GEOLOGICAL SURVEY CIRCULAR 766–D

Earthquakes in the United States, October–December 1976

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By J. H. Minsch, C. W. Stover, W. J. Person, R. B. Simon, and B. G. Reagor

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United States Department of the Interior

CECIL D. ANDRUS, *Secretary*

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CONTENTS

ILLUSTRATIONS

TABLES

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INTRODUCTION

The earthquake information in this publication supplements that published in the NEIS (National Earthquake Information Service) publications, PDE ("Preliminary Determination of Epicenters") and "Preliminary Determination of Epicenters, Monthly Listing," to the extent of providing detailed felt and intensity data, as well as isoseismal maps for U.S. earthquakes. The purpose is to provide a complete listing of macroseismic effects of earthquakes, which can be used in risk studies, nuclear power plant site evaluations, seismicity studies, and answering inquiries by the public.

This publication contains two major sections. The first (table 1) is a tabular listing of earthquakes in chronological order by State, consisting of the following basic information: date, origin time, hypocenter, magnitude, maximum intensity, and computational source of the hypocenter. The second section consists of five maps and table 2, which lists detailed intensity information. The list of earthquakes in table 1 was compiled from those located in the United States or off the coasts that were published in the PDE; from hypocenters in California above magnitude 3.0, supplied by California Institute of Technology, Pasadena, the University of California, Berkeley, and other offices of the U.S. Geological Survey; from hypocenters in Hawaii supplied by the Hawaiian Volcano Observatory; and from any others that were felt or that caused damage, regardless of magnitude or availability of a hypocenter. Known or suspected explosions are also listed.

The intensities and macroseismic data were compiled from information obtained through questionnaires, from newspaper articles, and with the cooperation of other government agencies, State institutions, local organizations, and individuals. (See "Acknowledgments" for a list of collaborators.) The questionnaire (fig. 1A, B) is the latest revision of this form; it was not in use for earthquake-intensity evaluations for the years 1975-76. An interim version of the form and an earlier version that had been in use since the 1930's were the basis for intensity evaluations throughout 1976. Anyone wishing to submit felt or damage information on earthquakes for inclusion in future reports should send it to the National Earthquake Information Service, Stop 967, Box 25046, Denver Federal Center, Denver, CO 80225. Copies of the current "Earthquake Report" questionnaire can be obtained at this address.

The primary method used by the NEIS to collect macroseismic information is a questionnaire canvass using the "Earthquake Report" forms, which are mailed to postmasters in the area affected by the earthquake. The postmasters complete the forms and return them to the NEIS, where they are evaluated and an intensity value is assigned. The intensity observations are mapped and contoured by isoseismals. Isoseismal contours present a generalization of intensity data and an extrapolation of these data to regions from which there are no observations; they do not necessarily account for every individual observation.

The data in table 2 will be included in the "Earthquake Description" section of "United States Earthquakes," an annual publication, to which later data from other sources may be added for the purpose of updating and completeness. "United States Earthquakes" is published jointly by the U.S. Geological Survey, Department of the Interior, and the Environmental Data Service, NOAA, Department of Commerce.

DISCUSSION OF TABLES

The parameters for the earthquakes in table 1 and table 2 include the date, origin time, hypocenter (epicenter and focal depth), magnitude, intensity, and hypocenter source. The origin time and date are listed in Universal Coordinated Time (UTC) and local standard time based on the time-zone maps in figures 2 and 3. The epicenters, which were taken from those published in the PDE, or from other sources as noted, are listed here to two decimals. 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 NEIS have a

U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

EARTHQUAKE REPORT

Form Approved
OMB No. 42-R1700

Please answer this questionnaire carefully and return as soon as possible.

1. Was an earthquake felt by anyone in your town or zip code area recently?

☐ Not felt: Please refold and tape for return mail.

☐ Felt: Date_____Time_____ ☐ AM ☐ PM ☐ Standard time ☐ Daylight time

Name of person filling out form _____

Address_____

City_____ County_____

State_____ Zip code_____

If you felt the earthquake, complete the following section. If others felt the earthquake but you did not, skip the personel report and complete the community report.

PERSONAL REPORT

2a. Did you personally feel the earthquake? 1☐ Yes ☐ No

b. Were you awakened by the earthquake? 2☐ Yes ☐ No

c. Were you frightened by the earthquake? 3☐ Yes ☐ No

d. Were you at 4☐ Home 5☐ Work 6☐ Other?

e. Town and zip code of your location at time of earthquake _____

f. Check your activity when the earthquake occurred:

7☐ Walking 8☐ Sleeping 9☐ Lying down 10☐ Standing
11☐ Driving (car in motion) 12☐ Sitting 13☐ Other

g. Were you 14☐ Inside or 15☐ Outside?

h. If inside, on what floor were you? 16☐☐

Continue on to next section which should include personal as well as reported observations.

COMMUNITY REPORT

Check one box for each question that is applicable.

3a. The earthquake was felt by	☐ No one	17☐ Few	18☐ Several	19☐ Many	20☐ All?
b. This earthquake awakened	☐ No one	21☐ Few	22☐ Several	23☐ Many	24☐ All?
c. This earthquake frightened	☐ No one	25☐ Few	26☐ Several	27☐ Many	28☐ All?

4. What outdoor physical effects were noted in your community?

Parapets or cornices fallen	29☐ Yes	☐ No	
Trees and bushes shaken	30☐ Slightly	31☐ Moderately	32☐ Strongly
Standing vehicles rocked	33☐ Slightly	34☐ Moderately	35☐ Strongly
Moving vehicles rocked	36☐ Slightly	37☐ Moderately	38☐ Strongly
Ground cracks	39☐ Wet ground	40☐ Steep slopes	41☐ Dry and level ground
Landslides	42☐ Small	43☐ Large	
Underground pipes	44☐ Broken	45☐ Out of service	
Water splashed onto sides of lakes, ponds, swimming pools	46☐ Yes	☐ No	
Elevated water tanks	47☐ Cracked	48☐ Twisted	49☐ Fallen (thrown down)
Air coolers	50☐ Displaced	51☐ Rotated	52☐ Fallen
Railroad tracks bent	53☐ Slightly	54☐ Greatly	
Stone or brick fences	55☐ Cracked	56☐ Fallen	57☐ Destroyed
Tombstones	58☐ Displaced 61☐ Fallen	59☐ Cracked	60☐ Rotated
Chimneys	62☐ Cracked	63☐ Twisted	64☐ Fallen
	65☐ Broken at roof line		66☐ Bricks fallen
Highways or streets	67☐ Cracked slightly	68☐ Large cracks	69☐ Displaced
Sidewalks	70☐ Cracked slightly	71☐ Large cracks	72☐ Displaced

Continued on the reverse side

FIGURE 1.--Example of the "Earthquake Report" form used for evaluating the intensities of earthquakes. A, front side.

5. What indoor physical effects were noted in your community?

Windows, doors, dishes rattled	73 ☐ Yes	☐ No		
Buildings creaked	74 ☐ Yes	☐ No		
Building trembled (shook)	75 ☐ Yes	☐ No		
Hanging pictures	76 ☐ Swung	77 ☐ Out of place	78 ☐ Fallen	
Water in small containers	79 ☐ Spilled	80 ☐ Slightly disturbed		
Windows	81 ☐ Few cracked	82 ☐ Some broken	83 ☐ Many broken	

6a. Did hanging objects, doors swing? ☐ No 84 ☐ Slightly 85 ☐ Moderately 86 ☐ Violently

b. Can you estimate direction? ☐ No 87 ☐ North/South 88 ☐ East/West 89 ☐ Other

7a. Were small objects (dishes, knick-knacks, pictures) ☐ Unmoved 90 ☐ Shifted 91 ☐ Overturned 92 ☐ Fallen, not broken 93 ☐ Broken?

b. Was light furniture ☐ Unmoved 94 ☐ Shifted 95 ☐ Overturned 96 ☐ Fallen, not broken 97 ☐ Broken?

c. Were heavy furniture or appliances ☐ Unmoved 98 ☐ Overturned 99 ☐ Shifted 100 ☐ Broken?

8. Indicate effects of the following types to interior walls if any:

Plaster	101 ☐ Cracked	102 ☐ Fell
Dry wall	103 ☐ Cracked	104 ☐ Fell
Ceiling tiles	105 ☐ Cracked	106 ☐ Fell

9a. Check below any damage to buildings or structures.

Foundation	107 ☐ Cracked	108 ☐ Destroyed		
Interior walls	109 ☐ Split	110 ☐ Fallen	111 ☐ Separated from ceiling or floor	
Exterior walls	112 ☐ Hairline cracks	113 ☐ Large cracks	114 ☐ Bulged outward	
	115 ☐ Partial collapse	116 ☐ Total collapse		
Building	117 ☐ Moved on foundation	118 ☐ Shifted off foundation		

b. What type of construction was the building that showed this damage?

119 ☐ Wood 120 ☐ Stone 121 ☐ Brick veneer 122 ☐ Other
123 ☐ Brick 124 ☐ Cinderblock 125 ☐ Reinforced concrete

c. What was the type of ground under the building?

126 ☐ Don't know 127 ☐ Sandy soil 128 ☐ Marshy 129 ☐ Fill
130 ☐ Hard rock 131 ☐ Clay soil 132 ☐ Sandstone, limestone, shale

d. Was the ground: 133 ☐ Level 134 ☐ Sloping 135 ☐ Steep?

e. Check the approximate age of the building:

136 ☐ Built before 1935 137 ☐ Built 1935–65 138 ☐ Built after 1965

10a. What percentage of buildings were damaged?

Within 2 city blocks of your location ☐ None 139 ☐ Few (about 5%) 140 ☐ Many(about 50%) 141 ☐ Most (about 75%)

b. In area covered by your zip code ☐ None 142 ☐ Few (about 5%) 143 ☐ Many (about 50%) 144 ☐ Most (about 75%)

11a. Were springs or well water disturbed? 145 ☐ Level changed 146 ☐ Flow disturbed 147 ☐ Muddied ☐ Don't know

b. Were rivers or lakes changed? 148 ☐ Yes ☐ No ☐ Don't know

12a. Was there earth noise? ☐ No 149 ☐ Faint 150 ☐ Moderate 151 ☐ Loud

b. Direction of noise 152 ☐ North 153 ☐ South 154 ☐ East 155 ☐ West

c. Estimated duration of shaking 156 ☐ Sudden, sharp (less than 10 secs) 157 ☐ Long (30–60 secs) 158 ☐ Short (10–30 secs) 159 ☐ Other

13. What is the approximate population of your city/town? Or are you in a

160 ☐ Less than 1,000 161 ☐ 10,000 to 100,000 164 ☐ Rural area?
162 ☐ 1,000 to 10,000 163 ☐ Over 100,000

This community report is associated with what town or zip code? _____

Thank you for your time and information. Refold this card and tape for return mail.

FIGURE 1.--Example of the "Earthquake Report" form used for evaluating the intensities of earthquakes. B, reverse side.

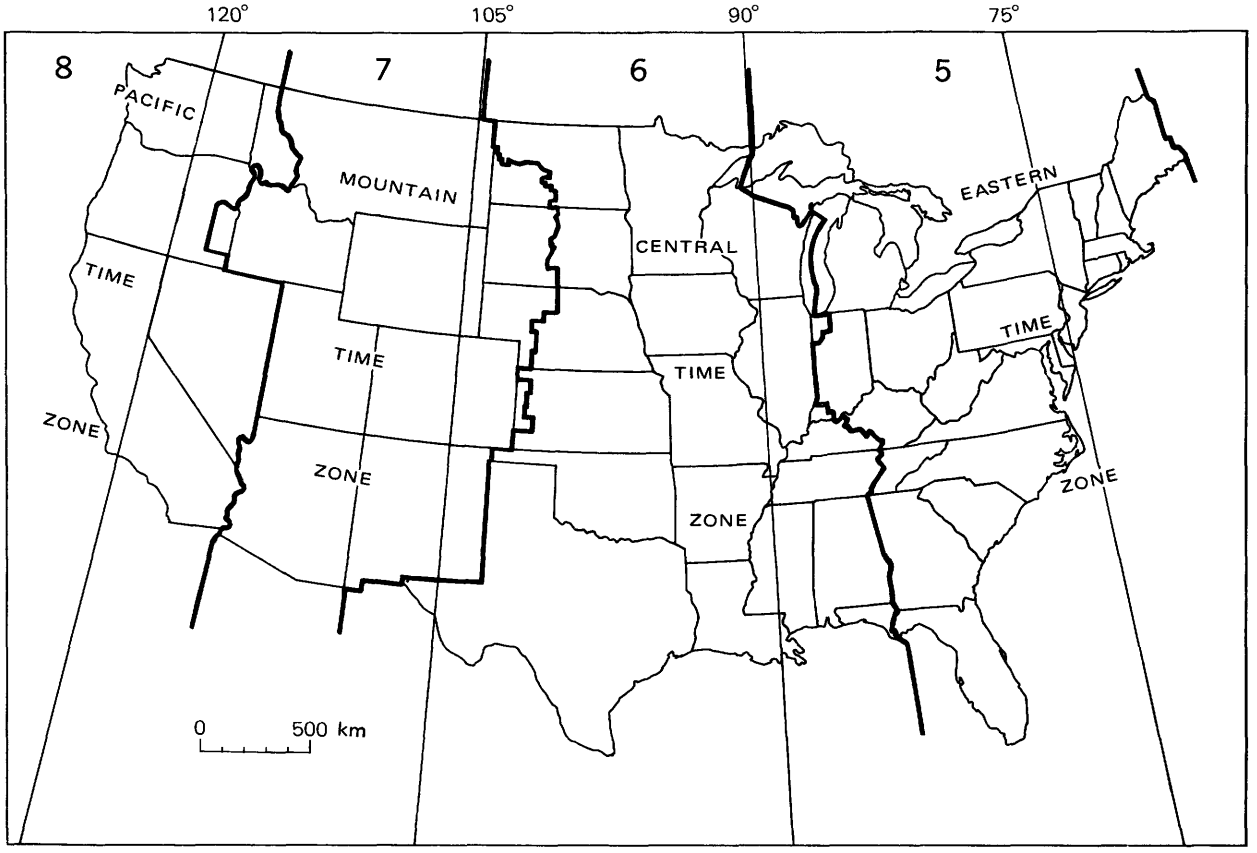

FIGURE 2.--Standard time zones of the conterminous United States. The number in each zone shows the number of hours to be subtracted from Universal Coordinated Time to convert to local standard time. (Subtract 1 hour less for local daylight-saving time.)

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 whole kilometer.

Figures 4-6 are maps summarizing the earthquake activity for the conterminous United States, Alaska, and Hawaii for the period October-December 1976. The annual summaries are shown in figures 7-9. The magnitudes plotted in these figures are based on ML or mbLg; if neither was computed, then on MS; and finally on mb, when it was the only magnitude computed.

The magnitude values listed in tables 1 and 2 were furnished by cooperating institutions or determined by the NEIS. The computational sources are labeled according to the assigned letter codes shown in headnotes to tables 1 and 2; the letter follows the value listed under the column heading "Magnitude." In table 1 the absence of a letter code indicates that the NEIS is the source. In table 2 the magnitude source is the same as the location source unless indicated otherwise, by an alphabetic character to the right of the magnitude value. The magnitude values calculated by the NEIS 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 horizontal 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 $20^\circ \leq D \leq 160^\circ$. No depth correction is made for depths less 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 $D \geq 5^\circ$.

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

as defined by Richter (1958, p. 340), where A is the maximum trace amplitude in millimeters, written by a Wood-Anderson torsion seismometer, and log A_o is a standard value as a function of distance, where the distance is ≤ 600 km. ML values are also calculated from other seismometers

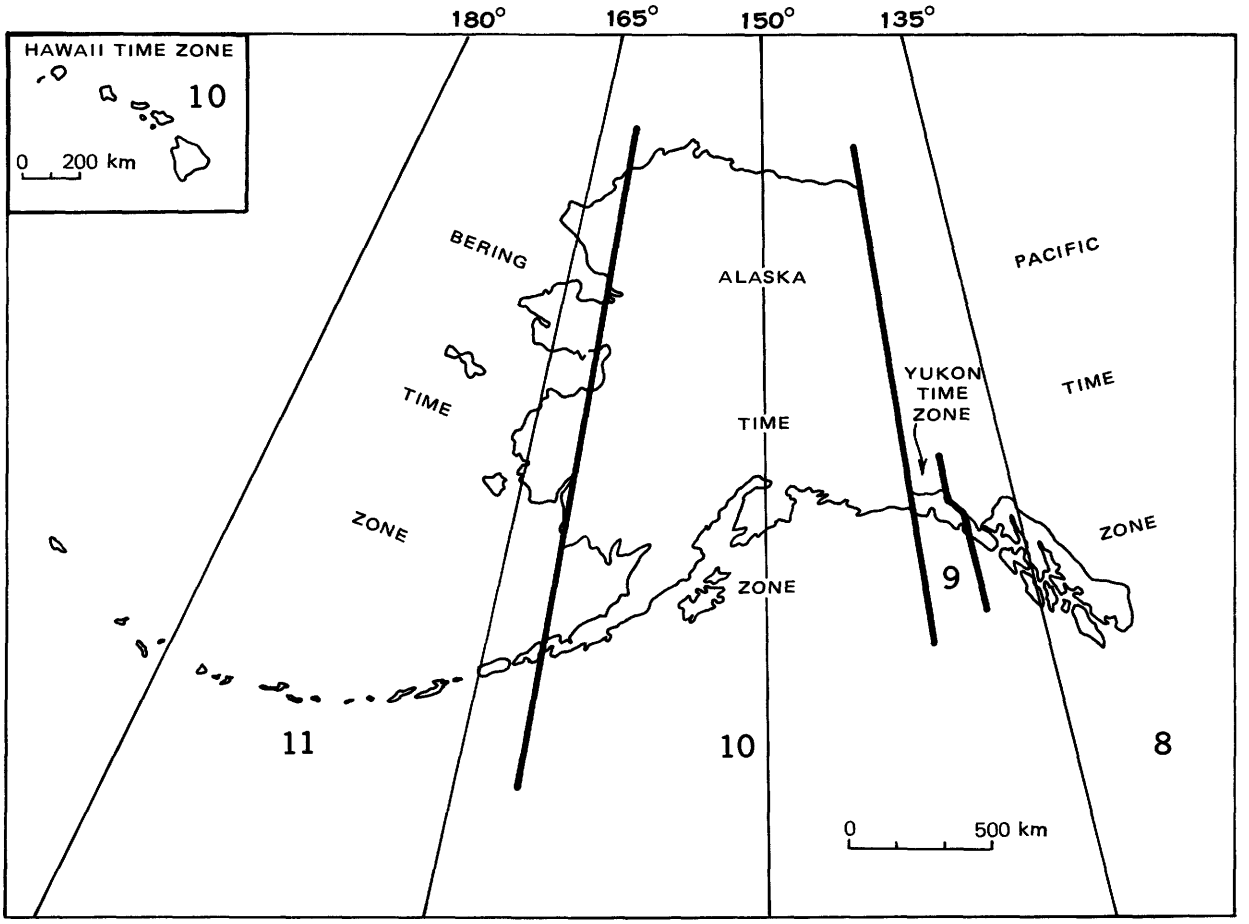

FIGURE 3.--Standard time zones of Alaska and Hawaii. The number in each zone shows the number of hours to be subtracted from Universal Coordinated Time to convert to local standard time. (Subtract 1 hour less for local daylight-saving time.)

by conversion of recorded ground motion to the expected response of the torsion seismometer.

$$mbLg=3.75+0.90(\log D)+\log(A/T) \qquad (4)$$
$$0.5^\circ \leq D \leq 4^\circ,$$

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

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.

