

GEOLOGICAL SURVEY CIRCULAR 871-A



Earthquakes in the United States January–March 1981

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By J. H. Minsch, C. W. Stover, P. K. Dunbar,
and F.W. Baldwin

G E O L O G I C A L S U R V E Y C I R C U L A R 8 7 1 - A

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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," by providing detailed felt and intensity data for U.S. earthquakes. The purpose of this circular 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 to answer inquiries by the public.

This publication contains two major sections. The first part (table 1), which is mainly concerned with data obtained by seismographs, 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, which concerns intensity information, consists of four maps and table 2. This section also contains information on events that were felt but were not listed in the PDE because there was not enough instrumental data to obtain a solution. The list of earthquakes in table 1 was compiled from those located in the United States or nearby offshore areas that were published in the PDE; from aftershock studies carried out by the U.S. Geological Survey and other organizations; from hypocenters in California above magnitude 3.0 supplied by the 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 other institutions as listed in the acknowledgments. Known or suspected explosions are also listed in table 1 and table 2.

The intensities and macroseismic data were compiled from information obtained from postal questionnaires, from newspaper articles, and

from other Government agencies, State institutions, local organizations, and individuals. (See "Acknowledgments" for a list of collaborators.) Figure 1 is the questionnaire in use by the NEIS. Other types of questionnaires are used by State agencies, engineering firms, and other Government agencies to collect intensity data. 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 NEIS uses the postal questionnaire as the primary source of macroseismic data to carry out an intensity survey; however, on-site field investigations are made following earthquakes that do significant damage. The "Earthquake Report" forms are mailed to postmasters within the area affected by the earthquake. The completed forms are returned to the NEIS, where they are evaluated and intensity values are assigned to individual locations. In the case of large or significant earthquakes, the intensity observations are plotted and isoseismal maps are prepared. It should be pointed out that the isoseismals represent a general intensity level and that they do not necessarily agree with every individual observation.

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 source of the computed solution. 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 not necessarily indicated by the number of decimals

**U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
EARTHQUAKE REPORT**

Form Approved
OMB No. 42-R1700

Please answer this questionnaire and return as soon as possible

1. Was an earthquake felt by anyone in your town near the date and time indicated on the opposite page?

☐ No: Please refold and tape for return mail.

☐ Yes: Date _____ Time _____ ☐ AM ☐ Standard time
☐ PM ☐ 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 personal report and complete the community report.

PERSONAL REPORT

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

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

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

Were you at 4 ☐ Home 5 ☐ Work 6 ☐ Other? _____

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

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 _____

Were you 14 ☐ Inside or 15 ☐ Outside?

If inside, on what floor were you? 16 _____

Did you have difficulty in standing or walking 17 ☐ Yes 18 ☐ No

Vibration could be described as 19 ☐ Light 20 ☐ Moderate 21 ☐ Strong

Was there earth noise? ☐ No 22 ☐ Faint 23 ☐ Moderate 24 ☐ Loud

Direction of noise ☐ North ☐ South ☐ East ☐ West

Estimated duration of shaking 25 ☐ Sudden, sharp (less than 10 secs) 26 ☐ Long (30-60 secs)
27 ☐ Short (10-30 secs)

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

COMMUNITY REPORT

Town and zip code _____

DO NOT INCLUDE EFFECTS FROM OTHER COMMUNITIES/TOWNS

Check one box for each question that is applicable.

- 3a. The earthquake was felt by ☐ No one 28 ☐ Few 29 ☐ Several 30 ☐ Many 31 ☐ All?

- b. This earthquake awakened ☐ No one 32 ☐ Few 33 ☐ Several 34 ☐ Many 35 ☐ All?

- c. This earthquake frightened ☐ No one 36 ☐ Few 37 ☐ Several 38 ☐ Many 39 ☐ All?

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

Windows, doors, dishes rattled 40 ☐ Yes ☐ No

Walls creaked 41 ☐ Yes ☐ No

Building trembled (shook) 42 ☐ Slightly 43 ☐ Strongly

Hanging pictures (more than one) 44 ☐ Swung 45 ☐ Out of place 46 ☐ Fallen

Windows 47 ☐ Few cracked 48 ☐ Some broken out 49 ☐ Many broken out

Small objects overturned 50 ☐ Few 51 ☐ Many

Small objects fallen 52 ☐ Few 53 ☐ Many

Glassware/dishes broken 54 ☐ Few 55 ☐ Many

Light furniture or small appliances 56 ☐ Overturned 57 ☐ Damaged seriously

Heavy furniture or appliances 58 ☐ Overturned 59 ☐ Damaged seriously

Did hanging objects or doors swing? 60 ☐ Slightly 61 ☐ Moderately 62 ☐ Violently

Can you estimate direction? ☐ North/South ☐ East/West ☐ Other _____

Items thrown from store shelves 63 ☐ Few 64 ☐ Many

Continued on the reverse side

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

5. Indicate effects of the following types to interior walls if any:
 Plaster/stucco 65 ☐ Hairline cracks 66 ☐ Large cracks (many) 67 ☐ Fell in large amounts
 Dry wall 68 ☐ Hairline cracks 69 ☐ Large cracks (many) 70 ☐ Fell in large amounts

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

- Trees and bushes shaken 71 ☐ Slightly 72 ☐ Moderately 73 ☐ Strongly
 Standing vehicles rocked 74 ☐ Slightly 75 ☐ Moderately
 Moving vehicles rocked 76 ☐ Slightly 77 ☐ Moderately
 Water splashed onto sides of lakes, ponds, swimming pools 78 ☐ Yes ☐ No
 Elevated water tanks 79 ☐ Cracked 80 ☐ Twisted 81 ☐ Fallen (thrown down)
 Tombstones 82 ☐ Displaced 83 ☐ Cracked 84 ☐ Rotated
 85 ☐ Fallen
 Chimneys 86 ☐ Cracked 87 ☐ Twisted 88 ☐ Fallen
 89 ☐ Broken at roof line 90 ☐ Bricks fallen
 Railroad tracks bent 91 ☐ Slightly 92 ☐ Greatly
 Stone or brick fences /walls 93 ☐ Open cracks 94 ☐ Fallen 95 ☐ Destroyed
 Underground pipes 96 ☐ Broken 97 ☐ Out of service
 Highways or streets 98 ☐ Large cracks 99 ☐ Large displacements
 Sidewalks 100 ☐ Large cracks 101 ☐ Large displacements

7a. Check below any structural damage to buildings.

- Foundation 102 ☐ Cracked 103 ☐ Destroyed
 Interior walls 104 ☐ Split 105 ☐ Fallen 106 ☐ Separated from ceiling or floor
 Exterior walls 107 ☐ Large Cracks 108 ☐ Bulged outward
 109 ☐ Partial collapse 110 ☐ Total collapse

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

- 111 ☐ Wood 112 ☐ Stone 113 ☐ Brick veneer 114 ☐ Other _____
 115 ☐ Brick 116 ☐ Cinderblock 117 ☐ Reinforced concrete 118 ☐ Mobile home

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

- ☐ Don't know 119 ☐ Sandy soil 120 ☐ Marshy 121 ☐ Fill
 122 ☐ Hard rock 123 ☐ Clay soil 124 ☐ Sandstone, limestone, shale

d. Was the ground: 125 ☐ Level 126 ☐ Sloping 127 ☐ Steep?

e. Check the approximate age of the building:

- 128 ☐ Built before 1935 129 ☐ Built 1935-65 130 ☐ Built after 1965

8. Check below any structural damage to

- Bridges/Overpasses 131 ☐ Concrete 132 ☐ Wood 133 ☐ Steel 134 ☐ Other _____
 Damage was 135 ☐ Slight 136 ☐ Moderate 137 ☐ Severe
 Dams 138 ☐ Concrete 139 ☐ Large earthen
 Damage was 140 ☐ Slight 141 ☐ Moderate 142 ☐ Severe

9. What geologic effects were noted in your community?

- Ground cracks 143 ☐ Wet ground 144 ☐ Steep slopes 145 ☐ Dry and level ground
 Landslides 146 ☐ Small 147 ☐ Large
 Slumping 148 ☐ River bank 149 ☐ Road fill 150 ☐ Land fill
 Were springs or well water disturbed? 151 ☐ Level changed 152 ☐ Flow disturbed
 153 ☐ Muddied ☐ Don't know
 Were rivers or lakes changed? 154 ☐ Yes ☐ No ☐ Don't know

10a. What percentage of buildings were damaged?

- Within 2 city blocks of your location ☐ None 155 ☐ Few (about 5%)
 156 ☐ Many (about 50%) 157 ☐ Most (about 75%)
 b. In area covered by your zip code ☐ None 158 ☐ Few (about 5%)
 159 ☐ Many (about 50%) 160 ☐ Most (about 75%)

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.

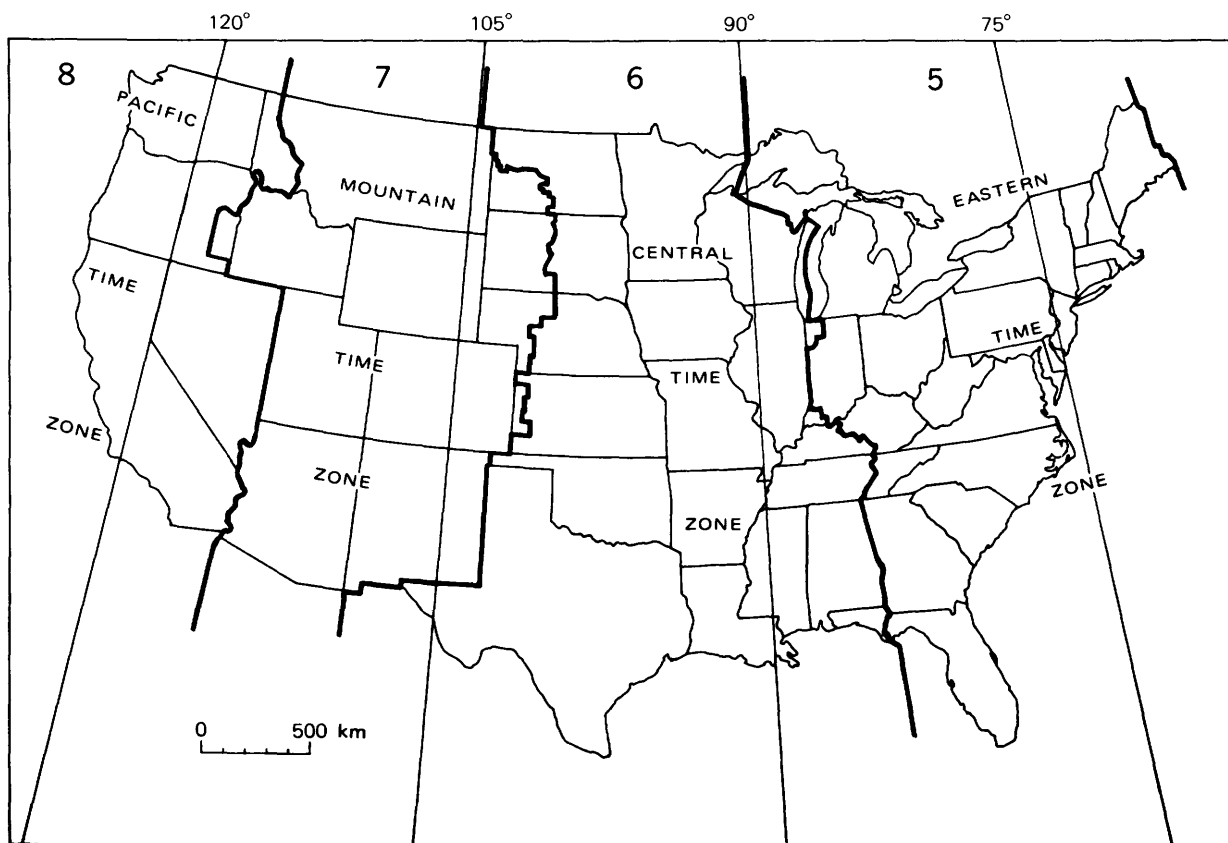


FIGURE 2.--Standard time zones of the conterminous United States. The number in each zone shows the number of hours to be subtracted from Universal Coordinated Time to convert to local standard time. (Subtract 1 hour less for local daylight-saving time.)

listed. The epicenters located by the NEIS usually are accurate to two-tenths of a degree or less. In general, epicenters located offshore are less accurate than those on land, even though they are listed to two decimals. In regions covered by dense networks of seismographs such as California, epicenter accuracy is significantly better than the two-tenths of a degree listed. 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 January-March 1981. The magnitudes represented in these figures are based on ML or Mn; 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 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 source is NEIS.

The magnitude values calculated by 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 vertical surface-wave ground amplitude, in micrometers; T is the period, in seconds, and $18 < T < 22$; and D is the distance, in geocentric degrees (station to epicenter), and $20^\circ < D < 160^\circ$. 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 $0.1 < T < 3.0$, 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 $D \geq 5^\circ$.

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

as defined by Richter (1958, p. 340), where A is

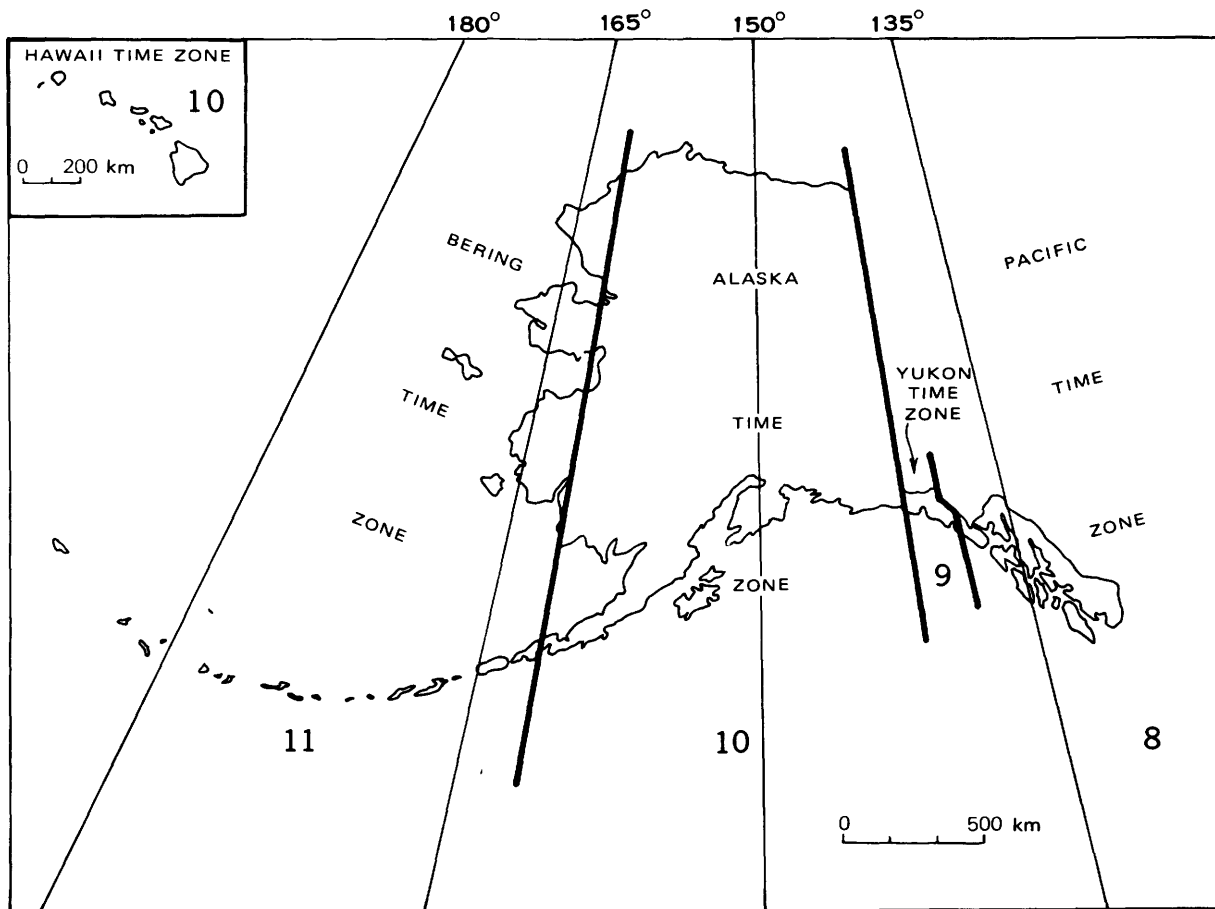


FIGURE 3.--Standard time zones of Alaska and Hawaii. The number in each zone shows the number of hours to be subtracted from Universal Coordinated Time to convert to local standard time. (Subtract 1 hour less for local daylight-saving time.)

the maximum trace amplitude in millimeters, written by a Wood-Anderson torsion seismometer, and $\log A_0$ is a standard value as a function of distance, where the distance is ≤ 600 km. ML values are also calculated from other seismometers by conversion of recorded ground motion to the expected response of the torsion seismometer.

$$M_n = 3.75 + 0.90(\log D) + \log(A/T) \quad (4) \\ 0.5^\circ \leq D < 4^\circ,$$

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

as proposed by Nuttli (1973), where A/T is expressed in micrometers per second, calculated from the vertical-component 1-second L_g 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 P_n or P_g -wave arrival time and the time

the final coda amplitude decreases to the background-noise amplitude. These magnitudes are normally correlated with ML or mbL_g so that resulting magnitudes are compatible. Thus the formulas vary for different geographic regions and seismograph systems.

All of the intensity values (indicated by Roman numerals) listed in this summary were determined, 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 that contain minimal or sketchy information are listed only as "FELT." This does not imply that the earthquake was felt at a low intensity level, but indicates that the available data is not sufficient for assigning a valid intensity value. These reports are filed in the offices of the NEIS or in government archives and are available for detailed study.

