WASHINGTON DIVISION OF GEOLOGY AND EARTH RESOURCES
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EARTHQUAKE HYPOCENTERS IN WASHINGTON AND NORTHERN OREGON—1981

by

ANTHONY QAMAR, ANNE RATHBUN, RUTH LUDWIN, LINDA L. NOSON,
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EARTHQUAKE HYPOCENTERS IN WASHINGTON AND NORTHERN OREGON — 1981

by

Anthony Qamar, Anne Rathbun, Ruth Ludwin, Linda L. Noson,

Robert S. Crosson, and Stephen D. Malone*

INTRODUCTION

The Geophysics Program at the University of Washington operates a continuously recording, telemetered seismograph network in Washington and northern Oregon (Figs. 1 and 2). This report is the tenth in a series designed to provide a chronological compilation of earthquake locations. Beginning with the report describing earthquakes in 1980 (Qamar and others, 1986), these reports cover the whole state of Washington and northern Oregon; previous reports covered earthquakes in western Washington only. Appendices I and II list hypocentral locations for 1,603 earthquakes and blasts having coda-length magnitudes equal to or exceeding M_C 1.0 that occurred in 1981; 1,093 of these were earthquakes. "Hypocenter" refers to the subsurface point where the earthquake occurs, while "epicenter" indicates the point on the Earth's surface, directly above the hypocenter. The distribution of earthquake epicenters in Washington and northern Oregon in 1981 is shown in Figures 3 and 4. Minor earthquakes are shown in Figure 5 and blasts in Figure 6. Figure 7 shows epicenters of earthquakes that were reported as felt.

The number of seismic events located each year depends on four basic factors: the number of stations operating, the locations of earthquakes relative to recording stations, earthquake magnitudes, and the number of earthquakes in the area monitored. Ignoring the inherent variability of the data may lead to incorrect interpretations. When used carefully, the data in this report may enhance evaluations of seismic hazard potential, as well as contribute to basic studies in seismology, structure of the Earth, and tectonics.

Previous compilations of earthquakes in western Washington have been published by the Washington Department of Natural Resources for the years 1970-1979 (Crosson, 1974, 1975; Crosson and Millard, 1975; Crosson and Noson, 1978a, 1978b, 1979; Noson and Crosson, 1980; Noson and others, 1985). Data for eastern Washington earthquakes from 1969-1979 are covered in annual technical reports to the U.S. Department of Energy and are available at the University of Washington library (Malone, 1975, 1976, 1977, 1978, 1979). Eastern Washington earthquakes, for the period 1969-1974, are summarized in an appendix of the 1979 annual report (Malone, 1979). A list of large historic earthquakes in Washington State from 1840 to 1965 was compiled by Rasmussen (1967).

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Network Operations

The seismograph network in Washington and northern Oregon (Figs. 1 and 2) operated by the University of Washington in 1981 consisted of more than 100 short-period, vertical-component, telemetered seismograph stations, a three-component (both short and long period) World Wide Standardized Seismograph Network (WWSSN) station at Longmire (LON), and two horizontal-component Wood-Anderson seismographs at Seattle (SEA). Station locations are given in Table 1. Each station, except WWSSN station LON, consisted of a vertical-component, short-period seismometer, an amplifier, a voltage-controlled oscillator, and, at some stations, radio-telemetry equipment to transmit the data to the central recording laboratory at the University of Washington.

Signals from many of the seismograph stations in the network were recorded on 16-mm film by three Geotech Develocorders, at a speed of 15 mm/min. A few selected stations' signals were recorded continuously on paper at 30 and 60 mm/min. Since 1980, we have digitally recorded all stations in the network except SEA using a Digital Equipment Corp. PDP-11/34 computer. The computer operates in an "event triggered" mode, recording data (at 100 samples per second) only when a seismic event is detected. The digital recording system is closely modeled after the CEDAR system developed at the California Institute of Technology by Johnson (1979).

Earthquake Analysis Procedure

Most of the earthquakes in 1981 were located from digital data recorded by our online PDP-11/34 computer. The reading of arrival times, first-motion polarities, and signal durations was done using interactive computer programs on a PDP-11/70 computer. Some of the earthquake data were taken from analog Develocorder films; these earthquakes are designated as type "H" in the appendices.

Detected events were classified and entered into a processing list in the following categories: teleseisms (epicentral distance greater than 1,000 km), regional events (distance less than 1,000 km), and local events (epicenter within the network). Local events large enough to be well recorded on at least three stations were analyzed. Locations determined for 1981 are given in Appendices I and II.

Earthquakes were located with the computer program "spong", a modification of the program FASTHYPO from St. Louis University (Herrmann, 1979). It is based on the standard non-linear least-squares inversion scheme of Geiger (1910) and has been optimized for use with data from the Washington seismograph network. The accuracy of locations determined with this program depends on the accuracy of the crustal model, station distribution around the epicenter, station spacing, number of stations used, and quality of arrival time data.

In the earthquake location procedure, we have used a different velocity model and set of station corrections for each of five regions in Washington and northern Oregon. The regions are shown in the inset on Figure 1. As a general rule, we locate earthquakes by giving full weight to P-wave arrival times at stations within (50+d) km of the epicenter (where d = the distance from the epicenter to the nearest station) and reduced weight to P readings at more distant stations. Usually P readings at stations farther than (150+d) km are not used. Readings from well-recorded S waves are also used from stations within 50 km of the epicenter. These guidelines may be relaxed for very deep earthquakes or earthquakes near the edge of the seismograph net.

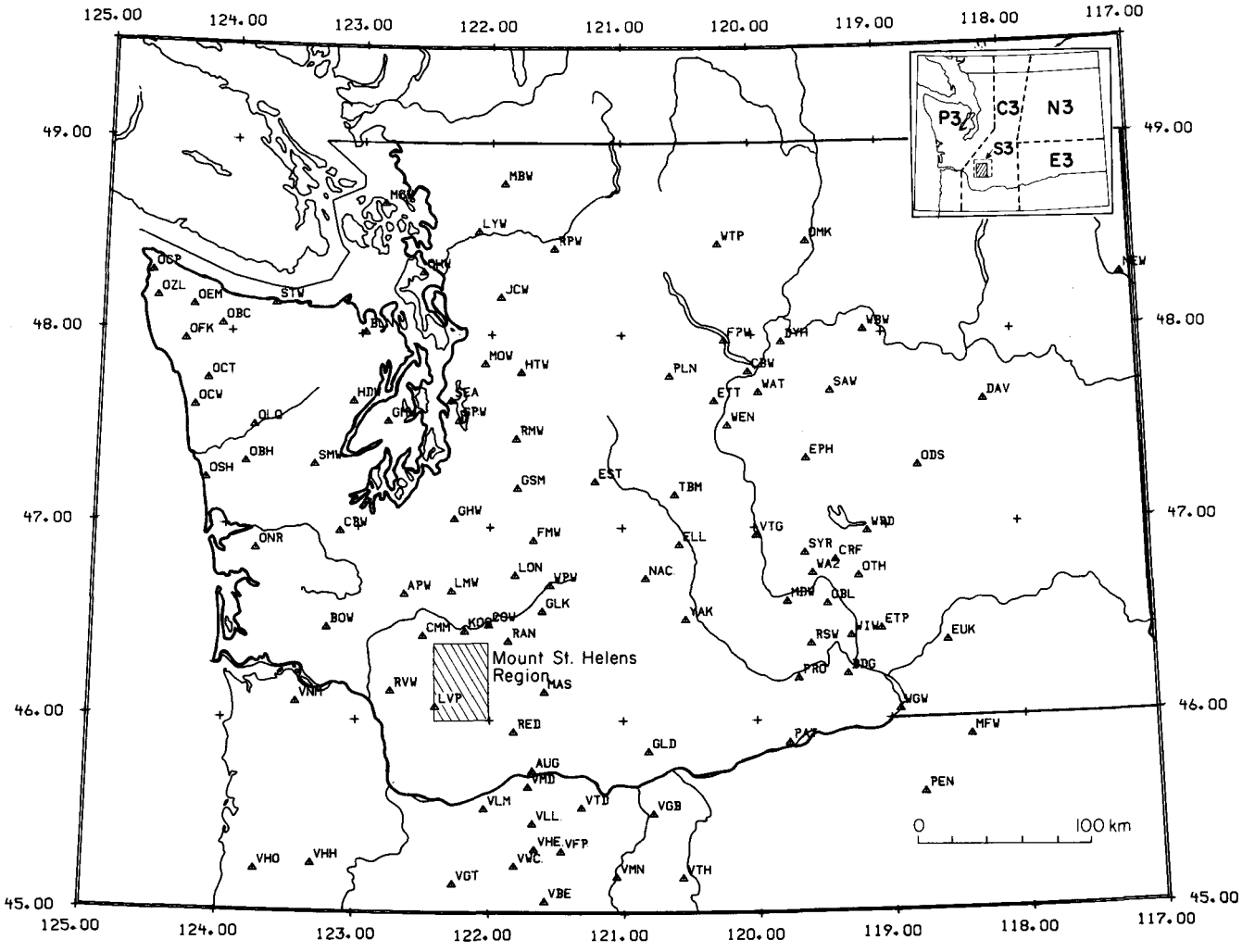

Figure 1.--Location map for stations operating in 1981. Stations in the Mount St. Helens region (shaded box) are shown in Figure 2. Additional network stations, VBP, VCP, VIP, VJY, VLO, and VSM, lie in Oregon, south of the region shown. Inset shows the five regions for which different crustal velocity models (P3, C3, N3, E3, and S3) are used to locate hypocenters.