All of the intensity values (indicated by Roman numerals) listed in this summary were derived, using the Modified Mercalli Intensity Scale of 1931 (Wood and Neumann, 1931) shown below, from the evaluation of "Earthquake Report" forms; from field reports by U.S. Geological Survey personnel, engineering firms, or universities; and from detailed macroseismic data communicated to the NEIS by people in the area affected by the earthquake. All earthquake reports received which contain minimal information are assigned an Intensity II. These reports are filed in the offices of the NEIS or in government archives and are available for detailed study.

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,

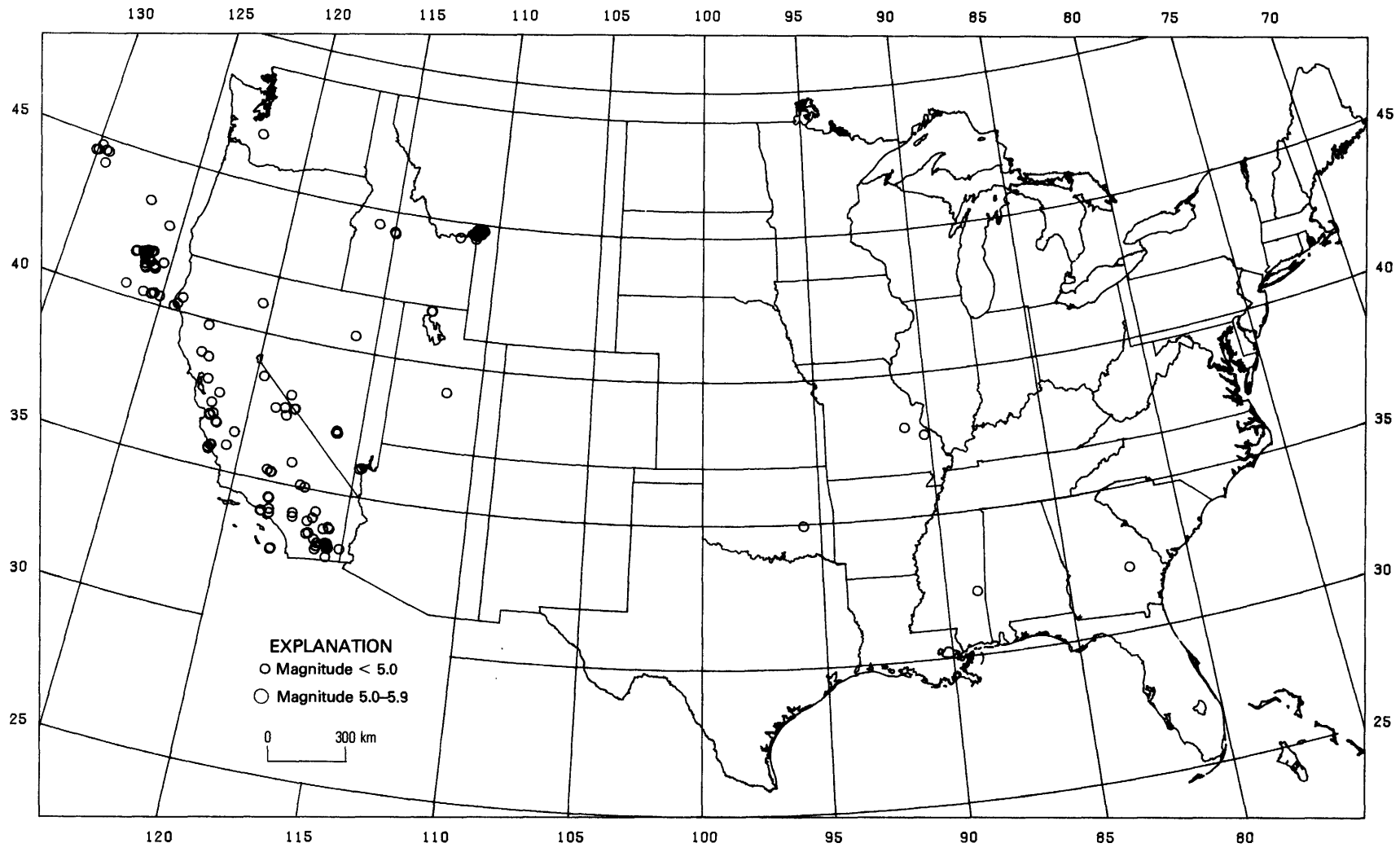

FIGURE 4.--Earthquake epicenters in the conterminous United States for October-December 1976, plotted from table 1.

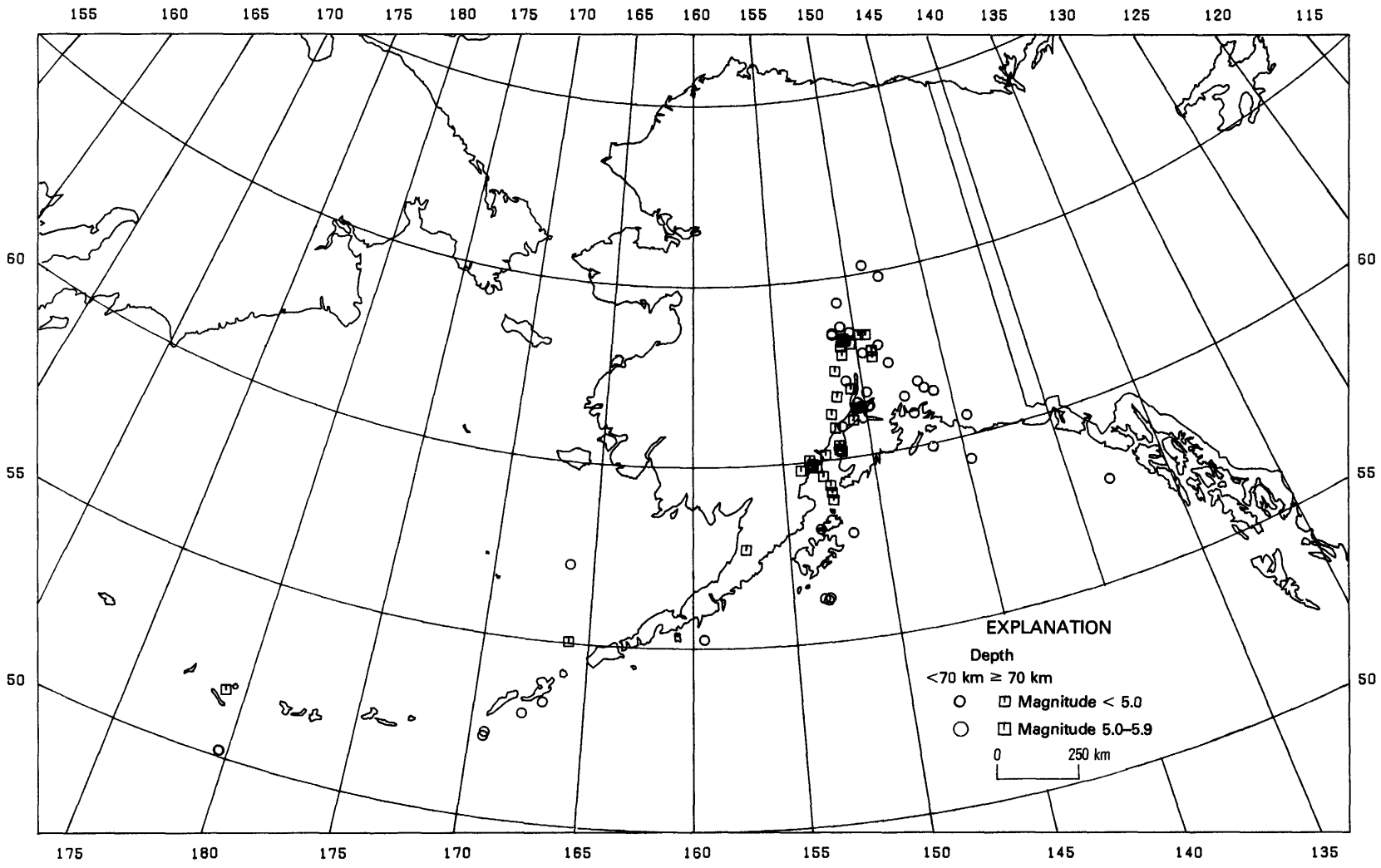

FIGURE 5.--Earthquake epicenters in Alaska for October-December 1976, plotted from table 1.

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.

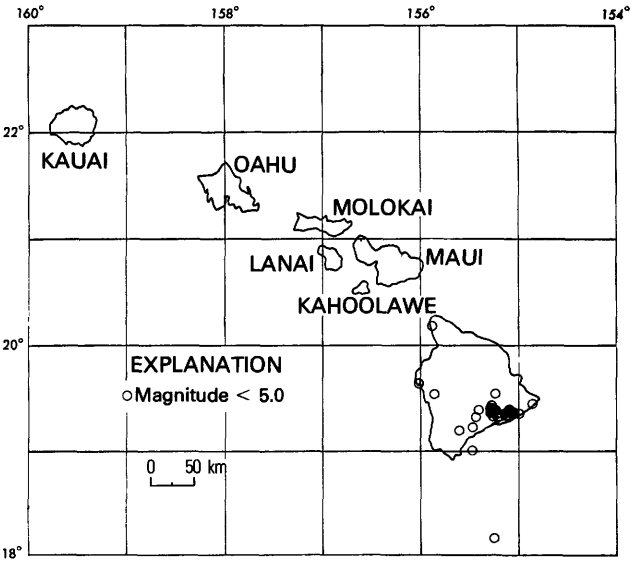

FIGURE 6.--Earthquake epicenters in Hawaii for October-December 1976, plotted from table 1.

Table 1.—*Summary of U.S. earthquakes for October–December 1976*

[Sources of the hypocenter and magnitudes: (A) U.S. Energy Research and Development Administration; (B) University of California, Berkeley; (D) University of Montana, Missoula; (F) USGS Open-File Report 77-181 (Fuis and others, 1977); (G) U.S. Geological Survey, National Earthquake Information Service; (R) U.S. Geological Survey, Hawaiian Volcano Observatory; (M) NOAA, Alaska Tsunami Warning Center, Palmer; (P) California Institute of Technology, Pasadena; (S) St. Louis University, St. Louis, Missouri; (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. N, Normal depth; UTC, Universal Coordinated Time. For names of local time zones, see figures 2 and 3. Leaders (...) indicate no information available]

Date (1976)	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								
OCT. 3	19	57	43.5	62.81 N.	149.66 W.	24	...	...	3.3M	...	G	OCT. 3	09 A.M. AST
OCT. 4	21	03	57.9	59.34 N.	144.73 W.	33N	...	...	3.7M	...	G	OCT. 4	11 A.M. AST
OCT. 4	22	35	33.1	63.30 N.	149.36 W.	107	...	...	...	...	G	OCT. 4	12 P.M. AST
OCT. 8	18	20	02.7	61.01 N.	150.79 W.	80	...	...	...	...	G	OCT. 8	08 A.M. AST
OCT. 10	01	32	21.9	63.34 N.	149.76 W.	109	...	...	...	...	G	OCT. 9	03 P.M. AST
OCT. 14	09	16	54.4	61.72 N.	149.81 W.	33N	...	...	2.8M	...	G	OCT. 13	11 P.M. AST
OCT. 16	23	05	40.4	50.17 N.	179.62 E.	33N	4.6	...	...	...	G	OCT. 16	12 P.M. BST
OCT. 17	03	59	42.1	50.17 N.	179.63 E.	31	5.0	...	...	...	G	OCT. 16	04 P.M. BST
OCT. 18	00	36	31.6	63.29 N.	150.74 W.	126	4.9	...	...	IV	G	OCT. 17	02 P.M. AST
OCT. 19	05	36	01.1	59.91 N.	146.64 W.	63	3.6	...	...	...	G	OCT. 18	07 P.M. AST
OCT. 20	10	14	35.9	60.92 N.	147.28 W.	33N	...	...	3.8M	...	G	OCT. 20	12 A.M. AST
OCT. 20	11	41	32.1	56.22 N.	153.18 W.	22	5.0	...	...	...	G	OCT. 20	01 A.M. AST
OCT. 21	02	58	51.4	53.33 N.	166.92 W.	64	4.4	...	...	...	G	OCT. 20	03 P.M. BST
OCT. 21	14	54	35.6	52.23 N.	169.39 W.	36	5.4	...	...	...	G	OCT. 21	03 A.M. BST
OCT. 21	15	13	18.7	52.33 N.	169.37 W.	33N	4.8	...	...	...	G	OCT. 21	04 A.M. BST