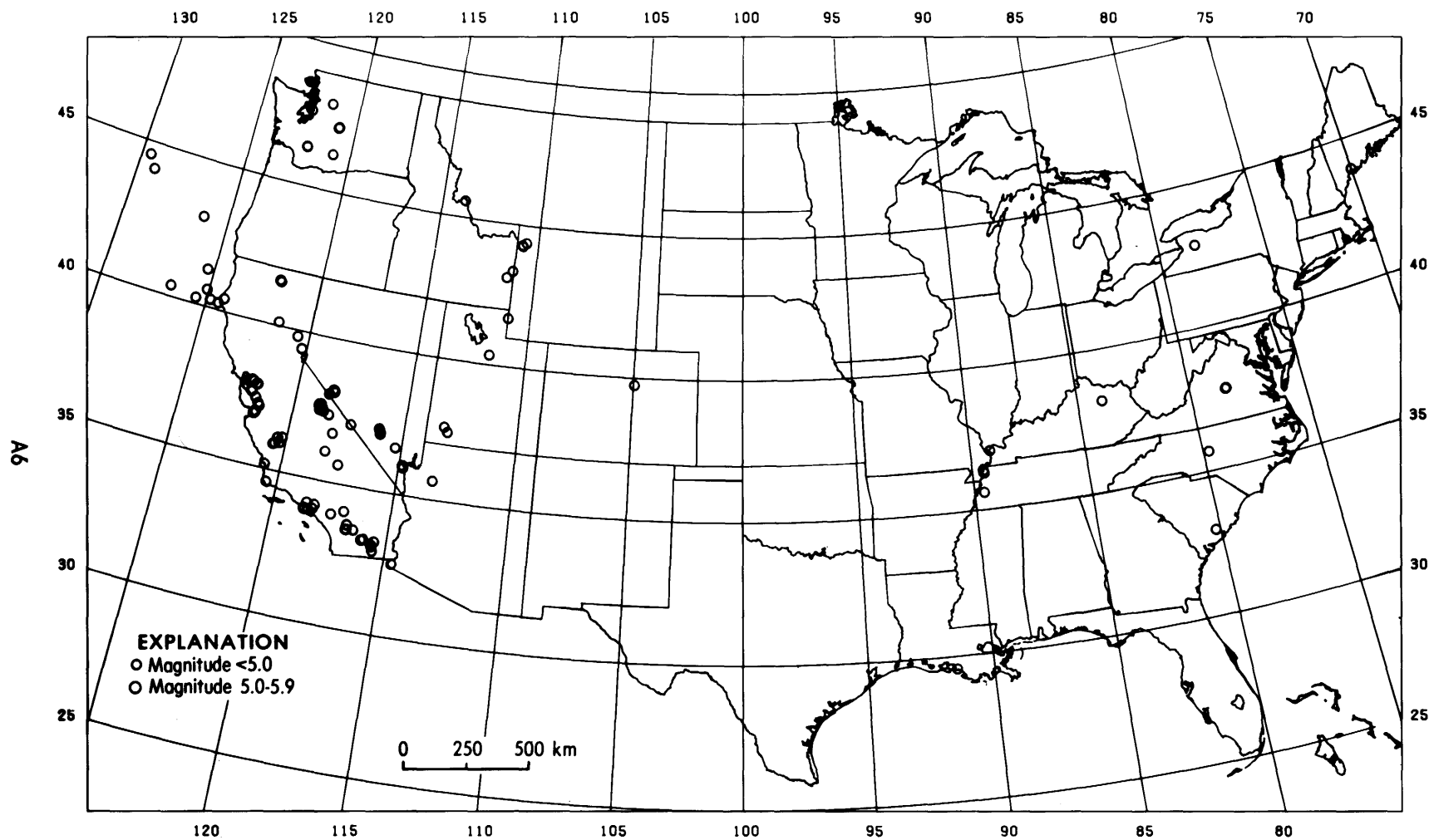


FIGURE 4.--Earthquake epicenters in the conterminous United States for January-March 1981, plotted from table 1.

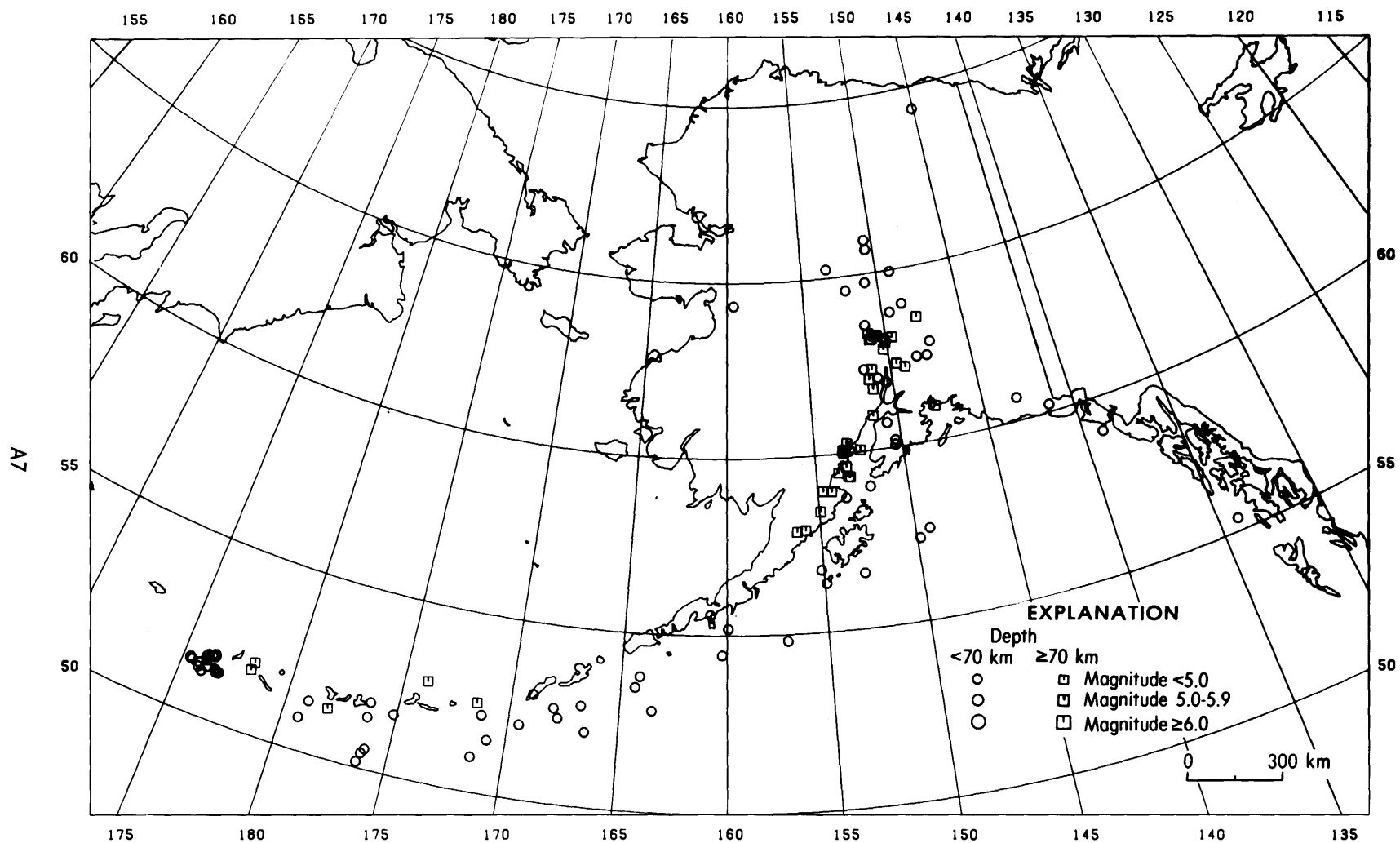


FIGURE 5.—Earthquake epicenters in Alaska for January-March 1981, plotted from table 1.

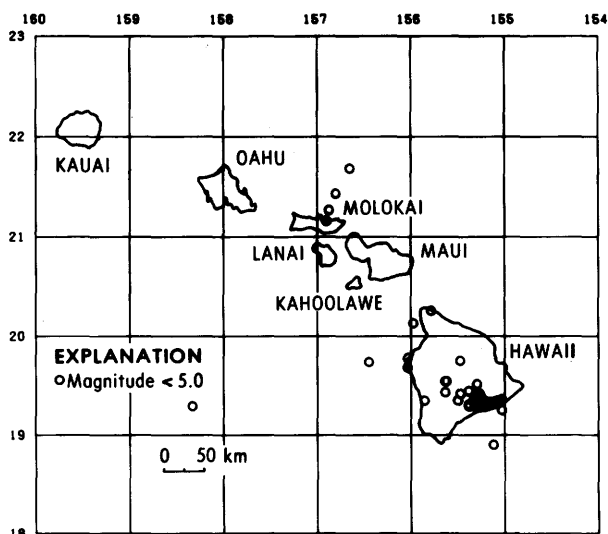


FIGURE 6.--Earthquake epicenters in Hawaii for January-March 1981, plotted from table 1.

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.

Table 1.--Summary of U.S. earthquakes for January-March 1981

[Sources of the hypocenters and magnitudes: (B) University of California, Berkeley; (E) U.S. Department of Energy, Las Vegas, Nevada; (G) U.S. Geological Survey, National Earthquake Information Service; (H) U.S. Geological Survey, Hawaiian Volcano Observatory; (J) Weston Observatory, Massachusetts; (K) Tennessee Earthquake Information Center, Memphis; (L) Lamont-Doherty Geological Observatory, Palisades, N.Y.; (M) National Oceanic and Atmospheric Administration, Alaska Tsunami Warning

Center, Palmer; (P) California Institute of Technology, Pasadena; (S) St. Louis University, St. Louis, Missouri; (U) University of Utah, Salt Lake; (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 (1980)	Origin time (UTC)			Lat	Long	Depth (km)	Magnitude			Maximum intensity	Hypocenter source	Local time					
	hr	min	s				mb	MS	ML or Mn			Date	Hour				
ALASKA																	
JAN.	3	19	05	57.5	59.61 N.	153.28 W.	131	...	...	...	G	JAN.	3	09	A.M.	AST	
JAN.	4	17	34	36.2	51.45 N.	176.28 W.	50	4.5	...	4.0M	III	G	JAN.	4	06	A.M.	BST
JAN.	5	06	03	58.2	51.43 N.	179.03 W.	61	4.7	...	...	...	G	JAN.	4	07	P.M.	BST
JAN.	5	22	01	43.9	61.99 N.	151.36 W.	102	...	...	...	...	G	JAN.	5	12	P.M.	AST
JAN.	6	21	51	51.9	52.50 N.	171.54 W.	76	4.7	...	...	...	G	JAN.	6	10	A.M.	BST
JAN.	7	04	54	43.1	62.01 N.	150.83 W.	63	...	...	...	...	G	JAN.	6	06	P.M.	AST
JAN.	7	16	44	09.4	56.36 N.	154.88 W.	33N	4.8	...	4.5M	...	G	JAN.	7	06	A.M.	AST
JAN.	8	12	50	41.6	61.71 N.	151.23 W.	111	4.0	...	...	...	G	JAN.	8	02	A.M.	AST
JAN.	12	00	39	29.5	54.44 N.	160.25 W.	20	4.5	...	4.3M	...	G	JAN.	11	02	P.M.	AST
JAN.	12	16	33	23.9	52.83 N.	166.79 W.	15	5.0	4.6	...	...	G	JAN.	12	05	A.M.	BST
JAN.	12	21	01	25.2	52.10 N.	166.54 W.	33N	4.2	...	...	...	G	JAN.	12	10	A.M.	BST
JAN.	14	10	17	27.8	52.98 N.	169.05 W.	33N	4.5	...	...	...	G	JAN.	13	11	P.M.	BST
JAN.	14	15	06	43.8	52.08 N.	169.50 W.	21	4.8	4.5	...	...	G	JAN.	14	04	A.M.	BST
JAN.	17	07	48	28.9	60.97 N.	151.42 W.	82	...	...	...	...	G	JAN.	16	09	P.M.	AST
JAN.	18	01	08	39.6	63.12 N.	150.92 W.	152	...	...	...	...	G	JAN.	17	03	P.M.	AST
JAN.	18	12	35	05.6	55.18 N.	159.94 W.	47	4.8	...	...	...	G	JAN.	18	02	A.M.	AST
JAN.	19	04	16	30.2	54.82 N.	157.01 W.	33N	4.7	...	4.9M	...	G	JAN.	18	06	P.M.	AST
JAN.	19	09	28	55.7	63.12 N.	151.02 W.	130	...	...	...	...	G	JAN.	18	11	P.M.	AST
JAN.	19	21	20	04.2	63.28 N.	151.07 W.	124	4.5	...	...	III	G	JAN.	19	11	A.M.	AST
JAN.	20	06	20	59.3	57.91 N.	155.78 W.	84	4.7	...	...	...	G	JAN.	19	08	P.M.	AST
JAN.	20	15	05	41.2	62.98 N.	150.08 W.	100	3.6	...	...	...	G	JAN.	20	05	A.M.	AST
JAN.	20	15	36	54.7	55.36 N.	134.06 W.	15	3.8	...	...	...	G	JAN.	20	07	A.M.	PST
JAN.	24	14	44	04.1	62.33 N.	149.60 W.	85	...	...	...	...	G	JAN.	24	04	A.M.	AST
JAN.	24	18	56	32.1	62.21 N.	149.10 W.	81	...	...	...	...	G	JAN.	24	08	A.M.	AST
JAN.	25	15	39	44.7	65.24 N.	153.28 W.	33N	...	...	...	...	G	JAN.	25	05	A.M.	AST
JAN.	25	18	22	28.3	60.26 N.	153.14 W.	142	...	...	...	...	G	JAN.	25	08	A.M.	AST
JAN.	26	13	54	32.9	64.74 N.	150.79 W.	33N	...	...	2.8M	...	G	JAN.	26	03	A.M.	AST
JAN.	26	18	24	52.1	60.06 N.	150.39 W.	56	4.0	...	...	...	G	JAN.	26	08	A.M.	AST
JAN.	29	00	43	36.9	63.99 N.	148.66 W.	33N	...	...	3.0M	...	G	JAN.	28	02	P.M.	AST
JAN.	29	06	11	05.9	53.48 N.	164.32 W.	33N	4.6	...	4.3M	...	G	JAN.	28	07	P.M.	BST
JAN.	30	08	52	44.1	51.74 N.	176.27 E.	33	6.3	7.0	7.1M	V	G	JAN.	29	09	P.M.	BST
JAN.	30	09	12	19.4	51.68 N.	176.00 E.	21	5.4	...	...	...	G	JAN.	29	10	P.M.	BST
JAN.	30	12	39	39.4	51.32 N.	175.79 E.	33N	4.2	...	...	...	G	JAN.	30	01	A.M.	BST
JAN.	30	14	04	09.4	51.74 N.	176.07 E.	33N	4.6	...	...	...	G	JAN.	30	03	A.M.	BST
JAN.	30	14	49	22.3	51.57 N.	176.08 E.	19	5.6	5.3	...	III	G	JAN.	30	03	A.M.	BST
JAN.	30	17	57	46.5	51.24 N.	176.00 E.	33N	4.7	4.0	...	...	G	JAN.	30	06	A.M.	BST
JAN.	30	18	40	11.7	51.40 N.	176.19 E.	26	4.4	4.6	...	...	G	JAN.	30	07	A.M.	BST
JAN.	30	21	04	16.6	51.63 N.	176.07 E.	33N	4.1	...	...	...	G	JAN.	30	10	A.M.	BST
JAN.	31	06	25	55.0	51.43 N.	175.80 E.	25	4.6	...	4.5M	...	G	JAN.	30	07	P.M.	BST
JAN.	31	13	06	29.5	51.37 N.	178.08 W.	76	4.0	...	...	...	G	JAN.	31	02	A.M.	BST
JAN.	31	23	59	07.2	58.99 N.	152.09 W.	62	4.8	...	...	...	G	JAN.	31	01	P.M.	AST
FEB.	1	13	17	11.3	51.34 N.	176.78 E.	23	5.6	5.5	...	...	G	FEB.	1	02	A.M.	BST
FEB.	1	18	29	47.2	51.35 N.	176.69 E.	36	4.9	...	4.4M	...	G	FEB.	1	07	A.M.	BST
FEB.	4	04	42	55.2	52.83 N.	163.51 W.	33	4.8	...	5.1M	...	G	FEB.	3	05	P.M.	BST
FEB.	4	05	13	19.0	51.34 N.	176.62 E.	33	5.4	5.0	...	...	G	FEB.	3	06	P.M.	BST
FEB.	4	06	06	34.4	51.41 N.	176.56 E.	33	4.4	...	...	...	G	FEB.	3	07	P.M.	BST
FEB.	5	08	43	19.6	57.58 N.	149.24 W.	33	4.1	...	3.2M	...	G	FEB.	4	10	P.M.	AST
FEB.	5	10	52	02.3	50.17 N.	176.27 W.	33	5.7	5.0	4.6M	...	G	FEB.	4	11	P.M.	BST
FEB.	7	03	59	11.8	60.65 N.	143.06 W.	33	...	...	3.7M	...	G	FEB.	6	05	P.M.	AST
FEB.	7	05	42	55.4	60.72 N.	150.69 W.	65	...	...	...	...	G	FEB.	6	07	P.M.	AST
FEB.	8	04	46	38.4	64.35 N.	159.55 W.	33	3.9	...	4.4M	...	G	FEB.	7	06	P.M.	AST
FEB.	9	14	35	21.1	60.08 N.	153.26 W.	149	...	...	...	...	G	FEB.	9	04	A.M.	AST
FEB.	11	16	02	26.7	59.32 N.	153.12 W.	109	4.1	...	...	...	G	FEB.	11	06	A.M.	AST
FEB.	12	10	56	34.6	56.76 N.	155.13 W.	45	4.5	...	3.4M	...	G	FEB.	12	00	A.M.	AST
FEB.	12	23	34	25.9	59.03 N.	138.95 W.	15	3.8	...	...	...	G	FEB.	12	02	P.M.	YST
FEB.	13	01	02	57.5	60.21 N.	141.34 W.	15	...	...	4.0M	...	G	FEB.	12	03	P.M.	AST
FEB.	13	10	57	31.5	50.56 N.	176.07 W.	33	4.0	...	3.4M	...	G	FEB.	12	11	P.M.	BST
FEB.	13	16	46	23.1	51.87 N.	176.29 W.	65	4.5	...	...	III	G	FEB.	13	05	A.M.	BST

