M. BST
MAR. 20	21	20	22.8	61.17 N.	150.61 W.	92	3.7	...	...	...	G	MAR. 20	11 A.M. AST
MAR. 20	22	04	25.3	60.00 N.	141.11 W.	3	3.4	...	3.4Z	...	Z	MAR. 20	12 M. AST
MAR. 21	03	29	55.2	60.02 N.	140.65 W.	3	...	...	3.2Z	...	Z	MAR. 20	06 P.M. YST
MAR. 21	05	51	50.7	50.62 N.	173.21 W.	33N	4.4	...	3.8M	...	G	MAR. 20	06 P.M. BST
MAR. 21	16	06	51.8	60.00 N.	141.11 W.	5	...	...	2.9Z	...	Z	MAR. 21	06 A.M. AST
MAR. 21	20	11	33.4	54.37 N.	163.85 W.	33N	4.4	...	...	...	G	MAR. 21	09 A.M. BST
MAR. 21	22	38	48.7	60.02 N.	152.58 W.	96	...	...	...	...	G	MAR. 21	12 M. AST
MAR. 22	12	02	24.7	53.48 N.	163.53 W.	33N	4.5	...	3.8M	...	G	MAR. 22	01 A.M. BST
MAR. 22	12	16	09.2	60.30 N.	140.96 W.	8	3.9	...	4.0Z	...	Z	MAR. 22	03 A.M. YST
MAR. 22	15	05	31.7	60.10 N.	140.74 W.	7	...	...	3.3Z	...	Z	MAR. 22	06 A.M. YST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
ALASKA--Continued													
MAR. 22	18	08	12.6	54.45 N.	157.52 W.	33N	4.5	...	3.8M	...	G	MAR. 22	08 A.M. AST
MAR. 22	18	36	07.8	61.86 N.	152.10 W.	136	3.7	...	...	...	G	MAR. 22	08 A.M. AST
MAR. 22	19	49	11.0	62.18 N.	150.75 W.	87	...	...	...	...	G	MAR. 22	09 A.M. AST
MAR. 23	02	31	11.5	65.46 N.	149.92 W.	33N	...	...	3.0M	...	G	MAR. 22	04 P.M. AST
MAR. 23	21	50	11.8	67.01 N.	154.45 W.	21	...	...	3.8M	...	G	MAR. 23	11 A.M. AST
MAR. 24	17	11	23.9	61.73 N.	151.65 W.	117	...	...	...	...	G	MAR. 24	07 A.M. AST
MAR. 24	18	37	41.8	61.53 N.	149.93 W.	52	...	...	...	FELT	G	MAR. 24	08 A.M. AST
MAR. 25	03	55	49.1	60.63 N.	141.71 W.	12	...	...	2.9Z	...	Z	MAR. 24	05 P.M. AST
MAR. 25	09	03	07.2	60.02 N.	141.31 W.	6	...	...	2.8Z	...	Z	MAR. 24	11 P.M. AST
MAR. 25	13	15	51.1	60.11 N.	141.18 W.	0	...	...	2.7Z	...	Z	MAR. 25	03 A.M. AST
MAR. 26	02	45	24.0	60.25 N.	140.77 W.	10	3.8	...	3.8Z	...	Z	MAR. 25	05 P.M. YST
MAR. 26	03	07	49.3	65.28 N.	150.24 W.	33N	...	...	3.0M	...	G	MAR. 25	05 P.M. AST
MAR. 27	11	39	09.0	51.82 N.	175.33 W.	43	5.0	4.4	...	IV	G	MAR. 27	12 P.M. BST
MAR. 27	18	16	10.7	60.31 N.	140.94 W.	5	...	...	3.0Z	...	Z	MAR. 27	09 A.M. YST
MAR. 27	18	38	42.2	60.49 N.	148.98 W.	26	...	...	2.9M	FELT	G	MAR. 27	08 A.M. AST
MAR. 28	01	32	17.3	60.23 N.	140.80 W.	12	...	...	3.6Z	...	Z	MAR. 27	04 P.M. YST
MAR. 28	18	50	39.1	59.99 N.	141.16 W.	6	3.0	...	3.5Z	...	Z	MAR. 28	08 A.M. AST
MAR. 29	01	05	38.7	58.78 N.	153.14 W.	33N	...	...	2.9M	...	G	MAR. 28	03 P.M. AST
MAR. 29	03	20	14.7	60.59 N.	141.29 W.	10	3.7	...	3.5Z	...	Z	MAR. 28	05 P.M. AST
MAR. 29	20	52	03.2	60.25 N.	140.90 W.	10	...	...	2.9Z	...	Z	MAR. 29	11 A.M. YST
MAR. 30	00	58	27.4	62.78 N.	151.77 W.	33N	...	...	...	...	G	MAR. 29	02 P.M. AST
MAR. 30	04	07	00.2	63.02 N.	150.97 W.	143	...	...	...	...	G	MAR. 29	06 P.M. AST
MAR. 30	08	28	18.4	60.29 N.	140.98 W.	8	3.4	...	3.6Z	...	Z	MAR. 29	11 P.M. YST
MAR. 30	12	56	08.8	59.95 N.	140.67 W.	13	...	...	2.9Z	...	Z	MAR. 30	03 A.M. YST
MAR. 30	18	55	55.8	53.26 N.	166.75 W.	37	4.8	4.0	...	...	G	MAR. 30	07 A.M. BST
MAR. 31	14	25	06.5	58.82 N.	152.94 W.	93	4.4	...	...	...	G	MAR. 31	04 A.M. AST
APR. 1	14	16	56.5	59.95 N.	140.40 W.	15	...	...	3.2M	...	G	APR. 1	05 A.M. YST
APR. 2	02	00	56.3	61.62 N.	150.99 W.	74	...	...	...	...	G	APR. 1	04 P.M. AST
APR. 2	02	15	31.4	64.81 N.	147.43 W.	10	...	...	3.1M	FELT	G	APR. 1	04 P.M. AST
APR. 2	16	04	58.9	61.58 N.	146.78 W.	33N	...	...	3.0M	...	G	APR. 2	06 A.M. AST
APR. 3	11	35	49.4	59.77 N.	140.92 W.	15	...	...	3.1M	...	G	APR. 3	02 A.M. YST
APR. 3	16	13	26.7	59.86 N.	140.87 W.	15	...	...	3.9M	...	G	APR. 3	07 A.M. YST
APR. 3	20	08	30.4	65.40 N.	151.05 W.	33N	...	...	3.4M	...	G	APR. 3	10 A.M. AST
APR. 4	02	34	25.2	60.38 N.	153.36 W.	166	4.3	...	...	...	G	APR. 3	04 P.M. AST
APR. 4	04	51	35.8	60.43 N.	151.95 W.	101	...	...	...	...	G	APR. 3	06 P.M. AST
APR. 4	08	16	15.3	60.32 N.	153.59 W.	174	4.5	...	...	FELT	G	APR. 3	10 P.M. AST
APR. 4	15	51	30.9	51.40 N.	178.07 E.	42	5.1	4.6	...	...	G	APR. 4	04 A.M. BST
APR. 5	17	49	15.8	59.97 N.	141.25 W.	15	...	...	3.5M	...	G	APR. 5	07 A.M. AST
APR. 5	23	07	6.2	59.97 N.	140.09 W.	18	4.0	...	4.2M	...	G	APR. 5	02 P.M. YST
APR. 6	09	18	59.4	59.00 N.	153.93 W.	139	...	...	...	...	G	APR. 5	11 P.M. AST
APR. 8	03	13	24.1	58.36 N.	152.86 W.	33N	4.3	...	3.4M	...	G	APR. 7	05 P.M. AST
APR. 10	08	30	42.8	62.24 N.	149.23 W.	33N	3.3	...	3.2M	...	G	APR. 9	10 P.M. AST
APR. 10	21	41	4.5	53.68 N.	163.00 W.	17	4.0	...	4.5M	...	G	APR. 10	10 A.M. BST
APR. 11	01	42	44.3	60.17 N.	140.63 W.	15	3.9	...	4.0M	...	G	APR. 10	04 P.M. YST
APR. 11	11	15	46.1	59.83 N.	140.35 W.	15	4.0	...	3.3M	...	G	APR. 11	02 A.M. YST
APR. 11	12	46	34.9	60.07 N.	141.22 W.	15	2.9	...	3.1M	...	G	APR. 11	02 A.M. AST
APR. 11	15	33	2.3	54.49 N.	160.81 W.	33N	4.7	...	4.3M	...	G	APR. 11	05 A.M. AST
APR. 11	20	48	57.5	59.75 N.	152.17 W.	89	...	...	...	...	G	APR. 11	10 A.M. AST
APR. 13	01	07	56.5	61.60 N.	152.18 W.	137	...	...	...	...	G	APR. 12	03 P.M. AST
APR. 13	13	26	25.8	60.05 N.	141.21 W.	15	...	...	...	...	G	APR. 13	03 A.M. AST
APR. 14	08	46	7.6	55.71 N.	158.55 W.	47	4.7	...	...	...	G	APR. 13	10 P.M. AST
APR. 14	13	04	52.5	54.15 N.	163.25 W.	55	4.7	...	...	...	G	APR. 14	02 A.M. BST
APR. 15	10	27	52.8	63.11 N.	150.94 W.	147	...	...	...	...	G	APR. 15	12 P.M. AST
APR. 16	08	33	46.6	52.33 N.	170.10 W.	39	4.6	...	...	...	G	APR. 15	09 P.M. BST
APR. 16	11	10	36.8	59.18 N.	154.07 W.	156	4.1	...	...	...	G	APR. 16	01 A.M. AST
APR. 16	13	08	46.4	60.26 N.	141.08 W.	15	3.2	...	...	...	G	APR. 16	03 A.M. AST
APR. 16	20	56	22.4	51.45 N.	179.17 W.	50	4.6	4.2	...	...	G	APR. 16	09 A.M. BST
APR. 17	00	09	1.5	60.10 N.	141.04 W.	15	...	...	3.5M	...	G	APR. 16	02 P.M. AST
APR. 17	02	59	20.3	61.68 N.	150.12 W.	33N	...	...	2.7M	II	G	APR. 16	04 P.M. AST
APR. 18	05	20	4.4	51.67 N.	173.90 W.	49	4.9	4.2	...	...	G	APR. 17	06 P.M. BST
APR. 18	13	21	4.7	51.24 N.	170.75 W.	33N	5.1	4.1	...	...	G	APR. 18	02 A.M. BST
APR. 18	15	14	8.2	51.45 N.	170.62 W.	33N	...	...	...	...	G	APR. 18	04 A.M. BST
APR. 18	17	06	19.5	62.16 N.	149.52 W.	79	...	...	...	II	G	APR. 18	07 A.M. AST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
ALASKA--Continued													
APR. 19	05	07	9.7	59.90 N.	141.05 W.	15	...	...	3.2M	...	G	APR. 18	07 P.M. AST
APR. 19	23	03	45.3	60.30 N.	140.86 W.	15	3.9	...	3.0M	...	G	APR. 19	02 P.M. YST
APR. 20	03	31	49.9	63.20 N.	150.74 W.	147	...	...	...	...	G	APR. 19	05 P.M. AST
APR. 20	08	42	30.7	59.32 N.	152.36 W.	85	4.4	...	...	...	G	APR. 19	10 P.M. AST
APR. 20	12	49	6.9	60.32 N.	140.87 W.	15	5.3	4.9	5.0Z	IV	G	APR. 20	03 A.M. YST
APR. 20	21	58	37.9	60.30 N.	140.75 W.	15	4.4	...	4.4M	...	G	APR. 20	12 M. YST
APR. 20	23	06	50.9	60.41 N.	140.82 W.	15	...	...	3.6M	...	G	APR. 20	02 P.M. YST
APR. 21	03	23	46.4	63.24 N.	149.53 W.	107	...	...	...	...	G	APR. 20	05 P.M. AST
APR. 21	12	36	53.9	60.31 N.	140.77 W.	15	4.0	...	4.3M	...	G	APR. 21	03 A.M. YST
APR. 21	13	23	12.4	52.34 N.	169.51 W.	36	4.8	4.5	...	...	G	APR. 21	02 A.M. BST
APR. 21	15	08	3.9	63.57 N.	147.30 W.	10	4.1	...	3.5M	...	G	APR. 21	05 A.M. AST
APR. 21	21	19	33.8	59.91 N.	153.36 W.	168	...	...	...	...	G	APR. 21	11 A.M. AST
APR. 22	09	24	56.7	61.68 N.	149.98 W.	52	...	...	...	...	G	APR. 21	11 P.M. AST
APR. 22	14	04	35.1	59.96 N.	141.28 W.	15	4.2	3.6	4.0M	...	G	APR. 22	04 A.M. AST
APR. 22	16	11	38.2	60.23 N.	140.63 W.	15	3.0	...	3.2M	...	G	APR. 22	07 A.M. YST
APR. 22	17	05	6.1	58.58 N.	152.44 W.	33N	3.7	...	3.3M	...	G	APR. 22	07 A.M. AST
APR. 23	05	20	30.5	63.63 N.	150.72 W.	33N	...	...	3.3M	...	G	APR. 22	07 P.M. AST
APR. 23	13	45	12.5	63.66 N.	150.72 W.	33N	...	...	3.3M	...	G	APR. 23	03 A.M. AST
APR. 24	13	57	48.9	60.23 N.	141.27 W.	15	...	...	...	...	G	APR. 24	03 A.M. AST
APR. 24	20	14	6.3	62.09 N.	148.12 W.	33N	...	...	3.2M	...	G	APR. 24	10 A.M. AST
APR. 24	23	32	21.1	50.02 N.	177.48 E.	33N	4.4	...	...	...	G	APR. 24	12 M. BST
APR. 25	00	27	57.6	63.35 N.	149.50 W.	119	3.9	...	...	FELT	G	APR. 24	02 P.M. AST
APR. 25	09	39	0.0	64.88 N.	148.83 W.	11	...	...	3.3M	III	G	APR. 24	11 P.M. AST
APR. 26	12	34	7.5	59.97 N.	149.42 W.	36	3.2	...	3.0M	...	G	APR. 26	02 A.M. AST
APR. 27	08	28	59.7	52.82 N.	171.65 E.	33N	4.2	...	...	...	G	APR. 26	09 P.M. BST
APR. 28	07	33	6.0	64.61 N.	149.46 W.	28	...	...	3.0M	FELT	G	APR. 27	09 P.M. AST
APR. 28	16	20	48.5	65.80 N.	148.50 W.	33N	...	...	3.1M	...	G	APR. 28	06 A.M. AST
APR. 29	07	08	28.7	60.01 N.	141.21 W.	15	3.6	...	4.0M	...	G	APR. 28	09 P.M. AST
APR. 30	20	46	21.6	63.95 N.	147.25 W.	10	...	...	3.3M	...	G	APR. 30	10 A.M. AST
MAY 1	01	48	31.2	61.55 N.	150.24 W.	33N	...	...	3.0M	...	G	APR. 30	03 P.M. AST
MAY 2	13	40	45.1	60.31 N.	140.89 W.	15	3.5	...	4.3M	...	G	MAY 2	04 A.M. YST
MAY 4	11	37	58.7	59.21 N.	146.25 W.	25	3.2	...	3.1M	...	G	MAY 4	01 A.M. AST
MAY 4	13	36	12.8	51.35 N.	179.73 W.	53	4.8	...	...	...	G	MAY 4	02 A.M. BST
MAY 4	19	16	54.6	60.30 N.	141.00 W.	15	3.1	...	3.8M	...	G	MAY 4	10 A.M. YST
MAY 5	06	50	38.8	62.97 N.	148.23 W.	77	4.6	...	...	FELT	G	MAY 4	08 P.M. AST
MAY 5	16	13	35.2	63.14 N.	150.88 W.	147	...	...	...	...	G	MAY 5	06 A.M. AST
MAY 5	16	54	20.5	59.88 N.	141.38 W.	15	3.4	...	3.6M	...	G	MAY 5	06 A.M. AST
MAY 5	17	00	46.5	51.92 N.	173.38 W.	33N	4.4	...	4.6M	...	G	MAY 5	06 A.M. BST
MAY 7	11	01	7.2	59.75 N.	153.45 W.	144	...	...	...	...	G	MAY 7	01 A.M. AST
MAY 7	21	24	22.5	60.91 N.	150.44 W.	66	...	...	...	...	G	MAY 7	11 A.M. AST
MAY 8	12	56	14.8	52.84 N.	168.30 W.	39	5.1	5.0	...	...	G	MAY 8	01 A.M. BST
MAY 9	14	22	21.0	61.93 N.	148.92 W.	12	...	...	2.9M	III	G	MAY 9	04 A.M. AST
MAY 10	21	38	51.4	60.24 N.	152.38 W.	134	...	...	...	...	G	MAY 10	11 A.M. AST
MAY 10	21	57	39.1	60.24 N.	141.03 W.	15	4.4	...	4.4M	...	G	MAY 10	11 A.M. AST
MAY 12	19	13	30.5	54.76 N.	165.59 W.	111	4.5	...	...	...	G	MAY 12	08 A.M. BST
MAY 14	09	19	9.6	60.08 N.	140.94 W.	15	...	...	3.5M	...	G	MAY 14	12 P.M. YST
MAY 14	20	14	36.0	61.73 N.	150.89 W.	45	...	...	...	II	G	MAY 14	10 A.M. AST
MAY 15	03	54	38.8	52.18 N.	172.97 E.	33N	4.4	...	...	...	G	MAY 14	04 P.M. BST
MAY 16	09	57	13.0	64.73 N.	147.56 W.	14	...	...	3.0M	...	G	MAY 15	11 P.M. AST
MAY 16	14	19	19.2	60.23 N.	141.04 W.	15	4.6	...	4.4M	...	G	MAY 16	04 A.M. AST
MAY 17	14	04	14.7	60.99 N.	147.02 W.	10	...	...	3.2M	...	G	MAY 17	04 A.M. AST
MAY 18	05	35	22.6	64.41 N.	147.08 W.	28	...	...	3.2M	III	G	MAY 17	07 P.M. AST
MAY 19	18	05	23.6	60.21 N.	141.01 W.	15	4.2	...	4.6M	...	G	MAY 19	08 A.M. AST
MAY 19	18	21	42.7	60.07 N.	141.23 W.	15	...	...	3.6M	...	G	MAY 19	08 A.M. AST
MAY 20	02	27	42.3	52.12 N.	171.21 W.	33N	4.8	...	...	...	G	MAY 19	03 P.M. BST
MAY 20	08	14	0.1	56.65 N.	156.73 W.	71	6.4	6.1P	...	VI	G	MAY 19	10 P.M. AST
MAY 20	11	24	10.4	56.63 N.	156.59 W.	68	4.4	...	...	...	G	MAY 20	01 A.M. AST
MAY 20	22	28	38.1	62.83 N.	149.17 W.	95	...	...	...	FELT	G	MAY 20	12 M. AST
MAY 21	01	37	30.7	60.31 N.	154.02 W.	170	3.8	...	...	...	G	MAY 20	03 P.M. AST
MAY 21	05	35	22.6	64.44 N.	147.02 W.	34	...	...	3.2M	...	G	MAY 20	07 P.M. AST
MAY 21	10	05	11.6	64.71 N.	148.43 W.	33N	...	...	3.0M	II	G	MAY 21	12 P.M. AST
MAY 22	03	48	11.2	58.68 N.	153.98 W.	84	...	...	...	...	G	MAY 21	05 P.M. AST
MAY 23	13	44	40.8	56.76 N.	156.67 W.	71	4.9	...	...	...	G	MAY 23	03 A.M. AST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
ALASKA--Continued													
MAY 23	20	15	39.3	57.87 N.	157.45 W.	150	3.7	...	...	...	G	MAY 23	10 A.M. AST
MAY 24	07	28	53.6	62.55 N.	148.92 W.	84	...	...	...	...	G	MAY 23	09 P.M. AST
MAY 25	14	14	16.7	51.59 N.	178.03 E.	33N	4.8	...	...	...	G	MAY 25	03 A.M. BST
MAY 25	14	50	16.9	51.59 N.	178.11 E.	33N	...	...	...	...	G	MAY 25	03 A.M. BST
MAY 25	16	45	27.3	52.61 N.	167.02 W.	23	6.0	6.2	...	IV	G	MAY 25	05 A.M. BST
MAY 25	17	46	57.5	52.22 N.	166.65 W.	33N	4.8	...	...	...	G	MAY 25	06 A.M. BST
MAY 25	18	10	43.7	52.90 N.	167.09 W.	33N	4.6	...	...	...	G	MAY 25	07 A.M. BST
MAY 26	13	43	5.7	52.81 N.	166.90 W.	26	4.5	...	...	...	G	MAY 26	02 A.M. BST
MAY 26	14	35	38.3	52.87 N.	167.14 W.	33N	4.6	...	...	...	G	MAY 26	03 A.M. BST
MAY 27	07	33	56.1	59.26 N.	151.37 W.	59	4.3	...	...	...	G	MAY 26	09 P.M. AST
MAY 27	09	00	51.7	59.88 N.	151.95 W.	78	...	...	...	...	G	MAY 26	11 P.M. AST
MAY 27	09	12	20.3	56.55 N.	153.91 W.	27	4.1	...	4.0M	...	G	MAY 26	11 P.M. AST
MAY 27	10	30	19.1	52.68 N.	167.16 W.	33N	4.7	...	...	...	G	MAY 26	11 P.M. BST
MAY 27	15	38	4.3	63.05 N.	151.13 W.	33N	...	...	3.0M	...	G	MAY 27	05 A.M. AST
MAY 28	06	58	27.6	52.75 N.	167.01 W.	33N	4.4	...	...	...	G	MAY 27	07 P.M. BST
MAY 28	17	50	14.3	61.64 N.	150.02 W.	45	...	...	...	II	G	MAY 28	07 A.M. AST
MAY 29	15	21	41.5	53.04 N.	170.94 E.	33N	4.6	...	...	...	G	MAY 29	04 A.M. BST
MAY 29	21	53	43.9	52.83 N.	170.89 W.	102	4.9	...	...	...	G	MAY 29	10 A.M. BST
MAY 30	18	25	40.9	60.23 N.	152.84 W.	115	...	...	...	...	G	MAY 30	08 A.M. AST
MAY 30	19	20	27.5	56.40 N.	161.72 W.	206	5.0	...	...	...	G	MAY 30	08 A.M. BST
MAY 31	04	22	54.3	61.74 N.	149.88 W.	55	3.4	...	...	FELT	G	MAY 30	06 P.M. AST
MAY 31	04	38	32.8	60.05 N.	152.26 W.	86	3.6	...	...	...	G	MAY 30	06 P.M. AST
JUNE 3	15	02	4.0	60.22 N.	140.99 W.	15	4.2	...	4.5M	...	G	JUNE 3	06 A.M. YST
JUNE 3	20	41	4.1	63.48 N.	150.40 W.	33N	...	...	3.1M	...	G	JUNE 3	10 A.M. AST
JUNE 4	02	05	57.6	62.86 N.	149.66 W.	99	...	...	...	...	G	JUNE 3	04 P.M. AST
JUNE 4	05	06	58.2	59.85 N.	153.21 W.	121	4.2	...	...	...	G	JUNE 3	07 P.M. AST
JUNE 4	20	39	1.0	53.04 N.	167.10 W.	33N	4.6	...	...	...	G	JUNE 4	09 A.M. BST
JUNE 8	05	12	31.2	63.99 N.	147.26 W.	33N	...	...	3.6M	...	G	JUNE 7	07 P.M. AST
JUNE 8	17	37	39.9	63.03 N.	148.80 W.	33N	...	...	3.0M	...	G	JUNE 8	07 A.M. AST
JUNE 9	09	39	4.2	60.10 N.	153.14 W.	133	...	...	...	...	G	JUNE 8	11 P.M. AST
JUNE 10	03	53	21.6	60.03 N.	152.85 W.	122	...	...	...	...	G	JUNE 9	05 P.M. AST
JUNE 12	22	20	25.9	52.99 N.	167.09 W.	40	4.5	...	...	...	G	JUNE 12	11 A.M. BST
JUNE 13	09	51	26.1	59.74 N.	148.88 W.	33N	...	...	3.0M	...	G	JUNE 12	11 P.M. AST
JUNE 15	01	12	58.6	60.25 N.	140.94 W.	15	3.8	...	4.1M	...	G	JUNE 14	04 P.M. YST
JUNE 15	16	51	52.6	59.93 N.	140.81 W.	15	...	...	3.0M	...	G	JUNE 15	07 A.M. YST
JUNE 15	17	23	57.5	58.94 N.	154.47 W.	151	...	...	...	...	G	JUNE 15	07 A.M. AST
JUNE 15	18	54	36.0	57.81 N.	152.47 W.	60	3.7	...	...	...	G	JUNE 15	08 A.M. AST
JUNE 16	20	06	16.5	63.74 N.	148.90 W.	124	...	...	...	...	G	JUNE 16	10 A.M. AST
JUNE 17	08	08	52.4	51.32 N.	179.27 W.	55	4.7	...	...	...	G	JUNE 16	09 P.M. BST
JUNE 17	17	58	20.4	60.22 N.	140.87 W.	15	4.4	...	4.4M	...	G	JUNE 17	08 A.M. YST
JUNE 17	18	21	27.6	60.12 N.	140.90 W.	15	...	...	3.5M	...	G	JUNE 17	09 A.M. YST
JUNE 18	04	52	7.7	60.36 N.	143.02 W.	15	...	...	3.0M	...	G	JUNE 17	06 P.M. AST
JUNE 18	08	29	26.9	57.45 N.	154.44 W.	139	...	...	...	...	G	JUNE 17	10 P.M. AST
JUNE 18	10	49	32.7	56.39 N.	161.74 W.	204	...	...	...	...	G	JUNE 17	11 P.M. BST
JUNE 19	21	10	56.9	52.74 N.	172.33 E.	33N	4.6	...	...	...	G	JUNE 19	10 A.M. BST
JUNE 20	08	18	30.8	60.88 N.	147.69 W.	33N	...	...	3.3M	FELT	G	JUNE 19	10 P.M. AST
JUNE 21	07	33	36.1	58.97 N.	152.25 W.	33N	...	...	3.0M	...	G	JUNE 20	09 P.M. AST
JUNE 22	23	38	41.1	53.65 N.	163.54 W.	33N	4.6	...	...	...	G	JUNE 22	12 M. BST
JUNE 23	08	41	3.1	57.70 N.	155.22 W.	86	4.2	...	...	...	G	JUNE 22	10 P.M. AST
JUNE 23	10	46	58.6	61.87 N.	150.28 W.	33N	3.1	...	3.1M	IV	G	JUNE 23	12 P.M. AST
JUNE 23	12	11	23.6	59.31 N.	141.76 W.	15	...	...	3.5M	...	G	JUNE 23	02 A.M. AST
JUNE 23	18	39	32.2	58.03 N.	134.91 W.	15	3.8	...	...	IV	G	JUNE 23	10 A.M. PST
JUNE 24	05	24	33.4	63.12 N.	150.45 W.	151	...	...	...	...	G	JUNE 23	07 P.M. AST
JUNE 24	12	41	33.7	60.04 N.	148.05 W.	33N	4.1	...	3.3M	...	G	JUNE 24	02 A.M. AST
JUNE 24	13	41	46.8	63.93 N.	148.58 W.	118	3.3	...	...	...	G	JUNE 24	03 A.M. AST
JUNE 25	01	38	21.9	63.40 N.	149.56 W.	123	...	...	...	...	G	JUNE 24	03 P.M. AST
JUNE 25	04	28	37.9	60.59 N.	146.89 W.	33N	...	...	3.0M	...	G	JUNE 24	06 P.M. AST
JUNE 25	05	07	59.3	60.27 N.	140.82 W.	19	4.6	...	4.8M	...	G	JUNE 24	08 P.M. YST
JUNE 25	11	36	7.1	63.36 N.	147.44 W.	103	...	...	...	...	G	JUNE 25	01 A.M. AST
JUNE 26	04	26	33.4	59.84 N.	153.30 W.	132	4.0	...	...	...	G	JUNE 25	06 P.M. AST
JUNE 26	19	08	21.3	62.36 N.	147.83 W.	86	3.8	...	...	IV	G	JUNE 26	09 A.M. AST
JUNE 28	02	09	47.1	61.83 N.	150.52 W.	33N	...	...	3.2M	...	G	JUNE 27	04 P.M. AST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
ALASKA--Continued													
JUNE 28	02	36	11.9	61.58 N.	151.43 W.	113	3.7	...	...	...	G	JUNE 27	04 P.M. AST
JUNE 29	06	51	49.6	60.04 N.	151.92 W.	71	...	...	...	...	G	JUNE 28	08 P.M. AST
JUNE 29	09	12	12.2	60.16 N.	141.47 W.	15	...	...	3.5M	...	G	JUNE 28	11 P.M. AST
JULY 2	06	47	33.6	61.99 N.	150.87 W.	22	...	...	3.0M	...	G	JULY 1	08 P.M. AST
JULY 2	18	20	20.0	59.87 N.	141.16 W.	15	...	...	3.7M	...	G	JULY 2	08 A.M. AST
JULY 3	11	38	31.9	61.39 N.	150.73 W.	49	...	...	...	...	G	JULY 3	01 A.M. AST
JULY 3	13	45	55.1	64.19 N.	150.00 W.	33N	...	...	3.0M	...	G	JULY 3	03 A.M. AST
JULY 4	00	15	39.5	60.23 N.	140.76 W.	15	3.1	...	3.9M	...	G	JULY 3	03 P.M. YST
JULY 4	08	15	37.0	59.83 N.	153.65 W.	153	4.4	...	...	...	G	JULY 3	10 P.M. AST
JULY 4	13	04	20.2	63.98 N.	150.33 W.	33N	...	...	2.9M	...	G	JULY 4	03 A.M. AST
JULY 4	18	57	34.3	52.84 N.	167.12 W.	33N	4.7	5.1	4.7M	...	G	JULY 4	07 A.M. BST
JULY 5	07	48	49.7	52.76 N.	166.85 W.	21	4.9	...	...	...	G	JULY 4	08 P.M. BST
JULY 8	02	37	58.9	52.30 N.	175.34 E.	90	4.2	...	...	...	G	JULY 7	03 P.M. BST
JULY 8	03	58	18.9	59.14 N.	152.36 W.	135	...	...	...	...	G	JULY 7	05 P.M. AST
JULY 9	01	23	49.1	66.03 N.	141.81 W.	33N	4.6	...	3.7M	...	G	JULY 8	03 P.M. AST
JULY 10	04	04	20.5	63.20 N.	150.72 W.	130	4.9	...	...	II	G	JULY 9	06 P.M. AST
JULY 10	17	48	52.0	60.90 N.	147.22 W.	33N	...	...	3.2M	...	G	JULY 10	07 A.M. AST
JULY 11	12	28	2.9	55.32 N.	134.97 W.	10	5.1	5.1	5.8M	IV	G	JULY 11	04 A.M. PST
JULY 13	12	56	27.3	56.19 N.	161.83 W.	230	4.1	...	...	...	G	JULY 13	01 A.M. BST
JULY 13	17	35	5.6	62.32 N.	150.94 W.	33N	...	...	3.0M	...	G	JULY 13	07 A.M. AST
JULY 14	00	48	25.7	65.80 N.	149.92 W.	33N	...	...	2.7M	...	G	JULY 13	02 P.M. AST
JULY 14	08	33	14.5	53.71 N.	166.96 W.	33N	3.8	...	...	...	G	JULY 13	09 P.M. BST
JULY 14	19	12	38.9	62.49 N.	151.13 W.	114	...	...	...	...	G	JULY 14	09 A.M. AST
JULY 15	05	46	47.8	61.05 N.	149.39 W.	33N	...	...	3.0M	...	G	JULY 14	07 P.M. AST
JULY 15	05	50	21.1	51.93 N.	170.55 W.	39	5.4	4.6	...	...	G	JULY 14	06 P.M. BST
JULY 16	06	00	56.4	63.24 N.	150.54 W.	145	...	...	...	...	G	JULY 15	08 P.M. AST
JULY 16	23	45	58.5	60.86 N.	153.02 W.	141	4.6	...	...	FELT	G	JULY 16	01 P.M. AST
JULY 17	18	01	46.8	51.63 N.	177.73 E.	89	4.3	...	...	...	G	JULY 17	07 A.M. BST
JULY 17	20	44	29.5	62.27 N.	148.14 W.	58	5.3	...	...	IV	G	JULY 17	10 A.M. AST
JULY 18	12	39	25.0	56.78 N.	156.62 W.	57	4.8	...	...	...	G	JULY 18	02 A.M. AST
JULY 18	19	41	45.5	56.78 N.	157.00 W.	80	4.7	...	...	...	G	JULY 18	09 A.M. AST
JULY 21	10	29	30.3	60.18 N.	140.93 W.	15	3.3	...	3.2M	...	G	JULY 21	01 A.M. YST
JULY 22	23	09	41.7	52.93 N.	166.51 W.	33N	...	...	4.1M	...	G	JULY 22	12 M. BST
JULY 23	08	38	13.0	58.63 N.	151.51 W.	33N	4.4	...	4.6M	II	G	JULY 22	10 P.M. AST
JULY 23	09	07	7.7	61.64 N.	150.51 W.	49	...	...	2.9M	II	G	JULY 22	11 P.M. AST
JULY 24	22	23	24.8	54.13 N.	160.89 W.	33N	4.9	5.5	4.1M	...	G	JULY 24	12 M. AST
JULY 25	04	04	33.2	60.06 N.	148.78 W.	33N	3.2	...	3.6M	...	G	JULY 24	06 P.M. AST
JULY 26	17	49	11.3	50.74 N.	171.79 W.	33N	5.0	...	...	...	G	JULY 26	06 A.M. BST
JULY 27	08	54	56.5	60.43 N.	143.15 W.	33N	...	...	4.0M	...	G	JULY 26	10 P.M. AST
JULY 28	03	24	4.7	59.82 N.	153.75 W.	161	...	...	...	...	G	JULY 27	05 P.M. AST
JULY 28	07	46	33.0	59.78 N.	152.05 W.	113	...	...	...	...	G	JULY 27	09 P.M. AST
JULY 29	09	52	31.4	51.99 N.	173.51 W.	44	4.8	...	3.5G	...	G	JULY 28	10 P.M. BST
JULY 29	17	03	46.8	64.61 N.	152.21 W.	33N	...	...	3.6M	...	G	JULY 29	07 A.M. AST
JULY 30	02	24	4.6	62.04 N.	145.44 W.	14	...	...	3.5M	II	G	JULY 29	04 P.M. AST
JULY 30	05	11	49.4	50.52 N.	175.84 W.	33N	4.9	...	...	...	G	JULY 29	06 P.M. BST
JULY 30	17	13	31.8	59.85 N.	140.83 W.	15	...	...	...	...	G	JULY 30	08 A.M. YST
JULY 31	02	04	54.9	51.09 N.	179.20 E.	33N	4.4	...	...	...	G	JULY 30	03 P.M. BST
JULY 31	09	27	28.1	59.64 N.	152.80 W.	33N	3.4	...	3.2M	...	G	JULY 30	11 P.M. AST
JULY 31	11	26	54.5	66.32 N.	157.49 W.	33N	...	...	...	...	G	JULY 31	01 A.M. AST
AUG. 3	00	19	40.7	62.30 N.	151.24 W.	33N	...	...	3.0M	...	G	AUG. 2	02 P.M. AST
AUG. 4	20	02	55.3	59.83 N.	153.40 W.	144	...	...	...	...	G	AUG. 4	10 A.M. AST
AUG. 4	20	12	10.6	62.49 N.	149.77 W.	99	4.1	...	...	III	G	AUG. 4	10 A.M. AST
AUG. 5	16	15	42.9	56.57 N.	153.06 W.	33N	4.1	...	...	...	G	AUG. 5	06 A.M. AST
AUG. 7	02	12	34.8	58.94 N.	154.53 W.	157	...	...	...	...	G	AUG. 6	04 P.M. AST
AUG. 7	18	15	9.5	51.32 N.	176.11 W.	33N	4.6	...	4.0M	III	G	AUG. 7	07 A.M. BST
AUG. 8	10	56	42.5	61.73 N.	151.95 W.	117	4.0	...	...	...	G	AUG. 8	12 P.M. AST
AUG. 10	00	02	25.4	61.97 N.	150.94 W.	81	4.3	...	...	III	G	AUG. 9	02 P.M. AST
AUG. 10	03	32	16.7	52.18 N.	170.49 W.	33N	4.5	4.1	...	...	G	AUG. 9	04 P.M. BST
AUG. 10	07	25	10.0	52.00 N.	170.57 W.	33N	5.0	4.8	...	...	G	AUG. 9	08 P.M. BST
AUG. 11	20	08	12.4	59.98 N.	140.75 W.	15	3.6	...	3.5M	...	G	AUG. 11	11 A.M. YST
AUG. 12	00	54	31.6	60.12 N.	152.78 W.	128	...	...	...	...	G	AUG. 11	02 P.M. AST
AUG. 13	10	58	28.1	58.13 N.	137.52 W.	15	4.0	...	4.3M	...	G	AUG. 13	02 A.M. PST
AUG. 14	19	26	10.5	63.66 N.	148.71 W.	17	...	...	3.5M	...	G	AUG. 14	09 A.M. AST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
ALASKA--Continued													
AUG. 15	00	25	59.9	57.69 N.	150.82 W.	33N	...	...	3.6M	...	G	AUG. 14	02 P.M. AST
AUG. 15	05	50	29.9	62.48 N.	151.26 W.	33N	...	...	3.1M	...	G	AUG. 14	07 P.M. AST
AUG. 15	07	17	26.2	54.32 N.	163.56 W.	33N	4.0	...	3.8M	...	G	AUG. 14	08 P.M. BST
AUG. 15	16	48	34.6	59.47 N.	153.31 W.	142	...	...	...	...	G	AUG. 15	06 A.M. AST
AUG. 15	18	30	56.5	59.69 N.	152.75 W.	129	...	...	...	...	G	AUG. 15	08 A.M. AST
AUG. 16	01	51	34.8	53.59 N.	152.46 W.	33N	...	...	3.9M	...	G	AUG. 15	03 P.M. AST
AUG. 16	20	29	28.6	62.97 N.	149.54 W.	108	...	...	...	...	G	AUG. 16	10 A.M. AST
AUG. 19	10	01	29.3	63.33 N.	152.00 W.	33N	4.0	...	4.9M	...	G	AUG. 19	12 P.M. AST
AUG. 21	11	13	29.2	51.70 N.	173.49 W.	44	3.6	...	...	...	G	AUG. 21	12 P.M. BST
AUG. 22	09	33	9.2	59.78 N.	152.73 W.	101	...	...	...	...	G	AUG. 21	11 P.M. AST
AUG. 22	22	13	38.9	58.84 N.	151.68 W.	33N	4.6	...	4.5M	...	G	AUG. 22	12 M. AST
AUG. 25	08	22	59.2	60.12 N.	141.02 W.	15	...	...	3.6M	...	G	AUG. 24	10 P.M. AST
AUG. 25	11	21	48.6	60.44 N.	147.67 W.	33N	...	...	3.7M	...	G	AUG. 25	01 A.M. AST
AUG. 25	20	36	19.2	53.60 N.	161.31 W.	33N	4.8	...	4.1M	...	G	AUG. 25	09 A.M. BST
AUG. 28	17	06	9.6	60.85 N.	150.91 W.	33N	...	...	3.3M	...	G	AUG. 28	07 A.M. AST
AUG. 29	19	38	11.4	61.91 N.	150.80 W.	88	3.9	...	...	III	G	AUG. 24	09 A.M. AST
AUG. 30	14	43	1.9	53.04 N.	173.07 E.	79	4.8	...	...	...	G	AUG. 30	03 A.M. BST
AUG. 30	21	17	53.2	57.68 N.	154.48 W.	67	4.4	...	...	...	G	AUG. 30	11 A.M. AST
AUG. 31	01	21	23.4	52.43 N.	168.49 W.	33N	4.6	...	...	...	G	AUG. 30	02 P.M. BST
AUG. 31	13	56	23.8	52.93 N.	170.82 E.	33N	4.3	...	...	...	G	AUG. 31	02 A.M. BST
AUG. 31	20	42	27.4	54.39 N.	161.84 W.	20	5.1	4.3	...	III	G	AUG. 31	09 A.M. BST
SEPT. 1	05	27	17.6	53.98 N.	165.20 W.	69	5.8	6.4B	...	IV	G	AUG. 31	06 P.M. BST
SEPT. 1	16	20	30.7	62.84 N.	151.29 W.	131	3.4	...	...	...	G	SEPT. 1	06 A.M. AST
SEPT. 1	18	56	51.6	60.03 N.	141.10 W.	15	3.4	...	4.0M	...	G	SEPT. 1	08 A.M. AST
SEPT. 3	11	10	13.4	60.05 N.	152.94 W.	150	...	...	...	...	G	SEPT. 3	01 A.M. AST
SEPT. 8	07	15	41.0	59.49 N.	146.72 W.	33N	4.7	...	4.2M	...	G	SEPT. 7	09 P.M. AST
SEPT. 8	08	45	8.0	59.46 N.	146.49 W.	33N	4.2	...	3.7M	...	G	SEPT. 7	10 P.M. AST
SEPT. 9	07	24	23.5	53.00 N.	166.76 W.	15	4.6	4.4	...	...	G	SEPT. 8	08 P.M. BST
SEPT. 9	22	57	38.1	62.94 N.	150.50 W.	120	...	...	...	...	G	SEPT. 9	12 M. AST
SEPT. 21	18	04	41.5	54.65 N.	161.03 W.	39	4.8	...	...	...	G	SEPT. 21	07 A.M. BST
SEPT. 22	03	49	27.7	53.73 N.	166.95 W.	33N	4.6	...	...	...	G	SEPT. 21	04 P.M. BST
SEPT. 23	10	17	20.8	52.29 N.	174.03 E.	43	5.8	5.6	...	IV	G	SEPT. 22	11 P.M. BST
SEPT. 24	03	19	56.7	52.19 N.	174.02 E.	33N	4.8	...	...	IV	G	SEPT. 23	04 P.M. BST
SEPT. 26	00	45	19.2	62.45 N.	151.52 W.	138	...	...	...	...	G	SEPT. 25	02 P.M. AST
SEPT. 30	10	38	4.4	55.45 N.	160.15 W.	66	4.1	...	...	...	G	SEPT. 30	12 P.M. AST
OCT. 2	06	07	57.6	51.08 N.	178.95 E.	50	4.5	...	...	...	G	OCT. 1	07 P.M. BST
OCT. 2	06	25	10.0	51.09 N.	178.87 E.	42	5.0	...	...	...	G	OCT. 1	07 P.M. BST
OCT. 4	02	48	47.6	62.95 N.	150.62 W.	117	3.6	...	...	...	G	OCT. 3	04 P.M. AST
OCT. 6	22	49	52.6	58.45 N.	153.49 W.	78	3.9	...	...	...	G	OCT. 6	12 M. AST
OCT. 7	05	59	21.8	61.22 N.	150.43 W.	9	...	...	3.1M	FELT	G	OCT. 6	07 P.M. AST
OCT. 8	14	58	14.0	59.49 N.	153.36 W.	131	...	...	...	...	G	OCT. 8	04 A.M. AST
OCT. 10	23	36	45.1	56.15 N.	135.75 W.	33N	4.4	...	...	FELT	G	OCT. 10	03 P.M. PST
OCT. 10	23	46	7.6	61.49 N.	151.92 W.	114	...	...	...	...	G	OCT. 10	01 P.M. AST
OCT. 13	07	03	19.7	51.96 N.	179.83 W.	100	4.6	...	...	...	G	OCT. 12	08 P.M. BST
OCT. 13	13	58	16.1	63.01 N.	148.62 W.	90	4.0	...	...	...	G	OCT. 13	03 A.M. AST
OCT. 15	06	24	1.2	51.77 N.	175.24 W.	54	4.8	...	...	IV	G	OCT. 14	07 P.M. BST
OCT. 16	12	14	33.1	59.70 N.	141.79 W.	15	...	...	3.4M	...	G	OCT. 16	02 A.M. AST
OCT. 16	21	16	5.2	51.85 N.	175.36 E.	34	5.3	5.2	...	II	G	OCT. 16	10 A.M. BST
OCT. 17	23	34	8.1	59.96 N.	140.98 W.	15	4.5	...	4.9M	...	G	OCT. 17	02 P.M. YST
OCT. 18	03	35	26.9	51.86 N.	177.13 E.	62	6.0	...	...	III	G	OCT. 17	04 P.M. BST
OCT. 18	11	51	58.6	62.13 N.	150.22 W.	33N	...	...	3.8M	...	G	OCT. 18	01 A.M. AST
OCT. 22	19	07	36.3	52.39 N.	173.60 W.	33N	4.9	...	...	...	G	OCT. 22	08 A.M. BST
OCT. 24	06	06	0.4	63.60 N.	149.20 W.	128	...	...	...	...	G	OCT. 23	08 P.M. AST
OCT. 24	06	13	42.8	62.55 N.	151.56 W.	134	...	...	...	...	G	OCT. 23	08 P.M. AST
OCT. 24	22	19	35.5	65.24 N.	164.74 W.	33N	4.4	...	...	...	G	OCT. 24	11 A.M. BST
OCT. 25	13	26	17.4	59.43 N.	153.12 W.	102	...	...	...	...	G	OCT. 25	03 A.M. AST
OCT. 25	17	01	1.8	63.10 N.	150.68 W.	139	4.1	...	...	...	G	OCT. 25	07 A.M. AST
OCT. 27	06	32	2.3	61.70 N.	149.58 W.	44	...	...	3.0M	II	G	OCT. 26	08 P.M. AST
OCT. 27	14	37	0.4	62.03 N.	150.55 W.	33N	...	...	3.2M	...	G	OCT. 27	04 A.M. AST
OCT. 27	22	16	59.2	59.38 N.	152.90 W.	77	4.1	...	...	FELT	G	OCT. 27	12 M. AST
OCT. 28	06	24	9.8	59.86 N.	151.67 W.	82	...	...	...	FELT	G	OCT. 27	08 P.M. AST
OCT. 29	13	42	25.5	52.63 N.	169.57 W.	25	4.8	4.4	4.9M	...	G	OCT. 29	02 A.M. BST
NOV. 2	00	34	49.8	62.84 N.	151.01 W.	132	...	...	...	...	G	NOV. 1	02 P.M. AST
NOV. 2	03	21	4.1	51.16 N.	178.05 W.	33N	4.8	4.6	4.3M	III	G	NOV. 1	04 P.M. BST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
ALASKA--Continued													
NOV. 4	05	03	41.4	60.55 N.	143.01 W.	33N	...	...	4.2M	...	G	NOV. 3	07 P.M. AST
NOV. 7	03	14	36.1	60.59 N.	150.68 W.	90	...	...	...	III	G	NOV. 6	05 P.M. AST
NOV. 8	05	39	40.4	62.79 N.	150.84 W.	133	...	...	...	...	G	NOV. 7	07 P.M. AST
NOV. 10	11	15	55.6	60.37 N.	141.37 W.	15	4.7	3.9	4.7M	...	G	NOV. 10	01 A.M. AST
NOV. 11	07	53	46.5	60.65 N.	141.41 W.	15	...	...	3.7M	...	G	NOV. 10	09 P.M. AST
NOV. 11	08	43	6.6	62.66 N.	149.85 W.	10	...	...	3.2M	...	G	NOV. 10	10 P.M. AST
NOV. 11	16	22	51.1	60.05 N.	152.89 W.	140	...	...	...	...	G	NOV. 11	06 A.M. AST
NOV. 11	19	18	14.7	59.40 N.	153.41 W.	140	...	...	...	...	G	NOV. 11	09 A.M. AST
NOV. 12	07	22	28.8	62.24 N.	150.81 W.	30	...	...	3.2M	...	G	NOV. 11	09 P.M. AST
NOV. 12	13	28	33.5	52.20 N.	169.39 W.	56	...	...	...	...	G	NOV. 12	02 A.M. BST
NOV. 12	15	13	32.5	59.82 N.	140.81 W.	15	...	...	3.7M	...	G	NOV. 12	06 A.M. YST
NOV. 14	23	00	42.8	61.38 N.	150.09 W.	57	5.1	...	...	V	G	NOV. 14	01 P.M. AST
NOV. 15	02	08	34.8	61.26 N.	150.00 W.	49	...	...	3.8M	IV	G	NOV. 14	04 P.M. AST
NOV. 15	07	15	13.2	60.18 N.	149.68 W.	69	...	...	...	IV	G	NOV. 14	09 P.M. AST
NOV. 18	03	46	56.5	61.92 N.	151.19 W.	112	4.4	...	...	...	G	NOV. 17	05 P.M. AST
NOV. 18	05	59	54.8	51.10 N.	178.68 W.	33N	3.9	...	4.3M	...	G	NOV. 17	06 P.M. BST
NOV. 20	06	32	12.7	62.07 N.	151.00 W.	78	3.3	...	...	...	G	NOV. 19	08 P.M. AST
NOV. 22	12	26	17.4	60.07 N.	142.37 W.	33N	3.4	...	3.6M	...	G	NOV. 22	02 A.M. AST
NOV. 22	18	51	51.7	59.83 N.	141.14 W.	33N	3.5	...	3.9M	...	G	NOV. 22	08 A.M. AST
NOV. 24	11	19	43.9	51.25 N.	178.05 W.	47	4.6	4.0	...	...	G	NOV. 24	12 P.M. BST
NOV. 24	12	37	05.4	61.28 N.	150.07 W.	33N	...	...	3.7M	...	G	NOV. 24	02 A.M. AST
NOV. 24	19	04	59.4	61.28 N.	147.30 W.	33N	...	...	4.0M	...	G	NOV. 24	09 A.M. AST
NOV. 24	22	25	8.7	52.54 N.	170.75 W.	33N	4.5	...	...	...	G	NOV. 24	11 A.M. BST
NOV. 25	14	20	32.9	60.23 N.	153.04 W.	152	4.1	...	...	...	G	NOV. 25	04 A.M. AST
NOV. 27	15	28	8.7	62.41 N.	151.41 W.	103	...	...	...	...	G	NOV. 27	05 A.M. AST
NOV. 27	23	42	39.9	63.59 N.	149.77 W.	33N	...	...	...	...	G	NOV. 27	01 P.M. AST
NOV. 28	04	07	47.0	52.07 N.	166.36 W.	33N	4.4	...	...	...	G	NOV. 27	05 P.M. BST
NOV. 28	17	50	2.0	58.84 N.	153.32 W.	102	...	...	...	...	G	NOV. 28	07 A.M. AST
NOV. 28	22	45	58.6	51.44 N.	178.43 W.	58	4.5	...	...	...	G	NOV. 28	11 A.M. BST
NOV. 29	23	34	22.1	63.07 N.	150.87 W.	144	3.3	...	...	...	G	NOV. 29	01 P.M. AST
NOV. 30	03	25	35.0	62.07 N.	149.06 W.	30	...	...	2.4M	...	G	NOV. 29	05 P.M. AST
NOV. 30	08	28	25.7	60.79 N.	147.58 W.	41	...	...	2.8M	...	G	NOV. 29	10 P.M. AST
DEC. 4	12	01	21.2	53.71 N.	164.02 W.	39	5.0	4.4	...	...	G	DEC. 4	01 A.M. BST
DEC. 5	07	42	54.0	59.74 N.	152.08 W.	78	...	...	...	...	G	DEC. 4	09 P.M. AST
DEC. 5	08	32	45.3	50.99 N.	179.41 W.	33N	4.8	...	4.0M	...	G	DEC. 4	09 P.M. BST
DEC. 7	05	16	33.5	51.78 N.	173.00 W.	47	4.6	...	3.8M	...	G	DEC. 6	06 P.M. BST
DEC. 7	09	37	20.0	59.61 N.	152.46 W.	85	...	...	...	...	G	DEC. 6	11 P.M. AST
DEC. 7	22	29	20.7	58.58 N.	153.59 W.	89	...	...	...	...	G	DEC. 7	12 M. AST
DEC. 9	07	03	48.4	60.32 N.	140.86 W.	15	4.9	4.1	5.0M	...	G	DEC. 8	10 P.M. YST
DEC. 9	22	25	50.7	53.00 N.	170.24 W.	102	5.4	...	...	...	G	DEC. 9	11 A.M. BST
DEC. 10	03	12	34.1	64.30 N.	147.40 W.	10	...	...	3.0M	...	G	DEC. 9	05 P.M. AST
DEC. 11	21	56	6.1	65.03 N.	148.69 W.	21	...	...	3.4M	...	G	DEC. 11	11 A.M. AST
DEC. 13	10	31	35.2	60.13 N.	153.18 W.	123	...	...	...	...	G	DEC. 13	12 P.M. AST
DEC. 14	02	55	26.5	52.45 N.	163.78 W.	33N	4.8	...	4.6M	...	G	DEC. 13	03 P.M. BST
DEC. 16	10	21	55.1	62.03 N.	151.03 W.	15	...	...	3.0M	...	G	DEC. 16	12 P.M. AST
DEC. 17	18	58	56.9	61.74 N.	149.01 W.	43	...	...	...	...	G	DEC. 17	08 A.M. AST
DEC. 19	06	43	46.7	61.93 N.	149.73 W.	33N	...	...	2.9M	...	G	DEC. 18	08 P.M. AST
DEC. 21	02	40	28.2	60.03 N.	141.25 W.	33N	...	...	3.4M	...	G	DEC. 20	04 P.M. AST
DEC. 21	16	35	4.5	63.30 N.	147.30 W.	33N	...	...	3.3M	...	G	DEC. 21	06 A.M. AST
DEC. 21	20	16	50.2	68.74 N.	148.84 W.	33N	...	...	...	...	G	DEC. 21	10 A.M. AST
DEC. 22	10	26	18.5	59.14 N.	154.02 W.	156	...	...	...	...	G	DEC. 22	12 P.M. AST
DEC. 23	00	39	20.0	59.68 N.	152.54 W.	120	...	...	...	...	G	DEC. 22	02 P.M. AST
DEC. 23	01	00	10.9	59.68 N.	152.53 W.	111	...	...	...	...	G	DEC. 22	03 P.M. AST
DEC. 23	07	24	44.9	53.64 N.	166.97 W.	83	4.0	...	...	...	G	DEC. 22	08 P.M. BST
DEC. 24	01	50	11.0	52.20 N.	179.07 E.	167	4.5	...	...	...	G	DEC. 23	02 P.M. BST
DEC. 24	04	47	28.2	62.01 N.	151.41 W.	33N	...	...	3.5M	...	G	DEC. 23	06 P.M. AST
DEC. 26	04	06	22.4	63.02 N.	150.44 W.	131	3.4	...	...	...	G	DEC. 25	06 P.M. AST
DEC. 26	08	18	41.4	51.02 N.	179.33 E.	53	4.5	...	...	...	G	DEC. 25	09 P.M. BST
DEC. 26	13	12	16.7	61.42 N.	151.62 W.	111	4.1	...	...	II	G	DEC. 26	03 A.M. AST
DEC. 26	16	42	18.4	54.47 N.	160.05 W.	33N	4.4	...	...	...	G	DEC. 26	06 A.M. AST
DEC. 27	07	21	28.2	51.14 N.	179.33 E.	33N	4.4	...	...	...	G	DEC. 26	08 P.M. BST
DEC. 28	14	47	51.6	61.96 N.	150.52 W.	63	3.2	...	...	...	G	DEC. 28	04 A.M. AST
DEC. 28	17	41	10.6	64.62 N.	152.18 W.	33N	...	...	3.3M	...	G	DEC. 28	07 A.M. AST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
ALASKA--Continued													
DEC. 29	08	34	29.4	64.62 N.	152.21 W.	33N	...	...	3.0M	...	G	DEC. 28	10 P.M. AST
DEC. 31	22	58	1.6	61.55 N.	146.60 W.	33N	...	...	3.5M	...	G	DEC. 31	12 M. AST
ARIZONA													
AUG. 5	19	10	15.9	36.80 N.	113.98 W.	5	...	...	3.7G	...	G	AUG. 5	12 M. MST
ARKANSAS													
FEB. 5	05	31	09.3	35.84 N.	90.08 W.	14	...	...	3.2T	IV	S	FEB. 4	11 P.M. CST
FEB. 27	22	54	54.0	35.92 N.	91.24 W.	9	...	...	3.1S	V	S	FEB. 27	04 P.M. CST
FEB. 27	22	55	12.0	35.93 N.	91.24 W.	10	...	...	...	IV	S	FEB. 27	04 P.M. CST
JUNE 25	17	11	13.4	35.53 N.	90.43 W.	11	...	...	3.2S	IV	S	JUNE 25	11 A.M. CST
NOV. 5	16	35	26.0	36.44 N.	91.01 W.	8	...	...	2.9S	IV	S	NOV. 5	10 A.M. CST
CALIFORNIA													
JAN. 1	17	12	04.7	33.50 N.	116.52 W.	16	...	...	3.3P	...	P	JAN. 1	09 A.M. PST
JAN. 1	20	38	18.0	34.90 N.	119.17 W.	1	...	...	3.2P	...	P	JAN. 1	12 M. PST
JAN. 1	23	14	38.9	33.95 N.	118.68 W.	11	5.1	4.7	5.0P	VI	P	JAN. 1	03 P.M. PST
JAN. 1	23	19	05.2	33.97 N.	118.72 W.	8	...	...	3.2P	...	P	JAN. 1	03 P.M. PST
JAN. 1	23	21	36.0	33.95 N.	118.70 W.	8	...	...	3.1P	...	P	JAN. 1	03 P.M. PST
JAN. 1	23	22	14.3	33.93 N.	118.70 W.	12	...	...	3.4P	FELT	P	JAN. 1	03 P.M. PST
JAN. 1	23	24	58.1	33.98 N.	118.67 W.	4	...	...	3.0P	...	P	JAN. 1	03 P.M. PST
JAN. 1	23	26	25.2	33.93 N.	118.68 W.	6	...	...	3.0P	...	P	JAN. 1	03 P.M. PST
JAN. 1	23	29	25.0	33.95 N.	118.67 W.	2	4.1	...	3.9P	FELT	P	JAN. 1	03 P.M. PST