Table 1.—*Summary of U.S. earthquakes for October–December 1976*—Continued

Date (1976)	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													
OCT. 22	11	35	00.1	62.95 N.	148.68 W.	63	...	...	...	...	G	OCT. 22	01 A.M. AST
OCT. 22	18	35	25.9	56.14 N.	153.27 W.	26	5.5	4.8	4.6M	...	G	OCT. 22	08 A.M. AST
OCT. 23	08	25	32.3	55.05 N.	165.97 W.	194	4.6	...	...	...	G	OCT. 22	09 P.M. BST
OCT. 24	08	36	12.7	58.13 N.	153.28 W.	59	5.0	...	...	...	G	OCT. 23	10 P.M. AST
OCT. 24	17	19	53.7	62.65 N.	149.14 W.	75	4.9	...	...	III	G	OCT. 24	07 A.M. AST
OCT. 24	18	49	59.4	63.21 N.	150.62 W.	137	...	...	...	...	G	OCT. 24	08 A.M. AST
OCT. 25	11	10	45.3	56.20 N.	153.44 W.	33N	4.8	4.3	...	...	G	OCT. 25	01 A.M. AST
OCT. 25	11	24	07.2	57.17 N.	166.22 W.	33N	4.5	...	...	...	G	OCT. 25	12 A.M. BST
OCT. 25	12	26	47.6	59.77 N.	154.03 W.	163	4.2	...	...	...	G	OCT. 25	02 A.M. AST
OCT. 26	01	04	42.4	57.71 N.	157.27 W.	185	4.4	...	...	...	G	OCT. 25	03 P.M. AST
OCT. 27	03	43	41.4	61.71 N.	151.54 W.	98	4.2	...	...	...	G	OCT. 26	05 P.M. AST
OCT. 28	15	29	20.8	52.98 N.	167.81 W.	50	4.9	...	...	...	G	OCT. 28	04 A.M. BST
OCT. 29	07	17	44.4	62.44 N.	148.25 W.	48	...	...	2.6M	...	G	OCT. 28	09 P.M. AST
OCT. 30	01	24	31.6	63.11 N.	150.37 W.	121	...	...	...	...	G	OCT. 29	03 P.M. AST
OCT. 30	16	28	53.2	60.87 N.	151.46 W.	18	...	...	3.0M	...	G	OCT. 30	06 A.M. AST
OCT. 31	23	13	45.6	59.83 N.	153.17 W.	131	4.6	...	...	...	G	OCT. 31	01 P.M. AST
NOV. 3	08	07	21.6	58.89 N.	152.47 W.	139	...	...	...	...	G	NOV. 2	10 P.M. AST
NOV. 3	16	40	44.6	63.09 N.	150.96 W.	133	4.4	...	...	...	G	NOV. 3	06 A.M. AST
NOV. 3	20	37	00.9	60.55 N.	144.41 W.	33N	...	...	3.1M	...	G	NOV. 3	10 A.M. AST
NOV. 4	07	04	38.9	63.64 N.	150.84 W.	12	4.3	...	4.3M	...	G	NOV. 3	09 P.M. AST
NOV. 4	12	44	01.5	61.42 N.	147.65 W.	47	...	...	...	...	G	NOV. 4	02 A.M. AST
NOV. 6	00	8	16.4	60.05 N.	153.52 W.	119	4.9	...	...	...	G	NOV. 5	02 P.M. AST
NOV. 6	09	42	30.2	59.57 N.	152.86 W.	129	...	...	...	...	G	NOV. 5	11 P.M. AST
NOV. 7	14	48	44.9	57.72 N.	138.04 W.	33N	4.0	...	...	...	G	NOV. 7	05 A.M. YST
NOV. 11	18	18	30.5	61.31 N.	149.79 W.	33N	...	...	3.2M	...	G	NOV. 11	08 A.M. AST
NOV. 13	23	32	57.0	60.26 N.	151.77 W.	86	...	...	...	...	G	NOV. 13	01 P.M. AST
NOV. 15	15	17	41.2	63.45 N.	150.30 W.	39	...	...	3.3M	...	G	NOV. 15	05 A.M. AST
NOV. 16	01	49	20.7	61.55 N.	146.46 W.	33N	...	...	3.7M	...	G	NOV. 15	03 P.M. AST
NOV. 19	09	08	13.1	62.83 N.	150.91 W.	79	...	...	...	...	G	NOV. 18	11 P.M. AST
NOV. 23	04	14	20.1	61.42 N.	145.95 W.	65	3.7	...	...	...	G	NOV. 22	06 P.M. AST
NOV. 27	04	47	21.8	62.11 N.	150.90 W.	24	...	...	3.0M	...	G	NOV. 26	06 P.M. AST
NOV. 27	06	57	05.5	61.76 N.	146.76 W.	33N	...	...	3.0M	...	G	NOV. 26	08 P.M. AST
NOV. 30	06	22	35.3	59.92 N.	153.36 W.	127	4.7	...	...	IV	G	NOV. 29	10 P.M. AST
DEC. 4	04	20	22.8	63.21 N.	150.80 W.	129	4.3	...	...	...	G	DEC. 3	06 P.M. AST
DEC. 4	15	53	10.7	61.35 N.	149.75 W.	38	...	...	3.0M	...	G	DEC. 4	05 A.M. AST
DEC. 4	18	08	36.8	60.86 N.	151.89 W.	177	...	...	...	...	G	DEC. 4	08 A.M. AST
DEC. 5	06	17	19.7	61.47 N.	150.42 W.	33N	...	...	3.0M	...	G	DEC. 4	08 P.M. AST
DEC. 7	04	57	16.3	59.84 N.	153.40 W.	163	...	...	...	...	G	DEC. 6	06 P.M. AST
DEC. 7	06	09	48.5	59.10 N.	152.49 W.	112	...	...	...	...	G	DEC. 6	08 P.M. AST
DEC. 13	17	27	53.6	61.87 N.	150.70 W.	74	4.3	...	...	...	G	DEC. 13	07 A.M. AST
DEC. 15	09	16	24.2	65.22 N.	148.81 W.	2	...	...	4.1M	...	G	DEC. 14	11 P.M. AST
DEC. 15	09	51	32.3	61.35 N.	150.25 W.	51	3.7	...	...	III	G	DEC. 14	11 P.M. AST
DEC. 15	13	35	53.8	64.83 N.	147.87 W.	31	...	...	3.0M	IV	G	DEC. 15	03 A.M. AST
DEC. 16	11	50	25.2	61.32 N.	150.48 W.	146	...	...	...	...	G	DEC. 16	01 A.M. AST
DEC. 16	16	29	17.6	57.92 N.	151.62 W.	46	4.2	...	3.0M	...	G	DEC. 16	06 A.M. AST
DEC. 17	18	33	03.3	60.16 N.	152.61 W.	118	4.0	...	...	...	G	DEC. 17	08 A.M. AST
DEC. 18	07	29	33.6	60.20 N.	151.66 W.	88	...	...	...	...	G	DEC. 17	09 P.M. AST
DEC. 18	12	39	58.5	59.29 N.	152.52 W.	104	...	...	...	...	G	DEC. 18	02 A.M. AST
DEC. 20	19	45	52.3	51.81 N.	179.09 E.	101	4.8	...	...	...	G	DEC. 20	08 A.M. BST
DEC. 21	07	28	23.3	62.42 N.	151.47 W.	76	...	...	...	...	G	DEC. 20	09 P.M. AST
DEC. 23	06	37	29.1	61.24 N.	151.99 W.	126	...	...	...	...	G	DEC. 22	08 P.M. AST
DEC. 24	01	50	17.2	63.42 N.	151.41 W.	33N	...	...	4.1M	...	G	DEC. 23	03 P.M. AST
DEC. 24	01	56	14.2	63.47 N.	151.39 W.	50	...	...	...	...	G	DEC. 23	03 P.M. AST
DEC. 24	06	40	37.2	64.30 N.	150.81 W.	33N	...	...	3.0M	...	G	DEC. 23	08 P.M. AST
DEC. 24	14	38	33.2	60.37 N.	151.78 W.	89	4.3	...	...	...	G	DEC. 24	04 A.M. AST
DEC. 26	14	47	38.1	55.24 N.	159.48 W.	40	5.1	4.0	...	...	G	DEC. 26	04 A.M. AST
DEC. 27	12	04	48.1	62.84 N.	149.09 W.	94	3.9	...	...	...	G	DEC. 27	02 A.M. AST
CALIFORNIA													
OCT. 6	20	54	19.9	37.63 N.	121.42 W.	2	...	...	3.3B	II	B	OCT. 6	12 P.M. PST
OCT. 9	01	08	58.7	33.11 N.	115.62 W.	12	...	...	3.0F	...	F	OCT. 8	05 P.M. PST
OCT. 9	02	09	28.1	33.33 N.	116.23 W.	16	...	...	3.9P	III	P	OCT. 8	06 P.M. PST
OCT. 14	17	25	20.5	35.33 N.	118.50 W.	10	...	...	3.2P	...	P	OCT. 14	09 A.M. PST
OCT. 15	01	35	31.8	38.01 N.	122.05 W.	19	...	...	3.4B	III	B	OCT. 14	05 P.M. PST
OCT. 15	04	01	00.5	33.90 N.	116.62 W.	8	...	...	2.9P	II	P	OCT. 14	08 P.M. PST
OCT. 17	05	38	11.9	34.45 N.	118.37 W.	15	4.3	...	3.9P	VI	P	OCT. 16	09 P.M. PST
OCT. 18	02	46	16.0	36.82 N.	121.58 W.	2	...	...	3.3B	...	B	OCT. 17	06 P.M. PST
OCT. 20	10	39	43.9	35.08 N.	117.18 W.	1	...	...	3.4P	...	P	OCT. 20	02 A.M. PST
OCT. 21	00	40	04.3	37.64 N.	118.46 W.	5	...	...	3.2B	...	G	OCT. 20	04 P.M. PST
OCT. 22	16	50	50.0	38.53 N.	119.67 W.	2	...	...	3.4B	...	B	OCT. 22	08 A.M. PST
OCT. 22	19	58	04.3	34.28 N.	116.32 W.	3	...	...	3.7P	...	P	OCT. 22	11 A.M. PST

Table 1.—*Summary of U.S. earthquakes for October–December 1976*—Continued

Date (1976)	Origin time (UTC) hr min s	Lat	Long	Depth (km)	Magnitude mb	Magnitude MS	Magnitude ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Local time Hour
				CALIFORNIA--Continued							
OCT. 22	23 19 13.6	33.48 N.	116.58 W.	15	4.5	...	3.6P	II	P	OCT. 22	03 P.M. PST
OCT. 23	19 24 33.2	36.89 N.	121.49 W.	11	...	...	3.5B	II	B	OCT. 23	11 A.M. PST
OCT. 24	02 19 52.7	36.84 N.	121.63 W.	2	...	...	3.8B	II	B	OCT. 23	06 P.M. PST
OCT. 26	23 23 44.8	40.30 N.	124.27 W.	15	...	...	3.4B	IV	B	OCT. 26	03 P.M. PST
NOV. 2	02 46 05.9	34.10 N.	117.30 W.	6	...	...	3.3P	V	P	NOV. 1	06 P.M. PST
NOV. 2	18 33 51.7	33.27 N.	115.72 W.	2	...	...	3.0P	...	P	NOV. 2	10 A.M. PST
NOV. 4	01 36 41.7	35.33 N.	118.53 W.	8	...	...	3.0P	...	P	NOV. 3	05 P.M. PST
NOV. 4	04 06 32.1	32.98 N.	116.12 W.	9	...	...	3.4F	...	F	NOV. 3	08 P.M. PST
NOV. 4	04 33 46.4	34.05 N.	116.43 W.	10	...	...	3.1P	...	P	NOV. 3	08 P.M. PST
NOV. 4	05 48 20.9	33.12 N.	115.60 W.	5	...	...	4.2P	II	F	NOV. 3	09 P.M. PST
NOV. 4	05 58 32.8	33.13 N.	115.10 W.	0	...	...	3.5F	...	F	NOV. 3	09 P.M. PST
NOV. 4	06 09 50.9	33.12 N.	115.60 W.	5	...	...	3.0F	...	F	NOV. 3	10 P.M. PST
NOV. 4	06 21 10.7	33.12 N.	115.60 W.	5	...	...	4.1F	...	F	NOV. 3	10 P.M. PST
NOV. 4	06 35 03.5	33.12 N.	115.59 W.	5	...	...	4.1P	II	F	NOV. 3	10 P.M. PST
NOV. 4	07 09 34.7	33.11 N.	115.59 W.	5	...	...	3.1F	...	F	NOV. 3	11 P.M. PST
NOV. 4	07 56 06.8	33.12 N.	115.61 W.	1	...	...	3.9P	II	F	NOV. 3	11 P.M. PST
NOV. 4	08 14 09.3	33.12 N.	115.61 W.	3	...	...	3.6F	...	F	NOV. 4	12 A.M. PST
NOV. 4	08 32 00.7	33.12 N.	115.59 W.	4	...	...	3.1F	...	F	NOV. 4	12 A.M. PST
NOV. 4	09 50 29.8	33.12 N.	115.59 W.	4	...	...	3.3F	...	F	NOV. 4	01 A.M. PST
NOV. 4	09 52 34.8	33.12 N.	115.59 W.	2	...	...	3.2F	...	F	NOV. 4	01 A.M. PST
NOV. 4	10 11 51.3	33.12 N.	115.59 W.	4	...	...	4.0B	...	G	NOV. 4	02 A.M. PST
NOV. 4	10 41 37.5	33.12 N.	115.59 W.	4	4.6	5.3	4.9P	VI	F	NOV. 4	02 A.M. PST
NOV. 4	11 39 08.3	33.10 N.	115.62 W.	1	...	...	4.1P	II	F	NOV. 4	03 A.M. PST
NOV. 4	11 49 40.4	33.11 N.	115.62 W.	2	3.8	...	4.1P	II	F	NOV. 4	03 A.M. PST
NOV. 4	12 23 27.9	33.12 N.	115.58 W.	4	...	...	3.0F	...	F	NOV. 4	04 A.M. PST
NOV. 4	12 52 22.4	33.12 N.	115.60 W.	5	...	...	3.0F	...	F	NOV. 4	04 A.M. PST
NOV. 4	13 00 59.5	33.11 N.	115.59 W.	4	...	...	3.0F	...	F	NOV. 4	05 A.M. PST
NOV. 4	13 31 27.7	33.10 N.	115.62 W.	4	...	...	4.2P	II	F	NOV. 4	05 A.M. PST
NOV. 4	14 01 14.1	33.12 N.	115.61 W.	6	...	...	3.4F	...	F	NOV. 4	06 A.M. PST
NOV. 4	14 12 50.2	33.12 N.	115.60 W.	5	4.2	...	4.4P	II	F	NOV. 4	06 A.M. PST
NOV. 4	14 26 51.5	33.10 N.	115.63 W.	2	...	...	3.2F	...	F	NOV. 4	06 A.M. PST
NOV. 4	14 35 34.5	33.12 N.	115.61 W.	4	...	...	3.0F	...	F	NOV. 4	06 A.M. PST
NOV. 4	15 38 39.0	33.09 N.	115.62 W.	5	...	...	3.1F	...	F	NOV. 4	07 A.M. PST
NOV. 4	17 15 36.9	33.11 N.	115.63 W.	5	...	...	3.8F	...	F	NOV. 4	09 A.M. PST
NOV. 4	18 51 58.0	33.11 N.	115.61 W.	2	...	...	3.6F	...	F	NOV. 4	10 A.M. PST
NOV. 4	20 57 40.8	33.12 N.	115.61 W.	2	...	...	3.8F	...	F	NOV. 4	12 P.M. PST
NOV. 4	21 31 24.1	33.15 N.	115.62 W.	7	...	...	3.3F	...	F	NOV. 4	01 P.M. PST
NOV. 4	22 28 59.7	33.10 N.	115.60 W.	3	...	...	3.4F	...	F	NOV. 4	02 P.M. PST
NOV. 5	05 21 52.5	33.11 N.	115.60 W.	5	...	...	3.0F	...	F	NOV. 4	09 P.M. PST
NOV. 5	19 43 11.0	35.80 N.	121.30 W.	2	...	...	3.4B	II	B	NOV. 5	11 A.M. PST
NOV. 6	20 15 29.0	33.11 N.	116.07 W.	5	...	...	3.2F	...	F	NOV. 6	12 P.M. PST
NOV. 10	22 13 13.2	33.10 N.	115.63 W.	4	...	...	3.3P	...	F	NOV. 10	02 P.M. PST
NOV. 11	02 32	NEAR WILLITS		..	...	...	...	V	.	NOV. 10	06 P.M. PST
NOV. 11	03 21 48.5	33.16 N.	115.64 W.	5	...	...	3.2P	...	F	NOV. 10	07 P.M. PST
NOV. 14	13 13 35.4	33.17 N.	115.63 W.	5	...	...	3.1P	...	F	NOV. 14	05 A.M. PST
NOV. 15	01 43 59.2	33.18 N.	115.63 W.	5	...	...	3.1F	...	F	NOV. 14	05 P.M. PST
NOV. 15	12 08 04.0	33.93 N.	118.25 W.	8	...	...	2.9P	III	P	NOV. 15	04 A.M. PST
NOV. 15	18 11 17.6	36.44 N.	120.39 W.	5	...	...	3.0B	...	B	NOV. 15	10 A.M. PST
NOV. 19	14 23 30.9	35.72 N.	121.38 W.	10	...	...	3.4B	...	B	NOV. 19	06 A.M. PST
NOV. 22	17 55 10.8	33.95 N.	118.62 W.	2	...	...	3.8P	VI	P	NOV. 22	09 A.M. PST
NOV. 22	19 32 36.8	33.97 N.	118.58 W.	8	...	...	2.9P	II	P	NOV. 22	11 A.M. PST
NOV. 24	10 05 10.1	35.66 N.	121.34 W.	5	...	...	2.9B	...	G	NOV. 24	02 A.M. PST
NOV. 25	15 58 25.8	36.62 N.	121.28 W.	3	...	...	3.5B	...	B	NOV. 25	07 A.M. PST
NOV. 26	00 9 47.5	37.37 N.	118.35 W.	5	...	...	3.0B	...	G	NOV. 25	04 P.M. PST
NOV. 27	02 49 48.5	40.87 N.	120.49 W.	7	5.0	...	3.8B	...	B	NOV. 26	06 P.M. PST
NOV. 27	15 23 43.1	33.50 N.	116.49 W.	5	...	...	3.3P	II	F	NOV. 27	07 A.M. PST
NOV. 28	01 23 20.1	37.56 N.	118.88 W.	5	...	...	3.1B	...	G	NOV. 27	05 P.M. PST
NOV. 30	23 55 18.8	34.08 N.	118.28 W.	8	...	...	2.5P	III	P	NOV. 30	03 P.M. PST
DEC. 2	00 36 04.9	33.77 N.	115.66 W.	3	...	...	3.1F	...	F	DEC. 1	04 P.M. PST
DEC. 2	07 24 53.2	36.61 N.	121.26 W.	3	4.4	...	3.3B	...	B	DEC. 1	11 P.M. PST
DEC. 3	16 35 57.6	35.03 N.	116.97 W.	5	...	...	3.2P	...	P	DEC. 3	08 A.M. PST
DEC. 4	04 24 07.0	33.82 N.	115.70 W.	6	...	...	3.1P	...	P	DEC. 3	08 P.M. PST
DEC. 5	04 41 08.9	35.39 N.	118.68 W.	1	...	...	3.8P	V	P	DEC. 4	08 P.M. PST
DEC. 6	13 37 25.8	33.77 N.	115.66 W.	5	...	...	3.5P	...	F	DEC. 6	05 A.M. PST
DEC. 8	02 13 44.1	34.47 N.	118.42 W.	12	...	...	3.3P	II	P	DEC. 7	06 P.M. PST
DEC. 8	12 46 22.7	39.80 N.	122.65 W.	19	...	...	2.8B	...	B	DEC. 8	04 A.M. PST
DEC. 8	20 13 19.4	37.26 N.	121.65 W.	6	...	...	3.1B	...	B	DEC. 8	12 P.M. PST
DEC. 9	17 11 36.3	33.98 N.	117.25 W.	11	...	...	2.9P	II	P	DEC. 9	09 A.M. PST
DEC. 12	06 23 21.7	33.77 N.	115.66 W.	0	...	...	3.0F	...	F	DEC. 11	10 P.M. PST
DEC. 12	14 53 06.4	35.80 N.	117.70 W.	6	...	...	3.1P	...	P	DEC. 12	06 A.M. PST
DEC. 13	02 26 00.6	36.80 N.	121.62 W.	2	...	...	2.9B	...	B	DEC. 12	06 P.M. PST
DEC. 13	19 50 09.2	33.74 N.	115.93 W.	5	...	...	3.0F	...	F	DEC. 13	11 A.M. PST
DEC. 17	21 36 28.4	38.77 N.	122.27 W.	2	...	...	3.0B	II	B	DEC. 17	01 P.M. PST