Table 1.--Summary of U.S. earthquakes for January-March 1981--Continued

Date (1980)	Origin time (UTC)			Lat	Long	Depth (km)	Magnitude			Maximum intensity	Hypocenter source	Local time			
	hr	min	s				mb	MS	ML or Mn			Date	Hour		
ALASKA--Continued															
FEB. 13	20	17	27.0	52.82 N.	173.96 W.	151	4.7	...	...	...	G	FEB. 13	09	A.M.	BST
FEB. 15	01	38	50.7	65.95 N.	150.49 W.	69	...	...	...	...	G	FEB. 14	03	P.M.	AST
FEB. 15	08	31	53.9	61.85 N.	150.37 W.	18	...	...	3.1M	...	G	FEB. 14	10	P.M.	AST
FEB. 15	12	39	50.4	57.87 N.	156.24 W.	140	4.0	...	...	...	G	FEB. 15	02	A.M.	AST
FEB. 15	13	06	24.9	50.98 N.	171.45 W.	33	5.1	...	...	...	G	FEB. 15	02	A.M.	BST
FEB. 15	14	26	15.3	51.51 N.	170.87 W.	53	4.4	...	...	...	G	FEB. 15	03	A.M.	BST
FEB. 16	10	00	42.2	58.40 N.	154.92 W.	89	3.9	...	...	...	G	FEB. 16	00	A.M.	AST
FEB. 16	18	11	41.4	65.68 N.	150.50 W.	33	...	...	3.0M	...	G	FEB. 16	08	A.M.	AST
FEB. 17	02	41	00.3	63.20 N.	150.73 W.	123	4.8	...	...	...	G	FEB. 16	04	P.M.	AST
FEB. 18	23	44	20.6	50.90 N.	179.25 W.	35	4.7	...	...	...	G	FEB. 18	12	P.M.	BST
FEB. 19	10	43	42.0	57.34 N.	149.84 W.	33	4.1	...	...	...	G	FEB. 19	00	A.M.	AST
FEB. 19	10	47	04.5	51.75 N.	178.10 E.	97	4.3	...	...	...	G	FEB. 18	11	P.M.	BST
FEB. 20	06	17	41.1	51.97 N.	178.16 E.	137	5.0	...	...	...	G	FEB. 19	07	P.M.	BST
FEB. 20	09	11	15.6	63.11 N.	149.61 W.	105	...	...	...	...	G	FEB. 19	11	P.M.	AST
FEB. 22	09	51	16.9	62.30 N.	151.60 W.	32	...	...	3.1M	...	G	FEB. 21	11	P.M.	AST
FEB. 23	03	07	33.1	62.28 N.	151.17 W.	97	...	...	...	...	G	FEB. 22	05	P.M.	AST
FEB. 23	06	26	30.1	52.17 N.	171.26 W.	33	4.6	...	...	...	G	FEB. 22	07	P.M.	BST
FEB. 23	13	03	07.6	60.20 N.	150.35 W.	46	4.5	...	4.3M	IV	G	FEB. 23	03	A.M.	AST
FEB. 24	22	04	18.5	64.96 N.	149.11 W.	23	4.4	...	4.5M	IV	G	FEB. 24	12	P.M.	AST
FEB. 25	18	13	48.5	50.42 N.	176.18 W.	33	4.9	...	4.4M	...	G	FEB. 25	07	A.M.	BST
FEB. 27	07	50	29.5	64.59 N.	152.17 W.	33	...	...	...	...	G	FEB. 26	09	P.M.	AST
FEB. 27	16	36	56.6	51.81 N.	176.37 E.	49	5.1	4.0	4.8M	...	G	FEB. 27	05	A.M.	BST
MAR. 2	14	30	40.6	63.55 N.	151.20 W.	25	4.3	...	4.6M	IV	G	MAR. 2	04	A.M.	AST
MAR. 3	12	07	39.0	63.21 N.	150.57 W.	142	...	...	...	...	G	MAR. 3	02	A.M.	AST
MAR. 5	20	05	35.7	69.35 N.	145.07 W.	33	...	...	3.4M	...	G	MAR. 5	10	A.M.	AST
MAR. 5	21	07	22.2	56.58 N.	152.90 W.	33	4.9	4.0	3.8M	...	G	MAR. 5	11	A.M.	AST
MAR. 6	06	44	31.2	60.05 N.	152.41 W.	104	3.9	...	...	...	G	MAR. 5	08	P.M.	AST
MAR. 8	00	42	36.8	53.80 N.	164.17 W.	48	4.4	...	...	...	G	MAR. 7	01	P.M.	BST
MAR. 8	07	06	41.2	59.31 N.	153.21 W.	114	...	...	...	...	G	MAR. 7	09	P.M.	AST
MAR. 9	16	51	51.6	60.09 N.	153.40 W.	143	...	...	...	...	G	MAR. 9	06	A.M.	AST
MAR. 13	04	59	34.1	63.08 N.	150.04 W.	33	...	...	3.0M	...	G	MAR. 12	06	P.M.	AST
MAR. 13	17	28	06.1	62.80 N.	150.27 W.	119	...	...	...	...	G	MAR. 13	07	A.M.	AST
MAR. 13	23	13	39.8	62.80 N.	147.35 W.	70	...	...	...	...	G	MAR. 13	01	P.M.	AST
MAR. 15	07	48	29.2	55.58 N.	160.83 W.	41	4.8	...	4.5M	...	G	MAR. 14	09	P.M.	AST
MAR. 17	23	33	18.7	62.44 N.	148.31 W.	32	3.6	...	3.1M	...	G	MAR. 17	01	P.M.	AST
MAR. 19	05	55	59.6	63.55 N.	147.90 W.	80	...	...	...	...	G	MAR. 18	07	P.M.	AST
MAR. 19	18	35	54.7	59.46 N.	153.74 W.	124	...	...	...	...	G	MAR. 19	08	A.M.	AST
MAR. 21	23	01	37.4	58.97 N.	154.70 W.	136	5.0	...	...	IV	G	MAR. 21	01	P.M.	AST
MAR. 22	10	41	45.1	51.68 N.	175.15 W.	42	4.4	...	4.2M	...	G	MAR. 21	11	P.M.	BST
MAR. 23	02	21	32.3	60.01 N.	153.39 W.	167	...	...	...	...	G	MAR. 22	04	P.M.	AST
MAR. 24	18	18	05.0	52.41 N.	167.80 W.	33	4.5	...	4.1M	...	G	MAR. 24	07	A.M.	BST
MAR. 24	18	21	27.9	52.67 N.	168.04 W.	33	5.5	5.3	5.5M	...	G	MAR. 24	07	A.M.	BST
MAR. 24	18	58	51.5	60.97 N.	147.75 W.	90	...	...	...	...	G	MAR. 24	08	A.M.	AST
MAR. 26	01	56	07.6	62.43 N.	147.64 W.	33	...	...	3.3M	...	G	MAR. 25	03	P.M.	AST
MAR. 26	10	13	48.2	51.74 N.	176.41 E.	59	4.4	...	...	...	G	MAR. 25	11	P.M.	BST
MAR. 28	09	20	44.0	58.94 N.	154.26 W.	133	...	...	...	...	G	MAR. 27	11	P.M.	AST
MAR. 28	09	48	10.5	63.82 N.	149.51 W.	33	...	...	3.0M	...	G	MAR. 27	11	P.M.	AST
MAR. 29	13	33	09.9	51.46 N.	175.45 E.	33	5.1	3.9	4.7M	...	G	MAR. 29	02	A.M.	BST
MAR. 29	14	25	36.7	51.50 N.	175.34 E.	39	4.6	...	4.5M	...	G	MAR. 29	03	A.M.	BST
MAR. 29	15	57	39.6	51.46 N.	175.34 E.	29	4.8	...	3.9M	...	G	MAR. 29	04	A.M.	BST
MAR. 31	05	59	11.3	58.72 N.	153.46 W.	69	4.1	...	...	...	G	MAR. 30	07	P.M.	AST
ARIZONA															
JAN. 12	08	59	13.2	35.66 N.	113.47 W.	5	...	...	3.5G	...	G	JAN. 12	01	A.M.	MST
MAR. 16	06	12	45.7	32.57 N.	114.68 W.	5	...	...	3.1P	...	P	MAR. 15	10	P.M.	PST
CALIFORNIA															
JAN. 1	18	22	22.4	38.05 N.	118.57 W.	5	...	...	4.2B	FELT	B	JAN. 1	10	A.M.	PST
JAN. 2	15	03	09.5	36.05 N.	118.28 W.	6	...	...	3.1P	...	P	JAN. 2	07	A.M.	PST
JAN. 2	18	12	46.1	39.77 N.	120.54 W.	5	...	...	3.5B	FELT	B	JAN. 2	10	A.M.	PST
JAN. 3	13	34	44.6	34.57 N.	120.47 W.	13	...	...	2.6P	FELT	P	JAN. 3	05	A.M.	PST
JAN. 5	02	52	17.9	37.96 N.	122.06 W.	8	...	...	3.0B	III	B	JAN. 4	06	P.M.	PST

Table 1.--Summary of U.S. earthquakes for January-March 1981--Continued

Date (1980)	Origin time (UTC)			Lat	Long	Depth (km)	Magnitude			Maximum intensity	Hypocenter source	Local time					
	hr	min	s				mb	MS	ML or Mn			Date	Hour				
CALIFORNIA--Continued																	
JAN.	7	11	42	32.9	36.87 N.	121.63 W.	6	4.3	...	4.5B	V	B	JAN.	7	03	A.M.	PST
JAN.	7	18	34	35.5	36.86 N.	121.61 W.	2	...	...	3.0B	...	B	JAN.	7	10	A.M.	PST
JAN.	8	14	52	16.7	33.93 N.	118.68 W.	12	...	...	3.2P	IV	P	JAN.	8	06	A.M.	PST
JAN.	9	06	45	51.7	41.53 N.	121.84 W.	5	...	...	3.3B	...	G	JAN.	8	10	P.M.	PST
JAN.	9	12	44	35.9	41.58 N.	121.92 W.	8	...	...	3.2B	FELT	B	JAN.	9	04	A.M.	PST
JAN.	10	00	36	15.9	41.56 N.	121.88 W.	5	...	...	3.6B	FELT	B	JAN.	9	04	P.M.	PST
JAN.	10	06	34	33.1	34.13 N.	118.25 W.	9	...	...	2.5P	FELT	P	JAN.	9	10	P.M.	PST
JAN.	10	14	19	41.7	37.65 N.	118.85 W.	10	...	...	3.1P	...	P	JAN.	10	06	A.M.	PST
JAN.	11	04	44	32.8	35.97 N.	120.47 W.	7	...	...	3.2B	FELT	B	JAN.	10	08	P.M.	PST
JAN.	12	20	42	00.3	37.55 N.	118.85 W.	6	...	...	3.1P	...	P	JAN.	12	12	P.M.	PST
JAN.	13	04	21	36.7	37.65 N.	118.92 W.	6	...	...	3.1P	...	P	JAN.	12	08	P.M.	PST
JAN.	15	12	47	51.3	37.38 N.	121.74 W.	9	4.8	4.0	4.8B	V	B	JAN.	15	04	A.M.	PST
JAN.	15	15	17	04.3	37.63 N.	118.87 W.	6	...	...	3.0P	...	P	JAN.	15	07	A.M.	PST
JAN.	16	07	01	16.3	37.60 N.	118.90 W.	6	...	...	3.2P	...	P	JAN.	15	11	P.M.	PST
JAN.	17	00	09	37.1	35.92 N.	120.53 W.	5	...	...	3.4P	FELT	P	JAN.	16	04	P.M.	PST
JAN.	18	20	19	55.7	33.50 N.	116.77 W.	4	...	...	3.7P	...	P	JAN.	18	12	P.M.	PST
JAN.	23	04	41	12.2	37.13 N.	117.38 W.	9	...	...	3.7P	...	P	JAN.	22	08	P.M.	PST
JAN.	23	22	13	03.6	33.13 N.	115.62 W.	7	...	...	3.0P	...	P	JAN.	23	02	P.M.	PST
JAN.	26	10	20	57.7	33.92 N.	117.53 W.	15	...	...	2.9P	FELT	P	JAN.	26	02	A.M.	PST
JAN.	27	04	47	33.5	33.25 N.	115.97 W.	1	...	...	2.8P	FELT	P	JAN.	26	08	P.M.	PST
JAN.	27	22	10	53.8	36.84 N.	121.63 W.	6	...	...	4.1B	V	B	JAN.	27	02	P.M.	PST
JAN.	28	04	00	16.1	33.98 N.	118.33 W.	4	...	...	3.1P	FELT	P	JAN.	27	08	P.M.	PST
JAN.	29	08	41	33.1	40.14 N.	121.53 W.	5	...	...	3.5B	...	B	JAN.	29	00	A.M.	PST
JAN.	30	01	54	13.4	33.93 N.	118.50 W.	11	...	...	3.2P	IV	P	JAN.	29	05	P.M.	PST
JAN.	31	05	23	19.9	36.22 N.	120.19 W.	5	...	...	3.3B	FELT	B	JAN.	30	09	P.M.	PST
JAN.	31	06	30	15.6	37.17 N.	121.57 W.	9	...	...	3.5B	FELT	B	JAN.	30	10	P.M.	PST
FEB.	1	11	30	06.9	33.50 N.	116.77 W.	3	...	...	3.7P	IV	P	FEB.	1	03	A.M.	PST
FEB.	1	19	27	07.8	33.50 N.	116.78 W.	2	...	...	3.4P	...	P	FEB.	1	11	A.M.	PST
FEB.	2	09	15	15.9	37.42 N.	118.68 W.	5	...	...	3.4P	...	P	FEB.	2	01	A.M.	PST
FEB.	5	13	38	10.9	33.50 N.	116.78 W.	4	...	...	3.2P	FELT	P	FEB.	5	05	A.M.	PST
FEB.	5	18	57	24.9	33.50 N.	116.77 W.	3	...	...	3.3P	...	P	FEB.	5	10	A.M.	PST
FEB.	6	08	13	33.0	37.58 N.	118.90 W.	5	...	...	3.1P	...	P	FEB.	6	00	A.M.	PST
FEB.	6	08	44	39.5	37.57 N.	118.90 W.	5	...	...	3.0P	...	P	FEB.	6	00	A.M.	PST
FEB.	11	00	07	53.2	37.92 N.	121.96 W.	5	...	...	2.5B	FELT	G	FEB.	10	04	P.M.	PST
FEB.	11	04	41	06.5	35.99 N.	120.27 W.	15	...	...	3.5B	...	B	FEB.	10	08	P.M.	PST
FEB.	11	08	47	28.6	37.85 N.	121.80 W.	17	...	...	3.1B	...	B	FEB.	11	00	A.M.	PST
FEB.	13	15	01	45.3	37.60 N.	118.90 W.	5	...	...	3.3P	...	P	FEB.	13	07	A.M.	PST
FEB.	18	10	49	24.5	36.72 N.	118.10 W.	6	...	...	3.0P	...	P	FEB.	18	02	A.M.	PST
FEB.	21	04	15	52.8	36.85 N.	121.67 W.	8	...	...	3.0B	FELT	B	FEB.	20	08	P.M.	PST
FEB.	21	15	09	51.9	33.52 N.	116.47 W.	9	...	...	3.3P	...	P	FEB.	21	07	A.M.	PST
FEB.	21	21	45	40.2	33.22 N.	116.07 W.	1	...	...	3.0P	...	P	FEB.	21	01	P.M.	PST
FEB.	21	22	56	16.5	33.67 N.	116.75 W.	14	...	...	3.4P	FELT	P	FEB.	21	02	P.M.	PST
FEB.	23	02	00	48.8	37.11 N.	121.52 W.	3	...	...	3.1B	FELT	B	FEB.	22	06	P.M.	PST
FEB.	23	06	12	51.7	35.17 N.	120.68 W.	5	...	...	3.4B	FELT	B	FEB.	22	10	P.M.	PST
FEB.	23	13	07	09.2	36.18 N.	120.41 W.	7	...	...	3.0B	FELT	B	FEB.	23	05	A.M.	PST
FEB.	24	02	56	10.4	36.88 N.	121.62 W.	5	...	...	3.0B	FELT	B	FEB.	23	06	P.M.	PST
FEB.	24	09	12	00.5	36.83 N.	121.68 W.	5	...	...	3.2B	FELT	B	FEB.	24	01	A.M.	PST
FEB.	24	20	29	58.5	37.63 N.	118.92 W.	3	...	...	3.0P	...	P	FEB.	24	12	P.M.	PST
FEB.	24	20	49	35.1	33.95 N.	118.67 W.	6	...	...	2.4P	FELT	P	FEB.	24	12	P.M.	PST
FEB.	27	15	11	12.6	34.17 N.	118.60 W.	16	...	...	3.5P	V	P	FEB.	27	07	A.M.	PST
FEB.	28	07	46	34.6	37.62 N.	118.88 W.	5	...	...	3.0P	...	P	FEB.	27	11	P.M.	PST
MAR.	3	10	45	12.8	37.55 N.	121.94 W.	8	4.2	4.0	4.4B	VI	B	MAR.	3	02	A.M.	PST
MAR.	3	12	02	52.7	32.92 N.	115.55 W.	6	...	...	2.3P	FELT	P	MAR.	3	04	A.M.	PST
MAR.	5	05	28	54.8	37.56 N.	118.91 W.	9	4.3	...	4.1B	IV	B	MAR.	4	09	P.M.	PST
MAR.	5	15	07	39.2	37.63 N.	118.93 W.	4	...	3.8P	3.5B	III	B	MAR.	5	07	A.M.	PST
MAR.	8	11	11	42.9	33.07 N.	115.60 W.	7	...	...	3.1P	FELT	P	MAR.	8	03	A.M.	PST
MAR.	8	11	17	09.2	33.07 N.	115.60 W.	8	...	...	3.5P	V	P	MAR.	8	03	A.M.	PST
MAR.	10	23	29	28.8	37.32 N.	118.41 W.	5	...	3.3P	3.6B	III	B	MAR.	10	03	P.M.	PST
MAR.	10	23	56	33.9	36.85 N.	121.67 W.	4	...	...	3.4B	FELT	B	MAR.	10	03	P.M.	PST
MAR.	12	03	58	54.8	33.23 N.	115.53 W.	5	...	...	2.5P	FELT	P	MAR.	11	07	P.M.	PST
MAR.	12	14	06	42.7	33.23 N.	115.53 W.	5	...	...	3.2P	FELT	P	MAR.	12	06	A.M.	PST
MAR.	15	11	21	38.7	37.84 N.	121.78 W.	5	...	...	3.1B	...	B	MAR.	15	03	A.M.	PST
MAR.	16	03	28	15.1	35.65 N.	117.60 W.	5	...	...	3.0P	...	P	MAR.	15	07	P.M.	PST
MAR.	16	04	53	53.0	37.61 N.	118.85 W.	4	...	...	3.6B	FELT	B	MAR.	15	08	P.M.	PST
MAR.	16	13	10	57.3	36.62 N.	115.30 W.	5	...	...	3.0P	...	P	MAR.	16	05	A.M.	PST