JAN. 1	23	32	12.3	33.95 N.	118.72 W.	9	...	...	3.0P	...	P	JAN. 1	03 P.M. PST
JAN. 1	23	36	28.2	34.02 N.	118.75 W.	3	...	...	3.0P	...	P	JAN. 1	03 P.M. PST
JAN. 1	23	49	58.8	33.93 N.	118.67 W.	6	...	...	3.7P	FELT	P	JAN. 1	03 P.M. PST
JAN. 2	00	03	52.3	33.93 N.	118.68 W.	6	...	...	3.0P	...	P	JAN. 1	04 P.M. PST
JAN. 2	07	15	51.6	33.97 N.	118.70 W.	6	...	...	3.0P	...	P	JAN. 1	11 P.M. PST
JAN. 2	07	41	14.1	33.95 N.	118.70 W.	6	...	...	3.7P	FELT	P	JAN. 1	11 P.M. PST
JAN. 2	18	16	31.4	33.95 N.	118.70 W.	15	...	...	3.4P	FELT	P	JAN. 2	10 A.M. PST
JAN. 2	22	29	57.9	33.93 N.	118.68 W.	6	...	...	2.5P	FELT	P	JAN. 2	02 P.M. PST
JAN. 2	22	43	27.1	33.95 N.	118.68 W.	11	...	...	2.6P	FELT	P	JAN. 2	02 P.M. PST
JAN. 3	00	20	52.4	33.90 N.	118.68 W.	6	...	...	2.8P	FELT	P	JAN. 2	04 P.M. PST
JAN. 3	13	36	50.4	34.90 N.	119.17 W.	1	...	...	3.5P	...	P	JAN. 3	05 A.M. PST
JAN. 3	16	54	16.5	33.95 N.	118.70 W.	11	...	...	3.0P	FELT	P	JAN. 3	08 A.M. PST
JAN. 3	20	00	43.0	35.02 N.	119.13 W.	5	...	...	3.4P	IV	P	JAN. 3	12 M. PST
JAN. 4	01	02	05.6	33.92 N.	118.68 W.	6	...	...	3.0P	...	P	JAN. 3	05 P.M. PST
JAN. 7	11	37	32.3	36.10 N.	120.21 W.	4	3.9	...	3.8B	IV	B	JAN. 7	03 A.M. PST
JAN. 11	19	57	26.6	37.00 N.	121.72 W.	9	...	...	3.1B	FELT	B	JAN. 11	11 A.M. PST
JAN. 11	20	39	23.8	37.39 N.	121.75 W.	1	...	...	3.6B	IV	B	JAN. 11	12 M. PST
JAN. 12	11	47	15.0	33.52 N.	116.50 W.	5	...	...	3.2P	...	P	JAN. 12	03 A.M. PST
JAN. 13	09	29	26.5	35.73 N.	118.05 W.	3	...	...	3.2P	...	P	JAN. 13	01 A.M. PST
JAN. 13	11	07	29.4	33.95 N.	118.68 W.	13	...	...	2.8P	FELT	P	JAN. 13	03 A.M. PST
JAN. 15	12	41	18.7	33.97 N.	118.72 W.	10	...	...	3.7P	IV	P	JAN. 15	04 A.M. PST
JAN. 19	13	59	55.4	37.34 N.	121.72 W.	8	...	...	3.1B	FELT	B	JAN. 19	05 A.M. PST
JAN. 19	18	10	42.0	37.55 N.	118.63 W.	9	...	...	4.1B	IV	B	JAN. 19	10 A.M. PST
JAN. 21	16	11	36.0	34.65 N.	117.73 W.	8	...	...	3.1P	...	P	JAN. 21	08 A.M. PST
JAN. 23	07	25	08.0	34.50 N.	116.33 W.	6	...	...	3.5P	...	P	JAN. 22	11 P.M. PST
JAN. 24	21	14	27.2	37.52 N.	118.60 W.	10	...	...	4.6B	IV	B	JAN. 24	01 P.M. PST
JAN. 29	04	59	22.7	33.95 N.	118.67 W.	6	...	...	3.1P	FELT	P	JAN. 28	08 P.M. PST
FEB. 2	18	29	26.2	38.81 N.	119.82 W.	19	...	...	3.4B	...	B	FEB. 2	10 A.M. PST
FEB. 4	15	55	54.7	33.98 N.	119.18 W.	5	...	...	3.6P	...	P	FEB. 4	07 A.M. PST
FEB. 5	02	08	19.6	37.77 N.	122.17 W.	8	...	...	2.7B	V	B	FEB. 4	06 P.M. PST
FEB. 5	02	14	09.9	37.55 N.	118.79 W.	10	...	...	3.7B	...	B	FEB. 4	06 P.M. PST
FEB. 5	07	22	41.2	37.32 N.	121.67 W.	8	...	...	3.4B	FELT	B	FEB. 4	11 P.M. PST
FEB. 5	08	42	23.9	37.55 N.	118.77 W.	10	...	...	3.3B	...	B	FEB. 5	12 P.M. PST
FEB. 7	04	20	15.6	37.56 N.	118.79 W.	10	...	...	3.8B	...	B	FEB. 6	08 P.M. PST
FEB. 12	04	48	42.3	33.45 N.	116.43 W.	4	...	...	4.2P	V	P	FEB. 11	08 P.M. PST
FEB. 12	04	55	16.1	33.45 N.	116.43 W.	4	...	...	3.2P	...	P	FEB. 11	08 P.M. PST
FEB. 12	05	15	23.8	33.45 N.	116.43 W.	4	...	...	3.0P	...	P	FEB. 11	09 P.M. PST
FEB. 12	20	26	22.1	36.66 N.	121.34 W.	7	...	...	3.6B	IV	B	FEB. 12	12 M. PST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
CALIFORNIA—Continued													
FEB. 13	01	05	45.8	34.30 N.	116.33 W.	1	...	...	3.1P	...	P	FEB. 12	05 P.M. PST
FEB. 13	16	26	45.3	37.45 N.	118.65 W.	5	...	...	3.0P	...	P	FEB. 13	08 A.M. PST
FEB. 13	19	21	48.4	36.55 N.	121.16 W.	10	...	...	3.5B	...	B	FEB. 13	11 A.M. PST
FEB. 15	03	05	16.6	34.27 N.	119.72 W.	5	...	...	3.5P	III	P	FEB. 14	07 P.M. PST
FEB. 15	03	19	32.9	34.27 N.	119.70 W.	5	...	...	3.4P	III	P	FEB. 14	07 P.M. PST
FEB. 21	12	56	47.9	37.83 N.	121.77 W.	12	...	...	3.5B	IV	B	FEB. 21	04 A.M. PST
FEB. 22	07	16	56.6	40.00 N.	120.09 W.	5	...	...	3.5B	...	B	FEB. 21	11 P.M. PST
FEB. 22	15	57	28.8	40.00 N.	120.09 W.	5	5.0	4.6	5.3B	VI	B	FEB. 22	07 A.M. PST
FEB. 23	03	40	52.9	40.00 N.	120.10 W.	5	...	...	3.7B	...	B	FEB. 22	07 P.M. PST
FEB. 27	07	07	38.6	33.95 N.	118.32 W.	5	...	...	3.0P	IV	P	FEB. 26	11 P.M. PST
FEB. 27	15	36	32.4	36.08 N.	119.95 W.	5	...	...	3.3P	IV	P	FEB. 27	07 A.M. PST
MAR. 1	12	26	03.4	34.32 N.	118.35 W.	5	...	...	2.3P	FELT	P	MAR. 1	04 A.M. PST
MAR. 5	10	49	31.0	33.95 N.	118.70 W.	13	...	...	3.7P	IV	P	MAR. 5	02 A.M. PST
MAR. 5	12	11	53.0	34.37 N.	119.75 W.	5	...	...	2.8P	FELT	P	MAR. 5	04 A.M. PST
MAR. 8	10	40	51.6	33.33 N.	116.83 W.	7	...	...	3.3P	...	P	MAR. 8	02 A.M. PST
MAR. 8	18	21	37.8	34.12 N.	118.33 W.	4	...	...	2.0P	FELT	P	MAR. 8	10 A.M. PST
MAR. 8	18	25	27.1	37.24 N.	118.44 W.	5	...	...	3.1B	...	G	MAR. 8	10 A.M. PST
MAR. 8	23	37	49.4	34.02 N.	117.03 W.	5	...	...	3.0P	...	P	MAR. 8	03 P.M. PST
MAR. 10	00	56	37.7	35.80 N.	116.62 W.	5	...	...	3.3P	...	P	MAR. 9	04 P.M. PST
MAR. 11	07	14	05.1	34.02 N.	116.73 W.	5	...	...	3.4P	...	P	MAR. 10	11 P.M. PST
MAR. 11	10	54	31.9	33.70 N.	116.77 W.	5	...	...	3.0P	FELT	P	MAR. 11	02 A.M. PST
MAR. 12	12	06	09.6	37.57 N.	121.69 W.	7	...	...	3.2B	FELT	B	MAR. 12	04 A.M. PST
MAR. 12	14	08	15.8	37.45 N.	118.67 W.	4	...	...	3.3P	...	P	MAR. 12	06 A.M. PST
MAR. 15	20	06	45.5	36.60 N.	121.08 W.	12	...	...	3.2B	...	B	MAR. 15	12 M. PST
MAR. 15	20	17	49.8	34.30 N.	116.43 W.	1	5.0	4.9	4.9P	FELT	P	MAR. 15	12 M. PST
MAR. 15	20	34	54.3	34.33 N.	116.45 W.	1	...	...	3.1P	...	P	MAR. 15	12 M. PST
MAR. 15	21	07	16.5	34.32 N.	116.45 W.	1	5.5	5.6	5.2P	VII	P	MAR. 15	01 P.M. PST
MAR. 15	21	15	49.1	34.32 N.	116.43 W.	3	...	...	3.2P	...	P	MAR. 15	01 P.M. PST
MAR. 15	21	25	17.3	34.33 N.	116.45 W.	2	...	...	3.2P	...	P	MAR. 15	01 P.M. PST
MAR. 15	21	33	14.9	34.30 N.	116.43 W.	2	...	...	3.1P	...	P	MAR. 15	01 P.M. PST
MAR. 15	21	34	25.5	34.35 N.	116.45 W.	1	...	...	4.5P	FELT	P	MAR. 15	01 P.M. PST
MAR. 15	21	44	50.0	34.32 N.	116.43 W.	1	...	...	3.3P	...	P	MAR. 15	01 P.M. PST
MAR. 15	22	26	19.3	34.30 N.	116.43 W.	1	...	...	3.0P	...	P	MAR. 15	02 P.M. PST
MAR. 15	23	07	58.4	34.33 N.	116.43 W.	5	4.5	4.4	4.8P	FELT	P	MAR. 15	03 P.M. PST
MAR. 15	23	16	38.1	34.30 N.	116.43 W.	1	...	...	3.9P	FELT	P	MAR. 15	03 P.M. PST
MAR. 15	23	47	27.4	34.32 N.	116.43 W.	2	...	...	3.0P	...	P	MAR. 15	03 P.M. PST
MAR. 15	23	59	51.4	34.33 N.	116.40 W.	1	...	...	3.0P	...	P	MAR. 15	03 P.M. PST
MAR. 16	00	57	29.4	34.32 N.	116.43 W.	2	...	...	3.4P	...	P	MAR. 15	04 P.M. PST
MAR. 16	01	21	25.2	34.33 N.	116.40 W.	1	3.7	...	3.8P	...	P	MAR. 15	05 P.M. PST
MAR. 16	01	35	01.9	34.33 N.	116.40 W.	1	3.7	...	3.4P	...	P	MAR. 15	05 P.M. PST
MAR. 16	02	35	40.2	34.30 N.	116.43 W.	2	...	...	3.0P	...	P	MAR. 15	06 P.M. PST
MAR. 16	02	46	51.8	34.32 N.	116.43 W.	3	...	...	3.2P	...	P	MAR. 15	06 P.M. PST
MAR. 16	05	54	00.5	34.30 N.	116.43 W.	2	...	...	3.7P	FELT	P	MAR. 15	09 P.M. PST
MAR. 16	06	22	03.1	34.32 N.	116.42 W.	1	...	...	2.4P	FELT	P	MAR. 15	10 P.M. PST
MAR. 16	06	40	18.8	34.32 N.	116.42 W.	3	...	...	2.7P	FELT	P	MAR. 15	10 P.M. PST
MAR. 16	06	42	46.2	34.30 N.	116.43 W.	2	...	...	3.0P	FELT	P	MAR. 15	10 P.M. PST
MAR. 16	07	06	33.0	34.30 N.	116.43 W.	1	...	...	2.5P	FELT	P	MAR. 15	11 P.M. PST
MAR. 16	07	52	09.1	34.32 N.	116.43 W.	2	...	...	3.5P	FELT	P	MAR. 15	11 P.M. PST
MAR. 16	09	33	49.6	34.32 N.	116.43 W.	1	...	...	2.6P	FELT	P	MAR. 16	01 A.M. PST
MAR. 16	12	56	32.1	34.20 N.	116.43 W.	3	...	...	3.1P	...	P	MAR. 16	04 A.M. PST
MAR. 16	13	41	20.5	34.32 N.	116.42 W.	1	...	...	2.8P	FELT	P	MAR. 16	05 A.M. PST
MAR. 16	14	10	57.5	34.33 N.	116.40 W.	1	...	...	3.2P	FELT	P	MAR. 16	06 A.M. PST
MAR. 16	17	36	59.1	34.33 N.	116.40 W.	5	...	...	4.0P	FELT	P	MAR. 16	09 A.M. PST
MAR. 17	08	12	42.9	34.28 N.	116.42 W.	1	...	...	3.2P	...	P	MAR. 17	12 P.M. PST
MAR. 17	17	51	06.0	34.32 N.	116.40 W.	2	...	...	3.1P	...	P	MAR. 17	09 A.M. PST
MAR. 17	18	48	39.0	34.32 N.	116.38 W.	2	...	...	3.3P	...	P	MAR. 17	10 A.M. PST
MAR. 18	12	11	04.2	34.33 N.	116.43 W.	2	...	...	3.1P	...	P	MAR. 18	04 A.M. PST
MAR. 18	22	53	02.6	34.22 N.	116.35 W.	5	...	...	4.2P	FELT	P	MAR. 18	02 P.M. PST
MAR. 19	00	45	34.9	34.32 N.	116.47 W.	4	...	...	3.0P	...	P	MAR. 18	04 P.M. PST
MAR. 19	09	35	51.0	34.23 N.	116.37 W.	4	...	...	3.0P	...	P	MAR. 19	01 A.M. PST
MAR. 20	04	41	21.8	34.33 N.	116.40 W.	1	...	...	3.1P	...	P	MAR. 19	08 P.M. PST
MAR. 20	06	34	56.6	34.32 N.	116.38 W.	2	...	...	3.2P	...	P	MAR. 19	10 P.M. PST
MAR. 20	10	39	47.1	34.32 N.	116.45 W.	1	...	...	3.2P	...	P	MAR. 20	02 A.M. PST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
CALIFORNIA--Continued													
MAR. 20	14	46	11.4	34.33 N.	116.42 W.	1	...	...	3.1P	...	P	MAR. 20	06 A.M. PST
MAR. 21	04	48	35.8	34.28 N.	116.40 W.	2	...	...	3.2P	...	P	MAR. 20	08 P.M. PST
MAR. 22	19	11	22.4	34.33 N.	116.42 W.	8	...	...	3.0P	...	P	MAR. 22	11 A.M. PST
MAR. 23	03	09	53.8	37.42 N.	118.67 W.	5	...	...	3.0P	...	P	MAR. 22	07 P.M. PST
MAR. 25	17	00	02.1	34.30 N.	116.43 W.	7	...	...	3.0P	...	P	MAR. 25	09 A.M. PST
MAR. 26	00	10	10.8	34.32 N.	116.42 W.	1	...	...	3.0P	...	P	MAR. 25	04 P.M. PST
MAR. 26	06	29	02.5	37.53 N.	118.68 W.	10	...	...	3.3B	...	B	MAR. 25	10 P.M. PST
MAR. 26	15	04	29.0	34.87 N.	120.50 W.	5	...	...	2.8P	FELT	P	MAR. 26	07 A.M. PST
MAR. 26	15	22	23.5	34.87 N.	120.50 W.	10	...	...	3.6P	IV	P	MAR. 26	07 A.M. PST
MAR. 26	17	01	03.1	37.55 N.	118.80 W.	5	...	...	3.4B	...	B	MAR. 26	09 A.M. PST
MAR. 26	21	36	38.5	37.57 N.	118.87 W.	10	...	...	3.7B	...	B	MAR. 26	01 P.M. PST
MAR. 29	02	17	11.3	33.67 N.	116.72 W.	8	...	...	3.0P	...	P	MAR. 28	06 P.M. PST
MAR. 29	14	43	20.3	34.33 N.	116.45 W.	7	...	...	3.2P	...	P	MAR. 29	06 A.M. PST
MAR. 31	00	16	09.0	34.30 N.	116.48 W.	8	...	...	4.2P	...	P	MAR. 30	04 P.M. PST
APR. 2	10	27	28.6	34.28 N.	116.50 W.	1	...	...	3.2P	...	P	APR. 2	02 A.M. PST
APR. 2	10	56	23.6	38.48 N.	119.36 W.	24	...	...	3.0B	...	B	APR. 2	02 A.M. PST
APR. 2	21	15	4.1	34.28 N.	116.50 W.	3	...	...	3.3P	...	P	APR. 2	01 P.M. PST
APR. 6	16	13	5.4	34.60 N.	116.52 W.	3	...	...	3.7P	...	P	APR. 6	08 A.M. PST
APR. 7	05	55	39.5	34.28 N.	116.42 W.	3	...	...	3.0P	...	P	APR. 6	09 P.M. PST
APR. 9	17	32	24.9	34.42 N.	116.47 W.	3	...	...	3.5P	...	P	APR. 9	09 A.M. PST
APR. 11	23	53	55.9	34.25 N.	116.43 W.	3	...	...	3.0P	...	P	APR. 11	03 P.M. PST
APR. 12	04	44	44.7	34.28 N.	116.50 W.	1	...	...	3.2P	...	P	APR. 11	08 P.M. PST
APR. 12	06	52	3.7	34.27 N.	116.52 W.	1	...	...	3.0P	...	P	APR. 11	10 P.M. PST
APR. 18	23	21	35.4	36.15 N.	117.77 W.	4	...	...	3.1P	...	P	APR. 18	03 P.M. PST
APR. 19	14	22	47.3	34.10 N.	118.33 W.	7	...	...	2.5P	FELT	P	APR. 19	06 A.M. PST
APR. 19	22	39	56.8	34.37 N.	119.73 W.	4	...	...	3.3P	III	P	APR. 19	02 P.M. PST
APR. 21	06	00	38.3	33.78 N.	118.07 W.	5	...	...	3.1P	IV	P	APR. 20	10 P.M. PST
APR. 22	06	23	25.2	36.83 N.	121.40 W.	10	...	...	3.1B	FELT	B	APR. 21	10 P.M. PST
APR. 22	16	52	16.9	33.43 N.	116.55 W.	6	...	...	3.3P	...	P	APR. 22	08 A.M. PST
APR. 24	16	05	54.5	34.00 N.	116.45 W.	5	...	...	3.0P	...	P	APR. 24	08 A.M. PST
APR. 28	00	44	44.8	37.65 N.	122.46 W.	13	...	...	4.4B	V	B	APR. 27	04 P.M. PST
APR. 28	07	52	4.5	34.17 N.	117.33 W.	5	...	...	3.1P	...	P	APR. 27	11 P.M. PST
MAY 2	22	22	52.7	33.00 N.	115.57 W.	5	...	...	2.9P	FELT	P	MAY 2	02 P.M. PST
MAY 4	16	05	56.3	35.48 N.	118.57 W.	1	...	...	3.2P	...	P	MAY 4	08 A.M. PST
MAY 4	20	03	49.9	35.47 N.	118.57 W.	1	...	...	3.1P	...	P	MAY 4	12 M. PST
MAY 5	03	49	4.2	35.50 N.	118.57 W.	5	...	...	3.0P	...	P	MAY 4	07 P.M. PST
MAY 5	23	13	34.2	34.30 N.	116.45 W.	4	...	...	3.1P	...	P	MAY 5	03 P.M. PST
MAY 8	05	11	7.6	37.31 N.	121.67 W.	9	4.3	4.0	4.8B	VI	B	MAY 7	09 P.M. PST
MAY 11	01	06	52.8	34.30 N.	116.48 W.	5	...	...	3.3P	...	P	MAY 10	05 P.M. PST
MAY 12	02	03	55.6	34.22 N.	117.53 W.	6	...	...	3.4P	...	P	MAY 11	06 P.M. PST
MAY 12	10	11	2.3	34.30 N.	116.47 W.	7	...	...	3.3P	...	P	MAY 12	02 A.M. PST
MAY 16	03	25	23.6	33.85 N.	118.55 W.	5	...	...	2.7P	FELT	P	MAY 15	07 P.M. PST
MAY 16	04	26	0.8	33.37 N.	116.35 W.	5	...	...	3.2P	...	P	MAY 15	08 P.M. PST
MAY 16	10	24	52.2	32.98 N.	115.82 W.	5	...	...	3.4P	...	P	MAY 16	02 A.M. PST
MAY 20	12	04	47.9	34.07 N.	116.37 W.	5	...	...	3.7P	III	P	MAY 20	04 A.M. PST
MAY 21	05	19	4.0	34.10 N.	116.37 W.	8	...	...	3.0P	III	P	MAY 20	09 P.M. PST
MAY 27	14	28	7.2	36.53 N.	121.13 W.	2	...	...	3.3B	...	B	MAY 27	06 A.M. PST
MAY 27	14	51	50.6	37.62 N.	118.93 W.	5	...	...	3.5B	...	B	MAY 27	06 A.M. PST
MAY 27	16	28	3.9	36.53 N.	121.13 W.	3	...	...	3.3B	...	B	MAY 27	08 A.M. PST
MAY 28	10	59	46.3	34.93 N.	116.68 W.	5	...	...	3.3P	...	P	MAY 28	02 A.M. PST
MAY 29	20	50	20.0	37.58 N.	118.44 W.	10	...	...	3.4B	...	B	MAY 29	12 M. PST
MAY 30	13	08	34.1	35.88 N.	117.42 W.	4	...	...	3.1P	...	P	MAY 30	05 A.M. PST
JUNE 1	23	58	26.3	37.87 N.	122.21 W.	10	...	...	2.6B	FELT	B	JUNE 1	03 P.M. PST
JUNE 3	04	07	29.4	40.34 N.	124.23 W.	12	...	...	3.2B	III	B	JUNE 2	08 P.M. PST
JUNE 8	18	39	33.8	36.82 N.	121.55 W.	6	...	...	3.2B	...	B	JUNE 8	10 A.M. PST
JUNE 11	11	51	56.8	37.97 N.	122.05 W.	12	...	...	2.8B	IV	B	JUNE 11	03 A.M. PST
JUNE 13	03	36	15.9	33.17 N.	115.62 W.	6	...	...	3.0P	...	P	JUNE 12	07 P.M. PST
JUNE 13	07	09	58.1	33.08 N.	115.62 W.	6	...	...	3.7P	FELT	P	JUNE 12	11 P.M. PST
JUNE 13	19	37	52.3	33.12 N.	115.62 W.	6	...	...	3.0P	...	P	JUNE 13	11 A.M. PST
JUNE 13	19	46	45.9	33.10 N.	115.65 W.	6	...	...	4.1P	V	P	JUNE 13	11 A.M. PST
JUNE 13	20	19	30.9	33.07 N.	115.58 W.	6	...	...	3.0P	...	P	JUNE 13	12 M. PST
JUNE 13	20	21	11.3	33.12 N.	115.62 W.	6	...	...	3.3P	FELT	P	JUNE 13	12 M. PST
JUNE 14	07	35	4.9	35.73 N.	118.00 W.	5	...	...	3.4P	...	P	JUNE 13	11 P.M. PST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
CALIFORNIA--Continued													
JUNE 14	07	39	27.9	35.72 N.	118.02 W.	5	4.2	...	4.6P	VI	P	JUNE 13	11 P.M. PST
JUNE 14	08	45	45.7	35.73 N.	118.00 W.	5	...	...	3.7P	...	P	JUNE 14	12 P.M. PST
JUNE 15	08	38	41.3	33.05 N.	115.60 W.	9	...	...	3.1P	...	P	JUNE 15	12 P.M. PST
JUNE 15	12	01	7.0	34.83 N.	116.40 W.	7	...	...	3.9P	...	P	JUNE 15	04 A.M. PST
JUNE 15	16	09	5.5	33.07 N.	115.60 W.	10	...	...	3.0P	...	P	JUNE 15	08 A.M. PST
JUNE 15	22	31	37.2	33.10 N.	115.62 W.	2	...	...	3.4P	...	P	JUNE 15	02 P.M. PST
JUNE 16	00	25	14.1	33.07 N.	115.58 W.	15	...	...	3.9P	...	P	JUNE 15	04 P.M. PST
JUNE 16	02	10	3.2	33.07 N.	115.60 W.	12	...	...	3.0P	...	P	JUNE 15	06 P.M. PST
JUNE 16	03	07	17.4	33.10 N.	115.60 W.	11	...	...	3.3P	...	P	JUNE 15	07 P.M. PST
JUNE 16	04	13	59.1	33.08 N.	115.62 W.	9	...	...	3.2P	...	P	JUNE 15	08 P.M. PST
JUNE 16	22	44	59.5	37.58 N.	118.92 W.	13	...	...	4.3B	IV	B	JUNE 16	02 P.M. PST
JUNE 16	22	57	27.9	37.58 N.	118.92 W.	16	...	...	3.7B	...	B	JUNE 16	02 P.M. PST
JUNE 17	03	59	45.8	37.97 N.	122.04 W.	18	...	...	2.7B	FELT	B	JUNE 16	07 P.M. PST
JUNE 17	04	01	34.9	38.10 N.	122.04 W.	16	...	...	2.9B	FELT	B	JUNE 16	08 P.M. PST
JUNE 17	18	06	37.7	37.34 N.	119.98 W.	5	...	...	3.1B	IV	B	JUNE 17	10 A.M. PST
JUNE 19	17	17	19.9	33.10 N.	115.62 W.	6	...	...	3.1P	...	P	JUNE 19	09 A.M. PST
JUNE 20	05	30	35.8	34.03 N.	118.35 W.	5	...	...	3.0P	III	P	JUNE 19	09 P.M. PST
JUNE 22	06	54	58.4	34.95 N.	120.27 W.	4	...	...	2.5P	FELT	P	JUNE 21	10 P.M. PST
JUNE 25	09	04	37.0	37.85 N.	121.76 W.	8	...	...	3.3B	...	B	JUNE 25	01 A.M. PST
JUNE 26	14	28	55.6	37.52 N.	118.58 W.	10	...	...	3.7B	FELT	B	JUNE 26	06 A.M. PST
JUNE 26	15	13	58.2	37.53 N.	118.58 W.	10	...	...	3.4B	FELT	B	JUNE 26	07 A.M. PST
JUNE 29	05	53	20.5	34.25 N.	116.90 W.	6	4.1	...	4.5P	VI	P	JUNE 28	09 P.M. PST
JUNE 30	00	34	11.6	34.25 N.	116.90 W.	10	4.6	...	4.9P	VI	P	JUNE 29	04 P.M. PST
JUNE 30	00	42	43.5	34.25 N.	116.88 W.	10	...	...	3.2P	...	P	JUNE 29	04 P.M. PST
JUNE 30	06	56	32.9	34.23 N.	116.90 W.	10	...	...	3.4P	...	P	JUNE 29	10 P.M. PST
JUNE 30	07	03	52.9	34.25 N.	116.90 W.	10	4.0	...	4.4P	FELT	P	JUNE 29	11 P.M. PST
JULY 1	09	29	28.0	34.22 N.	116.92 W.	6	...	...	3.2P	FELT	P	JULY 1	01 A.M. PST
JULY 2	06	51	40.7	34.05 N.	117.55 W.	14	...	...	2.5P	FELT	P	JULY 1	10 P.M. PST
JULY 2	11	51	55.2	33.50 N.	116.49 W.	16	...	...	3.7P	FELT	P	JULY 2	03 A.M. PST
JULY 2	12	42	37.0	33.52 N.	116.49 W.	17	...	...	3.6P	FELT	P	JULY 2	04 A.M. PST
JULY 3	13	03	1.3	34.38 N.	119.78 W.	4	...	...	3.0P	III	P	JULY 3	05 A.M. PST
JULY 3	13	25	45.5	37.60 N.	121.98 W.	8	...	...	3.4B	IV	B	JULY 3	05 A.M. PST
JULY 3	13	35	4.3	34.37 N.	119.78 W.	4	...	...	3.3P	III	P	JULY 3	05 A.M. PST
JULY 9	21	20	40.9	36.55 N.	121.18 W.	5	...	...	3.1B	...	B	JULY 9	01 P.M. PST
JULY 10	05	20	27.3	32.95 N.	117.78 W.	6	...	...	3.1P	...	P	JULY 9	09 P.M. PST
JULY 10	08	23	23.2	37.86 N.	121.98 W.	17	...	...	3.7B	V	B	JULY 10	12 P.M. PST
JULY 13	02	26	3.4	34.27 N.	116.43 W.	5	...	...	4.0P	IV	P	JULY 12	06 P.M. PST
JULY 13	02	26	56.9	34.25 N.	116.43 W.	5	...	...	3.2P	...	P	JULY 12	06 P.M. PST
JULY 13	02	28	41.0	34.25 N.	116.45 W.	4	...	...	3.5P	...	P	JULY 12	06 P.M. PST
JULY 13	03	51	23.5	34.27 N.	116.43 W.	5	4.2	...	3.9P	III	P	JULY 12	07 P.M. PST
JULY 13	04	57	24.0	34.25 N.	116.42 W.	1	...	...	3.1P	...	P	JULY 12	08 P.M. PST
JULY 13	10	57	38.2	37.57 N.	122.39 W.	6	...	...	2.2B	FELT	B	JULY 13	02 A.M. PST
JULY 14	06	39	42.1	36.02 N.	120.12 W.	13	...	...	3.0B	...	B	JULY 13	10 P.M. PST
JULY 14	12	07	53.1	34.33 N.	116.42 W.	7	...	...	3.0P	...	P	JULY 14	04 A.M. PST
JULY 15	09	06	6.6	35.73 N.	119.82 W.	4	...	...	3.3P	...	P	JULY 15	01 A.M. PST
JULY 20	23	59	38.1	37.38 N.	118.60 W.	5	...	...	3.0P	...	P	JULY 20	03 P.M. PST
JULY 27	19	57	29.9	37.63 N.	118.94 W.	7	...	...	2.9B	...	B	JULY 27	11 A.M. PST
JULY 27	23	23	8.0	37.63 N.	118.92 W.	10	...	...	3.2B	FELT	B	JULY 27	03 P.M. PST
JULY 27	23	23	59.2	37.63 N.	118.93 W.	9	...	...	3.1B	...	B	JULY 27	03 P.M. PST
JULY 28	20	09	21.4	37.63 N.	118.93 W.	10	...	...	3.2B	...	B	JULY 28	12 M. PST
JULY 31	12	51	11.9	33.83 N.	118.10 W.	7	...	...	2.7P	IV	P	JULY 31	04 A.M. PST
AUG. 1	17	54	2.3	37.50 N.	118.80 W.	5	...	...	3.0P	...	P	AUG. 1	09 A.M. PST
AUG. 2	12	18	45.4	40.17 N.	123.98 W.	5	...	...	3.5B	III	G	AUG. 2	04 A.M. PST
AUG. 2	20	41	35.5	36.78 N.	121.57 W.	3	...	...	3.1B	III	B	AUG. 2	12 M. PST
AUG. 2	20	52	7.4	36.76 N.	121.57 W.	4	...	...	3.1B	...	B	AUG. 2	12 M. PST
AUG. 2	21	43	16.3	36.78 N.	121.57 W.	3	...	...	3.9B	IV	B	AUG. 2	01 P.M. PST
AUG. 3	04	30	42.3	37.63 N.	118.98 W.	2	...	...	3.2B	...	B	AUG. 2	08 P.M. PST
AUG. 3	04	33	53.2	37.63 N.	119.00 W.	2	...	...	3.3B	...	B	AUG. 2	08 P.M. PST
AUG. 6	07	03	15.5	33.87 N.	118.08 W.	3	...	...	2.0P	FELT	P	AUG. 5	11 P.M. PST
AUG. 6	17	05	22.7	37.10 N.	121.50 W.	6	5.4	5.7	5.9B	VII	B	AUG. 6	09 A.M. PST
AUG. 6	17	10	43.3	37.09 N.	121.48 W.	6	...	...	3.8B	FELT	B	AUG. 6	09 A.M. PST
AUG. 6	17	22	47.6	37.04 N.	121.48 W.	7	...	...	3.2B	FELT	B	AUG. 6	09 A.M. PST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
CALIFORNIA--Continued													
AUG. 6	18	04	57.4	34.42 N.	118.40 W.	6	...	...	2.8P	FELT	P	AUG. 6	10 A.M. PST
AUG. 6	22	21	1.7	37.03 N.	121.47 W.	6	...	...	3.6B	FELT	B	AUG. 6	02 P.M. PST
AUG. 6	22	33	55.4	37.00 N.	121.48 W.	4	...	...	4.4B	FELT	B	AUG. 6	02 P.M. PST
AUG. 6	22	35	57.6	36.98 N.	121.49 W.	5	...	...	2.9B	FELT	B	AUG. 6	02 P.M. PST
AUG. 6	22	36	4.9	36.99 N.	121.48 W.	1	...	...	3.8B	FELT	B	AUG. 6	02 P.M. PST
AUG. 6	23	36	0.6	37.05 N.	121.47 W.	4	...	...	2.8B	...	B	AUG. 6	03 P.M. PST
AUG. 7	02	32	31.6	36.98 N.	121.47 W.	5	...	...	2.9B	...	B	AUG. 6	06 P.M. PST
AUG. 7	05	56	51.6	37.06 N.	121.49 W.	4	...	...	3.1B	FELT	B	AUG. 6	09 P.M. PST
AUG. 7	18	51	46.5	36.99 N.	121.46 W.	1	...	...	2.5B	...	B	AUG. 7	10 A.M. PST
AUG. 7	19	01	41.3	36.98 N.	121.47 W.	2	...	...	2.5B	...	B	AUG. 7	11 A.M. PST
AUG. 7	19	11	25.7	36.98 N.	121.47 W.	2	...	...	3.2B	FELT	B	AUG. 7	11 A.M. PST
AUG. 8	03	52	14.4	36.99 N.	121.47 W.	2	...	...	2.6B	...	B	AUG. 7	07 P.M. PST
AUG. 8	22	56	7.9	37.03 N.	121.47 W.	4	...	...	3.4B	FELT	B	AUG. 8	02 P.M. PST
AUG. 9	05	28	48.6	36.98 N.	121.46 W.	6	...	...	2.7B	...	B	AUG. 8	09 P.M. PST
AUG. 9	07	03	20.2	37.01 N.	121.45 W.	6	...	...	4.2B	FELT	B	AUG. 8	11 P.M. PST
AUG. 9	12	49	27.5	36.98 N.	121.46 W.	3	...	...	3.5B	FELT	B	AUG. 9	04 A.M. PST
AUG. 9	12	51	41.7	36.97 N.	121.46 W.	5	...	...	2.5B	...	B	AUG. 9	04 A.M. PST
AUG. 9	14	39	5.6	37.48 N.	118.67 W.	5	...	...	3.0P	...	G	AUG. 9	06 A.M. PST
AUG. 10	00	25	20.8	37.02 N.	121.46 W.	5	...	...	3.7B	FELT	B	AUG. 9	04 P.M. PST
AUG. 10	04	50	40.0	36.96 N.	121.48 W.	5	...	...	3.0B	FELT	B	AUG. 9	08 P.M. PST
AUG. 10	05	10	42.9	36.98 N.	121.44 W.	5	...	...	2.7B	...	B	AUG. 9	09 P.M. PST
AUG. 10	12	37	0.3	36.96 N.	121.47 W.	5	...	...	2.5B	...	B	AUG. 10	04 A.M. PST
AUG. 10	19	22	26.8	36.97 N.	121.47 W.	1	...	...	2.5B	...	B	AUG. 10	11 A.M. PST
AUG. 11	09	40	19.3	36.98 N.	121.46 W.	2	...	...	2.8B	...	B	AUG. 11	01 A.M. PST
AUG. 11	16	42	32.7	36.97 N.	121.48 W.	5	...	...	2.6B	...	B	AUG. 11	08 A.M. PST
AUG. 11	20	29	35.2	37.14 N.	121.52 W.	5	...	...	3.4B	FELT	B	AUG. 11	12 M. PST
AUG. 13	10	13	1.0	34.28 N.	116.42 W.	4	...	...	3.3P	...	P	AUG. 13	02 A.M. PST
AUG. 13	19	02	52.5	37.88 N.	122.21 W.	13	...	...	2.3B	FELT	B	AUG. 13	11 A.M. PST
AUG. 13	19	18	46.8	37.86 N.	122.17 W.	9	...	...	3.5B	IV	B	AUG. 13	11 A.M. PST
AUG. 14	03	15	57.0	36.99 N.	121.47 W.	4	...	...	3.6B	FELT	B	AUG. 13	07 P.M. PST
AUG. 14	04	20	18.6	33.80 N.	117.80 W.	6	...	...	2.1P	FELT	P	AUG. 13	08 P.M. PST
AUG. 14	17	19	17.6	34.28 N.	116.43 W.	5	...	...	3.0P	...	P	AUG. 14	09 A.M. PST
AUG. 16	02	20	13.5	33.42 N.	116.62 W.	10	...	...	3.0P	...	P	AUG. 15	06 P.M. PST
AUG. 16	06	39	21.1	34.23 N.	116.90 W.	5	...	...	3.0P	...	P	AUG. 15	10 P.M. PST
AUG. 16	11	47	44.9	37.16 N.	121.55 W.	3	...	...	2.5B	...	B	AUG. 16	03 A.M. PST
AUG. 17	15	43	03.3	37.84 N.	122.23 W.	8	...	...	2.9B	FELT	B	AUG. 17	07 A.M. PST
AUG. 19	03	13	51.2	34.08 N.	117.22 W.	5	...	...	2.7P	FELT	P	AUG. 18	07 P.M. PST
AUG. 19	08	45	50.8	36.97 N.	121.46 W.	5	...	...	2.3B	IV	B	AUG. 19	12 P.M. PST
AUG. 21	13	18	7.0	34.55 N.	119.72 W.	6	...	...	3.1P	IV	P	AUG. 21	05 A.M. PST
AUG. 22	02	01	36.4	33.70 N.	116.85 W.	16	...	...	4.0P	IV	P	AUG. 21	06 P.M. PST
AUG. 24	04	46	51.6	37.84 N.	122.25 W.	7	...	...	2.9B	IV	B	AUG. 23	08 P.M. PST
AUG. 25	18	33	17.9	37.45 N.	118.67 W.	5	...	...	3.2P	...	P	AUG. 25	10 A.M. PST
AUG. 27	05	19	40.0	33.88 N.	115.90 W.	5	...	...	3.4P	...	P	AUG. 26	09 P.M. PST
AUG. 27	07	23	53.5	32.70 N.	115.90 W.	5	...	...	3.5P	FELT	P	AUG. 26	11 P.M. PST
AUG. 28	08	57	56.3	34.42 N.	117.73 W.	9	...	...	3.9P	IV	P	AUG. 28	12 P.M. PST
AUG. 29	09	19	24.9	33.97 N.	118.70 W.	7	...	...	2.7P	FELT	P	AUG. 29	01 A.M. PST
AUG. 31	18	53	45.1	37.84 N.	122.03 W.	8	...	...	2.7B	FELT	B	AUG. 31	10 A.M. PST
SEPT. 2	07	38	00.1	39.20 N.	122.86 W.	22	...	...	2.6B	III	B	SEPT. 1	11 P.M. PST
SEPT. 3	06	40	16.4	37.05 N.	121.49 W.	5	...	...	3.2B	...	B	SEPT. 2	10 P.M. PST
SEPT. 3	11	44	17.0	33.38 N.	116.33 W.	9	...	...	3.8P	...	P	SEPT. 3	03 A.M. PST
SEPT. 5	17	11	7.1	34.07 N.	118.90 W.	7	...	...	3.4P	FELT	P	SEPT. 5	09 A.M. PST
SEPT. 7	09	43	47.3	37.62 N.	118.91 W.	3	...	...	4.2B	IV	B	SEPT. 7	01 A.M. PST
SEPT. 7	10	17	20.4	33.40 N.	116.35 W.	7	...	...	3.0P	...	P	SEPT. 7	02 A.M. PST
SEPT. 9	20	48	30.7	37.84 N.	121.95 W.	1	...	...	2.9B	FELT	B	SEPT. 9	12 M. PST
SEPT. 10	06	16	4.2	37.15 N.	121.55 W.	6	...	...	3.0B	...	B	SEPT. 9	10 P.M. PST
SEPT. 10	19	26	52.6	37.55 N.	118.68 W.	5	...	...	2.7P	FELT	P	SEPT. 10	11 A.M. PST
SEPT. 14	01	04	5.0	37.11 N.	121.94 W.	15	...	...	3.2B	FELT	B	SEPT. 13	05 P.M. PST
SEPT. 14	07	41	14.6	37.46 N.	118.54 W.	19	...	...	3.0B	...	B	SEPT. 13	11 P.M. PST
SEPT. 16	08	55	40.7	33.47 N.	116.52 W.	17	...	...	3.0P	...	P	SEPT. 16	12 P.M. PST
SEPT. 17	19	19	13.1	37.04 N.	121.49 W.	5	...	...	3.0B	...	B	SEPT. 17	11 A.M. PST
SEPT. 19	02	44	40.0	39.79 N.	120.79 W.	14	...	...	3.2B	...	B	SEPT. 18	06 P.M. PST
SEPT. 20	03	05	24.8	37.88 N.	122.30 W.	10	...	...	2.5B	FELT	B	SEPT. 19	07 P.M. PST
SEPT. 22	09	09	49.5	32.98 N.	116.28 W.	7	...	...	3.1P	...	P	SEPT. 22	01 A.M. PST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
CALIFORNIA--Continued													
SEPT. 23	20	00	58.2	34.22 N.	116.37 W.	5	...	...	3.1P	...	P	SEPT. 23	12 M. PST
SEPT. 24	07	47	56.6	34.15 N.	116.67 W.	5	...	...	3.2P	...	P	SEPT. 23	11 P.M. PST
SEPT. 24	13	05	3.2	37.66 N.	118.94 W.	5	...	...	4.1B	IV	B	SEPT. 24	05 A.M. PST
SEPT. 24	14	26	18.5	37.66 N.	118.94 W.	5	...	...	3.6B	FELT	B	SEPT. 24	06 A.M. PST
SEPT. 24	15	01	19.3	37.66 N.	118.94 W.	5	...	...	3.1B	...	B	SEPT. 24	07 A.M. PST
SEPT. 26	21	45	35.2	37.62 N.	118.91 W.	16	...	...	3.4B	...	B	SEPT. 26	01 P.M. PST
SEPT. 26	22	29	36.9	33.75 N.	116.00 W.	4	...	...	3.4P	...	P	SEPT. 26	02 P.M. PST
SEPT. 26	22	30	12.7	33.75 N.	116.05 W.	6	...	...	3.1P	...	P	SEPT. 26	02 P.M. PST
SEPT. 27	06	14	50.2	36.79 N.	121.59 W.	2	...	...	2.9B	FELT	B	SEPT. 26	10 P.M. PST
SEPT. 28	20	08	26.2	34.03 N.	118.32 W.	6	...	...	2.2P	FELT	P	SEPT. 28	12 M. PST
OCT. 1	11	52	00.7	37.60 N.	118.86 W.	10	...	...	2.9B	FELT	B	OCT. 1	03 A.M. PST
OCT. 1	11	52	20.6	37.54 N.	118.82 W.	10	...	...	3.2B	FELT	B	OCT. 1	03 A.M. PST
OCT. 1	12	37	2.3	37.60 N.	118.85 W.	12	...	...	3.0B	FELT	B	OCT. 1	04 A.M. PST
OCT. 3	08	54	24.8	37.63 N.	118.91 W.	12	...	...	3.1B	FELT	B	OCT. 3	12 P.M. PST
OCT. 3	08	58	30.8	37.62 N.	118.91 W.	10	...	...	3.0B	FELT	B	OCT. 3	12 P.M. PST
OCT. 4	13	44	17.8	33.60 N.	117.23 W.	5	...	...	3.4P	III	P	OCT. 4	05 A.M. PST
OCT. 5	04	51	38.6	37.52 N.	118.77 W.	5	...	...	3.0P	...	P	OCT. 4	08 P.M. PST
OCT. 7	20	54	41.4	38.22 N.	119.35 W.	9	4.1	...	5.0B	IV	B	OCT. 7	12 M. PST
OCT. 7	21	10	0.0	38.23 N.	119.36 W.	10	...	...	3.9B	...	B	OCT. 7	01 P.M. PST
OCT. 7	21	20	53.0	38.23 N.	119.36 W.	11	...	...	4.4B	FELT	B	OCT. 7	01 P.M. PST
OCT. 7	21	45	23.8	38.21 N.	119.33 W.	8	...	...	4.1B	...	B	OCT. 7	01 P.M. PST
OCT. 7	23	31	44.8	38.21 N.	119.33 W.	10	...	...	3.8B	...	B	OCT. 7	03 P.M. PST
OCT. 8	00	23	54.6	38.23 N.	119.36 W.	10	...	...	3.7B	...	B	OCT. 7	04 P.M. PST
OCT. 8	00	47	44.8	38.22 N.	119.36 W.	9	...	...	4.0B	...	B	OCT. 7	04 P.M. PST
OCT. 8	03	34	24.0	38.21 N.	119.32 W.	9	...	...	4.6B	FELT	B	OCT. 7	07 P.M. PST
OCT. 8	09	38	36.4	38.21 N.	119.33 W.	10	...	...	3.8B	...	B	OCT. 8	01 A.M. PST
OCT. 8	11	26	43.1	32.98 N.	116.28 W.	9	...	...	3.5P	...	P	OCT. 8	03 A.M. PST
OCT. 8	12	14	2.0	38.23 N.	119.35 W.	9	...	...	4.1B	...	B	OCT. 8	04 A.M. PST
OCT. 9	22	00	10.4	38.21 N.	119.34 W.	8	...	...	4.2B	...	B	OCT. 9	02 P.M. PST
OCT. 13	20	46	12.0	36.81 N.	121.56 W.	4	...	...	3.4B	...	B	OCT. 13	12 M. PST
OCT. 15	23	16	54.5	32.63 N.	115.33 W.	12	5.7	6.9	6.6P	IX	P	OCT. 15	03 P.M. PST
OCT. 15	23	35	20.3	32.92 N.	115.55 W.	2	...	...	3.5P	...	P	OCT. 15	03 P.M. PST
OCT. 15	23	43	14.1	32.58 N.	115.43 W.	2	...	...	3.4P	...	P	OCT. 15	03 P.M. PST
OCT. 15	23	55	4.7	32.90 N.	115.55 W.	1	4.2	...	4.3P	...	P	OCT. 15	03 P.M. PST
OCT. 16	01	00	13.9	32.91 N.	115.53 W.	5	4.3	...	4.6P	...	P	OCT. 15	05 P.M. PST
OCT. 16	01	07	12.3	32.83 N.	115.48 W.	5	...	...	3.6P	...	P	OCT. 15	05 P.M. PST
OCT. 16	01	14	23.0	32.88 N.	115.45 W.	4	...	...	4.3P	...	P	OCT. 15	05 P.M. PST
OCT. 16	01	33	49.0	32.83 N.	115.47 W.	5	...	...	3.5P	...	P	OCT. 15	05 P.M. PST
OCT. 16	01	39	6.6	32.97 N.	115.43 W.	5	...	...	4.0P	...	P	OCT. 15	05 P.M. PST
OCT. 16	02	10	19.5	32.82 N.	115.40 W.	5	...	...	3.8P	...	P	OCT. 15	06 P.M. PST
OCT. 16	03	01	57.8	32.80 N.	115.45 W.	5	...	...	3.0P	...	P	OCT. 15	07 P.M. PST
OCT. 16	03	09	44.9	32.82 N.	115.45 W.	5	...	...	3.5P	...	P	OCT. 15	07 P.M. PST
OCT. 16	03	10	47.1	32.96 N.	115.55 W.	9	4.5	...	4.5P	...	P	OCT. 15	07 P.M. PST
OCT. 16	03	16	27.5	32.83 N.	115.42 W.	5	...	...	4.1P	...	P	OCT. 15	07 P.M. PST
OCT. 16	03	39	34.8	32.97 N.	115.55 W.	10	4.4	...	4.4P	...	P	OCT. 15	07 P.M. PST
OCT. 16	04	32	33.9	32.87 N.	115.45 W.	5	...	...	3.8P	...	P	OCT. 15	08 P.M. PST
OCT. 16	05	16	15.2	32.83 N.	115.48 W.	5	...	...	3.5P	...	P	OCT. 15	09 P.M. PST
OCT. 16	05	18	3.6	32.98 N.	115.48 W.	5	...	...	3.5P	...	P	OCT. 15	09 P.M. PST
OCT. 16	05	23	1.8	32.82 N.	115.47 W.	5	...	...	3.2P	...	P	OCT. 15	09 P.M. PST
OCT. 16	05	38	2.3	32.88 N.	115.52 W.	5	...	...	3.1P	...	P	OCT. 15	09 P.M. PST
OCT. 16	05	41	17.7	32.82 N.	115.50 W.	5	...	...	3.0P	...	P	OCT. 15	09 P.M. PST
OCT. 16	05	49	10.8	33.02 N.	115.57 W.	5	4.9	...	5.0P	...	P	OCT. 15	09 P.M. PST
OCT. 16	06	12	0.9	32.91 N.	112.52 W.	5	...	...	4.0P	...	P	OCT. 15	10 P.M. PST
OCT. 16	06	19	48.7	32.93 N.	115.54 W.	9	4.8	5.4	5.5B	...	P	OCT. 15	10 P.M. PST
OCT. 16	06	55	23.6	32.98 N.	115.58 W.	5	4.3	...	4.5P	...	P	OCT. 15	10 P.M. PST
OCT. 16	06	58	43.2	33.02 N.	115.58 W.	5	5.2	5.7	5.4P	VI	P	OCT. 15	10 P.M. PST
OCT. 16	07	23	26.0	32.82 N.	115.42 W.	5	4.3	...	4.2P	...	P	OCT. 15	11 P.M. PST
OCT. 16	07	35	3.2	32.82 N.	115.48 W.	6	...	...	3.5P	...	P	OCT. 15	11 P.M. PST
OCT. 16	08	09	43.1	32.95 N.	115.48 W.	5	...	...	3.5P	...	P	OCT. 16	12 P.M. PST
OCT. 16	08	14	34.0	32.82 N.	115.47 W.	5	...	...	3.0P	...	P	OCT. 16	12 P.M. PST
OCT. 16	08	37	54.3	32.82 N.	115.45 W.	5	...	...	3.4P	...	P	OCT. 16	12 P.M. PST
OCT. 16	09	23	21.8	32.92 N.	115.52 W.	5	...	...	3.9P	...	P	OCT. 16	01 A.M. PST
OCT. 16	09	33	53.3	32.97 N.	115.53 W.	5	...	...	3.6P	...	P	OCT. 16	01 A.M. PST
OCT. 16	09	36	43.0	32.90 N.	115.45 W.	4	4.1	...	4.0P	...	P	OCT. 16	01 A.M. PST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
CALIFORNIA--Continued													
OCT. 16	09	57	4.8	32.60 N.	115.50 W.	5	...	...	3.2P	...	P	OCT. 16	01 A.M. PST
OCT. 16	10	11	54.9	32.97 N.	115.55 W.	5	...	...	3.8P	...	P	OCT. 16	02 A.M. PST
OCT. 16	10	30	1.9	32.82 N.	115.45 W.	5	...	...	3.6P	...	P	OCT. 16	02 A.M. PST
OCT. 16	10	34	38.5	32.97 N.	115.52 W.	5	...	...	3.7P	...	P	OCT. 16	02 A.M. PST
OCT. 16	10	51	27.8	32.93 N.	115.55 W.	5	...	...	4.0P	...	P	OCT. 16	02 A.M. PST
OCT. 16	11	15	57.0	33.05 N.	115.62 W.	5	...	...	3.5P	...	P	OCT. 16	03 A.M. PST
OCT. 16	11	19	12.7	33.00 N.	115.57 W.	5	...	...	3.8P	...	P	OCT. 16	03 A.M. PST
OCT. 16	11	46	56.2	32.90 N.	115.55 W.	5	4.5	...	4.8P	...	P	OCT. 16	03 A.M. PST
OCT. 16	12	01	45.7	32.88 N.	115.48 W.	5	4.2	...	4.0P	...	P	OCT. 16	04 A.M. PST
OCT. 16	12	25	47.4	32.98 N.	115.55 W.	5	...	...	3.4P	...	P	OCT. 16	04 A.M. PST
OCT. 16	12	49	5.5	33.00 N.	115.57 W.	5	...	...	3.3P	...	P	OCT. 16	04 A.M. PST
OCT. 16	12	54	16.2	32.85 N.	115.47 W.	5	...	...	3.1P	...	P	OCT. 16	04 A.M. PST
OCT. 16	12	58	0.4	33.05 N.	115.57 W.	5	...	...	3.8P	...	P	OCT. 16	04 A.M. PST
OCT. 16	13	14	57.5	32.80 N.	115.47 W.	5	...	...	3.0P	...	P	OCT. 16	05 A.M. PST
OCT. 16	13	33	32.8	33.05 N.	115.57 W.	5	...	...	3.1P	...	P	OCT. 16	05 A.M. PST
OCT. 16	14	08	33.9	33.02 N.	115.68 W.	5	...	...	3.2P	...	P	OCT. 16	06 A.M. PST
OCT. 16	14	20	7.9	32.93 N.	115.55 W.	5	...	...	3.3P	...	P	OCT. 16	06 A.M. PST
OCT. 16	15	00	2.0	33.07 N.	115.55 W.	5	...	...	4.0P	...	P	OCT. 16	07 A.M. PST
OCT. 16	15	05	41.7	33.07 N.	115.60 W.	5	...	...	3.3P	...	P	OCT. 16	07 A.M. PST
OCT. 16	15	09	6.6	32.93 N.	115.63 W.	5	...	...	3.2P	...	P	OCT. 16	07 A.M. PST
OCT. 16	15	13	14.2	33.07 N.	115.55 W.	6	...	...	3.0P	...	P	OCT. 16	07 A.M. PST
OCT. 16	15	16	1.5	33.03 N.	115.60 W.	6	...	...	3.3P	...	P	OCT. 16	07 A.M. PST
OCT. 16	16	37	16.3	32.98 N.	115.58 W.	4	...	...	3.4P	...	P	OCT. 16	08 A.M. PST
OCT. 16	17	22	54.9	33.02 N.	115.53 W.	5	...	...	3.8P	...	P	OCT. 16	09 A.M. PST
OCT. 16	19	07	56.4	33.03 N.	115.60 W.	5	...	...	3.2P	...	P	OCT. 16	11 A.M. PST
OCT. 16	21	48	43.9	33.07 N.	115.60 W.	6	...	...	3.9P	...	P	OCT. 16	01 P.M. PST
OCT. 16	22	32	22.2	33.10 N.	115.58 W.	5	...	...	3.2P	...	P	OCT. 16	02 P.M. PST
OCT. 16	23	12	36.9	33.07 N.	115.53 W.	6	...	...	3.3P	...	P	OCT. 16	03 P.M. PST
OCT. 16	23	16	32.7	33.07 N.	115.57 W.	7	5.4	4.8	4.9P	...	P	OCT. 16	03 P.M. PST
OCT. 16	23	23	52.4	32.82 N.	115.47 W.	5	...	...	3.3P	...	P	OCT. 16	03 P.M. PST
OCT. 17	00	00	59.5	33.18 N.	115.55 W.	5	...	...	3.0P	...	P	OCT. 16	04 P.M. PST
OCT. 17	00	06	22.0	33.07 N.	115.55 W.	6	...	...	3.2P	...	P	OCT. 16	04 P.M. PST
OCT. 17	00	14	55.7	33.07 N.	115.62 W.	5	...	...	3.2P	...	P	OCT. 16	04 P.M. PST
OCT. 17	00	15	17.2	32.78 N.	115.50 W.	6	...	...	3.2P	...	P	OCT. 16	04 P.M. PST
OCT. 17	01	29	52.8	32.97 N.	115.55 W.	6	...	...	3.2P	...	P	OCT. 16	05 P.M. PST
OCT. 17	02	13	17.9	33.25 N.	115.67 W.	5	...	...	3.1P	...	P	OCT. 16	06 P.M. PST
OCT. 17	02	28	18.8	33.08 N.	115.55 W.	5	...	...	3.4P	...	P	OCT. 16	06 P.M. PST
OCT. 17	06	14	2.3	33.08 N.	115.55 W.	8	...	...	3.5P	...	P	OCT. 16	10 P.M. PST
OCT. 17	08	38	52.7	33.03 N.	115.38 W.	8	...	...	3.1P	...	P	OCT. 17	12 P.M. PST
OCT. 17	09	17	22.8	33.15 N.	115.65 W.	6	...	...	3.2P	...	P	OCT. 17	01 A.M. PST
OCT. 17	16	17	36.3	33.00 N.	115.57 W.	5	...	...	3.3P	...	P	OCT. 17	08 A.M. PST
OCT. 17	19	03	2.3	32.82 N.	115.48 W.	2	...	...	3.4P	...	P	OCT. 17	11 A.M. PST
OCT. 17	19	14	38.1	32.97 N.	115.60 W.	7	...	...	4.1P	FELT	P	OCT. 17	11 A.M. PST
OCT. 17	20	52	36.8	33.90 N.	118.63 W.	6	4.5	...	4.2P	V	P	OCT. 17	12 M. PST
OCT. 17	22	45	33.4	33.10 N.	115.55 W.	5	4.8	...	4.5P	FELT	P	OCT. 17	02 P.M. PST
OCT. 17	22	50	32.0	33.03 N.	115.50 W.	5	...	...	3.2P	...	P	OCT. 17	02 P.M. PST
OCT. 17	22	54	20.5	33.03 N.	115.52 W.	4	...	...	3.4P	...	P	OCT. 17	02 P.M. PST
OCT. 17	23	27	31.1	33.03 N.	115.50 W.	4	...	...	3.2P	...	P	OCT. 17	03 P.M. PST
OCT. 17	23	35	29.2	33.08 N.	115.48 W.	5	...	...	3.2P	...	P	OCT. 17	03 P.M. PST
OCT. 18	00	29	48.4	33.17 N.	115.67 W.	8	...	...	3.2P	...	P	OCT. 17	04 P.M. PST
OCT. 18	02	14	47.9	33.15 N.	115.65 W.	6	...	...	3.0P	...	P	OCT. 17	06 P.M. PST
OCT. 18	03	17	16.5	32.97 N.	115.60 W.	6	...	...	3.6P	...	P	OCT. 17	07 P.M. PST
OCT. 18	04	25	43.2	33.93 N.	118.65 W.	16	...	...	3.0P	FELT	P	OCT. 17	08 P.M. PST
OCT. 18	04	40	55.5	33.15 N.	115.63 W.	5	...	...	3.0P	...	P	OCT. 17	08 P.M. PST
OCT. 18	12	01	9.7	32.97 N.	115.62 W.	9	...	...	3.5P	...	P	OCT. 18	04 A.M. PST
OCT. 18	13	20	26.9	32.88 N.	115.50 W.	5	...	...	3.2P	...	P	OCT. 18	05 A.M. PST