Table 1.—*Summary of U.S. earthquakes for October–December 1976*—Continued

Date (1976)	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. 18	17	44	00.0	33.23 N.	115.65 W.	5	...	...	3.5P	...	F	DEC. 18	09 A.M. PST
DEC. 18	19	55	56.0	35.86 N.	120.50 W.	7	...	...	3.3B	...	B	DEC. 18	11 A.M. PST
DEC. 18	22	04	17.7	40.50 N.	124.05 W.	2	...	...	3.2B	...	B	DEC. 18	02 P.M. PST
DEC. 19	11	42	02.9	33.22 N.	116.08 W.	7	...	...	3.2P	...	P	DEC. 19	03 A.M. PST
DEC. 20	19	54	22.0	33.24 N.	115.65 W.	5	...	...	3.0F	...	F	DEC. 20	11 A.M. PST
DEC. 21	02	32	01.4	35.81 N.	121.27 W.	2	3.9	...	3.2B	...	B	DEC. 20	06 P.M. PST
DEC. 22	00	42	20.4	38.85 N.	122.61 W.	2	3.1	...	2.9B	...	B	DEC. 21	04 P.M. PST
DEC. 22	01	09	24.8	40.16 N.	124.38 W.	15	...	...	3.3B	...	G	DEC. 21	05 P.M. PST
DEC. 24	23	18	41.6	32.79 N.	115.63 W.	8	...	...	3.4F	...	F	DEC. 24	03 P.M. PST
CALIFORNIA--OFF THE COAST													
OCT. 15	08	40	02.2	40.34 N.	125.12 W.	18	4.9	...	3.9B	...	G	OCT. 15	12 A.M. PST
OCT. 18	17	26	52.6	32.72 N.	117.92 W.	15	4.6	...	4.2P	III	P	OCT. 18	09 A.M. PST
OCT. 18	17	27	53.1	32.76 N.	117.91 W.	14	...	...	4.2F	...	F	OCT. 18	09 A.M. PST
OCT. 23	02	16	11.2	40.34 N.	125.47 W.	10	...	...	3.8B	...	G	OCT. 22	06 P.M. PST
OCT. 31	05	18	23.2	40.40 N.	125.40 W.	18	4.5	...	3.7B	...	B	OCT. 30	09 P.M. PST
NOV. 26	11	19	25.2	41.29 N.	125.71 W.	15	6.0	6.8	6.2B	V	G	NOV. 26	03 A.M. PST
NOV. 26	11	39	41.2	41.51 N.	126.27 W.	15	...	...	4.1B	...	G	NOV. 26	03 A.M. PST
NOV. 26	11	42	10.2	41.48 N.	125.34 W.	15	...	...	4.0B	...	G	NOV. 26	03 A.M. PST
NOV. 26	12	27	30.4	41.31 N.	125.75 W.	15	...	...	3.7B	...	G	NOV. 26	04 A.M. PST
NOV. 26	18	16	14.8	41.20 N.	125.65 W.	15	...	...	3.6B	...	G	NOV. 26	10 A.M. PST
NOV. 26	19	12	23.3	41.28 N.	126.19 W.	15	...	...	3.7B	...	G	NOV. 26	11 A.M. PST
NOV. 28	04	30	12.6	41.19 N.	126.16 W.	15	4.9	...	4.2B	...	G	NOV. 27	08 P.M. PST
NOV. 30	04	20	46.6	41.40 N.	125.98 W.	15	4.3	...	3.8B	...	G	NOV. 29	08 P.M. PST
DEC. 6	09	19	15.5	40.46 N.	126.74 W.	15	4.5	3.6	3.9B	...	G	DEC. 6	01 A.M. PST
DEC. 8	12	04	42.4	40.35 N.	125.88 W.	18	4.8	...	3.8B	...	G	DEC. 8	04 A.M. PST
DEC. 8	14	21	25.6	41.13 N.	126.09 W.	15	3.9	...	3.6B	...	G	DEC. 8	06 A.M. PST
DEC. 17	03	44	32.2	41.62 N.	126.71 W.	15	4.5	...	3.4B	...	G	DEC. 16	07 P.M. PST
DEC. 21	19	04	31.3	41.58 N.	126.74 W.	15	4.7	...	3.5B	...	G	DEC. 21	11 A.M. PST
DEC. 23	01	45	27.3	41.66 N.	126.40 W.	12	4.4	...	3.4B	...	G	DEC. 22	05 P.M. PST
DEC. 23	09	38	58.4	41.78 N.	125.95 W.	15	5.5	5.5	5.1B	...	G	DEC. 23	01 A.M. PST
DEC. 23	09	53	56.8	41.71 N.	126.28 W.	15	4.8	...	3.7B	...	G	DEC. 23	01 A.M. PST
DEC. 23	10	42	21.7	41.75 N.	126.19 W.	15	4.9	...	3.5B	...	G	DEC. 23	02 A.M. PST
DEC. 23	12	40	24.7	41.63 N.	126.36 W.	15	4.2	...	3.5B	...	G	DEC. 23	04 A.M. PST
DEC. 25	16	35	44.8	41.73 N.	126.01 W.	15	5.1	3.6	4.1B	...	G	DEC. 25	08 A.M. PST
DEC. 26	07	44	25.9	40.33 N.	125.50 W.	15	4.6	...	4.1B	...	G	DEC. 25	11 P.M. PST
DEC. 27	07	34	00.7	41.69 N.	126.22 W.	15	4.8	3.4	3.9B	...	G	DEC. 26	11 P.M. PST
GEORGIA													
DEC. 27	06	57	13.9	32.22 N.	82.46 W.	5	...	...	3.7V	V	G	DEC. 27	01 A.M. EST
HAWAII													
OCT. 3	17	53	08.5	19.33 N.	155.12 W.	9	...	...	3.4H	...	H	OCT. 3	07 A.M. HST
OCT. 4	03	21	45.4	19.34 N.	155.13 W.	10	...	...	3.1H	...	H	OCT. 3	05 P.M. HST
OCT. 4	15	18	52.5	19.35 N.	155.11 W.	9	...	...	3.0H	II	H	OCT. 4	05 A.M. HST
OCT. 5	15	58	50.5	19.34 N.	155.11 W.	9	...	...	3.8H	III	H	OCT. 5	05 A.M. HST
OCT. 5	19	55	39.6	19.37 N.	155.08 W.	8	...	...	3.5H	III	H	OCT. 5	09 A.M. HST
OCT. 7	13	11	37.9	19.38 N.	155.09 W.	9	...	...	3.4H	...	H	OCT. 7	03 A.M. HST
OCT. 8	07	52	57.8	19.00 N.	155.48 W.	40	...	...	3.4H	...	H	OCT. 7	09 P.M. HST
OCT. 9	02	29	29.9	19.55 N.	155.85 W.	25	...	...	3.3H	II	H	OCT. 8	04 P.M. HST
OCT. 9	08	53	52.9	19.39 N.	155.11 W.	9	...	...	3.2H	...	H	OCT. 8	10 P.M. HST
OCT. 15	09	17	06.9	19.38 N.	155.09 W.	9	...	...	2.7H	II	H	OCT. 14	11 P.M. HST
OCT. 21	12	25	26.0	19.45 N.	154.87 W.	9	...	...	2.9H	II	H	OCT. 21	02 A.M. HST
OCT. 22	22	43	23.6	19.32 N.	155.20 W.	11	...	...	3.4H	II	H	OCT. 22	12 P.M. HST
OCT. 23	00	11	25.8	19.35 N.	155.06 W.	9	...	...	3.5H	II	H	OCT. 22	02 P.M. HST
OCT. 24	18	18	54.0	19.37 N.	155.00 W.	7	...	...	2.5H	II	H	OCT. 24	08 A.M. HST
OCT. 26	17	07	25.3	19.36 N.	155.29 W.	10	...	...	3.3H	...	H	OCT. 26	07 A.M. HST
NOV. 3	04	15	46.3	19.32 N.	155.22 W.	10	...	...	3.7H	III	H	NOV. 2	06 P.M. HST
NOV. 3	05	36	16.0	19.38 N.	155.10 W.	8	...	...	3.3H	...	H	NOV. 2	07 P.M. HST
NOV. 5	00	44	55.8	19.41 N.	155.27 W.	3	...	...	2.3H	III	H	NOV. 4	02 P.M. HST
NOV. 5	02	08	48.7	19.35 N.	155.11 W.	8	...	...	3.0H	...	H	NOV. 4	04 P.M. HST
NOV. 5	12	58	29.6	19.36 N.	155.14 W.	9	...	...	2.7H	II	H	NOV. 5	02 A.M. HST
NOV. 7	09	40	47.1	19.39 N.	155.42 W.	10	...	...	3.3H	...	H	NOV. 6	11 P.M. HST
NOV. 10	01	33	03.3	19.34 N.	155.07 W.	9	...	...	3.8H	III	H	NOV. 9	03 P.M. HST
NOV. 11	04	15	16.5	19.35 N.	155.19 W.	10	...	...	3.1H	II	H	NOV. 10	06 P.M. HST
NOV. 13	02	54	46.4	19.35 N.	155.04 W.	8	...	...	3.5H	II	H	NOV. 12	04 P.M. HST
NOV. 13	21	14	03.3	19.37 N.	155.09 W.	9	...	...	3.7H	III	H	NOV. 13	11 A.M. HST

Table 1.—*Summary of U.S. earthquakes for October–December 1976*--Continued

Date (1976)	Origin time (UTC) hr min s	Lat	Long	Depth (km)	Magnitude mb	Magnitude MS	Magnitude ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Local time Hour
HAWAII--Continued											
NOV. 14	14 19 23.0	19.43 N.	155.28 W.	16	...	...	3.0H	II	H	NOV. 14	04 A.M. HST
NOV. 16	12 23 35.4	19.38 N.	155.08 W.	9	...	...	3.6H	III	H	NOV. 16	02 A.M. HST
NOV. 17	05 44 33.9	19.43 N.	155.28 W.	1	...	...	2.3H	II	H	NOV. 16	04 P.M. HST
NOV. 17	15 51 48.5	19.54 N.	155.24 W.	25	...	...	3.7H	III	H	NOV. 17	05 A.M. HST
NOV. 17	22 13 08.6	19.38 N.	155.28 W.	3	...	...	2.1H	II	H	NOV. 17	12 P.M. HST
NOV. 18	14 33 18.1	19.35 N.	155.22 W.	9	...	...	2.3H	II	H	NOV. 18	04 A.M. HST
NOV. 19	08 24 43.7	19.40 N.	155.28 W.	4	...	...	3.0H	III	H	NOV. 18	10 P.M. HST
NOV. 22	06 35 13.5	19.37 N.	155.11 W.	8	...	...	2.5H	II	H	NOV. 21	08 P.M. HST
NOV. 23	01 40 49.9	19.39 N.	155.28 W.	3	...	...	2.4H	II	H	NOV. 22	03 P.M. HST
NOV. 24	00 12 14.5	20.19 N.	155.87 W.	21	...	...	3.0H	...	H	NOV. 23	02 P.M. HST
NOV. 25	16 37 27.4	19.39 N.	155.29 W.	4	...	...	2.3H	II	H	NOV. 25	06 A.M. HST
NOV. 25	21 05 40.3	19.40 N.	155.28 W.	2	...	...	2.5H	II	H	NOV. 25	11 A.M. HST
NOV. 26	13 49 14.8	19.40 N.	155.27 W.	2	...	...	2.1H	II	H	NOV. 26	03 A.M. HST
NOV. 26	20 15 58.5	19.40 N.	155.27 W.	5	...	...	3.1H	III	H	NOV. 26	10 A.M. HST
DEC. 1	03 46 09.9	19.33 N.	155.19 W.	10	...	...	3.3H	III	H	NOV. 30	05 P.M. HST
DEC. 1	04 18 45.2	19.32 N.	155.19 W.	10	...	...	3.0H	II	H	NOV. 30	06 P.M. HST
DEC. 1	05 37 30.1	19.33 N.	155.27 W.	10	...	...	2.5H	II	H	NOV. 30	07 P.M. HST
DEC. 1	14 44 17.4	19.36 N.	155.26 W.	9	...	...	3.1H	...	H	DEC. 1	04 A.M. HST
DEC. 4	13 50 50.8	19.34 N.	155.14 W.	9	...	...	3.0H	III	H	DEC. 4	03 A.M. HST
DEC. 6	03 11 59.1	19.39 N.	155.11 W.	8	...	...	1.9H	II	H	DEC. 5	05 P.M. HST
DEC. 6	16 26 58.0	19.36 N.	155.13 W.	10	...	...	3.8H	III	H	DEC. 6	06 A.M. HST
DEC. 7	00 00 17.7	19.41 N.	155.30 W.	15	...	...	3.0H	...	H	DEC. 7	02 P.M. HST
DEC. 8	09 40 22.2	19.40 N.	155.28 W.	3	...	...	2.8H	II	H	DEC. 7	11 P.M. HST
DEC. 8	21 49 16.9	19.32 N.	155.45 W.	26	...	...	3.4H	...	H	DEC. 8	11 A.M. HST
DEC. 9	00 15 42.5	19.34 N.	155.18 W.	9	...	...	2.9H	II	H	DEC. 8	02 P.M. HST
DEC. 9	04 50 26.3	19.43 N.	155.28 W.	1	...	...	2.0H	II	H	DEC. 8	06 P.M. HST
DEC. 10	01 28 49.9	19.40 N.	155.29 W.	3	...	...	3.0H	III	H	DEC. 9	03 P.M. HST
DEC. 12	09 39 36.6	19.22 N.	155.47 W.	9	...	...	2.8H	II	H	DEC. 11	11 P.M. HST
DEC. 14	03 26 42.0	19.34 N.	155.13 W.	10	...	...	3.4H	II	H	DEC. 13	05 P.M. HST
DEC. 17	13 39 14.5	19.43 N.	155.28 W.	1	...	...	2.9H	II	H	DEC. 17	03 A.M. HST
DEC. 18	06 31 43.2	19.34 N.	155.12 W.	9	...	...	3.2H	...	H	DEC. 17	08 P.M. HST
DEC. 18	14 01 00.5	19.34 N.	155.12 W.	9	5.0	...	4.8H	V	H	DEC. 18	04 A.M. HST
DEC. 22	19 03 32.4	19.40 N.	155.27 W.	3	...	...	2.2H	II	H	DEC. 22	09 A.M. HST
DEC. 25	17 01 15.4	19.64 N.	156.01 W.	9	...	...	3.3H	III	H	DEC. 25	07 A.M. HST
DEC. 27	14 15 20.6	19.39 N.	155.25 W.	5	...	...	3.3H	III	H	DEC. 27	04 A.M. HST
DEC. 27	16 24 27.3	19.32 N.	155.27 W.	10	...	...	3.1H	III	H	DEC. 27	06 A.M. HST
DEC. 27	19 19 27.0	19.40 N.	155.25 W.	3	...	...	2.5H	II	H	DEC. 27	09 A.M. HST
DEC. 27	22 13 53.9	19.19 N.	155.60 W.	10	...	...	3.0H	...	H	DEC. 27	12 P.M. HST
DEC. 29	01 17 36.6	19.40 N.	155.28 W.	3	...	...	2.8H	II	H	DEC. 28	03 P.M. HST
DEC. 29	05 37 04.8	19.32 N.	155.20 W.	10	...	...	3.2H	III	H	DEC. 28	07 P.M. HST
DEC. 29	13 45 37.4	19.39 N.	155.29 W.	2	...	...	2.4H	II	H	DEC. 29	03 A.M. HST
DEC. 30	02 44 25.6	19.33 N.	155.19 W.	9	...	...	2.9H	II	H	DEC. 29	04 P.M. HST
DEC. 30	05 26 26.9	19.39 N.	155.24 W.	5	...	...	3.0H	III	H	DEC. 29	07 P.M. HST
DEC. 30	10 47 36.9	18.16 N.	155.25 W.	7	...	...	3.9H	II	H	DEC. 30	12 A.M. HST
DEC. 30	14 19 51.5	19.33 N.	155.27 W.	10	...	...	3.0H	II	H	DEC. 30	04 A.M. HST
IDAHO											
OCT. 4	08 24 56.1	44.32 N.	115.02 W.	5	...	...	3.2A	...	G	OCT. 4	01 A.M. MST
NOV. 1	22 22 51.1	44.26 N.	114.97 W.	5	...	...	3.7A	IV	G	NOV. 1	03 P.M. MST
DEC. 2	00 42 30.7	44.48 N.	111.83 W.	5	...	...	3.4A	...	G	DEC. 1	05 P.M. MST
DEC. 29	06 59 35.1	44.49 N.	115.82 W.	5	...	...	3.6A	...	G	DEC. 28	11 P.M. MST
MISSISSIPPI											
OCT. 23	00 40 59.5	32.20 N.	88.73 W.	5	...	...	3.0G	...	G	OCT. 22	06 P.M. CST
MISSOURI											
DEC. 11	07 05 00.4	38.12 N.	91.07 W.	0	4.2	...	...	...	S	DEC. 11	01 A.M. CST
DEC. 13	08 35 54.9	37.80 N.	90.24 W.	5	...	...	3.5S	V	S	DEC. 13	02 A.M. CST
MONTANA											
OCT. 11	21 44 12.8	44.64 N.	111.20 W.	5	...	...	3.0A	...	G	OCT. 11	02 P.M. MST
OCT. 11	21 46 58.7	44.63 N.	111.17 W.	5	...	...	3.2A	...	G	OCT. 11	02 P.M. MST
OCT. 20	04 55 59.4	44.61 N.	111.06 W.	5	...	...	3.2A	...	G	OCT. 19	09 P.M. MST
NOV. 27	00 24 46.1	44.64 N.	111.14 W.	9	...	...	3.3A	IV	G	NOV. 26	05 P.M. MST
DEC. 20	17 07 10.5	44.50 N.	111.07 W.	9	...	...	3.3A	III	G	DEC. 20	10 A.M. MST