Table 1.--Summary of U.S. earthquakes for January-March 1981--Continued

Date (1980)	Origin time (UTC)			Lat	Long	Depth (km)	Magnitude			Maximum intensity	Hypocenter source	Local time					
	hr	min	s				mb	MS	ML or Mn			Date	Hour				
CALIFORNIA--Continued																	
MAR.	18	06	07	11.8	34.10 N.	117.00 W.	12	...	...	4.0P	V	P	MAR.	17	10	P.M.	PST
MAR.	21	05	38	46.6	40.45 N.	124.22 W.	5	...	...	3.2B	III	B	MAR.	20	09	P.M.	PST
MAR.	21	19	05	04.9	37.62 N.	118.86 W.	5	...	3.1P	3.3B	...	B	MAR.	21	11	A.M.	PST
MAR.	24	04	09	09.1	37.50 N.	118.76 W.	5	...	3.3P	3.4B	...	B	MAR.	23	08	P.M.	PST
MAR.	25	00	06	15.4	37.59 N.	118.84 W.	5	...	3.2P	3.2B	...	G	MAR.	24	04	P.M.	PST
MAR.	25	04	01	43.9	37.57 N.	118.91 W.	10	...	3.5P	3.4B	...	B	MAR.	24	08	P.M.	PST
MAR.	28	04	39	59.8	39.40 N.	120.23 W.	5	...	...	3.3B	...	B	MAR.	27	08	P.M.	PST
MAR.	28	05	04	37.8	39.39 N.	120.24 W.	5	...	...	3.8B	FELT	B	MAR.	27	09	P.M.	PST
MAR.	29	11	53	30.0	37.57 N.	118.87 W.	6	...	...	3.0P	...	P	MAR.	29	03	A.M.	PST
MAR.	30	12	38	49.9	40.26 N.	124.46 W.	5	4.4	...	4.2B	IV	B	MAR.	30	04	A.M.	PST
MAR.	30	15	05	13.4	37.46 N.	118.89 W.	12	...	3.0P	3.2B	...	B	MAR.	30	07	A.M.	PST
CALIFORNIA--OFF THE COAST																	
JAN.	4	09	29	41.4	41.30 N.	125.31 W.	15	3.5	...	3.4B	...	G	JAN.	4	01	A.M.	PST
FEB.	19	05	56	36.2	40.60 N.	125.09 W.	15	...	...	3.5B	...	G	FEB.	18	09	P.M.	PST
MAR.	15	06	07	41.7	40.21 N.	125.51 W.	5	4.5	4.5	4.7B	III	B	MAR.	14	10	P.M.	PST
MAR.	27	16	16	38.3	40.38 N.	126.76 W.	5	...	...	4.2B	...	B	MAR.	27	08	A.M.	PST
MAR.	31	02	10	33.8	40.29 N.	124.84 W.	5	4.0	...	3.9B	...	B	MAR.	30	06	P.M.	PST
COLORADO																	
MAR.	24	13	03	40.0	39.75 N.	104.94 W.	5	...	...	2.8G	FELT	G	MAR.	24	06	A.M.	MST
HAWAII																	
JAN.	2	08	31	49.5	19.35 N.	155.50 W.	30	...	...	3.4H	...	H	JAN.	1	10	P.M.	HST
JAN.	2	17	42	08.0	19.30 N.	155.23 W.	10	...	...	3.6H	II	H	JAN.	2	07	A.M.	HST
JAN.	3	13	04	40.1	20.26 N.	155.78 W.	28	...	...	3.9H	III	H	JAN.	3	03	A.M.	HST
JAN.	5	16	04	37.1	19.45 N.	155.39 W.	8	...	...	3.1H	...	H	JAN.	5	06	A.M.	HST
JAN.	7	04	14	05.4	18.90 N.	155.12 W.	52	...	...	4.1H	III	H	JAN.	6	06	P.M.	HST
JAN.	7	20	16	46.4	19.42 N.	155.27 W.	16	...	...	3.4H	...	H	JAN.	7	10	A.M.	HST
JAN.	12	14	18	10.6	19.36 N.	155.30 W.	31	4.4	...	4.5H	V	H	JAN.	12	04	A.M.	HST
JAN.	12	14	30	17.1	19.29 N.	155.31 W.	33	...	...	4.0H	IV	H	JAN.	12	04	A.M.	HST
JAN.	12	15	07	48.9	19.33 N.	155.28 W.	33	...	...	4.0H	IV	H	JAN.	12	05	A.M.	HST
JAN.	12	21	21	41.1	19.52 N.	155.30 W.	33	4.1	...	4.3H	IV	H	JAN.	12	11	A.M.	HST
JAN.	14	04	13	31.5	19.35 N.	155.26 W.	15	...	...	3.1H	III	H	JAN.	13	06	P.M.	HST
JAN.	14	04	20	16.5	19.37 N.	155.32 W.	29	4.5	...	4.3H	V	H	JAN.	13	06	P.M.	HST
JAN.	15	00	36	53.0	19.43 N.	155.63 W.	0	...	...	3.1H	...	H	JAN.	14	02	P.M.	HST
JAN.	15	09	16	34.3	19.30 N.	158.33 W.	15	...	...	3.3H	...	H	JAN.	14	11	P.M.	HST
JAN.	16	00	37	12.0	19.32 N.	155.29 W.	34	...	...	3.8H	V	H	JAN.	15	02	P.M.	HST
JAN.	18	11	25	53.5	19.42 N.	155.28 W.	2	...	...	3.4H	V	H	JAN.	18	01	A.M.	HST
JAN.	20	04	21	40.4	19.31 N.	155.22 W.	9	...	...	3.0H	II	H	JAN.	19	06	P.M.	HST
JAN.	22	13	39	02.5	19.78 N.	156.03 W.	41	...	...	3.8H	III	H	JAN.	22	03	A.M.	HST
JAN.	25	01	30	34.5	19.36 N.	155.25 W.	9	...	...	3.4H	II	H	JAN.	24	03	P.M.	HST
FEB.	9	06	03	59.9	19.35 N.	155.85 W.	11	...	...	3.0H	...	H	FEB.	8	08	P.M.	HST
FEB.	9	16	02	44.0	19.54 N.	155.62 W.	11	...	...	3.8H	III	H	FEB.	9	06	A.M.	HST
FEB.	9	23	34	11.1	19.55 N.	155.63 W.	10	...	...	3.0H	...	H	FEB.	9	01	P.M.	HST
FEB.	11	05	34	02.1	19.33 N.	155.13 W.	9	...	...	3.0H	...	H	FEB.	10	07	P.M.	HST
FEB.	11	14	44	31.2	19.30 N.	155.38 W.	3	...	...	3.0H	...	H	FEB.	11	04	A.M.	HST
FEB.	14	05	52	44.2	19.30 N.	155.39 W.	6	...	...	3.3H	IV	H	FEB.	13	07	P.M.	HST
FEB.	19	06	07	49.7	19.31 N.	155.39 W.	6	...	...	3.5H	...	H	FEB.	18	08	P.M.	HST
FEB.	21	21	37	12.1	19.33 N.	155.11 W.	9	...	...	3.1H	...	H	FEB.	21	11	A.M.	HST
FEB.	24	23	45	57.5	19.33 N.	155.19 W.	8	...	...	3.0H	...	H	FEB.	24	01	P.M.	HST
FEB.	25	02	11	42.3	20.13 N.	155.98 W.	53	...	...	3.1H	...	H	FEB.	24	04	P.M.	HST
FEB.	25	10	20	27.4	19.33 N.	155.21 W.	9	...	...	3.0H	...	H	FEB.	25	00	A.M.	HST
MAR.	1	17	01	21.3	19.36 N.	155.03 W.	9	4.7	...	4.3H	IV	H	MAR.	1	07	A.M.	HST
MAR.	2	08	19	45.2	19.33 N.	155.13 W.	9	...	...	3.0H	...	H	MAR.	1	10	P.M.	HST
MAR.	5	01	56	45.7	19.42 N.	155.47 W.	11	...	...	4.1H	IV	H	MAR.	4	03	P.M.	HST
MAR.	5	02	00	27.2	19.42 N.	155.47 W.	11	...	...	3.4H	III	H	MAR.	4	04	P.M.	HST
MAR.	5	14	09	40.8	21.43 N.	156.80 W.	0	5.0	...	5.1H	VI	G	MAR.	5	04	A.M.	HST
MAR.	5	14	16	15.7	21.27 N.	156.87 W.	1	...	...	3.4H	...	H	MAR.	5	04	A.M.	HST
MAR.	6	02	43	36.4	21.16 N.	156.91 W.	0	4.5	...	4.9H	III	G	MAR.	5	04	P.M.	HST
MAR.	6	15	19	08.1	21.68 N.	156.66 W.	15	...	...	3.6H	...	H	MAR.	6	05	A.M.	HST

Table 1.--Summary of U.S. earthquakes for January-March 1981--Continued

Date (1980)	Origin time (UTC)			Lat	Long	Depth (km)	Magnitude			Maximum intensity	Hypocenter source	Local time					
	hr	min	s				mb	MS	ML or Mn			Date	Hour				
HAWAII--Continued																	
MAR.	6	19	57	46.9	19.35 N.	155.50 W.	11	...	...	3.1H	...	H	MAR.	6	09	A.M.	HST
MAR.	7	03	56	00.7	19.74 N.	156.44 W.	15	...	...	4.0H	IV	H	MAR.	6	05	P.M.	HST
MAR.	9	13	27	45.2	19.35 N.	155.05 W.	9	...	...	3.3H	III	H	MAR.	9	03	A.M.	HST
MAR.	11	23	23	09.0	19.37 N.	155.03 W.	6	...	...	3.1H	III	H	MAR.	11	01	P.M.	HST
MAR.	12	08	37	44.9	19.25 N.	155.03 W.	44	...	...	3.7H	III	H	MAR.	11	10	P.M.	HST
MAR.	15	06	26	14.5	19.30 N.	155.39 W.	7	...	...	3.1H	...	H	MAR.	14	08	P.M.	HST
MAR.	15	08	23	21.3	19.37 N.	155.23 W.	31	...	...	3.2H	III	H	MAR.	14	10	P.M.	HST
MAR.	16	06	17	19.6	19.37 N.	155.23 W.	31	...	...	4.0H	IV	H	MAR.	15	08	P.M.	HST
MAR.	18	05	43	17.8	19.69 N.	156.03 W.	9	...	...	3.0H	...	H	MAR.	17	07	P.M.	HST
MAR.	25	16	25	05.3	19.76 N.	155.47 W.	17	...	...	3.3H	III	H	MAR.	25	06	A.M.	HST
MAR.	26	11	55	40.2	19.35 N.	155.08 W.	9	...	...	3.2H	II	H	MAR.	26	01	A.M.	HST
MAR.	30	19	06	14.0	19.33 N.	155.33 W.	9	...	...	3.6H	III	H	MAR.	30	09	A.M.	HST
IDAHO																	
FEB.	9	22	53	36.7	43.12 N.	111.36 W.	5	...	...	3.0G	III	G	FEB.	9	03	P.M.	MST
MAR.	26	00	21	28.2	43.36 N.	111.11 W.	5	...	...	3.0G	...	G	MAR.	25	05	P.M.	MST
KENTUCKY																	
JAN.	14	21	10	33.9	38.20 N.	83.91 W.	11	...	...	1.5K	FELT	K	JAN.	14	04	P.M.	EST
FEB.	11	14	42	57.4	37.06 N.	89.13 W.	2	...	...	3.0S	IV	S	FEB.	11	08	A.M.	CST
LOUISIANA																	
FEB.	18	06	33	48.2	29.56 N.	91.46 W.	5	...	...	3.0K	...	K	FEB.	18	00	A.M.	CST
MAINE																	
JAN.	4	09	17	10.2	43.89 N.	70.01 W.	0	...	...	2.6J	FELT	J	JAN.	4	04	A.M.	EST
MONTANA																	
MAR.	2	21	58	46.9	45.57 N.	113.88 W.	5	...	...	3.5G	...	G	MAR.	2	02	P.M.	MST
NEVADA																	
JAN.	11	18	25	38.1	38.15 N.	118.35 W.	5	...	...	3.3P	...	G	JAN.	11	10	A.M.	PST
JAN.	15	20	25	00.1	37.09 N.	116.05 W.	0	5.6	...	5.5B	...	E	JAN.	15	12	P.M.	PST
JAN.	24	16	14	18.7	38.23 N.	118.43 W.	5	...	...	3.0P	...	P	JAN.	24	08	A.M.	PST
JAN.	28	20	08	50.5	38.17 N.	118.35 W.	18	4.5	...	4.5B	IV	B	JAN.	28	12	P.M.	PST
FEB.	5	18	00	00.1	37.01 N.	116.03 W.	0	...	...	3.2G	...	E	FEB.	5	10	A.M.	PST
FEB.	25	15	00	00.8	37.18 N.	116.08 W.	0	...	...	3.0G	...	E	FEB.	25	07	A.M.	PST
MAR.	12	17	28	08.8	36.03 N.	114.84 W.	2	...	...	2.8G	FELT	G	MAR.	12	09	A.M.	PST
MAR.	13	00	09	06.6	35.95 N.	114.80 W.	2	...	...	3.2G	FELT	G	MAR.	12	04	P.M.	PST
MAR.	23	08	52	30.7	38.19 N.	118.37 W.	5	...	3.3P	3.5B	...	B	MAR.	23	00	A.M.	PST
NEW YORK																	
MAR.	31	21	05	14.2	42.86 N.	78.26 W.	6	...	...	2.8L	...	L	MAR.	31	04	P.M.	EST
NORTH CAROLINA																	
MAR.	4	20	44	42.6	35.71 N.	79.75 W.	5	...	...	2.8V	IV	G	MAR.	4	03	P.M.	EST
OREGON--OFF THE COAST																	
JAN.	7	04	34	25.9	43.03 N.	126.18 W.	15	3.9	...	...	...	G	JAN.	6	08	P.M.	PST
JAN.	20	10	32	15.2	44.11 N.	129.19 W.	15	4.6	3.9	...	...	G	JAN.	20	02	A.M.	PST
FEB.	3	04	19	21.4	44.55 N.	129.57 W.	15	4.0	...	...	...	G	FEB.	2	08	P.M.	PST