OCT. 18	14	56	19.9	33.03 N.	115.50 W.	4	...	...	3.3P	...	P	OCT. 18	06 A.M. PST
OCT. 18	19	18	57.9	32.97 N.	115.62 W.	15	...	...	3.2P	...	P	OCT. 18	11 A.M. PST
OCT. 19	10	35	8.6	32.98 N.	115.58 W.	5	...	...	3.4P	...	P	OCT. 19	02 A.M. PST
OCT. 19	12	22	37.7	34.20 N.	117.53 W.	7	...	...	4.1P	V	P	OCT. 19	04 A.M. PST
OCT. 19	19	42	38.3	32.73 N.	115.37 W.	4	...	...	3.3P	...	P	OCT. 19	11 A.M. PST
OCT. 20	05	04	7.3	33.00 N.	115.57 W.	5	...	...	3.0P	...	P	OCT. 19	09 P.M. PST
OCT. 20	06	25	38.5	36.56 N.	121.20 W.	9	...	...	3.4B	...	B	OCT. 19	10 P.M. PST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
CALIFORNIA--Continued													
OCT. 20	11	35	33.0	32.88 N.	115.47 W.	5	...	...	3.0P	...	P	OCT. 20	03 A.M. PST
OCT. 20	14	52	55.3	32.83 N.	115.52 W.	7	...	...	3.3P	...	P	OCT. 20	06 A.M. PST
OCT. 20	20	52	22.7	33.15 N.	115.65 W.	1	...	...	3.0P	...	P	OCT. 20	12 M. PST
OCT. 21	18	17	57.8	32.98 N.	115.53 W.	5	...	...	3.3P	...	P	OCT. 21	10 A.M. PST
OCT. 23	01	13	13.6	32.98 N.	115.57 W.	7	...	...	3.1P	...	P	OCT. 22	05 P.M. PST
OCT. 23	10	55	37.9	40.43 N.	124.27 W.	19	...	...	4.0B	FELT	B	OCT. 23	02 A.M. PST
OCT. 24	06	44	31.2	33.05 N.	115.48 W.	5	...	...	3.1P	...	P	OCT. 23	10 P.M. PST
OCT. 24	13	32	50.0	34.18 N.	116.42 W.	8	...	...	3.4P	IV	P	OCT. 24	05 A.M. PST
OCT. 28	23	12	25.7	37.50 N.	118.80 W.	5	...	...	3.0P	FELT	P	OCT. 28	03 P.M. PST
OCT. 31	11	43	46.4	32.88 N.	115.48 W.	5	...	...	3.4P	FELT	P	OCT. 31	03 A.M. PST
NOV. 1	09	29	33.5	33.10 N.	115.62 W.	8	...	...	3.0P	...	P	NOV. 1	01 A.M. PST
NOV. 2	08	58	6.1	32.63 N.	115.72 W.	3	...	...	3.0P	...	P	NOV. 2	12 P.M. PST
NOV. 4	09	30	30.5	33.02 N.	115.62 W.	5	...	...	3.0P	...	P	NOV. 4	01 A.M. PST
NOV. 4	17	13	30.8	33.08 N.	115.55 W.	5	...	...	3.6P	IV	P	NOV. 4	09 A.M. PST
NOV. 5	22	37	2.4	35.40 N.	118.62 W.	8	...	...	3.1P	...	P	NOV. 5	02 P.M. PST
NOV. 5	22	44	31.5	33.20 N.	116.00 W.	6	...	...	3.2P	...	P	NOV. 5	02 P.M. PST
NOV. 5	23	10	22.3	37.62 N.	118.90 W.	9	...	...	2.6B	...	B	NOV. 5	03 P.M. PST
NOV. 6	04	30	59.0	32.92 N.	116.20 W.	7	...	...	3.2P	IV	P	NOV. 5	08 P.M. PST
NOV. 7	06	27	24.0	37.62 N.	118.91 W.	11	...	...	3.8B	FELT	B	NOV. 6	10 P.M. PST
NOV. 7	21	50	6.4	34.32 N.	116.40 W.	7	...	...	3.0P	...	P	NOV. 7	01 P.M. PST
NOV. 9	09	00	52.8	37.62 N.	118.89 W.	7	...	...	3.3B	FELT	B	NOV. 9	01 A.M. PST
NOV. 9	10	12	54.5	37.59 N.	118.90 W.	3	...	...	4.0B	FELT	B	NOV. 9	02 A.M. PST
NOV. 9	17	33	14.8	37.62 N.	118.89 W.	7	...	...	2.9B	...	B	NOV. 9	09 A.M. PST
NOV. 9	17	46	58.3	37.62 N.	118.88 W.	14	...	...	4.0B	FELT	B	NOV. 9	09 A.M. PST
NOV. 9	17	54	15.0	37.60 N.	118.88 W.	3	...	...	4.3B	IV	B	NOV. 9	09 A.M. PST
NOV. 9	20	10	58.2	37.62 N.	118.90 W.	15	...	...	3.1B	...	B	NOV. 9	12 M. PST
NOV. 9	20	38	54.6	37.62 N.	118.89 W.	15	...	...	3.3P	...	B	NOV. 9	12 M. PST
NOV. 9	21	04	49.2	37.62 N.	118.90 W.	13	...	...	3.6B	FELT	B	NOV. 9	01 P.M. PST
NOV. 9	22	26	54.4	37.62 N.	118.90 W.	14	...	...	3.4B	FELT	B	NOV. 9	02 P.M. PST
NOV. 9	22	59	33.3	37.63 N.	118.90 W.	16	...	...	3.6B	FELT	B	NOV. 9	02 P.M. PST
NOV. 9	23	03	58.2	32.90 N.	115.48 W.	8	...	...	3.0P	...	P	NOV. 9	03 P.M. PST
NOV. 10	09	45	8.9	37.62 N.	118.91 W.	17	...	...	4.0B	FELT	B	NOV. 10	01 A.M. PST
NOV. 12	14	09	51.9	37.62 N.	118.90 W.	12	...	...	3.2P	...	B	NOV. 12	06 A.M. PST
NOV. 13	07	56	55.1	36.90 N.	121.49 W.	10	...	...	2.8B	...	B	NOV. 12	11 P.M. PST
NOV. 13	22	14	47.3	37.63 N.	118.92 W.	10	...	...	3.3B	...	B	NOV. 13	02 P.M. PST
NOV. 14	01	05	44.7	37.61 N.	118.92 W.	10	...	...	3.4B	FELT	B	NOV. 13	05 P.M. PST
NOV. 15	20	51	33.8	37.61 N.	118.87 W.	17	...	...	3.3B	FELT	B	NOV. 15	12 M. PST
NOV. 16	21	48	25.6	37.60 N.	118.87 W.	18	...	...	3.8B	FELT	B	NOV. 16	01 P.M. PST
NOV. 16	21	50	9.7	37.61 N.	118.89 W.	10	...	...	3.2B	...	B	NOV. 16	01 P.M. PST
NOV. 17	18	46	40.7	37.60 N.	118.87 W.	18	...	...	3.3B	...	B	NOV. 17	10 A.M. PST
NOV. 17	21	47	52.3	37.61 N.	118.87 W.	10	...	...	3.1B	...	B	NOV. 17	01 P.M. PST
NOV. 19	04	55	52.4	37.62 N.	118.91 W.	18	...	...	3.2B	...	B	NOV. 18	08 P.M. PST
NOV. 19	08	17	35.2	37.62 N.	118.89 W.	19	...	...	3.2B	...	B	NOV. 19	12 P.M. PST
NOV. 19	17	39	57.4	32.98 N.	115.58 W.	5	...	...	3.0P	...	P	NOV. 19	09 A.M. PST
NOV. 20	17	23	59.0	37.61 N.	118.88 W.	14	...	...	4.2B	FELT	B	NOV. 20	09 A.M. PST
NOV. 21	08	59	46.6	37.61 N.	118.88 W.	9	...	...	3.1B	...	B	NOV. 21	12 P.M. PST
NOV. 22	11	54	14.0	37.53 N.	118.73 W.	5	...	...	3.1P	...	P	NOV. 22	03 A.M. PST
NOV. 22	19	44	11.3	35.65 N.	118.38 W.	4	...	...	3.0P	...	P	NOV. 22	11 A.M. PST
NOV. 23	06	38	29.6	35.33 N.	118.78 W.	7	...	...	3.0P	...	P	NOV. 22	10 P.M. PST
NOV. 23	11	09	14.9	36.45 N.	117.85 W.	7	...	...	3.0P	...	P	NOV. 23	03 A.M. PST
NOV. 24	04	29	30.1	37.61 N.	118.84 W.	7	...	...	3.1B	...	B	NOV. 23	08 P.M. PST
NOV. 25	06	47	00.1	37.60 N.	118.86 W.	6	...	...	2.9B	FELT	B	NOV. 24	10 P.M. PST
NOV. 26	12	40	08.6	37.86 N.	121.99 W.	7	...	...	3.0B	FELT	B	NOV. 26	04 A.M. PST
NOV. 26	12	43	57.6	37.86 N.	122.00 W.	5	...	...	2.8B	FELT	B	NOV. 26	04 A.M. PST
NOV. 26	17	26	30.9	37.61 N.	118.83 W.	12	...	...	3.1B	...	B	NOV. 26	09 A.M. PST
NOV. 27	14	39	3.5	38.43 N.	119.09 W.	8	...	...	3.1B	...	B	NOV. 27	06 A.M. PST
NOV. 28	00	56	58.6	37.04 N.	121.47 W.	1	...	...	2.9B	...	B	NOV. 27	04 P.M. PST
NOV. 28	10	53	18.0	33.97 N.	118.65 W.	12	...	...	2.7P	FELT	P	NOV. 28	02 A.M. PST
NOV. 29	08	23	31.3	37.61 N.	118.84 W.	2	...	...	3.3B	...	B	NOV. 29	12 P.M. PST
NOV. 29	15	09	41.0	35.63 N.	118.38 W.	3	...	...	2.7P	FELT	P	NOV. 29	07 A.M. PST
NOV. 30	05	25	35.0	37.63 N.	118.89 W.	12	...	...	3.1B	...	B	NOV. 29	09 P.M. PST
DEC. 2	00	46	27.7	32.63 N.	116.02 W.	13	...	...	3.9P	III	P	DEC. 1	04 P.M. PST
DEC. 2	18	09	21.1	33.93 N.	118.65 W.	7	...	...	2.7P	FELT	P	DEC. 2	10 A.M. PST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
CALIFORNIA--Continued													
DEC. 6	07	14	49.3	37.15 N.	121.52 W.	9	...	...	3.0B	...	B	DEC. 5	11 P.M. PST
DEC. 6	19	32	38.9	37.60 N.	118.87 W.	15	...	...	4.2B	FELT	B	DEC. 6	11 A.M. PST
DEC. 7	23	54	36.1	33.98 N.	116.70 W.	5	...	...	3.3P	...	P	DEC. 7	03 P.M. PST
DEC. 8	13	19	19.8	37.61 N.	118.88 W.	8	...	...	3.0B	...	B	DEC. 8	05 A.M. PST
DEC. 8	13	20	50.3	37.61 N.	118.88 W.	10	...	...	3.0B	...	B	DEC. 8	05 A.M. PST
DEC. 8	21	38	52.4	37.60 N.	118.90 W.	16	...	...	4.3B	FELT	B	DEC. 8	01 P.M. PST
DEC. 9	02	08	16.8	37.61 N.	118.86 W.	14	...	...	3.5B	FELT	B	DEC. 8	06 P.M. PST
DEC. 9	08	32	3.3	37.62 N.	118.90 W.	10	...	...	3.2B	...	B	DEC. 9	12 P.M. PST
DEC. 10	11	11	59.3	37.62 N.	118.80 W.	5	...	...	3.0P	...	G	DEC. 10	03 A.M. PST
DEC. 11	12	05	02.2	37.74 N.	122.13 W.	6	...	...	2.5B	FELT	B	DEC. 11	04 A.M. PST
DEC. 11	18	32	39.7	37.60 N.	118.89 W.	5	...	...	3.1P	...	G	DEC. 11	10 A.M. PST
DEC. 14	06	02	11.4	37.60 N.	118.95 W.	6	...	...	3.3B	...	B	DEC. 13	10 P.M. PST
DEC. 16	06	00	54.3	33.97 N.	118.67 W.	9	...	...	3.2P	FELT	P	DEC. 15	10 P.M. PST
DEC. 16	06	29	27.0	37.59 N.	118.86 W.	2	...	...	3.6B	FELT	B	DEC. 15	10 P.M. PST
DEC. 16	06	51	53.3	37.16 N.	118.60 W.	7	...	...	3.4B	...	B	DEC. 15	10 P.M. PST
DEC. 16	10	44	15.8	37.60 N.	118.87 W.	13	...	...	3.4B	FELT	B	DEC. 16	02 A.M. PST
DEC. 17	06	54	53.1	37.06 N.	121.50 W.	11	...	...	2.9B	IV	B	DEC. 16	10 P.M. PST
DEC. 18	00	59	23.5	35.64 N.	118.08 W.	5	...	...	3.2B	...	G	DEC. 17	04 P.M. PST
DEC. 18	11	59	48.5	34.07 N.	117.15 W.	6	...	...	2.7P	IV	P	DEC. 18	03 A.M. PST
DEC. 18	12	00	16.5	34.07 N.	117.13 W.	2	...	...	2.9P	FELT	P	DEC. 18	04 A.M. PST
DEC. 18	15	37	13.8	34.02 N.	117.12 W.	8	...	...	3.3P	FELT	P	DEC. 18	07 A.M. PST
DEC. 19	18	11	5.2	34.02 N.	117.12 W.	5	...	...	2.7P	FELT	P	DEC. 19	10 A.M. PST
DEC. 20	02	27	36.8	37.62 N.	118.96 W.	10	...	...	3.5B	...	B	DEC. 19	06 P.M. PST
DEC. 20	05	02	19.6	38.80 N.	122.80 W.	4	...	...	3.0B	FELT	B	DEC. 19	09 P.M. PST
DEC. 20	12	29	56.1	37.59 N.	122.37 W.	15	...	...	2.0B	FELT	B	DEC. 20	04 A.M. PST
DEC. 20	20	31	52.0	34.28 N.	117.47 W.	6	...	...	3.2P	...	P	DEC. 20	12 M. PST
DEC. 21	20	40	25.3	32.78 N.	115.38 W.	5	4.5	...	4.6P	VI	P	DEC. 21	12 M. PST
DEC. 22	09	32	6.9	37.70 N.	118.87 W.	5	...	...	3.0P	...	G	DEC. 22	01 A.M. PST
DEC. 22	18	54	15.7	36.68 N.	121.37 W.	5	...	...	3.3B	...	B	DEC. 22	10 A.M. PST
DEC. 23	06	34	14.5	33.10 N.	115.60 W.	10	...	...	3.3P	...	P	DEC. 22	10 P.M. PST
DEC. 24	13	09	40.1	36.98 N.	122.20 W.	8	...	...	3.8B	FELT	B	DEC. 24	05 A.M. PST
DEC. 25	14	17	10.8	37.27 N.	117.06 W.	5	...	...	4.2B	...	G	DEC. 25	06 A.M. PST
DEC. 26	08	09	4.4	37.53 N.	118.80 W.	19	...	...	3.9B	FELT	B	DEC. 26	12 P.M. PST
DEC. 28	02	52	38.1	37.63 N.	118.86 W.	5	...	...	3.1P	...	G	DEC. 27	06 P.M. PST
DEC. 28	03	29	49.5	37.66 N.	118.87 W.	15	...	...	3.7B	FELT	B	DEC. 27	07 P.M. PST
DEC. 28	04	40	38.7	37.64 N.	118.87 W.	7	...	...	3.2B	...	B	DEC. 27	08 P.M. PST
DEC. 31	06	03	40.3	33.65 N.	117.90 W.	7	...	...	2.7P	FELT	P	DEC. 30	10 P.M. PST
CALIFORNIA--OFF THE COAST													
JAN. 1	02	19	44.5	40.47 N.	126.35 W.	5	4.2	...	4.2B	...	B	DEC. 31	06 P.M. PST
FEB. 3	09	58	16.0	40.92 N.	124.42 W.	22	5.2	4.6	5.2B	VII	B	FEB. 3	01 A.M. PST
MAR. 4	06	24	43.7	34.80 N.	121.13 W.	5	...	...	3.3B	...	B	MAR. 3	10 P.M. PST
MAR. 18	04	41	50.9	40.37 N.	124.36 W.	10	...	...	3.3B	...	B	MAR. 17	08 P.M. PST
MAR. 18	04	42	17.3	40.34 N.	124.46 W.	10	...	...	3.3B	...	B	MAR. 17	08 P.M. PST
MAR. 18	16	18	31.2	40.34 N.	124.71 W.	10	4.0	...	4.1B	IV	B	MAR. 18	08 A.M. PST
MAR. 22	15	14	00.8	41.87 N.	126.83 W.	15	5.2	4.8	4.2B	...	B	MAR. 22	07 A.M. PST
MAR. 22	15	41	56.3	41.74 N.	127.01 W.	15	4.4	...	3.3B	...	G	MAR. 22	07 A.M. PST
APR. 7	06	18	33.0	41.99 N.	126.82 W.	15	5.5	5.3	5.0B	...	G	APR. 6	10 P.M. PST
APR. 7	10	17	38.2	40.55 N.	127.52 W.	15	3.6	...	3.8B	...	B	APR. 7	02 A.M. PST
APR. 13	08	07	43.2	40.60 N.	127.83 W.	5	4.7	...	4.7B	...	B	APR. 13	12 P.M. PST
APR. 25	04	48	8.8	40.35 N.	125.28 W.	5	...	...	3.4B	...	B	APR. 24	08 P.M. PST
APR. 25	19	29	57.2	33.75 N.	119.37 W.	7	...	...	3.5P	...	P	APR. 25	11 A.M. PST
MAY 8	02	49	4.7	32.68 N.	119.60 W.	5	...	...	3.1P	...	P	MAY 7	06 P.M. PST
MAY 28	04	12	13.1	40.98 N.	125.12 W.	5	...	...	3.9B	...	B	MAY 27	08 P.M. PST
AUG. 1	10	50	24.7	40.87 N.	127.43 W.	5	5.3	5.2	4.7B	...	B	AUG. 1	02 A.M. PST
AUG. 1	11	33	11.3	40.92 N.	127.63 W.	5	4.2	...	3.5B	...	B	AUG. 1	03 A.M. PST
AUG. 2	21	34	21.0	40.82 N.	127.60 W.	5	4.6	4.0	3.9B	...	B	AUG. 2	01 P.M. PST
AUG. 4	14	48	0.4	40.31 N.	124.84 W.	28	...	...	3.8B	...	B	AUG. 4	06 A.M. PST
AUG. 8	10	24	57.6	40.31 N.	124.68 W.	29	3.8	...	4.3B	IV	B	AUG. 8	02 A.M. PST
SEPT. 5	09	42	3.4	41.79 N.	125.78 W.	9	4.3	...	4.3B	...	G	SEPT. 5	01 A.M. PST
SEPT. 24	08	07	10.3	40.21 N.	125.66 W.	5	...	...	3.8B	...	B	SEPT. 24	12 P.M. PST
OCT. 24	15	23	50.6	40.43 N.	124.70 W.	24	4.8	...	4.5B	IV	B	OCT. 24	07 A.M. PST
OCT. 25	09	01	40.3	40.42 N.	124.51 W.	24	...	...	4.0B	...	B	OCT. 25	01 A.M. PST
NOV. 8	04	30	27.9	40.32 N.	125.17 W.	5	4.7	3.7	4.5B	...	B	NOV. 7	08 P.M. PST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
CALIFORNIA--OFF THE COAST--Continued													
NOV. 13	12	46	21.2	40.42 N.	125.66 W.	5	...	...	3.5B	...	B	NOV. 13	04 A.M. PST
NOV. 15	07	09	58.2	32.75 N.	118.10 W.	11	...	...	3.2P	...	P	NOV. 14	11 P.M. PST
DEC. 13	09	09	13.3	40.48 N.	126.31 W.	5	...	...	3.8B	...	B	DEC. 13	01 A.M. PST
COLORADO													
JAN. 6	01	58	55.3	38.96 N.	105.16 W.	5	...	...	2.9G	VI	G	JAN. 5	06 P.M. MST
JAN. 20	06	59	08.4	40.82 N.	107.86 W.	5	...	...	3.3G	...	G	JAN. 19	11 P.M. MST
MAR. 19	14	59	29.7	40.18 N.	108.90 W.	2	...	...	3.1G	IV	G	MAR. 19	07 A.M. MST
MAR. 29	22	07	13.3	40.27 N.	108.81 W.	2	...	...	2.6G	IV	G	MAR. 29	03 P.M. MST
HAWAII													
JAN. 2	06	31	25.2	20.95 N.	156.06 W.	12	...	...	3.5H	III	H	JAN. 1	08 P.M. HST
JAN. 11	12	24	45.6	19.37 N.	155.09 W.	3	...	...	3.0H	...	H	JAN. 11	02 A.M. HST
JAN. 11	15	24	52.6	19.38 N.	155.08 W.	1	...	...	3.8H	...	H	JAN. 11	05 A.M. HST
JAN. 15	07	12	36.5	19.37 N.	155.08 W.	9	...	...	3.1H	III	H	JAN. 14	09 P.M. HST
JAN. 17	05	47	13.8	20.37 N.	154.99 W.	0	...	...	3.4H	...	H	JAN. 16	07 P.M. HST
JAN. 20	00	19	15.4	19.33 N.	155.20 W.	10	...	...	3.0H	III	H	JAN. 19	02 P.M. HST
JAN. 29	05	22	53.5	19.38 N.	155.50 W.	9	...	...	3.0H	...	H	JAN. 28	07 P.M. HST
FEB. 3	12	49	04.3	19.34 N.	155.20 W.	9	...	...	3.5H	III	H	FEB. 3	02 A.M. HST
FEB. 4	18	37	08.6	19.33 N.	155.13 W.	9	...	...	3.5H	...	H	FEB. 4	08 A.M. HST
FEB. 4	19	11	03.0	19.01 N.	156.45 W.	36	...	...	3.6H	...	H	FEB. 4	09 A.M. HST
FEB. 6	08	04	00.0	19.34 N.	155.12 W.	9	...	...	3.2H	...	H	FEB. 5	10 P.M. HST
FEB. 14	02	52	51.0	19.34 N.	155.07 W.	9	...	...	3.9H	IV	H	FEB. 13	04 P.M. HST
FEB. 18	14	45	44.1	19.45 N.	155.48 W.	11	...	...	3.2H	III	H	FEB. 18	04 A.M. HST
FEB. 21	05	14	20.3	19.37 N.	155.27 W.	27	...	...	3.1H	...	H	FEB. 20	07 P.M. HST
FEB. 23	03	15	06.3	19.37 N.	155.09 W.	9	...	...	3.2H	...	H	FEB. 22	05 P.M. HST
FEB. 27	10	52	53.0	19.20 N.	155.67 W.	6	...	...	3.2H	...	H	FEB. 27	12 P.M. HST
MAR. 2	12	27	18.2	19.33 N.	155.11 W.	10	...	...	3.6H	III	H	MAR. 2	02 A.M. HST
MAR. 3	07	48	11.8	19.41 N.	155.47 W.	11	...	...	3.0H	...	H	MAR. 2	09 P.M. HST
MAR. 6	06	41	58.6	19.35 N.	155.10 W.	9	...	...	3.3H	III	H	MAR. 5	08 P.M. HST
MAR. 6	12	59	50.1	19.33 N.	155.12 W.	10	...	...	3.7H	III	H	MAR. 6	02 A.M. HST
MAR. 6	15	07	58.5	19.52 N.	155.27 W.	27	5.0	4.3	4.7H	VI	H	MAR. 6	05 A.M. HST
MAR. 10	13	55	14.6	19.33 N.	155.11 W.	10	4.8	...	4.5H	IV	H	MAR. 10	03 A.M. HST
MAR. 10	14	54	49.3	19.20 N.	155.68 W.	7	...	...	3.3H	III	H	MAR. 10	04 A.M. HST
MAR. 10	19	49	33.3	19.30 N.	155.12 W.	10	...	...	3.1H	...	H	MAR. 10	09 A.M. HST
MAR. 11	10	14	56.5	19.29 N.	155.10 W.	11	...	...	3.4H	III	H	MAR. 11	12 P.M. HST
MAR. 12	03	28	05.2	19.52 N.	155.28 W.	24	...	...	3.4H	III	H	MAR. 11	05 P.M. HST
MAR. 13	19	57	08.8	19.35 N.	155.43 W.	11	...	...	3.5H	III	H	MAR. 13	09 A.M. HST
MAR. 15	18	55	01.1	19.37 N.	155.10 W.	1	...	...	3.4H	III	H	MAR. 15	08 A.M. HST
MAR. 15	20	10	14.7	19.38 N.	155.10 W.	0	...	...	3.4H	III	H	MAR. 15	10 A.M. HST
MAR. 20	23	03	09.9	19.35 N.	155.13 W.	9	...	...	3.3H	III	H	MAR. 20	01 P.M. HST
MAR. 22	06	46	59.8	20.10 N.	155.84 W.	16	4.6	...	4.5H	V	H	MAR. 21	08 P.M. HST
MAR. 25	16	50	17.9	19.35 N.	155.13 W.	10	...	...	3.1H	...	H	MAR. 25	06 A.M. HST
MAR. 26	23	41	25.5	19.35 N.	155.14 W.	7	...	...	3.2H	III	H	MAR. 26	01 P.M. HST
MAR. 28	07	30	09.8	20.09 N.	155.83 W.	12	4.4	...	4.9H	V	H	MAR. 27	09 P.M. HST
MAR. 28	07	34	44.9	20.07 N.	155.82 W.	10	...	...	3.1H	III	H	MAR. 27	09 P.M. HST
MAR. 28	15	54	50.6	19.36 N.	155.08 W.	9	...	...	3.0H	III	H	MAR. 28	05 A.M. HST
MAR. 29	10	56	02.3	20.14 N.	155.86 W.	13	...	...	3.1H	...	H	MAR. 29	12 P.M. HST
MAR. 30	09	06	40.7	20.65 N.	158.82 W.	19	4.7	3.9	5.5H	V	G	MAR. 29	11 P.M. HST
MAR. 30	22	56	21.1	20.06 N.	155.83 W.	22	...	...	3.1H	III	H	MAR. 30	12 M. HST
APR. 5	06	14	58.7	19.35 N.	155.02 W.	7	...	...	3.3H	III	H	APR. 4	08 P.M. HST
APR. 9	04	08	57.9	19.44 N.	155.45 W.	10	...	...	3.1H	...	H	APR. 8	06 P.M. HST
APR. 12	18	39	46.4	19.33 N.	155.22 W.	9	...	...	3.0H	...	H	APR. 12	08 A.M. HST
APR. 14	13	31	12.7	19.40 N.	155.27 W.	5	...	...	3.4H	III	H	APR. 14	03 A.M. HST
APR. 17	06	29	53.9	19.26 N.	155.40 W.	47	...	...	3.6H	III	H	APR. 16	08 P.M. HST
APR. 21	22	14	52.3	19.33 N.	155.48 W.	8	...	...	3.0H	...	H	APR. 21	12 M. HST
APR. 22	04	57	06.8	19.31 N.	155.22 W.	11	...	...	3.0H	...	H	APR. 22	06 P.M. HST
APR. 24	11	12	38.1	20.12 N.	155.91 W.	31	...	...	3.1H	...	H	APR. 24	01 A.M. HST
APR. 28	00	26	55.3	18.97 N.	155.47 W.	37	...	...	3.4H	...	H	APR. 27	02 P.M. HST
MAY 1	08	03	32.5	18.71 N.	155.18 W.	7	...	...	3.0H	...	H	APR. 30	10 P.M. HST
MAY 3	07	08	47.9	19.42 N.	155.48 W.	11	...	...	3.2H	...	H	MAY 2	09 P.M. HST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
HAWAII--Continued													
MAY 6	04	51	07.3	19.22 N.	155.59 W.	8	...	...	3.1H	...	H	MAY 5	06 P.M. HST
MAY 6	07	22	47.4	19.08 N.	155.52 W.	57	...	...	3.0H	...	H	MAY 5	09 P.M. HST
MAY 10	20	37	45.8	19.43 N.	155.41 W.	11	...	...	3.0H	...	H	MAY 10	10 A.M. HST
MAY 11	23	59	37.3	19.34 N.	155.07 W.	9	...	...	3.3H	III	H	MAY 11	01 P.M. HST
MAY 12	22	26	17.3	19.38 N.	155.06 W.	9	...	...	3.1H	...	H	MAY 12	12 M. HST
MAY 13	21	38	39.8	19.38 N.	155.05 W.	10	...	...	3.0H	...	H	MAY 13	11 A.M. HST
MAY 14	20	57	31.4	19.28 N.	155.78 W.	9	...	...	3.5H	...	H	MAY 14	10 A.M. HST
MAY 15	04	38	45.1	19.04 N.	155.03 W.	51	...	...	3.0H	...	H	MAY 14	06 P.M. HST
MAY 17	15	30	52.3	19.47 N.	155.40 W.	10	...	...	3.4H	III	H	MAY 17	05 A.M. HST
MAY 22	07	42	26.2	19.33 N.	155.20 W.	9	...	...	3.2H	II	H	MAY 21	09 P.M. HST
MAY 23	13	09	44.3	19.40 N.	155.45 W.	9	...	...	3.3H	...	H	MAY 23	03 A.M. HST
MAY 24	02	51	14.1	19.96 N.	155.62 W.	11	...	...	3.2H	...	H	MAY 23	04 P.M. HST
MAY 25	02	26	06.1	19.38 N.	155.25 W.	3	...	...	3.2H	III	H	MAY 24	04 P.M. HST
MAY 28	16	44	58.3	18.83 N.	154.36 W.	7	...	...	3.1H	...	H	MAY 28	06 A.M. HST
MAY 29	04	50	33.8	19.37 N.	155.08 W.	9	...	...	3.0H	III	H	MAY 28	06 P.M. HST
MAY 30	03	43	55.4	19.37 N.	155.21 W.	7	...	...	3.0H	III	H	MAY 29	05 P.M. HST
MAY 30	03	44	55.0	19.37 N.	155.21 W.	5	...	...	3.1H	III	H	MAY 29	05 P.M. HST
MAY 30	03	48	07.5	19.37 N.	155.22 W.	0	...	...	3.1H	III	H	MAY 29	05 P.M. HST
MAY 30	03	52	17.0	19.36 N.	155.22 W.	7	...	...	3.2H	III	H	MAY 29	05 P.M. HST
JUNE 1	10	16	11.6	19.34 N.	155.23 W.	10	...	...	3.0H	...	H	JUNE 1	12 P.M. HST
JUNE 1	10	54	58.2	19.37 N.	155.08 W.	9	...	...	3.0H	...	H	JUNE 1	12 P.M. HST
JUNE 5	22	16	36.5	19.36 N.	155.08 W.	9	...	...	3.1H	III	H	JUNE 5	12 M. HST
JUNE 9	19	07	53.3	19.41 N.	155.47 W.	11	...	...	3.1H	...	H	JUNE 9	09 A.M. HST
JUNE 13	02	55	48.8	19.41 N.	155.42 W.	12	...	...	3.1H	...	H	JUNE 12	04 P.M. HST
JUNE 20	01	17	38.3	19.33 N.	155.18 W.	10	...	...	3.2H	III	H	JUNE 19	03 P.M. HST
JUNE 27	07	47	59.8	19.48 N.	155.87 W.	10	...	...	3.4H	III	H	JUNE 26	09 P.M. HST
JULY 3	04	42	44.8	19.40 N.	155.45 W.	11	...	...	3.3H	IV	H	JULY 2	06 P.M. HST
JULY 5	03	27	15.9	19.35 N.	155.13 W.	9	...	...	3.4H	III	H	JULY 4	05 P.M. HST
JULY 5	12	33	46.1	19.47 N.	154.82 W.	12	...	...	3.1H	...	H	JULY 5	02 A.M. HST
JULY 14	15	15	34.3	19.72 N.	156.00 W.	34	...	...	3.0H	...	H	JULY 14	05 A.M. HST
JULY 16	02	42	07.3	19.38 N.	155.09 W.	1	...	...	3.6H	IV	H	JULY 15	04 P.M. HST
JULY 16	08	03	40.5	19.49 N.	155.92 W.	13	...	...	3.0H	...	H	JULY 15	10 P.M. HST
JULY 16	12	48	49.7	19.38 N.	155.08 W.	2	...	...	3.1H	...	H	JULY 16	02 A.M. HST
JULY 16	14	13	15.7	19.40 N.	155.03 W.	9	...	...	3.5H	III	H	JULY 16	04 A.M. HST
JULY 19	13	56	29.0	18.58 N.	154.73 W.	7	...	...	3.4H	...	H	JULY 19	03 A.M. HST
JULY 21	09	22	30.2	19.41 N.	155.46 W.	11	...	...	3.6H	IV	H	JULY 20	11 P.M. HST
JULY 25	04	07	38.3	19.33 N.	155.14 W.	10	...	...	3.5H	III	H	JULY 24	06 P.M. HST
JULY 26	19	50	41.6	19.76 N.	155.97 W.	20	...	...	3.6H	III	H	JULY 26	09 A.M. HST
JULY 27	18	56	33.6	19.33 N.	155.13 W.	9	...	...	3.5H	IV	H	JULY 27	08 A.M. HST
JULY 31	13	30	51.3	19.47 N.	155.43 W.	12	...	...	4.3H	V	H	JULY 31	03 A.M. HST
AUG. 1	16	14	11.8	19.39 N.	155.28 W.	3	...	...	3.0H	III	H	AUG. 1	06 A.M. HST
AUG. 3	13	30	06.3	19.33 N.	155.21 W.	10	...	...	3.3H	III	H	AUG. 3	03 A.M. HST
AUG. 6	03	03	34.8	19.28 N.	155.54 W.	10	...	...	3.5H	IV	H	AUG. 5	05 P.M. HST
AUG. 11	03	57	53.1	19.31 N.	155.22 W.	10	...	...	3.0H	...	H	AUG. 10	05 P.M. HST
AUG. 13	06	32	01.3	19.33 N.	155.12 W.	8	...	...	3.0H	...	H	AUG. 12	08 P.M. HST
AUG. 13	16	03	40.6	19.30 N.	155.26 W.	10	...	...	3.4H	III	H	AUG. 13	06 A.M. HST
AUG. 14	12	51	42.2	20.82 N.	156.29 W.	24	4.1	...	4.5H	V	H	AUG. 14	02 A.M. HST
AUG. 15	15	00	08.1	19.41 N.	155.42 W.	11	...	...	3.0H	...	H	AUG. 15	05 A.M. HST
AUG. 16	23	04	19.4	19.38 N.	155.47 W.	11	...	...	3.9M	IV	H	AUG. 16	01 P.M. HST
AUG. 26	07	08	14.6	19.35 N.	155.12 W.	10	...	...	3.3H	II	H	AUG. 25	09 P.M. HST
AUG. 28	15	21	59.1	19.31 N.	155.22 W.	11	...	...	3.5H	III	H	AUG. 28	05 A.M. HST
AUG. 28	15	47	24.8	19.32 N.	155.22 W.	11	...	...	3.4H	III	H	AUG. 28	05 A.M. HST
AUG. 28	16	55	13.2	19.31 N.	155.22 W.	11	...	...	3.8H	III	H	AUG. 28	06 A.M. HST
SEPT. 1	22	16	33.5	19.37 N.	155.08 W.	10	...	...	3.8H	IV	H	SEPT. 1	12 M. HST
SEPT. 4	11	30	09.2	19.74 N.	156.02 W.	9	...	...	3.2H	IV	H	SEPT. 4	01 A.M. HST
SEPT. 6	12	24	48.0	19.33 N.	155.12 W.	10	...	...	3.4H	III	H	SEPT. 6	02 A.M. HST
SEPT. 8	23	34	42.2	19.32 N.	155.23 W.	11	...	...	3.4H	III	H	SEPT. 8	01 P.M. HST
SEPT. 14	14	32	17.4	19.39 N.	155.28 W.	3	...	...	3.0H	III	H	SEPT. 14	04 A.M. HST
SEPT. 14	17	35	18.7	19.33 N.	155.20 W.	10	...	...	3.2H	III	H	SEPT. 14	07 A.M. HST
SEPT. 15	01	31	48.0	19.35 N.	155.82 W.	11	...	...	3.8H	IV	H	SEPT. 14	03 P.M. HST
SEPT. 16	19	51	36.7	19.40 N.	155.04 W.	9	...	...	3.2H	III	H	SEPT. 16	09 A.M. HST
SEPT. 21	11	29	24.1	19.33 N.	155.20 W.	10	...	...	3.4H	III	H	SEPT. 21	01 A.M. HST
SEPT. 22	07	59	37.6	19.35 N.	155.07 W.	9	5.7	4.8	5.5H	VI	H	SEPT. 21	09 P.M. HST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
HAWAII--Continued													
SEPT. 22	09	29	12.3	19.35 N.	155.03 W.	9	4.8	...	4.3H	IV	H	SEPT. 21	11 P.M. HST
SEPT. 22	09	36	17.3	19.35 N.	155.04 W.	8	...	...	3.2H	III	H	SEPT. 21	11 P.M. HST
SEPT. 23	11	28	19.9	19.38 N.	155.07 W.	9	...	...	3.3H	III	H	SEPT. 23	01 A.M. HST
SEPT. 23	19	25	25.8	19.37 N.	155.27 W.	36	...	...	3.3H	...	H	SEPT. 23	09 A.M. HST
SEPT. 25	03	50	23.1	19.37 N.	155.08 W.	9	...	...	3.6H	III	H	SEPT. 24	05 P.M. HST
SEPT. 26	16	21	22.8	19.36 N.	155.04 W.	9	...	...	3.0H	...	H	SEPT. 26	06 A.M. HST
SEPT. 27	01	01	32.4	19.54 N.	155.92 W.	11	...	...	3.2H	III	H	SEPT. 26	03 P.M. HST
SEPT. 27	15	35	45.5	19.33 N.	155.12 W.	10	4.7	...	4.3H	V	H	SEPT. 27	05 A.M. HST
SEPT. 27	15	38	31.2	19.33 N.	155.13 W.	9	...	...	3.2H	IV	H	SEPT. 27	05 A.M. HST
SEPT. 30	00	02	26.3	19.37 N.	155.11 W.	8	...	...	3.2H	II	H	SEPT. 29	02 P.M. HST
OCT. 6	10	46	12.2	19.33 N.	155.22 W.	10	...	...	3.9H	IV	H	OCT. 6	12 P.M. HST
OCT. 9	02	40	19.8	19.33 N.	155.19 W.	10	...	...	3.7H	III	H	OCT. 8	04 P.M. HST
OCT. 13	01	59	25.8	19.38 N.	155.25 W.	4	...	...	3.0H	II	H	OCT. 12	03 P.M. HST
OCT. 13	11	16	26.0	19.44 N.	155.35 W.	8	...	...	3.8H	III	H	OCT. 13	01 A.M. HST
OCT. 13	12	58	51.0	19.45 N.	155.36 W.	7	...	...	3.1H	II	H	OCT. 13	02 A.M. HST
OCT. 14	17	37	17.5	19.91 N.	155.19 W.	14	...	...	4.0H	IV	H	OCT. 14	07 A.M. HST
OCT. 15	10	44	12.3	19.93 N.	156.46 W.	3	...	...	3.1H	...	H	OCT. 15	12 P.M. HST
OCT. 17	05	54	37.8	19.32 N.	155.14 W.	9	...	...	3.1H	...	H	OCT. 16	07 P.M. HST
OCT. 19	06	14	32.4	19.78 N.	156.05 W.	9	...	...	3.1H	...	H	OCT. 18	08 P.M. HST
OCT. 20	23	59	12.0	19.41 N.	155.47 W.	11	...	...	3.3H	...	H	OCT. 20	01 P.M. HST
OCT. 21	05	57	02.0	19.32 N.	155.20 W.	10	...	...	3.5H	III	H	OCT. 20	07 P.M. HST
OCT. 28	18	36	49.3	19.33 N.	155.27 W.	37	...	...	3.1H	...	H	OCT. 28	08 A.M. HST
OCT. 31	05	35	11.7	19.88 N.	156.34 W.	1	4.1	...	4.2H	IV	H	OCT. 30	07 P.M. HST
OCT. 31	15	23	30.1	19.97 N.	155.80 W.	10	...	...	3.0H	...	H	OCT. 31	05 A.M. HST
NOV. 1	02	57	50.7	19.29 N.	154.99 W.	39	...	...	3.0H	...	H	OCT. 31	04 P.M. HST
NOV. 3	16	58	03.1	19.28 N.	155.27 W.	11	...	...	3.3H	...	H	NOV. 3	06 A.M. HST
NOV. 4	04	09	51.6	20.06 N.	155.64 W.	13	...	...	3.0H	III	H	NOV. 3	06 P.M. HST
NOV. 4	12	10	33.3	19.33 N.	155.19 W.	10	...	...	3.0H	...	H	NOV. 4	02 A.M. HST
NOV. 11	10	25	33.6	19.36 N.	155.25 W.	11	...	...	3.5H	III	H	NOV. 11	12 P.M. HST
NOV. 15	14	13	00.9	19.38 N.	155.24 W.	4	...	...	3.4H	IV	H	NOV. 15	04 A.M. HST
NOV. 16	09	54	29.5	19.35 N.	155.23 W.	1	...	...	3.4H	III	H	NOV. 15	11 P.M. HST
NOV. 16	20	24	26.1	19.37 N.	155.24 W.	2	...	...	3.1H	...	H	NOV. 16	10 A.M. HST
NOV. 17	16	11	59.5	19.35 N.	155.22 W.	10	...	...	3.3H	IV	H	NOV. 17	06 A.M. HST
NOV. 20	02	58	13.9	19.33 N.	155.13 W.	9	...	...	3.2H	...	H	NOV. 19	04 P.M. HST
NOV. 21	07	29	38.0	19.38 N.	155.24 W.	3	...	...	3.2H	III	H	NOV. 20	09 P.M. HST
NOV. 21	19	07	27.6	19.27 N.	155.78 W.	10	...	...	3.1H	...	H	NOV. 21	09 A.M. HST
NOV. 23	03	42	30.7	19.31 N.	155.22 W.	9	...	...	3.1H	...	H	NOV. 22	05 P.M. HST
NOV. 23	16	41	34.0	19.38 N.	155.25 W.	4	...	...	3.4H	IV	H	NOV. 23	06 A.M. HST
NOV. 23	20	45	38.0	19.36 N.	155.25 W.	1	...	...	3.5H	IV	H	NOV. 23	10 A.M. HST
NOV. 24	04	48	27.7	19.44 N.	155.39 W.	9	...	...	3.0H	...	H	NOV. 23	06 P.M. HST
NOV. 25	07	31	06.8	19.40 N.	155.45 W.	13	...	...	3.5H	IV	H	NOV. 24	09 P.M. HST
NOV. 25	10	50	01.9	19.32 N.	155.19 W.	9	...	...	3.4H	IV	H	NOV. 25	12 P.M. HST
NOV. 26	03	51	25.0	19.33 N.	155.32 W.	32	...	...	3.1H	...	H	NOV. 25	05 P.M. HST
NOV. 29	08	03	30.3	19.38 N.	155.08 W.	8	...	...	3.1H	...	H	NOV. 28	10 P.M. HST
NOV. 30	10	55	47.9	19.58 N.	155.98 W.	11	...	...	3.1H	IV	H	NOV. 30	12 P.M. HST
NOV. 30	20	15	41.8	19.39 N.	155.25 W.	3	...	...	3.0H	IV	H	NOV. 30	10 A.M. HST
DEC. 5	22	05	04.8	19.33 N.	155.22 W.	10	...	...	3.4H	...	H	DEC. 5	12 M. HST
DEC. 6	01	32	27.2	19.41 N.	155.47 W.	11	...	...	3.8H	IV	H	DEC. 5	03 P.M. HST
DEC. 14	03	44	3.1	19.42 N.	155.41 W.	11	...	...	4.0H	IV	H	DEC. 13	05 P.M. HST
DEC. 16	03	45	13.1	19.35 N.	155.31 W.	14	...	...	3.6H	IV	H	DEC. 15	05 P.M. HST
DEC. 17	04	11	03.8	19.19 N.	155.60 W.	6	...	...	3.0H	...	H	DEC. 16	06 P.M. HST
DEC. 17	09	44	25.4	19.39 N.	155.28 W.	4	...	...	3.2H	...	H	DEC. 16	11 P.M. HST
DEC. 23	11	06	02.1	19.38 N.	155.24 W.	3	...	...	3.6H	...	H	DEC. 23	01 A.M. HST
DEC. 24	11	44	08.2	19.38 N.	155.10 W.	8	...	...	3.1H	...	H	DEC. 24	01 A.M. HST
DEC. 24	23	39	39.2	20.14 N.	155.87 W.	34	...	...	3.1H	...	H	DEC. 24	01 P.M. HST
DEC. 25	15	55	54.9	20.47 N.	156.81 W.	33	...	...	3.2H	...	H	DEC. 25	05 A.M. HST
DEC. 28	21	25	49.9	19.30 N.	155.24 W.	10	...	...	3.1H	III	H	DEC. 28	11 A.M. HST
DEC. 31	02	04	10.0	19.94 N.	155.72 W.	10	...	...	3.0H	...	H	DEC. 30	04 P.M. HST
DEC. 31	04	59	57.9	19.38 N.	155.48 W.	10	...	...	3.2H	...	H	DEC. 30	06 P.M. HST
IDAHO													
JUNE 3	04	58	25.4	42.51 N.	111.36 W.	5	...	...	3.7U	IV	U	JUNE 2	09 P.M. MST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
KANSAS													
JUNE 30	20	46	41.3	39.94 N.	97.27 W.	5	...	...	3.3G	VI	I	JUNE 30	02 P.M. CST
KENTUCKY													
NOV. 9	21	29	59.1	38.42 N.	82.88 W.	10	...	...	3.5S	V	G	NOV. 9	04 P.M. EST
MAINE													
APR. 18	02	34	14.4	43.95 N.	69.75 W.	4	3.8	...	4.1O	V	J	APR. 17	09 P.M. EST
JULY 28	23	29	12.3	43.29 N.	70.44 W.	11	...	...	3.5G	IV	J	JULY 28	06 P.M. EST
MINNESOTA													
APR. 16	06	40	16.7	46.70 N.	95.54 W.	20	...	...	3.1C	...	C	APR. 16	12 P.M. CST
MISSOURI													
JUNE 3	05	50	24.6	35.61 N.	90.52 W.	5	...	...	2.1S	FELT	S	JUNE 2	11 P.M. CST
JUNE 11	04	12	16.9	36.17 N.	89.65 W.	12	...	...	3.8G	IV	S	JUNE 10	10 P.M. CST
JULY 8	12	35	15.1	36.89 N.	89.29 W.	3	...	...	3.1S	IV	S	JULY 8	06 A.M. CST
JULY 13	07	29	39.0	36.08 N.	89.77 W.	11	...	...	2.8S	IV	S	JULY 13	01 A.M. CST
SEPT. 12	10	59	46.2	37.74 N.	89.95 W.	3	...	...	2.5S	FELT	S	SEPT. 12	04 A.M. CST
NOV. 26	04	43	19.0	36.36 N.	89.52 W.	10	...	...	2.7S	FELT	S	NOV. 25	10 P.M. CST
MONTANA													
JAN. 4	14	51	24.8	47.31 N.	113.14 W.	5	...	...	3.0D	...	G	JAN. 4	07 A.M. MST
JAN. 6	01	25	48.7	44.84 N.	111.45 W.	5	...	...	4.1G	...	G	JAN. 5	06 P.M. MST
APR. 14	09	39	6.4	48.59 N.	112.41 W.	5	...	...	3.2G	...	G	APR. 14	02 A.M. MST
MAY 4	18	58	49.3	47.09 N.	112.79 W.	5	...	...	3.5G	...	G	MAY 4	11 A.M. MST
MAY 7	17	15	43.4	44.76 N.	111.14 W.	5	...	...	3.2G	III	G	MAY 7	10 A.M. MST
MAY 8	00	56	34.1	44.77 N.	111.12 W.	5	...	...	3.3G	III	G	MAY 7	05 P.M. MST
MAY 8	00	57	42.9	44.74 N.	111.20 W.	5	...	...	3.9G	IV	G	MAY 7	05 P.M. MST
MAY 8	00	58	44.8	44.75 N.	111.38 W.	5	...	...	4.6G	IV	G	MAY 7	05 P.M. MST
MAY 8	01	23	18.3	44.78 N.	111.08 W.	5	...	...	3.4G	III	G	MAY 7	06 P.M. MST
MAY 30	15	19	25.7	44.95 N.	111.87 W.	5	...	...	3.6G	...	G	MAY 30	08 A.M. MST
JUNE 22	12	02	26.8	45.32 N.	112.83 W.	5	...	...	4.4G	IV	G	JUNE 22	05 A.M. MST
JULY 21	22	18	47.3	47.72 N.	114.15 W.	5	...	...	3.5G	FELT	G	JULY 21	02 P.M. PST
AUG. 9	17	12	55.4	48.49 N.	111.47 W.	5	...	...	3.8G	...	G	AUG. 9	10 A.M. MST
OCT. 16	18	33	44.6	48.24 N.	114.54 W.	5	...	...	3.1G	FELT	G	OCT. 16	11 A.M. MST
NOV. 30	07	07	28.9	45.75 N.	111.56 W.	5	...	...	3.1D	...	G	NOV. 30	12 P.M. MST
NEBRASKA													
APR. 8	22	46	10.4	40.97 N.	98.56 W.	1	...	...	2.8G	...	K	APR. 8	04 P.M. CST
JUNE 6	16	16	22.4	40.14 N.	100.41 W.	2	...	...	2.7G	III	K	JUNE 6	10 A.M. CST
JULY 16	00	03	47.8	40.18 N.	100.35 W.	14	...	...	3.2T	III	K	JULY 15	06 P.M. CST
AUG. 2	4	16	22.2	40.17 N.	100.40 W	1	...	...	2.5K	III	K	AUG. 1	10 P.M. CST
AUG. 31	8	00	11.6	40.16 N.	100.33 W.	12	...	...	2.2K	IV	K	AUG. 31	02 A.M. CST
NEVADA													
JAN. 6	01	20	35.1	39.24 N.	116.38 W.	5	...	...	4.2B	IV	G	JAN. 5	05 P.M. PST
JAN. 24	17	27	20.6	39.13 N.	115.71 W.	5	...	...	3.4G	...	G	JAN. 24	09 A.M. PST
JAN. 24	18	00	00.1	37.10 N.	116.01 W.	0	4.5	...	4.5B	...	E	JAN. 24	10 A.M. PST
FEB. 8	20	00	00.1	37.10 N.	116.06 W.	0	5.5	4.1	5.2B	...	E	FEB. 8	12 M. PST
FEB. 13	15	52	48.5	40.93 N.	116.16 W.	5	4.1	...	3.6G	IV	G	FEB. 13	07 A.M. PST
FEB. 15	18	05	00.2	37.15 N.	116.07 W.	0	4.8	...	4.7B	...	E	FEB. 15	10 A.M. PST
MAR. 14	18	30	00.1	37.03 N.	116.04 W.	0	4.3	...	4.2B	...	E	MAR. 14	10 A.M. PST
MAR. 18	21	06	11.0	39.25 N.	116.36 W.	5	...	...	3.5G	IV	G	MAR. 18	01 P.M. PST
MAR. 19	00		51.1	39.20 N.	116.40 W.	5	...	...	3.6G	...	G	MAR. 18	04 P.M. PST
APR. 3	12	08	30.7	40.64 N.	119.66 W.	5	4.0	...	3.8B	...	G	APR. 3	04 A.M. PST
APR. 15	03	12	6.7	37.13 N.	117.37 W.	6	...	...	3.2P	...	P	APR. 14	07 P.M. PST
MAY 11	15	59	59.7	36.99 N.	116.01 W.	2	...	...	4.3B	...	G	MAY 11	07 A.M. PST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Hour
NEVADA--Continued													
JUNE 6	01	49	56.4	38.49 N.	118.42 W.	12	4.3	...	4.2B	IV	B	JUNE 5	05 P.M. PST
JUNE 8	05	44	3.6	38.51 N.	117.88 W.	5	...	...	4.0G	IV	G	JUNE 7	09 P.M. PST
JUNE 11	14	00	0.2	37.29 N.	116.45 W.	0	5.5	4.4	5.4B	...	E	JUNE 11	06 A.M. PST
JUNE 20	15	00	13.5	37.11 N.	116.02 W.	0	4.0	...	4.3B	...	E	JUNE 20	07 A.M. PST
JUNE 28	14	44	0.2	37.14 N.	116.09 W.	0	5.0	...	5.0B	...	E	JUNE 28	06 A.M. PST
JULY 19	16	51	8.5	39.60 N.	119.90 W.	7	...	...	3.3B	...	B	JULY 19	08 A.M. PST
AUG. 3	15	07	30.2	37.08 N.	116.07 W.	0	4.5	...	4.6B	...	E	AUG. 3	07 A.M. PST
AUG. 8	15	00	0.1	37.01 N.	116.01 W.	0	4.8	...	4.6B	...	E	AUG. 8	07 A.M. PST
AUG. 12	11	31	19.7	37.26 N.	115.08 W.	5	...	...	3.6G	...	G	AUG. 12	03 A.M. PST
AUG. 16	03	37	44.9	37.24 N.	115.06 W.	5	...	...	3.7G	...	G	AUG. 15	07 P.M. PST
AUG. 29	15	08	0.2	37.12 N.	116.07 W.	0	4.7	...	5.0B	...	E	AUG. 29	07 A.M. PST
SEPT. 6	15	00	0.1	37.09 N.	116.05 W.	0	5.8	4.1	5.5B	...	E	SEPT. 6	07 A.M. PST
SEPT. 8	17	02	0.1	37.15 N.	116.04 W.	0	...	...	3.7B	...	E	SEPT. 8	09 A.M. PST
SEPT. 26	15	00	0.1	37.23 N.	116.36 W.	0	5.6	4.1	5.4B	...	E	SEPT. 26	07 A.M. PST
NOV. 29	15	00	0.1	36.99 N.	116.02 W.	0	3.8	...	...	...	E	NOV. 29	07 A.M. PST
DEC. 14	18	00	0.1	37.14 N.	116.06 W.	0	...	...	3.6B	...	E	DEC. 14	10 A.M. PST
DEC. 31	08	27	52.5	38.46 N.	118.43 W.	8	4.2	...	4.8B	IV	B	DEC. 31	12 P.M. PST
NEW HAMPSHIRE													
APR. 23	00	05	45.7	43.04 N.	71.24 W.	0	...	...	3.1J	IV	J	APR. 22	07 P.M. EST
NEW JERSEY													
JAN. 30	16	30	52.1	40.32 N.	74.26 W.	5	...	...	3.0L	V	L	JAN. 30	11 A.M. EST
FEB. 2	02	26	13.3	40.77 N.	74.66 W.	0	...	...	1.9L	III	L	FEB. 1	09 P.M. EST
FEB. 23	10	23	57.2	40.80 N.	74.81 W.	13	...	...	2.9L	IV	L	FEB. 23	05 A.M. EST
MAR. 10	04	49	39.7	40.72 N.	74.50 W.	3	...	...	2.2L	V	L	MAR. 9	11 P.M. EST
NEW YORK													
JUNE 7	13	45	53.3	44.43 N.	73.86 W.	0	...	...	3.1L	...	L	JUNE 7	08 A.M. EST
JUNE 20	19	20	17.8	41.35 N.	74.38 W.	0	...	...	3.0L	...	L	JUNE 20	02 P.M. EST
DEC. 30	14	15	12.3	41.16 N.	73.71 W.	4	...	...	2.0L	IV	L	DEC. 30	09 A.M. EST
OKLAHOMA													
MAR. 13	23	29	22.6	35.42 N.	97.85 W.	5	...	...	1.7T	II	T	MAR. 13	05 P.M. CST
MAR. 14	03	10	56.8	35.50 N.	97.83 W.	5	...	...	1.9T	IV	T	MAR. 13	09 P.M. CST
MAR. 14	04	37	15.3	35.52 N.	97.78 W.	5	...	...	2.2T	V	T	MAR. 13	10 P.M. CST
MAR. 18	20	44	19.5	35.38 N.	98.12 W.	5	...	...	2.9T	III	T	MAR. 18	02 P.M. CST
MAR. 18	23	19	01.3	34.10 N.	97.45 W.	5	...	...	2.3T	III	T	MAR. 18	05 P.M. CST
MAY 22	03	49	23.8	34.03 N.	97.47 W.	4	...	...	1.9T	III	T	MAY 21	09 P.M. CST
JUNE 7	07	39	35.6	35.19 N.	99.81 W.	5	...	...	3.0T	IV	T	JUNE 7	01 A.M. CST
JULY 25	03	15	37.3	33.97 N.	97.55 W.	5	...	...	2.7T	V	T	JULY 24	10 P.M. CST
SEPT. 13	00	49	23.0	35.22 N.	99.36 W.	15	...	...	3.4T	IV	T	SEPT. 12	06 P.M. CST
SEPT. 16	15	57	20.8	35.34 N.	98.00 W.	5	...	...	2.5T	IV	T	SEPT. 16	09 A.M. CST
SEPT. 17	20	41	50.5	35.32 N.	97.97 W.	5	...	...	2.5T	IV	T	SEPT. 17	02 P.M. CST
DEC. 9	23	12	58.7	33.99 N.	97.35 W.	5	...	...	2.5T	III	T	DEC. 9	05 P.M. CST
OREGON--OFF THE COAST													
FEB. 1	11	26	46.4	42.57 N.	126.35 W.	15	4.8	4.2	...	...	G	FEB. 1	03 A.M. PST
FEB. 1	16	23	51.4	42.55 N.	126.36 W.	15	4.3	3.9	...	...	G	FEB. 1	08 A.M. PST
MAR. 3	09	46	55.3	42.71 N.	126.02 W.	15	3.9	...	...	...	G	MAR. 3	01 A.M. PST
MAR. 15	09	50	24.2	43.11 N.	126.35 W.	15	3.9	...	...	...	G	MAR. 15	01 A.M. PST
MAR. 21	14	49	24.3	42.09 N.	126.79 W.	15	4.5	...	...	...	G	MAR. 21	06 A.M. PST
MAY 4	08	08	49.9	43.57 N.	127.21 W.	15	4.3	3.6	...	...	G	MAY 4	12 P.M. PST
MAY 22	14	41	15.9	44.21 N.	128.86 W.	15	4.7	...	...	...	G	MAY 22	06 A.M. PST
JUNE 7	09	50	30.4	43.53 N.	127.09 W.	15	4.9	4.2	...	...	G	JUNE 7	01 A.M. PST
JUNE 19	18	44	38.2	43.26 N.	126.20 W.	15	4.2	...	...	...	G	JUNE 19	10 A.M. PST
JUNE 27	12	48	21.5	43.30 N.	126.55 W.	15	4.5	...	...	...	G	JUNE 27	04 A.M. PST
AUG. 28	01	23	56.9	43.39 N.	126.34 W.	15	4.2	...	...	...	G	AUG. 27	05 P.M. PST
OCT. 31	18	43	12.9	43.97 N.	128.34 W.	15	4.7	...	...	...	G	OCT. 31	10 A.M. PST