In the computer location procedure the hypocentral parameters (that is, location and occurrence time) are modified until arrival time residuals (the observed minus the predicted P or S wave arrival times) are minimized. The root mean square (RMS) residual is one indicator of the overall quality of the solution. It is obtained by squaring each residual, summing the squares, dividing by the number of observations minus 4, and taking the square root of that quantity. A RMS residual is included with each event solution in Appendices I and II. Values less than 0.1 sec indicate a solution that fits the observed arrival-time data very well. Values greater than 0.5 sec usually indicate a poor solution. Earthquakes located with only three or four readings (in column labeled NS/NP in the Appendices) have RMS values set to zero. The RMS does not indicate the quality of the location unless more than four P or S readings are available. In addition, two quality factors, each rated A to D, are assigned to every event. The first factor is based on the RMS residual and horizontal and vertical

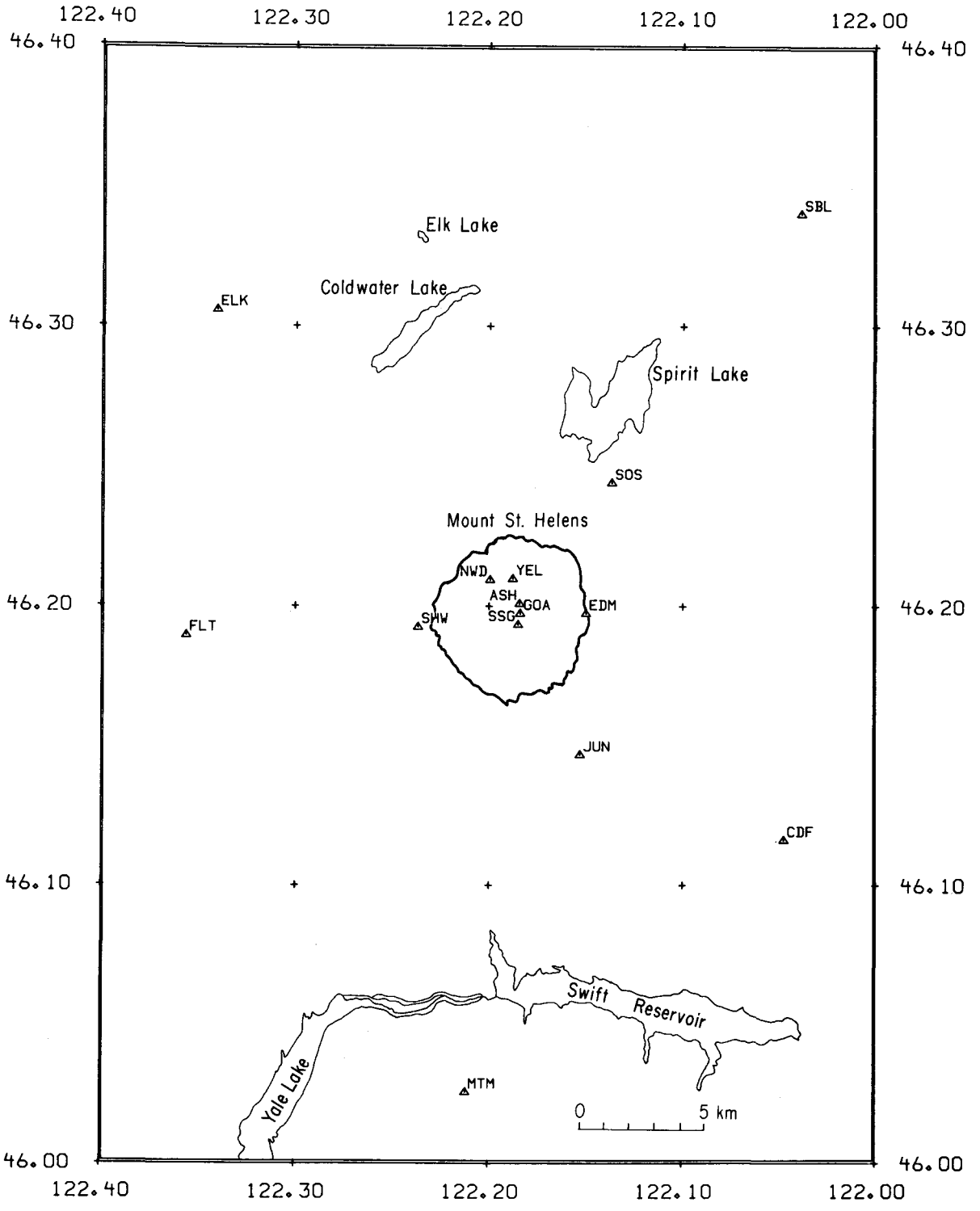

Figure 2.--Seismograph stations in the Mount St. Helens region during 1981. Most of the stations have been installed since the beginning of 1980. Station SHW has operated on the flank of Mount St. Helens since 1972. Solid line around Mount St. Helens is the 1,500-m elevation contour.

Table 1. Stations operating in 1981; see also Figures 1 and 2 for locations.

Station designator	Latitude(N) (dg mn sec)	Longitude(W) (dg mn sec)	Elevation (km)	Station name
APW	46 39 06.0	122 38 51.0	0.457	Alpha Peak
ASH	46 12 03.0	122 11 03.4	1.900	Crater, Mt. St. Helens
AUG	45 44 10.0	121 40 50.0	0.865	Augspurger Mtn
BDG	46 13 59.1	119 19 03.9	0.430	Badger Mt.
BLN	48 00 26.5	122 58 18.6	0.585	Blyn Mt.
BOW	46 28 30.0	123 13 41.0	0.870	Boistfort Mt.
CBW	47 48 25.5	120 01 57.6	1.160	Chelan Butte
CDF	46 06 58.2	122 02 51.0	0.780	Cedar Flats
CMM	46 26 07.0	122 30 21.0	0.620	Crazy Man Mt.
COW	46 29 27.6	122 00 43.6	0.305	Cowlitz River
CPW	46 58 25.8	123 08 10.8	0.792	Capitol Peak
CRF	46 49 30.6	119 23 18.0	0.260	Corfu
DAV	47 38 18.0	118 13 33.6	0.758	Davenport
DYH	47 57 37.8	119 46 09.6	0.820	Dyer Hill
EDM	46 11 50.4	122 09 00.0	1.609	East Dome, Mt. St. Helens
ELK	46 18 20.0	122 20 27.0	1.270	Elk Rock
ELL	46 54 35.0	120 34 06.0	0.805	Ellensburg
EPH	47 21 12.8	119 35 46.2	0.628	Ephrata
EST	47 14 16.8	121 12 21.8	0.756	Easton
ETP	46 27 53.4	119 03 32.4	0.250	Eltopia
ETT	47 39 18.0	120 17 36.0	0.439	Entiat
EUK	46 23 45.0	118 33 43.5	0.350	Eureka
FLT	46 11 21.3	122 21 22.5	1.387	Flat Top
FMW	46 55 54.0	121 40 19.2	1.890	Mt. Fremont
FPW	47 58 09.0	120 12 46.5	0.352	Fields Point
GBL	46 35 51.6	119 27 35.4	0.330	Gable Mountain
GHW	47 02 30.0	122 16 21.0	0.268	Garrison Hill
GLD	45 50 13.0	120 48 46.0	0.610	Goldendale
GLK	46 33 50.2	121 36 30.7	1.320	Glacier Lake
GMW	47 32 52.5	122 47 10.8	0.506	Gold Mt.
GOA	46 11 50.5	122 11 02.0	1.900	Grandson of Ash
GSM	47 12 11.4	121 47 40.2	1.305	Grass Mt.
HDW	47 38 54.6	123 03 15.2	1.006	Hoodsport
HTW	47 48 12.5	121 46 08.6	0.829	Haystack Lookout
JCW	48 11 36.6	121 55 46.2	0.616	Jim Creek
JUN	46 08 48.0	122 09 10.8	1.049	June Lake
KOS	46 27 40.8	122 11 25.8	0.828	Kosmos
LMW	46 40 04.8	122 17 28.8	1.195	Ladd Mt.
LON	46 45 00.0	121 48 36.0	0.853	Longmire (WWSSN and DWWSSN)
LVP	46 04 06.0	122 24 30.0	1.170	Lakeview Peak
LYW	48 32 07.2	122 06 06.0	0.107	Lyman
MAS	46 08 41.0	121 35 30.7	1.370	Mt Adams South
MBW	48 47 02.4	121 53 58.8	1.676	Mt. Baker
MCW	48 40 46.8	122 49 56.4	0.693	Mt. Constitution
MDW	46 36 48.0	119 45 39.0	0.330	Midway

Table 1. Continued.