Table 1.--Summary of U.S. earthquakes for January-March 1981--Continued

Date (1980)	Origin time (UTC)			Lat	Long	Depth (km)	Magnitude			Maximum intensity	Hypocenter source	Local time					
	hr	min	s				mb	MS	ML or Mn			Date	Hour				
SOUTH CAROLINA																	
MAR.	19	04	33	55.7	32.96 N.	80.19 W.	6	...	...	2.5G	III	G	MAR.	18	11	P.M.	EST
TENNESSEE																	
JAN.	2	14	31	23.0	36.36 N.	89.51 W.	5	...	...	2.3K	IV	K	JAN.	2	08	A.M.	CST
JAN.	3	19	05	21.2	36.29 N.	89.49 W.	5	...	...	1.8K	FELT	K	JAN.	3	01	P.M.	CST
FEB.	8	16	52	58.5	35.62 N.	89.60 W.	5	...	...	3.0G	IV	K	FEB.	8	10	A.M.	CST
UTAH																	
JAN.	16	10	26	29.8	37.45 N.	113.10 W.	1	...	...	3.4U	IV	U	JAN.	16	03	A.M.	MST
JAN.	16	14	50	45.7	37.45 N.	113.10 W.	4	...	...	3.2U	IV	U	JAN.	16	07	A.M.	MST
FEB.	1	02	21	48.0	37.60 N.	113.28 W.	5	...	...	3.8U	FELT	U	FEB.	0	07	P.M.	MST
FEB.	20	09	13	01.4	40.33 N.	111.72 W.	7	4.7	...	3.9U	VI	U	FEB.	20	02	A.M.	MST
MAR.	31	20	40	45.5	41.70 N.	111.03 W.	2	...	...	3.1U	...	U	MAR.	31	01	P.M.	MST
VIRGINIA																	
FEB.	11	13	44	16.4	37.72 N.	78.44 W.	6	...	...	3.4V	IV	V	FEB.	11	08	A.M.	EST
FEB.	11	13	50	31.4	37.75 N.	78.41 W.	10	...	...	3.2V	IV	V	FEB.	11	08	A.M.	EST
FEB.	11	13	51	38.6	37.72 N.	78.45 W.	7	...	...	2.9V	III	V	FEB.	11	08	A.M.	EST
WASHINGTON																	
JAN.	13	01	21	42.2	48.54 N.	122.88 W.	10	...	...	3.0G	V	G	JAN.	12	05	P.M.	PST
JAN.	23	16	46	47.3	47.60 N.	122.42 W.	23	...	...	2.9G	FELT	W	JAN.	23	08	A.M.	PST
FEB.	2	01	23	17.2	46.28 N.	120.88 W.	5	3.9	...	4.0G	IV	G	FEB.	1	05	P.M.	PST
FEB.	14	06	09	27.2	46.35 N.	122.24 W.	7	5.1	4.8	5.5G	VI	W	FEB.	13	10	P.M.	PST
FEB.	14	06	50	58.5	46.35 N.	122.23 W.	17	...	...	3.0G	...	W	FEB.	13	10	P.M.	PST
FEB.	14	06	53	17.8	46.33 N.	122.23 W.	18	...	...	2.9G	...	W	FEB.	13	10	P.M.	PST
FEB.	14	08	43	45.9	46.35 N.	122.25 W.	12	4.6	...	3.4G	...	W	FEB.	14	00	A.M.	PST
FEB.	14	21	27	43.8	46.34 N.	122.23 W.	7	...	...	3.6G	V	W	FEB.	14	01	P.M.	PST
FEB.	18	06	09	38.7	47.21 N.	120.90 W.	0	...	...	4.2G	VI	W	FEB.	17	10	P.M.	PST
MAR.	6	14	19	05.8	47.26 N.	120.84 W.	5	...	...	2.9G	III	G	MAR.	6	06	A.M.	PST
MAR.	15	07	24	06.0	47.99 N.	121.49 W.	4	...	...	3.4G	FELT	W	MAR.	14	11	P.M.	PST
WYOMING																	
MAR.	6	13	44	42.4	44.39 N.	110.57 W.	1	...	...	1.5G	III	G	MAR.	6	06	A.M.	MST
MAR.	12	14	12	02.2	44.27 N.	110.76 W.	1	...	...	3.8G	IV	G	MAR.	12	07	A.M.	MST
MAR.	12	14	19	38.2	44.29 N.	110.76 W.	2	...	...	3.1G	II	G	MAR.	12	07	A.M.	MST
MAR.	12	14	22	44.6	44.30 N.	110.76 W.	4	...	...	2.5G	III	G	MAR.	12	07	A.M.	MST
MAR.	12	14	23	55.2	44.29 N.	110.75 W.	5	...	...	2.5G	...	G	MAR.	12	07	A.M.	MST
MAR.	12	14	29	32.1	44.29 N.	110.75 W.	4	...	...	2.6G	III	G	MAR.	12	07	A.M.	MST
MAR.	12	14	41	12.6	44.27 N.	110.75 W.	0	...	...	2.6G	...	G	MAR.	12	07	A.M.	MST
MAR.	12	14	48	13.7	44.28 N.	110.76 W.	2	...	...	3.0G	III	G	MAR.	12	07	A.M.	MST
MAR.	12	15	00	22.4	44.26 N.	110.75 W.	1	...	...	2.6G	III	G	MAR.	12	08	A.M.	MST
MAR.	12	15	12	02.2	44.29 N.	110.75 W.	1	...	...	2.5G	II	G	MAR.	12	08	A.M.	MST
MAR.	12	15	55	41.9	44.28 N.	110.76 W.	1	...	...	3.4G	III	G	MAR.	12	08	A.M.	MST
MAR.	12	17	09	09.0	44.29 N.	110.75 W.	1	...	...	3.1G	III	G	MAR.	12	10	A.M.	MST

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981

[Sources of the hypocenters, magnitudes, and macroseismic data: (B) University of California, Berkeley; (E) U.S. Department of Energy, Las Vegas, Nevada; (G) U.S. Geological Survey, National Earthquake Information Service; (H) U.S. Geological Survey, Hawaiian Volcano Observatory; (J) Weston Observatory, Massachusetts; (K) Tennessee Earthquake Information Center, Memphis; (L) Lamont-Doherty Geological Observatory, Palisades, N.Y.; (M) National Oceanic and Atmospheric Administration, Alaska Tsunami Warning Center, Palmer; (P) California Institute of Technology, Pasadena; (S) St. Louis University, St. Louis, Missouri; (U) University of Utah, Salt Lake; (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

4 January (G) Andreanof Islands, Aleutian Islands

Origin time: 17 34 36.2
Epicenter: 51.45 N., 176.28 W.
Depth: 50 km
Magnitude: 4.5 mb(G), 4.0 ML(M)
Intensity III: Adak (M).

19 January (G) Central Alaska

Origin time: 21 20 04.2
Epicenter: 63.28 N., 151.07 W.
Depth: 124 km
Magnitude: 4.5 mb(G)
Intensity III: Anchorage and Palmer (M).

30 January (G) Rat Islands, Aleutian Islands

Origin time: 08 52 44.1
Epicenter: 51.74 N., 176.27 E.
Depth: 33 km
Magnitude: 6.3 mb(G), 7.0 MS(G),
7.1 MS(B), 6.3 mb(B),
7.1 ML(M), 6.7 MS(P)

Intensity V: Shemya Air Force Base (hanging objects swung moderately, small objects overturned and fell, glassware and dishes broke, few windows cracked, felt by many).

30 January (G) Rat Islands, Aleutian Islands

Origin time: 14 49 22.3
Epicenter: 51.57 N., 176.08 E.
Depth: 19 km
Magnitude: 5.6 mb(G), 5.3 MS(G),
5.5 MS(B)
Intensity III: Shemya (M).

13 February (G) Andreanof Islands, Aleutian Islands

Origin time: 16 46 23.1
Epicenter: 51.87 N., 176.29 W.
Depth: 65 km
Magnitude: 4.5 mb(G)
Intensity III: Adak (M).

23 February (G) Southern Alaska

Origin time: 13 03 07.6
Epicenter: 60.20 N., 150.35 W.
Depth: 46 km

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

Alaska--Continued

Magnitude: 4.5 mb(G), 4.3 ML(M)
Intensity IV: Homer, Kenai (M), Moose Pass (M); Seward (M).

24 February (G) Central Alaska

Origin time: 22 04 18.5
Epicenter: 64.96 N., 149.11 W.
Depth: 23 km
Magnitude: 4.4 mb(G), 4.5 ML(M)
Intensity IV: Ester, Fairbanks.
Intensity III: Fort Wainwright, Nenana.

2 March (G) Central Alaska

Origin time: 14 30 40.6
Epicenter: 63.55 N., 151.20 W.
Depth: 25 km
Magnitude: 4.3 mb(G), 4.6 ML(M)
Intensity IV: Medfra.

21 March (G) Alaska Peninsula

Origin time: 23 01 37.4
Epicenter: 58.97 N., 154.70 W.
Depth: 136 km
Magnitude: 5.0 mb(G)
Intensity IV: Clam Gulch, Homer.
Intensity III: Kenai.
Intensity II: Tyonek.
Felt: Anchorage (M), Kodiak (M), Soldotna (M).

California

1 January (B) California-Nevada border region

Origin time: 18 22 22.4

See Nevada listing.

2 January (B) Northern California

Origin time: 18 12 46.1
Epicenter: 39.77 N., 120.54 W.
Depth: 5 km
Magnitude: 3.5 ML(B)

Felt at Graeagle, Loyalton, and Quincy (press report).

3 January (P) Southern California

Origin time: 13 34 44.6
Epicenter: 34.57 N., 120.47 W.
Depth: 13 km
Magnitude: 2.6 ML(P)

Felt at Lompoc (P).

5 January (B) Central California

Origin time: 02 52 17.9
Epicenter: 37.96 N., 122.06 W.

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

California--Continued	
Depth:	8 km
Magnitude:	3.0 ML(B)
Felt in central Contra Costa County (press report).	
<u>Intensity III:</u> Concord (press report), Pleasant Hill (press report), Martinez (press report), Walnut Creek.	
7 January (B) Central California	
Origin time:	11 42 32.9
Epicenter:	36.87 N., 121.63 W.
Depth:	6 km
Magnitude:	4.3 mb(G), 4.5 ML(B)
<u>Intensity V:</u> The most common effects at the places listed below were hairline cracks in plaster and drywall, few windows cracked, small objects overturned and fell, hanging pictures out of place, felt by and awakened many. Ben Lomond, Boulder Creek, Freedom, Monterey, Moss Landing, Pacific Grove, San Martin, Soquel.	
<u>Intensity IV:</u> Aptos, Aromas, Capitola, Castroville, Davenport, Felton, Gilroy, Half Moon Bay, Hercules, La Honda, Morgan Hill, Mount Hermon, Oakland, Pescadero, Redwood Estates, Ross, Salinas, San Carlos, San Jose, San Juan Bautista (press report), Santa Cruz, Sunnyvale, Watsonville.	
<u>Intensity III:</u> Bolinas, Chualar, Marina, San Mateo, Seaside, South San Francisco.	
<u>Intensity II:</u> Byron, Hollister, Patterson.	
<u>Felt:</u> Daly City (Westlake district--press report).	
8 January (P) Southern California	
Origin time:	14 52 16.7
Epicenter:	33.93 N., 118.68 W.
Depth:	12 km
Magnitude:	3.2 ML(P)
<u>Intensity IV:</u> Malibu (press report), North Hollywood (press report), Redondo Beach (press report), Santa Monica, Topanga.	
<u>Intensity III:</u> Marina Del Rey, Venice.	
<u>Felt:</u> Canoga Park, West Los Angeles, and Westchester (P).	
9 January (B) Northern California	
Origin time:	12 44 35.9
Epicenter:	41.58 N., 121.92 W.
Depth:	8 km
Magnitude:	3.2 ML(B)
This is one of a series of earthquakes in this area beginning on January 7 that totaled more than 100 events by January 14.	
Felt at Tennant (B).	

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

California--Continued	
10 January (B) Northern California	
Origin time:	00 36 15.9
Epicenter:	41.56 N., 121.88 W.
Depth:	5 km
Magnitude:	3.6 ML(B)
Felt at Tennant (B).	
10 January (P) Southern California	
Origin time:	06 34 33.1
Epicenter:	34.13 N., 118.25 W.
Depth:	9 km
Magnitude:	2.5 ML(P)
Felt at Glendale (P).	
11 January (B) Central California	
Origin time:	04 44 32.8
Epicenter:	35.97 N., 120.47 W.
Depth:	7 km
Magnitude:	3.2 ML(B), 3.2 ML(P)
Felt at Paso Robles (B) and San Luis Obispo (P).	
15 January (B) Central California	
Origin time:	12 47 51.3
Epicenter:	37.38 N., 121.74 W.
Depth:	9 km
Magnitude:	4.8 mb(G), 4.0 MS(G), 4.8 ML(B)
This earthquake was felt over an area of approximately 18,700 sq km and was described as "sharp" in the Salinas-Hollister area and mild and "rolling" in San Francisco (fig. 7).	
<u>Intensity V:</u> The most common effects at the places listed below were few items thrown from store shelves, small objects overturned and fell, hanging pictures swung, felt by and awakened many. Ben Lomond, Cupertino, Mountain View (hanging pictures fell), Redwood Estates, San Jose (hairline cracks in plaster walls), San Martin, Santa Clara, Sonora (few windows cracked), Soquel.	
<u>Intensity IV:</u> Aptos, Aromas, Brisbane, Capitola, Carmel Valley, Castroville, Coarsegold, Concord, Daly City, Davenport, East Palo Alto, Felton, Foster City, Fremont, Gilroy, Half Moon Bay, Hickman, Hollister (knocked out power in some areas for a couple of minutes--press report), La Grange, La Honda, Livermore, Los Gatos,	

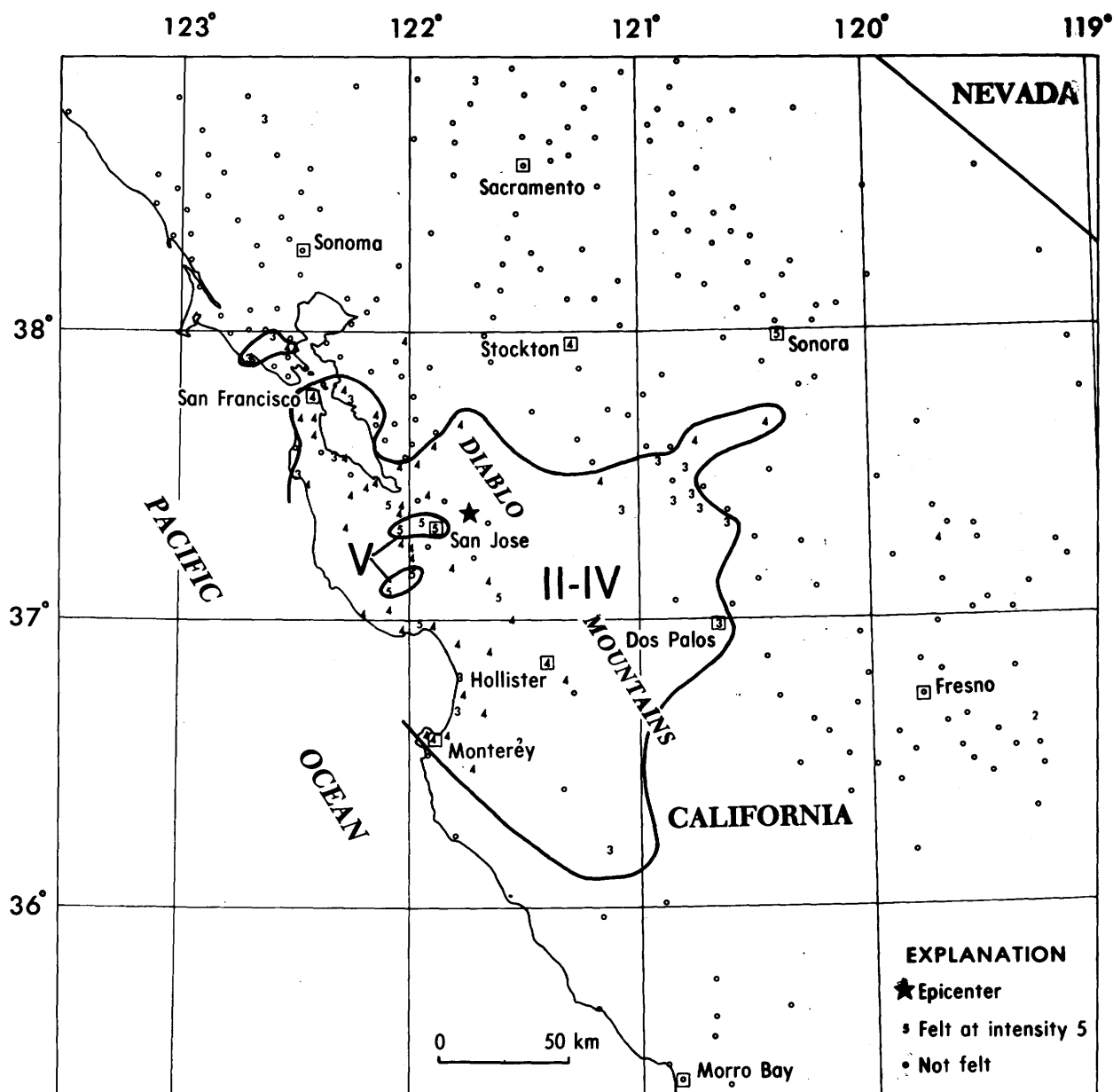


FIGURE 7.--Isoseismal map for the central California earthquake of 15 January 1981, 12 47 51.3 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

California--Continued	
Menlo Park, Milpitas, Moffett Field (telegraphic report), Monte Sereno, Monterey, Morgan Hill, Mount Hermon, New Almaden, Newark, Oakland, Pacific Grove, Patterson, Redwood City, Ross, Salinas (radio station KDON was knocked off the air for a few seconds--press report), San Francisco, San Leandro, Santa Cruz, Saratoga, Scotts Valley, Seaside, South San Francisco, Stockton, Sunnyvale, Sunol, Tres Pinos, Watsonville.	
<u>Intensity III</u> : Alameda, Atwater, Bolinas, Crows Landing, Delhi, Denair, Dos Palos, El Granada, Fairfax, Hilmar, Keyes, King City, Livingston, Marina, Middletown, Moss Landing, Robbins, San Mateo.	
<u>Intensity II</u> : Chualar, Orange Cove.	
<u>Felt</u> : Berkeley (B), Merced (press report), Modesto (B).	
17 January (P) Central California	
Origin time: 00 09 37.1	
Epicenter: 35.92 N., 120.53 W.	
Depth: 5 km	
Magnitude: 3.4 ML(P), 3.1 ML(B)	
Felt in northern San Luis Obispo County (press report).	
22 January Southern California	
Origin time: 20 50	
Epicenter: Not located.	
Depth: None computed.	
Magnitude: None computed.	
<u>Intensity IV</u> : Morongo Valley.	
<u>Intensity III</u> : Yucca Valley.	
26 January (P) Southern California	
Origin time: 10 20 57.7	
Epicenter: 33.92 N., 117.53 W.	
Depth: 15 km	
Magnitude: 2.9 ML(P)	
Felt at Riverside (P).	
27 January (P) Imperial Valley area	
Origin time: 04 47 33.5	
Epicenter: 33.25 N., 115.97 W.	
Depth: 1 km	
Magnitude: 2.8 ML(P)	
Felt in the Imperial Valley (P).	
27 January (B) Central California	
Origin time: 22 10 53.8	
Epicenter: 36.84 N., 121.63 W.	
Depth: 6 km	
Magnitude: 4.1 ML(B)	
<u>Intensity V</u> : San Jose (few windows	