Table 1.--*Summary of U.S. earthquakes for 1979*--Continued

Date (1979)	Origin time (UTC) hr	min	s	Lat	Long	Depth (km)	Magnitude mb	MS	ML or mbLg	Maximum intensity	Hypocenter source		Local time Date	Hour
OREGON--OFF THE COAST--Continued														
NOV. 1	06	35	8.9	44.56 N.	129.81 W.	15	4.2	...	...	...	G	OCT.	31	10 P.M. PST
DEC. 12	14	39	11.4	43.86 N.	127.25 W.	15	...	...	...	...	G	DEC.	12	06 A.M. PST
DEC. 21	11	06	36.8	44.50 N.	129.42 W.	15	...	...	...	...	G	DEC.	21	03 A.M. PST
SOUTH CAROLINA														
JAN. 19	08	55	36.9	34.64 N.	82.84 W.	1	...	...	2.8G	IV	G	JAN.	19	03 A.M. EST
FEB. 16	14	37	08.4	34.34 N.	81.36 W.	3	...	...	3.3G	...	G	FEB.	16	09 A.M. EST
AUG. 11	02	11	56.6	32.99 N.	80.22 W.	10	...	...	2.5G	III	F	AUG.	10	09 P.M. EST
AUG. 26	01	31	45.0	34.93 N.	82.97 W.	2	...	...	3.7V	VI	G	AUG.	25	08 P.M. EST
OCT. 8	23	20	10.1	34.31 N.	81.36 W.	5	...	...	2.9G	FELT	G	OCT.	8	06 P.M. EST
DEC. 7	05	43	35.0	33.01 N.	80.17 W.	6	...	...	2.9G	IV	G	DEC.	7	12 P.M. EST
TENNESSEE														
FEB. 2	11	17	04.9	36.27 N.	89.47 W.	2	...	...	2.0S	III	S	FEB.	2	05 A.M. CST
FEB. 2	18	49	33.0	36.26 N.	89.45 W.	3	...	...	1.9S	II	S	FEB.	2	12 M. CST
FEB. 2	18	50	18.9	36.27 N.	89.46 W.	4	...	...	2.0S	III	S	FEB.	2	12 M. CST
FEB. 3	06	56	42.3	36.26 N.	89.47 W.	4	...	...	2.0S	FELT	S	FEB.	2	12 P.M. CST
AUG. 13	05	18	56.0	35.24 N.	84.38 W.	5	...	...	3.7V	V	G	AUG.	13	12 P.M. EST
SEPT. 12	06	24	3.6	35.59 N.	83.90 W.	5	...	...	3.2V	V	G	SEPT.	12	01 A.M. EST
TEXAS														
JULY 5	01	05	1.0	32.95 N.	100.90 W.	4	...	...	2.7T	...	G	JULY	4	07 P.M. CST
UTAH														
JAN. 12	09	29	00.1	37.73 N.	113.13 W.	0	...	...	3.5G	IV	U	JAN.	12	02 A.M. MST
MAR. 25	21	41	55.7	41.34 N.	113.29 W.	7	...	...	3.2U	FELT	U	MAR.	25	02 P.M. MST
APR. 30	02	07	10.3	37.88 N.	111.02 W.	7	...	...	3.8G	III	U	APR.	29	07 P.M. MST
OCT. 6	10	12	35.2	39.29 N.	111.69 W.	7	...	...	3.2U	FELT	U	OCT.	6	03 A.M. MST
OCT. 23	04	17	19.9	37.89 N.	110.93 W.	7	...	...	3.5U	FELT	U	OCT.	22	09 P.M. MST
VERMONT														
JAN. 29	06	35	46.2	44.82 N.	73.19 W.	9	...	...	2.5L	II	L	JAN.	29	01 A.M. EST
WASHINGTON														
JAN. 19	14	55	16.0	47.90 N.	119.69 W.	7	...	...	3.6G	V	W	JAN.	19	06 A.M. PST
FEB. 1	20	18	28.1	47.53 N.	121.92 W.	9	...	...	3.6G	IV	W	FEB.	1	12 M. PST
MAR. 11	14	39	32.8	46.45 N.	122.40 W.	16	3.8	...	3.8G	VI	W	MAR.	11	06 A.M. PST
MAR. 12	12	41	37.0	48.19 N.	122.76 W.	24	3.8	...	3.4G	V	W	MAR.	12	04 A.M. PST
APR. 8	07	29	37.4	46.00 N.	118.45 W.	5	...	...	3.2G	V	W	APR.	7	11 P.M. PST
JULY 7	20	50	1.5	46.52 N.	122.17 W.	5	...	...	3.8G	IV	G	JULY	7	12 M. PST
JULY 28	02	19	6.9	46.67 N.	120.59 W.	0	...	...	3.1G	IV	W	JULY	27	06 P.M. PST
SEPT. 5	03	49	59.4	47.52 N.	122.00 W.	7	...	...	2.1W	FELT	W	SEPT.	4	07 P.M. PST
NOV. 26	23	18	27.0	48.54 N.	122.41 W.	20	4.1	...	3.9G	IV	W	NOV.	26	03 P.M. PST
NOV. 27	02	13	46.5	48.59 N.	122.41 W.	20	...	...	3.3G	III	G	NOV.	26	06 P.M. PST
DEC. 10	05	40	6.1	46.66 N.	120.58 W.	5	...	...	3.2G	IV	W	DEC.	9	09 P.M. PST
WASHINGTON--OFF THE COAST														
APR. 14	08	57	6.8	47.72 N.	128.40 W.	15	4.1	...	...	...	G	APR.	14	12 P.M. PST
AUG. 30	14	22	58.0	47.64 N.	127.84 W.	15	4.9	...	...	...	G	AUG.	30	06 A.M. PST
WYOMING														
JAN. 5	14	08	38.8	44.40 N.	110.27 W.	5	...	...	3.5G	...	G	JAN.	5	07 A.M. MST
FEB. 24	12	43	38.2	41.65 N.	111.00 W.	5	...	...	3.5G	...	G	FEB.	24	05 A.M. MST
JULY 3	09	57	23.9	43.41 N.	110.71 W.	5	...	...	3.2U	IV	G	JULY	3	02 A.M. MST

Network Operations

ALASKA EARTHQUAKES, 1979

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During 1979, the Geophysical Institute of the University of Alaska located 3,761 Alaskan earthquakes occurring within the boundaries of its various networks. This figure is down slightly from the 4,281 located in 1978, and this is probably due in part to slight reconfigurations in the network mandated by changing research objectives.

During 1979, the National Earthquake Information Service published the parameters of 476 Alaskan earthquakes which were deemed large enough to include in the Preliminary Determination of Epicenters bulletin and in the Earthquake Data Report. This figure compares with a total of 261 events appearing in these publications for all the other states combined. In spite of the large number of locatable earthquakes in Alaska, felt reports were received from only 65 of them, illustrating the remoteness of most of Alaska from population centers. As might be expected, more than half (35) of these earthquakes occurred in southcentral Alaska around the population centers of Anchorage and the Kenai Peninsula, and another 15 centered around Fairbanks and nearby populated areas of the Central Interior.

One of the largest earthquakes to occur worldwide during the decade was centered near Mt. St. Elias on 28 February, 1979. This earthquake had a surface-wave magnitude of about 7.4. The Mt. St. Elias area, near where the panhandle of southeast Alaska joins the rest of the state, occupies one of the "seismic gaps" around the northeast Pacific rim, thought to be potential candidates for future great earthquakes. This earthquake and its aftershock sequence, however, only partially filled this gap.

Other large Alaskan earthquakes ocurring in 1979 included events of magnitude 6.0 and 6.4 on the Alaska Peninsula on January 27 and May 20, respectively. At least 10 other earthquakes with magnitudes greater than 5.0 occurred during the year, with about half of those in the Aleutians.

One 1979 Alaskan earthquake was interesting, not by virtue of its large size, but from the time-space profile exhibited by it and its aftershocks. This was one of a sequence of small earthquake swarms which have intermittently occurred near Fairbanks since a series of large earthquakes there in 1967. The main 1979 shock occurred on February 22 local time, and had an ML of 4.6. The point of interest is that it and its aftershock sequence extended the aftershock zone of a similar swarm in 1977 linearly to the northwest and to greater depths (figures 27, 28, 29, and 30).

The configuration of the seismographic net operated by the Geophysical Institute during 1979 is shown in figure 31. In general, most of the stations around the coastal margins are operated under the auspices of the Outer Continental Shelf Environmental Assessment Program, administered by NOAA. Some support for the southern net is also received from the U.S. Department of Energy. Stations in the Alaskan Interior are primarily funded by the State of Alaska.

Data originating at the various seismometers were transmitted in analog format to central recording sites at Fairbanks and Homer, Alaska, via combinations of VHF, tropospheric scatter and satellite communication links. Communication ties with the NOAA Alaska Tsunami Warning Center at Palmer, Alaska, permit real-time mutual data exchange with both the USGS and NOAA. Cooperative data acquisition and analysis is also carried out with the Lamont-Doherty Geological Observatory, which operated stations in the Shumagin Islands region of the Aleutians.

NORTHERN AND CENTRAL CALIFORNIA EARTHQUAKES, 1979

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Some 5,800 events were noted on summary sheets and 1,150 teleseisms and 477 local earthquakes were analyzed during 1979. The Bulletin of the Seismographic Stations, Volume 49, No. 1 (January-June, 1979, by Murtha and others, 1980), and No. 2 (July-December, 1979, by McKenzie and others, 1981), contain location and magnitude data for 136 earthquakes ($3.0 \leq ML \leq 5.8$) located in northern and central California and adjoining regions. The epicentral locations are plotted in figure 32.

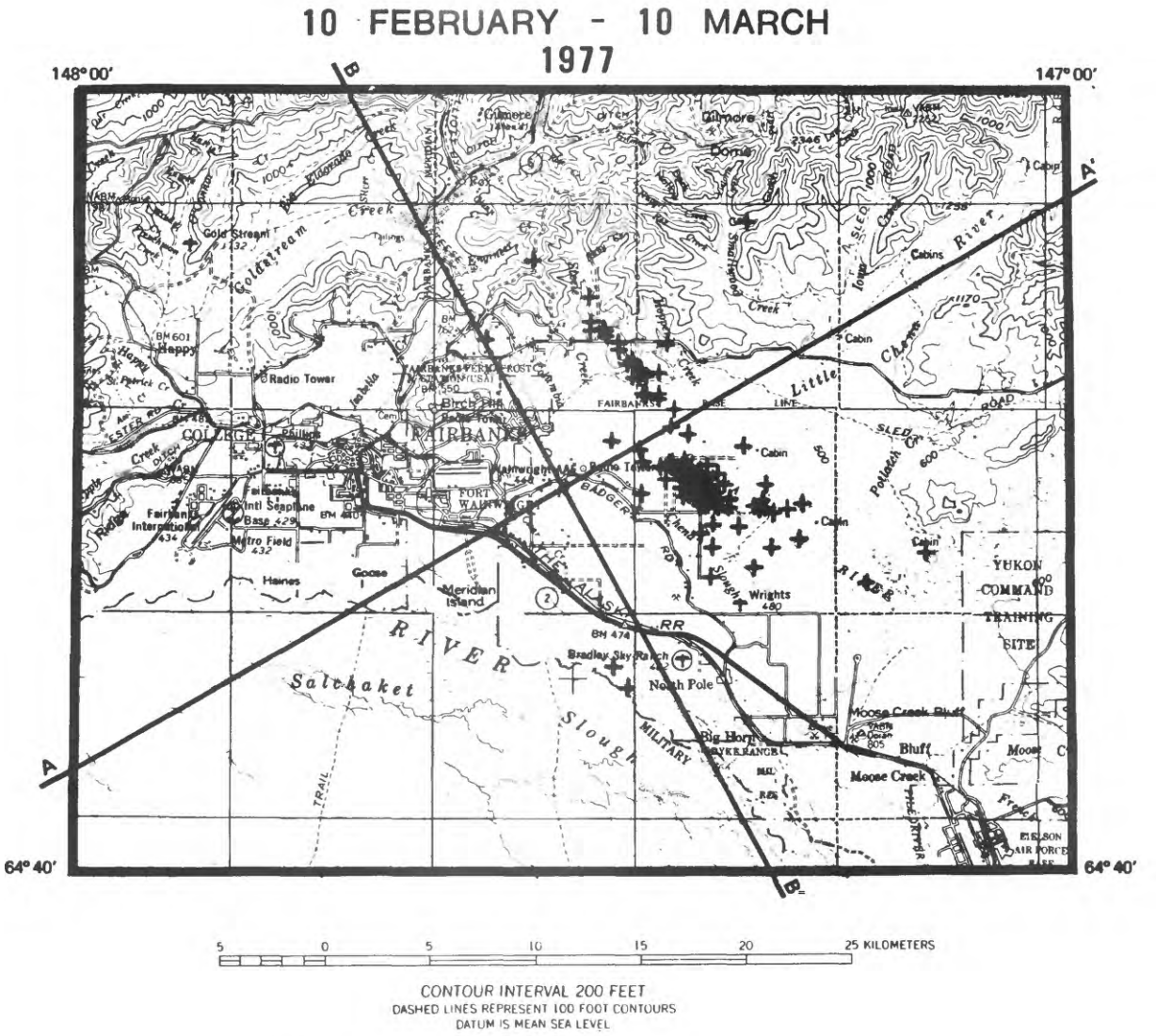

FIGURE 27.--Locations of the 1977 Fairbanks earthquake swarm.

A plot of the cumulative number of earthquakes versus local Richter magnitude (ML) is given in figure 33. The data set consists of 895 earthquakes ($3.0 \leq ML \leq 5.9$) listed in the U.C. Bulletin of the Seismographic Stations, in a 280,000 sq km region in northern and central California during the decade of January 1, 1967 to December 31, 1976. The region is bounded on the north and east by the California border, on the southeast by the dashed line in figure 33, on the southwest by a line connecting 35° N. by 121° W. and 39° N. by 125° W., and on the west by 125° W. longitude. The earthquakes are grouped into 20 consecutive 6-month intervals for analysis, and the average cumulative number of earthquakes N (total number with magnitude $\geq$ ML) in a 6-month interval is given by

$$\log N = 4.412 - 0.912\ ML$$

(valid for $3.0 \leq ML \leq 5.9$). The shaded zone in figure 33 depicts the 95% confidence interval for log N.

The open circles in figure 33 give the cumulative number of earthquakes (49 earthquakes, $3.0 \leq ML \leq 5.9$) in the first 6 months of 1979, and the solid circles give the cumulative number of earthquakes (87 earthquakes, $3.0 \leq ML \leq 5.8$) in the last 6 months of 1979. There is thus no indication that the rate of seismicity for the first 6 months of 1979 is significantly different from the average semiannual rate of seismicity over the past decade. However, the rate of seismicity for the last 6 months of 1979 is significantly higher than the average semiannual rate of seismicity over the past decade. The high rate of seismicity for the last 6 months of 1979 is primarily due to

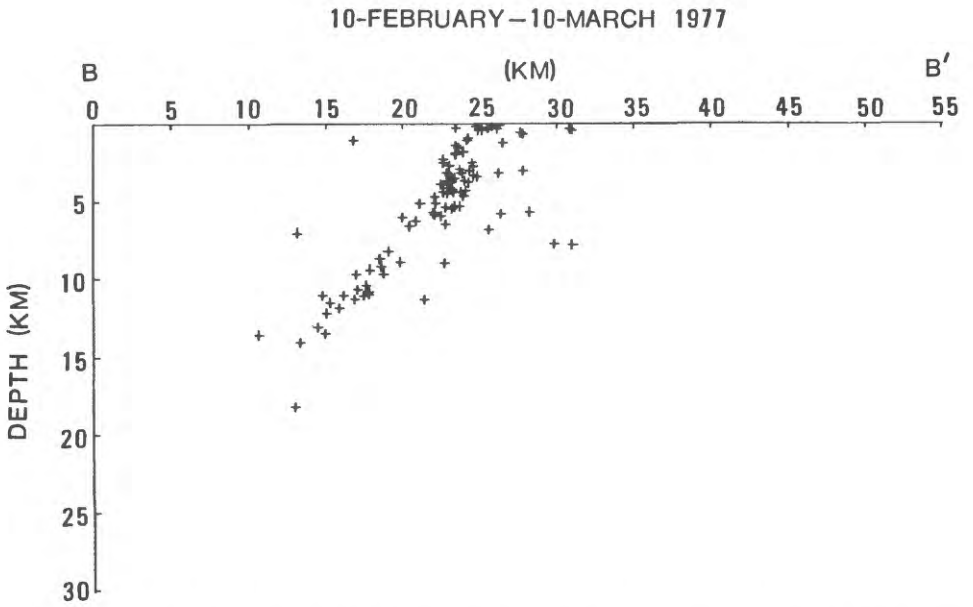

FIGURE 28.--Plot of distance versus depth for the 1977 earthquake swarm.

the occurrence of earthquake sequences at Coyote Lake and Bridgeport.

A sequence of 19 earthquakes ($3.0 \leq ML \leq 5.8$) centered in the vicinity of Coyote lake, approximately 30 km north of Hollister, occurred during August, 1979. This sequence contained the largest earthquake (ML = 5.8) to have occurred in northern and central California during 1979.

The Seismograhic Station operated a network of 19 stations during 1979. One set of instruments located at Berkeley (BKS), a three-component ultralong-period seismograph (Ts = 100 sec) which is recorded photographically and on magnetic tape, is of particular interest. Displacement transducers are used on the seismometers to detect the boom deflection and the displacement signals are recorded photographically with a peak magnification of 500 at a period of 100 seconds, after being filtered to simulate a velocity transducer coupled to a 300 second galvonometer. The displacement signals are also recorded on analog magnetic tape at two gain levels, $\pm$ 20 microns full scale (flat in displacement response from 0.1 sec to 100 sec) and $\pm$ 2 mm full scale (flat from 0-10 Hz). As an example, figure 34 shows the displacement seismograms of the Coyote Lake mainshock (ML 5.8 on August 6, 1979, centered 120 km southeast of Berkeley) recorded by the ultralong-period seismograph at Berkeley.

SOUTHERN CALIFORNIA EARTHQUAKES, 1979

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and

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During the calendar year 1979, 8453 local earthquakes were located by the 138-station Southern California Seismographic Network, which is operated jointly by the California Institute of Technology and the U.S. Geological Survey. Figure 35 shows these events plotted on a map of the region, with the major faults indicated. Caltech maintains an earthquake catalogue complete above magnitude 3.0 in the area enclosed by the box in the figure.

Sixty-nine of the year's earthquakes were 4.0 or greater in magnitude. The most significant sequences were: (1) the January 1 Malibu earthquake (ML = 5.0) and aftershocks; (2) the

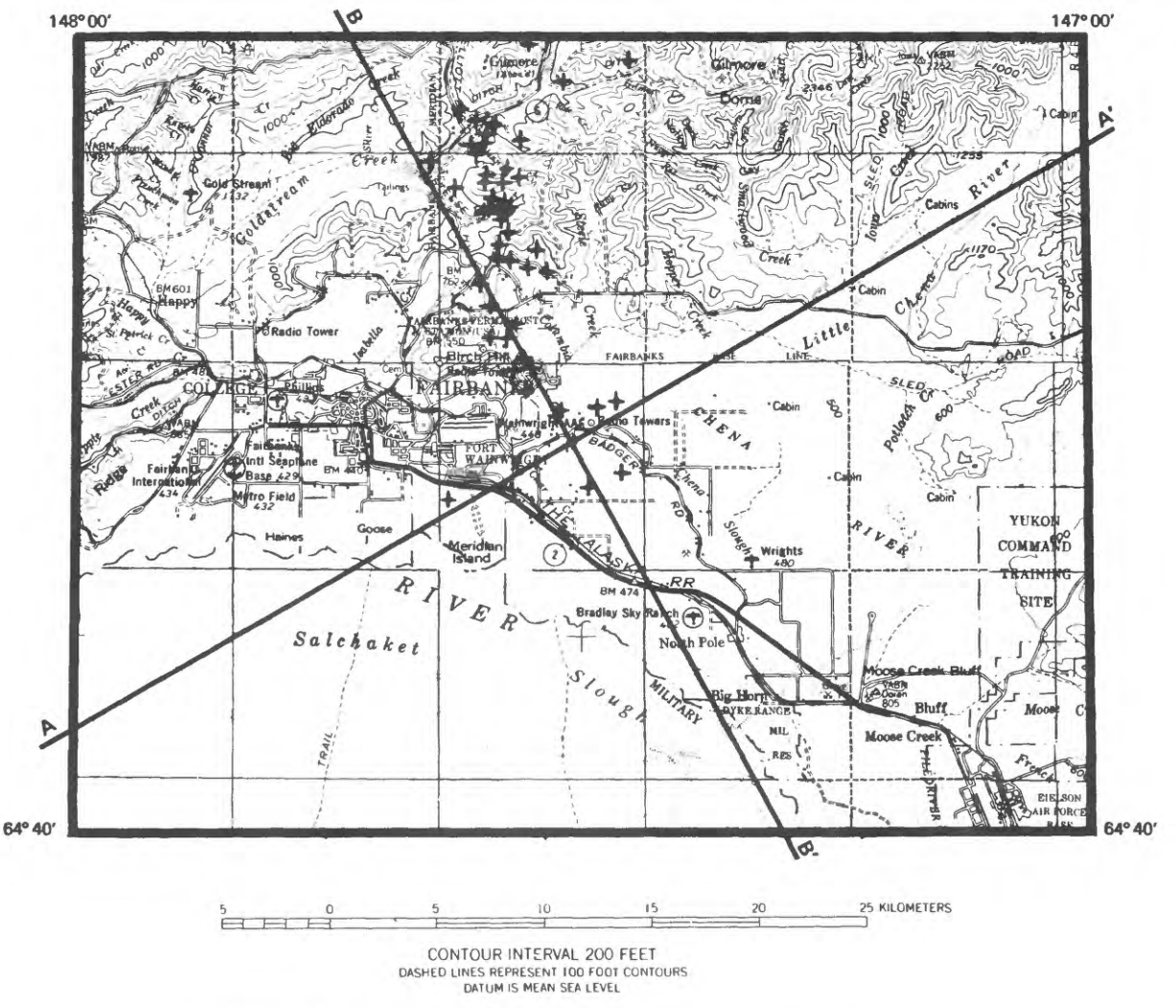

FIGURE 29.--Locations of the 1979 Fairbanks earthquake swarm.

March 15 Homestead Valley sequence (largest events ML = 4.9, 5.2, and 4.5) with its 2300 locatable members (Hutton and others, 1980); (3) a Big Bear Lake sequence (largest event ML = 4.9) in late June and early July; and (4) the October 15 Imperial Valley earthquake (ML = 6.6) and its aftershocks (C. E. Johnson and L. K. Hutton, unpub. data, 1981). The first three caused minor damage, while the Imperial Valley sequence caused extensive damage in the towns of El Centro and Brawley. Figures 36 and 37 show details of the epicentral distributions of the Homestead Valley and Imperial Valley sequences.

This level of seismic activity represents a substantial increase over the previous few years. During 1978 and 1979, five events of ML $\geq$ 5.0 occurred, as compared to one each in 1973 (Pt. Mugu ML = 5.9) and 1976 (Galway Lake ML = 5.2). The Imperial Valley shock was the first ML $\geq$ 6.0 event since 1971, and the largest since 1952. Southern California has apparently returned to the seismicity level that it had prior to the 1952 Kern County earthquake.

HAWAII EARTHQUAKES, 1979

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The emphasis in 1979 by the Hawaiian Volcano Observatory (HVO) in both station coverage and detailed data analysis was on the highly active south flank of the island of Hawaii. Hundreds of earthquakes too small to locate were counted daily, and the set of located earthquakes in the Kilauea region is nearly complete

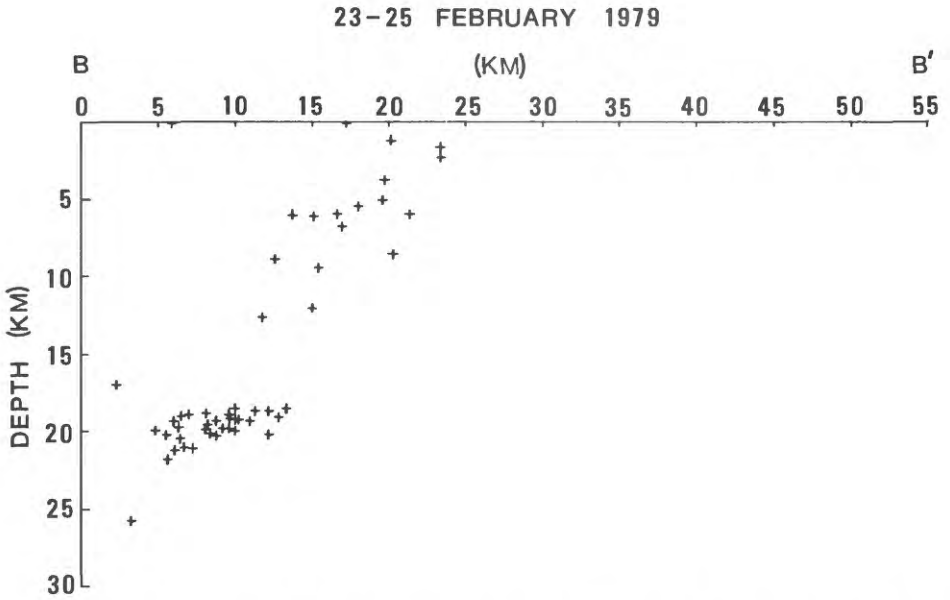

FIGURE 30.--Plot of distance versus depth for the 1979 earthquake swarm.

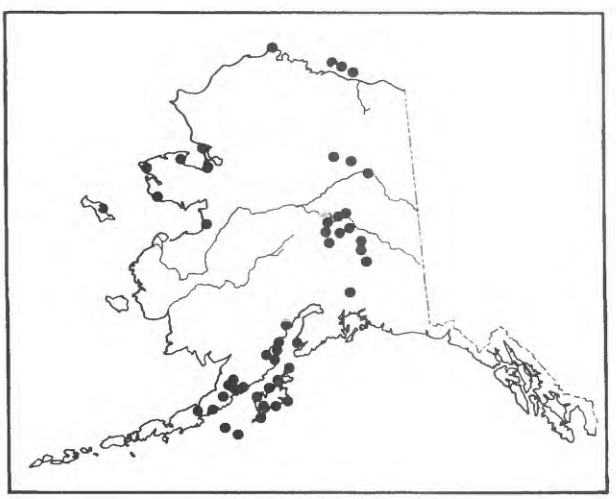

FIGURE 31.--University of Alaska seismographic stations operated in 1979.

FIGURE 32.--Northern and central California earthquakes during 1979.