Table 1.—*Summary of U.S. earthquakes for October–December 1976*--Continued

Date (1976)	Origin time (UTC) hr min s	Lat	Long	Depth (km)	Magnitude mb	Magnitude MS	Magnitude ML or mbLg	Maximum intensity	Hypocenter source	Local time Date	Local time Hour
NEVADA											
OCT. 4	14 48 39.0	36.03 N.	114.73 W.	5	...	...	3.0G	III	G	OCT. 4	06 A.M. PST
OCT. 19	01 59 10.6	35.98 N.	114.82 W.	5	...	...	...	III	G	OCT. 18	05 P.M. PST
OCT. 20	06 53 43.4	37.65 N.	118.05 W.	5	...	...	3.1B	...	G	OCT. 19	10 P.M. PST
OCT. 20	23 14 56.3	37.64 N.	118.02 W.	5	...	...	3.4B	III	G	OCT. 20	03 P.M. PST
NOV. 1	18 44 07.6	38.09 N.	118.32 W.	5	...	...	2.9G	...	G	NOV. 1	10 A.M. PST
NOV. 17	08 23 35.0	40.54 N.	115.99 W.	15	...	...	3.9B	V	G	NOV. 17	12 A.M. PST
NOV. 23	15 15 00.2	37.17 N.	116.05 W.	0	...	...	...	...	A	NOV. 23	07 A.M. PST
DEC. 8	14 49 30.1	37.08 N.	116.00 W.	0	4.9	...	4.5B	...	A	DEC. 8	06 A.M. PST
DEC. 21	15 09 00.2	37.12 N.	116.07 W.	0	...	...	4.2B	...	A	DEC. 21	07 A.M. PST
DEC. 28	18 00 00.1	37.10 N.	116.04 W.	0	5.5	...	5.5B	...	A	DEC. 28	10 A.M. PST
DEC. 28	20 14 26.0	37.10 N.	116.04 W.	0	3.5	...	...	...	G	DEC. 28	12 P.M. PST
DEC. 28	20 29 26.0	37.10 N.	116.04 W.	0	4.4	...	4.5B	...	G	DEC. 28	12 P.M. PST
OKLAHOMA											
DEC. 19	08 26 36.7	34.92 N.	95.73 W.	5	...	...	2.9T	II	T	DEC. 19	02 A.M. CST
OREGON--OFF THE COAST											
OCT. 7	22 37 34.3	44.18 N.	129.43 W.	33N	4.6	...	...	...	G	OCT. 7	02 P.M. PST
DEC. 9	09 50 59.5	44.53 N.	129.96 W.	18	5.3	5.5	...	...	G	DEC. 9	01 A.M. PST
DEC. 9	09 58 13.0	44.51 N.	130.10 W.	15	4.9	...	...	...	G	DEC. 9	01 A.M. PST
DEC. 9	10 28 06.9	44.59 N.	129.45 W.	15	5.1	...	...	...	G	DEC. 9	02 A.M. PST
DEC. 9	10 36 06.8	44.74 N.	129.83 W.	15	4.9	...	...	...	G	DEC. 9	02 A.M. PST
DEC. 9	10 38 14.2	44.62 N.	129.57 W.	15	4.9	...	...	...	G	DEC. 9	02 A.M. PST
DEC. 19	19 00 59.5	42.75 N.	125.60 W.	15	5.4	...	...	...	G	DEC. 19	11 A.M. PST
DEC. 29	08 03 43.2	43.44 N.	126.78 W.	15	5.0	...	...	...	G	DEC. 29	12 A.M. PST
UTAH											
OCT. 6	11 15 04.1	39.08 N.	111.51 W.	2	...	...	3.0G	...	G	OCT. 6	04 A.M. MST
NOV. 5	01 15 06.9	41.82 N.	112.69 W.	7	...	...	3.4U	II	U	NOV. 4	06 P.M. MST
NOV. 5	02 48 55.4	41.81 N.	112.70 W.	7	...	...	4.1U	V	U	NOV. 4	07 P.M. MST
NOV. 5	05 54 00.8	41.82 N.	112.69 W.	7	...	...	2.8A	...	U	NOV. 4	10 P.M. MST
NOV. 5	10 58 03.5	41.82 N.	112.69 W.	7	...	...	3.2U	II	U	NOV. 5	03 A.M. MST
WASHINGTON											
OCT. 14	21 39 17.7	46.66 N.	122.34 W.	30	...	...	3.1G	V	W	OCT. 14	01 P.M. PST
WYOMING											
OCT. 19	06 18 35.3	44.74 N.	110.81 W.	4	5.3	...	4.0G	IV	G	OCT. 18	11 P.M. MST
OCT. 19	07 24 34.6	44.80 N.	110.70 W.	5	5.3	...	4.1G	IV	G	OCT. 19	12 A.M. MST
OCT. 26	10 08 50.3	44.62 N.	111.04 W.	5	...	...	3.0A	...	G	OCT. 26	03 A.M. MST
NOV. 17	14 34 33.4	44.75 N.	110.86 W.	5	...	...	3.0A	IV	G	NOV. 17	07 A.M. MST
NOV. 17	14 57 38.6	44.74 N.	110.83 W.	5	...	...	3.0A	III	G	NOV. 17	07 A.M. MST
NOV. 27	01 09 35.2	44.66 N.	110.82 W.	5	...	...	3.5A	III	G	NOV. 26	06 P.M. MST
NOV. 27	19 18 57.9	44.85 N.	110.97 W.	5	...	...	3.6A	II	G	NOV. 27	12 P.M. MST
DEC. 8	14 40 59.1	44.76 N.	110.79 W.	5	5.5	...	4.6G	V	G	DEC. 8	07 A.M. MST
DEC. 8	22 10 42.3	44.75 N.	111.05 W.	5	...	...	3.5G	III	G	DEC. 8	03 P.M. MST
DEC. 9	22 35 05.4	44.77 N.	110.79 W.	6	4.9	...	4.2D	...	G	DEC. 9	03 P.M. MST
DEC. 9	22 36 23.7	44.77 N.	110.80 W.	5	4.5	...	5.1G	V	G	DEC. 9	03 P.M. MST
DEC. 11	21 57 12.4	44.68 N.	111.04 W.	5	...	...	3.1A	...	G	DEC. 11	02 P.M. MST
DEC. 16	00 28 21.4	44.64 N.	111.05 W.	5	...	...	3.0A	IV	G	DEC. 15	05 P.M. MST
DEC. 19	17 10 15.6	44.77 N.	110.80 W.	5	4.9	...	4.5G	V	G	DEC. 19	10 A.M. MST
DEC. 20	01 34 16.7	44.84 N.	110.83 W.	5	4.4	...	4.3G	IV	G	DEC. 19	06 P.M. MST

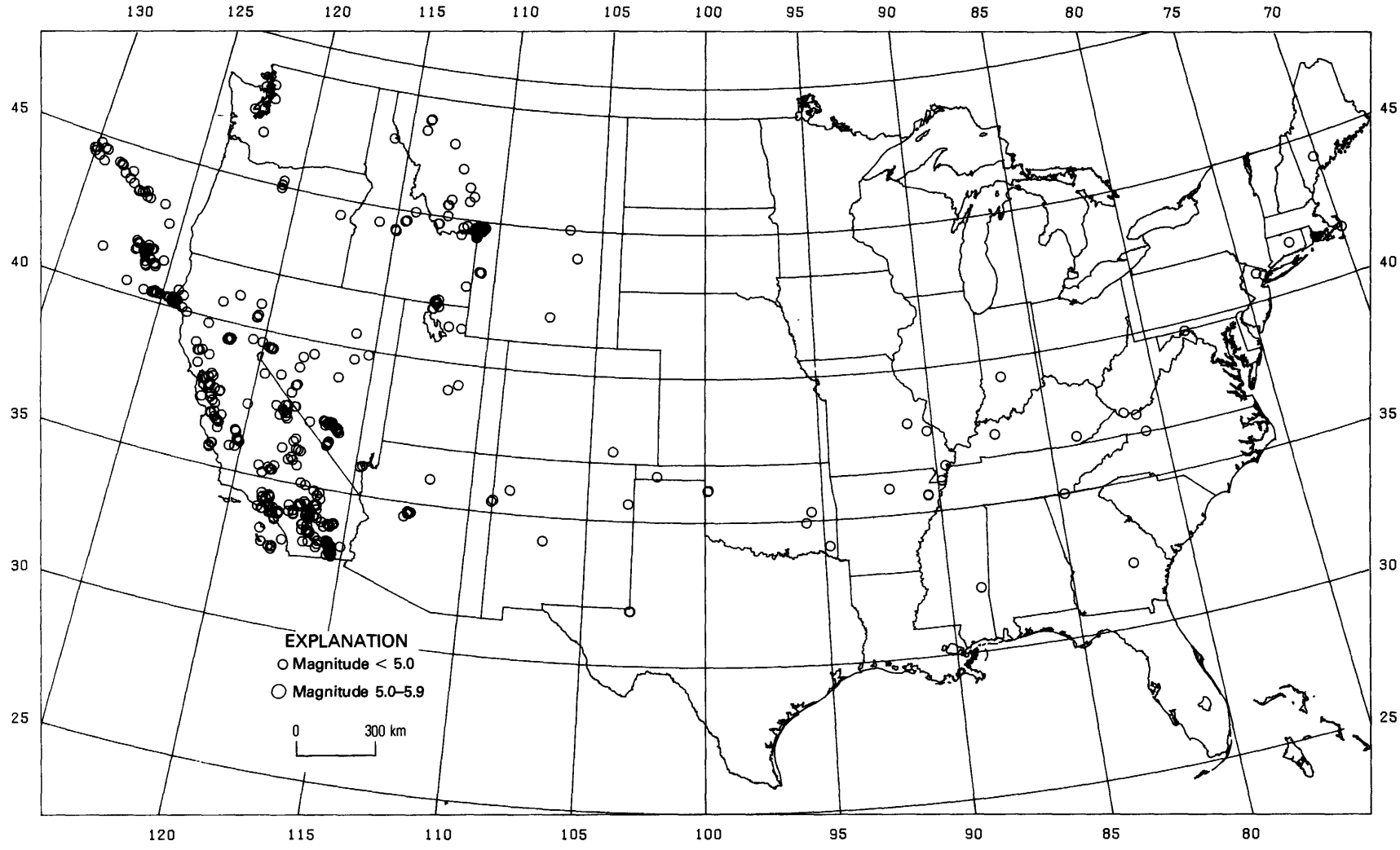

FIGURE 7.--Summary of earthquake epicenters in the conterminous United States for January-December 1976.

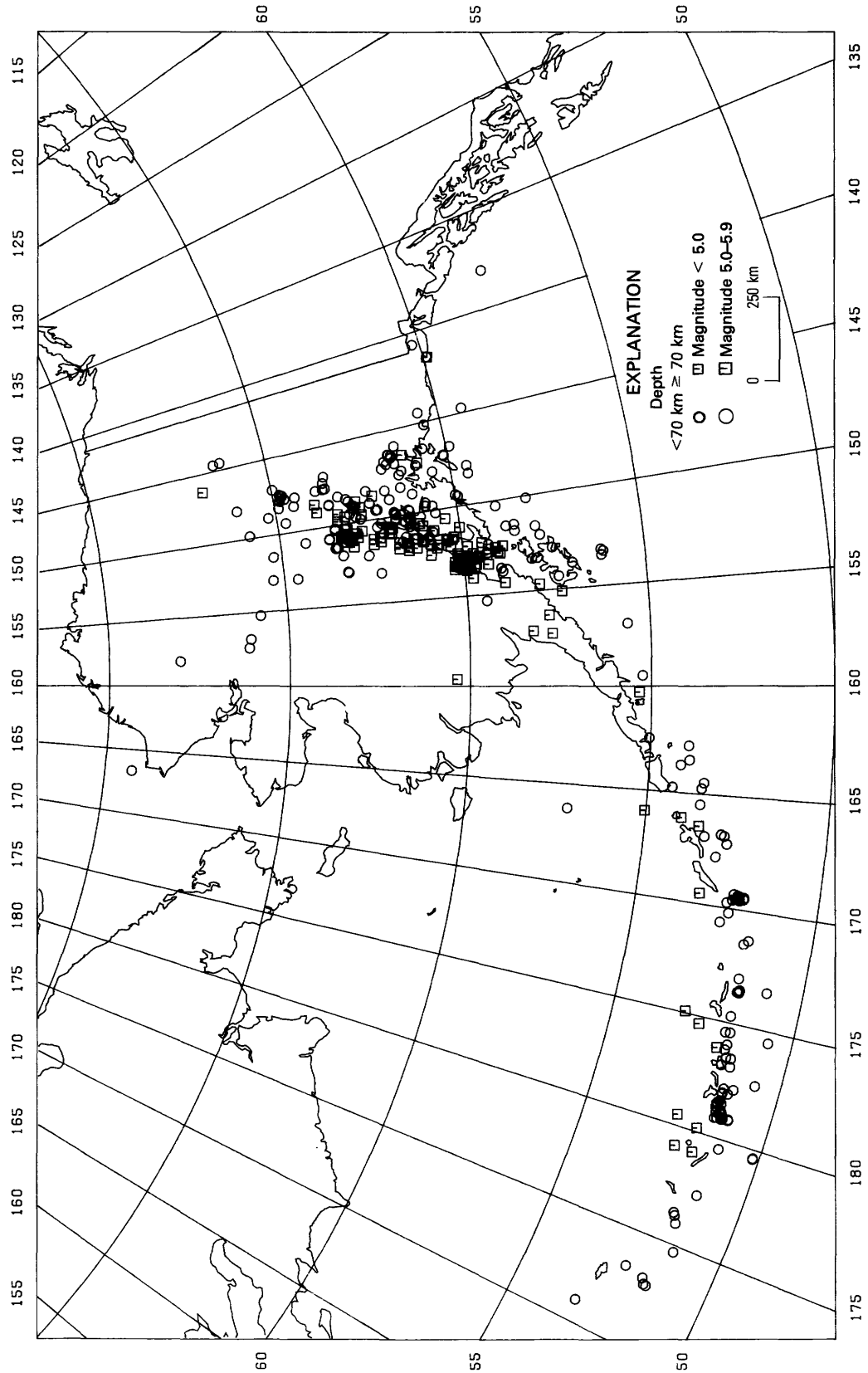

FIGURE 8.--Summary of earthquake epicenters in Alaska for January-December 1976.

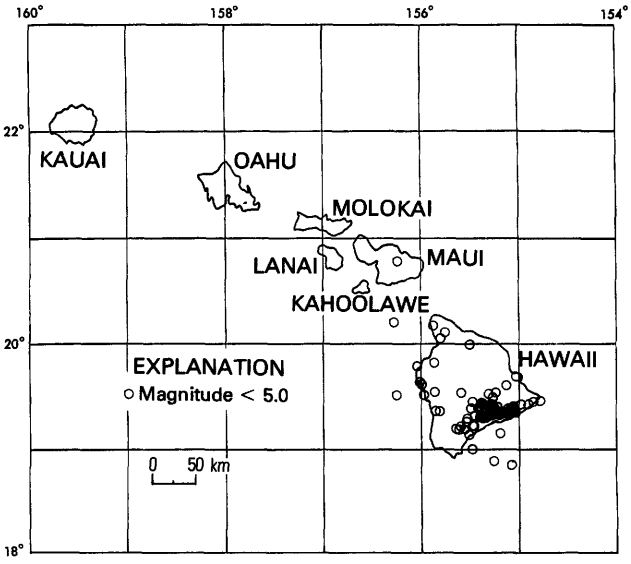

FIGURE 9.--Summary of earthquake epicenters in Hawaii for January-December 1976.

Table 2.--*Summary of macroseismic data for U.S. earthquakes, October–December 1976*

[Sources of the hypocenter and magnitudes: (A) U.S. Energy Research and Development Administration; (B) University of California, Berkeley; (D) University of Montana, Missoula; (F) USGS Open-File Report 77-181 (Fuis and others, 1977); (G) U.S. Geological Survey, National Earthquake Information Service; (H) U.S. Geological Survey, Hawaiian Volcano Observatory; (J) Weston Observatory, Massachusetts; (L) Lamont-Doherty Geological Observatory, Palisades, New York; (M) NOAA, Alaska Tsunami Warning Center, Palmer; (O) Seismological Service of Canada, Ottawa; (P) California Institute of Technology, Pasadena; (S) St. Louis University, St. Louis, Missouri; (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. Dates and origin times are listed in Universal Coordinated Time (UTC), giving the hour, minute, and second. Epicenters are shown in decimal degrees. Only earthquakes with intensity data and explosions are listed]

Alaska

18 October (G) Central Alaska
Origin time: 00 36 31.6
Epicenter: 63.29 N., 150.74 W.
Depth: 126 km
Magnitude: 4.9 mb
Intensity IV: Cantwell, Colorado.
Intensity II: Anchorage, Palmer.

24 October (G) Central Alaska
Origin time: 17 19 53.7
Epicenter: 62.65 N., 149.14 W.
Depth: 75 km
Magnitude: 4.9 mb
Intensity III: South-central Alaska.

30 November (G) Southern Alaska
Origin time: 06 22 35.3
Epicenter: 59.92 N., 153.36 W.
Depth: 127 km
Magnitude: 4.7 mb
Intensity IV: Kenai-Anchor Point area.
Intensity III: Anchorage, Homer.

Table 2.--*Summary of macroseismic data for U.S. earthquakes, October–December 1976*--Continued

Alaska--Continued

15 December (G) Southern Alaska
Origin time: 09 51 32.3
Epicenter: 61.35 N., 150.25 W.
Depth: 51 km
Magnitude: 3.7 mb
Intensity III: Anchorage, Peters Creek.

15 December (G) Central Alaska
Origin time: 13 35 53.8
Epicenter: 64.83 N., 147.87 W.
Depth: 31 km
Magnitude: 3.0 ML(M)
Intensity IV: Fairbanks.

Arizona

7 December (P) Baja California
Origin time: 12 59 56.3
Epicenter: 31.98 N., 114.78 W.
Depth: 8 km
Magnitude: 5.5 mb(G), 5.7 MS(G), 5.2 ML
Intensity VI:
Arizona--San Luis, Wellton (broken windows--press report), Yuma (broken windows--telephone report; broken waterline at Del Oro Mobile Estates--press report).
California--El Centro (cracked plaster).
Intensity V:
Arizona--Gadsden, Martinez Lake, Roll, Somerton.
California--Bard, Borrego Springs, Boulevard, Campo, Jacumba, Mount Laguna, Ocotillo, Winterhaven.
Intensity IV:
California--Brawley, Glamis, Julian, Lamesa, Santa Ysabel.
Intensity III:
California--San Diego (press report).

California

6 October (B) Central California
Origin time: 20 54 19.9
Epicenter: 37.63 N., 121.42 W.
Depth: 2 km
Magnitude: 3.0 ML
Intensity II: Stockton, Tracy.

9 October (P) Southern California
Origin time: 02 09 28.1
Epicenter: 33.33 N., 116.23 W.
Depth: 16 km
Magnitude: 3.9 ML
Intensity III: Cuyamaca, North San Diego County.

Table 2.—*Summary of macroseismic data for U.S. earthquakes, October–December 1976*—Continued

California—Continued

15 October (B) Northern California
Origin time: 01 35 31.8
Epicenter: 38.01 N., 122.05 W.
Depth: 19 km
Magnitude: 3.4 ML
Intensity III: Concord, Orinda, Walnut Creek.

15 October (P) Southern California
Origin time: 04 01 00.5
Epicenter: 33.90 N., 116.62 W.
Depth: 8 km
Magnitude: 2.9 ML
Intensity II: Palm Springs.

17 October (P) Southern California
Origin time: 05 38 11.9
Epicenter: 34.45 N., 118.37 W.
Depth: 15 km
Magnitude: 4.3 mb(G), 3.9 ML, 4.1 ML(B)

This earthquake was felt over an area of 8,000 sq km (fig. 10).

Intensity VI: Newhall (broken water main—press report), Tarzana (cracked plaster, masonry), Van Nuys (slight damage).
Intensity V: Altadena, Arcadia, Burbank, Glendale, Granada Hills, Hermosa Beach, La Canada, Los Angeles, Magnolila Park, North Hollywood, Pasadena, San Fernando, Saugus, Sherman Oaks, West Adams.
Intensity IV: Agoura, Hughes Lake, Lancaster, Lebec, Lynwood, Montrose, Panorama City, Redondo Beach, Rosamond, San Gabriel, Sepulveda, Simi Valley, Studio City, Sun Valley, Sunset Beach, Tujunga, York.
Intensity III: El Monte, Sierra Madre, Sunland, Temple City.
Intensity II: Gardena, Keene, Pacoima, Reseda, Valyermo.

22 October (P) Southern California
Origin time: 23 19 13.6
Epicenter: 33.48 N., 116.58 W.
Depth: 15 km
Magnitude: 4.5 mb(G), 3.6 ML
Intensity II: Palm Springs (press report).

23 October (B) Central California
Origin time: 19 24 33.2
Epicenter: 36.89 N., 121.49 W.
Depth: 11 km
Magnitude: 3.5 ML
Intensity II: Gilroy, Hollister.