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

California--Continued	
cracked, small objects overturned and fell, glassware and dishes broke, hanging objects swung slightly, felt by many).	
<u>Intensity IV</u> : Aromas, Freedom, Moss Landing.	
<u>Intensity III</u> : Los Gatos, Soquel, Watsonville.	
<u>Intensity II</u> : Castroville, Mount Hamilton, New Almaden.	
<u>Felt</u> : Gilroy, Hollister (B), Monterey (B).	
28 January (P) Southern California	
Origin time: 04 00 16.1	
Epicenter: 33.98 N., 118.33 W.	
Depth: 4 km	
Magnitude: 3.1 ML(P)	
Felt at Culver City, Echo Park, Hollywood, and the Wilshire district of Los Angeles (press report).	
28 January (B) Owens Valley area	
Origin time: 20 08 50.5	
See Nevada listing.	
30 January (P) Southern California	
Origin time: 01 54 13.4	
Epicenter: 33.93 N., 118.50 W.	
Depth: 11 km	
Magnitude: 3.2 ML(P)	
<u>Intensity V</u> : West Los Angeles (books were knocked from shelves and furniture was jostled--press report).	
<u>Intensity IV</u> : Malibu.	
<u>Intensity III</u> : Venice.	
<u>Felt</u> : Pasadena (P), Santa Monica (P).	
31 January (B) Central California	
Origin time: 05 23 19.9	
Epicenter: 36.22 N., 120.19 W.	
Depth: 5 km	
Magnitude: 3.3 ML(B), 3.8 ML(P)	
<u>Intensity IV</u> : Coalinga.	
31 January (B) Central California	
Origin time: 06 30 15.6	
Epicenter: 37.17 N., 121.57 W.	
Depth: 9 km	
Magnitude: 3.5 ML(B)	
Felt at Gilroy and Morgan Hill (B).	
1 February (P) Southern California	
Origin time: 11 30 06.9	
Epicenter: 33.50 N., 116.77 W.	
Depth: 3 km	

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

California--Continued	
Magnitude:	3.7 ML(P)
Intensity IV:	Palomar Mountain.
5 February (P) Southern California	
Origin time:	13 38 10.9
Epicenter:	33.50 N., 116.78 W.
Depth:	4 km
Magnitude:	3.2 ML(P)
Felt at Hemet (P).	
11 February (G) Central California	
Origin time:	00 07 53.2
Epicenter:	37.92 N., 121.96 W.
Depth:	5 km
Magnitude:	2.5 ML(B)
Felt in Contra Costa County (press report).	
21 February (B) Central California	
Origin time:	04 15 52.8
Epicenter:	36.85 N., 121.67 W.
Depth:	8 km
Magnitude:	3.0 ML(B)
Felt at Salinas (B).	
21 February (P) Southern California	
Origin time:	22 56 16.5
Epicenter:	33.67 N., 116.75 W.
Depth:	14 km
Magnitude:	3.4 ML(P)
Felt at Palm Springs (P).	
23 February (B) Central California	
Origin time:	02 00 48.8
Epicenter:	37.11 N., 121.52 W.
Depth:	3 km
Magnitude:	3.1 ML(B)
Felt in the Coyote Lake area (B).	
23 February (B) Southern California	
Origin time:	06 12 51.7
Epicenter:	35.17 N., 120.68 W.
Depth:	5 km
Magnitude:	3.4 ML(B), 3.4 ML(P)
Felt at Arroyo Grande, Grover City, and San Luis Obispo (P).	
23 February (B) Central California	
Origin time:	13 07 09.2
Epicenter:	36.18 N., 120.41 W.
Depth:	7 km
Magnitude:	3.0 ML(B)
Felt at Coalinga (B).	

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

California--Continued	
24 February (B) Central California	
Origin time:	02 56 10.4
Epicenter:	36.88 N., 121.62 W.
Depth:	5 km
Magnitude:	3.0 ML(B)
Felt at Salinas (B).	
24 February (B) Central California	
Origin time:	09 12 00.5
Epicenter:	36.83 N., 121.68 W.
Depth:	5 km
Magnitude:	3.2 ML(B)
Felt at Salinas (B).	
24 February (P) Southern California	
Origin time:	20 49 35.1
Epicenter:	33.95 N., 118.67 W.
Depth:	6 km
Magnitude:	2.4 ML(P).
Felt at Redondo Beach (P).	
27 February (P) Southern California	
Origin time:	15 11 12.6
Epicenter:	34.17 N., 118.60 W.
Depth:	16 km
Magnitude:	3.5 ML(P)
Intensity V:	Mission Hills (few windows cracked, few small objects overturned and fell, glassware and dishes broke, hanging pictures swung).
Intensity IV:	Altadena, Calabasas Park, Canoga Park, Granada Hills, North Hollywood, Northridge, Santa Monica, Simi Valley, Topanga, Van Nuys.
Intensity III:	Beverly Hills, Burbank (press report), Encino, Glendale (press report), Montrose, San Fernando, South Pasadena, Venice.
Intensity II:	Castaic.
Felt:	La Crescenta (P), Malibu (press report), West Los Angeles (press report).
3 March (B) Central California	
Origin time:	10 45 12.8
Epicenter:	37.55 N., 121.94 W.
Depth:	8 km
Magnitude:	4.2 mb(G), 4.0 MS(G), 4.4 ML(B)

This earthquake was felt over an area of approximately 4,900 sq km from Monterey to Marin County (fig. 8). There was a roaring sound and rolling motion interrupted by a sharp jolt associated with the quake.

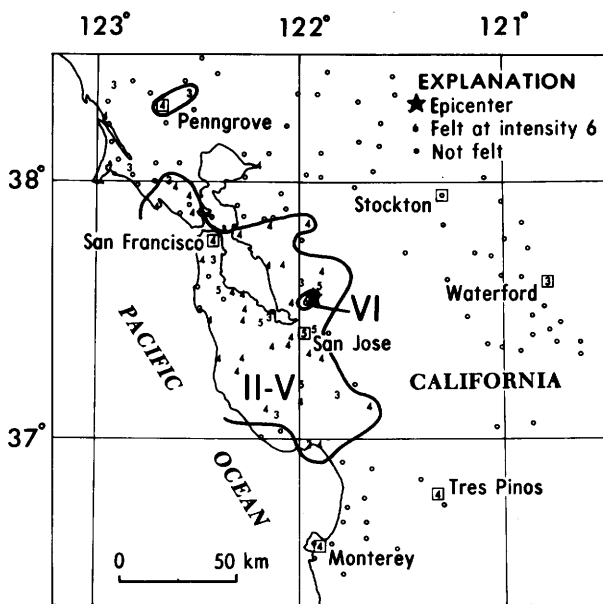


FIGURE 8.--Isoseismal map for the central California earthquake of 3 March 1981, 10 45 12.8 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

Table 2.--Summary of macroseismic data for U.S. earthquakes, January-March 1981--Continued

California--Continued

Intensity VI: Fremont (a rockslide blocked the Niles Canyon Road 1 1/2 miles east of Mission Boulevard between Fremont and Sunol, but workers quickly cleared away the debris. A worker at a 7-Eleven Store reported wine bottles, soda pop, medicine, books, and coffee pots were knocked from shelves. Burglar alarms were set off when store windows were broken out--press reports.).

Intensity V: The most common effects at the places listed below were hairline cracks in plaster walls, few windows cracked, few items thrown from store shelves, small objects overturned and fell, felt by and awakened many). Alviso, Los Gatos, Menlo Park, Millbrae, Milpitas, Sunol.

Intensity IV: Aptos, Bolinas, Boulder Creek, Castro Valley, Daly City, Diablo, Dillon Beach, Fairfax, Foster City, Half Moon Bay, Holy City, La Honda, Loma Mar, Los Altos, Mill Valley, Moffatt Field (telegraphic report), Monterey, Moraga, Morgan Hill, Newark, Oakland, Pennngrove,

Table 2.--Summary of macroseismic data for U.S. earthquakes, January-March 1981

California--Continued

Pleasanton, Port Costa, Redwood City, Redwood Estates, Ross, San Carlos, San Francisco, San Gregorio, San Jose, San Lorenzo, San Mateo, Santa Clara, Sunnyvale, Tres Pinos, Union City.

Intensity III: Brisbane, Brookdale, East Palo Alto, El Granada, Freestone, Glen Ellen, New Almaden, Point Reyes, San Francisco Airport, Waterford, Woodacre.

Intensity II: Capitola, Hickman.

Felt: Hayward (press report), Mount Hamilton, Richmond (press report).

3 March (P) Imperial Valley

Origin time: 12 02 52.7
Epicenter: 32.92 N., 115.55 W.
Depth: 6 km
Magnitude: 2.3 ML(P)

Felt at Brawley (P).

4 March Southern California

Origin time: 21 04
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.
Intensity IV: Atascadero.

5 March (B) Owens Valley area

Origin time: 05 28 54.8
Epicenter: 37.56 N., 118.91 W.
Depth: 9 km
Magnitude: 4.3 mb(G), 4.1 ML(B), 4.0 ML(P)

Felt in northern Inyo and southern Mono Counties (press report).

Intensity IV: Bishop, Grant Grove area of Kings Canyon National Park, Mammoth Lakes, Piedra, Shaver Lake.

Intensity III: Big Creek, Fish Camp, Mariposa, Oakhurst, Wawona.

Intensity II: Prather.

5 March (B) Owens Valley area

Origin time: 15 07 39.2
Epicenter: 37.63 N., 118.93 W.
Depth: 4 km
Magnitude: 3.5 ML(B), 3.8 ML(P)

Felt in northern Inyo and southern Mono Counties (press report).

Intensity III: Wawona.

8 March (P) Imperial Valley area

Origin time: 11 11 42.9
Epicenter: 33.07 N., 115.60 W.

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

California--Continued	
Depth:	7 km
Magnitude:	3.1 ML(P)
Felt in the Imperial Valley (P).	
8 March (P) Imperial Valley	
Origin time:	11 17 09.2
Epicenter:	33.07 N., 115.60 W.
Depth:	8 km
Magnitude:	3.5 ML(P)
Many people were awakened in the Imperial Valley (press report).	
<u>Intensity V:</u> Westmorland (few small objects overturned; hanging pictures swung; buildings trembled; windows, doors, and dishes rattled; felt by and awakened many).	
<u>Intensity IV:</u> El Centro.	
10 March (B) Owens Valley area	
Origin time:	23 29 28.8
Epicenter:	37.32 N., 118.41 W.
Depth:	5 km
Magnitude:	3.6 ML(B), 3.3 ML(P)
<u>Intensity III:</u> Bishop.	
10 March (B) Central California	
Origin time:	23 56 33.9
Epicenter:	36.85 N., 121.67 W.
Depth:	4 km
Magnitude:	3.4 ML(B)
Felt at Salinas and Watsonville (B).	
12 March (P) Imperial Valley area	
Origin time:	03 58 54.8
Epicenter:	33.23 N., 115.53 W.
Depth:	5 km
Magnitude:	2.5 ML(P)
Felt in the Imperial Valley (P).	
12 March (P) Imperial Valley area	
Origin time:	14 06 42.7
Epicenter:	33.23 N., 115.53 W.
Depth:	5 km
Magnitude:	3.2 ML(P)
Felt at Brawley (P).	
16 March (B) Owens Valley area	
Origin time:	04 53 53.0

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

California--Continued	
Epicenter:	37.61 N., 118.85 W.
Depth:	4 km
Magnitude:	3.6 ML(B), 3.8 ML(P)
Felt in the Mammoth Lakes area (B).	
18 March (P) Southern California	
Origin time:	06 07 11.8
Epicenter:	34.10 N., 117.00 W.
Depth:	12 km
Magnitude:	4.0 ML(P)
<u>Intensity V:</u> The most common effects at the places listed below were a few cracked windows, few items thrown from store shelves, few small objects overturned and fell, glassware and dishes broke, hanging objects swung slightly, felt by many and awakened several.	
Angelus Oaks, Big Bear City, Desert Hot Springs (hairline cracks in plaster and dry wall), Mentone.	
<u>Intensity IV:</u> Beaumont, Fawnskin, Forest Falls, Hemet, Idyllwild, Lake Arrowhead, Loma Linda, Perris, Riverside, San Bernardino, White Water.	
<u>Intensity III:</u> Bloomington, Blue Jay, Crestline, Green Valley Lake, Highland, Landers, Lucerne Valley, Patton, Morongo Valley, Quail Valley, Redlands (press report), Twin Peaks, Yucaipa.	
<u>Intensity II:</u> Calimesa, North Palm Springs.	
21 March (B) Northern California	
Origin time:	05 38 46.6
Epicenter:	40.45 N., 124.22 W.
Depth:	5 km
Magnitude:	3.2 ML(B)
<u>Intensity III:</u> Rio Dell.	
28 March (B) Northern California	
Origin time:	05 04 37.8
Epicenter:	39.39 N., 120.24 W.
Depth:	5 km
Magnitude:	3.8 ML(B)
Felt at Soda Springs and Truckee (B).	
30 March (B) Northern California	
Origin time:	12 38 49.9
Epicenter:	40.26 N., 124.46 W.
Depth:	5 km
Magnitude:	4.4 mb(G), 4.2 ML(B)
<u>Intensity IV:</u> Loleta, Petrolia, Rio Dell.	
<u>Felt:</u> Eureka (B).	

**Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued**

California--off the coast	
15 March (B) Northern California	
Origin time:	06 07 41.7
Epicenter:	40.21 N., 125.51 W.
Depth:	5 km
Magnitude:	4.5 mb(G), 4.5 MS(G), 4.7 ML(B)
<u>Intensity III:</u> Rio Dell.	
Colorado	
24 March (G) Northern Colorado	
Origin time:	13 03 40.0
Epicenter:	39.75 N., 104.94 W.
Depth:	5 km
Magnitude:	2.8 ML(G)
Felt in the Thornton-Northglenn area (press report).	
Hawaii	
2 January (H) Island of Hawaii	
Origin time:	17 42 08.0
Epicenter:	19.30 N., 155.23 W.
Depth:	10 km
Magnitude:	3.6 ML(H)
<u>Intensity II:</u> Hilo, Papaikou, Volcano.	
3 January (H) Island of Hawaii	
Origin time:	13 04 40.1
Epicenter:	20.26 N., 155.87 W.
Depth:	28 km
Magnitude:	3.9 ML(H)
<u>Intensity III:</u> Ahualoa, Kohala.	
<u>Intensity II:</u> Kamuela.	
7 January (H) Island of Hawaii	
Origin time:	04 14 05.4
Epicenter:	18.90 N., 155.12 W.
Depth:	52 km
Magnitude:	4.1 ML(H)
<u>Intensity III:</u> Hilo.	
12 January (H) Island of Hawaii	
Origin time:	14 18 10.6
Epicenter:	19.36 N., 155.30 W.
Depth:	31 km
Magnitude:	4.4 mb(G), 4.5 ML(H)
Felt on the islands of Hawaii, Maui, Molokai, and Oahu.	
<u>Intensity V:</u> Hilo, Kapapala, Volcano.	
<u>Intensity IV:</u> Captain Cook, Hakalau, Hawi, Holualoa, Honokaa, Honomu, Kapaau, Keaau,	

**Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued**

Hawaii--Continued	
Kurtistown, Laupahoehoe, Mountain View, Naalehu, Ninole, Ookala, Pahala, Papaaloa, Papaikou, Pepeekeo, Puna areas.	
<u>Intensity III:</u> Kohala, Kona, Kualapuu, Paauhau, Paauilo, Paia, Honalo.	
<u>Intensity II:</u> Island of Oahu.	
12 January (H) Island of Hawaii	
Origin time:	14 30 17.1
Epicenter:	19.29 N., 155.31 W.
Depth:	33 km
Magnitude:	4.0 ML(H)
<u>Intensity IV:</u> Hilo, Kapapala, Volcano.	
<u>Intensity III:</u> Pahala, Puna areas.	
<u>Intensity II:</u> Honokaa, Kohala, Kona.	
12 January (H) Island of Hawaii	
Origin time:	15 07 48.9
Epicenter:	19.33 N., 155.28 W.
Depth:	33 km
Magnitude:	4.0 ML(H)
<u>Intensity IV:</u> Hilo, Kapapala, Volcano.	
<u>Intensity III:</u> Pahala, Puna areas.	
<u>Intensity II:</u> Honokaa, Kohala, Kona.	
12 January (H) Island of Hawaii	
Origin time:	21 21 41.1
Epicenter:	19.52 N., 155.30 W.
Depth:	33 km
Magnitude:	4.1 mb(G), 4.3 ML(H)
<u>Intensity IV:</u> Bradshaw Air Force Base, Hilo, Kapapala, Volcano.	
<u>Intensity III:</u> Pahala, Puna areas.	
<u>Intensity II:</u> Honokaa, Kamuela, Kohala, Kona.	
14 January (H) Island of Hawaii	
Origin time:	04 13 31.5
Epicenter:	19.35 N., 155.26 W.
Depth:	15 km
Magnitude:	3.1 ML(H)
<u>Intensity III:</u> Volcano.	
<u>Intensity II:</u> Glenwood, Keokea.	
14 January (H) Island of Hawaii	
Origin time:	04 20 16.5
Epicenter:	19.37 N., 155.32 W.
Depth:	29 km
Magnitude:	4.5 mb(G), 4.3 ML(H)
The earthquake may have been the cause of a break in a main water line in Ainako. Some shear pins in the United Kingdom telescope atop Mauna Kea were broken (press report).	
<u>Intensity V:</u> Hilo, Pahala, Puna areas, Volcano.	
<u>Intensity IV:</u> Ahualoa, Hamakua, Honokaa,	

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

Hawaii--Continued	
	Kamuela, Kona, Punaluu. <u>Intensity III:</u> Kohala.
16 January (H) Island of Hawaii	
Origin time:	00 37 12.0
Epicenter:	19.32 N., 155.29 W.
Depth:	34 km
Magnitude:	3.8 ML(H)
<u>Intensity V:</u>	Hilo, Volcano.
<u>Intensity IV:</u>	Hamakua, Kau, Puna areas.
<u>Intensity III:</u>	Kamuela, Kona.
18 January (H) Island of Hawaii	
Origin time:	11 25 53.5
Epicenter:	19.42 N., 155.28 W.
Depth:	2 km
Magnitude:	3.4 ML(H)
<u>Intensity V:</u>	Hawaii Volcanoes National Park, Volcano.
20 January (H) Island of Hawaii	
Origin time:	04 21 40.4
Epicenter:	19.31 N., 155.22 W.
Depth:	9 km
Magnitude:	3.0 ML(H)
<u>Intensity II:</u>	Hilo.
22 January (H) Island of Hawaii	
Origin time:	13 39 02.5
Epicenter:	19.78 N., 156.03 W.
Depth:	41 km
Magnitude:	3.8 ML(H)
<u>Intensity III:</u>	Kona.
25 January (H) Island of Hawaii	
Origin time:	01 30 34.5
Epicenter:	19.36 N., 155.25 W.
Depth:	9 km
Magnitude:	3.4 ML(H)
<u>Intensity II:</u>	Volcano.
9 February (H) Island of Hawaii	
Origin time:	16 02 44.0
Epicenter:	19.54 N., 155.62 W.
Depth:	11 km
Magnitude:	3.8 ML(H)
<u>Intensity III:</u>	Kona, Volcano Golf Course.
14 February (H) Island of Hawaii	
Origin time:	05 52 44.2
Epicenter:	19.30 N., 155.39 W.
Depth:	6 km
Magnitude:	3.3 ML(H)
<u>Intensity IV:</u>	Kapapala.
<u>Intensity III:</u>	Pahala, Volcano.
1 March (H) Island of Hawaii	
Origin time:	17 01 21.3
Epicenter:	19.36 N., 155.03 W.