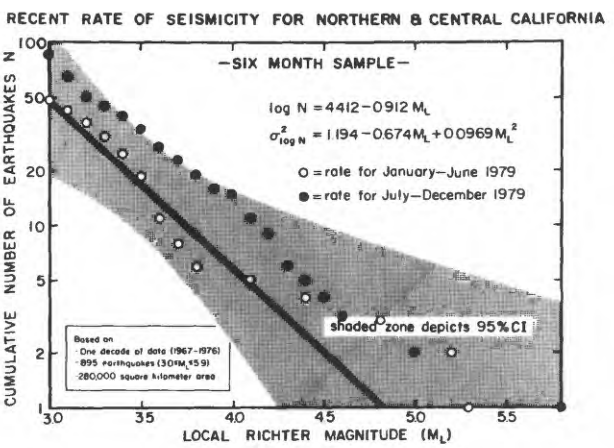

FIGURE 33.--Plot of the cumulative number of earthquakes versus local Richter magnitude (ML).

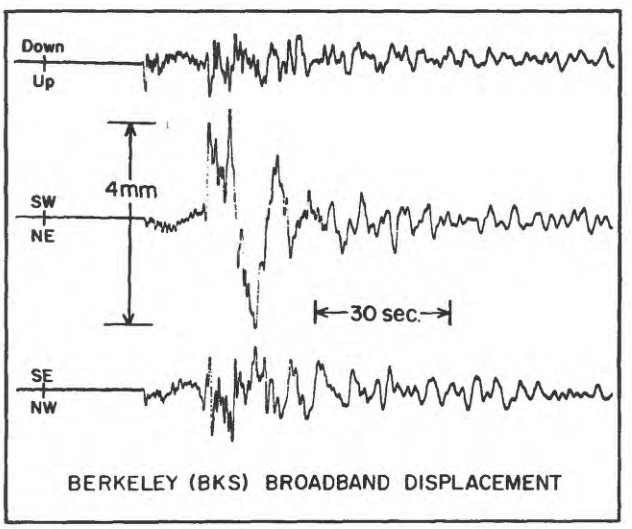

FIGURE 34.--Displacement seismograms of the Coyote Lake mainshock (6 August 1979, ML = 5.8) recorded by the ultralong-period seismograph at Berkeley.

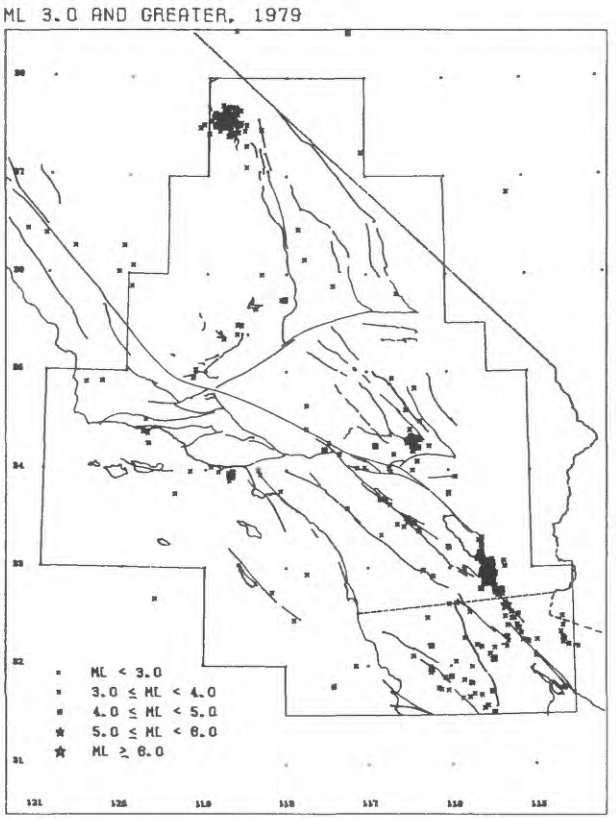

FIGURE 35.--Southern California earthquakes of magnitude 3.0 ML or greater during 1979.

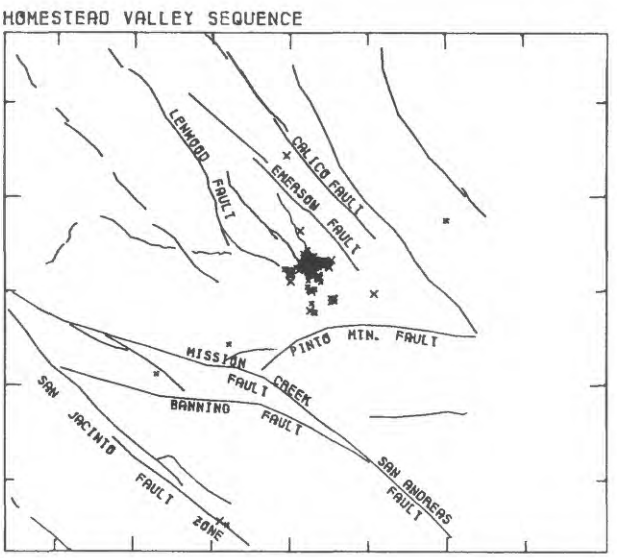

FIGURE 36.--The Homestead Valley, California earthquake sequence (ML $\geq$ 2.5) of 15 March 1979.

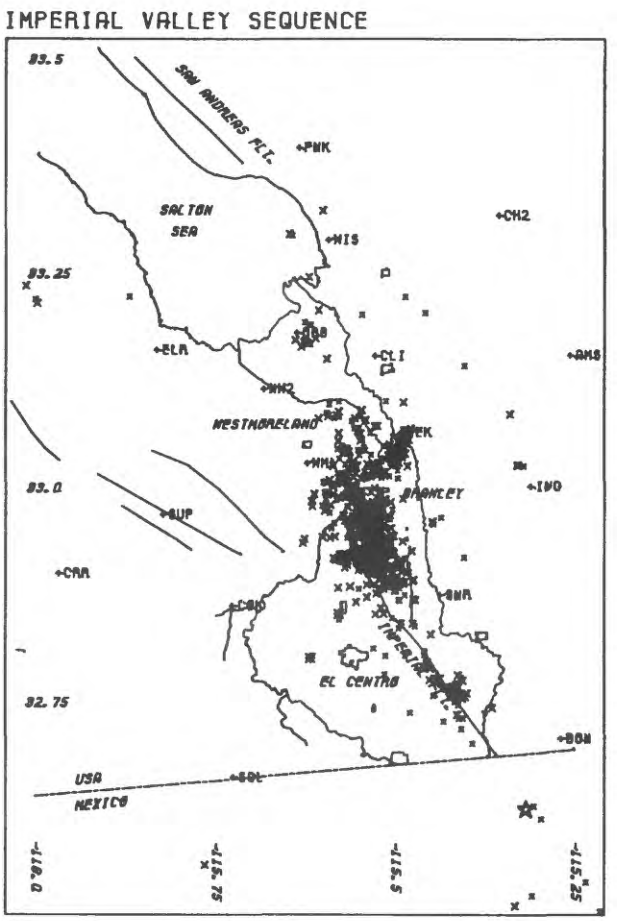

FIGURE 37.--The Imperial Valley, California earthquake and its aftershocks (ML $\geq$ 2.5) of 15 October 1979.

above magnitude about 2.0. Many smaller events were also located. Substantial effort was made to locate earthquakes elsewhere on the island and within about 150 km of the island. Such coverage cannot be as complete as on the south flank (fig. 38), but nearly all events above magnitude 3.0 to 3.5 were located.

There was a marked increase in the frequency of felt earthquakes at Kilauea during March, and shallow summit quake counts increased to nearly 500 per day during April-May. This activity culminated in an east rift zone intrusion on May 29-30. The event was heralded by several felt earthquakes which roughly coincided with the onset of summit deflation at 0.3 microradians/hour. This modest rate was maintained for roughly 5 hours, after which subsidence slowed before levelling off early on May 30 after a net deflation of 2.7 microradians. A simultaneous swarm of shallow earthquakes which began near buried Aloi crater migrated slightly uprift at an average rate of 1.3 km/hr during the first 1.5 hours of intense activity, then moved downrift to Makaopuhi crater at roughly 0.6 km/hr. Nearly 2,000 earthquakes ranging upward in magnitude to M = 3.3 were recorded by the HVO seismic network during the first 15 hours of anomalous activity.

Attention was again focused on Kilauea's upper east rift zone during June-July, when shallow earthquakes became concentrated between Keanakakoi and Pauahi craters. A M = 4.0 earthquake along the middle east rift zone on July 15 was followed by a brief seismic flurry, but no discernible harmonic tremor or summit deflation. On August 12, a swarm of shallow earthquakes and rapid summit deflation totalling 1 microradian marked a second intrusion in the upper east rift zone. During the first few hours of activity, earthquakes migrated downrift from Keanakakoi to Kokoolau at a mean rate of 1.4 km/hr. No measureable ground deformation within the epicentral zone accompanied this relatively minor intrusive event.

The September-November period was characterized by resumed summit inflation at roughly 10 microradians/month and generally increasing seismicity at the summit and along the upper east rift zone. Hawaii's largest seismic event since November 1975 occurred on September 21, when a M = 5.4 quake struck the south flank of Kilauea roughly 7 km south of Kalalua. The quake followed a substantial inflation of the east rift zone between Makaopuhi and Heiheiahulu since the September 1977 eruption, and was presumably caused in part by accumulated magma pressure. Dry tilt measurements along the rift zone in early September revealed as much as 125 microradians inflation since October 1977, but another survey after the M = 5.4 earthquake indicated a distinct reversal of this trend. Presumably, ground movements associated with the quake at least partially relieved accumulated stress caused by shallow magma storage within the rift zone.

The Hawaiian Volcano Observatory has installed and maintains an extensive telemetering seismometer network on the island of Hawaii (fig. 39). In December 1979 the seismometer network consisted of 44 stations spread over an area with a diameter of 125 km on the island of Hawaii. Of these 44 stations, 2 are low-gain multicomponent stations (optical), 6 are 2-component, 4 are 3-component, and 32 are vertical only. The coverage is most complete on and around the main center of seismic and volcanic activity, Kilauea Volcano. Other stations in the network are part of a larger net located on other volcanoes of the island of Hawaii. With

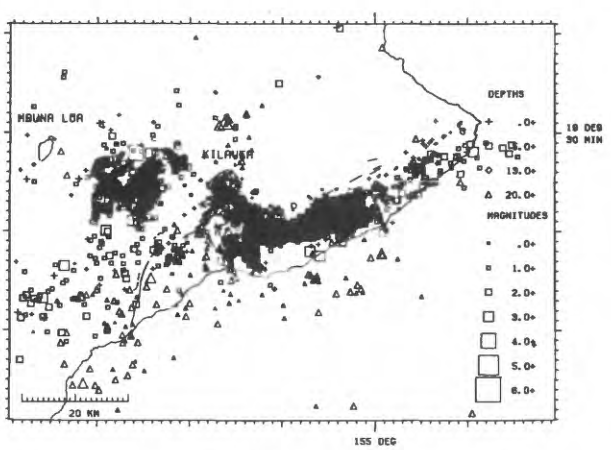

FIGURE 38.--1979 epicenter map of Kilauea-Mauna Loa showing all located earthquakes.

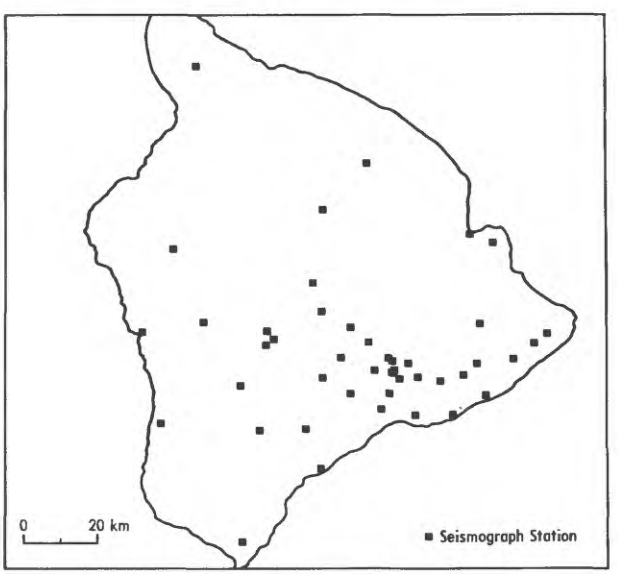

FIGURE 39.--Seismometer network on the island of Hawaii.

the exception of the station at Hilo, all seismometer signals from the short period network are telemetered to the observatory for recording.

In addition, optical seismographs are maintained at Uwekahuna (HVO), Hilo, Maui, and on Oahu (Kipapa station operated by the Pacific Tsunami Warning Center). The less sensitive short period records are used primarily for amplitude measurements for magnitude calculations to supplement readings from the high-gain stations. Hilo and Haleakala are each equipped with two low-gain Wood-Anderson torsion seismographs. Long period Press-Ewing seismographs record in three components in the Uwekahuna vault. The paper (optical) records as well as the 16mm develocorder microfilm are archived at HVO.

KANSAS EARTHQUAKES, 1979

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Lawrence, Kansas 66044

Table 2 lists all earthquakes located in Kansas and western Missouri during 1979. These locations were done using the earthquake location computer program (Lee and Lahr, 1972). Figure 40 shows all microearthquake activity recorded since December 1, 1977. Also shown on figure 40 are events located in Nebraska (from table 5 below) which show trends of microearthquake activity that cross the Kansas-Nebraska border.

In northeast Kansas an interesting earthquake trend has developed along the northwest flank of the Midcontinent Geophysical Anomaly (MGA) since November 1, 1978 (fig. 41). This activity includes a felt event (MM Intensity IV) on June 30, 1979, that represents the largest earthquake in Kansas since 1961. The University of Minnesota has also recorded at least two earthquakes of about magnitude 1.5 along the western flank of the MGA in Minnesota during 1979 (Mooney and Walton, 1980). The Iowa Geological Survey has recently installed a 5-station network along the MGA in southwestern Iowa, so monitoring of this important Midcontinent feature will be available for much of its length.

Three events have recently been recorded in Barber County, southcentral Kansas, in an area where no microearthquake activity had previously been noted. These epicenters are within about 25 km of a MM Intensity V event that occurred in 1956. When one considers that the uncertainties in the microearthquake locations are 5 to 10 km and that the uncertainty of the location of the 1956 event is perhaps 30 km or more, it is very possible that the recent activity and the 1956 event were on the same structure. The seismicity is coincident with a pre-Desmoinesian post-Mississippian structure known as the Pratt anticline.

This activity in Barber County is about the same distance west of the Humboldt fault zone as the activity along the MGA in northern Kansas. This spatial relationship to the Humboldt fault zone and the north-northeasterly trend of Precambrian basement faults in Pratt County north of Barber County
may suggest the continuation of
a much-subdued MGA southward into Oklahoma along a trend just east of Pratt and Barber counties, Kansas. A second vertical derivative map of aeromagnetic data indicates such a continuation as pointed out by Yarger (1981).

Microearthquake activity between McCook, Nebraska and Norton, Kansas has been pinpointed southeast of Indianola, Nebraska on the Central Kansas Uplift. It is not certain that all the seismicity occurred there, but the concentration has been there since March, 1979, when three portable stations were installed in the area (fig. 42). This seismicity is discussed in detail in Nebraska Earthquakes, 1979 below.

Elsewhere, seismicity along the Humboldt fault zone continued at a low level. Both the pattern of earthquakes and other geological and geophysical studies indicate a complex pattern of structures on both sides of the Nemaha Ridge.

Table 2.--*Kansas earthquakes, 1979*

Date (1979)	Origin time (UTC)	Lat. (°N.)	Long. (°W.)	Depth (km)	Mag. (MD)
Jan. 24	03 42 00.85	39.619	96.082	5.00	1.5
Feb. 10	19 56 03.61	39.265	95.905	4.02	1.7
Feb. 25	19 29 44.18	39.134	92.671	5.00	1.9
Mar. 9	11 47 43.48	37.140	97.167	1.21	1.7
Mar. 9	12 43 18.77	37.169	97.160	2.04	1.8
June 3	05 06 22.10	39.444	97.788	12.93	2.2
June 15	05 08 23.60	39.840	97.220	5.00	1.9
June 25	07 30 22.45	38.016	97.005	2.09	1.6
June 26	13 04 10.23	39.296	96.016	8.98	2.0
June 30	20 46 41.34	39.937	97.274	5.00	3.1
June 30	21 10 07.27	39.908	97.292	5.00	1.4
July 1	19 59 34.14	39.952	97.286	5.00	2.0
July 14	18 32 26.81	39.526	99.256	12.61	2.1
Aug. 2	10 46 32.55	38.930	96.563	18.21	2.2
Sep. 9	00 00 22.19	39.391	95.892	5.00	1.5
Oct. 19	16 17 25.83	37.061	98.607	5.11	2.0
Oct. 19	21 12 28.05	37.090	98.588	5.00	1.8
Dec. 7	14 17 08.19	39.694	97.619	0.15	2.1
Dec. 15	07 30 15.53	37.090	98.471	0.46	1.7

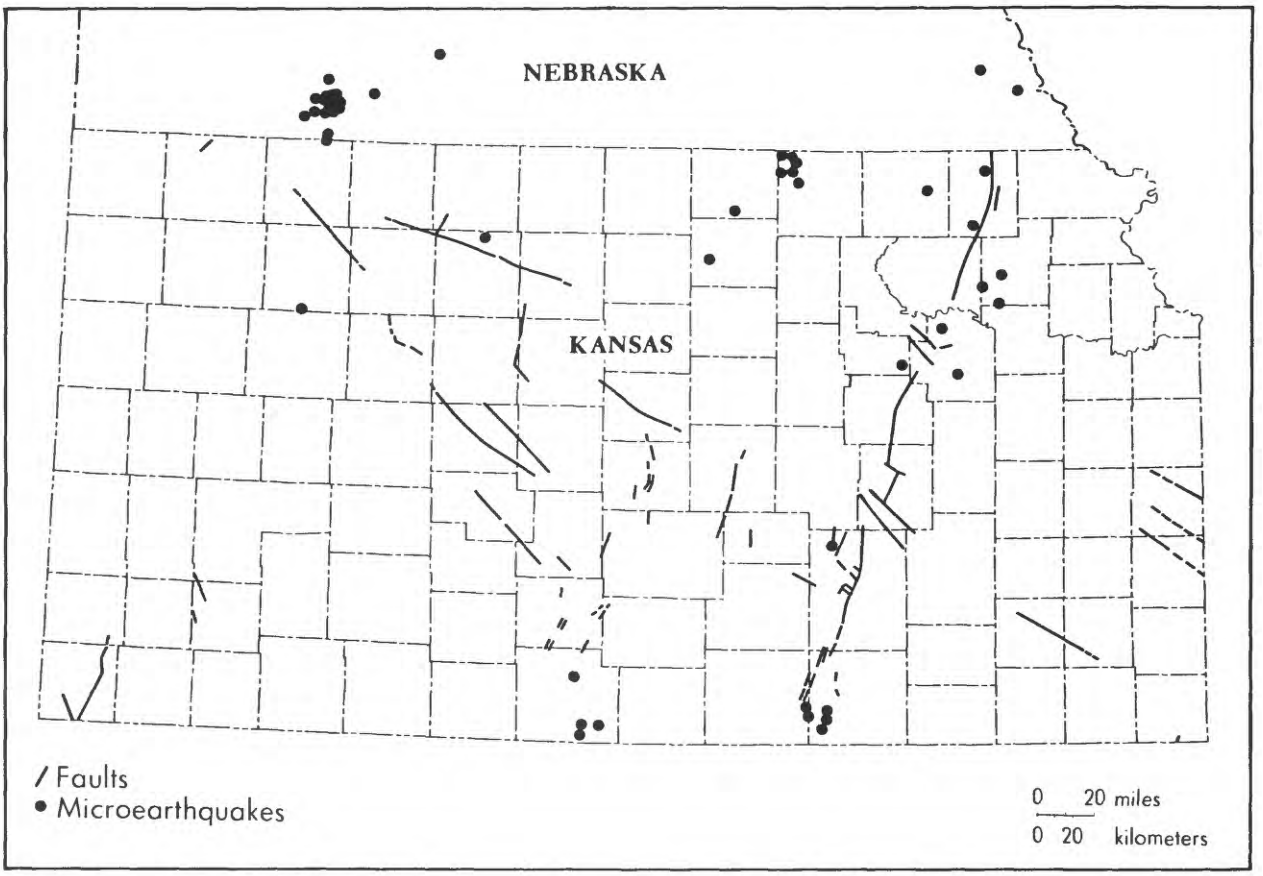

FIGURE 40.--Microearthquake activity in Kansas and southern Nebraska from December 1, 1977 to February 28, 1980.

MINNESOTA EARTHQUAKES, 1979

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A six-element array is operated in east-central Minnesota by the University of Minnesota and the Minnesota Geological Survey. Each element is based upon a 1 Hz vertical seismometer. Diameter of the array is 27 km. The array location with respect to the state of Minnesota is shown in figure 43. Station locations are given in table 3. Seismometer outputs are multiplexed and transmitted by phone line 100 km to Minneapolis, where they are recorded on magnetic tape using a common time base along with WWVB time code.

Three earthquakes within Minnesota were recorded by the Central Minnesota Seismic Array in 1979. Their parameters are listed in table 4 and their locations are shown in figure 43.

Table 3.--*Station locations for the Central Minnesota Seismic Array*

Code	Station Number	Lat. (°N.)	Long. (°W.)	Elevation (meters)	Elevation (feet)
CM1	1	45.934	93.353	324.6	1065
CM2	2	45.974	93.162	323.1	1060
CM3	3	45.875	93.010	294.1	965
CM4	4	45.750	93.102	298.7	980
CM5	5	45.783	93.323	298.7	980
CM6	6	45.860	93.198	310.9	1020

Table 4.--*1979 Minnesota earthquakes recorded by the Central Minnesota Seismic Array*

Date (1979)	Origin time (UTC)	Lat. (°N.)	Long. (°W.)	Depth (km)	Mag.	Location
Mar. 6	00 27 56.1	45.848	93.748	5	1.0	Milaca
Apr. 16	06 40 16.7	46.697	95.540	20	3.1	Detroit Lakes
May 14	19 27 38.5	45.720	92.992	6	0.1	Rush City

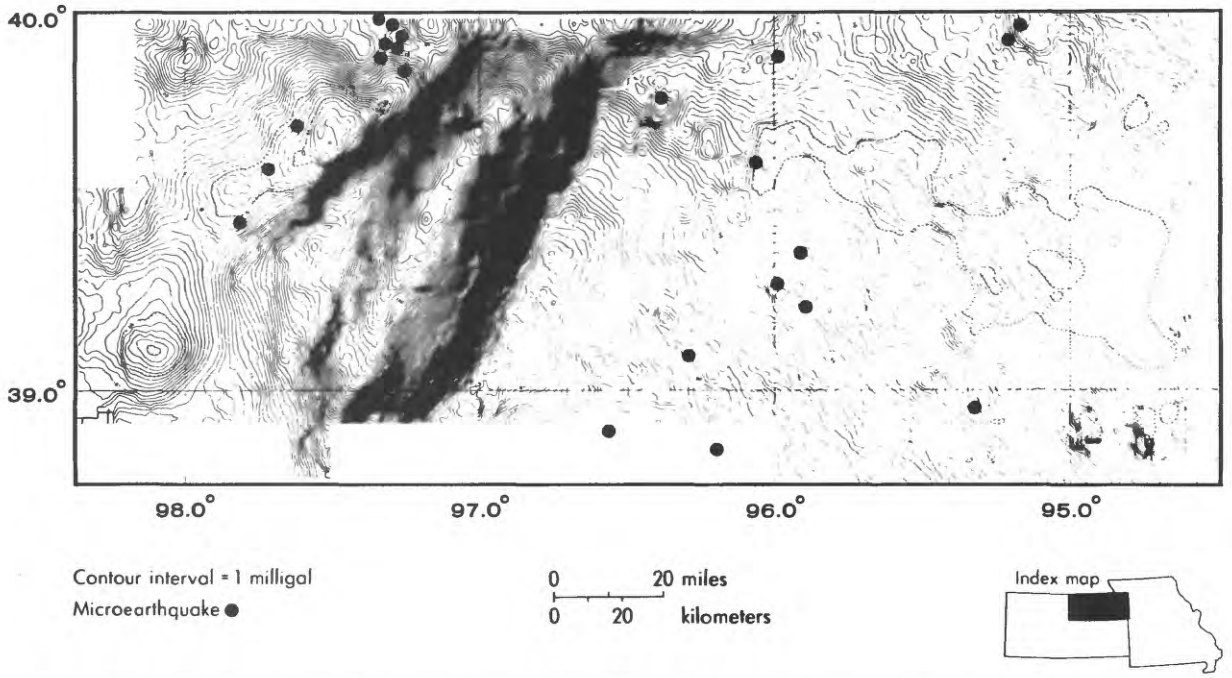

FIGURE 41.--Microearthquakes and Bouguer Gravity Map of northeastern Kansas. Note coincidence of microearthquakes and northwest flank of MGA (Midcontinent Gravity Anomaly). Gravity data were gathered by the Kansas Geological Survey; some of the east-west linear trends are caused by machine contouring and the fact that east-west data traverses were 6 miles apart with 1 mile between points on each traverse.

CENTRAL MISSISSIPPI VALLEY EARTHQUAKES, 1979

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During 1979, 238 earthquakes were located by the 25 station regional microearthquake network operated by Saint Louis University under contract with the USGS and NRC. Another 485 earthquakes were recorded by one or more stations of the network but not by a sufficient number of stations to allow location of the events. Hypocentral coordinates and arrival times of P and S phases read at each station are published in the quarterly Central Mississippi Valley Earthquake Bulletin, available on request. Data from the SLU network are supplemented by data from the four permanent and several temporary stations of the Tennessee Earthquake Information Center.

Figure 44 shows the 238 earthquakes located within a 4° by 4° region centered on 37.0° N., and 89.5° W. The magnitudes of the events are indicated by the size of the open symbols. Station locations are indicated by the triangles. Figure 45 shows the locations and magnitudes of 207 earthquakes located within a 1.5° by 1.5° region centered at 36.25° N., and 89.75° W., the immediate region of the New Madrid seismic zone.

The operation of the network continues to contribute to the delineation of the active seismic features of the New Madrid zone. The northeast-southwest trend of hypocenters is apparent. The clustering of hypocenters between the station at Gratio, Tennessee (GRT), and that at New Madrid, Missouri (NMMO), has been and is the subject of special investigations.

Significant earthquakes during 1979 included the following:

1. 2 February 1115 UTC, 36.25° N., 89.46° W., the first locatable event of an earthquake swarm of unusual duration from 2 February to 4 February; 135 earthquakes were recorded in 57 hours. At least 8 of the earthquakes were felt in the immediate vicinity of the swarm epicenters. The 4 largest were of MM Intensity II-III in Ridgely, Tennessee. Focal depths for most of the events were less than 5 km.

2. 5 February 0531 UTC, 35.85° N., 90.08° W., felt in Blytheville area, Arkansas MM IV, mb3Hz = 3.0 (FVM).

3. 27 February 2254 UTC, 35.92° N., 91.24° W., main event of a 42 earthquake sequence in 22

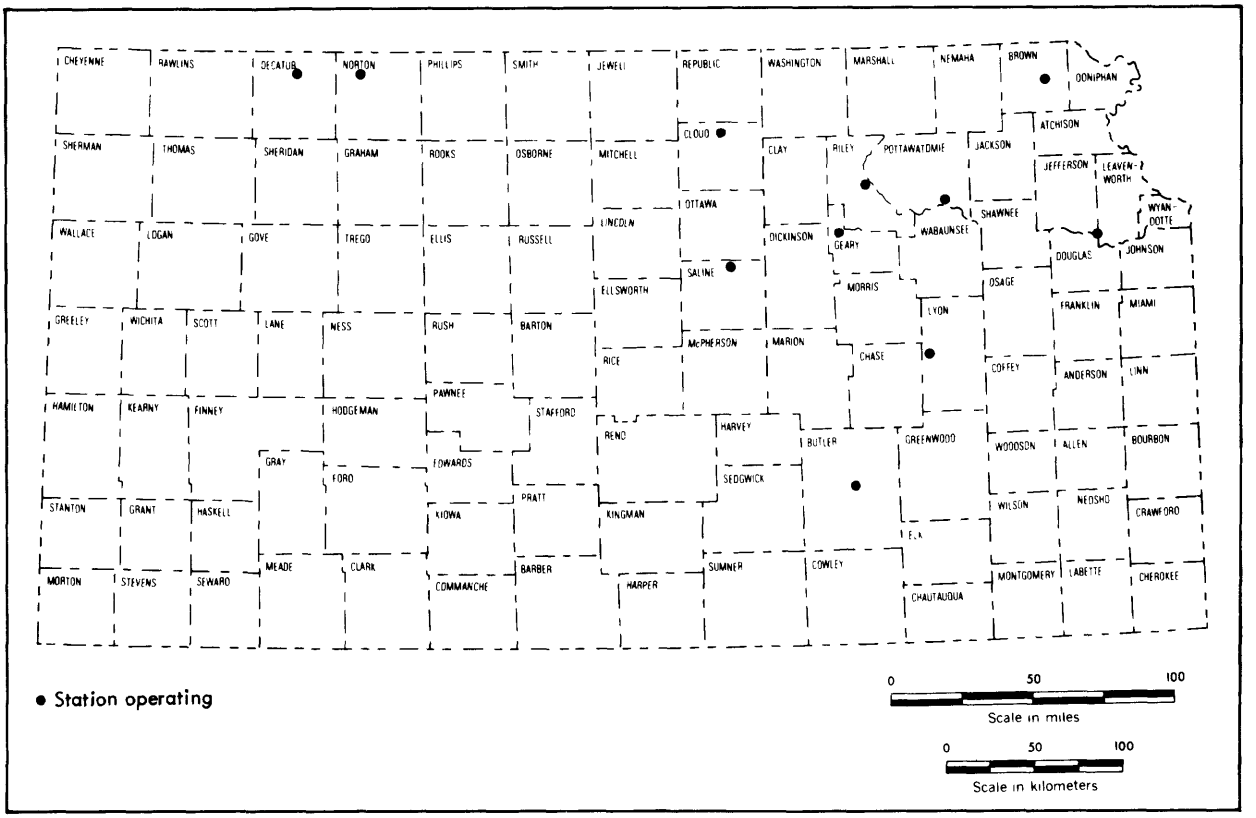

FIGURE 42.--Kansas Geological Survey seismograph network in 1979. Stations in eastern Kansas are telemetered to Lawrence. Stations in western Kansas are operated by volunteers at the station sites.

hours. Felt strongly in Powhattan, Arkansas, MM V, mb3Hz = 3.5 (FVM).

4. 11 June 0412 UTC, 36.17° N., 89.95° W., felt widely in Caruthersville, Missouri region and in Dyersburg, Tennessee, mb3Hz = 3.9 (FVM).

5. 25 June 1711 UTC, 35.53° N., 90.43° W., felt in Marked Tree, Arkansas region, mb3Hz = 3.2 (FVM).

6. 08 July 1235 UTC, 36.89° N., 89.29° W., felt in Charleston area, Missouri mb3Hz = 3.1 (FVM).

7. 05 November 1635 UTC, 36.44° N., 91.01° W., felt in Dalton, Arkansas, MM IV, mbLg = 3.2 (FVM).

NEBRASKA EARTHQUAKES, 1979

By George H. Rothe
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The operation of several local seismograph networks has significantly increased our knowledge of the seismotectonics of the Midwest. The nine-station Kansas Geological Survey (KGS) seismic network and the five-station Nebraska Geological Survey (NGS) seismic network were installed in the fall of 1977 to evaluate the seismic risk associated with the Nemaha Ridge and its eastern bounding fault - the Humboldt fault. The operation of these networks and a four-station temporary expansion of the KGS network into western Kansas and south-central

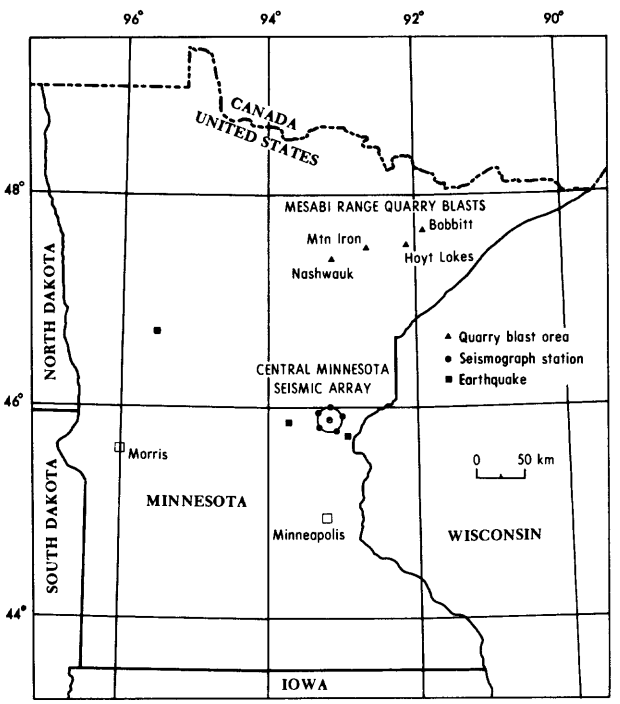

FIGURE 43.--Map of Central Minnesota Seismic Array, quarry blasts, and earthquakes during 1979.

Nebraska has lead to the location of twenty-three (23) earthquakes during 1979. This instrumentally recorded seismicity is summarized in table 5 and figure 46.

The relationship of this activity to the Sleepy Hollow Oil Field can be seen in figure 47. The Sleepy Hollow Field has been the highest producing field in Nebraska and is currently produced by the Amoco Production Company. Injection (for secondary recovery) into perimeter wells has been primarily at the base of the sedimentary section (1.2 km deep). The shallow nature of some of the seismicity as deduced from intensity-magnitude considerations and hypocenter determinations, the fact that injection continues in the Sleepy Hollow Field, and reported cases of cause and effect relationships of fluid injection to earthquakes elsewhere (Healy and others, 1968, and Rogers and Malkiel, 1979) suggest injection of fluids as a cause for the shallower seismic activity in the Sleepy Hollow Field. Injection records from the Nebraska Oil and Gas Commission consist of six-month averages combined for all wells in the field. Comparison of the net injection and seismicity has revealed no obvious correlation. More detailed injection and seismicity data are needed to examine the possibility that some of the earthquakes are induced by the fluid injection.

The University of Kansas (Kansas Geological Survey and Department of Geology) is in the process of modifying the temporary expansion of the

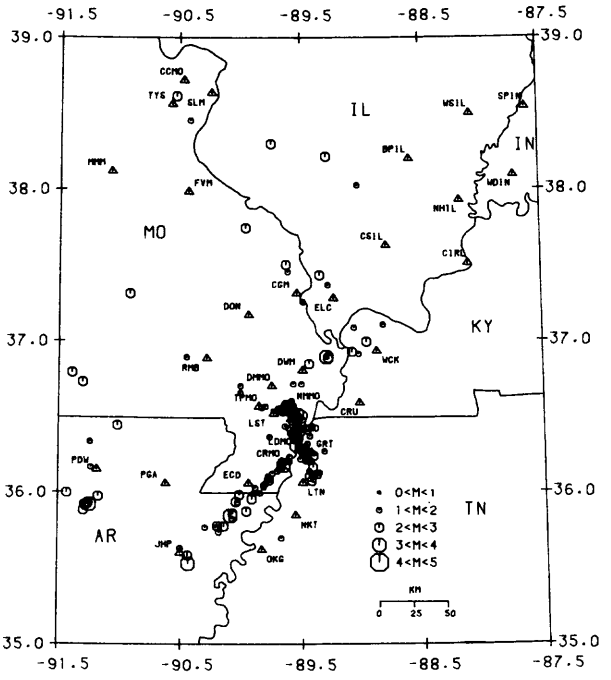

FIGURE 1
CUMULATIVE EVENTS 01 JAN 1979 TO 31 DEC 1979
LEGEND ▲ STATION ⊙ EPICENTER

FIGURE 44.--Central Mississippi Valley earthquakes during 1979 within a 4° x 4° region centered at 37.0° N. and 89.5° W.

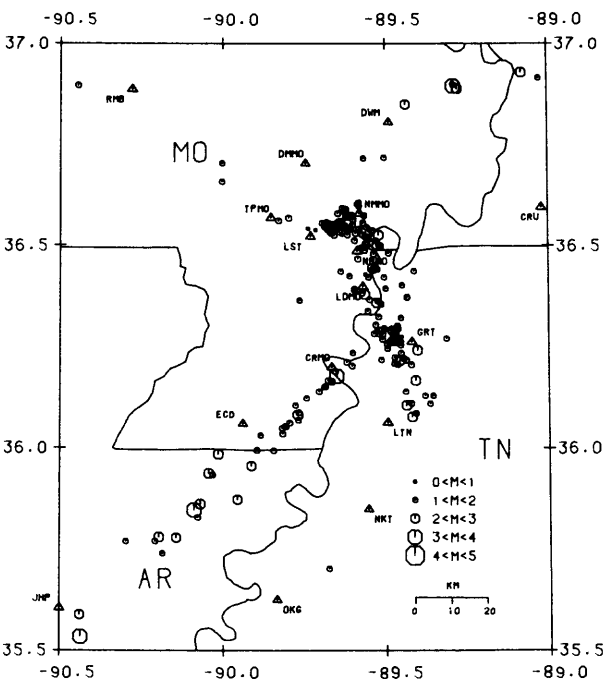

FIGURE 2
CUMULATIVE EVENTS 01 JAN 1979 TO 31 DEC 1979
LEGEND . ▲ STATION ⊙ EPICENTER

FIGURE 45.--Central Mississippi Valley earthquakes during 1979 within a 1.5° x 1.5° region centered at 36.25° N. and 89.75° W.

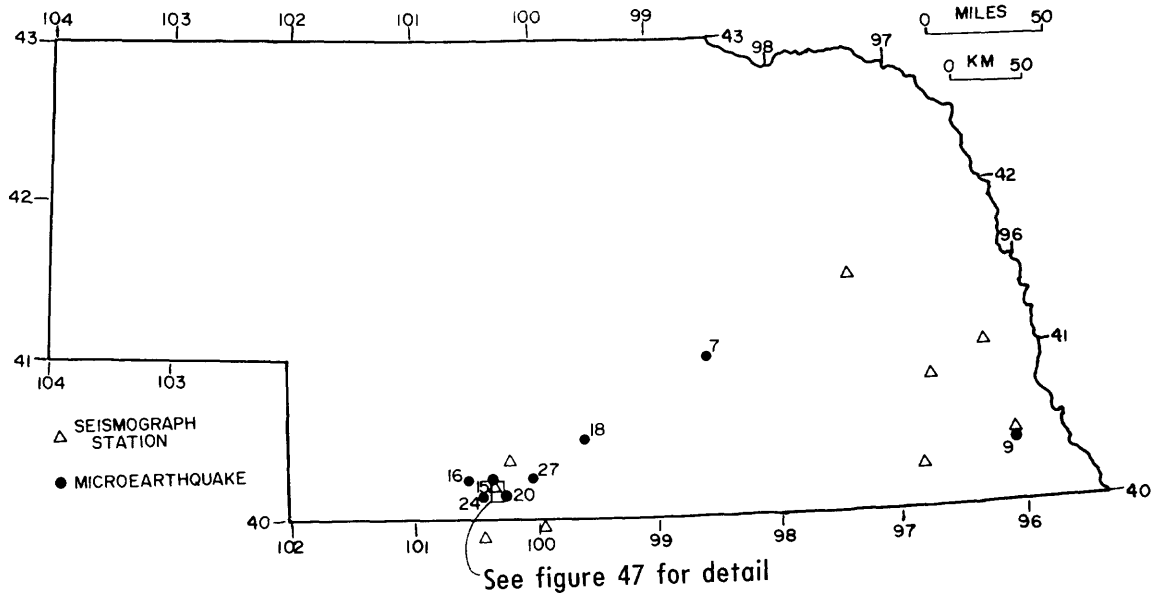

FIGURE 46.--Map of the Nebraska Geological Survey seismic network and earthquake epicenters in Nebraska during 1979.

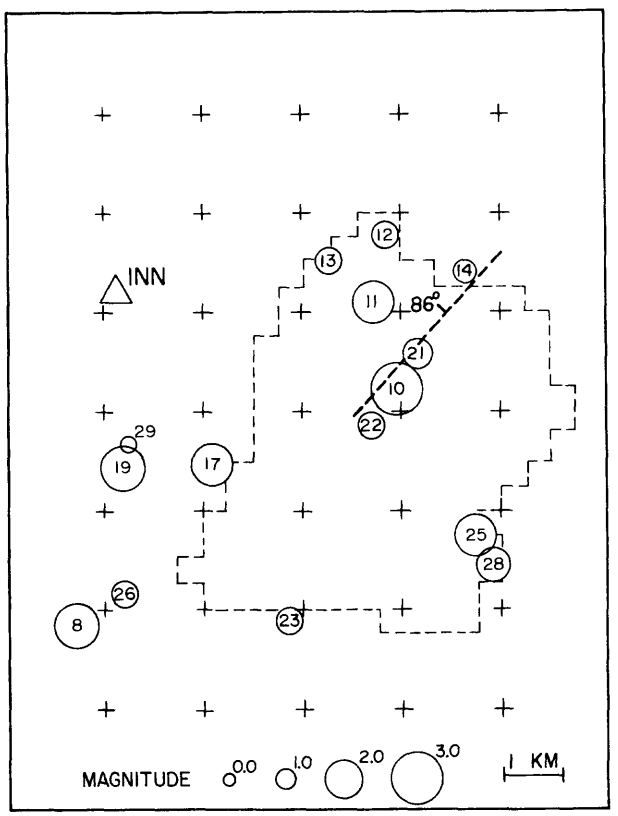

FIGURE 47.--Seismicity for 1979 in the area of the Sleepy Hollow Oil Field, Nebraska. Numbers correspond to event numbers in table 5.

KGS network to create a semi-permanent, semi-regional, seven-station, telemetered network known as the University of Kansas South-Central Nebraska seismic network. The goal of this expansion is to increase the station density along the southern end of the Cambridge Arch and improve the timing accuracy by telemetering the seismic signals to Lawrence where uniform timing information can be applied. Improved timing accuracy is needed to achieve improved location resolution over the temporary network expansion. The spatial distribution of the stations has been designed to improve both depth resolution (a good epicentral distance distribution including a station directly over the area of highest activity) and epicentral resolution (a uniform azimuthal distribution).

In addition to the installation of the University of Kansas South-Central Nebraska network, the Induced Seismicity Program of the Office of Earthquake Studies of the U.S. Geological Survey is funding the installation and maintenance of a dense, eight-station telemetered seismograph network (the Sleepy Hollow seismic network) for a period of at least 2 years beginning in the fall of 1981. The network will have an average station spacing of about 3 km centered on the oil field and should enable us to more accurately determine foci and focal mechanisms of earthquakes within the oil field and study the possibility that they are induced. The seismic signals will be radio and telephone telemetered to the University of Kansas in Lawrence where they will be recorded on inked-paper recorders.

The installation of the seven-station South-Central Nebraska network and the eight-station Sleepy Hollow network will bring the total number of stations being recorded in Lawrence to 24. In addition to the analog recording, planning is underway to record all 24 stations digitally in the "event" mode.

Table 5.--*Nebraska earthquakes, 1979*

Event Number	Date (1979)	Origin time (UTC)	Lat. (°N.)	Long. (°W.)	Depth (km)	Magnitude (MD)	Modified Mercalli (MM) Intensity
7	Apr. 8	22 46 10.41	40.969	98.564	0.67	2.4	---
8	June 6	16 16 22.40	40.144	100.407	1.62	2.6	III
9	June 12	11 13 11.88	40.406	96.054	2.07	1.8	---
10	July 16	00 03 47.79	40.179	100.347	14.05	2.9	III
11	July 16	01 34 20.31	40.191	100.351	8.37	2.4	---
12	July 16	05 27 01.04	40.201	100.349	16.64	1.5	---
13	July 16	06 08 09.59	40.197	100.360	16.87	1.5	---
14	July 16	07 05 56.23	40.196	100.334	1.59	1.2	---
15	July 16	18 02 49.70	40.256	100.401	6.18	1.5	---
16	July 20	13 43 02.74	40.252	100.589	1.80	1.4	---
17	July 24	04 16 46.42	40.168	100.381	1.62	2.2	---
18	July 24	08 04 46.35	40.757	100.632	2.00	1.2	---
19	Aug. 2	04 16 22.23	40.167	100.399	1.11	2.5	III
20	Aug. 4	22 50 05.52	40.165	100.306	1.62	1.5	---
21	Aug. 13	11 09 50.38	40.184	100.343	9.24	1.7	---
22	Aug. 13	23 59 31.60	40.173	100.351	1.91	1.5	---
23	Aug. 15	06 45 53.46	40.145	100.367	12.47	1.5	---
24	Aug. 15	16 07 07.17	40.143	100.462	1.76	1.3	---
25	Aug. 31	08 00 11.56	40.157	100.331	11.93	2.2	IV
26	Nov. 19	04 40 02.96	40.149	100.398	2.00	1.5	---
27	Nov. 19	04 58 43.40	40.248	100.361	3.15	1.9	---
28	Nov. 29	22 02 31.31	40.153	100.328	1.66	1.9	---
29	Dec. 10	12 20 28.78	40.171	100.398	1.69	0.9	---

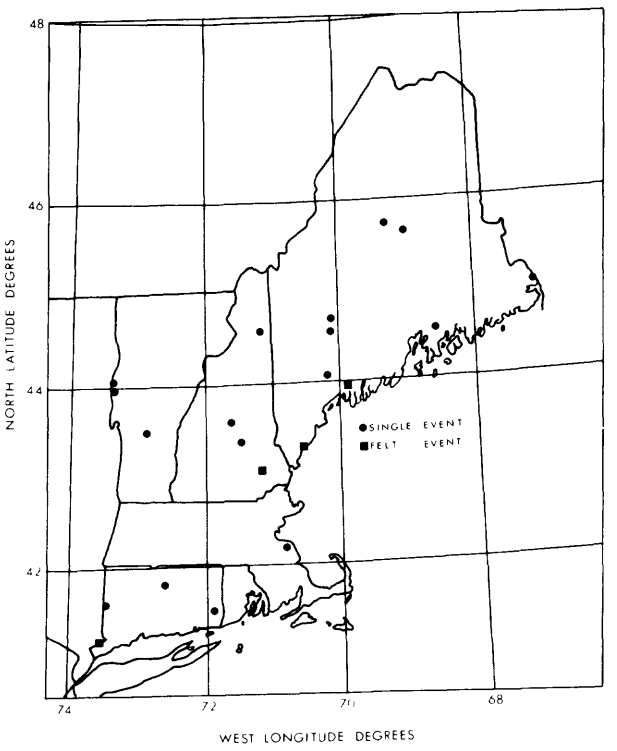

FIGURE 48.--New England earthquake epicenters during 1979.

NEW ENGLAND EARTHQUAKES, 1979

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Weston Observatory of Boston College continued to expand its seismic station coverage in New England during 1979. By the end of the year Weston Observatory was operating 36 telemetered stations, 8 of which were newly installed. Five of the new stations are for the purpose of monitoring microearthquake activity near the towns of Haddam and Moodus in central Connecticut. This area was the site of a locally strong tremor in 1791 and has had numerous heard earthquakes reported in the historic record. Two stations were installed near Passamaquoddy Bay in eastern Maine also to improve microearthquake detection capabilities.

During 1979, Weston Observatory detected 46 earthquakes in New England. Of these, 21 were large enough to be located and 4 were reported felt (fig. 48). The largest New England event had a magnitude (mbLg) of 4.0. In addition, Weston Observatory detected 98 events from neighboring areas in the United States and Canada, 38 of these events were located and 5 of them were felt. The largest event detected was the Charlevoix, Quebec, earthquake of August 19, 1979 (mbLg = 5.0).

The Bath, Maine, earthquake of April 18, 1979, (43.95° N., 69.75° W., mbLg = 4.0) was the largest New England event in several years. The maximum Modified Mercalli intensity reported for the earthquake was V, and the event was felt as far away as Boston, which is 220 km from the epicenter. A couple of weeks after the main shock occurred, portable seismographs were installed near the epicenter to monitor the aftershock activity. A total of 17 aftershocks were detected, 7 of them being magnitude 2.0 or greater.

Weston Observatory continued to publish the quarterly seismic bulletin of the Northeastern United States Seismic Network (NEUSSN). The bulletin lists locations and magnitudes for events in the Northeastern United States and adjacent areas in Canada. Sources of data for the information in the bulletin are: Lamont-Doherty Geological Observatory, Massachusetts Institute of Technology, Pennsylvania State University, Delaware Geological Survey, Maine Geological Survey and the State University of New York at Stony Brook.

EARTHQUAKES IN NEW YORK STATE AND ADJACENT AREAS, 1979

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Lamont-Doherty Geological Observatory operates a seismic network of 38 short-period stations in the states of New York, New Jersey, and Vermont. The present configuration of this network consists of 38 stations and is shown in figure 49. The signals are telemetered by telephone line and radio to a central recording site at Palisades, New York, and recorded on a common time base. Twenty-eight channels are recorded on two develocorders and all are recorded on an analog magnetic tape recorder. Seven helicorders are used to monitor activity in real time, enabling rapid detection of earthquakes. The magnetic tapes are digitized for detailed analysis of particular events.

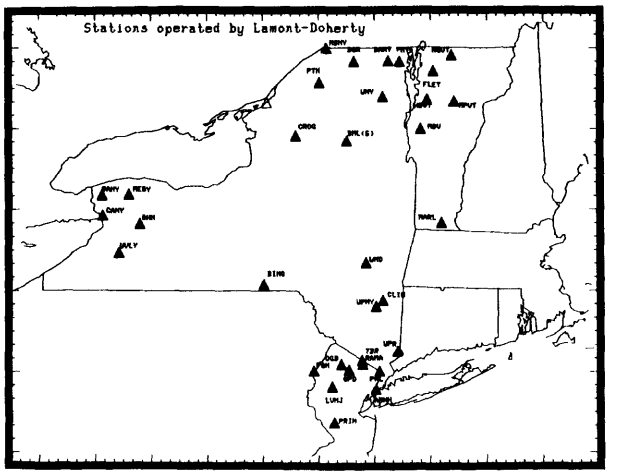

FIGURE 49.--Distribution of short-period seismic stations operated by the Lamont-Doherty Geological Observatory in New York State and adjacent areas.

Figure 50 shows the distribution of earthquakes recorded by the Lamont-Doherty network during 1979. The longer term distribution of seismicity in New York State and adjacent areas can be seen in figure 51, which shows the locations of all earthquakes (mb $\geq$ 2) recorded by the network from its inception in 1970 through 1980. In this figure we chose a magnitude threshold of mb = 2 so as to reduce the bias introduced by non-uniform coverage in space and time. The major features of interest in figure 51 are:

1. A NNW trending zone of seismicity extending from northern New York to western Quebec.
2. A notheasterly trending belt of seismic activity extending from New Jersey into Connecticut.
3. Concentrations of seismicity in western New York and western Lake Ontario.
4. Relative absence of activity in the central part of New York State, Vermont, and western Massachusetts.