Station designator	Latitude(N) (dg mn sec)	Longitude(W) (dg mn sec)	Elevation (km)	Station name
MFW	45 54 10.8	118 24 21.0	0.395	Milton-Freewater, Oregon
MOW	47 50 46.9	122 02 52.9	0.180	Monroe
MTM	46 01 31.8	122 12 42.0	1.121	Mt. Mitchell
NAC	46 44 03.8	120 49 33.2	0.738	Naches
NEW	48 15 50.0	117 07 13.0	1.000	Newport Observatory (USGS)
NWD	46 12 33.6	122 11 58.2	2.195	NW Dome, Mt. St. Helens
OBC	48 02 07.1	124 04 39.0	0.938	Olympics - Bonidu Creek
OBH	47 19 34.5	123 51 57.0	0.383	Olympics - Burnt Hill
OCP	48 17 58.5	124 37 37.5	0.487	Cheela Pk
OCT	47 44 57.0	124 10 25.8	0.743	Mt. Octopus
OCW	47 36 30.0	124 16 04.1	0.195	Clearwater
ODS	47 18 24.0	118 44 42.0	0.523	Odessa
OEM	48 07 46.5	124 18 13.5	0.712	Tyee Ridge
OFK	47 57 00.0	124 21 28.1	0.134	Olympics - Forks
OHW	48 19 24.0	122 31 54.6	0.054	Oak Harbor
OLQ	47 30 58.1	123 48 31.5	0.121	Olympics - Lake Quinault
OMK	48 28 49.2	119 33 39.0	0.421	Omak
ONR	46 52 37.5	123 46 16.5	0.257	Olympics - North River
OSH	47 14 08.6	124 09 57.4	0.110	Sunset Hill
OTH	46 44 20.4	119 12 59.4	0.260	Othello
OZL	48 10 06.0	124 35 06.0	0.195	Ozette Lake
PAT	45 52 50.1	119 45 40.1	0.300	Paterson
PEN	45 36 43.2	118 45 46.5	0.430	Pendleton, Oregon
PLN	47 47 04.8	120 37 58.8	0.700	Plains
PRO	46 12 45.6	119 41 09.0	0.552	Prosser
RAN	46 24 30.0	121 51 49.0	1.620	Randle
RED	45 56 13.2	121 49 10.8	1.510	Red Mt.
RMW	47 27 34.9	121 48 19.2	1.024	Rattlesnake Mt. (West)
RPW	48 26 54.0	121 30 49.0	0.850	Rockport
RSW	46 23 28.2	119 35 19.2	1.037	Rattlesnake Mt. (East)
RVW	46 08 58.2	122 44 37.2	0.460	Rose Valley
SAW	47 42 06.0	119 24 03.6	0.690	St. Andrews
SBL	46 20 25.2	122 02 19.8	1.665	Strawberry Lookout
SEA	47 39 18.0	122 18 30.0	0.030	Seattle (UW)
SHW	46 11 33.0	122 14 12.0	1.423	Mt. St. Helens
SMW	47 19 10.2	123 20 30.0	0.840	South Mt.
SOS	46 14 38.5	122 08 12.0	1.270	Source of Smith Creek
SPW	47 33 13.3	122 14 45.1	0.008	Seward Park, Seattle
SSG	46 11 36.0	122 11 06.0	2.100	Shoestring Gl., Mt. St. Helens
STW	48 09 02.9	123 40 13.1	0.308	Striped Peak
SYR	46 51 46.8	119 37 04.2	0.267	Smyrna
TBM	47 10 10.0	120 35 58.0	1.064	Table Mt.
VBE	45 03 37.2	121 35 12.6	1.544	Beaver Butte, Oregon
VBP	44 39 37.8	121 41 20.4	1.876	Bald Peter, Oregon
VCP	44 40 16.2	122 05 22.2	1.161	Cooper's Ridge, Oregon

Table 1. Continued.

Station designator	Latitude(N) (dg mn sec)	Longitude(W) (dg mn sec)	Elevation (km)	Station name
VFP	45 19 05.0	121 27 54.3	1.716	Flag Point, Oregon
VGB	45 30 56.4	120 46 39.0	0.729	Gordon Butte, Oregon
VGT	45 08 59.4	122 15 55.2	0.993	Goat Mt., Oregon
VHE	45 19 45.0	121 39 57.0	1.646	Mt. Hood East, Oregon
VHH	45 15 09.0	123 18 34.2	0.553	High Heaven, Oregon
VHO	45 13 09.0	123 43 31.2	0.951	Mt. Hebo, Oregon
VIP	44 30 29.4	120 37 07.8	1.731	Ingram Pt., Oregon
VJY	44 54 07.8	120 58 27.0	0.951	Jersey
VLL	45 27 48.0	121 40 45.0	1.195	Laurance Lk., Oregon
VLM	45 32 18.6	122 02 21.0	1.150	Little Larch, Oregon
VLO	44 52 46.2	122 23 34.8	1.351	Lookout Mt., Oregon
VMD	45 39 09.6	121 42 43.8	1.317	Mt. Defiance, Oregon
VMN	45 11 12.6	121 03 10.8	0.555	Maupin, Oregon
VNM	46 05 18.0	123 27 00.0	0.900	Nicolai Mt., Oregon
VSM	44 57 37.2	123 07 39.0	0.290	Salem, Oregon
VTD	45 32 42.0	121 18 48.0	0.365	The Dalles, Oregon
VTG	46 57 28.8	119 59 14.4	0.208	Vantage
VTH	45 10 52.2	120 33 40.8	0.773	The Trough, Oregon
VWC	45 14 29.0	121 48 47.0	1.457	Wolf Camp, Oregon
WA2	46 45 24.2	119 33 45.5	0.230	Wahluke Slope
WAT	47 41 55.0	119 57 15.0	0.900	Waterville
WBW	48 01 04.2	119 08 13.8	0.825	Wilson Butte
WEN	47 31 46.2	120 11 39.0	1.061	Wenatchee
WGW	46 02 40.8	118 55 57.6	0.158	Wallula Gap
WIW	46 25 48.8	119 17 13.4	0.130	Wooded Island
WPW	46 41 53.4	121 32 48.0	1.250	White Pass
WRD	46 58 11.4	119 08 36.0	0.378	Warden
WTP	48 28 16.2	120 14 52.2	0.855	Winthrop
YAK	46 31 15.8	120 31 45.2	0.619	Yakima
YEL	46 12 35.0	122 11 16.0	1.750	Yellow Rock, Mt. St. Helens

location error estimates. The second factor depends on number of stations read, largest angular gap between stations, and distance from the epicenter to the nearest station. In each case, A is the highest and D the lowest quality.

Explosions are identified in the data set wherever possible. Criteria useful in distinguishing explosions are: shallow depths, positive P-wave polarity, clustering of epicenters, time of day of occurrence, spectral content of signals, and, of course, direct verification. When explosions occur in unusual locations and are nonrepetitive, positive identification is difficult. Suspected or possible explosions are indicated in Appendices I and II as type P. Confirmed or very probable explosions are indicated as type X.

The magnitude of earthquakes is determined using a coda or signal duration technique. The method used is described by Crosson (1972), and the magnitude is referred to as coda magnitude or M_C to distinguish it from magnitudes determined by other methods. We refer occasionally to M_L, the local or Richter magnitude determined from Wood-Anderson seismograph records; M_S, surface wave magnitude; and m_b, body wave magnitude (Richter, 1958).

DISCUSSION OF EARTHQUAKE ACTIVITY

In 1981 we located 3,344 earthquakes and blasts having $M_C \geq 0.0$. Figures 3 and 4 and the two earthquake catalogs, Appendices I and II, summarize earthquakes with magnitudes $M_C \geq 1$. For $M_C \geq 1.0$ we located 689 earthquakes (Fig. 3) and 474 blasts outside of the Mount St. Helens region, and 404 tectonic and volcanic earthquakes (Fig. 4) and 36 blasts in the Mount St. Helens region. Minor earthquakes having magnitudes $M_C < 1$ are plotted in Figure 5, and blasts are plotted in Figure 6. Minor earthquakes and blasts in the Mount St. Helens region are not plotted or listed in Appendix II.

The largest earthquakes in western Washington occurred in the southern Cascades at Elk Lake (M_C 5.2), which is 17 km north of Mount St. Helens, and in the Goat Rocks Wilderness (M_C 5.0), 45 km southeast of Mount Rainier. There were also clusters of earthquakes in the North Cascades and throughout the Puget Sound region, particularly the southern part of Puget Sound.

Figure 3 shows that, although shallow earthquakes occur over much of Washington and northern Oregon, earthquakes deeper than 30 km are principally confined to western Washington. The deepest earthquakes occur under the Cascade mountains. The largest (M_C 3.3) deep earthquake (38 km) in 1981 occurred on September 9 near the town of Raymond, in southwest Washington. The deepest earthquake occurred on October 25, 60 km east of Seattle, at a depth of 87 km. It was very small, with a magnitude M_C 1.3.

In eastern Washington the greatest number of earthquakes occurred near Entiat (south of Lake Chelan), southwest of Moses Lake, and in the Horse Heaven Hills, southwest of Richland (Figs. 3 and 5). A moderately large (M_C 4.0) earthquake occurred in the Yakima Indian Reservation on February 2.

FELT EARTHQUAKES

Twenty-nine earthquakes were reported felt in 1981 (Table 2 and Fig. 7). For a description of damage reported for these earthquakes, see the 1981 edition of the annual U.S. Geological Survey publication, United States Earthquakes (Stover, 1984). A description of the Modified Mercalli (MM) Intensity scale can also be found there or in Richter (1958).

On January 13, a M_C 3.3 earthquake was felt throughout the San Juan Islands; it had an MM Intensity V at Eastsound and Waldron Island. Small earthquakes were felt on January 23 in Seattle and on January 28 near North Bend.

On February 2, a M_C 4.0 earthquake occurred in a remote part of the Yakima Indian Reservation near Toppenish Ridge, 50 km southwest of Yakima. It was felt at White Swan with MM Intensity IV. The focal mechanism of the earthquake appears to be right-lateral strike-slip motion on a northwest-trending fault. On May 28 two earthquakes (M_C 4.6 and 5.0) occurred 15 min apart in the remote Goat Rocks Wilderness. This region is about 70 km west of Yakima. Because there were no observers near the epicenter, the largest reported intensity was MM Intensity IV for both earthquakes. However, the M_C 5.0 earthquake was felt as far away as Seattle and Portland, Oregon. The two largest Goat Rocks earthquakes and the many hundreds of aftershocks occurred at shallow depths, between 3 and 8 km. The spatial distribution of aftershocks and the focal mechanism of the main shock indicated that the earthquakes occurred on a northwest-trending, right-lateral, strike-slip fault (Zollweg and Crosson, 1981).