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

Hawaii--Continued	
	Depth: 9 km
	Magnitude: 4.3 ML(H)
	<u>Intensity IV:</u> Hilo, Volcano.
	<u>Intensity III:</u> Hawaiian Ocean View Estates, Kau, Kona, Papaikou, Puna areas.
5 March (H) Island of Hawaii	
Origin time:	01 56 45.7
Epicenter:	19.42 N., 155.47 W.
Depth:	11 km
Magnitude:	4.1 ML(H)
<u>Intensity IV:</u>	Hawaiian Volcano Observatory, Volcano.
	<u>Intensity III:</u> Hilo, Pahala, Puna areas.
	<u>Intensity II:</u> Hawaiian Ocean View Estates, Kona, Papaikou.
5 March (H) Island of Hawaii	
Origin time:	02 00 27.2
Epicenter:	19.42 N., 155.47 W.
Depth:	11 km
Magnitude:	3.4 ML(H)
<u>Intensity III:</u>	Volcano.
5 March (G) Near Island of Molokai	
Origin time:	14 09 40.8
Epicenter:	21.43 N., 156.80 W.
Depth:	0 km
Magnitude:	5.0 mb(G), 5.1 ML(H)
The press reported four breaks and some cracks in the pipe that carries water from Waikolu Valley to Kalaupapa.	
<u>Intensity VI:</u>	
Molokai--Near Kalaupapa (cracked under- ground water pipes).	
<u>Intensity V:</u> The most common effects at the places listed below were few items thrown from store shelves, few small objects overturned and fell, glassware and dishes broke, hanging pictures swung, felt by and awakened many.	
Molokai--Hoolehua, Kualapuu, Kaunakakai (press report).	
Oahu--Honolulu (Wailae-Kahala, Waikiki), Kailua, Waihiawa.	
<u>Intensity IV:</u>	
Hawaii--Hawi, Honokaa, Kurtistown, Moun- tainview.	
Lanai--Lanai City.	
Maui--Kahului, Lahaina, Pukalani, Wailuku.	
Oahu--Aiea, Ewa Beach, Honolulu (Aiea Haina, Makiki), Kaneone, Kunia, Laie, Waianae.	
<u>Intensity III:</u>	
Hawaii--Papaikou, Waimea.	
Oahu--Hauula, Kahuku, Waiialua.	
<u>Intensity II:</u>	
Hawaii--Captain Cook, Kapaau, Volcano.	

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

Hawaii--Continued	
6 March (G) Near Island of Molokai	
Origin time:	02 43 36.4
Epicenter:	21.16 N., 156.91 W.
Depth:	0 km
Magnitude:	4.9 mb(G), 4.5 ML(H)
Intensity III:	Island of Molokai.
Felt:	Honolulu.
7 March (H) Island of Hawaii	
Origin time:	03 56 00.7
Epicenter:	19.74 N., 156.44 W.
Depth:	15 km
Magnitude:	4.0 ML(H)
Intensity IV:	Kona.
Intensity III:	Waimea.
9 March (H) Island of Hawaii	
Origin time:	13 27 45.2
Epicenter:	19.35 N., 155.05 W.
Depth:	9 km
Magnitude:	3.3 ML(H)
Intensity III:	Hilo.
Intensity II:	Mountain View.
11 March (H) Island of Hawaii	
Origin time:	23 23 09.0
Epicenter:	19.37 N., 155.03 W.
Depth:	6 km
Magnitude:	3.1 ML(H)
Intensity III:	Hilo.
12 March (H) Island of Hawaii	
Origin time:	08 37 44.9
Epicenter:	19.25 N., 155.03 W.
Depth:	44 km
Magnitude:	3.7 ML(H)
Intensity III:	Glenwood, Hilo, Volcano.
16 March (H) Island of Hawaii	
Origin time:	06 17 19.6
Epicenter:	19.37 N., 155.23 W.
Depth:	31 km
Magnitude:	4.0 ML(H)
Intensity IV:	Hawaii Volcanoes National Park, Hilo.
Intensity III:	Glenwood, Mountain View, Pahala, Volcano.
Intensity II:	Nanawali, Waimea.
15 March (H) Island of Hawaii	
Origin time:	08 23 21.3
Epicenter:	19.37 N., 155.23 W.
Depth:	31 km
Magnitude:	3.2 ML(H)
Intensity III:	Hilo, Volcano.
25 March (H) Island of Hawaii	
Origin time:	16 25 05.3
Epicenter:	19.76 N., 155.47 W.
Depth:	17 km

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

Hawaii--Continued	
Magnitude:	3.3 ML(H)
Intensity III:	Waimea.
Intensity II:	Hilo.
26 March (H) Island of Hawaii	
Origin time:	11 55 40.2
Epicenter:	19.35 N., 155.08 W.
Depth:	9 km
Magnitude:	3.2 ML(H)
Intensity II:	Hilo.
30 March (H) Island of Hawaii	
Origin time:	19 06 14.0
Epicenter:	19.33 N., 155.33 W.
Depth:	9 km
Magnitude:	3.6 ML(H)
Intensity III:	Hawaii Volcanoes National Park.
Idaho	
9 February (G) Southeastern Idaho	
Origin time:	22 53 36.7
Epicenter:	43.12 N., 111.36 W.
Depth:	5 km
Magnitude:	3.0 ML(G)
Intensity III:	Wayan.
14 February (W) Southwestern Washington	
Origin time:	06 09 27.2
See Washington listing.	
Illinois	
11 February (S) Kentucky-Illinois border region	
Origin time:	14 42 57.4
See Kentucky listing.	
Kentucky	
14 January (K) Northeastern Kentucky	
Origin time:	21 10 33.9
Epicenter:	38.20 N., 83.91 W.
Depth:	11 km
Magnitude:	1.5 MD(K)
This earthquake was felt in East Union, Mount Sterling, North Middletown, and Sherburne and heard in the southeast portions of Nicholas County (press report). It was also felt by a few near Sharpsburg and Owingsville (K).	

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

Kentucky--Continued	
11 February (S) Kentucky-Illinois border region	
Origin time:	14 42 57.4
Epicenter:	37.06 N., 89.13 W.
Depth:	2 km
Magnitude:	3.0 Mn(S)
Intensity IV:	
Illinois--Cairo, Mound City.	
Kentucky--Barlow, Wickliffe.	
Intensity III:	
Illinois--Cache, Mounds.	
Felt:	
Illinois--Unity (press report).	
Kentucky--Ballard County (press report),	
Barton (S), Olmsted (press report).	
Louisiana	
13 February Southern Louisiana	
Origin time:	02 15
Epicenter:	Not located.
Depth:	None computed.
Magnitude:	None computed.
Intensity IV:	New Iberia.
Intensity III:	Gonzales.
Intensity II:	Baton Rouge, Saint Amant.
Maine	
4 January (J) Southwestern Maine	
Origin time:	09 17 10.2
Epicenter:	43.89 N., 70.01 W.
Depth:	0 km
Magnitude:	2.6 Mn(J), 2.6 Mn(L)
Felt at Brunswick (J).	
Nevada	
1 January (B) California-Nevada border region	
Origin time:	18 22 22.4
Epicenter:	38.05 N., 118.57 W.
Depth:	5 km
Magnitude:	4.2 ML(B), 3.8 ML(P)
Felt in the Mono Lake area, California (B).	
15 January (E) Southern Nevada	
Origin time:	20 25 00.090
Epicenter:	37.09 N., 116.04 W.
Depth:	0 km
Magnitude:	5.6 mb(G), 5.5 ML(B)

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

Nevada--Continued	
Nevada Test Site explosion "BASEBALL" at	
37°05'13.52" N., 116°02'41.10" W., surface	
elevation 1254 m, depth of burial 564 m.	
28 January (B) Owens Valley area	
Origin time:	20 08 50.5
Epicenter:	38.17 N., 118.35 W.
Depth:	18 km
Magnitude:	4.5 mb(G), 4.5 ML(B), 4.3 ML(P).
Intensity IV:	
Nevada--Luning, Mina.	
Felt:	
California--Mono Lake (B).	
5 February (E) Southern Nevada	
Origin time:	18 00 00.117
Epicenter:	37.01 N., 116.03 W.
Depth:	0 km
Magnitude:	3.2 ML(G)
Nevada Test Site explosion 'CLAIRETTE' at	
37°00'39.22" N., 116°01'55.86" W., surface	
elevation 1210 m, depth of burial 354 m.	
25 February (E) Southern Nevada	
Origin time:	15 00 00.8
Epicenter:	37.18 N., 116.08 W.
Depth:	0 km
Magnitude:	3.0 ML(G)
Nevada Test Site explosion "SECO" at	
37°10'54.83" N., 116°05'03.29" W., surface	
elevation 1383 m, depth of burial 229 m.	
12 March (G) Southern Nevada	
Origin time:	17 28 08.8
Epicenter:	36.03 N., 114.84 W.
Depth:	2 km
Magnitude:	2.8 ML(G)
Felt at Boulder City (telephone report).	
13 March (G) Southern Nevada	
Origin time:	00 09 06.6
Epicenter:	35.95 N., 114.80 W.
Depth:	2 km
Magnitude:	3.2 ML(G)
Felt at Boulder City (telephone report).	
North Carolina	
4 March (G) Central North Carolina	
Origin time:	20 44 42.6
Epicenter:	35.71 N., 79.75 W.

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

North Carolina--Continued	
Depth:	5 km
Magnitude:	2.8 Mn(V)
A loud explosion-like sound was heard at the time of this earthquake.	
<u>Intensity IV:</u>	Cedar Falls, Central Falls.
<u>Intensity III:</u>	Franklinville, North Ashboro.
Oregon	
14 February (W) Southwestern Washington	
Origin time:	06 09 27.2
See Washington listing.	
South Carolina	
19 March (G) Southern South Carolina	
Origin time:	04 33 55.4
Epicenter:	32.96 N., 80.19 W.
Depth:	6 km
Magnitude:	2.5 Mn(G)
<u>Intensity III:</u>	Goose Creek, Ladsom (press report), Summerville.
Tennessee	
2 January (K) Northwestern Tennessee	
Origin time:	14 31 23.0
Epicenter:	36.36 N., 89.51 W.
Depth:	5 km
Magnitude:	2.3 MD(K)
This is the first and largest event in a swarm of earthquakes occurring from January 2 to January 5 (Zollweg, 1981).	
<u>Intensity IV:</u>	Ridgely.
<u>Felt:</u>	Madie and Gratio (K).
3 January (K) Northwestern Tennessee	
Origin time:	19 05 21.1
Epicenter:	36.29 N., 89.49 W.
Depth:	5 km
Magnitude:	1.8 MD(K)
Felt at Ridgely and heard at Madie (K).	
8 February (K) Southwestern Tennessee	
Origin time:	16 52 58.5

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

Tennessee--Continued	
Epicenter:	35.62 N., 89.60 W.
Depth:	5 km
Magnitude:	3.0 Mn(G)
<u>Intensity IV:</u>	Covington.
<u>Intensity III:</u>	Mason.
<u>Felt:</u>	Brighton and Hollygrove (K).
Utah	
16 January (U) Southwestern Utah	
Origin time:	10 26 29.8
Epicenter:	37.45 N., 113.10 W.
Depth:	1 km
Magnitude:	3.4 ML(U)
<u>Intensity IV:</u>	Cedar City, Kanarraville, New Harmony.
<u>Intensity III:</u>	Rockville, Tropic, Virgin.
16 January (U) Southwestern Utah	
Origin time:	14 50 45.7
Epicenter:	37.45 N., 113.10 W.
Depth:	4 km
Magnitude:	3.2 ML(U)
<u>Intensity IV:</u>	Glendale, Kanarraville, New Harmony, Rockville, Virgin.
<u>Intensity III:</u>	Tropic.
<u>Intensity II:</u>	Cedar City.
1 February (U) Southwestern Utah	
Origin time:	02 21 48.0
Epicenter:	37.60 N., 113.28 W.
Depth:	5 km
Magnitude:	3.8 ML(U)
<u>Felt:</u>	Cedar City and Kanarraville (U).
20 February (U) Northern Utah	
Origin time:	09 13 01.4
Epicenter:	40.33 N., 111.72 W.
Depth:	7 km
Magnitude:	4.7 mb(G), 3.9 ML(U)
<u>Intensity VI:</u>	Orem (foundation cracked, hairline cracks in plaster and dry wall, trees and bushes shook slightly, few items thrown from store shelves, few small objects overturned and fell, felt by all and awakened many).
<u>Intensity V:</u>	Provo (a hairline crack in a cinderblock wall at the Ming Center expanded to 1 inch--press report).
<u>Intensity IV:</u>	American Fork, Lehi, Payson, Pleasant Grove, Salt Lake City, Santaquin, Springville.
<u>Felt:</u>	Draper and Riverton (press report).

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

Virginia	
11 February (V) Central Virginia	
Origin time:	13 44 16.4
Epicenter:	37.72 N., 78.44 W.
Depth:	6 km
Magnitude:	3.4 MD(V)
This earthquake was felt over an area of approximately 900 sq km and was the first and largest event in a series of three earthquakes which occurred in this area on February 11 (Virginia Tech Seismological Observatory).	
<u>Intensity IV:</u> Arvonion, Bremon Bluff, Diana Mills, Gold Hills, Jaggert, Keen, New Canton, Palmyra, Scottsville.	
<u>Intensity III:</u> Antioch, Centenary, Esmont, Farmville, Howardsville, Richmond, Warren, Woodridge.	
<u>Intensity II:</u> Gladstone, Madisonville, South Boston, Warsaw.	
11 February (V) Central Virginia	
Origin time:	13 50 31.4
Epicenter:	37.75 N., 78.41 W.
Depth:	10 km
Magnitude:	3.2 MD(V)
<u>Intensity IV:</u> New Canton.	
<u>Intensity III:</u> Arvonion, Esmont, Howardsville, Palmyra, Warren.	
<u>Felt:</u> Antioch, Centenary, Keen, Scottsville.	
11 February (V) Central Virginia	
Origin time:	13 51 38.6
Epicenter:	37.72 N., 78.45 W.
Depth:	7 km
Magnitude:	2.9 MD(V)
<u>Intensity III:</u> Howardsville, New Canton.	
<u>Intensity II:</u> Arvonion.	
<u>Felt:</u> Antioch, Centenary, Keen, Scottsville.	

Washington

- 13 January (G) Northwestern Washington
- Origin time: 01 21 42.2
- Epicenter: 48.54 N., 122.88 W.
- Depth: 10 km
- Magnitude: 3.0 ML(G)
- Intensity V: The most common effects at the places listed below were windows, doors, and dishes rattled; felt by many. Eastsound (small objects overturned, few items thrown from store shelves). Waldron (few windows cracked).

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

Washington--Continued

- Intensity IV: Friday Harbor, Roche Harbor, Shaw Island.
- Intensity III: Deer Harbor, San Juan Island (press report).
- Intensity II: Lummi Island.
- 23 January (W) Northwestern Washington
- Origin time: 16 46 47.3
- Epicenter: 47.60 N., 122.42 W.
- Depth: 23 km
- Magnitude: 2.9 ML(G)
- Intensity III: Queen Anne district of Seattle and near Alki Point (press report).
- 2 February (G) Southern Washington
- Origin time: 01 23 17.2
- Epicenter: 46.28 N., 120.88 W.
- Depth: 5 km
- Magnitude: 3.9 mb(G), 4.0 ML(G)
- Intensity IV: White Swan.
- 14 February (W) Southwestern Washington
- Origin time: 06 09 27.2
- Epicenter: 46.35 N., 122.24 W.
- Depth: 7 km
- Magnitude: 5.1 mb(G), 4.8 MS(G), 5.5 ML(G)
- This earthquake was felt over an area of approximately 104,000 sq km of Oregon and Washington (fig. 9).
- Intensity VI: The most common effects at the places listed below were foundations cracked, hairline cracks in plaster and drywall, light furniture overturned, many small objects overturned and fell, few glassware and dishes broke, few windows cracked, felt by all and awakened many.
- Washington--
- Ariel (large cracks in sidewalks).
- Carrolls.
- Graham (water splashed onto sides of lakes and swimming pools, chimneys cracked).
- Grays River (chimneys cracked).
- Hazel Dell--suburb of Vancouver (plaster fell off ceilings and windows broke--press report).
- Kapowsin (report of chimneys broken at roof line).
- Kidd Valley--8 miles east of Toutle (at the Antique Shed Store pottery was broken, figurines crashed inside a display case, and 300 maps fell to the floor--press report).
- Mossyrock (chimneys twisted, open cracks in stone walls).