24 October (B) Central California
Origin time: 02 19 52.7
Epicenter: 36.84 N., 121.63 W.
Depth: 2 km
Magnitude: 3.8 ML
Intensity II: Gilroy, Hollister.

Table 2.—*Summary of macroseismic data for U.S. earthquakes, October–December 1976*—Continued

California—Continued

26 October (B) Northern Californa
Origin time: 23 23 44.8
Epicenter: 40.30 N., 124.27 W.
Depth: 15 km
Magnitude: 3.4 ML
Intensity IV: Fortuna, Rio Dell, Scotia. (Buildings creaked in all three towns.)

2 November (P) Southern California
Origin time: 02 46 05.9
Epicenter: 34.10 N., 117.30 W.
Depth: 6 km
Magnitude: 3.3 ML

A canvass of students conducted at the University of Redlands, Calif., was evaluated by the USGS and the results are listed below.

Intensity V: Loma Linda (frightened many in Loma Linda Hospital), Redlands (frightened students in dormitory of University of Redlands), San Bernardino (picture fell from wall in southernmost part of city).
Intensity IV: Highland, Rialto, Yucaipa.
Intensity III: Norton Air Force Base (telephone report).

4 November (F) Southern California
Origin time: 05 48 20.9
Epicenter: 33.12 N., 115.60 W.
Depth: 5 km
Magnitude: 4.2 ML(P)
Intensity II: Imperial Valley.

4 November (F) Southern California
Origin time: 06 35 03.5
Epicenter: 33.12 N., 115.59 W.
Depth: 5 km
Magnitude: 4.1 ML(P)
Intensity II: Imperial Valley.

4 November (F) Southern California
Origin time: 07 56 06.8
Epicenter: 33.12 N., 115.61 W.
Depth: 1 km
Magnitude: 3.9 ML(P)
Intensity II: Imperial Valley.

4 November (F) Southern California
Origin time: 10 41 37.5
Epicenter: 33.12 N., 115.59 W.
Depth: 4 km
Magnitude: 4.6 mb(G), 5.3 MS(G), 4.9 ML(P), 5.5 ML(B)

Thirty earthquakes between magnitude 2 and 4 were reported between 8 p.m. and 11:30 p.m. PST (press report). One hundred earthquakes were recorded at California Institute of Technology in a 24-hour

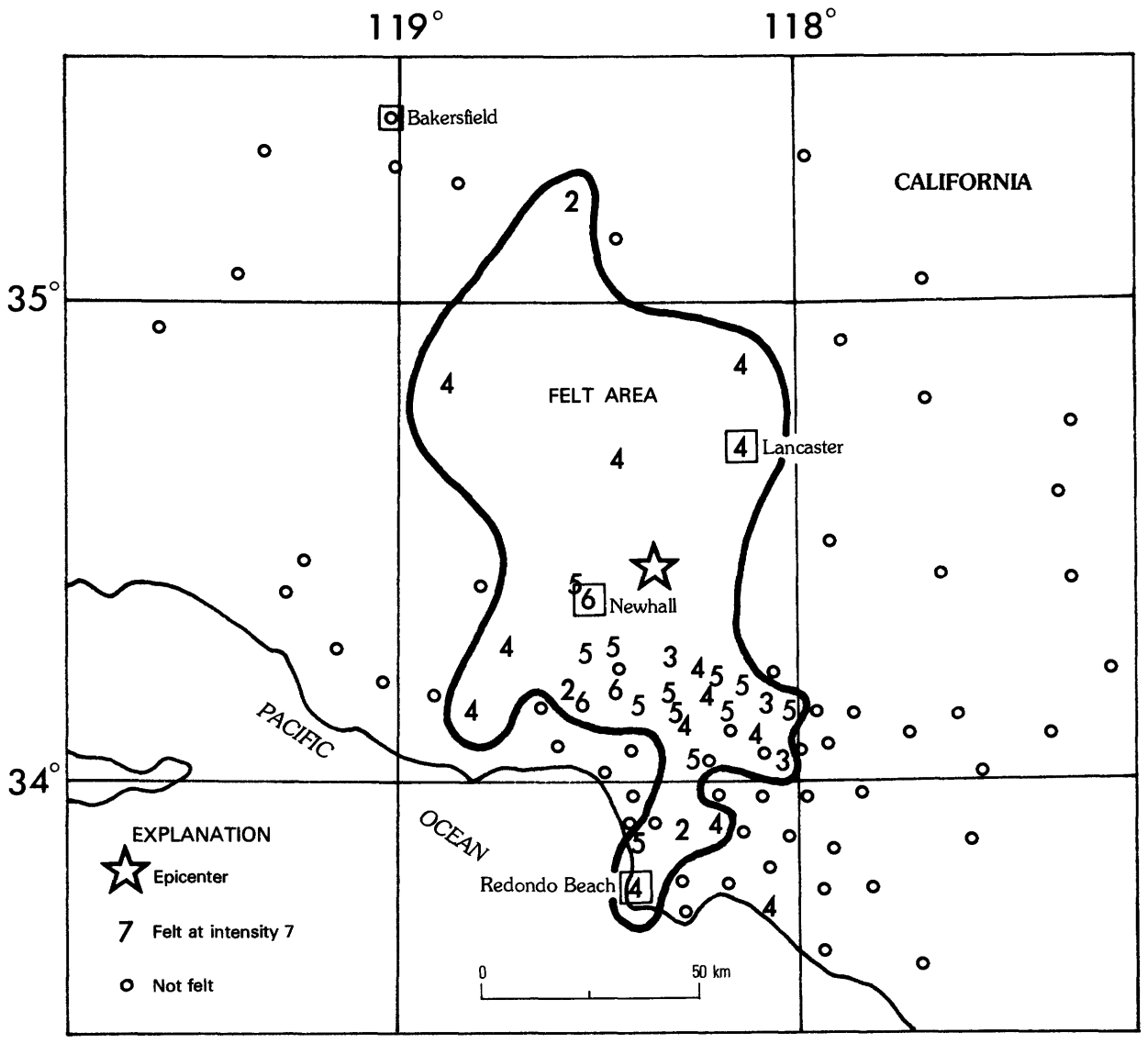

FIGURE 10.—Intensity map for the southern California earthquake of 17 October 1976, 05 38 11.9 UTC. Arabic numbers are used to represent Modified Mercalli intensities at specific sites.

Table 2.—*Summary of macroseismic data for U.S. earthquakes October–December 1976*—Continued

California—continued

period (press report). Burglar alarms were triggered in several Imperial Valley communities (press report). The main shock was felt over an area of approximately 25,000 sq km (fig. 11) of southern California. No intensity data are available from Mexico.

Intensity VI:

California—Brawley (bottles and jars falling from market shelves caused approximately $200 damage—press report), El Centro (fences displaced slightly, furniture moved, plaster and ceiling tiles cracked, many awakened and frightened), Westmorland (large appliances displaced, ground cracked, plaster cracked, electric service interrupted in zip code area).

Intensity V:

Arizona—San Luis, Yuma (press report).

California—Anza, Bard, Blythe, Boulevard, Cabazon, Calexico, Chiriaco Summit, Guatay, Heber, Imperial,

Table 2.—*Summary of macroseismic data for U.S. earthquakes October–December 1976*—Continued

California—continued

Table 2.—*Summary of macroseismic data for U.S. earthquakes October–December 1976*—Continued

California—continued

Julian, Lost Lake, Mt. Laguna, Niland, Ocotillo, Palo Verde, Pine Valley, Plaster City, Ripley, Seeley, Thermal, Winterhaven.

Intensity IV:
California—Campo, Cuyamaca, Indio, San Diego.

Intensity III:
California—Bonita (press report), Chula Vista (press report), Palm Desert, Valley Center.

Intensity II:
California—Bryn Mawr, Potrero, Rancho Mirage, San Bernardino.

4 November (F) Southern California
Origin time: 11 39 08.3
Epicenter: 33.10 N., 115.62 W.
Depth: 1 km
Magnitude: 4.1 ML(P)
Intensity II: Imperial Valley.

4 November (F) Southern California
Origin time: 11 49 40.4
Epicenter: 33.11 N., 115.62 W.
Depth: 2 km
Magnitude: 3.8 mb(G), 4.1 ML(P)
Intensity II: Imperial Valley.

4 November (F) Southern California
Origin time: 13 31 27.7
Epicenter: 33.10 N., 115.62 W.
Depth: 4 km
Magnitude: 4.2 ML(P)
Intensity II: Imperial Valley.

4 November (F) Southern California
Origin time: 14 12 50.2
Epicenter: 33.12 N., 115.60 W.
Depth: 5 km
Magnitude: 4.2 mb(G), 4.4 ML(P)
Intensity II: Imperial Valley.

5 November (B) Central California
Origin time: 19 43 11.0
Epicenter: 35.80 N., 121.30 W.
Depth: 2 km
Magnitude: 3.4 ML
Intensity II: San Simeon.

11 November Northern California
Origin time: 02 32
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.
Intensity V: Willets.

15 November (P) Southern California
Origin time: 12 08 04.0
Epicenter: 33.93 N., 118.25 W.
Depth: 8 km
Magnitude: 2.9 ML
Intensity III: Culver City, Gardena, Inglewood.

Table 2.—*Summary of macroseismic data for U.S. earthquakes October–December 1976*—Continued

California—Continued

22 November (P) Southern California
Origin time: 17 55 10.8
Epicenter: 33.95 N., 118.62 W.
Depth: 2 km
Magnitude: 3.8 ML

This earthquake was felt over an area of approximately 4,000 sq km (fig. 12) along the coast of California west of Los Angeles.

Intensity VI: Long Beach (slight damage, some people frightened), Los Angeles (plaster cracked), North Hollywood (plaster cracked and windows broken).
Intensity V: El Segundo, Fillmore, Hawthorne, Hermosa Beach, Inglewood, Lynwood, Playa del Rey, Redondo Beach, Santa Monica, Sepulveda, Sherman Oaks, Topanga, Torrance, Venice, West Los Angeles, Woodland Hills.
Intensity IV: Burbank, Canoga Park, Chatsworth, Culver City, Downey, Encino, Gardena (press report), Granada Hills, Huntington Park, Lakewood, Mission Hills, Montebello (press report), Mount Baldy, Northridge, Norwalk, Pacific, Palisades, Rosemead, Simi Valley, Somis, South Gate, Sylmar (press report), Thousand Oaks, Van Nuys, Westwood, Wilmington.
Intensity III: La Palma (press report), Pasadena, Piru.
Intensity II: Malibu.

22 November (P) Southern California
Origin time: 19 32 36.8
Epicenter: 33.97 N., 118.58 W.
Depth: 8 km
Magnitude: 2.9 ML
Intensity II: Santa Monica.

27 November (F) Southern California
Origin time: 15 23 43.1
Epicenter: 33.50 N., 116.49 W.
Depth: 5 km
Magnitude: 3.3 ML(P)
Intensity II: Palm Springs.

30 November (P) Southern California
Origin time: 23 55 18.8
Epicenter: 34.08 N., 118.28 W.
Depth: 8 km
Magnitude: 2.5 ML
Intensity III: Hollywood, Los Angeles downtown area.

5 December (P) Central California
Origin time: 04 41 08.9
Epicenter: 35.39 N., 118.68 W.
Depth: 1 km
Magnitude: 3.8 ML
Intensity V: Keene.
Intensity II: Walkers Basin (near Caliente).

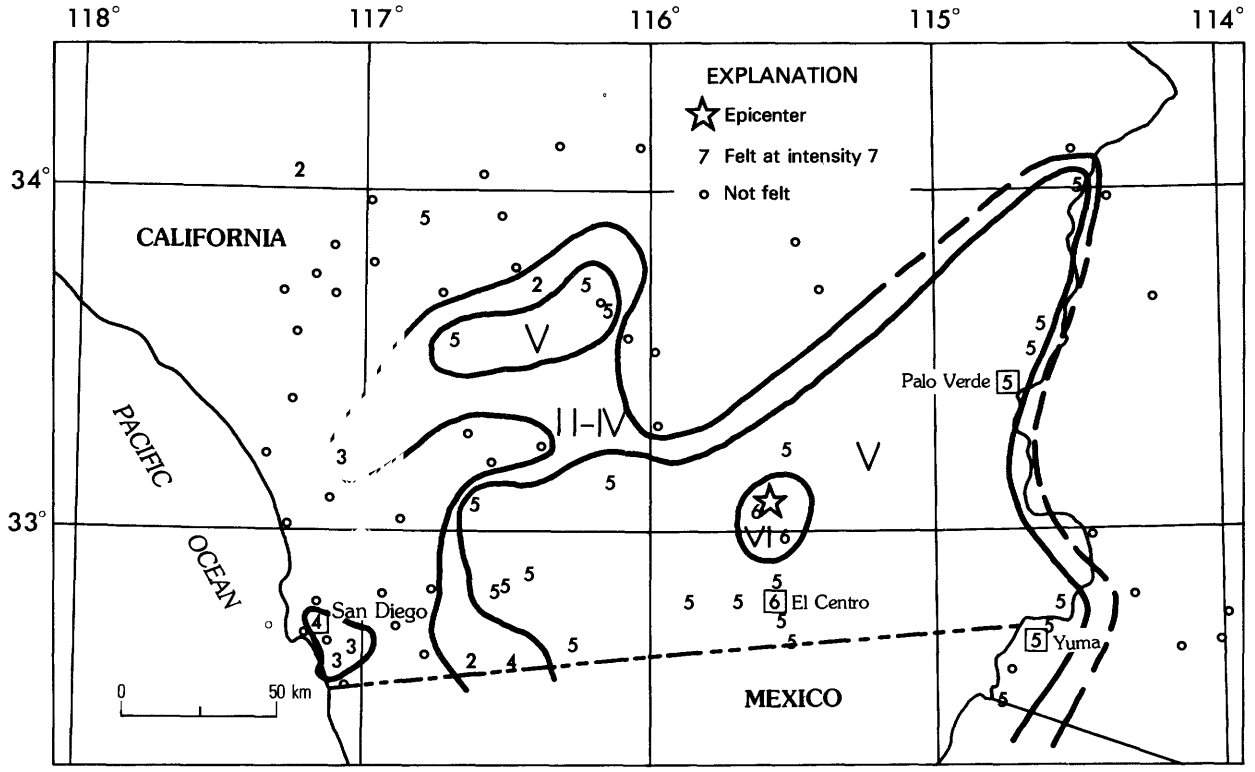

FIGURE 11.--Isoseismal map for the southern California earthquake of 4 November 1976, 10 41 37.5 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numbers are used to represent these intensities at specific sites.

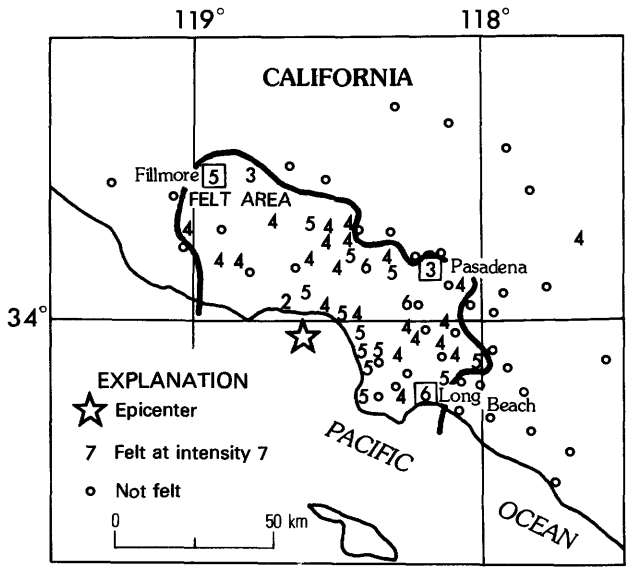

FIGURE 12.--Intensity map for the southern California earthquake of 22 November 1976, 17 55 10.8 UTC. Arabic numbers are used to represent Modified Mercalli intensities at specific sites.

Table 2.--*Summary of macroseismic data for U.S. earthquakes October–December 1976*--Continued

California--Continued

7 December (P) Baja California
Origin time: 12 59 56.3
Epicenter: 31.98 N., 114.78 W.
Depth: 8 km
Magnitude: 5.5 mb(G), 5.7 MS(G), 5.2 ML

See Arizona listing for intensity data.

8 December (P) Southern California
Origin time: 02 13 44.1
Epicenter: 34.47 N., 118.42 W.
Depth: 12 km
Magnitude: 3.3 ML
Intensity II: San Fernando.

9 December (P) Southern California
Origin time: 17 11 36.3
Epicenter: 33.98 N., 117.25 W.
Depth: 11 km
Magnitude: 2.9 ML
Intensity II: Riverside County (press report), San Bernardino County (press report).

Table 2.—*Summary of macroseismic data for U.S. earthquakes, October–December 1976*—Continued

California—Continued

17 December (B) Northern California
Origin time: 21 36 28.4
Epicenter: 38.77 N., 122.27 W.
Depth: 2 km
Magnitude: 3.0 ML
Intensity II: Geyserville.

California—Off the coast

18 October (P) Southern California
Origin time: 17 26 52.6
Epicenter: 32.72 N., 117.92 W.
Depth: 15 km
Magnitude: 4.6 mb(G), 4.2 ML

Felt in western San Diego and Orange Counties.

Intensity III: Newport Beach, Newhall (press report), San Diego.

26 November (G) Northern California
Origin time: 11 19 25.2
Epicenter: 41.29 N., 125.71 W.
Depth: 15 km
Magnitude: 6.0 mb, 6.8 MS, 6.2 ML(B)

This earthquake was felt over an area of approximately 6,500 sq km (fig. 13) along the coast north and south of Eureka.

Intensity V:
California—Arcata, Bayside, Blocksburg, Blue Lake, Burnt Ranch, Cedar Ridge, Crescent City (press report), Eureka, Ferndale, Honeydew, Humboldt (press report), Klamath, Loleta, McKinleyville, Petrolia, Samoa, Weott.
Intensity IV:
California—Carlotta, Comptche, Fort Bragg, Horse Creek, Kneeland, Mt. Shasta, Rio Dell (observer said all effects exaggerated in the press and on radio), Scott Bar, Trinidad.
Oregon—Brookings.
Intensity III:
California—Hydesville, Orick.
Oregon—Merlin.
Intensity II:
California—Denny.
Oregon—Eugene (telephone report).
Washington—Long View (telephone report).