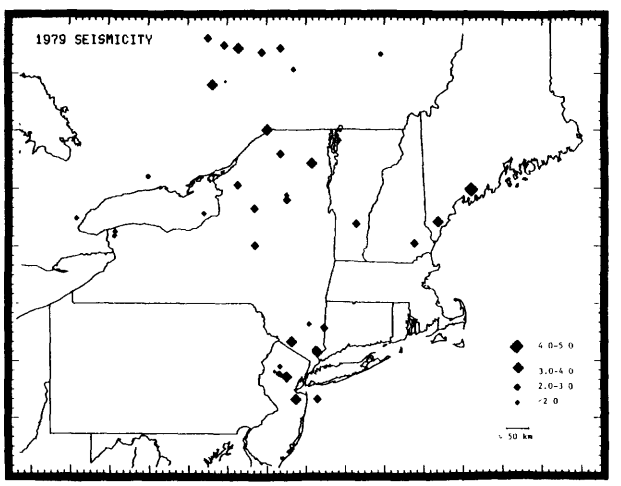

FIGURE 50.--All earthquakes recorded by the Lamont-Doherty network in New York State and adjacent areas during 1979.

A comparison of the instrumentally recorded seismicity with the historical earthquake record for this region reveals that these features are relatively stationary. Those areas of the New York State region that have had little or no seismicity historically are relatively aseismic today, whereas the historically active areas are also active today.

Forty-eight earthquakes ranging in magnitude from 1 to 5 were recorded during 1979 in New York State and its vicinity. Significant activity has been recorded during this year in northern New York and western Quebec, and also in the New York City region. During 1979 very little activity was recorded in western New York. The most significant earthquakes which occurred this year within the area covered by the network were:

1. An earthquake in northern New Jersey (mbLg = 3.0) approximately 20 km south of New York City (Cheesequake, New Jersey; January 30, 1979). This earthquake generated Modified Mercalli intensity VI shaking in the epicentral region and was felt over an area of approximately 15,000 sq km.

2. An earthquake in northern New Jersey (mbLg = 2.2) about 40 km west of New York City (Bernardsville, New Jersey; March 10, 1979). This event generated Modified Mercalli

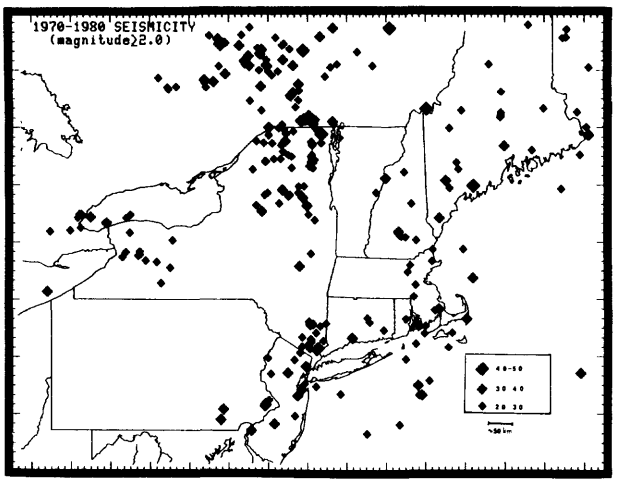

FIGURE 51.--Distribution of earthquakes (mb $\geq$ 2) recorded by the Lamont-Doherty network in New York State and adjacent areas from 1970 through 1980.

intensity IV shaking in the epicentral region and was felt over at least 2,000 sq km. During the past decade other earthquakes have been located by the network which occurred to the northeast of this event, and these earthquakes appear to be associated with the Ramapo fault zone of northern New Jersey and southeastern New York. The surface trace of the Ramapo fault terminates about 10 km to the southwest of the Bernardsville earthquake.

3. An earthquake in Westchester County (mbLg = 2.0) about 20 km north of New York City (Mt. Kisco, New York, December 30, 1979). This event generated Modified Mercalli intensity IV shaking in the epicentral region, and was felt over a small area surrounding Mt. Kisco.

OKLAHOMA EARTHQUAKES, 1979

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and

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The article below is a condensed version of a paper by Lawson and Luza originally published in Oklahoma Geology Notes, v. 40, June 1980.

A statewide network of 11 seismograph stations is recording seismological data in Oklahoma (fig. 52). The Oklahoma Geophysical Observatory station, TUL, has been recording earthquake data since December 1961. The Observatory, located near Leonard, Oklahoma, in southern Tulsa County, operates seven seismometers, three long-period and four short-period, which are installed in a vault detached from the main building. The seismograph instrumentation and recording equipment were described in United States Earthquakes, 1978. From January 1, 1979, to December 31, 1979, station coverage was relatively uniform. However, a third radiotelemetry station, named GBO (Fort Gibson), was established July 7, 1979. This site, northeast of Fort Gibson, Cherokee County, has a 55-km line-of-sight path to TUL.

In 1979, 96 Oklahoma earthquakes were located (fig. 53) by the Oklahoma Geophysical Observatory staff. Magnitude values range from a low of 1.2 (mbLg) in Hughes County to a high of 3.4 (mbLg) in Beckham County (table 6). The listing represents only those earthquakes that could be located by using three or more seismograph records. Twelve earthquakes were reported felt by people living in the vicinity of an earthquake epicenter.

Almost one-half of the earthquakes, approximately 42, have epicentral locations in Canadian County (fig. 54). Two earthquake swarms, one north of Cogar and the other northwest of Minco, account for most of the locatable earthquakes in Canadian County. The first earthquake swarm began on March 18 (near Cogar) and lasted until April 1. Thirty earthquakes, with magnitudes ranging from 0.8 (MD) to 2.5 (MD), had epicentral locations in Canadian, Caddo, and Grady Counties. Only one of these earthquakes, MM III, was reported felt. A second earthquake swarm, northwest of Minco, Grady County, occurred on September 15 and lasted through September 17, 1979. Six earthquakes, with magnitudes ranging from 1.6 (MD) to 2.3 (MD), had epicentral locations in Grady and Canadian Counties (fig. 54). Of these six, two earthquakes, with MM IV intensities, were reported felt.

In south-central Oklahoma, earthquakes are concentrated in the Wilson area, Carter and Love Counties. Twelve earthquakes, of which four were felt, were located in this region in 1979. In the past, this area has also been the site of numerous small earthquakes. A third general area of earthquake activity is located along and north of the Ouachita front (Arkoma Basin) in southeastern Oklahoma. Twelve earthquakes, with (MD) magnitudes that range from 1.7 to 2.4 were instrumentally detected in this region.

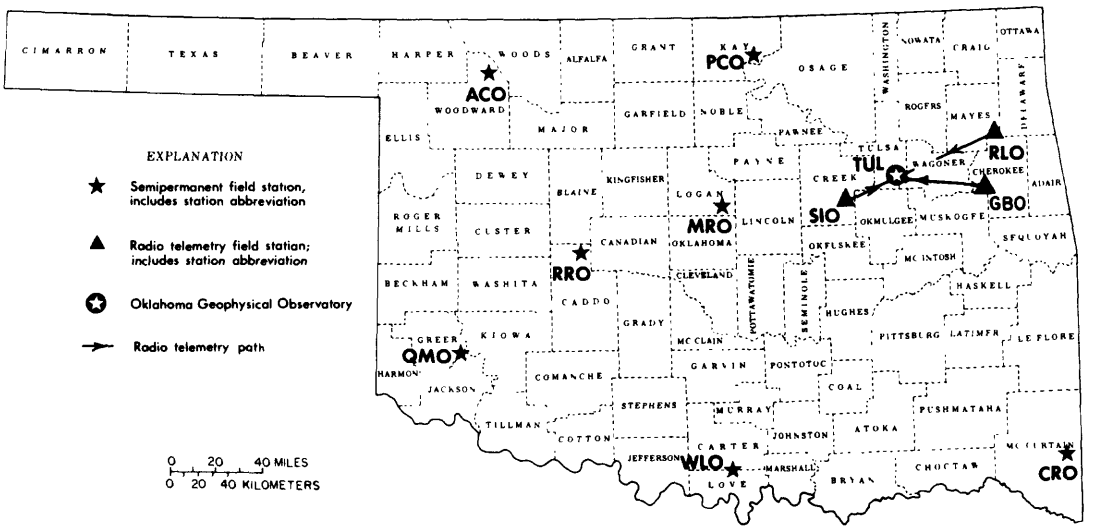

FIGURE 52.--Active seismograph stations in Oklahoma.

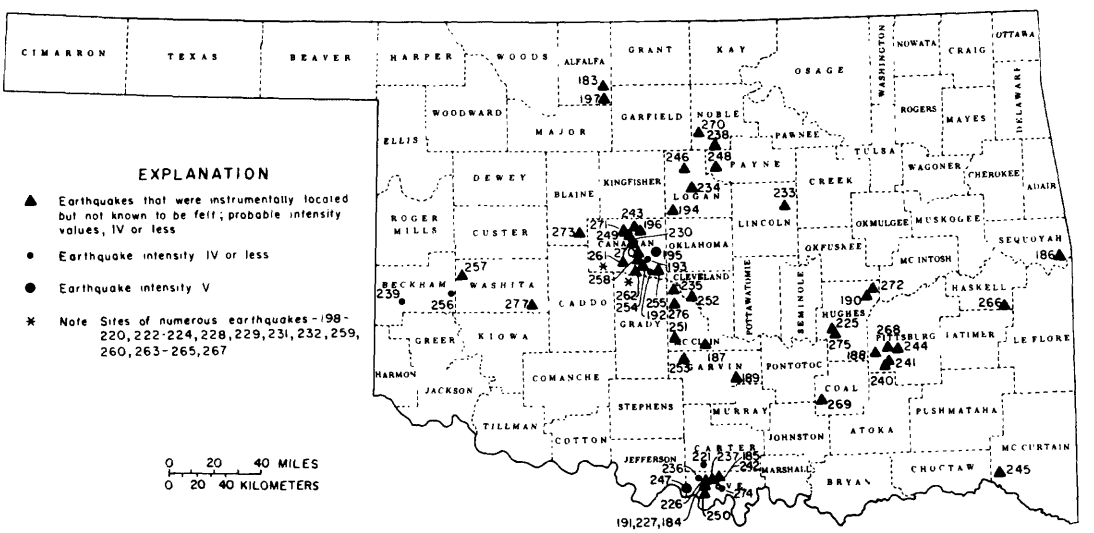

FIGURE 53.--Distribution of Oklahoma earthquakes during 1979. Numbers correspond to event numbers in table 6.

Table 6.--*Oklahoma earthquake catalog for 1979*

Event number	Date and origin time (UTC)		County	Intensity (MM)	Magnitudes 3Hz	bLg	MD	Latitude (°N)	Longitude (°W)	Depth (km)[1]
183	JAN 8	113542 99	Alfalfa		20	21	19	36 579	98 146	4 7
184	JAN 24	051546 35	Love		14		15	33 985	97 434	5 0R
185	JAN 24	052532 00	Love		18	21	19	34 022	97 381	5 0R
186	JAN 28	102409 34	Sequoyah		14		17	35 483	94 568	5 0R
187	JAN 29	192010 40	McClain		24	26	23	34 916	97 383	5 0R
188	FEB 1	123132 28	Pittsburg		18	17	21	34 830	96 062	5 0R
189	FEB 4	165559 96	Garvin		26	25	26	34 672	97 157	5 0R
190	FEB 5	142340 05	Hughes		22	18	22	35 177	96 092	5 0R
191	MAR 1	034218 77	Love		19	20	18	33 969	97 446	5 0R
192	MAR 13	232922 56	Canadian	II	17			35 421	97 851	5 0R
193	MAR 14	031056 83	Canadian	IV	20	19	18	35 498	97 826	5 0R
194	MAR 14	040243 05	Logan		14		15	35 781	97 650	5 0R
195	MAR 14	043715 27	Canadian	V	22	22	21	35 519	97 781	5 0R
196	MAR 15	103810 48	Canadian		16		16	35 689	97 923	5 0R
197	MAR 16	123817 42	Alfalfa		20	19	20	36 517	98 123	5 0R
198	MAR 18	172539 66	Canadian		16		15	35 377	98 100	5 0R
199	MAR 18	173309 23	Canadian				08	35 410	98 115	5 0R
200	MAR 18	173516 41	Canadian				10	35 410	98 115	5 0R
201	MAR 18	173951 71	Canadian		15		13	35 410	98 115	5 0R
202	MAR 18	174431 59	Canadian		16		14	35 410	98 115	5 0R
203	MAR 18	175252 20	Grady		18		15	35 344	98 053	5 0R
204	MAR 18	175536 84	Canadian		16		11	35 384	98 110	5 0R
205	MAR 18	180717 57	Canadian		21	20	18	35 439	98 118	5 0R
206	MAR 18	181453 81	Canadian		19	17	15	35 410	98 116	5 0R
207	MAR 18	183036 85	Canadian		23	23	20	35 418	98 108	5 0R
208	MAR 18	184629 65	Canadian		19	20	16	35 443	98 126	5 0R
209	MAR 18	185723 95	Canadian		20	20	18	35 416	98 130	5 0R
210	MAR 18	191350 60	Canadian		24	24	19	35 418	98 155	5 0R
211	MAR 18	193021 23	Canadian		22	22	18	35 418	98 101	5 0R
212	MAR 18	194157 26	Canadian		22	20	18	35 406	98 110	5 0R
213	MAR 18	200530 54	Canadian		27	25	20	35 416	98 110	5 0R
214	MAR 18	202411 90	Canadian		23		18	35 420	98 110	5 0R
215	MAR 18	204419 47	Canadian	III	29	29	25	35 379	98 124	5 0R
216	MAR 18	210741 09	Canadian		20	18	15	35 429	98 114	5 0R
217	MAR 18	211654 63	Canadian		19	18	13	35 379	98 118	5 0R
218	MAR 18	214210 54	Canadian		24	25	21	35 394	98 108	5 0R
219	MAR 18	220820 53	Canadian		21	19	17	35 396	98 126	5 0R
220	MAR 18	224217 44	Canadian		20	19	15	35 416	98 126	5 0R
221	MAR 18	231901 29	Carter	III	25	23	22	34 100	97 448	5 0R
222	MAR 18	234039 22	Canadian		22	20	17	35 433	98 102	5 0R
223	MAR 19	005432 65	Canadian		21	20	17	35 408	98 102	5 0R
224	MAR 19	034255 14	Canadian		25	25	23	35 400	98 110	5 0R
225	MAR 21	045556 19	Hughes		18	12	17	35 043	96 349	5 0R
226	MAR 23	013148 66	Love				13	34 034	97 430	5 0R
227	MAR 23	060139 99	Love				18	34 022	97 440	5 0R
228	MAR 23	075737 46	Caddo		19	18	17	35 361	98 108	5 0R
229	MAR 23	084114 13	Canadian		20	19	19	35 387	98 108	5 0R
230	MAR 23	104354 67	Canadian		15		09	35 605	97 974	5 0R
231	MAR 23	172602 40	Canadian		21		18	35 411	98 163	5 0R
232	APR 1	122910 76	Canadian		18	17	19	35 420	98 132	5 0R
233	APR 22	092252 46	Lincoln		16		18	35 789	96 711	5 0R
234	MAY 8	112334 88	Logan		21	19	22	35 923	97 480	5 0R
235	MAY 12	215641 18	McClain		21	19	23	35 301	97 601	5 0R
236	MAY 22	034923 77	Love	III	18	19	20	34 027	97 470	3 7R
237	MAY 23	173008.30	Love			22	20	34 055	97 405	3 4R
238	JUN 1	110001 61	Noble		16	14	11	36 207	97 330	5 0R
239	JUN 7	073935 56	Beckham	III	32	29	30	35 187	99 812	5 0R
240	JUN 19	044956 95	Pittsburg		19	14	20	34 715	95 965	5 0R
241	JUN 19	045313 53	Pittsburg		18		19	34 746	95 932	5 0R
242	JUL 1	070016 28	Love		19	18	20	34 028	97 383	5 0R
243	JUL 4	034521 29	Canadian		23	23	22	35 705	97 978	5 0R
244	JUL 7	011533 23	Pittsburg		24	16	21	34 879	95 814	5 0R
245	JUL 13	074813 44	McCurtain		13		18	34 033	95 087	5 0R
246	JUL 24	022406 27	Logan		28	25	25	36 070	97 506	5 0R
247	JUL 25	031537 27	Love	V		27	23	33 967	97 549	5 0R
248	JUL 31	191105 62	Payne		24	25	19	36 086	97 305	5 0R
249	AUG 3	102911 63	Canadian		20	19	17	35 683	98 005	5 0R
250	AUG 9	000414 86	Love		18	24	20	33 930	97 432	5 0R
251	AUG 16	072712 82	McClain		17	19	17	34 953	97 602	5 0R
252	AUG 19	015807 85	Cleveland		24	22	21	35 203	97 445	5 0R
253	SEP 4	074011 97	Garvin		22	23	21	34 799	97 557	5 0R
254	SEP 5	023848 48	Canadian		17	19	15	35 429	97 871	5 0R
255	SEP 5	040434 49	Canadian		18	18	15	35 427	97 717	5 0R
256	SEP 13	004922 97	Beckham	IV	33	34	31	35 217	99 362	14 5R
257	SEP 13	021951 28	Washita		19		21	35 380	99 360	14 5R
258	SEP 15	034225 39	Canadian		18		17	35 493	97 882	5 0R
259	SEP 15	140119 38	Grady		20	19	19	35 369	97 952	5 0R
260	SEP 16	060453 11	Grady		17		16	35 355	97 997	5 0R
261	SEP 16	062758 42	Canadian		17		15	35 435	97 981	5 0R
262	SEP 16	104205 85	Canadian		20	20	19	35 455	97 905	5 0R
263	SEP 16	110700 23	Grady		19	18	18	35 355	97 989	5 0R
264	SEP 16	155720 84	Grady	IV	25	25	22	35 343	97 997	5 0R
265	SEP 16	221642 17	Grady		21	19	19	35 355	97 966	5 0R
266	SEP 17	143809 60	Haskell		16	18	17	35 063	94 937	5 0R
267	SEP 17	204150 53	Grady	IV	26	25	23	35 320	97 968	5 0R
268	OCT 6	110851 92	Pittsburg		15		16	34 887	95 8731	5 0R
269	OCT 21	072907 55	Coal		23	22	24	34 502	96 432	5 0R
270	NOV 7	055409 84	Canadian		21		19	35 510	97 888	5 0R
271	NOV 11	102657 33	Canadian		22	19	21	35 695	98 050	5 0R
272	NOV 16	055015 60	Hughes				13	35 285	95 987	5 0R
273	NOV 27	091036 79	Blaine		33	33	29	35 630	98 408	5 0R
274	DEC 9	231258 66	Love	III	29	25	24	33 988	97 353	5 0R
275	DEC 10	082514 82	Hughes		18	15	20	34 965	96 307	5 0R
276	DEC 14	132009 02	McClain		18	19	18	35 187	97 664	5 0R
277	DEC 16	123737 49	Washita		25		22	35 158	98 741	5 0R
278	DEC 20	145826 81	Noble		21		19	36 367	97 379	5 0R

[1] The hypocenter is restrained (R) at an arbitrary depth of 5 0 km, except where indicated, for purposes of computing latitude, longitude, and origin time

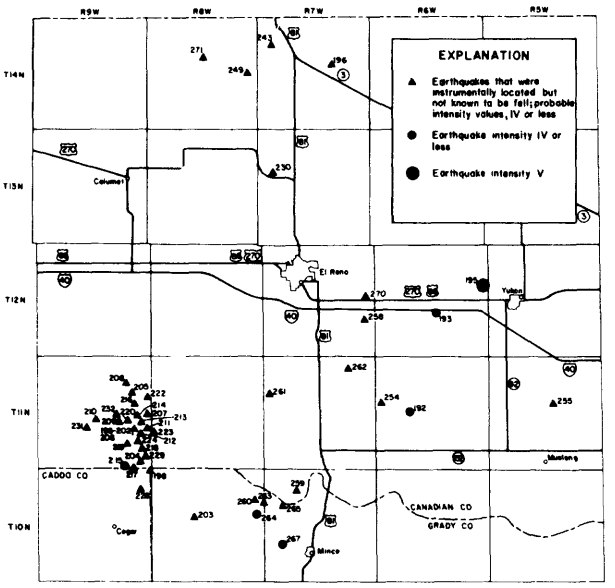

FIGURE 54.--Earthquake epicentral locations for 1979 in Canadian County and nearby Grady and Caddo Counties, Oklahoma.

SOUTHEASTERN UNITED STATES EARTHQUAKES, 1979

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There were 44 earthquakes located in the southeastern United States during 1979 (fig. 55). Of these, eight had M $\geq$ 3 and/or were felt (table 7). Additionally, seven events were reported (TVA/Georgia Tech) in an aftershock study of the August 13 Tennessee earthquake (mbLg = 3.7) and a single coalburst event (pillar failure in an underground mine) was reported (Virginia Tech) in western Virginia on November 13 (MD Mag = 0.2). Finally, some 113 microearthquakes (M$\leq$3) were reported as detected, but not located. Most of these events were in the vicinity of reservoirs.

A full data listing for all 1979 earthquakes was given in Southeastern United States Seismic Network Bulletins No. 4 and 5. A discussion of the "Detection and Location Capability of the Southeastern United States Seismic Network" by Arthur C. Tarr is presented in Bulletin No. 5. Copies of both reports may be obtained by contacting the author.

The number of seismograph stations operating in the region varied from 79 to 83. Figure 56 shows the station distribution (83) at the end of 1979.

Table 7.--*Southeastern United States earthquakes, 1979*

Date (1979)	Origin time (UTC)	Lat. (°N.)	Long. (°W.)	Depth (km)	Mag. (mbLg/MD)	State Felt
Jan. 19	08 55 36.9	34.64	82.84	1.1	3.4	SC
Feb. 16	14 37 08.4	34.34	81.36	2.7	3.3	SC
Aug. 7	19 32 16.9	34.22	81.30	2.0R	3.0	SC
Aug. 13	05 18 57.4	35.21	84.35	6.0	3.7	TN
Aug. 26	01 31 45.8	34.90	82.94	2.0	3.7	SC
Sep. 12	06 24 04.1	35.57	83.94	5.0R	3.2	TN
Nov. 9	21 29 58.6	38.42	82.87	5.0R	3.5	KY
Dec. 7	05 43 34.9	33.01	80.16	5.0	2.8	SC

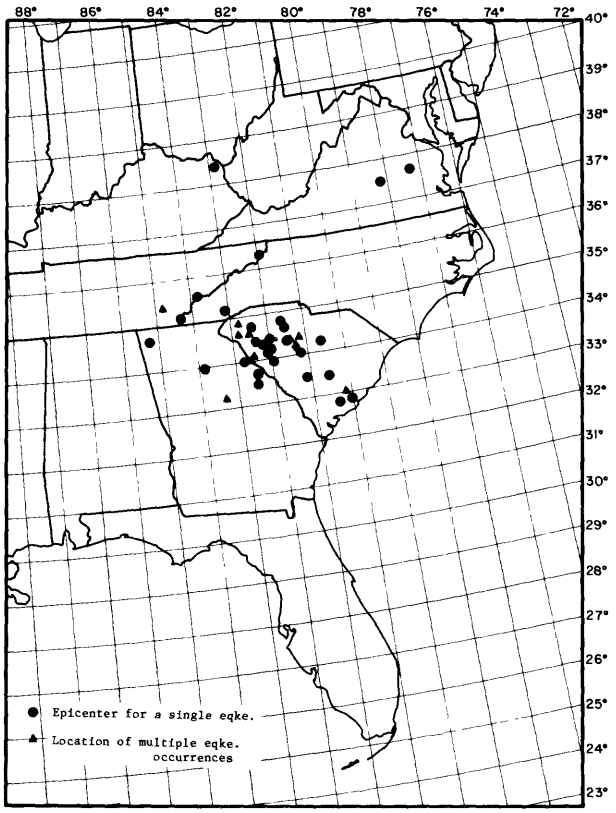

FIGURE 55.--Southeastern United States earthquake epicenters during 1979.

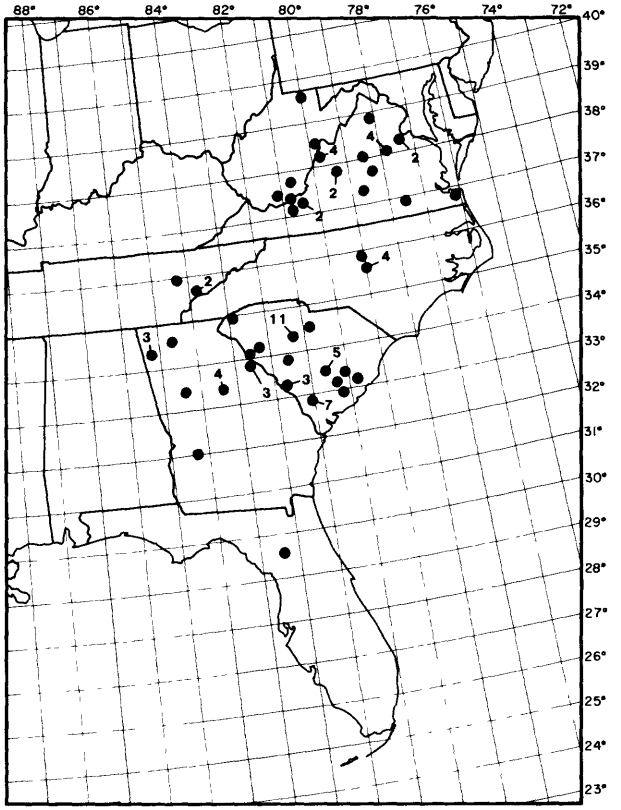

FIGURE 56.--Southeastern United States seismic stations (solid circles) operating at the close of 1979. Numbers indicate the number of closely spaced multiple stations at a given location.

WASHINGTON EARTHQUAKES, 1979

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During 1979, 23 telemetered short-period seismograph stations were operated west of the Cascade Mountains and 33 stations were operated east of the Cascades. All central recording was done at the University of Washington. Six additional stations were added on the east flank of the Cascade Range late in 1979. Five strong-motion stations were also maintained by the

University. Substational expansion of this network has occurred since 1979. In western Washington, 375 earthquakes were located and in eastern Washington, 243 were located. Eight earthquakes had felt reports in the western part of the state and four were reported felt in the eastern part of the state.

Several events were of particular significance or interest in 1979. In southwest Washington, a magnitude 3.9 earthquake occurred on March 11 near Riffe Lakes which is about 30 km NNE of Mt. St. Helens. Again on July 7, another event of magnitude 3.6 occurred in the same area. For comparison, the largest earthquake previously recorded from that area was approximately magnitude 3.0. A total of 23 earthquakes were located in this area compared to a previous background level of approximately 5 events/year. East of the Cascade range a magnitude 4.0 earthquake occurred on January 19 south of Chief Joseph Dam on the upper Columbia River. Numerous aftershocks, the largest being magnitude 3 on January 21, were recorded over the next few weeks. An unusual earthquake of magnitude approximately 4.1 occurred near Walla Walla, Washington on April 8. Contrary to usual experience with shallow earthquakes in the Columbia basin, no foreshock or aftershock activity was detected associated with this earthquake.

A bulletin for eastern Washington is included in technical reports prepared for the Department of Energy under contract EY-76-8-06-2225. A bulletin covering just the region west of the Cascade range is being prepared for publication through the Washington State Department of Natural Resources, Geology and Earth Resources Division, Olympia, Washington.

Miscellaneous Activities

CRUSTAL MOVEMENT STUDIES

Vertical Control Surveys

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Recomputation of the Palmdale Bulge

The area of southern California surrounding Palmdale has been undergoing further study. In 1976, analysis of leveling data had indicated uplift near Palmdale to be up to 25 cm, according to Robert Castle of the U.S. Geological Survey (USGS). The National Geodetic Survey (NGS) estimates of the uplift, using another method, were about half as large. Recomputation of the Palmdale data was undertaken because of several shortcomings in the original analyses:

1. Refraction was found to be a considerably larger source of error than previously assumed.
2. One pair of rods with apparent calibration problems was suspect.
3. The original adjustment by NGS was not performed in geopotential units.

In the revised computation the above problems were eliminated. A refraction correction was applied to the data based on a new model for temperature stratification near the ground. All rod calibrations were recomputed, and the adjustment was calculated using geopotential units. The new results now show that Palmdale has moved very little by comparison to most areas in southern California. The revised estimates of motion in the region could not be considered alarming because they amounted to only a few centimeters between 1959 and 1975. The primary leveling routes to Palmdale are very conducive to large accumulations of refraction error. Some routes traverse subsidence pockets or pass through locations of recent earthquakes. Refraction error is the cause of the original weak estimates. The sight lengths used in leveling have shortened considerably since 1955. Refraction error is proportional to the square of the sight length, and during most of the work day it will make the observed height differences be too small. Because of the recently shortened sight lenghts, high locations such as Palmdale (approached by low gradient level routes) will appear to have moved upward with time. The study indicates that refraction correction should be considered a necessary and important correction prior to extracting vertical crustal motions from leveling records.

Refraction Studies

Leveling refraction has been studied intensively by NGS because of its harmful influence on data used for estimating vertical crustal motion.

Refraction causes leveled height differences to be too small. It is usually considered to be the largest known systematic error in leveling measurements, amounting to as much as 1.0 cm/km.

Refraction error is proportional to the square of the sight length used in a leveling measurement. Recent modern leveling is accomplished with much shorter sight lengths than leveling performed prior to 1964. Consequently, there is less refraction in the newer measurements, thus giving the appearance of crustal movement when comparisons are made to older measurements.

T. J. Kukkamaki developed a refraction correction which is proportional to the temperature difference, Δt, between heights of 0.5 and 2.5 m. Δt was to be measured, requiring extra effort and equipment. The United States and most other countries did not adopt the correction. However, it is now realized that the correction is necessary, especially in the middle and lower latitudes.

Removing refraction bias from old leveling measurements requires that t be estimated by a temperature stratification model. Such a model has been developed by NGS, and is based on historical records of solar radiation, sky cover, precipitation, and ground albedo from many locations in the conterminous United States. Tests have shown the average difference between the predicted t and observed t to be $-0.12°$, $+0.14°$, and $-0.22°$ C for data sets from Maryland, California, and Arizona, respectively. These accurate t values now make refraction correction possible for old levellings, and consequently the calculations and interpretations of crustal motion can be more reliable.

Horizontal Control Surveys

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Imperial Valley, California

A triangulation-trilateration survey was performed by the NGS 4 months prior to the October 15, 1979, Imperial Valley earthquake (M = 6.6). The survey was repeated in February-March, 1980 to gauge the coseismic displacement. These data, combined with triangulation surveys performed in 1934, 1939, 1941, 1954, and 1967, provide a historical record of crustal deformation over a time period that also includes the 1940 El Centro earthquake (M = 7.1). The total data set was analyzed in terms of a dislocation model which relates the observed surface deformation to slippage on prescribed geologic faults. According to the model, the 1941-80 fault slippage at depths 10 km and greater is 1.9 $\pm$ 0.3 m. This is approximately twice the amount of estimated movement, 1.0 $\pm$ 0.1 m, for the 1941-80 slippage on the Imperial fault in the 0- to 10-km depth range. This discrepancy can be explained by a range of possibilities some of which were postulated by Thatcher (1979) in his study of triangulation throughout southern California. These possibilities include: (1) the existence of permanent inelastic deformation, (2) massive post-seismic slippage at depth following the 1940 event, (3) distribution of the shallow slippage over several subparallel faults, and (4) a mechanism other than slippage to accomodate deformation at depth.

Salt Lake City, Utah

Estimates of horizontal strain rates in the vicinity of Salt Lake City, Utah were derived from triangulation-trilateration data observed by the NGS between 1962 and 1974. The data which spans the Wasatch fault zone around and south of the city produce an estimate of N 79° E $\pm$ 14° for the direction of maximum extension. This estimate is in accordance with an expected trend of east-west extension across the fault zone. The maximum extension direction, N 35° W $\pm$ 10° , derived for data north of the city, differs significantly from the expectation. Nevertheless, the northern estimate is in general agreement with the previously published estimate N 17° W $\pm$ 10° derived for the slightly more northerly Ogden area from 1972-78 trilateration data observed by the U.S. Geological Survey. The unexpected strain pattern north of Salt Lake City may be related to the seismic quiescence realized on this sector of the Wasatch fault zone since 1962 or earlier.

TSUNAMIS

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During 1979, nine tsunamis were reported to the National Oceanic and Atmospheric Administration (NOAA), including three which were recorded on NOAA tide gages.

On February 28, an earthquake (mag. 7.1) in southeastern Alaska (60.6° N., 141.6° W.), generated a small tsunami which was recorded at Yakutat with a maximum amplitude of 30 cm.

An earthquake (mag. 7.6) near the coast of Guerrero, Mexico (17.8° N., 101.3° W.), on March 14, caused a minor tsunami that was recorded at Pago Pago, American Samoa, with a maximum amplitude of 14 cm.

An earthquake (mag. 7.0) on April 15, in Yugoslavia (41.1° N., 19.1° E.), was reported to have generated a tsunami in Kotor Bay which caused considerable damage.

On July 17, a tsunami generated by a landslide struck the south coast of Lomblen Island, Lesser Sunda Islands, Indonesia. The landslide, which occurred on the south coast of Lembata Island, was possibly triggered by a small earthquake in the Sawu Sea. Four villages on Lomblen were destroyed with 187 killed and 364 missing.

A second tsunami caused by landsliding was reported to have struck the south coast of Lomblen Island on August 9, with waves reaching more than 120 m inland.

The September 12 earthquake (mag. 8.1) in the West Irian region (1.7° S., 135.9° E.) generated a local tsunami on the islands of Biak and Yapen. The waves killed 100 and destroyed 400 houses on Yapen. Two meter waves were reported from Biak.

On October 16 about 1300 UTC, a tsunami thought to be generated by a submarine landslide of sediments at the mouth of the Var River, struck a 60 km stretch of the French Riviera. Waves in excess of 10 m killed six people at Nice and one at Antibes and left three missing. The tsunami also caused widespread damage.

On November 16 the Fiji Island earthquake (16.5° S., 179.9° E., mag. 6.9) caused a small tsunami which penetrated 150 m inland on the northern tip of Taveuni Island.

The most destructive and most widely recorded tsunami of the year was generated on December 12 by an earthquake (mag. 7.9) near the coast of Ecuador (1.6° N., 79.4° W.). Two-to-five meter waves were reported along the Colombian coast. Six fishing villages were practically destroyed, fifteen others were damaged, and several hundred people were killed. The tsunami was recorded with the following maximum amplitudes: Hilo - 73 cm; Kahului - 75 cm; Nawiliwili - 14 cm; Pago Pago - 12 cm.

PRINCIPAL EARTHQUAKES OF THE WORLD

Table 8 lists principal world earthquakes for 1979. The list has been included in this annual series since 1941. It includes earthquakes of magnitude 6.8 or greater; those of smaller magnitude that were locally destructive to life and property; and events of unusual interest.

Table 8.--*Principal earthquakes of the world during 1979*

Date (1979)	Origin time (UTC) hr min sec	Geographic Coordinates Lat. (°)	Long. (°)	Depth (km)	USGS Magnitude mb	MS	Other Magnitude	Region	Remarks
Jan. 16	09 50 10.1	33.90 N.	59.47 E.	33	5.9	6.7	6.9MS(BRK) 6.8MS(PAS)	Iran	Two hundred killed, many injured, and considerable damage in Bonzonabad and surrounding areas.
Jan. 26	10 04 32.0	17.41 N.	100.88 W.	41	5.8	6.6	6.9MS(BRK) 6.6mb(PAS) 6.0MS(PAS)	Guerrero, Mexico	Felt widely in central Mexico. Felt strongly at Mexico City.
Feb. 13	05 34 25.9	55.43 N.	157.16 W.	33	5.9	6.7	6.6MS(BRK) 6.4MS(PAL) 6.5MS(PAS) 6.8mb(PAS)	Alaska Peninsula	Felt at Chignik.
Feb. 16	10 08 53.4	16.39 S.	72.66 W.	53	6.2	6.9	6.3MS(PAS) 6.9mb(PAS)	Near coast of Peru	Eighteen killed, a number injured, and considerable damage in the Arequipa area.
Feb. 28	21 27 06.1	60.64 N.	141.59 W.	15	6.4	7.1	7.3MS(BRK) 7.4MS(PAS) 6.9ML(PMR)	Southeastern Alaska	Slight damage in the Valdez-Yakutat and Juneau-Haines areas, Alaska and in the Kluane-Beaver Creek area, Yukon Territory, Canada. Tsunami recorded.
Mar. 14	11 07 16.3	17.81 N.	101.28 W.	49	6.5	7.6	7.6MS(BRK) 7.5MS(PAL) 7.2MS(PAS)	Near coast of Guerrero, Mexico	Five killed, many injured, and extensive damage in the Mexico City area. Extensive damage was also reported in many villages in Guerrero and slight damage at Acapulco, Guadalajara, Puebla, and Monterrey. Tsunami recorded.
Apr. 10	01 42 22.0	2.96 N.	126.93 E.	37	6.6	6.8	7.2MS(BRK) 7.1MS(PAS) 6.7mb(PAS)	Talaud Islands	Felt on Mindanao.
Apr. 14	10 00 24.9	36.01 S.	102.60 W.	10	6.1	6.5	6.8MS(BRK) 6.6MS(PAS)	Southern Pacific Ocean	
Apr. 15	06 19 44.1	42.10 N.	19.21 E.	10	6.2	6.9	7.3MS(BRK) 7.0MS(PAS)	Yugoslavia	One hundred-twenty-one killed, more than 1,000 injured, 100,000 reported homeless, and extensive damage along the southwestern coast of Yugoslavia. Local tsunami reported in Kotor Bay causing considerable damage. Thirty-five people reported killed, 400 injured, and extensive damage in northern Albania. Tsunami recorded.

Table 8.--*Principal earthquakes of the world during 1979*--Continued

Date (1979)	Origin time (UTC) hr min sec	Geographic Coordinates Lat. (°) Long. (°)	Depth (km)	USGS Magnitude mb	USGS Magnitude MS	Other Magnitude	Region	Remarks
May 1	13 03 37.1	21.24 S. 169.80 E.	79	6.4		7.2mb(PAS)	Loyalty Islands region	Felt on Tanna and at Port-Vila, New Hebrides Islands.
May 24	17 23 18.2	42.26 N. 18.75 E.	8	5.8	6.2	6.3MS(BRK) 6.1MS(PAS)	Yugoslavia	At least 65 people injured and damage reported in the Kotor-Ulcinj area, Yugoslavia.
May 30	09 38 52.9	8.21 S. 115.95 E.	25	6.1	5.8		Bali Island region	Thirty-seven killed, 70 injured, and extensive damage and landslides on Lombok Island.
July 9	10 57 22.1	31.45 N. 119.24 E.	11	5.5	5.4		Eastern China	Forty-one killed, more than 2,000 injured, and considerable damage in the Liyang area.
July 24	19 31 19.8	11.15 S. 107.71 E.	31	6.3	6.9	6.9MS(BRK) 6.9MS(PAS)	South of Java	
Aug. 26	14 31 22.1	19.07 N. 122.10 E.	15	6.1	7.1	6.7MS(BRK) 6.6MS(PAS)	Philippine Islands region	Felt on Luzon at Aparri, Baguio, Laoag, and Vigan.
Sep. 12	05 17 51.4	1.68 S. 136.04 E.	5	6.3	7.9	7.9MS(BRK) 7.7MS(PAS)	West Irian region	One-hundred killed and 400 homes on Yapen were destroyed by a local tsunami.
Sep. 19	21 35 37.2	42.81 N. 13.06 E.	16	5.9	5.8	5.9MS(BRK)	Central Italy	Five killed, many injured, and considerable damage in the Umbria region. Some damage reported in the Rome area.
Sep. 29	18 37 12.5	1.19 N. 94.25 E.	27	6.2	6.8	6.6MS(BRK) 6.7MS(PAS)	Off west coast of Northern Sumatera	Felt in the Padang area.
Oct. 12	10 25 22.3	46.68 S. 165.71 E.	33	6.1	7.4	7.5MS(BRK) 7.3MS(PAS)	Off west coast of South Island, New Zealand	Felt widely on southern South Island and Stewart Island.
Oct. 15	23 16 54.5	32.63 N. 115.33 W.	12	5.7	6.9	7.0ML(BRK) 6.6ML(PAS)	California-Mexico border region	Ninety-one people reported injured and damage at Brawley, Calexico, and El Centro, California; and Mexicali, Mexico.
Oct. 20	01 41 10.4	8.25 S. 115.85 E.	38	6.0	6.2		Sumbawa Island region	Two people killed, 40 injured, and considerable damage on Bali and Lombok.
Oct. 23	09 51 06.7	10.62 S. 161.28 E.	22	6.1	7.1	7.2MS(BRK) 7.2MS(PAS)	Solomon Islands	Slight damage at Kirakira.

Table 8.--*Principal earthquakes of the world during 1979*--Continued

Date (1979)	Origin time (UTC) hr min sec	Geographic Coordinates Lat. (°) Long. (°)	Depth (km)	USGS Magnitude mb	USGS Magnitude MS	Other Magnitude	Region	Remarks
Oct. 27	14 35 57.3	13.83 N. 90.88 W.	58	5.7	6.8	6.8MS(BRK) 6.8mb(PAS)	Near coast of Guatemala	Four killed, 20 injured and considerable damage reported in El Salvador. Three people injured and damage reported in Guatemala.
Oct. 27	21 43 24.9	13.78 N. 90.73 W.	65	5.6	6.6	6.8MS(BRK) 6.8mb(PAS)	Near coast of Guatemala	Felt strongly in Guatemala and El Salvador.
Nov. 2	15 53 03.5	7.66 S. 108.25 E.	62	6.1		6.0MS(BRK) 6.0MS(PAS)	Java	Thirty killed, at least 200 injured, and extensive damage in western Java.
Nov. 6	05 26 17.7	39.54 N. 20.40 E.	40	5.4	5.2		Greece-Albania border region	One person killed, three injured at Igoumenitsa, and severe damage in the Kerkira-Thesprotikon area of northwestern Greece.
Nov. 14	02 21 22.1	33.92 N. 59.74 E.	33	6.2	6.5	6.8MS(PAS)	Iran	Two-hundred-eighty killed, 55 injured, and extensive damage in northeastern Iran.
Nov. 16	15 21 25.7	16.76 S. 179.98 W.	33	6.1	6.9	7.0MS(BRK) 6.6MS(PAS)	Fiji Islands region	Considerable damage and landslides on Taveuni. Damage also reported on Laucala, Savasavu, and Vanua Levu. Tsunami recorded.
Nov. 23	23 40 29.8	4.81 N. 76.22 W.	108	6.4		6.7mb(PAS)	Colombia	Fifty-two killed, 600 injured, and extensive damage in the Manizales-Armenia area. Felt throughout Colombia and in parts of Venezuela, Ecuador, and Panama.
Nov. 27	17 10 32.9	33.96 N. 59.73 E.	10	6.1	7.1	7.5MS(BRK) 7.3MS(PAS)	Iran	Seventeen killed, 24 injured, and extensive damage in northeastern Iran.
Dec. 12	07 59 03.3	1.60 N. 79.36 W.	24	6.4	7.7	7.7MS(BRK) 7.3MS(PAS)	Near coast of Ecuador	At least 600 killed, 20,000 reported injured, and extensive damage in the Pasto-Tumaco-Buenaventura area and on Gorgona Island, Colombia. Tsunami recorded.
Dec. 15	00 02 41.6	3.30 S. 102.71 E.	33	5.8	6.6	6.6MS(BRK) 6.5MS(PAS)	Southern Sumatera	Eight reported killed and 162 injured. 2500 houses collapsed or were damaged. Other buildings in the Bengkulu area were also damaged.

Table 8.--*Principal earthquakes of the world during 1979*--Continued

Date (1979)	Origin time (UTC) hr min sec	Geographic Coordinates Lat. (°) Long. (°)	Depth (km)	USGS Magnitude mb	USGS Magnitude MS	Other Magnitude	Region	Remarks
Dec. 17	19 58 23.8	8.39 S. 115.89 E.	33	5.6	6.3	6.1MS(BRK)	Sumbawa Island region	Twenty-seven people reported killed and 200 injured on Bali. Some damage reported on Lombok.

Abbreviations used in the Other Magnitude column: PAS--California Institute of Technology, BRK--University of California Berkeley; PAL--Lamont Doherty Geological Observatory, Palisades, New York.

Strong-Motion Seismograph Data

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INTRODUCTION

The first engineering seismology program in the United States was administered by the Seismological Field Survey of the Coast and Geodetic Survey (C&GS). This program was begun in 1931 and effectively remained the responsibility of the Seismological Field Survey (SFS) for more than 40 years. During this period the SFS was shifted from one acronymic agency to another, including C&GS, ESSA, NOS, NOAA, ERL, ESL, and finally, in 1973, USGS; soon afterwards the SFS became the Seismic Engineering Branch of the USGS. In spite of these numerous high-level administrative changes, the program has retained a distinct identity and its basic objectives and field-level operations have remained remarkably consonant throughout the years.

The current program of strong-motion instrumentation administered by the USGS is supported by the National Science Foundation (Grant CA-114) in cooperation with both private industry and educational institutions, as well as numerous Federal, State, and local agencies and organizations. The objectives of the program are to record strong ground motions and the response of representative types of engineered structures during potentially damaging earthquakes and to disseminate processed data and information about the records, sites, and structures to external users in earthquake engineering research and design practice and engineering seismology. The dissemination of this information and data is achieved in various ways.

Preliminary earthquake reports and a summary of recent accelerograph records are presented on a regular basis in Seismic Engineering Program Reports[1], a USGS Circular. These summaries include a brief description of the earthquake and strong-motion recording station, the results of routine scalings of those records that contain peak accelerations greater than 0.05 g, and photographic reproductions of many of the more significant accelerograms. The program reports also contain abstracts of recent reports, notes on strong-motion information sources and the availability of digitized data, and other information pertinent to the USGS and other strong-motion programs.

Strong-Motion event and strong-motion data reports are periodically published as USGS Open-file Reports and include the results of digitization and routine analyses of strong-motion accelerograms that contain peak accelerations greater than 0.10 g or are related to a specific event, particular strong-motion station, or geographic group of stations. The minimum acceleration level is based primarily on the current capability of the USGS to process strong-motion records and may vary with both the degree of seismic activity and number of personnel available at any given time. Although maximum acceleration is not directly related to frequency content or duration of strong-motion, the peak acceleration can be readily obtained from an accelerogram and thus the value is commonly used as a general indicator of the potential significance of the record. Detailed information on the availability of digitized data from various sources is published regularly in Seismic Engineering Program Reports.

The Strong-Motion Accelerograph Station List is periodically published as a USGS Open-file Report and includes information on all of the accelerograph stations in the western hemisphere known to the USGS. Because of the ever-changing nature of this information, it is impossible to have a complete list of all of the stations in existence at any one time. Rather, the list is intended to provide that community of persons interested in strong-motion programs with a reasonably complete indication of the current status of the various strong-motion networks. Information presented in this list includes the station name and geographic coordinates, site characteristics, type and size of structure, location of instruments, and the primary sources of data. The current list contains information on approximately 1200 stations located in 38 states, Canada, the Caribbean, and throughout Central and South America (Seismic Engineering Branch, 1977).

A strong-motion information retrieval system (SMIRS) has been developed to provide up-to-date information about strong-motion records

[1]Copies of these reports are available free on application to Branch of Distribution, U.S. Geological Survey, 1200 South Eads Street, Arlington, Va. 22202.

and the circumstances in which they were recorded. The system is accessible through a data terminal (30 cps, half duplex) A user's manual is available (Converse, 1978). To retrieve information, dial (415) 329-8600 and place the telephone handset into the terminal. When the carrier light comes on press the "line-feed" key and wait for the computer to respond (two lines will be printed); type the following:

enter yourname SMIRS

Type the "enter" and "SMIRS" exactly as shown above, but replace yourname with your own name. The word "enter" is five lowercase characters followed by one space; your name is typed as one continuous character string and followed by one space; and "SMIRS" is five uppercase characters. Type the carriage-return key and then the line-feed key; then you will be given instructions.

ACCELEROGRAPH DATA

Table 9 is a summary of the 511 records recovered from USGS strong-motion stations during 1979. This number is contrasted with a yearly average of 174 records for the period 1972 to 1978 inclusive; however, 70 percent of the 1979 records were related to either the August 6 Gilroy (Coyote Lake) or October 15 Imperial Valley earthquakes, both of which occurred in areas that contained extensive arrays of accelerographs operated under the USGS Strong-Motion Program that is funded by the National Science Foundation. Other organizations involved in the planning of these ground-motion arrays (Gilroy, Bear Valley, and Imperial Valley) include the California Institute of Technology, the California Division of Mines and Geology, and the Federal Highways Administration. Although the number of accelerograms recorded at these arrays is impressive (table 9), of much greater significance is the comprehensive azimuthal distribution and number (23) of close-in accelerograms (fault-station distance less than 20 km) recorded during the Gilroy and Imperial Valley earthquakes (Porcella and others, 1979; Porcella and Matthiesen, 1979).

Additionally, many accelerograms were recovered in 1979 at stations operated by the California Division of Mines and Geology's Office of Strong-Motion Studies (OSMS). Recent state legislation has given responsibility to OSMS for the dissemination of that organization's strong-motion data, which is no longer routinely listed in Seismic Engineering Program Reports (see Calif. Div. of Mines and Geology, 1979, and Porter, 1980). Brune and others, 1980, discuss strong-motion data obtained in Mexico for the Imperial Valley earthquake, which was recorded at stations operated jointly by the University at Mexico City and the University of California at San Diego.

The earthquakes (table 9) are listed in chronological order and include date, time (UTC), general location, geographic coordinates, and magnitude. Information about the recording station consists of the name and location, owner, and geographic coordinates. Record data include S-wave minus trigger time and the orientation, maximum acceleration, and duration of strong-motion (greater than 0.10 g) for each instrument component. Record data is included only when one or more components recorded at least 0.05 g at ground stations or 0.10 g at upper floors of buildings. The event information has been compiled principally from the Preliminary Determination of Epicenters, published by the Geological Survey.

The following paragraphs summarize the results of the most significant earthquakes from which strong-motion records were obtained in 1979; these abridged reports have been abstracted from 1979 Seismic Engineering Program Reports (Geological Survey Circulars 818A, 818B, and 818C).

ST. ELIAS, ALASKA - February 28

A magnitude 7.1 (MS) earthquake occurred on February 28, 1979 (1127 local time) approximately 75 km north of Icy Bay, Alaska. The hypocenter was located at a depth of about 15 km (±10) in the vicinity of the St. Elias Mountains in southeastern Alaska (Lahr and others, 1979), which is a highly faulted and tectonically very complex region. Strong-motion acccelerograph records were recovered at the U.S. Geological Survey's Icy Bay station, Shell Oil Company's Munday Creek station, and Lamont-Doherty Geological Observatory's Yakutat station; maximum recorded ground accerlerations and the corresponding epicentral distances were 0.16 g (73 km) at Icy Bay, 0.06 g (92 km) at Munday Creek, and 0.09 g (161 km) at Yakutat (table 9). These stations are part of an informal Alaska strong-motion network operated by the U.S. Geological Survey, Lamont-Doherty Geological Observatory, the University of Alaska, and Shell Oil Company (fig. 57); additional accelerographs within this network that did not trigger include Cape Yakataga, Kayak Island, and Cordova at epicentral distances of 79 km, 200 km, and 214 km, respectively. The Icy Bay and Yakutat accelerograms are shown in figure 58.