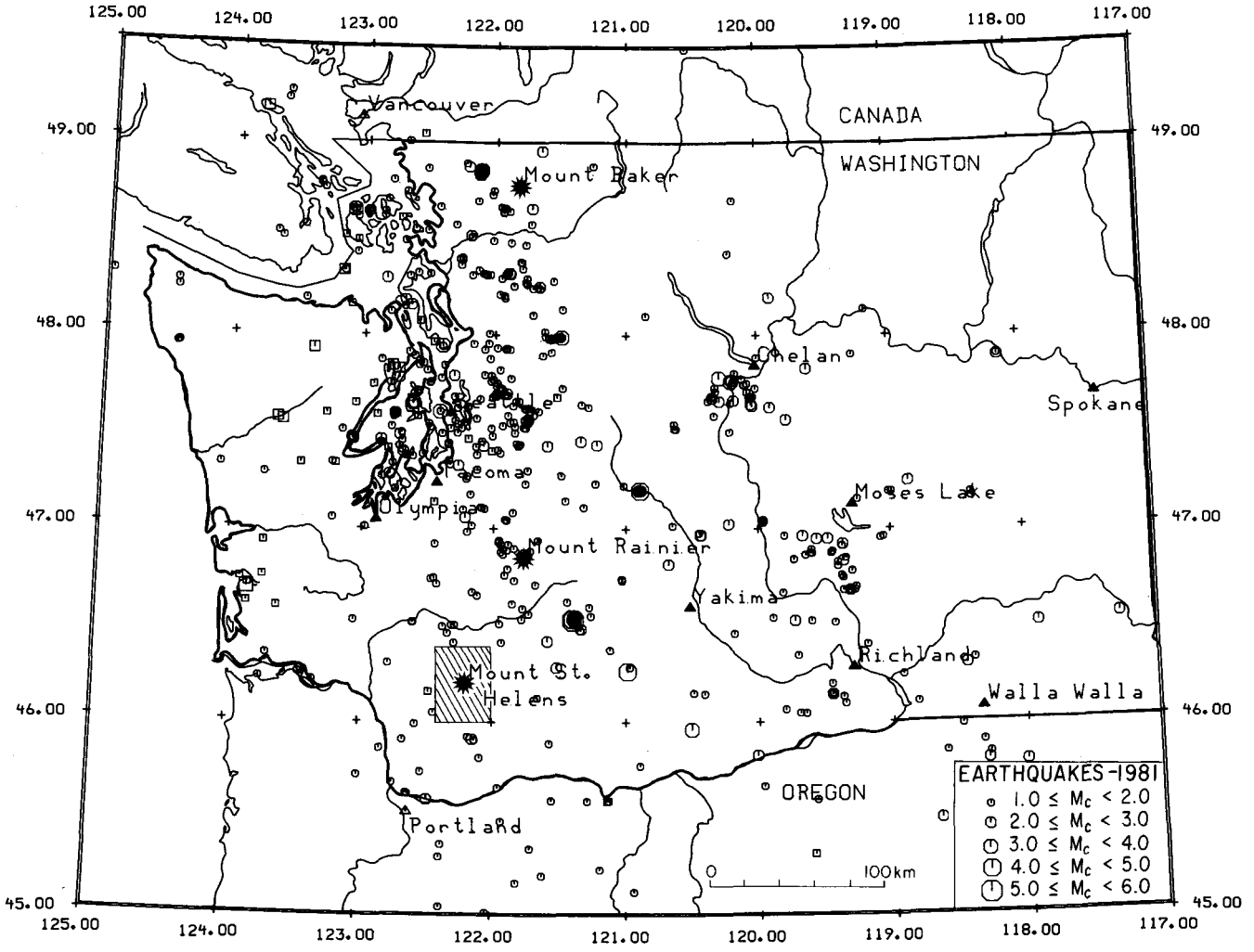

Figure 3.--Earthquake epicenters for Washington and northern Oregon in 1981, $M_C \geq 1$. Earthquakes deeper than 30 km are shown as squares. Earthquakes in the shaded Mount St. Helens region are shown in Figure 4. Four earthquakes, listed in Appendix I, occurred in western Oregon between lat. 44° and 45°, just to the south of area shown here. They had magnitudes from 1.5 to 2.5 and occurred on March 26, June 22, July 6, and November 20.

The Elk Lake earthquake of February 14, 1981 (M_C 5.2 or M_L 5.5), was the largest tectonic earthquake to occur in Washington in 16 years. It was felt over an area of 104,000 km^2 and reached MM Intensity VI in the epicentral region (Fig. 8) where the shaking cracked foundations, dry wall, and windows and overturned light furniture and small objects. The data in Figure 8 were compiled by Linda Noson and are more complete than the data shown on the isoseismal map published in the 1981 edition of United States Earthquakes (Stover, 1984). The variation of intensity caused by local geologic conditions is particularly evident in the Puget Sound region. The Elk Lake earthquakes are discussed further in the section on the Mount St. Helens region, but at least ten aftershocks were felt between February and September, including a M_C 4.5 earthquake on May 13.

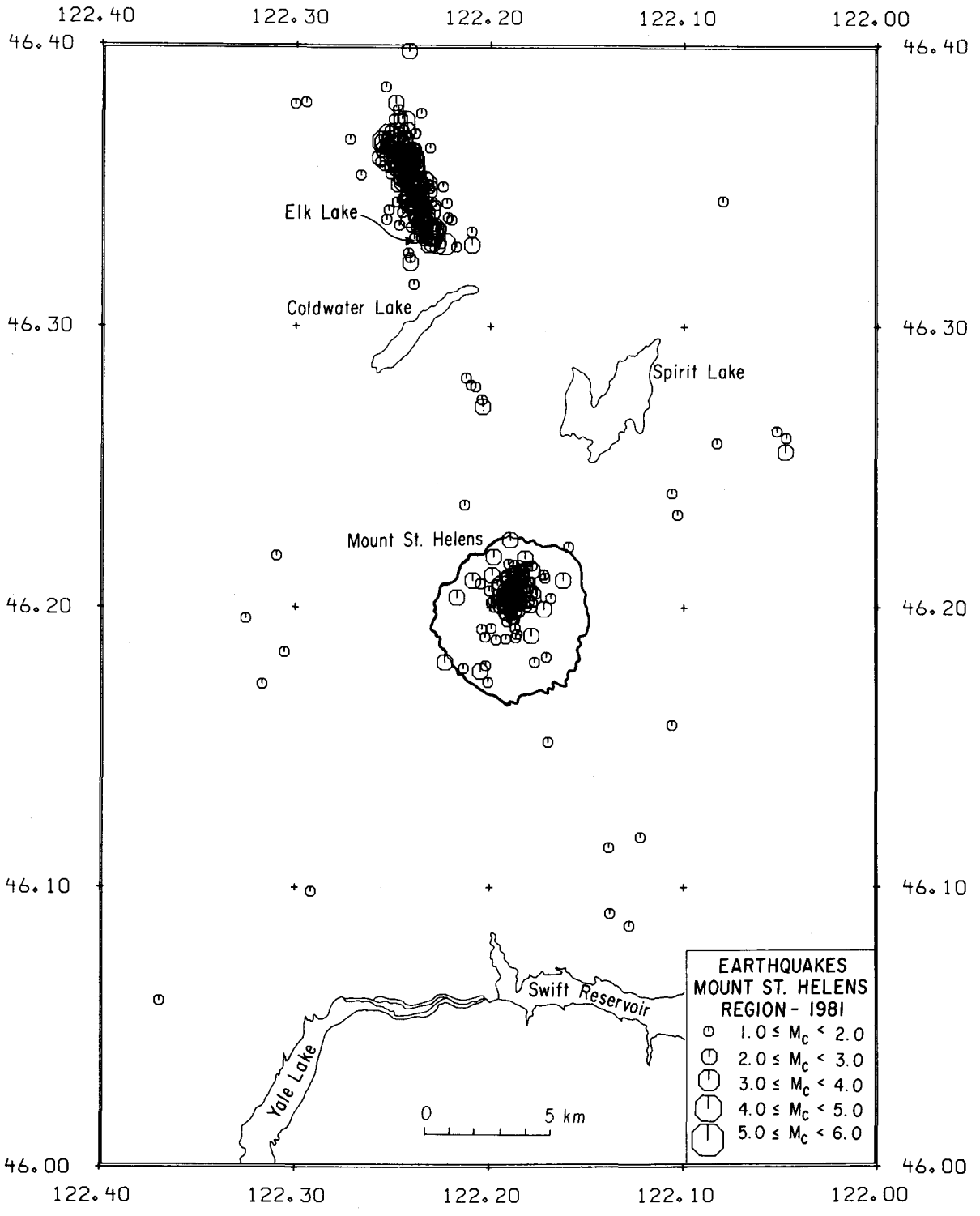

Figure 4.--Earthquake epicenters in the Mount St. Helens region in 1981. No D-quality earthquake epicenters are shown. (See description of appendices, p. 17.) Solid line around Mount St. Helens is the 1,500-m elevation contour.