Georgia

27 December (G) Southeastern Georgia
Origin time: 06 57 13.9
Epicenter: 32.22 N., 82.46 W.
Depth: 5 km
Magnitude: 3.7 mbLg(V)

Table 2.—*Summary of macroseismic data for U.S. earthquakes, October–December 1976*—Continued

Georgia—Continued

The intensities listed below are from a NEIS questionnaire canvass and a report by R. J. Lance, G. H. Fogle, and L. T. Long (1977). Three small aftershocks that occurred on December 28, 1976, at 22 17 UTC, on January 5, 1977, at 02 30 UTC, and on January 5, 1977, at 02 32 UTC were reported by R. J. Lance, G. H. Fogle, and L. T. Long (1977).
Intensity V: Baxley, Hazelhurst, Reidsville, Uvalda (pictures tilted).
Intensity IV: Cedar Crossing (oral commun.), Fitzgerald, Jeykll Island (wind blowing fiercely, loud thunderclap, followed one-half minute later by loud noise as if heavy boots were dropped above—written commun.), Lyons.

Hawaii

The places shown below followed by (H) designate intensity values assigned by the Hawaiian Volcano Observatory.

4 October (H) Island of Hawaii
Origin time: 15 18 52.5
Epicenter: 19.35 N., 155.11 W.
Depth: 9 km
Magnitude: 3.0 ML
Intensity II: Hilo (H).

5 October (H) Island of Hawaii
Origin time: 15 58 50.5
Epicenter: 19.34 N., 155.11 W.
Depth: 9 km
Magnitude: 3.8 ML
Intensity III: Hawaiian Beaches (H), Hilo (H).
Intensity II: Mountain View (H), Papaikou (H), Volcano (H).

5 October (H) Island of Hawaii
Origin time: 19 55 39.6
Epicenter: 19.37 N., 155.08 W.
Depth: 8 km
Magnitude: 3.5 ML
Intensity III: Hilo (H), Kalapana (H).
Intensity II: Volcano (H).

9 October (H) Island of Hawaii
Origin time: 02 29 29.9
Epicenter: 19.55 N., 155.85 W.
Depth: 25 km
Magnitude: 3.3 ML
Intensity II: Kona district (H).

15 October (H) Island of Hawaii
Origin time: 09 17 06.9
Epicenter: 19.38 N., 155.09 W.
Depth: 9 km
Magnitude: 2.7 ML
Intensity II: Hamakua district (H), Hilo (H).

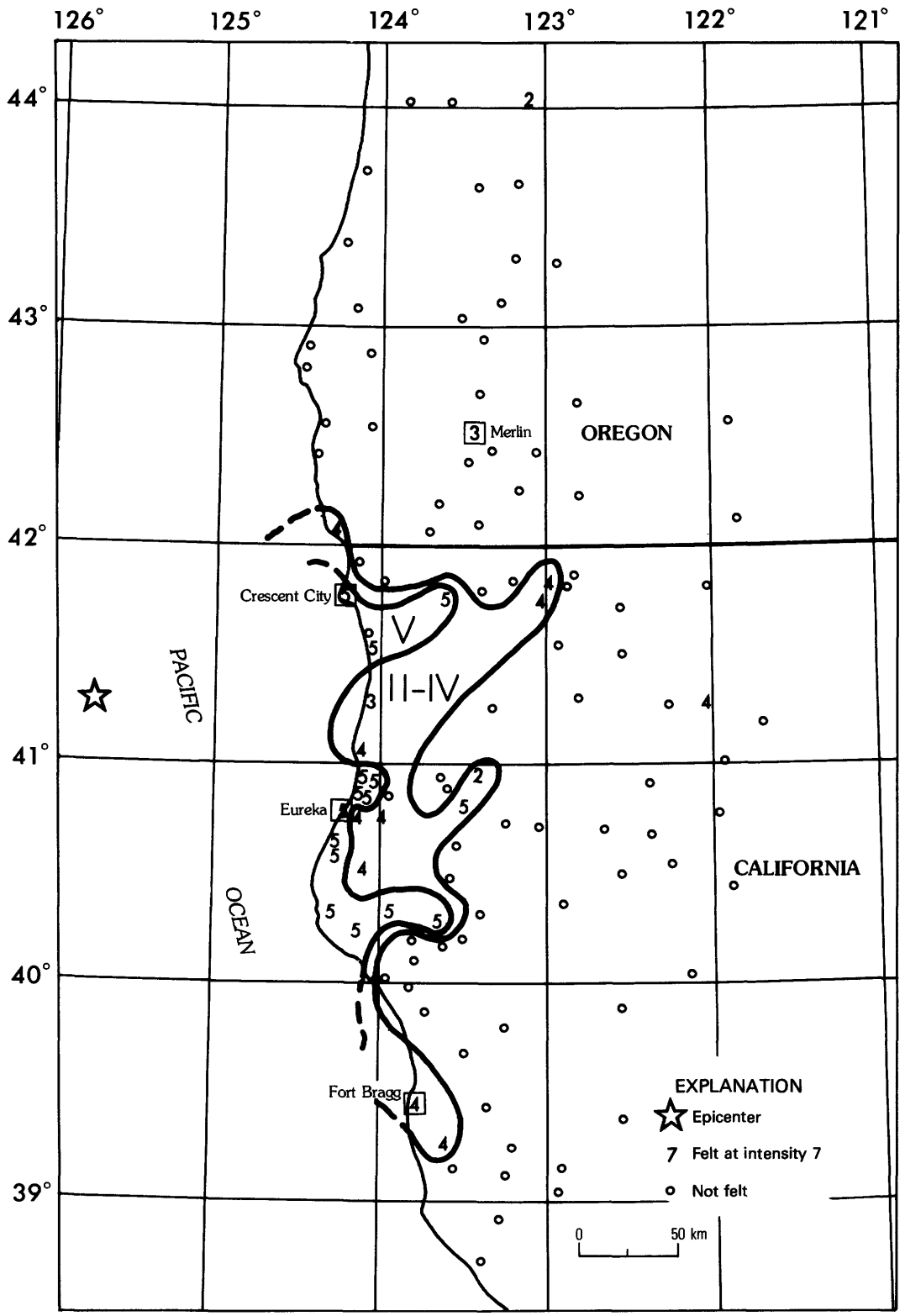

FIGURE 13.--Isoseismal map for the northern California earthquake of 26 November 1976, 11 19 25.2 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numbers are used to represent these intensities at specific sites.

Table 2.—*Summary of macroseismic data for U.S. earthquakes, October–December 1976*—Continued

Hawaii—continued

21 October (H) Island of Hawaii
Origin time: 12 25 26.0
Epicenter: 19.45 N., 154.87 W.
Depth: 9 km
Magnitude: 2.9 ML
Intensity II: Pahoa (H).

22 October (H) Island of Hawaii
Origin time: 22 43 23.6
Epicenter: 19.32 N., 155.20 W.
Depth: 11 km
Magnitude: 3.4 ML
Intensity II: Hilo (H).

23 October (H) Island of Hawaii
Origin time: 00 11 25.8
Epicenter: 19.35 N., 155.06 W.
Depth: 9 km
Magnitude: 3.5 ML
Intensity II: Hilo (H), Kalapana (H).

24 October (H) Island of Hawaii
Origin time: 18 18 54.0
Epicenter: 19.37 N., 155.00 W.
Depth: 7 km
Magnitude: 2.5 ML
Intensity II: Wahaula Visitors Center (H).

3 November (H) Island of Hawaii
Origin time: 04 15 46.3
Epicenter: 19.32 N., 155.22 W.
Depth: 10 km
Magnitude: 3.7 ML
Intensity III: Mountain View (H).
Intensity II: Hilo (H), Volcano (H).

5 November (H) Island of Hawaii
Origin time: 00 44 55.8
Epicenter: 19.41 N., 155.27 W.
Depth: 3 km
Magnitude: 2.3 ML
Intensity III: Hawaii Volcanoes National Park (H).
Intensity II: Volcano (H).

5 November (H) Island of Hawaii
Origin time: 12 58 29.6
Epicenter: 19.36 N., 155.14 W.
Depth: 9 km
Magnitude: 2.7 ML
Intensity II: Volcano (H).

10 November (H) Island of Hawaii
Origin time: 01 33 03.3
Epicenter: 19.34 N., 155.07 W.
Depth: 9 km
Magnitude: 3.8 ML
Intensity III: Hilo (H).
Intensity II: Hale Pohaku (H), Pepeekeo (H), Wood Valley (H).

11 November (H) Island of Hawaii
Origin time: 04 15 16.5

Table 2.—*Summary of macroseismic data for U.S. earthquakes, October–December 1976*—Continued

Hawaii—continued

Epicenter: 19.35 N., 155.19 W.
Depth: 10 km
Magnitude: 3.1 ML
Intensity II: Mountain View (H).

13 November (H) Island of Hawaii
Origin time: 02 54 46.4
Epicenter: 19.35 N., 155.04 W.
Depth: 8 km
Magnitude: 3.5 ML
Intensity II: Volcano (H).

13 November (H) Island of Hawaii
Origin time: 21 14 03.3
Epicenter: 19.37 N., 155.09 W.
Depth: 9 km
Magnitude: 3.7 ML
Intensity III: Hilo (H).

14 November (H) Island of Hawaii
Origin time: 14 19 23.0
Epicenter: 19.43 N., 155.28 W.
Depth: 16 km
Magnitude: 3.0 ML
Intensity II: Volcano (H).

16 November (H) Island of Hawaii
Origin time: 12 23 35.4
Epicenter: 19.38 N., 155.08 W.
Depth: 9 km
Magnitude: 3.6 ML
Intensity III: Hilo.
Intensity II: Hawaiian Beaches (H), Paauhau (H).

17 November (H) Island of Hawaii
Origin time: 05 44 33.9
Epicenter: 19.43 N., 155.28 W.
Depth: 1 km
Magnitude: 2.3 ML
Intensity II: Hawaii Volcanoes National Park (H), Volcano (H).

17 November (H) Island of Hawaii
Origin time: 15 51 48.5
Epicenter: 19.54 N., 155.24 W.
Depth: 25 km
Magnitude: 3.7 ML
Intensity III: Hilo (H).
Intensity II: Hawaii Volcanoes National Park (H), Hawaiian Volcano Observatory (H), Keaau (H), Papaikou (H), Volcano (H), Wood Valley (H).

17 November (H) Island of Hawaii
Origin time: 22 13 08.6
Epicenter: 19.38 N., 155.28 W.
Depth: 3 km
Magnitude: 2.1 ML
Intensity II: Hawaii Volcanoes National Park (H), Volcano (H).

18 November (H) Island of Hawaii
Origin time: 14 33 18.1

Table 2.—*Summary of macroseismic data for U.S. earthquakes, October–December 1976*--Continued

Hawaii--continued

Epicenter: 19.35 N., 155.22 W.
Depth: 9 km
Magnitude: 2.3 ML
Intensity II: Hawaii Volcanoes National Park (H).

19 November (H) Island of Hawaii
Origin time: 08 24 43.7
Epicenter: 19.40 N., 155.28 W.
Depth: 4 km
Magnitude: 3.0 ML
Intensity III: Hawaii Volcanoes National Park (H).
Intensity II: Hawaiian Volcano Observatory (H), Volcano (H).

22 November (H) Island of Hawaii
Origin time: 06 35 13.5
Epicenter: 19.37 N., 155.11 W.
Depth: 8 km
Magnitude: 2.5 ML
Intensity II: Puna district (H).

23 November (H) Island of Hawaii
Origin time: 01 40 49.9
Epicenter: 19.39 N., 155.28 W.
Depth: 3 km
Magnitude: 2.4 ML
Intensity II: Hawaii Volcanoes National Park (H), Volcano (H).

25 November (H) Island of Hawaii
Origin time: 16 37 27.4
Epicenter: 19.39 N., 155.29 W.
Depth: 4 km
Magnitude: 2.3 ML
Intensity II: Hawaii Volcanoes National Park (H), Volcano (H).

25 November (H) Island of Hawaii
Origin time: 21 05 40.3
Epicenter: 19.40 N., 155.28 W.
Depth: 2 km
Magnitude: 2.5 ML
Intensity II: Hawaii Volcanoes National Park (H).

26 November (H) Island of Hawaii
Origin time: 13 49 14.8
Epicenter: 19.40 N., 155.27 W.
Depth: 2 km
Magnitude: 2.1 ML
Intensity II: Hawaii Volcanoes National Park (H).

26 November (H) Island of Hawaii
Origin time: 20 15 58.5
Epicenter: 19.40 N., 155.27 W.
Depth: 5 km
Magnitude: 3.1 ML
Intensity III: Hawaiian Volcano Observatory (H).
Intensity II: Volcano (H).

Table 2.—*Summary of macroseismic data for U.S. earthquakes, October–December 1976*--Continued

Hawaii--continued

1 December (H) Island of Hawaii
Origin time: 03 46 09.9
Epicenter: 19.33 N., 155.19 W.
Depth: 10 km
Magnitude: 3.3 ML
Intensity III: Volcano (H).

1 December (H) Island of Hawaii
Origin time: 04 18 45.2
Epicenter: 19.32 N., 155.19 W.
Depth: 10 km
Magnitude: 3.0 ML
Intensity II: Volcano (H).

1 December (H) Island of Hawaii
Origin time: 05 37 30.1
Epicenter: 19.33 N., 155.27 W.
Depth: 10 km
Magnitude: 2.5 ML
Intensity II: Volcano (H).

4 December (H) Island of Hawaii
Origin time: 13 50 50.8
Epicenter: 19.34 N., 155.14 W.
Depth: 9 km
Magnitude: 3.0 ML
Intensity III: Hilo (H).
Intensity II: Kamuela (H), Volcano (H).

6 December (H) Island of Hawaii
Origin time: 03 11 59.1
Epicenter: 19.39 N., 155.11 W.
Depth: 8 km
Magnitude: 1.9 ML
Intensity II: Hilo (H).

6 December (H) Island of Hawaii
Origin time: 16 26 58.0
Epicenter: 19.36 N., 155.13 W.
Depth: 10 km
Magnitude: 3.8 ML
Intensity III: Hawaiian Beaches (H), Hilo (H).
Intensity II: Mountain View (H), Volcano (H).

8 December (H) Island of Hawaii
Origin time: 09 40 22.2
Epicenter: 19.40 N., 155.28 W.
Depth: 3 km
Magnitude: 2.8 ML
Intensity II: Hawaii Volcanoes National Park (H), Volcano (H).

9 December (H) Island of Hawaii
Origin time: 00 15 42.5
Epicenter: 19.34 N., 155.18 W.
Depth: 9 km
Magnitude: 2.9 ML
Intensity II: Hilo (H).

9 December (H) Island of Hawaii
Origin time: 04 50 26.3

Table 2.—*Summary of macroseismic data for U.S. earthquakes, October–December 1976*--Continued

Hawaii--Continued

Epicenter: 19.43 N., 155.28 W.
Depth: 1 km
Magnitude: 2.0 ML
Intensity II: Hawaii Volcanoes National Park (H), Volcano (H).

10 December (H) Island of Hawaii
Origin time: 01 28 49.9
Epicenter: 19.40 N., 155.29 W.
Depth: 3 km
Magnitude: 3.0 ML
Intensity III: Keanakakoi (H).
Intensity II: Hawaiian Volcano Observatory (H), Volcano (H).

12 December (H) Island of Hawaii
Origin time: 09 39 36.6
Epicenter: 19.22 N., 155.47 W.
Depth: 9 km
Magnitude: 2.8 ML
Intensity II: Kau district (H).

14 December (H) Island of Hawaii
Origin time: 03 26 42.0
Epicenter: 19.34 N., 155.13 W.
Depth: 10 km
Magnitude: 3.4 ML
Intensity II: Puna district (H), Volcano (H).

17 December (H) Island of Hawaii
Origin time: 13 39 14.5
Epicenter: 19.43 N., 155.28 W.
Depth: 1 km
Magnitude: 2.9 ML
Intensity II: Hawaii Volcanoes National Park (H), Volcano (H).

18 December (H) Island of Hawaii
Origin time: 14 01 00.5
Epicenter: 19.34 N., 155.12 W.
Depth: 9 km
Magnitude: 4.8 ML, 5.0 mb(G)
Intensity V: Hakalao, Hilo (H), Honokaa, Honomu, Keaau, Kurtistown, Lahaina, Laupahoehoe, Mountain View, Ookala, Paauhau, Pahala, Papaikou, Volcano.
Intensity IV: Puna district (H).
Intensity III: Kau district (H).
Intensity II: Kamuela (H), Kohala (H), Kona district (H).

22 December (H) Island of Hawaii
Origin time: 19 03 32.4
Epicenter: 19.40 N., 155.27 W.
Depth: 3 km
Magnitude: 2.2 ML
Intensity II: Hawaii Volcanoes National Park (H), Volcano (H).

25 December (H) Island of Hawaii
Origin time: 17 01 15.4
Epicenter: 19.64 N., 156.01 W.
Depth: 9 km

Table 2.–*Summary of macroseismic data for U.S. earthquakes, October-December 1976*–Continued

Hawaii--Continued

Magnitude: 3.3 ML
Intensity III: Kailua (H), Kona district (H).
Intensity II: Holualoa (H).

27 December (H) Island of Hawaii
Origin time: 14 15 20.6
Epicenter: 19.39 N., 155.25 W.
Depth: 5 km
Magnitude: 3.3 ML
Intensity III: Hawaii Volcanoes National Park (H).
Intensity II: Mountain View (H).

27 December (H) Island of Hawaii
Origin time: 16 24 27.3
Epicenter: 19.32 N., 155.27 W.
Depth: 10 km
Magnitude: 3.1 ML
Intensity III: Hawaii Volcanoes National Park (H).

27 December (H) Island of Hawaii
Origin time: 19 19 27.0
Epicenter: 19.40 N., 155.25 W.
Depth: 3 km
Magnitude: 2.5 ML
Intensity II: Hawaii Volcanoes National Park (H).

29 December (H) Island of Hawaii
Origin time: 01 17 36.6
Epicenter: 19.40 N., 155.28 W.
Depth: 3 km
Magnitude: 2.8 ML
Intensity II: Hawaii Volcanoes National Park (H).

29 December (H) Island of Hawaii
Origin time: 05 37 04.8
Epicenter: 19.32 N., 155.20 W.
Depth: 10 km
Magnitude: 3.2 ML
Intensity III: Hawaiian Volcano Observatory (H).
Intensity II: Volcano (H).

29 December (H) Island of Hawaii
Origin time: 13 45 37.4
Epicenter: 19.39 N., 155.29 W.
Depth: 2 km
Magnitude: 2.4 ML
Intensity II: Hawaii Volcanoes National Park (H).