GILROY, CALIFORNIA (COYOTE LAKE) - August 6

A magnitude 5.7 (ML) earthquake occurred at 10:05:23 local time on August 6, 1979 in the central California coastal region at a depth of about 6 km; the epicenter was located at 37.10° N. and 121.50° W. in the Calaveras fault zone near Coyote Lake, approximately 10 km north-northeast of Gilroy (fig. 59). This event was the largest to occur in the region since a magnitude 6.6 earthquake near the town of Coyote on July 1, 1911, and was reported felt from Santa Rosa south to the San Fernando Valley and east

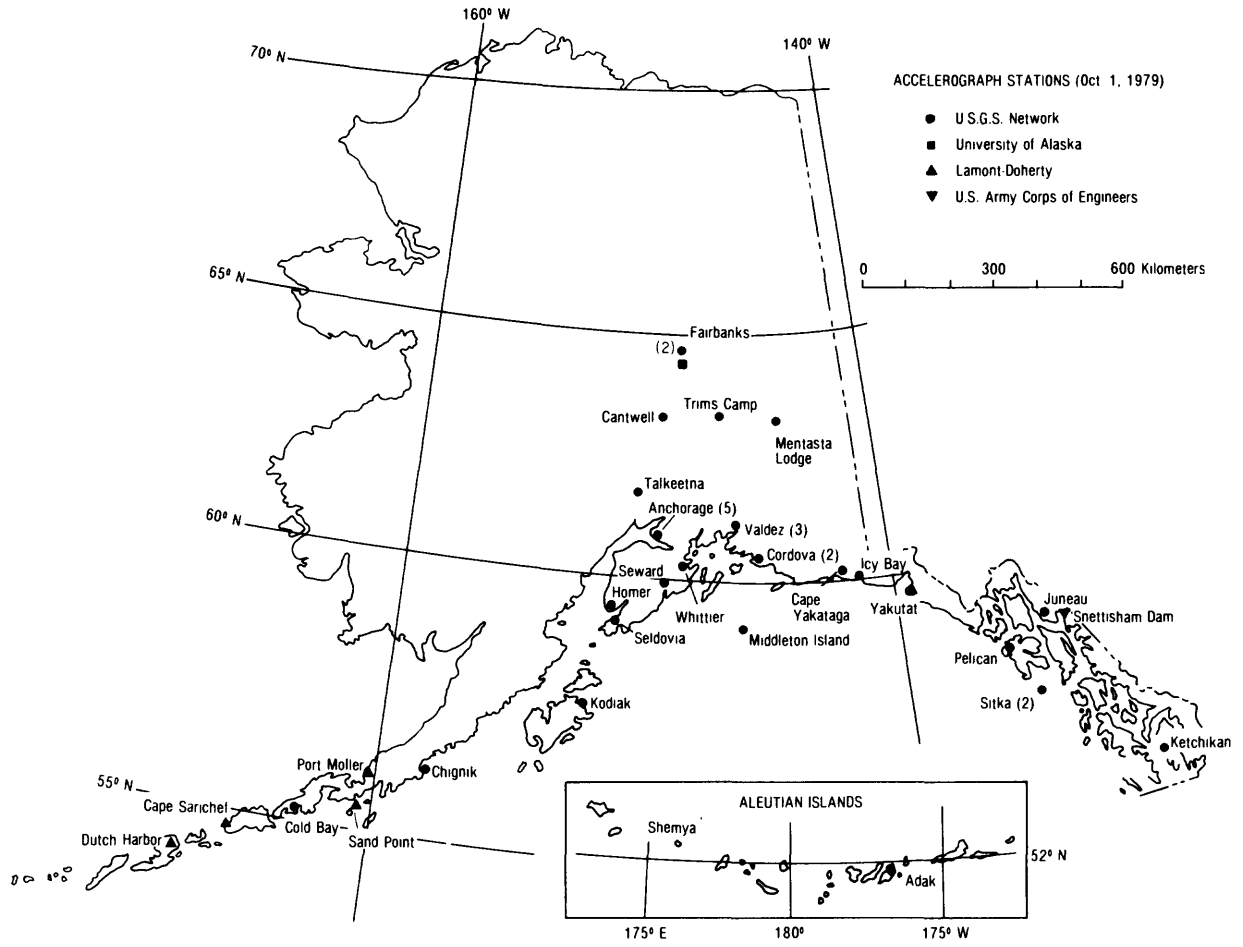


FIGURE 57.--Accelerograph stations in Alaska; numbers in parentheses show the total number of accelerograph stations at the indicated locality.

to Reno, Nevada. Some damage was reported in the Gilroy-Hollister area and included cracked plaster and stucco, broken windows, and fallen stock from store shelves.

The Gilroy (Coyote Lake) earthquake triggered all accelerographs within a radius of approximately 40 km of the epicenter; the most distant instrument triggered was located approximately 114 km from the epicenter. The locations of ground-motion instruments relative to the epicenter are shown in figure 59. The dots in this figure indicate instruments from which a record was obtained, and the circles indicate instruments that were operational at the time of the earthquake but did not trigger; stations that are not known to have been operational at the time of the earthquake are omitted from the figure.

Figure 59 (inset) shows the locations of close-in stations and their relation to the epicenter. Two arrays of ground stations, the Gilroy and Bear Valley arrays, recorded the event. All stations in the Gilroy array are within 16 km of the epicenter and extend from a rock site across an alluvial valley to a rock site. Therefore, the Gilroy array characteristics provide data that are important in studies of source mechanism, wave propagation, near-field motions, and site effects. Refraction surveys and down-hole shear-wave velocity studies are being conducted to determine the subsurface conditions at each of the Gilroy array stations. Stations in the Bear Valley array are located between 50 and 75 km from the epicenter and are within a relatively narrow azimuthal range; the stations are situated on both sides of the San Andreas fault on a variety of surficial materials. Data from this array exhibit a considerable range of peak accelerations and provide additional information for studies of propagation path and site effects. Full-scale reproductions of records from the Gilroy array are shown in figure 60. The data from instruments at ground level are summarized in table 9 (see event of 6 August 1979, 1705 UTC) and are presented in order of increasing epicentral distance.

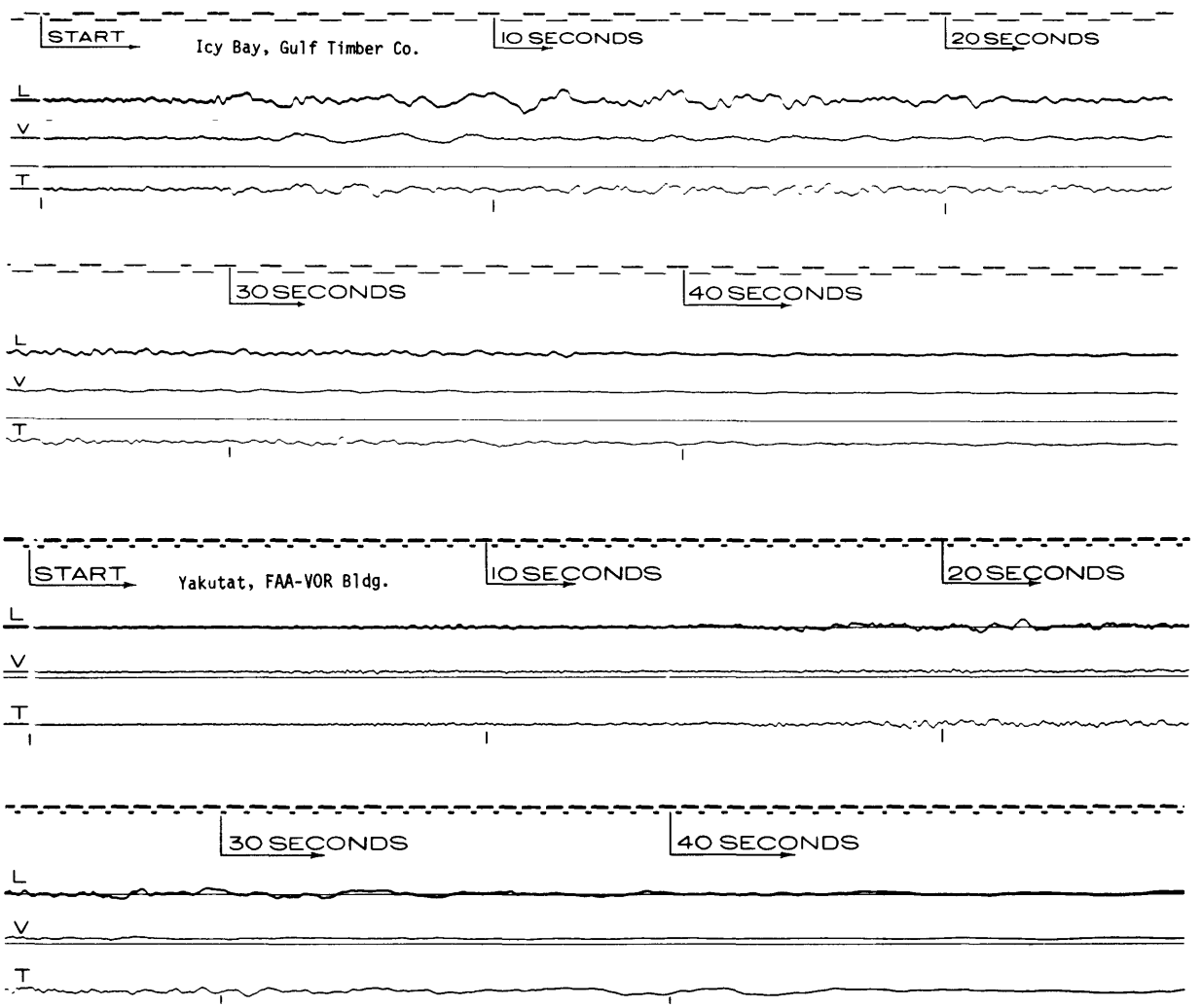


FIGURE 58.--Icy Bay and Yakutat accelerograms from the magnitude 7.1 St. Elias, Alaska, earthquake of 28 February 1979 (epicentral distances 73 km and 161 km, respectively).

All instrumented structures from which records were obtained were at sufficiently large distances that the recorded motions at these stations were small relative to those associated with damage; however, these records do provide important structural response data for the study of a freeway overpass, the torsional response of buildings, and deformation of diaphragms and walls.

IMPERIAL VALLEY, CALIFORNIA - OCTOBER 15

The October 15, 1979 Imperial Valley earthquake, which was centered at lat 32.63° N. and long 115.33° W., triggered all of the USGS accelerographs within about 100 km of the epicenter and one as far away as 196 km (Porcella and Matthiesen, 1979). With this initial information, all of the stations within about 200 km of the epicenter were inspected to ascertain which instruments had been triggered. The complete set of data including that from Baja California is, in several respects, the most significant set of ground motion data collected from a single event and provides a rewarding result from several years of planning and execution of a cooperative effort by the U.S. Geological Survey (USGS), the California Division of Mines and Geology (CDMG), and the Earthquake Engineering Research Laboratory of the California Institute of Technology (CIT) and a similar effort in Baja California by the National University at Mexico City (UNAM) and the University of California at San Diego (UCSD). The locations of the instruments known to be operational in the greater Imperial Valley region at the time of the earthquake are shown in figure 61.

The strong-motion accelerograph network in the Imperial Valley operated by the USGS (fig.

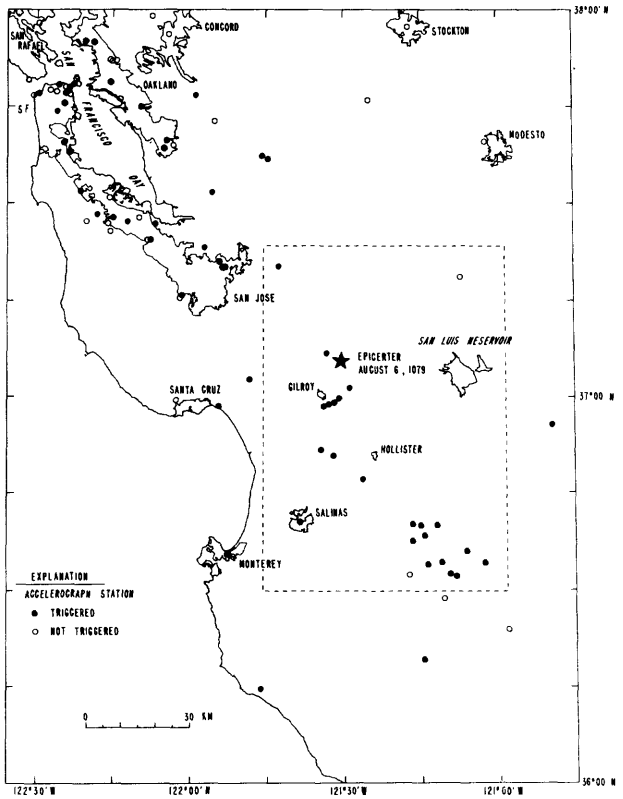


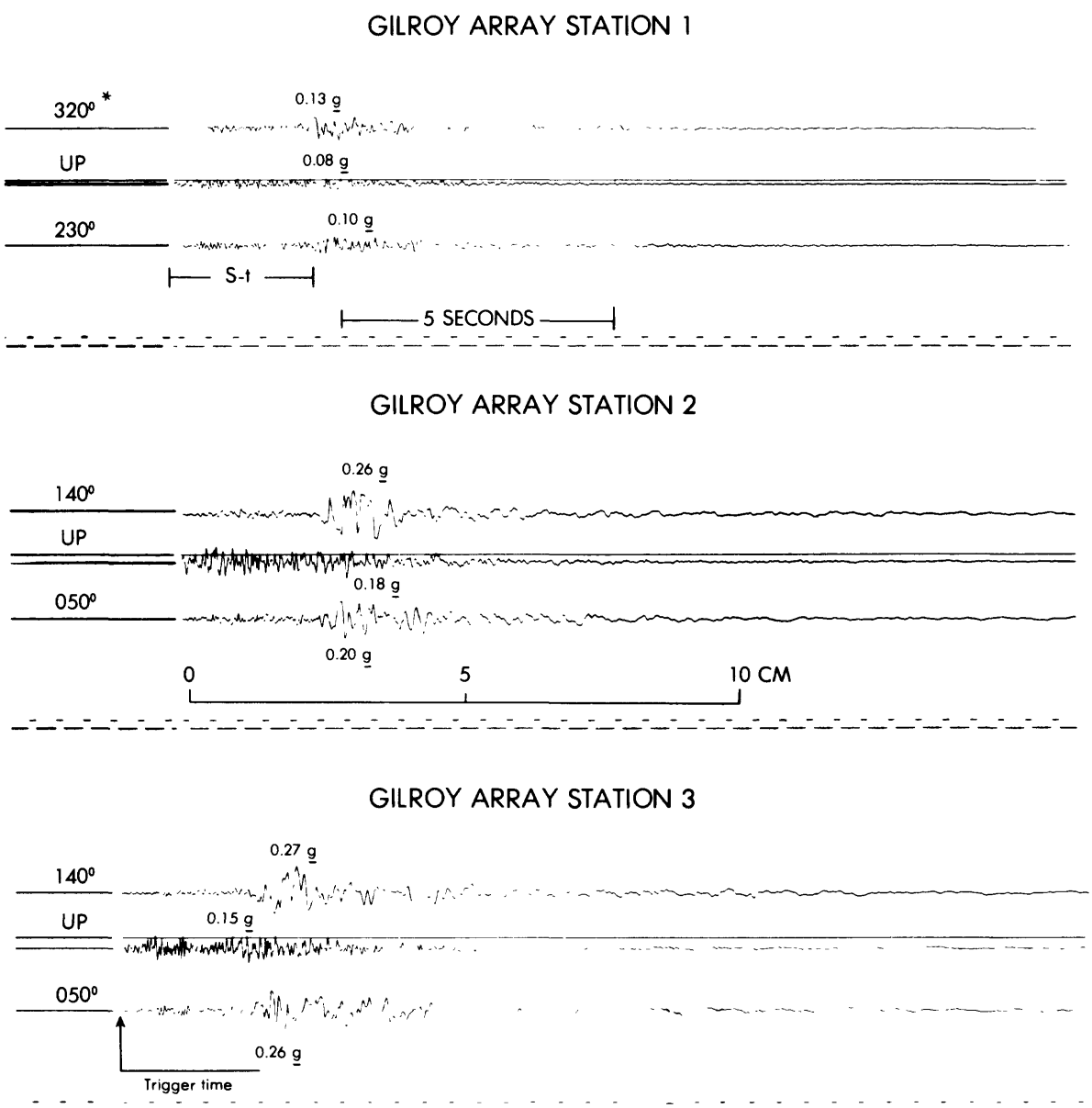
FIGURE 59.--Location of strong-motion stations in the region of the 6 August 1979 Gilroy, California earthquake (from Porcella and others, 1979).

62) consists of 24 stations; 21 of these stations are instrumented with triaxial film-recording accelerographs (Kinemetrics model SMA-IT) equipped with vertical starters (capable of bringing the instrument into full operation within 0.2 sec of the first vertical motion greater than 0.01 g) and WWVB radio receivers that record absolute time codes on the accelerograms. Consequently, during the October 15 earthquake and aftershocks, each accelerograph typically triggered on the first-arriving P wave; the resultant accelerogram commonly displays a time interval between the first S-wave arrival and the trigger time (S - t) that can be used with the WWVB time code in epicenter determinations.

Copies of the main-shock accelerograph records from the USGS stations within 30 km of the fault rupture are shown in figure 63. Of particular significance is the long-period pulse that is evident in all of the records from stations within 10 km of the fault. This acceleration pulse can be integrated to yield significant velocity and displacement changes. In that regard, the close-in records from the main shock have been digitized and processed to obtain velocity and displacement time-histories and spectra (Brady and others, 1980). A comparison of the accelerograms from El Centro array station 9 (302 Commercial Avenue, El Centro) that were recorded during the May 18, 1940 and October 15, 1979 earthquakes is shown in figure 64.

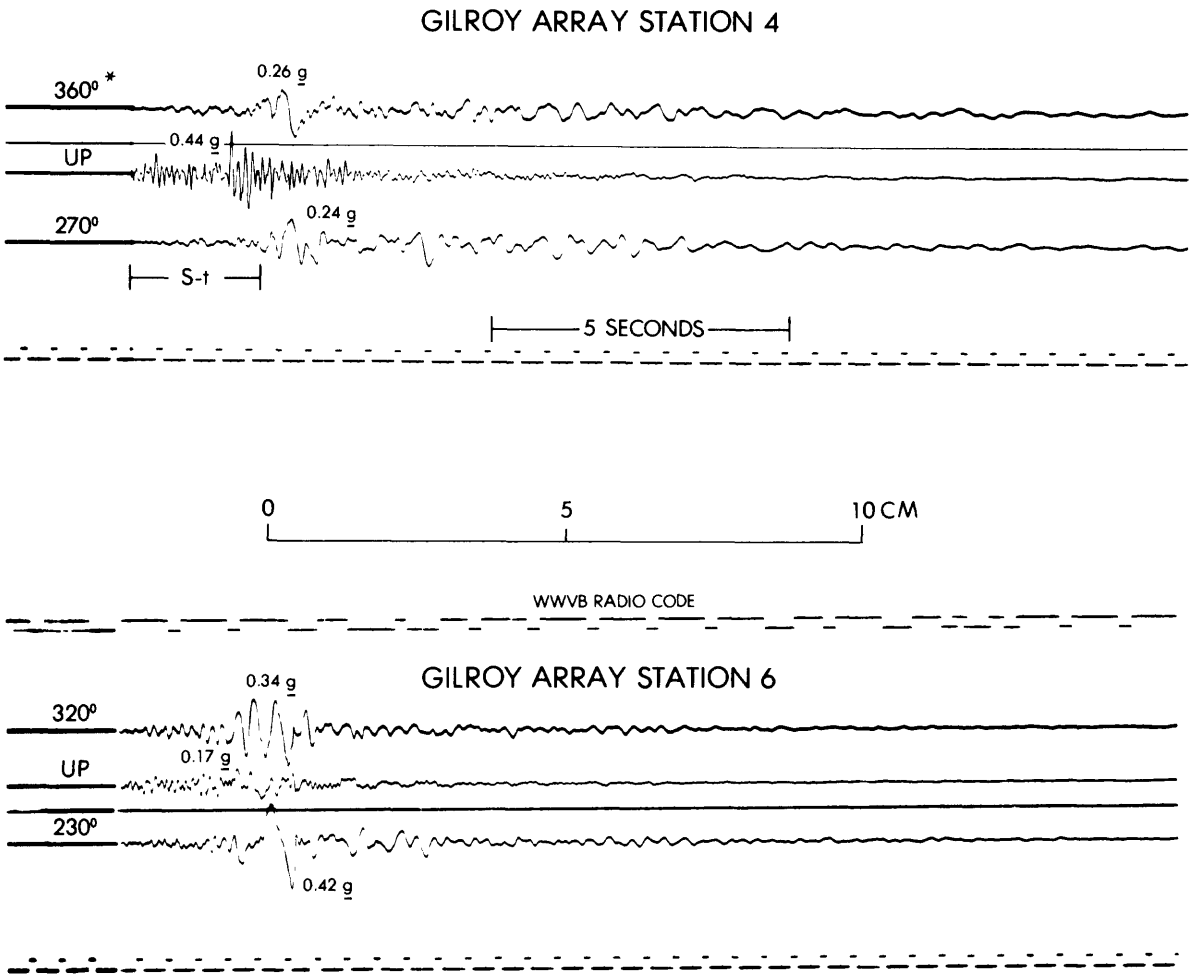
The close-in Imperial Valley accelerograph network recorded at least 82 identifiable aftershocks at 21 stations during the first week after the October 15 main shock; 14 of these aftershocks were recorded at three or more stations. This data set contains more than 150 records that can be used in epicenter and magnitude determinations, as well as for studies of source mechanisms and ground motion attenuation. In all, 22 stations within 30 km of the main-shock surface rupture produced at least 165 aftershock records; 49 of these records contain peak accelerations greater than 0.1 g.

In summary, forty-three U.S. strong-motion stations within an epicentral distance of 150 km were in operation during the main shock of the October 15, 1979 Imperial Valley earthquake; more than 265 aftershock records were obtained at 20 stations within 25 km of the main-shock surface rupture. Maximum horizontal ground accelerations of greater than 0.5 g were measured at seven stations within 10 km of the Imperial fault rupture; a maximum vertical acceleration of 1.74 g recorded at El Centro array station 6 exhibits a duration (peak accelerations grearer than 0.1 g) of more than 6 sec. These accelerograms contain the most comprehensive collection of close-in strong-motion data ever recorded. Because abolute times were recorded on many of the records, detailed studies of the source mechanism and ground-motion characteristics are possible.



* Azimuthal direction of case acceleration for upward trace deflection.

FIGURE 60.--Gilroy array accelerograms from the magnitude 5.9 earthquake of 6 August 1979.



* Azimuthal direction of case acceleration for upward trace deflection.

FIGURE 60.--Gilroy array accelerograms --continued.

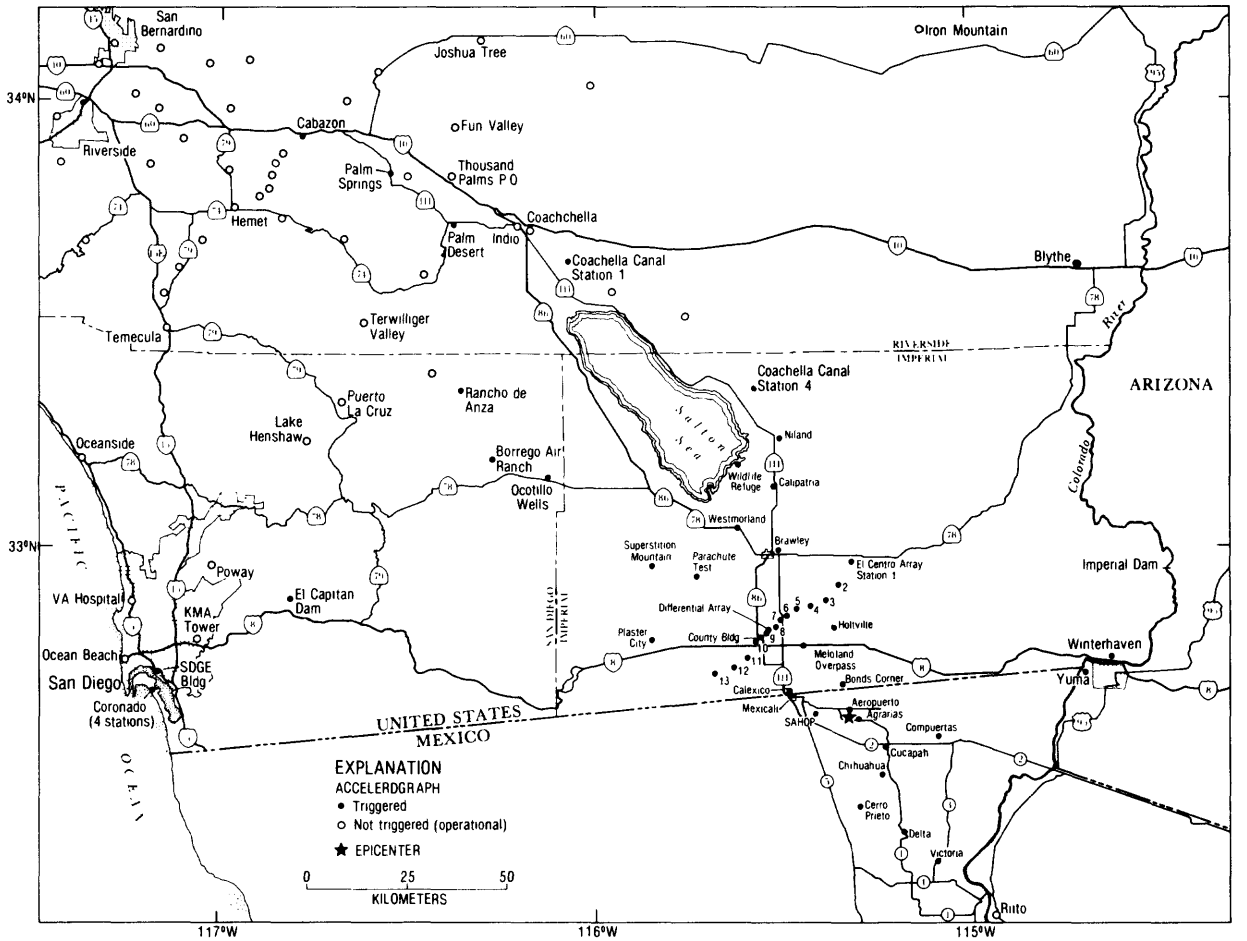


FIGURE 61.--Strong-motion stations in the greater Imperial Valley region that are known to have been operational at the time of the 15 October 1979 earthquake (from Seismic Engineering Program Report, U.S. Geological Survey Circular 818C, 1980).

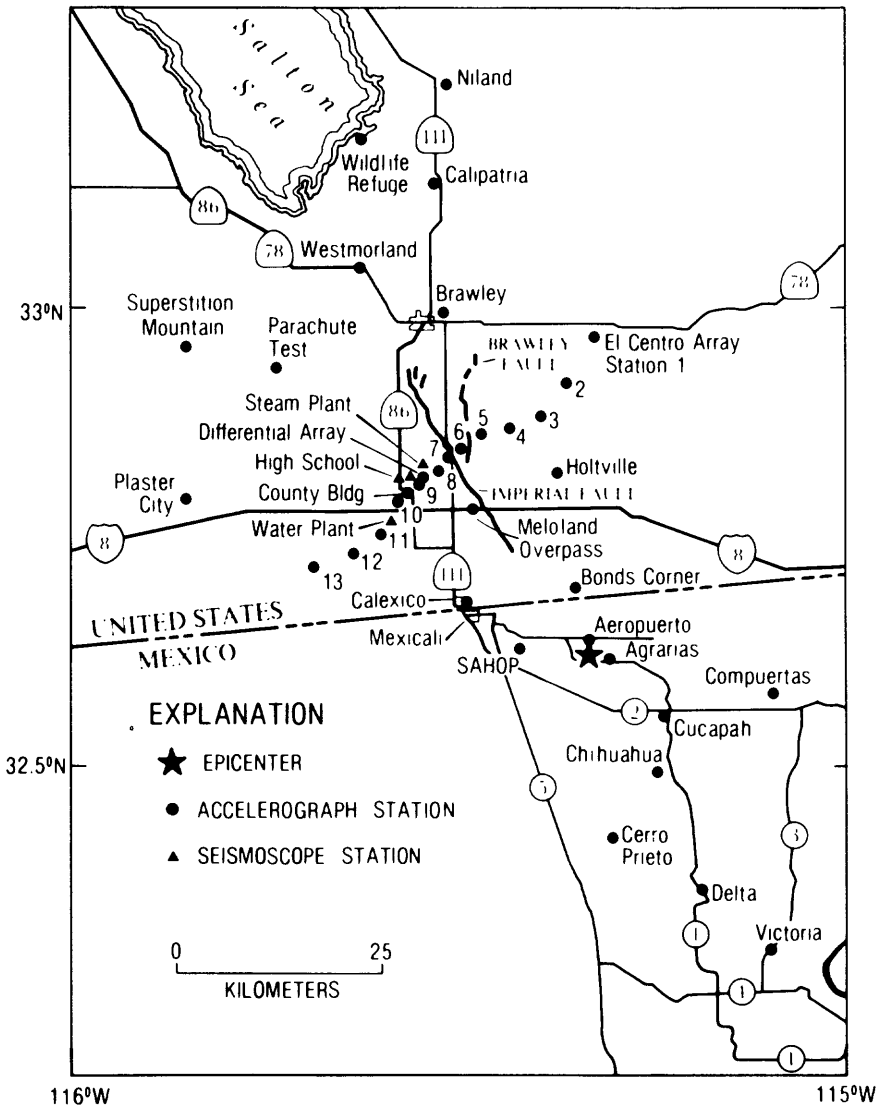


FIGURE 62.--Close-in strong-motion stations that operated during the 15 October 1979 Imperial Valley earthquake (from Seismic Engineering Program Report, U.S. Geological Survey Circular 818C, 1980).

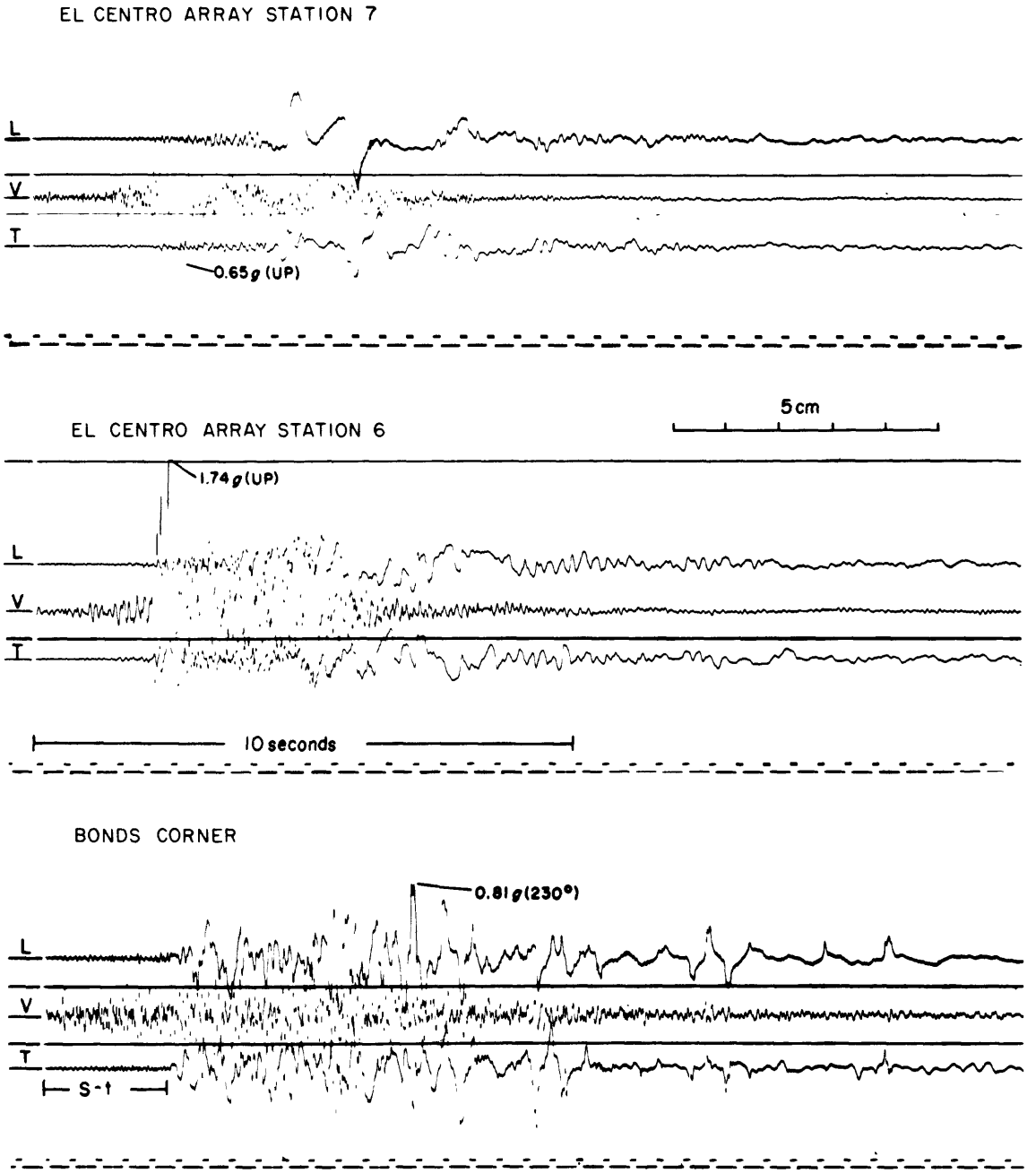


FIGURE 63.--Selection of USGS accelerograms from the magnitude 6.6 Imperial Valley earthquake of 15 October 1979.

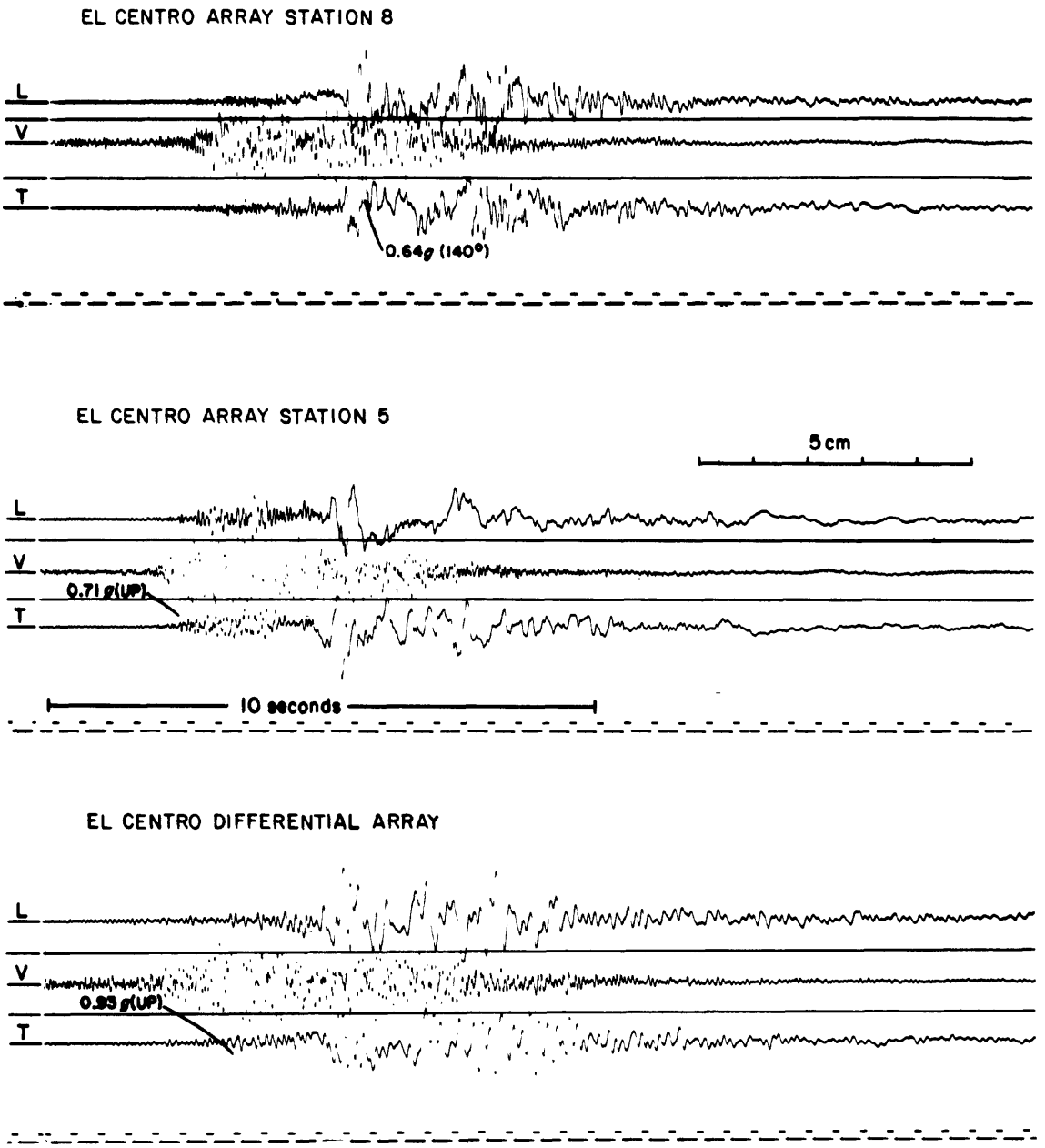


FIGURE 63.--Selection of USGS accelerograms from Imperial Valley — continued.

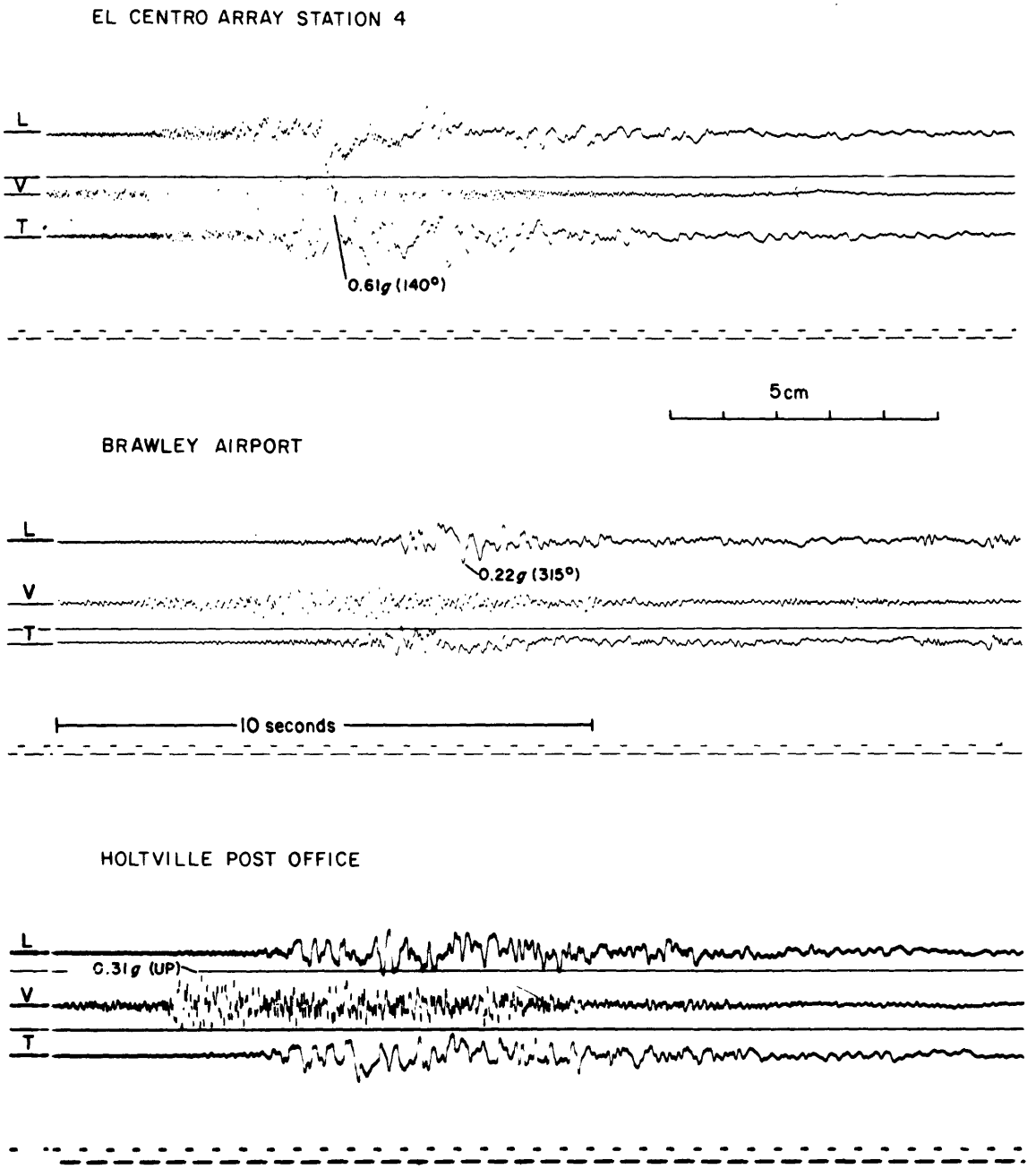


FIGURE 63.—Selection of USGS accelerograms from Imperial Valley -- continued.

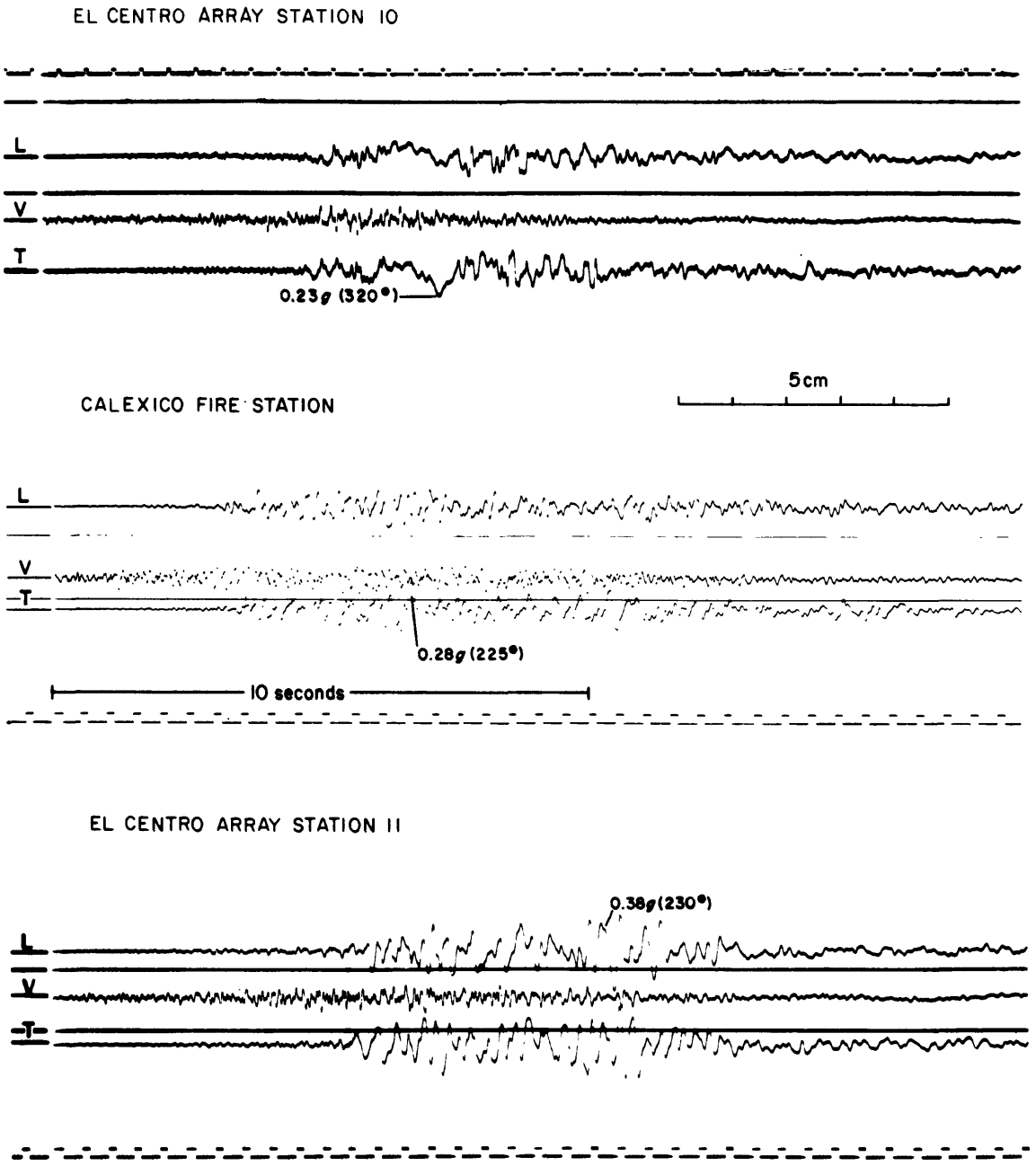


FIGURE 63.—Selection of USGS accelerograms from Imperial Valley -- continued.

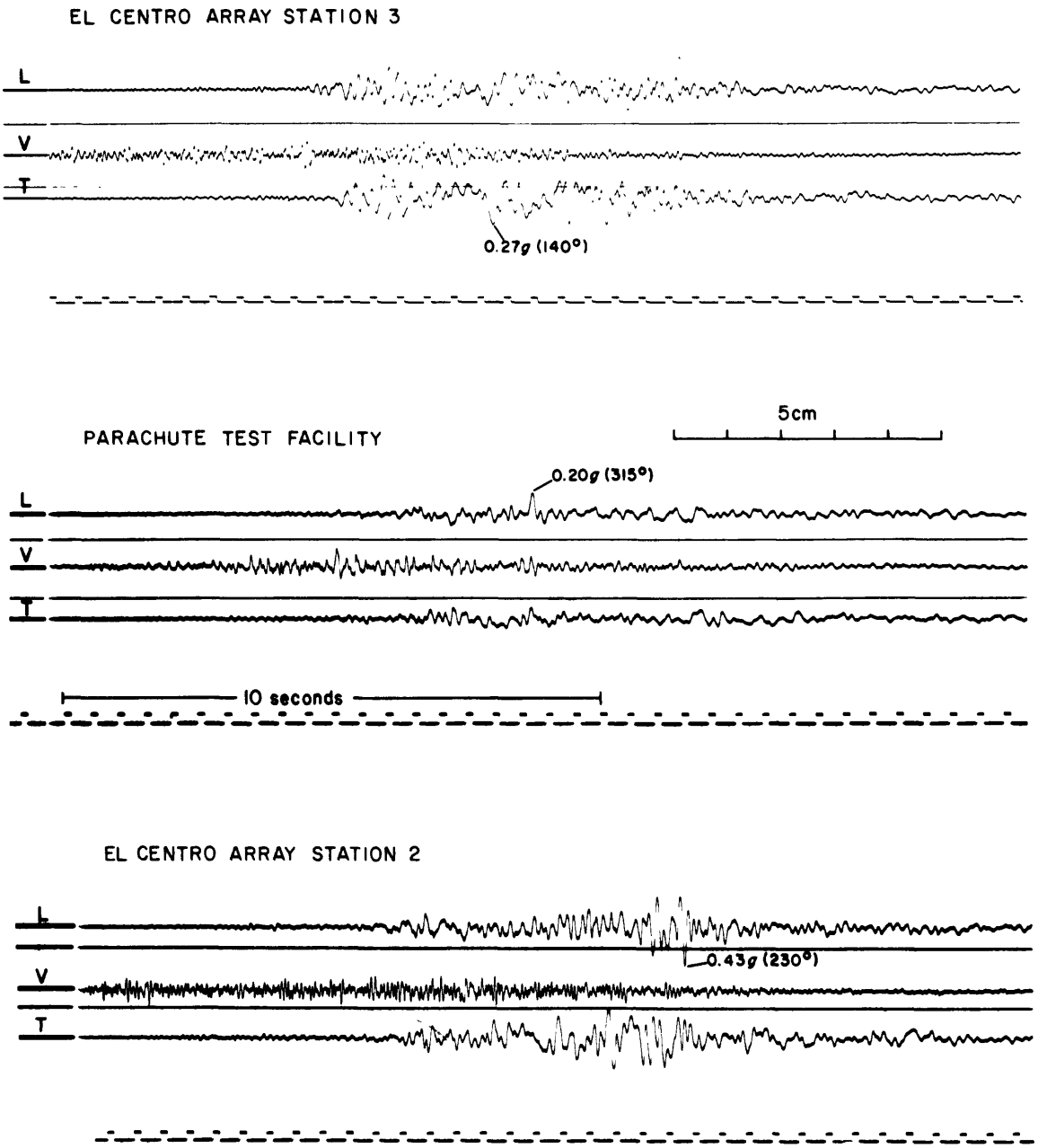


FIGURE 63.--Selection of USGS accelerograms from Imperial Valley -- continued.