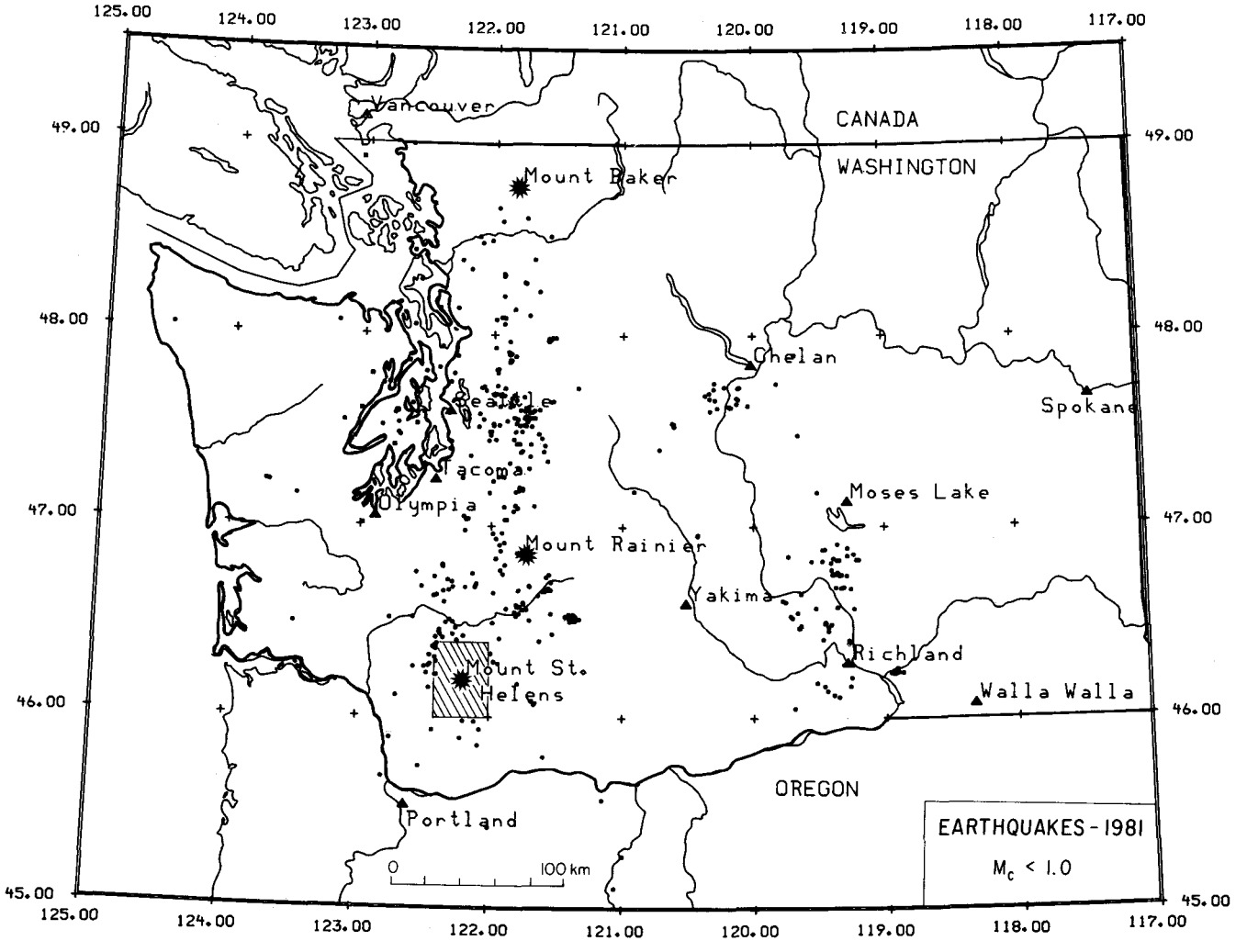

Figure 5.--Epicenters of minor earthquakes in Washington and northern Oregon in 1981, $M_C < 1$. Minor earthquakes in the shaded Mount St. Helens region are not shown.

A moderate (M_C 3.6) earthquake was felt near Darrington, northeast of Seattle, on March 15. It was accompanied by two dozen aftershocks exceeding M_C 1.0. On June 23 two earthquakes (M_C 3.4 and 2.3) were felt west of Mount Baker. There were two dozen aftershocks with $1.0 < M_C < 2.5$. The M_C 3.4 earthquake was felt in Bellingham, Deming, and Everson.

The only deep (38 km) earthquake that was felt occurred on September 6 near Raymond. It had a magnitude M_C 3.3 and was reported felt at MM Intensity IV in South Bend, just north of Willapa Bay. Two of the many earthquakes that occurred near Entiat, south of Lake Chelan in eastern Washington, were felt on July 22 (M_C 3.0) and November 2 (M_C 3.2).

On November 12 and November 26 two earthquakes (M_C 3.7 and M_C 3.5) were felt in the Puget Sound area. The November 12 earthquake was centered under the southern tip of Whidbey Island and was felt with MM Intensity IV in Everett and

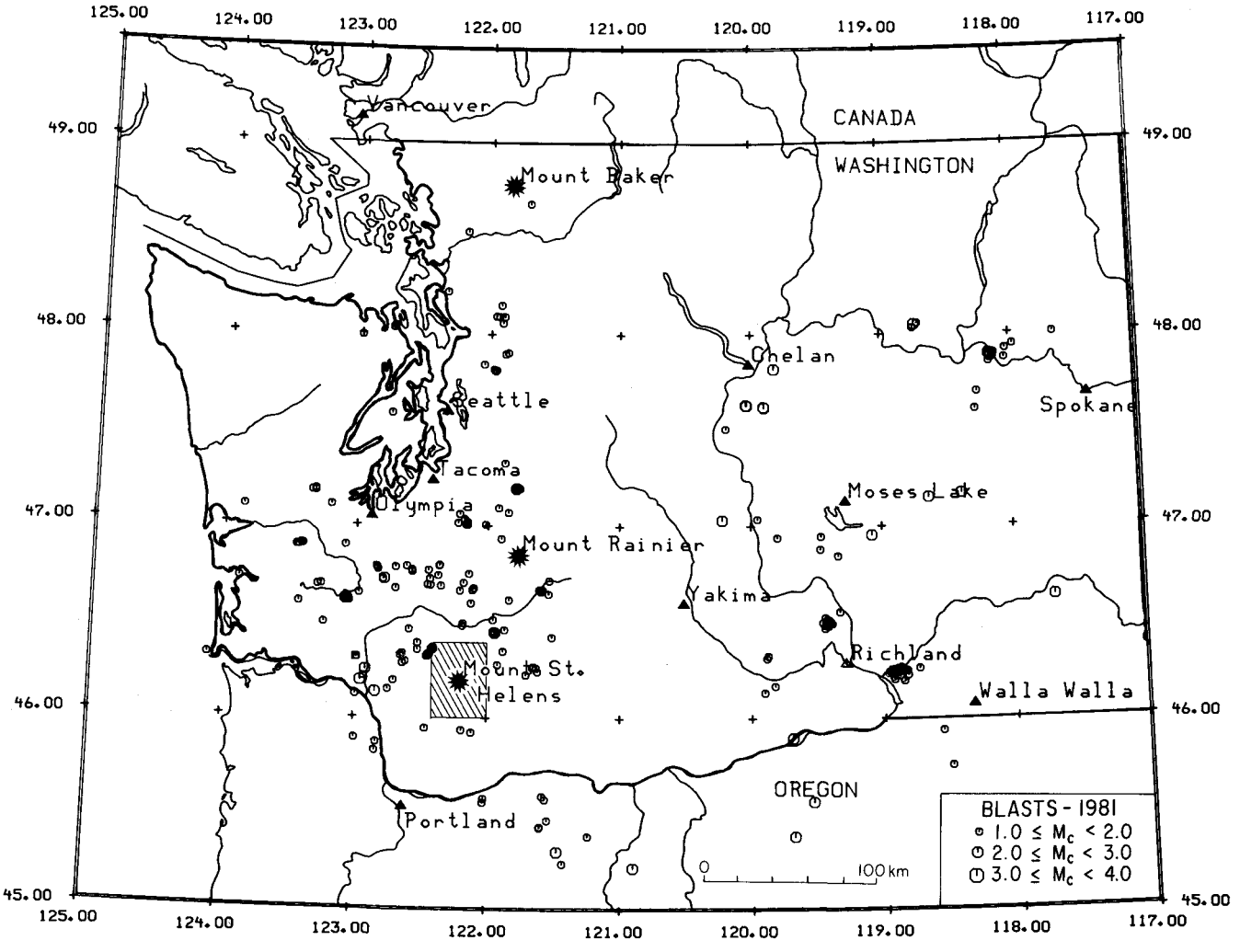

Figure 6.--Epicenters of blasts and probable blasts in Washington and northern Oregon in 1981, $M_C \geq 1$. Blasts in the shaded Mount St. Helens region are not shown.

Seattle. The November 26 earthquake was centered near Bremerton, west of Seattle, and reached MM Intensity IV at Seabeck, Port Orchard, Fox Island, and Indianola.

MOUNT ST. HELENS REGION

Earthquake activity in 1981 in the Mount St. Helens region (Fig. 4) was concentrated in two areas: at Mount St. Helens, and at Elk Lake, 17 km to the north. Most of the earthquakes at Mount St. Helens were associated with five volcanic eruptions in 1981; these occurred on February 5, April 10, June 18, September 6, and October 30. These eruptions added new material to the central dacite dome in the crater. They were not accompanied by significant explosive activity. The number of earthquakes under the volcano increased significantly about one week before each eruption and generally decreased immediately afterwards (Malone and others, 1983). A short-term prediction of all 1981 eruptions was possible from the rapid increase of seismic energy release from 12 to 24 hours before magma was actually extruded at the surface (Swanson and others, 1983).