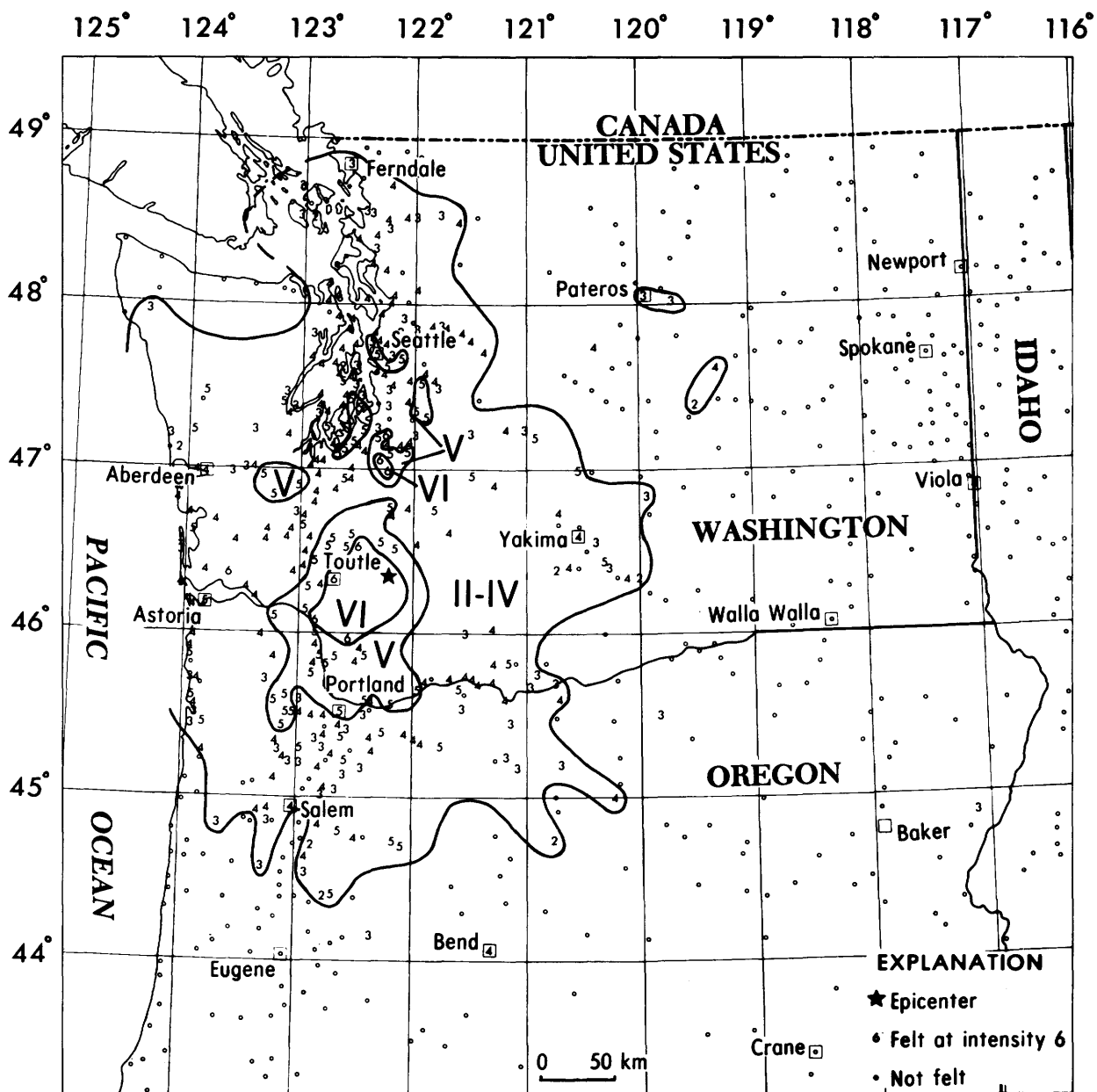


FIGURE 9.--Isoseismal map for the southwestern Washington earthquake of 14 February 1981, 06 09 27.2 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

Washington--Continued

Sumner (few items thrown from store shelves).

Intensity V: The most common effects at the places listed below were hairline cracks in plaster and dry wall, few items thrown from store shelves, few small objects overturned and fell, few dishes broke, few windows cracked, hanging pictures out of place, felt by many and awakened several).

Oregon--Astoria, Banks, Bridal Veil, Clatskanie, Cornelius, Detroit, Forest Grove, Foster, Gales Creek, Gaston, Gladstone, Government Camp, Idanha, Mehama, Mulino, Newberg, Oak Grove, Portland, Rockaway, Saint Helens, Sandy, Scappoose, Tillamook, Tolovana Park, West Linn.

Washington--Bay Center, Brush Prairie, Buena, Camas, Carbonado, Castle Rock, Chehalis, Cinebar, Cle Elum, Crystal Mountain, Dockton, DuPont, Elbe, Ellensburg, Ethel, Glenoma, Hoodspout, Humptulips, Kalama, Klickitat, La Center, Lakebay, Lakewood Center, Littlerock, Longmire, Longview, Malone, Medina, Morton, North Bonneville, North Fort Lewis, Oakville, Olalla, Onalaska, Orting, Oysterville, Palmer, Port Orchard, Preston, Puyallup, Quinault, Ravensdale, Redmond, Richmond Beach, Ridgefield, Salkum, Seattle-Tacoma Airport, Silver Creek, Toledo, Tacoma (lamps on the Tacoma Narrows Bridge shattered--press report), Vancouver (press report), Wilkeson, Yacolt, Yelm.

Intensity IV:

Idaho--Viola.

Oregon--Aloha, Amity, Beaver, Bearverton, Bend, Birkenfeld, Brightwood, Canby, Cannon Beach, Cascade Locks, Columbia City, Crabtree, Dallas, Deer Island, Eagle Creek, Estacada, Fossil, Garibaldi, Hammond, Hillsboro, Hubbard, Lafayette, Lake Oswego, Mill City, Milwaukie, Mosier, Nehalem, Rhododendron, Rickreall, Saint Benedict, Salem, Seaside, Sublimity, The Dalles, Tiller, Tualatin, Vernonia, Warren, Warrenton, Wasco, Welches, West Slope, Yamhill.

Washington--Aberdeen, Acme, Adna, Allyn, Amboy, Anderson Island, Appleton, Ardenvoir, Ashford, Baring, Belfair, Bingen, Bremerton, Brinnon, Brownstown, Buckley, Bucoda, Cathlamet, Centralia, Chimacum, Cook, Coulee City, Curtis, Doty, East Olympia, Easton, Edmonds, Elma, Everett (press report), Fall City, Fort Lewis (telegraphic report), Glenwood, Gold

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

Washington--Continued

Bar, Goose Prairie, Granite Falls, Grayland, Hadlock, Hansville, Heisson, Hoquiam, Ilwaco, Index, Indianaola, Issaquah, Kelso, Kenmore, La Conner, Lacey, Lakeview, Langley, Lebam, Lyle, Lyman, Manchester, Maple Valley, Marysville, McChord Air Force Base (telegraphic report), McKenna, McMillin, Mercer Island, Mineral, Mount Vernon, Mountlake Terrace, Mukilteo, Naches, Napavine, Naselle, Nordland, Olympia, Outlook, Packwood, Pe Ell, Port Gamble, Port Ludlow, Port Townsend, Poulsbo, Rainier, Randle, Raymond, Renton, Ret-sil, Rockport, Rosburg, Roy, Ryderwood, Seabeck, Seattle, Sedro Woolley, Shelton, Silvana, Silver Lake, Silverdale, Skamokawa, Skykomish, Snoqualmie, South Cle Elum, South Prairie, Spanaway, Stanwood, Stevenson, Sultan, Suquamish, Tenino, Tokeland, Tumwater, Underwood, Union, Vader, Vashon Island (press report), Vaughn, Washougal, Wauna, Winlock, Woodinville, Yakima.

Intensity III:

Oregon--Bay City, Blue River, Carlton, Clackamas, Colton, Corvallis, Dayton, Dufur, Dundee, Gresham, Halfway, Harbor, Hood River, Ione, Kent, Lebanon, Manzanita, Maupin, Molalla, Monmouth, Mount Hood, Netarts, North Plains, Oceanside, Rufus, Saint Paul, Scotts Mills, Seaside, Sherwood, Silverton, Stayton, Timber, Tygh Valley, Valsetz, Wilsonville.

Washington--Aloha, Bainbridge Island, Beverly, Bow, Bridgeport, Centerville, Clearlake, Concrete, Conway, Coupeville, Dallesport, Edison, Enumclaw, Ferndale, Forks, Fox Island, Friday Harbor, Galvin, Grapeview, Hamilton, Kent, Kirkland, Lester, Lilliwaup, Matlock, Milton, Moclips, Monroe, Montesano, Moxee City, Nahcotta, North Bend, Pateros, Quilcene, Ronald, Satsop, Seaview, Skyway, Snohomish, Southworth, Startup, Sultan, Tahuya, Trout Lake, Vashon, Waldron, Westport, Wishram, Zillah.

Intensity II:

Oregon--Ashwood, Blue River, Scio, Sweet Home.

Washington--Clearview, Copalis Crossing, Lopez, Soap Lake, Sunnyside, Tracyton, White Swan.

Felt:

Canada--Southern British Columbia (press report), Vancouver Island (press report).

Oregon--Eugene (press report), Medford

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

Washington--Continued	
	(press report), Springfield (press report).
	Washington--Battleground, Capitol Hill (press report), Lake City (press report), Paradise, Queen Anne (press report), Rochester.
14 February	Southwestern Washington
Origin time:	08 43 45.9
Epicenter:	46.35 N., 122.25 W.
Depth:	12 km
Magnitude:	4.6 mb(G), 3.4 ML(G)
	Felt in Kid Valley 8 miles east of Toutle (press report).
14 February	Southwestern Washington
Origin time:	09 05
Epicenter:	Not located.
Depth:	None computed.
Magnitude:	None computed.
	Felt in Kid Valley 8 miles east of Toutle (press report).
14 February	Southwestern Washington
Origin time:	14 19
Epicenter:	Not located.
Depth:	None computed.
Magnitude:	None computed.
	Felt in Kid Valley 8 miles east of Toutle (press report).
14 February	Southwestern Washington
Origin time:	15 00
Epicenter:	Not located.
Depth:	None computed.
Magnitude:	None computed.
	Felt in Kid Valley 8 miles east of Toutle (press report).
14 February (W)	Southwestern Washington
Origin time:	21 27 43.8
Epicenter:	46.34 N., 122.23 W.
Depth:	7 km
Magnitude:	3.6 ML(G)
	Intensity V: Vancouver (two broken windows--press report).
	Felt: Kelso, Kid Valley (8 miles east of Toutle), Longview, Mercer Island near Seattle and in Cowlitz County (press reports).
18 February (W)	Central Washington
Origin time:	06 09 38.7
Epicenter:	47.21 N., 120.90 W.

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1981--Continued

Washington--Continued	
Depth:	0 km
Magnitude:	4.2 ML(G)
This earthquake was felt over area of approximately 9,300 sq km (fig. 10). There were reports of a sharp crack or explosion type of sound associated with the quake.	
Intensity VI:	
Cle Elum (chimney bricks fell, telephone service disrupted and broken dishes--press report).	
Puyallup (some windows broken out, water splashed onto sides of lakes and swimming pools, hairline cracks in dry wall, felt by and awakened several. The validity of this data is questionable but is listed as reported.).	
South Cle Elum (chimney bricks fell, felt by and awakened many).	
Intensity V: The most common effects at the places listed below were hairline cracks in plaster and drywall, trees and bushes shook slightly, few items thrown from store shelves, few small objects overturned and fell, glassware and dishes broke, few windows cracked, hanging pictures swung, felt by many and awakened several).	
Bothell, Bremerton, Dockton, Easton, Ellensburg (pictures fell--press report), Kent, Ronald, Seattle (Ballard, East Union, and Lake City areas), Sumner, Tacoma, Union, Wauna.	
Intensity IV: Burton, Edmonds, Kenmore, La Grande, Long Beach, Tracyton, Tumwater, Vashon, West Seattle.	
Intensity III: Bellevue, Crystal Mountain, Leavenworth, Lynnwood, Palmer, Proctor, Thorp, Trout Lake, White Swan, Winslow.	
Intensity II: Lester, Olalla.	
Felt: Port Orchard.	
6 March (G)	Central Washington
Origin time:	14 19 05.8
Epicenter:	47.26 N., 120.84 W.
Depth:	5 km
Magnitude:	2.9 ML(G)
Intensity III: Roslyn, South Cle Elum.	
Intensity II: Ronald	
15 March (W)	Northwestern Washington
Origin time:	07 24 06.0
Epicenter:	47.99 N., 121.49 W.
Depth:	4 km
Magnitude:	3.4 ML(G)
Felt at Darrington, Granite Falls, Kenmore, Marysville, and Redmond (press report).	

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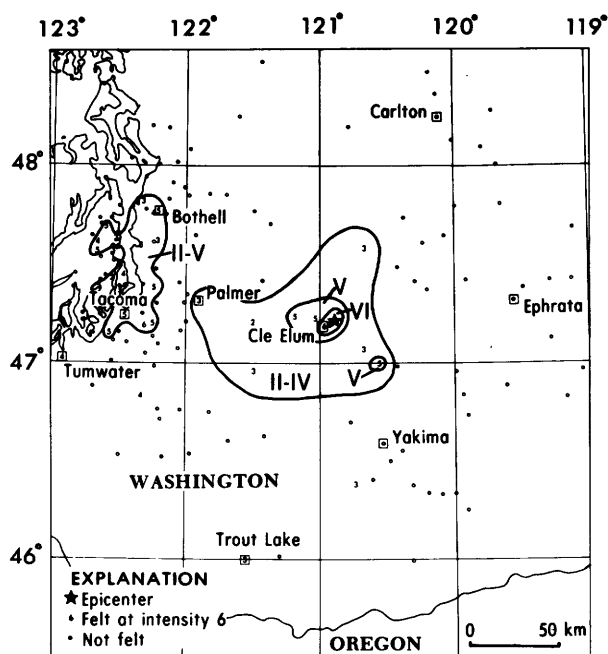


FIGURE 10.--Isoseismal map for the central Washington earthquake of 18 February 1981 UTC, 06 09 38.7. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

Table 2.--Summary of macroseismic data for U.S. earthquakes, January-March 1981--Continued

Washington--Continued	
Many residents were awakened in King and Snohomish Counties (press report).	
Wyoming	
6 March (G) Yellowstone National Park	
Origin time:	13 44 42.4
Epicenter:	44.39 N., 110.57 W.
Depth:	1 km
Magnitude:	1.5 ML(G)
Intensity III:	Grant Village.
12 March (G) Yellowstone National Park	
Origin time:	14 12 02.2
Epicenter:	44.27 N., 110.76 W.
Depth:	1 km
Magnitude:	3.8 ML(G)
This event was the first of a swarm of over 200 events recorded on the Old Faithful seismograph.	
Intensity IV:	Grant Village and Old Faithful.

Table 2.--Summary of macroseismic data for U.S. earthquakes, January-March 1981--Continued

Wyoming--Continued	
12 March (G) Yellowstone National Park	
Origin time:	14 19 38.2
Epicenter:	44.29 N., 110.76 W.
Depth:	2 km
Magnitude:	3.1 ML(G)
Intensity II:	Grant Village and Old Faithful.
12 March (G) Yellowstone National Park	
Origin time:	14 22 44.6
Epicenter:	44.30 N., 110.76 W.
Depth:	4 km
Magnitude:	2.5 ML(G)
Intensity III:	Grant Village.
12 March (G) Yellowstone National Park	
Origin time:	14 29 32.1
Epicenter:	44.29 N., 110.75 W.
Depth:	4 km
Magnitude:	2.6 ML(G)
Intensity III:	Old Faithful.
12 March (G) Yellowstone National Park	
Origin time:	14 48 13.7
Epicenter:	44.28 N., 110.76 W.
Depth:	2 km
Magnitude:	3.0 ML(G)
Intensity III:	Grant Village and Old Faithful.
12 March (G) Yellowstone National Park	
Origin time:	15 00 22.4
Epicenter:	44.26 N., 110.75 W.
Depth:	1 km
Magnitude:	2.6 ML(G)
Intensity III:	Grant Village and Old Faithful.
12 March (G) Yellowstone National Park	
Origin time:	15 12 02.2
Epicenter:	44.29 N., 110.75 W.
Depth:	1 km
Magnitude:	2.5 ML(G)
Intensity II:	Old Faithful.
12 March (G) Yellowstone National Park	
Origin time:	15 55 41.9
Epicenter:	44.28 N., 110.76 W.
Depth:	1 km
Magnitude:	3.4 ML(G)
Intensity III:	Grant Village and Old Faithful.
12 March (G) Yellowstone National Park	
Origin time:	17 09 09.0
Epicenter:	44.29 N., 110.75 W.
Depth:	1 km
Magnitude:	3.1 ML(G)
Intensity III:	Old Faithful.