30 December (H) Island of Hawaii
Origin time: 02 44 25.6
Epicenter: 19.33 N., 155.19 W.
Depth: 9 km
Magnitude: 2.9 ML
Intensity II: Hawaii Volcanoes National Park (H).

Table 2.–*Summary of macroseismic data for U.S. earthquakes, October-December 1976*–Continued

Hawaii--Continued

30 December (H) Island of Hawaii
Origin time: 05 26 26.9
Epicenter: 19.39 N., 155.24 W.
Depth: 5 km
Magnitude: 3.0 ML
Intensity III: Hawaii Volcanoes National Park (H).

30 December (H) Island of Hawaii
Origin time: 10 47 36.9
Epicenter: 18.16 N., 155.25 W.
Depth: 7 km
Magnitude: 3.9 ML
Intensity II: Kau district (H).

30 December (H) Island of Hawaii
Origin time: 14 19 51.5
Epicenter: 19.33 N., 155.27 W.
Depth: 10 km
Magnitude: 3.0 ML
Intensity II: Volcano (H).

Idaho

1 November (G) Western Idaho
Origin time: 22 22 51.1
Epicenter: 44.26 N., 114.97 W.
Depth: 5 km
Magnitude: 3.7 ML(A), 3.9 ML(D)
Intensity IV: Stanley.
Intensity III: Salmon, South Stanley.

Maine

23 October (O) Southern Quebec, Canada
Origin time: 20 58 18.0
Epicenter: 47.82 N., 69.79 W.
Depth: 18 km
Magnitude: 3.8 mb(G), 4.2 mbLg, 4.1 mbLg(L), 3.8 mbLg(J)

This earthquake was felt over a large area of southern Quebec, Canada, as shown by figure 14 (furnished by R. Wetmiller, Earth Physics Branch, Energy, Mines, and Resources, Ottawa, Canada). All the intensity values shown in figure 14 were evaluated by the office of R. Wetmiller.

Intensity V:
Maine--Fort Kent.
Intensity IV:
Maine--Frenchville.

Table 2.–*Summary of macroseismic data for U.S. earthquakes, October-December 1976*–Continued

Missouri

11 December (S) Eastern Missouri
Origin time: 07 05 00.4
Epicenter: 38.12 N., 91.07 W.
Depth: 0 km
Magnitude: 4.2 mb(G)

Pea Ridge Mine explosion. Five hundred twenty tons of explosive.

13 December (S) Eastern Missouri
Origin time: 08 35 54.9
Epicenter: 37.80 N., 90.24 W.
Depth: 5 km
Magnitude: 3.5 ML
Intensity V:
Missouri--Clearwater, Farmington, Flat River, Frankclay, Ironton, Perryville. Many in these communities were awakened and frightened by the earthquake.
Intensity IV:
Missouri--Arcadia, Belleview, Iron Mountain.
Illinois--Renault, Welge.

Montana

27 November (G) Hebgen Lake region
Origin time: 00 24 46.1
Epicenter: 44.64 N., 111.14 W.
Depth: 9 km
Magnitude: 3.3 ML(A), 3.7 ML(D)
Intensity IV:
Wyoming--Canyon Village, Madison Junction.

20 December (G) Hebgen Lake region, Montana
Origin time: 17 07 10.5
Epicenter: 44.50 N., 111.07 W.
Depth: 9 km
Magnitude: 3.3 ML(A)

The intensity data listed below are from information supplied by R. A. Hutchinson, Yellowstone Park geologist, National Park Service.

Intensity III:
Wyoming--Canyon Village, Madison Junction, Mammoth Hot Springs.
Intensity II:
Montana--Gardiner, West Yellowstone.
Wyoming--Old Faithful.

Nevada

4 October (G) Southern Nevada
Origin time: 14 48 39.0

Table 2.—*Summary of macroseismic data for U.S. earthquakes, October-December 1976*—Continued

Nevada--Continued

Epicenter: 36.03 N., 114.73 W.
Depth: 5 km
Magnitude: 3.0 ML
Intensity III: Hoover Dam.

19 October (G) Southern Nevada
Origin time: 01 59 10.6
Epicenter: 35.98 N., 114.82 W.
Depth: 5 km
Magnitude: None computed.
Intensity III: Boulder City (press report).

20 October (G) California-Nevada border region
Origin time: 23 14 56.3
Epicenter: 37.64 N., 118.02 W.
Depth: 5 km
Magnitude: 3.4 ML(B)
Intensity III: California--Bishop.

17 November (G) Northern Nevada
Origin time: 08 23 35.0
Epicenter: 40.54 N., 115.99 W.
Depth: 15 km
Magnitude: 3.9 ML(B)
Intensity V: Elko.
Intensity IV: Tuscarora.

23 November (A) Southern Nevada
Origin time: 15 15 00.2
Epicenter: 37.17 N., 116.05 W.
Depth: 0 km
Magnitude: None computed.

Nevada Test Site explosion "Chevre" at 37° 10′18.14" N., 116°03′09.62" W., surface elevation 1305 m, depth of burial 317 m, shot time at 15 15 00.163.

8 December (A) Southern Nevada
Origin time: 14 49 30.1
Epicenter: 37.08 N., 116.00 W.
Depth: 0 km
Magnitude: 4.9 mb, 4.5 ML(B)

Nevada Test Site explosion "Redmud" at 37° 04′45.35" N., 116°00′05.84" W., surface elevation 1296 m, depth of burial 427 m, shot time at 14 49 30.083.

21 December (A) Southern Nevada
Origin time: 15 09 00.2
Epicenter: 37.12 N., 116.07 W.
Depth: 0 km
Magnitude: 4.2 ML(B)

Nevada Test Site explosion "Asiago" at 37° 07′26.08" N., 116°04′02.85" W., surface elevation 1292 m, depth of burial 331 m, shot time at 15 09 00.166.

28 December (A) Southern Nevada
Origin time: 18 00 00.1
Epicenter: 37.10 N., 116.04 W.
Depth: 0 km
Magnitude: 5.5 mb, 5.5 ML(B)

Table 2.—*Summary of macroseismic data for U.S. earthquakes, October-December 1976*—Continued

Nevada--Continued

Nevada Test Site explosion "Rudder" at 37° 06′01.78" N., 116°02′11.27" W., surface elevation 1282 m, depth of burial 640 m, shot time at 18 00 00.076.

28 December (G) Southern Nevada
Origin time: 20 14 26.0
Epicenter: 37.10 N., 116.04 W.
Depth: 0 km
Magnitude: 3.5 mb

Nevada Test Site collapse from the explosion at 18 00 00.1.

28 December (G) Southern Nevada
Origin time: 20 29 26.0
Epicenter: 37.10 N., 116.04 W.
Depth: 0 km
Magnitude: 4.4 mb, 4.5 ML(B)

Nevada Test Site collapse from the explosion at 18 00 00.1.

Oklahoma

19 December (T) Southeastern Oklahoma
Origin time: 08 26 36.7
Epicenter: 34.92 N., 95.73 W.
Depth: 5 km
Magnitude: 2.9 mbLg(T)
Intensity II: McAlester (telephone report).

Utah

5 November (U) Northern Utah
Origin time: 01 15 06.9
Epicenter: 41.82 N., 112.69 W.
Depth: 7 km
Magnitude: 3.4 ML
Intensity II: Snowville.

5 November (U) Northern Utah
Origin time: 02 48 55.4
Epicenter: 41.81 N., 112.70 W.
Depth: 7 km
Magnitude: 4.1 ML
Intensity V: Howell, Lewiston, Riverside, Stone.
Intensity IV: Holbrook, Hyrum, Snowville.
Intensity III: Portage.
Intensity II: Plymouth.

5 November (U) Northern Utah
Origin time: 10 58 03.5
Epicenter: 41.82 N., 112.69 W.
Depth: 7 km
Magnitude: 3.2 ML
Intensity II: Snowville.

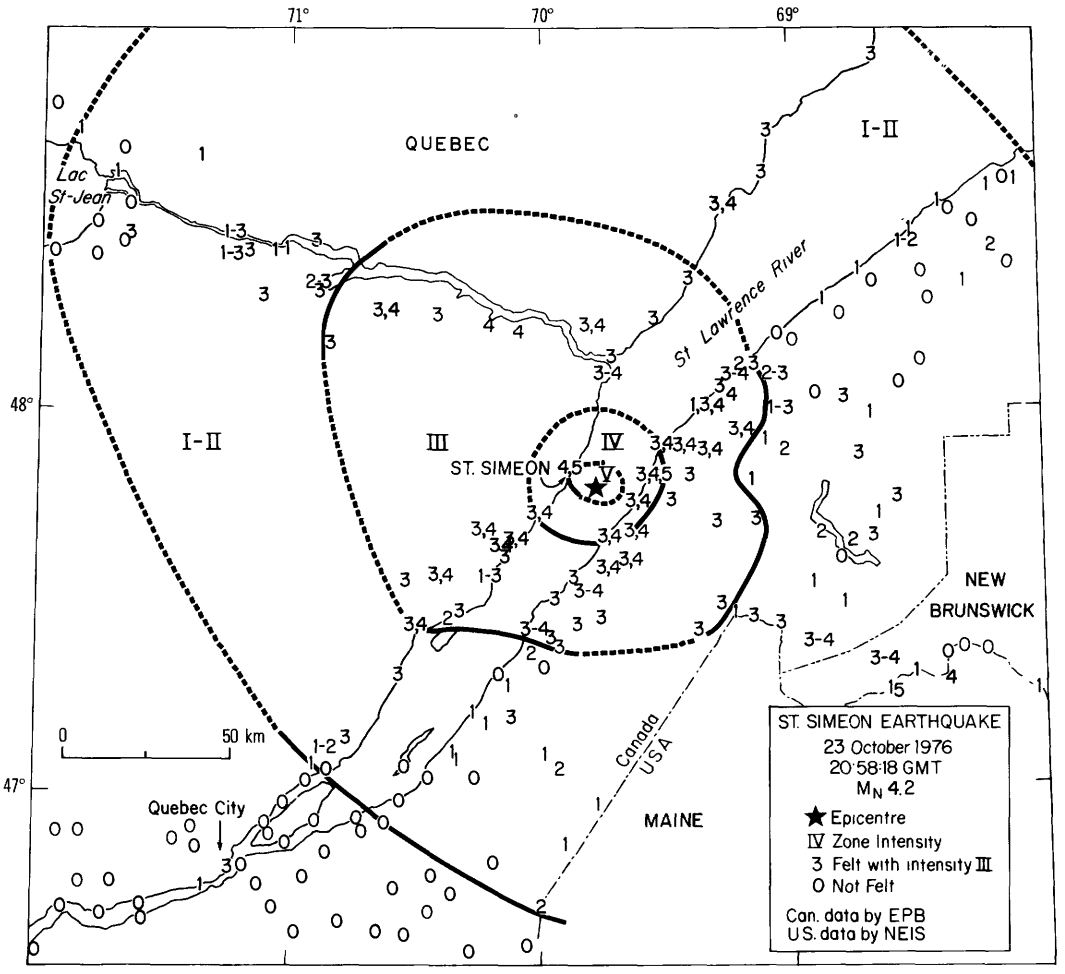

FIGURE 14.--Isoseismal map for the Quebec, Canada, earthquake of 23 October 1976, 20 15 18 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numbers are used to represent these intensities at specific sites (courtesy of R. Wetmiller, Earth Physics Branch, Energy, Mines, and Resources, Ottawa, Canada).

Table 2.–*Summary of macroseismic data for U.S. earthquakes, October-December 1976*–Continued

Washington

14 October (W) Southwestern Washington
Origin time: 21 39 17.7
Epicenter: 46.66 N., 122.34 W.
Depth: 30 km
Magnitude: 3.1 ML(G)
Intensity V: Elbe, Glenoma, La Grande, Mineral.
Intensity IV: Ashford, Morton, Randle, Silver Creek.
Intensity III: Salkum.
Intensity II: Eatonville, McKenna, Mossyrock.

Table 2.–*Summary of macroseismic data for U.S. earthquakes, October-December 1976*–Continued

Wyoming

19 October (G) Yellowstone National Park
Origin time: 06 18 35.3
Epicenter: 44.74 N., 110.81 W.
Depth: 4 km
Magnitude: 5.3 mb, 4.0 ML

This earthquake was felt over an area of approximately 3,000 sq km in the Park. Both tremors (the second occurred at 07 24 34.6) were described as a strong, quick jolt or rocking action lasting a few seconds. The only direction sensed

Table 2.—*Summary of macroseismic data for U.S. earthquakes, October-December 1976*—Continued

Wyoming--Continued

was at Canyon where the winterkeeper reported tremors coming from the west (R. A. Hutchinson, National Park Service, written commun.).

Intensity IV:
Montana--West Yellowstone.
Wyoming--Canyon Village, Madison Junction, Mammoth, Old Faithful.
Intensity III:
Montana--Corwin Springs.

19 October (G) Yellowstone National Park
Origin time: 07 24 34.6
Epicenter: 44.80 N., 110.70 W.
Depth: 5 km
Magnitude: 5.3 mb, 4.1 ML
Intensity IV:
Montana--West Yellowstone.
Wyoming--Canyon Village, Madison Junction, Mammoth, Old Faithful.

17 November (G) Yellowstone National Park
Origin time: 14 34 33.4
Epicenter: 44.75 N., 110.86 W.
Depth: 5 km
Magnitude: 3.0 ML(A), 3.7 ML(D)
Intensity IV: Canyon Village (windows rattled).
Intensity III: Madison Junction.

17 November (G) Yellowstone National Park
Origin time: 14 57 38.6
Epicenter: 44.74 N., 110.83 W.
Depth: 5 km
Magnitude: 3.0 ML(A)
Intensity III: Madison Junction.

27 November (G) Yellowstone National Park
Origin time: 01 09 35.2
Epicenter: 44.66 N., 110.82 W.
Depth: 5 km
Magnitude: 3.5 ML(A)
Intensity III: Madison Junction.

27 November (G) Yellowstone National Park
Origin time: 19 18 57.9
Epicenter: 44.85 N., 110.97 W.
Depth: 5 km
Magnitude: 3.6 ML(A)
Intensity II: Canyon Village, Madison Junction.

8 December (G) Yellowstone National Park
Origin time: 14 40 59.1
Epicenter: 44.76 N., 110.79 W.
Depth: 5 km
Magnitude: 5.5 mb, 4.6 ML
Intensity V:
Montana--Corwin Springs.
Intensity IV:
Montana--Gardiner, West Yellowstone.

Table 2.—*Summary of macroseismic data for U.S. earthquakes, October-December 1976*—Continued

Wyoming--Continued

Intensity III:
Wyoming--Canyon Village, Madison Junction, Mammoth Hot Springs, Old Faithful.

8 December (G) Yellowstone National Park
Origin time: 22 10 42.3
Epicenter: 44.75 N., 111.05 W.
Depth: 5 km
Magnitude: 3.5 ML
Intensity III:
Montana--Gardiner, West Yellowstone.

9 December (G) Yellowstone National Park
Origin time: 22 36 23.7
Epicenter: 44.77 N., 110.80 W.
Depth: 5 km
Magnitude: 4.5 mb, 5.1 ML, 4.7 ML(D)
Intensity V:
Montana--Corwin Springs, West Yellowstone.
Wyoming--Canyon Village (small objects fell, Gibbon River turbid).
Intensity IV:
Montana--Harrison.
Wyoming--Madison Junction (oral commun.), Mammoth (oral commun.).
Intensity III:
Montana--Gallatin Gateway (telephone report), Virginia City.
Wyoming--Old Faithful (oral commun.).

16 December (G) Yellowstone National Park
Origin time: 00 28 21.4
Epicenter: 44.64 N., 111.05 W.
Depth: 5 km
Magnitude: 3.0 ML(A)
Intensity IV: Madison Junction.

19 December (G) Yellowstone National Park
Origin time: 17 10 15.6
Epicenter: 44.77 N., 110.80 W.
Depth: 5 km
Magnitude: 4.9 mb, 4.5 ML

The intensity data listed below are from information supplied by R. A. Hutchinson, Yellowstone Park geologist, National Park Service.

Intensity V:
Montana--Gardiner.
Wyoming--Mammoth Hot Springs.
(Both areas reported cracked windows; Christmas decorations and household items were knocked to the floor.)
Intensity IV:
Wyoming--Canyon Village, Devil's Slide area of Yellowstone Valley (south of Corwin Springs, Mont.), Madison Junction, Old Faithful.
Intensity III:
Montana--West Yellowstone.

Table 2.–*Summary of macroseismic data for U.S. earthquakes, October-December 1976*–Continued

Wyoming--Continued

20 December (G) Yellowstone National Park
Origin time: 01 34 16.7
Epicenter: 44.84 N., 110.83 W.
Depth: 5 km
Magnitude: 4.4 mb, 4.3 ML

The intensity data listed below are from information supplied by R. A. Hutchinson, Yellowstone Park geologist, National Park Service.

Intensity IV:
Montana--Gardiner.
Wyoming--Canyon Village, Madison Junction, Mammoth Hot Springs, Mary Mountain Patrol Cabin.

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UTAH: Department of Geological and Geophysical Sciences, University of Utah, Salt Lake City.
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REFERENCES CITED

Bath, Markus, 1966, Earthquake energy and magnitude, in Physics and chemistry of the Earth, Volume 7: Oxford and New York, Pergamon Press, p. 115-165.

Fuis, G. S., Friedman, M. E., and Hileman, J. A., 1977, Preliminary catalog of earthquakes in southern California, July 1974-September 1976: U.S. Geol. Survey Open-File Report 77-181, 107 p.

Gutenberg, B. and Richter, C. F., 1956, Magnitude and energy of earthquakes: Annali di Geofisica, v. 9, no. 1, p. 1-15.

Lance, R. J., Fogle, G. H., and Long, L. T., 1977, Report on the earthquake of December 27, in southern Georgia: Earthquake Notes, v. 48, no. 1-2, p. 51-56.

Nuttli, O. W., 1973, Seismic wave attenuation and magnitude relations for eastern North America: Jour. Geophys. Research, v. 78, no. 5, p. 876-885.

Richter, C. F., 1958, Elementary seismology: San Francisco, Calif., W. H. Freeman and Co., Inc., 768 p.

Wood, H. O., and Neumann, F., 1931, Modified Mercalli Intensity Scale of 1931: Seismol. Soc. America Bull., v. 21, no. 4, p. 277-283.

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