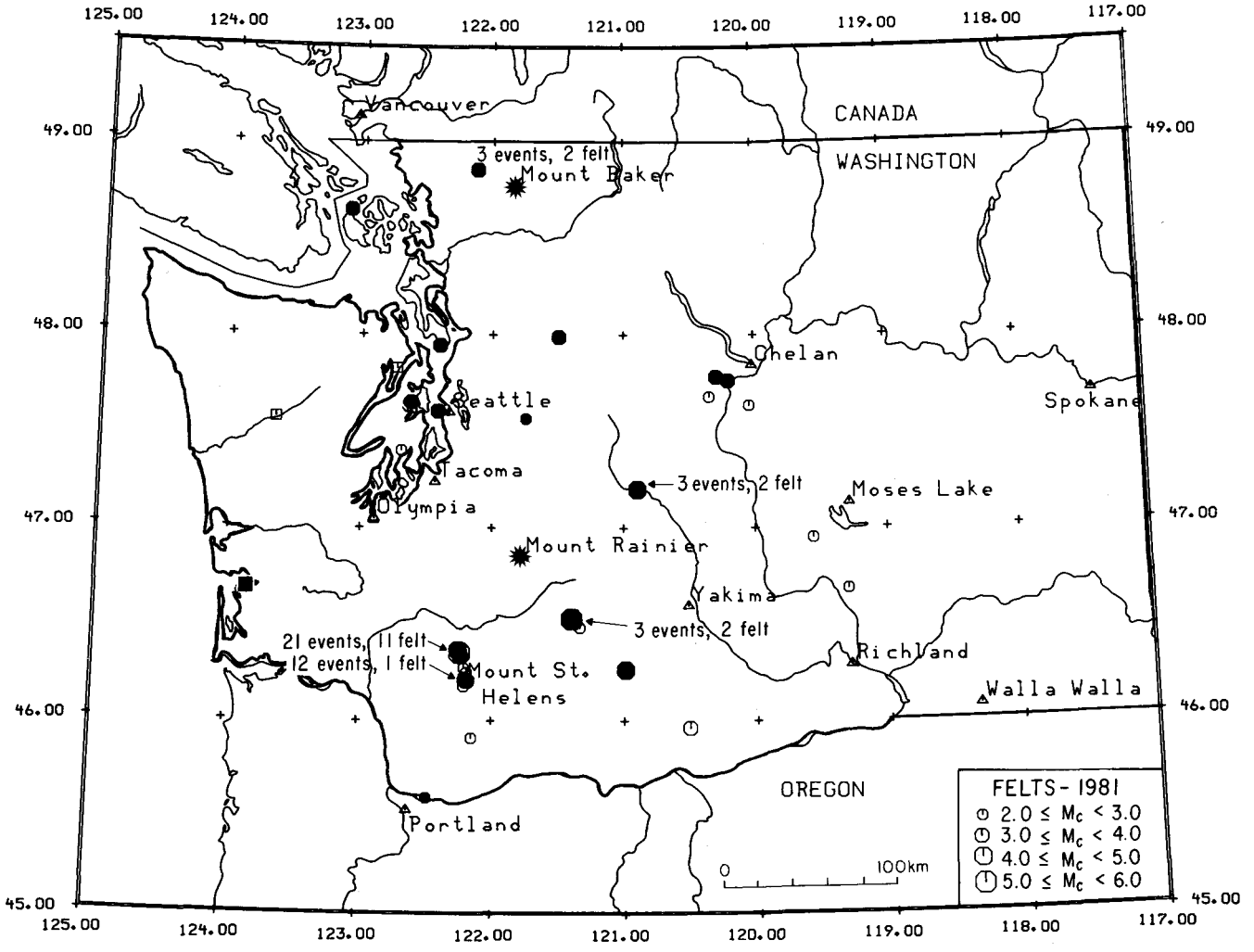

Figure 7.--Epicenters of felt and other important earthquakes in Washington and northern Oregon in 1981. Besides felt earthquakes, all other earthquakes in 1981 having $M_c \geq 2.7$ are shown. Earthquakes deeper than 30 km shown as squares. Earthquakes not felt are shown as open symbols, and felt earthquakes are shown as solid symbols.

The earthquakes accompanying each eruption were shallow (depths less than 5 km) and were presumably caused by the upward motion of molten rock from the shallower of two magma chambers hypothesized under Mount St. Helens (Malone and others, 1983; Weaver and others, 1983). Because seismic waves from shallow volcanic earthquakes tend to have low-frequency, emergent P-wave onsets, many of these earthquakes are difficult to time accurately. As a result, their epicentral locations are more uncertain than those of tectonic earthquakes. Much of the scatter of epicenters near Mount St. Helens in Figure 4 is due to the difficulty of precisely locating some of these low-frequency volcanic earthquakes. Forty-four of the least well constrained epicenters in Appendix II (those having a quality of D) have been excluded from Figure 4.

Table 2. Felt earthquakes, 1981.

Day*	Time	M	Int	Comments
81/01/13	01:21	3.3	V	Felt throughout San Juan Islands
81/01/23	16:46	3.0	III	Seattle. III at Queen Anne and Alki Point
81/01/28	21:35	2.7	Felt	Near North Bend
81/02/02	01:23	4.0	IV	Yakima Indian Reservation
81/02/14	06:09	5.2	VI	Elk Lake. Felt over an area covering 104,000 km^2
81/02/14	06:50	3.5	Felt	Elk Lake. Felt in Kidd Valley
81/02/14	06:53	3.4	Felt	Same as above
81/02/14	08:43	3.8	Felt	Same as above
81/02/14	09:05	2.8	Felt	Same as above
81/02/14	15:00	3.0	Felt	Same as above
81/02/14	21:27	3.8	V	Elk Lake. V in Vancouver, WA. Felt as far north as Mercer Island
81/02/18	06:09	4.2	VI	Felt over an area of 9,300 km^2. VI in Cle Elum and Puyallup
81/03/06	14:19	2.9	III	Near Cle Elum
81/03/15	07:24	3.6	Felt	Near Darrington
81/05/01	10:06	3.1	IV	Elk Lake. Felt in Elbe
81/05/13	05:00	4.5	V	Elk Lake. V at Ariel
81/05/27	10:02	3.2	Felt	Elk Lake. Felt on north side of Mount St. Helens
81/05/28	08:56	4.6	IV	Goat Rocks Wilderness. IV at Mineral and White Pass
81/05/28	09:10	5.0	IV	Goat Rocks Wilderness. IV over broad area
81/06/17	21:22	1.5	Felt	Felt in crater of Mount St. Helens
81/06/23	00:05	3.4	Felt	Bellingham, Deming, Everson
81/06/23	00:06	2.3	Felt	Same as above
81/07/22	06:05	3.0	III	Entiat
81/08/23	16:22	3.4	Felt	Randle and Glenoma
81/09/06	19:34	3.3	IV	North of Willapa Bay. IV at South Bend
81/10/25	03:21	3.2	Felt	Entiat. Felt in Chelan area of eastern Washington
81/11/08	07:54	2.4	Felt	Near Portland, Oregon. Felt in Camas
81/11/12	18:10	3.7	IV	IV at Everett and Seattle
81/11/26	12:30	3.5	IV	IV at Seabeck, Port Orchard, Fox Island, and Indianola

*Day gives year, month and day of earthquake. Time is hour and minute in Coordinated Universal Time (subtract 8 hours for Pacific Standard Time or 7 hours for Pacific Daylight Time). M is coda magnitude of earthquake. Int is an estimate of the maximum Modified Mercalli Intensity (United States Earthquakes - 1981), from earthquake felt reports. If reported information is insufficient to assign a numerical value of Modified Mercalli Intensity, Int is listed as "Felt".

The tectonic earthquake sequence that occurred at Elk Lake actually began a few hours after the major eruption of May 18, 1980 (Grant and others, 1984). Several earthquakes in that sequence reached magnitude 4.1 on May 28, 1980. There were almost no earthquakes from July 1980 to February 11, 1981, when two earthquakes (magnitudes 2.5 and 1.9) occurred. Three days later, on February 14, 1981, the mainshock occurred; it had a Richter Magnitude M_L 5.5 (computed from the Newport Wood-Anderson seismograph).