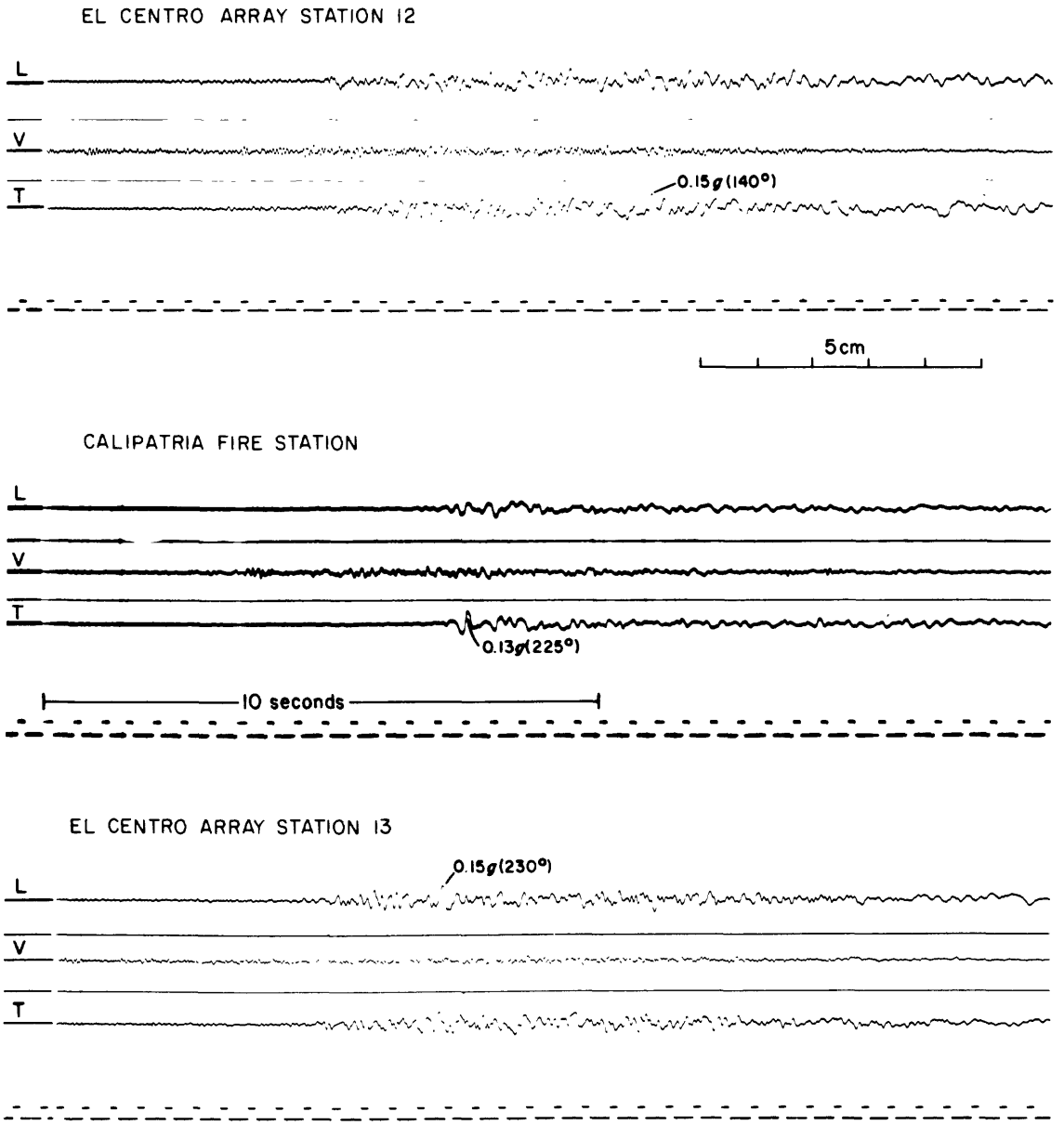


FIGURE 63.--Selection of USGS accelerograms from Imperial Valley -- continued.

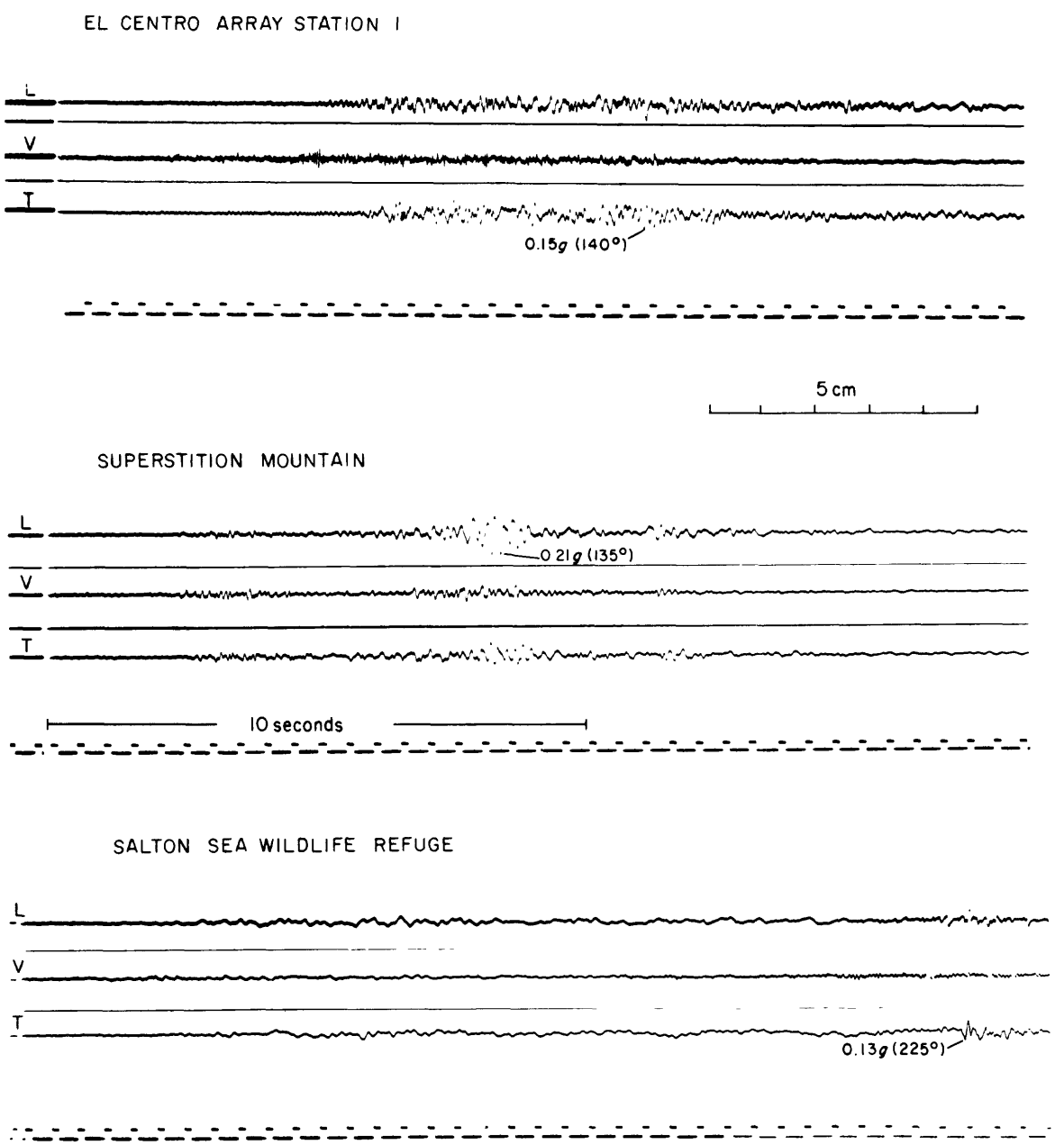


FIGURE 63.--Selection of USGS accelerograms from Imperial Valley -- continued.

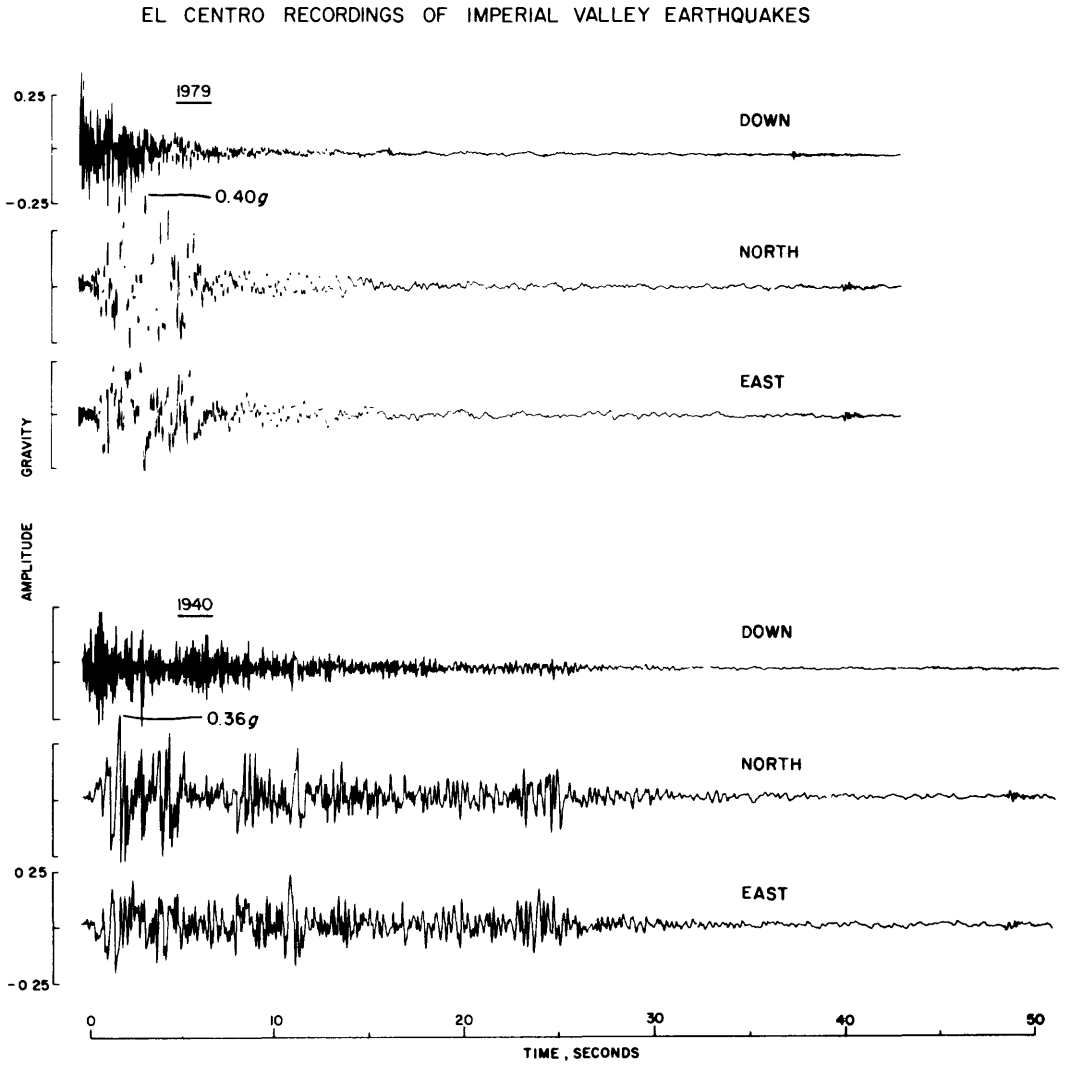


FIGURE 64.--Accelerograms from El Centro array station 9 (302 Commercial Avenue), for the Imperial Valley earthquakes of 15 October 1979 and 18 May 1940.

Table 9.--*Summary of U.S. accelerograph records recovered during 1979*

Event	Station name (owner)[1]	Station coord.(°)	S-t[2]	Direction[3]	Max accl[4] (g)	Duration[5] (s)
28 August 1978-	Pahala, Hawaii	19.20 N.	1.4	155	.08	-
17 January 1979	Kau Hospital	155.47 W.		Up	.03	-
S. Hawaii	(USGS)			065	.08	-
Epicenters and						
magnitudes unknown	Wahaula, Hawaii	19.33 N.	*		**	
	Visitor Center	155.03 W.				
	(USGS)					
	Note: Two additional records recovered at Pahala and one additional record recovered at Wahaula during this period; maximum acceleration less than 0.05 g.					
20 November 1978	Cherry Valley	33.98 N.	*		**	
0655 UTC	Johnson Res.	116.99 W.				
S. California	(USGS)					
34.15 N., 116.97 W.						
Magnitude 4.1	Forest Falls	34.09 N.	0.3	300	.11	0.1
	Mill Creek Canyon	116.92 W.		Up	.07	-
	(USGS)			210	.16	.1
	Mill Creek	34.08 N.	2.3	315	.04	-
	Forest Station	117.05 W.		Up	.02	-
	(USGS)			225	.05	-
	East Highlands	34.11 N.	3.2		**	
	Post Office	117.17 W.				
	(USGS)+					
31 December 1978	Mud Mt. Dam	47.14 N.	*		**	
0323 UTC	Enumclaw, Wash.	121.93 W.				
Seattle, Wash.	Crest (ACOE)+					
47.58 N., 121.85 W.						
Magnitude 4.0						
1 January 1979	Topanga Fire Sta.	34.084 N.	2.4	270	.07	-
2314 UTC	Topanga, Calif.	118.599 W.		Up	.04	-
S. California	(USGS)			180	.09	-
33.93 N., 118.70 W.						
Magnitude 4.6	Kilpatrick School	34.093 N.	2.2	270	.06	-
	Malibu, Calif.	118.836 W.		Up	.04	-
	(USGS)			180	.07	-
	Monte Nido Fire Sta.	34.08 N.	2.1	090	.05	-
	Malibu Canyon, Calif.	118.69 W.		Up	.05	-
	(USGS)			360	.06	-
	Century City	34.06 N.	*		**	
	Los Angeles, Calif.	118.42 W.				
	(USGS)					
	Liquid Metal Eng. Cntr.	34.23 N.				
	Canoga Park, Calif.	118.71 W.				
	(DOE)					
	Bldg 462, ground level		*		**	
	Bldg 462, 6th floor		*			
	Bldg 463, roof level		*	090	.02	-
				Up	.10	-
				360	.05	-

Table 9.--*Summary of U.S. accelerograph records recovered during 1979*--Continued

Event	Station name (owner)[1]	Station coord.(°)	S-t[2]	Direction[3]	Max accl[4] (g)	Duration[5] (s)
	Jensen Filter Plant Los Angeles, Calif. (MWD)	34.31 N. 118.50 W.				
	Gen room, ground level		*		**	
	Residence, roof level		*		**	
	Admin bldg, basement		*		**	
	Sepulveda Dam Los Angeles, Calif. (ACOE)	34.17 N. 118.47 W.				
	Crest station		*		**	
	Downstream station		*		**	
	Sepulveda Canyon Control Facility (MWD)	34.10 N. 118.48 W.	3.3	156 Up 066	.03 .02 .06	- - -
	333 S. Hope St. Los Angeles, Calif. (CLA)	34.05 N. 118.25 W.	*			
	Basement				**	
	31st floor				**	
	55th floor				**	
	Brentwood VA Hosp. Ground level (VA)	34.06 N. 118.46 W.	3.6		**	
	Long Beach VA Hosp. Long Beach, Calif. (VA)+	33.78 N. 118.12 W.	*			
	Basement				**	
	6th floor				**	
	Note: Instrument at 11th floor malfunctioned.					
	Vernon, Calif. CMD Terminal (USGS)+	34.00 N. 118.20 W.	*		**	
	201 Ocean Ave. Santa Monica, Calif. (OTA)	34.03 N. 118.51 W.	3.2			
	Basement			170 Up 080	.03 .02 .05	- - -
	10th floor			170 Up 080	.06 .03 .12	- - 0.3
	17th floor			170 Up 080	.10 .11 .17	1-peak 0.2 1.6
	Note: Data from station at 201 Ocean Ave. was obtained from a reproduction of records owned by Ocean Tower Apartments, Santa Monica, Calif.					

Table 9.--*Summary of U.S. accelerograph records recovered during 1979*--Continued

Event	Station name (owner)[1]	Station coord.(°)	S-t[2]	Direction[3]	Max accl[4] (g)	Duration[5] (s)
	Note: Additional accelerograph records were recovered at California Strong-Motion Instrumentation Program (CSMIP) sites; stations that were triggered include Santa Catalina, Culver City, Inglewood, University of California at Los Angeles, Hollywood Storage, Century City, Long Beach (2), Irvine, Sherman Oaks, and Ventura (Rich McJunkin, oral commun.).					
12 February 1979 0448 UTC S. California 33.45 N., 116.42 W. Magnitude 4.4	Pinyon Flt. Observ. Underground vault (USGS)	33.61 N. 116.46 W.	*		**	
	Rancho De Anza Anza-Borrego Park (USGS)	33.35 N. 116.40 W.	1.8		**	
22 February 1979 1557 UTC N. California 40.01 N., 120.07 W. Magnitude 5.2	Grizzly Valley Dam Abutment station (CDWR)+	39.88 N. 120.48 W.	*		**	
28 February 1979 2127 UTC S. Alaska 60.52 N., 141.51 W. Magnitude 7.1	Yakutat, Alaska FAA-VOR Bldg. (LDGO)	59.51 N. 139.63 W.	*	360	.09	-
				Up	.02	-
				270	.06	-
	Icy Bay, Alaska Gulf Timber Co. (USGS)	59.97 N. 141.64 W.	*	180	.16	16.5
				Up	.07	-
				090	.11	1-peak
15 March 1979 2017 UTC S. California 34.30 N., 116.44 W. Magnitude 5.0	Morongo Valley F.S. Morongo Valley, Calif. (USGS)+	34.05 N. 116.58 W.	4.4		**	
15 March 1979 2107 UTC S. California 34.32 N., 116.44 W. Magnitude 5.2	Morongo Valley F.S. Morongo Valley, Calif. (USGS)+	34.05 N. 116.58 W.	4.7		**	
	White Water Trout Farm White Water Canyon (USGS)+	33.99 N. 116.66 W.	4.6		**	
	Fun Valley Reservoir 361 (USGS)+	33.93 N. 116.39 W.	*		**	
	North Palm Springs Post Office (USGS)+	33.92 N. 116.54 W.	5.0		**	
15 March 1979 2307 UTC S. California 34.33 N., 116.44 W. Magnitude 5.0	Morongo Valley F.S. Morongo Valley, Calif. (USGS)+	34.05 N. 116.58 W.	*		**	
	Note: Additional records recovered at CSMIP sites include those from Joshua Tree Palm Springs, Desert Hot Springs, Palm Desert, and San Bernardino (Rich McJunkin, oral commun.).					

Table 9.--*Summary of U.S. accelerograph records recovered during 1979*--Continued

Event	Station name (owner)[1]	Station coord.(°)	S-t[2]	Direction[3]	Max accl[4] (g)	Duration[5] (s)
16 May 1978-12 June 1979 Central Alaska Epicenters and magnitudes unknown	Talkeetna, Alaska FAA/VOR (USGS)	62.30 N. 150.10 W.	*		**	
	Fairbanks, Alaska Duckering Hall (USGS)	64.85 N. 147.82 W.	*		**	
	Fairbanks, Alaska College Observatory (USGS)	64.86 N. 147.83 W.	*	200	.05	-
				Up	.05	-
				110	.03	-
	Note: One each additional records recovered at Talkeetna and at College Observatory; maximum acceleration less than 0.05 g.					
20 January 1979-29 July 1979 S. Hawaii Epicenters and magnitudes unknown	Waimea, Hawaii Waimea School (USGS)	20.03 N. 155.67 W.	*		**	
			*	140	.14	0.2
				Up	.06	-
				050	.17	0.1
	Honokaa, Hawaii Fire Station (USGS)	20.081 N. 155.465 W.	6.4	030	.09	1-peak
				Up	.08	-
				300	.12	0.8
			*	030	.05	-
				Up	.02	-
				300	.04	-
			*	030	.04	-
				Up	.04	-
				300	.07	-
	Hilo, Hawaii Univ. of Hawaii (USGS)	19.707 N. 155.083 W.	4.4		**	
	Hilo, Hawaii Fish & Wildlife (USGS)	19.731 N. 155.096 W.	4.7	180	.09	-
				Up	.04	-
				090	.11	1-peak
	Hilo, Hawaii Sewage plant (USGS)	19.734 N. 155.050 W.	4.9	156	.06	-
				Up	.02	-
				066	.03	-
	Hawaii Nat'l Park Volcano Observatory (USGS)	19.42 N. 155.29 W.	*	360	.06	-
				Up	.06	-
				270	.11	1-peak
	Wahaula, Hawaii Visitor Center (USGS)	19.33 N. 155.03 W.	1.4		**	
	Note: The largest amplitude record for each station is questionably associated with the magnitude 4.7 event of March 6, 1979; this earthquake was located at 19.52 N. and 155.27 W., depth of 28 km.					

Table 9.--*Summary of U.S. accelerograph records recovered during 1979*--Continued

Event	Station name (owner)[1]	Station coord.(°)	S-t[2]	Direction[3]	Max accl[4] (g)	Duration[5] (s)
16 November 1978-6 August 1979 Central California Epicenters and magnitudes unknown	Bear Valley Array Sta. 11, Wilkinson Ranch (USGS)	36.61 N. 121.11 W.	1.8		**	
			1.5	130	.06	-
				Up	.02	
				040	.05	-
13 February 1979 1921 UTC Central California 36.56 N., 121.16 W. Magnitude 3.5	Bear Valley Array Sta. 10, Webb Ranch (USGS)	36.53 N. 121.14 W.	*		**	
	Bear Valley Array Sta. 14, Butts Ranch (USGS)	36.57 N. 121.04 W.	*		**	
5 March 1979 0818 UTC Central California Epicenter and magnitude unknown	Bear Valley Array Sta. 12, Williams Ranch (USGS)	36.66 N. 121.25 W.	2.3		**	
10 March 1979 0831 UTC Central California Epicenter and magnitude unknown	Bear Valley Array Sta. 10, Webb Ranch (USGS)	36.53 N. 121.14 W.	*		**	
15 March 1979 2006 UTC Central California 36.61 N., 121.09 W. Magnitude 3.0	Bear Valley Array Sta. 14, Butts Ranch (USGS)	36.57 N. 121.04 W.	1.7	310	.11	0.1
				Up	.04	-
				220	.10	1-peak
16 March 1979 2000 UTC Central California Epicenter and magnitude unknown	Bear Valley Array Sta. 9, Schrolls Ranch (USGS)	36.63 N 121.28 W.	*		**	
21 March 1979 17 July 1979 N. California Epicenter and magnitude unknown	San Francisco 3333 25th St. (USGS)	37.75 N. 122.42 W.	*			
	Basement				**	
	Roof (9th)				**	
	San Francisco 3250 Van Ness Ave. (USGS)	37.81 N. 122.42 W.	*			
	Basement				**	
	4th floor				**	
21 March 1979-6 August 1979 N. California Epicenter and magnitude unknown	San Francisco BART Tube (USGS)	37.80 N. 122.38 W.	*			
	Section 16				**	
	Section 19				**	

Table 9.--*Summary of U.S. accelerograph records recovered during 1979*--Continued

Event	Station name (owner)[1]	Station coord.(°)	S-t[2]	Direction[3]	Max acc[4] (g)	Duration[5] (s)
	San Francisco BART Vent Shaft (USGS)	37.80 N. 122.39 W.	*			
	Level -48 ft				**	
	Level + 9 ft				**	
	San Francisco 555 Pine Street (USGS)	37.79 N. 122.40 W.	*			
	Basement				**	
	8th floor & rack				**	
	16th floor & rack				**	
	Roof (18th)				**	
27 May 1979 1428 UTC Central California 36.53 N., 121.13 W. Magnitude 3.3	Bear Valley Array Sta. 6, James Ranch (USGS)	36.51 N. 121.10 W.	1.2	310	.07	-
				Up	.05	-
				220	.10	1-peak
	Bear Valley Array Sta. 10, Webb Ranch (USGS)	36.53 N. 121.14 W.	*	310	.08	-
				Up	.02	-
				220	.10	1-peak
27 May 1979 1628 UTC Central California 36.53 N., 121.13 W. Magnitude 3.2	Bear Valley Array Sta. 6, James Ranch (USGS)	36.51 N. 121.10 W.	1.1	310	.07	-
				Up	.03	-
				220	.06	-
27 May 1979 1630 UTC Central California Epicenter and magnitude unknown	Bear Valley Array Sta. 6, James Ranch (USGS)	36.51 N. 121.10 W.	1.1		**	
29 May 1979 2216 UTC Central California Epicenter and magnitude unknown	Bear Valley Array Sta. 6, James Ranch (USGS)	36.51 N. 121.10 W.	1.1		**	
26 June 1979- 5 September 1979 N. California Epicenter and magnitude unknown	Rancho Seco Nuclear Power Plant (USGS)	38.34 N. 121.11 W.	*		**	
	Note: May be related to Gilroy event of August 6.					
5 June 1979- 4 August 1979 South Carolina Epicenters and magnitudes unknown	Jenkinsville, S.C. Monticello Dam (USGS)	34.30 N. 81.33 W.	*			
	Shared abutment			180	.05	-
	(Center crest)			Up	.04	-
				090	.05	-
	Note: Three additional records recovered at this station; maximum acceleration less than 0.05 g.					
13 June 1979 0709 UTC Imperial Valley, Ca. 33.08 N., 115.62 W. Magnitude 3.7	Calipatria, Calif. Fire Station (USGS)	33.13 N. 115.52 W.	3.0		**	

Table 9.--*Summary of U.S. accelerograph records recovered during 1979*--Continued

Event	Station name (owner)[1]	Station coord.(°)	S-t[2]	Direction[3]	Max accl[4] (g)	Duration[5] (s)
13 June 1979 1946 UTC Imperial Valley, Ca. 33.02 N., 115.67 W. Magnitude 4.2	Brawley, Calif. Municipal Airport (USGS)	32.988 N. 115.509 W.	2.3		**	
	Calipatria, Calif. Fire Station (USGS)	33.13 N. 115.52 W.	3.0	315	.04	-
				Up	.04	-
				225	.06	-
13 June 1979 2021 UTC Imperial Valley, Ca. 33.12 N., 115.62 W. Magnitude 3.3	Calipatria, Calif. Fire Station (USGS)	33.13 N. 115.52 W.	3.0		**	
29 June 1979 0553 UTC Big Bear Lake, Ca. 34.25 N., 116.90 W. Magnitude 4.6	Cherry Valley Johnson Residence (USGS)	33.98 N. 116.99 W.	*		**	
	Forest Falls Mill Creek Canyon (USGS)	34.09 N. 116.92 W.	2.6	300	.08	-
				Up	.07	-
				210	.12	1-peak
30 June 1979 0034 UTC Big Bear Lake, Ca. 34.24 N., 116.90 W. Magnitude 4.8	Whitewater Trout Farm, Whitewater Canyon, (USGS)	33.99 N. 116.66 W.	4.2		**	
	North Palm Springs+ Post Office, (USGS)	33.92 N. 116.54 W.	6.1		**	
	Cedar Springs Dam Toe Station, (CDWR)+	34.30 N. 117.31 W.	*		**	
	Cedar Springs Dam Crest Station, (CDWR)+	34.30 N. 117.31 W.	*	020	.06	-
				Up	.04	
				290	.03	-
	Perris Dam Crest Station (CDWR)+	33.85 N. 117.18 W.	*		**	
30 June 1979 0703 UTC Big Bear Lake, Ca. 34.25 N., 116.90 W. Magnitude 4.5	Cedar Springs Dam Toe Station, (CDWR)+	34.30 N. 117.31 W.	*		**	
	Cedar Springs Dam Crest Station, (CDWR)+	34.30 N. 117.31 W.	*		**	
9 July 1979 2120 UTC Central California 36.55 N., 121.18 W. Magnitude 3.0	Bear Valley Array Sta. 1, Fire Station (USGS)	36.57 N. 121.18 W.	0.6	310	.05	-
				Up	.03	-
				220	.05	-
	Bear Valley Array Sta. 4, Bickmore Canyon (USGS)	36.57 N. 121.22 W.	*		**	
	Bear Valley Array Sta. 5, Callens Ranch (USGS)	36.67 N. 121.20 W.	*		**	

Table 9.--*Summary of U.S. accelerograph records recovered during 1979*--Continued

Event	Station name (owner)[1]	Station coord.(°)	S-t[2]	Direction[3]	Max accl[4] (g)	Duration[5] (s)
	Bear Valley Array Sta. 10, Webb Residence, (USGS)	36.53 N. 121.14 W.	1.1		**	
17 July 1979- 6 August 1979 N. California Epicenter and magnitude unknown	San Francisco 3333 25th St. (USGS)	37.75 N. 122.42 W.	*			
	Basement				**	
	Roof (9th)				**	
	San Francisco 600 Montgomery St. (USGS)	37.80 N. 122.40 W.	*			
	Basement (3rd)				**	
	24th floor				**	
	49th floor				**	
	Tower (58th)				**	
2 August 1979 2143 UTC Central California 36.79 N., 121.57 W. Magnitude 3.7	Bear Valley Sta. 12 Williams Ranch (USGS)	36.66 N. 121.25 W.	*		**	
4 August 1979 2012 UTC Central Alaska 62.45 N., 149.72 W. Magnitude 4.4	Talkeetna, Alaska FAA-VOR, (USGS)	63.30 N. 150.10 W.	*		**	
6 August 1979 1705 UTC Gilroy, California 37.10 N., 121.50 W. Magnitude 5.9	San Martin Coyote Creek (CDMG)+	37.118 N. 121.550 W.	1.3	250 Up 160	.23 .10 .16	1.5 1-peak 2.8
	Gilroy Array Sta. 6 San Ysidro F.F. (USGS)	37.026 N. 121.484 W.	1.5	320 Up 230	.34 .17 .42	1.8 1.5 3.2
	Gilroy Array Sta. 4 San Ysidro School (USGS)+	37.000 N. 121.521 W.	2.2	360 Up 270	.26 .44 .24	3.8 3.4 6.1
	Gilroy Array Sta. 3 Sewage Plant (USGS)+	36.991 N. 121.536 W.	2.6	140 Up 050	.27 .15 .26	3.0 3.8 2.5
	Gilroy Array Sta. 2 Mission Trails Motel (USGS)+	36.982 N. 121.556 W.	2.7	140 Up 050	.26 .18 .20	1.4 3.1 1.7
	Gilroy Array Sta. 1 Gavilan College (USGS)	36.973 N. 121.572 W.	2.5	320 Up 230	.13 .08 .10	0.9 - 0.9
	Corralitos Eureka Canyon Rd. (CDMG)+	37.05 N. 121.80 W.	*		**	

Table 9.--*Summary of U.S. accelerograph records recovered during 1979*--Continued

Event	Station name (owner)[1]	Station coord.(°)	S-t[2]	Direction[3]	Max accl[4] (g)	Duration[5] (s)
	San Juan Bautista 101/156 Overpass (CDMG)+	36.86 N. 121.58 W.	3.5	293 Up 023	.12 .06 .08	0.1 - -
	San Juan Bautista 24 Polk St. (CDMG)+	36.86 N. 121.54 W.	4.3	303 Up 213	.09 .12 .11	- 2.0 0.4
	Halls Valley Grant Ranch (CDMG)	37.34 N. 121.71 W.	*	240 Up 150	.05 .03 .04	- - -
	SAGO Central Harris Ranch (USGS)+	36.78 N. 121.45 W.	3		**	
	Capitola 405 Capitola Ave. (CDMG)+	36.97 N. 121.95 W.	*		**	
	San Jose Great Western Bldg. (CDMG)+	37.34 N. 121.89 W.	7		**	
	San Jose Town Park Towers (CDMG)+	37.34 N. 121.89 W.	6		**	
	San Jose Santa Clara County Bldg. (CDMG)+	37.35 N. 121.90 W.	*		**	
	Saratoga West Valley College (CDMG)+	37.27 N. 122.01 W.	6		**	
	Agnews State Hospital (CDMG)+	37.40 N. 121.95 W.	9		**	
	Salinas John and Work St. (CDMG)+	36.67 N. 121.64 W.	7	250 Up 160	.10 .06 .10	1-peak - 1-peak
	Bear Valley Sta. 3 Almaden Guest House (USGS)	36.67 N. 121.28 W.	*		**	
	Bear Valley Sta. 12 Williams Ranch (USGS)	36.66 N. 121.25 W.	8	310 Up 220	.09 .07 .08	- - -
	Bear Valley Sta. 5 Callens Ranch (USGS)	36.67 N. 121.20 W.	10		**	
	Fremont Mission San Jose (CDMG)+	37.52 N. 121.92 W.	10		**	

Table 9.--*Summary of U.S. accelerograph records recovered during 1979*--Continued

Event	Station name (owner)[1]	Station coord.(°)	S-t[2]	Direction[3]	Max accl[4] (g)	Duration[5] (s)
	Bear Valley Sta. 9 Schrolls Ranch (USGS)	36.63 N. 121.28 W.	7		**	
	Bear Valley Sta. 2 Stone Canyon (USGS)	36.64 N. 121.24 W.	10		**	
	Del Valle Dam Toe Station (CDWR)+	37.61 N. 121.74 W.	*		**	
	Palo Alto VA Hospital Bldg. 5 (USGS)+	37.41 N. 122.14 W.	*		**	
	Palo Alto 1900 Embarcadero Rd. (CDMG)+	37.45 N. 122.12 W.	9		**	
	Monterey City Hall Few Hall (USGS)+	36.60 N. 121.89 W.	*		**	
	Dos Amigos Pumping Plant (CDWR)+	36.92 N. 120.83 W.	6			
	Level 1			180	.03	-
				Up	.02	-
				090	.06	-
	Level 4			180	.03	-
				Up	.02	-
				090	.06	-
	Bear Valley Sta. 4 Bickmore Canyon (USGS)	36.57 N. 121.22 W.	8		**	
	Bear Valley Sta. 11 Wilkinson Ranch (USGS)	36.61 N. 121.11 W.	8		**	
	Bear Valley Sta. 1 Fire Station (USGS)	36.57 N. 121.18 W.	6		**	
	Bear Valley Sta. 10 Webb Residence (USGS)	36.53 N. 121.14 W.	7		**	
	Bear Valley Sta. 14 Upper Butts Ranch (USGS)	36.57 N. 121.04 W.	11	310	.05	-
				Up	.02	-
				220	.08	-
	Bear Valley Sta. 6 James Ranch (USGS)	36.51 N. 121.10 W.	*		**	

Table 9.--*Summary of U.S. accelerograph records recovered during 1979*--Continued

Event	Station name (owner)[1]	Station coord.(°)	S-t[2]	Direction[3]	Max accl[4] (g)	Duration[5] (s)
	APEEL Array Sta. 2E Hayward (USGS)+	37.66 N. 122.08 W.	12		**	
	Hayward City Hall (USGS)+	37.68 N. 122.08 W.	*		**	
	APEEL Array Sta. 7 Crystal Springs (USGS)+	37.48 N. 122.31 W.	*		**	
	San Ramon Fire Station (CDMG)	37.78 N. 121.98 W.	13		**	
	Lower Crystal Springs Dam, Abutment (CDMG)+	37.53 N. 122.36 W.	*		**	
	Oakland Calrus Bldg. (CDMG)+	37.74 N. 122.15 W.	*		**	
	Greenfield 845 Oak St. (CDMG)+	36.32 N. 121.24 W.	*		**	
	San Francisco International Airport (CDMG)+	37.62 N. 122.40 W.	13		**	
	Big Sur State Park Maintenance Bldg. (CDMG)+	36.25 N. 121.78 W.	*		**	
	South San Francisco Kaiser Medical Bldg. (CDMG)+	37.66 N. 122.43 W.	17		**	
	Oakland Title Ins. & Trust (CDMG)+	37.81 N. 122.27 W.	16		**	
	San Francisco Diamond Heights (CDMG)+	37.74 N. 122.43 W.	*		**	
	San Francisco 3333 25th St. (USGS)+	37.75 N. 122.42 W.	*		**	
	San Francisco 555 California St. (USGS)+	37.79 N. 122.40 W.	*		**	
	San Francisco 600 Montgomery St. (USGS)+	37.80 N. 122.40 W.	*		**	

Table 9.--*Summary of U.S. accelerograph records recovered during 1979*--Continued

Event	Station name (owner)[1]	Station coord.(°)	S-t[2]	Direction[3]	Max accl[4] (g)	Duration[5] (s)
	San Francisco 3250 Van Ness Ave. (USGS)+	37.81 N. 122.42 W.	*		**	
	El Cerrito Capwell's Dept. Store (CDMG)+	37.90 N. 122.30 W.	*		**	
	San Francisco VA Hospital (USGS)+	37.78 N. 122.50 W.	*		**	
	Richmond Field Station (UCB)	37.92 N. 122.33 W.	*		**	
	Note: This data summary for the Gilroy earthquake includes ground stations only; for structural response data, see Porcella and others, 1979.					
6 August 1979 2233 UTC Gilroy, California 37.00 N., 121.48 W. Magnitude 4.4	Gilroy Array Sta. 6 San Ysidro F.F. (USGS)	37.026 N. 121.484 W.	1.2		**	
6 August 1979 2236 UTC Gilroy, California 36.96 N., 121.55 W. Magnitude 3.8	Gilroy Array Sta. 6 San Ysidro F.F. (USGS)	37.026 N. 121.484 W.	1.3		**	
	Note: Unidentifiable aftershock records were obtained at Gilroy array stations 2 and 6; peak accelerations were 0.05 g and 0.06 g, respectively. Additional records that could not be identified were obtained at Gilroy array stations 2 (3 each) 3, and 4; peak accelerations were less than 0.05 g.					
12 May 1979 0203 UTC S. California 34.22 N., 117.53 W. Magnitude 3.4	Sycamore Forest Sta. Angeles Forest (USGS)	34.19 N. 117.42 W.	1.2		**	
27 June 1979- 12 September 1979 Central California Epicenter and magnitude unknown	New Hogan Dam (ACOE)	38.15 N. 120.81 W.	*			
	Crest station				**	
	Gallery station				**	
	Downstream station				**	
	Note: These records may be related to the Gilroy (Coyote Lake) earthquake of August 6, epicentral distance approx. 130 km					

Table 9.--*Summary of U.S. accelerograph records recovered during 1979*--Continued

Event	Station name (owner)[1]	Station coord.(°)	S-t[2]	Direction[3]	Max accl[4] (g)	Duration[5] (s)
22 August 1979 0201 UTC S. California 33.72 N., 116.83 W. Magnitude 4.1	Cranston Forest Station (USGS)	33.74 N. 116.84 W.	2.2		**	
3 September 1979 1144 UTC S. California 33.38 N., 116.33 W. Magnitude 3.8	Rancho de Anza Anza-Borrego Park (USGS)	33.35 N. 116.40 W.	*	135 Up 045	.08 .02 .04	- - -
22 September 1979 0759 UTC S. Hawaii 19.35 N., 155.07 W. Magnitude 5.5	Hilo, Hawaii Fish & Wildlife (USGS)+	19.731 N. 155.096 W.	6.2	180 Up 090	.44 .18 .17	4.4 0.6 2.7
	Hilo, Hawaii Univ. of Hawaii (USGS)+	19.707 N. 155.083 W.	*	265 Up 175	.02 .03 .11	- - 1-peak
	Hilo, Hawaii Sewage Plant (USGS)+	19.734 N. 155.050 W.	*		**	
	Honokaa, Hawaii Fire Station (USGS)+	20.081 N. 155.465 W.	*		**	
	Pahala, Hawaii Kau Hospital (USGS)+	19.20 N. 155.47 W.	*		**	
	Wahaula, Hawaii Visitor Center (USGS)+	19.33 N. 155.03 W.	*	145 Up 055	.04 .11 .04	- 1-peak -
	Note: Two additional records recovered at Wahaula and one additional record recovered at Hilo Fish and Wildlife; maximum acceleration less than 0.05 g.					
15 October 1979 2316 UTC Imperial Valley, Ca 32.63 N., 115.33 W. Magnitude 6.6	Blythe CDF Fire Station (CDMG)+	33.67 N. 114.71 W.	*		**	
	Bonds Corner Highways 98 & 115 (USGS)	32.693 N. 115.338 W.	2.4	230 Up 140	.81 .47 .66	13.2 12.0 13.3
	Borrego Air Ranch Borrego Springs (USGS)	33.19 N. 116.28 W.	8.2		**	
	Brawley Airport Brawley (USGS)	32.988 N. 115.509 W.	6.3	315 Up 225	.22 .18 .17	2.2 5.2 1.8
	Cabazon Post Office Cabazon (USGS)	33.92 N. 116.78 W.	*		**	

Table 9.--*Summary of U.S. accelerograph records recovered during 1979*--Continued

Event	Station name (owner)[1]	Station coord.(°)	S-t[2]	Direction[3]	Max acc[4] (g)	Duration[5] (s)
	Calexico Fire Sta	32.669 N.	3.2	315	.22	9.5
	Fifth & Mary	115.492 W.		Up	.21	8.8
	(USGS)			225	.28	10.8
	Calipatria Fire Sta	33.13 N.	7.4	315	.09	-
	Calipatria	115.52 W.		Up	.07	-
	(USGS)			225	.13	1-peak
	Coachella Canal	33.64 N.	*		**	
	Station 1	116.08 W.				
	(USGS)					
	Coachella Canal	33.36 N.	8.5	135	.14	0.5
	Station 4	115.59 W.		Up	.04	-
	(USGS)			045	.11	0.3
	Note: Anomalously high accelerations recorded at Coachella Canal Station 4 may be a result of structure response.					
	Coronado	32.68 N.	*		**	
	1770 Ava del Mundo	117.17 W.				
	(CCO)+					
	Coronado	32.68 N.	*		**	
	1780 Ava del Mundo	117.17 W.				
	(CCO)+					
	El Capitan Dam	32.88 N.	*		**	
	Left Abutment	116.82 W.				
	(CDMG)					
	El Centro, Imperial	32.793 N.	5.0	360	.29	6
	County Services Bldg.	115.564 W.		Up	.19	
	(CDMG)			090	.32	
	El Centro, Imperial	32.79 N.	5.0	092	.24	5
	County Center	115.56 W.		Up	.27	
	(CDMG)			002	.24	
	El Centro array sta. 1	32.960 N.	6	230	.15	3.1
	Borchard Ranches	115.319 W.		Up	.10	1-peak
	(USGS)			140	.15	4.8
	El Centro array sta. 2	32.916 N.	6	230	.43	5.7
	Keystone Road	115.366 W.		Up	.17	9.3
	(USGS)			140	.33	9.2
	El Centro array sta. 3	32.894 N.	5.4	230	.22	6.2
	Pine Union School	115.380 W.		Up	.15	5.6
	(USGS)+			140	.27	6.0
	El Centro array sta. 4	32.864 N.	4.8*	230	.38	6.5
	2905 Anderson Road	115.432 W.		Up	.32	6.7
	(USGS)			140	.61	6.8
	El Centro array sta. 5	32.855 N.	5.1	230	.40	7.6
	2801 James Road	115.466 W.		Up	.71	5.6
	(USGS)			140	.56	7.4

Table 9.--*Summary of U.S. accelerograph records recovered during 1979*--Continued

Event	Station name (owner)[1]	Station coord.(°)	S-t[2]	Direction[3]	Max acc[4] (g)	Duration[5] (s)
	El Centro array sta. 6	32.839 N.	5*	230	.45	7.9
	551 Huston Road	115.487 W.		Up	1.74	6.2
	(USGS)			140	.72	11.8
	El Centro array sta. 7	32.829 N.	4.6	230	.52	4.9
	Imperial Val. College	115.504 W.		Up	.65	5.5
	(USGS)+			140	.36	3.7
	El Centro array sta. 8	32.811 N.	5*	230	.50	6.9
	95 E Cruickshank Road	115.532 W.		Up	.55	5.8
	(USGS)			140	.64	6.9
	El Centro array sta. 9	32.794 N.	*	Down	.38	4.7
	302 Commercial Avenue	115.549 W.		360	.40	7.4
	(USGS)+			090	.27	7.0
	El Centro array sta. 10	32.780 N.	4.9	050	.20	5.2
	Community Hospital	115.567 W.		Up	.15	2.2
	(USGS)+			320	.23	5.1
	El Centro array sta. 11	32.752 N.	5.6	230	.38	6.5
	McCabe School	115.594 W.		Up	.16	7.7
	(USGS)			140	.38	7.0
	El Centro array sta. 12	32.718 N.	5.2	230	.11	4.9
	907 Brockman Road	115.637 W.		Up	.08	-
	(USGS)			140	.15	3.8
	El Centro array sta. 13	32.709 N.	5.1	230	.15	5.0
	Strobel Residence	115.683 W.		Up	.06	-
	(USGS)			140	.12	2.4
	El Centro diff. array	32.796 N.	5	360	.51	10.2
	Dogwood Road	115.535 W.		Up	.93	7.0
	(USGS)+			270	.37	7.0
	El Centro, Route I-8	32.773 N.	*	360	.32	7
	Meloland Overpass	115.448 W.		Up	.23	
	(CDMG)			270	.25	
	Holtville	32.812 N.	4.1	315	.22	7.5
	Post Office	115.377 W.		Up	.31	7.0
	(USGS)+			225	.26	6.2
	Niland Fire Station	33.24 N.	5.7	090	.10	1-peak
	8071 Luxor Avenue	115.51 W.		Up	.03	-
	(CDMG)+			360	.07	-
	Ocotillo Wells	33.14 N.	7.5*	315	.05	-
	Burro Bend Cafe	116.13 W.		Up	.03	-
	(USGS)			225	.04	-
	Palm Desert	33.76 N.	*		**	
	Kiewit Building	116.41 W.				
	(CDMG)+					
	Palm Springs	33.84 N.	*		**	
	Desert Hospital	116.51 W.				
	(CDMG)+					

Table 9.--*Summary of U.S. accelerograph records recovered during 1979*--Continued

Event	Station name (owner)[1]	Station coord.(°)	S-t[2]	Direction[3]	Max accl[4] (g)	Duration[5] (s)
	Parachute Test Site	32.93 N.	7.0	315	.20	1.5
	Imler Road	115.70 W.		Up	.18	5.2
	(USGS)+			225	.11	1.4
	Plaster City	32.79 N.	5*	135	.07	-
	Storehouse	115.86 W.		Up	.03	-
	(USGS)+			045	.05	-
	Rancho de Anza	33.35 N.	*		**	
	Anza Borrego Park	116.40 W.				
	(USGS)					
	Riverside, County	33.98 N.	*		**	
	Administrative Bldg.	117.37 W.				
	(CDMG)+					
	Salton Sea	33.18 N.	3.5*	315	.06	-
	Wildlife Refuge	115.62 W.		Up	.03	-
	(USGS)			225	.06	-
	San Diego	32.72 N.	*		**	
	SDGE Office Bldg.	117.16 W.				
	(CDMG)+					
	Superstition Mountain	32.955 N.	7.2*	135	.21	1.1
	USAF Camera Site	115.823 W.		Up	.09	-
	(USGS)			045	.12	0.6
	Westmorland	33.04 N.	5.4	175	.11	1-peak
	Fire Station	115.62 W.		Up	.08	-
	(CDMG)+			085	.08	-
	Winterhaven	32.74 N.	*	180	.05	-
	Sheriff Substation	114.64 W.		Up	.02	-
	(CDMG)+			090	.07	-
	Yuma, Arizona	32.73 N.	*		**	
	Strand Avenue	114.70 W.				
	(USGS)					
	Note: See Seismic Engineering Program Report, Geological Survey Circular 818C, table 2, for data from more than 250 aftershocks recorded at 22 USGS Imperial Valley accelerograph stations located within 30 km of the main-shock surface rupture.					
19 October 1979	Lytle Creek	34.26 N.	0.9	315	.07	-
1222 UTC	Mann Residence	117.50 W.		Up	.04	-
S. California	(USGS)			225	.16	0.4
34.14 N., 117.57 W.						
Magnitude 4.1	Big Pines Station	34.38 N.	1.4	300	.05	-
	Angeles Forest	117.69 W.		Up	.03	-
	(USGS)			210	.07	-
	Lone Pine Canyon	34.32 N.	1.7		**	
	Clyde Ranch	117.57 W.				
	(USGS)					

Table 9.--*Summary of U.S. accelerograph records recovered during 1979*--Continued

Event	Station name (owner)[1]	Station coord.(°)	S-t[2]	Direction[3]	Max accl[4] (g)	Duration[5] (s)
20 October 1979 2052 UTC Imperial Valley, Ca. Epicenter and magnitude unknown	Salton Sea Wildlife Refuge (USGS)	33.18 N. 115.62 W.	0.9		**	
21 October 1979 0459 UTC Imperial Valley, Ca. Epicenter and magnitude unknown	Salton Sea Wildlife Refuge (USGS)	33.18 N. 115.62 W.	1		**	
29 October 1979 0542 UTC Imperial Valley, Ca. Epicenter and magnitude unknown	Salton Sea Wildlife Refuge (USGS)	33.18 N. 115.62 W.	1.1		**	
14 November 1979 2300 UTC Central Alaska 61.35 N., 150.13 W. Magnitude 5.1	Anchorage, Alaska Westward Hotel (USGS)+	61.22 N. 149.89 W.	5.3			
	Basement level				**	
	Roof (22nd) level				**	
	Note: One additional event recorded at this station between 10 September 1979 and 17 May 1980; maximum acceleration less than 0.05 g at basement level.					
20 November 1979 0655 UTC S. California 34.15 N., 116.98 W. Magnitude 4.2	Sunnymead Merchant Farms (USGS)	33.95 N. 117.50 W.	3.9		**	
21 December 1979 2040 UTC Imperial Valley, Ca. 32.45 N., 115.20 W. Magnitude 4.8	El Centro array sta 3 Pine Union School (USGS)	32.894 N. 115.380 W.	6.8		**	
	El Centro array sta 11	32.752 N.	*	230	.04	-
	McCabe School	115.594 W.		Up	.02	-
	(USGS)			140	.07	-
	Bonds Corner	32.693 N.	4.1	230	.12	0.2
	Highways 98 and 115	115.338 W.		Up	.05	-
	(USGS)			140	.10	1-peak
	Calexico Fire Station Fifth and Mary (USGS)	32.669 N. 115.492 W.	5		**	
	Holtville	32.812 N.	6.0	315	.05	-
	Post Office	115.377 W.		Up	.02	-
	(USGS)			225	.05	-
	Parachute Test Site Imler Road (USGS)+	32.93 N. 115.70 W.	2.3		**	

Table 9.--*Summary of U.S. accelerograph records recovered during 1979*--Continued

Event	Station name (owner)[1]	Station coord.(°)	S-t[2]	Direction[3]	Max accl[4] (g)	Duration[5] (s)
	El Centro diff. array	32.796 N.	*	360	.06	-
	Dogwood Road	115.535 W.		Up	.03	-
	(USGS)+			270	.08	-
	El Centro array sta. 9	32.794 N.	*	Down	.02	-
	302 Commerical Avenue	115.549 W.		360	.07	-
	(USGS)+			090	.07	-
	Note: One additional record recovered at array station 9; maximum acceleration less than 0.05 g.					

[1]Station owner code:
ACOE - U.S. Army Corps of Engineers
CCO - City of Coronado
CDMG - California Division of Mines and Geology
CDWR - California Dept. of Water Resources
CLA - City of Los Angeles
DOE - U.S. Department of Energy
LDGO - Lamont-Doherty Geological Observatory
MWD - Metropolitan Water District of Southern California
OTA - Ocean Tower Apartments, Santa Monica
UCB - University of California, Berkeley
USGS - U.S. Geological Survey
VA - Veterans Administration
+ - WWVB time code not legible or instrument not equipped with a radio receiver; correlation of accelerogram with event may be questionable.

[2]S-wave arrival minus trigger time (S - t) interval.
* S - t interval is questionable or cannot be determined.

[3]Direction of case acceleration for upward trace deflection on accelerogram. Horizontal components are listed as azimuth in degrees clockwise from north; vertical components are listed as "up" or "down."

[4]Peak acceleration recorded at ground level on one vertical and two orthogonal horizontal components.
** Denotes maximum acceleration is less than 0.05 g at ground level or less than 0.10 g at upper floors of buildings.

[5]Duration between first and last peaks of acceleration greater than 0.10 g.

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