The Elk Lake earthquake had more than 1,000 aftershocks with $M_C \geq 0$ in an area not previously recognized as capable of having large earthquakes in the shallow crust. The Elk Lake earthquake was the largest shallow earthquake in the crust of the Pacific Northwest since the 1936 (M_L 5 3/4) Milton-Freewater earthquake, which occurred just south of Walla Walla. Larger earthquakes--for example, the M_b 6.5 Seattle earthquake of 1965--occurred at depths of more than 30 km and had foci

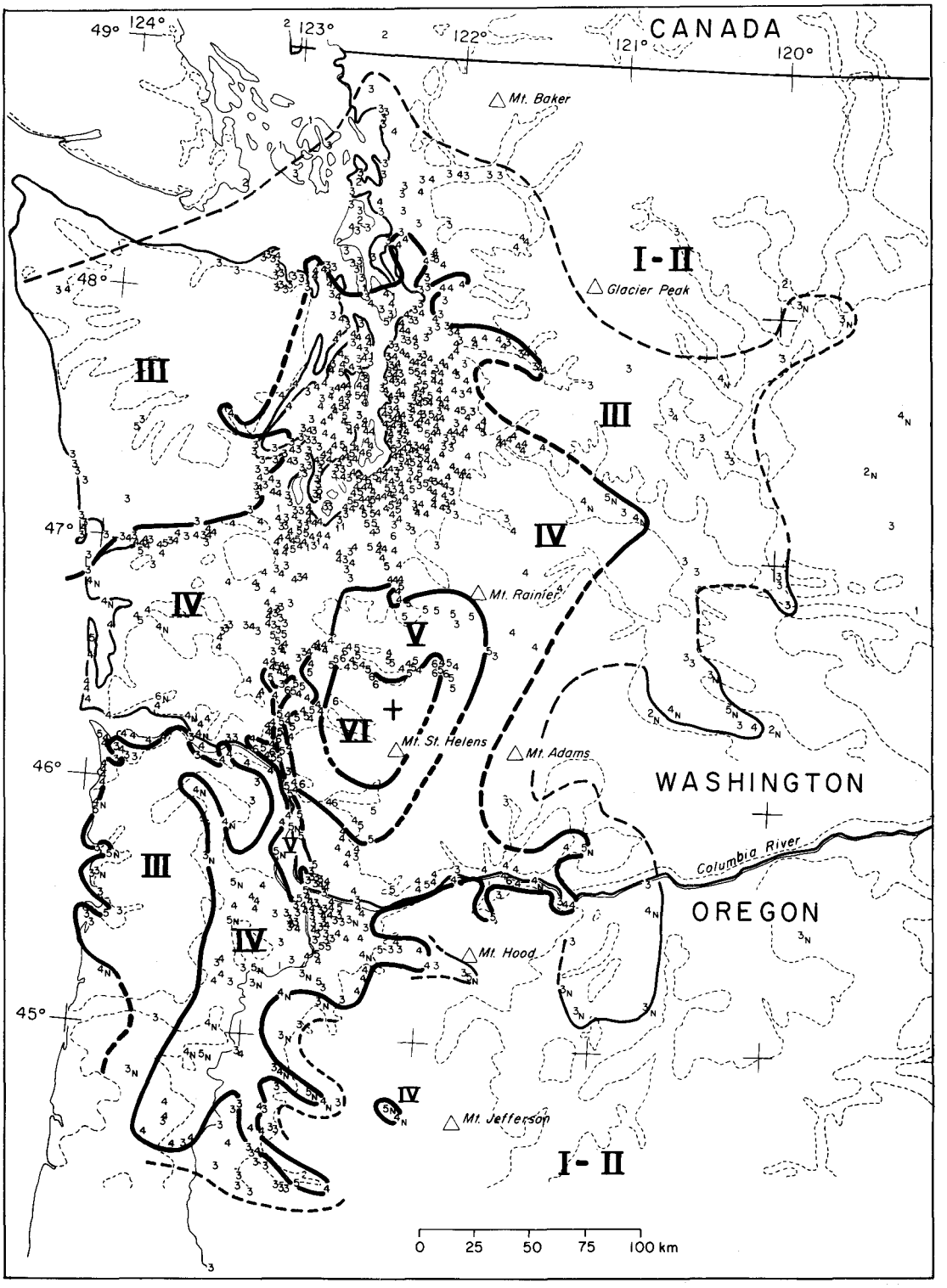

Figure 8.--Felt area of the Elk Lake earthquake (M_L 5.5) of February 14, 1981, derived from felt reports compiled by Linda Noson, University of Washington. Roman numerals indicate Modified Mercalli intensity; see Stover (1984) for a description of the Modified Mercalli intensity scale. Individual intensities used to determine isoseismal contour lines are shown as Arabic numerals. Data obtained from the National Oceanic and Atmospheric Administration are indicated by the subscript "N".

below the crust. The large number of aftershocks following the February 14, 1981, Elk Lake earthquake was unusual for the northwest United States. In the recent past, only the 1961 Swift Reservoir earthquake (Grant and Weaver, 1986) and the May 28, 1981, Goat Rocks Wilderness earthquake have had large numbers of aftershocks. The focal mechanism and hypocenter pattern for the Elk Lake earthquakes define a north- to northwest-trending fault with right-lateral strike-slip motion. The earthquake epicenter lies at the center of the proposed St. Helens seismic zone (Weaver and Smith, 1983), a 90-km-long fault zone striking north-northwest through Mount St. Helens. Although there is strong seismological evidence for this fault zone, no geologic evidence of a fault at the Earth's surface has yet been reported.

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DESCRIPTION OF APPENDICES

Earthquake locations for 1981 have been divided into two catalogs, Appendices I and II. Appendix I contains data for all earthquakes and blasts that occurred between lat. 44° and 50° N. and long. 117° and 125° W., but excluding those in the Mount St. Helens region, lat. 46.0° to 46.4° N., long. 122.0° to 122.4° W. Appendix II lists the earthquakes and blasts in the Mount St. Helens region only. Although we located 3,344 earthquakes and blasts in 1981 having magnitude $M_C \geq 0$ in the region bounded by 44°-50° N. and 117°-125° W., we list only earthquakes having $M_C \geq 1.0$ in the catalogs. There are 1,163 earthquakes and blasts listed in Appendix I, and 440 earthquakes and blasts listed in Appendix II. Epicenters of earthquakes with magnitudes less than 1.0 are plotted in Figure 5.

In Appendices I and II the following information is given:

TIME Origin time is calculated for each earthquake on the basis of multi-station arrival times. Time is given in **Coordinated Universal Time** (UTC), in hours:minutes:seconds. To convert to **Pacific Standard Time** (PST), subtract 8 hours, or to **Pacific Daylight Time** subtract 7 hours.

LAT North latitude, in degrees and minutes, of the epicenter.

LON West longitude, in degrees and minutes, of the epicenter.

DEPTH The depth, given in kilometers, is usually freely calculated from the arrival-time data. In some instances, the depth must be fixed arbitrarily to obtain a convergent solution. Such depths are noted by an asterisk (*) in the column immediately following the depth. A $ or a # following the depth means that the maximum number of iterations has been exceeded without meeting convergence tests and both the location and depth have been arbitrarily fixed.

M Coda magnitude, M_C (Crosson, 1972). For tectonic earthquakes in Washington, M_C is an estimate of local Richter magnitude, M_L (Richter, 1958). Normally, the only earthquakes with undetermined magnitudes are very small ones. Magnitude values may be revised as we improve our analysis procedure.

NS/NP NS, the number of station observations, and NP, the number of P and S phases used to calculate the earthquake location. A minimum of three stations and four phases is required. Generally, more observations improve the quality of the solution.

GAP Azimuthal gap. The largest angle (relative to the epicenter) containing no stations.

RMS The root mean square residual taken about the mean of the station first-arrival residuals. It is only useful as a measure of the quality of the solution when five or more well distributed stations are used in the solution. Good solutions are normally characterized by RMS values less than about 0.3 sec.

Q Two **Quality factors** indicate the general reliability of the solution (A is best quality, D is worst). Similar quality factors are used by the U.S. Geological Survey for events located with the computer program HYPO71. The first letter is a measure of the hypocenter quality based on travel-time residuals. For example: A quality requires an RMS less than 0.15 sec, while an RMS of 0.5 sec or more is D quality. (Estimates of the uncertainty in hypocenter location also affect this quality parameter.) The second letter of the quality code depends on the spatial distribution of stations around the epicenter, that is, number of stations, their azimuthal distribution, and the minimum distance (DMIN) from the epicenter to a station. Quality A requires a solution with eight or more phases, GAP $\leq 90°$, and DMIN $\leq$ d, where d = 5 km or d = depth if depth > 5 km. If the number of phases, NP, is five or less, or GAP > 180°, or DMIN > 50 km, the solution is assigned quality D.

MOD The crustal velocity model used in location calculations (refer to Fig. 1).

P3--Puget Sound model
C3--Cascade model
S3--Mount St. Helens model including Elk Lake
N3--northeastern model
E3--southeastern model

TYP Earthquake classification.

F--earthquakes reported to have been felt
P--probable explosion
L--low-frequency earthquakes
H--handpicked from helicorder records
X--known explosion

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APPENDIX I

EARTHQUAKE CATALOG 1981

Earthquake Locations lat. 44°-50°N, long. 117°-125°W, $M_c \geq 1.0$
Excluding Mount St. Helens region lat. 46°-46.4°N, long. 122°-122.4°W

Jan 1981

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
1	13:13:02.25	47 25.87	121 13.06	4.64$	2.0	26/37	80	0.42	CC	C3	
2	04:47:41.33	48 10.94	123 27.56	19.92$	1.3	5/07	171	0.20	CD	P3	H
2	17:05:56.24	46 14.41	118 56.84	0.05*	1.2	7/07	195	0.13	AD	E3	X
2	22:00:03.09	46 14.85	118 51.86	6.33	1.0	9/10	208	0.25	BD	E3	X
3	01:23:15.35	47 31.52	121 50.63	6.80	1.4	9/14	110	0.13	AC	P3	
3	01:30:42.68	46 13.77	118 58.32	1.68	1.0	8/09	185	0.19	BD	E3	X
3	06:01:43.28	46 13.87	118 57.46	3.36	1.0	9/10	184	0.23	BD	E3	X
3	09:09:43.39	46 14.29	118 55.33	3.59	1.1	10/11	193	0.26	BD	E3	X
3	17:13:30.77	46 14.05	118 57.08	1.05	1.1	8/09	193	0.13	BD	E3	X
4	00:59:21.95	46 13.46	118 56.89	3.05	1.0	9/10	186	0.37	CD	E3	X
4	04:08:39.71	46 14.60	118 56.38	0.45	1.0	8/08	199	0.11	AD	E3	X
4	05:59:05.74	46 45.37	119 22.08	4.50#	1.1	9/13	110	0.09	AB	E3	
5	09:43:25.35	46 54.90	121 56.65	7.42	1.3	12/16	68	0.41	CC	C3	
5	17:25:15.08	46 14.87	118 56.06	0.71	1.1	6/06	201	0.07	AD	E3	X
5	17:50:47.93	46 14.56	118 53.21	3.60	1.0	7/08	202	0.24	CD	E3	X
5	22:18:36.91	46 14.07	118 55.14	5.70	1.0	7/08	194	0.26	CD	E3	X
5	23:51:49.20	46 30.68	121 57.35	2.99	1.3	8/10	142	0.10	AC	C3	P
6	05:45:24.44	46 14.96	118 51.41	5.08	1.2	7/08	209	0.09	BD	E3	X
6	18:56:36.15	47 32.34	122 29.98	24.84	1.3	21/29	55	0.14	AA	P3	
7	01:25:50.06	46 14.60	118 55.08	3.26	1.3	6/08	194	0.23	BD	E3	X
7	05:25:35.81	46 14.60	118 55.32	3.37	1.2	7/09	193	0.10	AD	E3	X
7	08:30:36.13	46 15.92	118 52.60	8.79$	1.1	9/12	204	1.58	DD	E3	X
8	01:21:42.44	46 14.67	118 55.89	2.12	1.1	7/09	191	0.12	BD	E3	X
8	05:35:38.85	46 14.15	118 54.50	2.52	1.2	9/12	197	0.16	BD	E3	X
8	08:30:53.21	46 14.46	118 56.09	0.95	1.1	5/08	200	0.07	AD	E3	X
8	15:13:14.41	46 14.75	118 54.65	2.85	1.1	9/10	196	0.13	BD	E3	X
8	19:24:12.34	46 14.49	118 54.15	4.49	1.1	7/10	180	0.14	AC	E3	X
8	22:07:26.61	46 14.78	118 50.52	12.30	1.1	6/09	213	0.40	CD	E3	X
9	06:48:18.52	46 14.69	118 54.83	3.28	1.2	9/12	196	0.17	BD	E3	X
9	15:09:01.82	46 14.41	118 56.56	0.50*	1.1	8/10	188	0.50	CD	E3	X
9	16:17:21.87	46 57.47	119 03.19	1.02	1.2	12/13	149	0.15	AC	E3	
9	19:40:38.22	46 14.68	118 55.31	2.94	1.1	14/17	123	0.16	BC	E3	X
9	22:20:21.97	46 14.85	118 54.29	3.34	1.1	11/13	198	0.25	BD	E3	X
10	01:21:40.41	46 14.42	118 55.85	1.50	1.2	8/10	121	0.16	BC	E3	X
10	04:29:58.67	48 17.65	124 57.47	6.98	1.2	7/09	298	0.23	CD	P3	
10	06:15:09.49	46 14.53	118 56.15	2.17	1.1	9/11	200	0.12	AD	E3	X
10	07:20:53.41	46 14.33	118 52.78	9.39*	1.1	6/09	219	0.23	BD	E3	X
10	09:25:32.24	46 14.34	118 55.54	1.09	1.2	10/11	123	0.19	BC	E3	X
10	14:31:48.13	46 11.99	118 55.57	25.74	1.1	4/05	228	0.06	BD	E3	X
10	19:51:41.11	46 14.38	118 56.68	4.35	1.1	8/10	188	0.14	AD	E3	X
10	20:14:50.23	46 15.30	118 54.86	1.95	1.3	14/16	123	0.14	AC	E3	X
10	20:39:14.60	48 13.21	122 20.64	0.03*	1.2	5/07	235	1.71	DD	P3	P
11	01:21:56.91	47 19.76	123 28.03	40.58	1.8	18/24	89	0.23	BA	P3	
11	02:16:15.46	46 14.34	118 56.08	4.15	1.1	10/13	172	0.19	BC	E3	X
11	02:36:40.62	46 14.51	118 56.17	2.43	1.2	11/14	190	0.17	BD	E3	X
11	03:27:28.89	48 16.35	121 46.03	4.60*	1.3	5/08	159	0.09	AD	P3	
11	06:19:48.42	46 14.59	118 56.40	0.41*	1.3	9/09	171	0.10	AC	E3	X
11	09:39:07.71	46 13.01	118 53.27	5.28	1.2	6/07	286	0.23	CD	E3	X
11	11:11:38.24	48 15.88	121 45.36	8.19	1.4	6/09	139	0.17	BC	P3	
11	21:16:49.35	46 56.34	121 57.34	8.59	1.3	15/20	65	0.13	AC	C3	
12	12:57:29.00	48 29.31	123 04.30	47.80	1.7	21/27	66	0.17	BA	P3	
12	20:50:35.16	46 14.30	118 56.38	1.27	1.0	7/07	198	0.04	AD	E3	X
13	00:20:02.50	47 53.79	121 53.28	0.04*	1.1	4/05	139	0.23	BD	P3	P
13	01:21:41.61	48 38.59	123 06.35	15.63	3.3	24/29	67	0.27	BB	P3	F
13	01:23:57.96	48 38.70	123 06.13	13.87	1.7	14/19	68	0.25	BB	P3	
13	01:43:47.00	45 12.42	121 37.28	2.54	1.2	5/05	169	0.08	AD	C3	
13	06:40:53.99	46 15.41	118 54.46	0.39*	1.2	11/13	124	0.19	BC	E3	X
13	08:44:41.29	46 14.63	118 56.10	2.46	1.2	11/12	125	0.09	AC	E3	X
13	13:45:19.84	47 19.94	123 12.17	43.90	1.2	12/18	96	0.18	BB	P3	
13	15:54:24.30	47 40.28	122 38.31	54.59	1.9	20/29	60	0.16	BA	P3	

Jan 1981 cont'd

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
13	22:59:06.66	46 14.70	118 55.50	2.21	1.3	13/15	174	0.20	BC	E3	X
14	03:00:53.51	46 14.48	118 54.41	1.98	1.3	12/15	128	0.21	BC	E3	X
14	06:25:53.33	46 14.83	118 54.07	2.63	1.2	12/16	81	0.16	BC	E3	X
14	09:01:13.13	46 14.14	118 55.33	1.86	1.2	11/13	85	0.14	AC	E3	X
14	18:01:44.97	46 14.33	118 55.44	2.09	1.2	8/10	123	0.19	BC	E3	X
14	21:07:36.98	47 50.55	122 03.17	0.02*	1.5	6/08	209	0.25	BD	P3	P
15	05:15:12.90	46 13.79	118 54.72	0.84	1.4	11/13	212	0.22	BD	E3	X
15	06:00:36.15	45 50.08	118 17.14	20.58	1.9	8/09	330	0.18	CD	E3	
15	08:21:13.20	46 14.63	118 53.40	2.52	1.3	14/16	79	0.21	BC	E3	X
15	08:51:37.74	46 13.71	118 55.02	3.72	1.3	8/09	127	0.13	AC	E3	X
15	16:57:22.44	46 14.70	118 53.94	2.40	1.4	10/13	180	0.18	BC	E3	X
15	23:36:53.25	47 00.41	122 58.40	0.04*	1.0	4/04	186	0.17	BD	P3	H
15	23:46:14.22	46 14.03	118 55.82	2.47	1.4	10/13	191	0.21	BD	E3	X
16	04:11:16.61	46 14.42	118 56.66	0.33	1.1	6/06	197	0.01	AD	E3	X
16	04:32:12.37	46 14.80	118 53.95	4.08	1.4	14/18	148	0.24	BC	E3	X
16	08:02:42.29	46 14.68	118 53.74	3.43	1.5	12/15	200	0.22	BD	E3	X
16	11:50:30.85	46 08.73	120 24.59	16.62*	1.6	11/12	139	0.17	BC	E3	
16	14:14:04.63	46 09.31	122 28.55	33.93	1.2	4/06	252	0.24	CD	S3	
16	15:33:38.26	46 14.22	118 54.82	6.91$	1.6	8/11	126	0.20	CC	E3	X
16	18:42:36.87	46 14.67	118 53.46	4.11	1.3	12/14	78	0.25	BC	E3	X
16	20:52:24.85	46 44.78	123 44.26	41.84$	1.1	5/06	223	0.42	DD	P3	
16	22:14:09.58	46 14.56	118 53.13	4.08	1.2	9/13	149	0.20	BC	E3	X
16	22:46:18.63	46 46.32	122 50.03	6.65	1.9	16/17	91	0.12	AC	P3	X
17	00:51:13.66	46 14.22	118 55.49	3.28	1.3	10/11	123	0.15	BC	E3	X
17	00:55:55.28	46 57.12	119 04.75	2.97	2.1	21/21	163	0.15	AC	E3	P
17	05:45:13.82	46 14.44	118 55.13	3.53	1.3	10/12	124	0.18	BC	E3	X
17	07:55:12.87	46 14.72	118 53.64	4.80	1.4	10/15	148	0.19	BC	E3	X
17	09:35:14.34	46 14.93	118 55.60	0.04*	1.3	9/10	121	0.11	AC	E3	X
17	15:35:44.23	46 13.88	118 55.32	3.13	1.2	10/13	125	0.19	BC	E3	X
17	17:08:57.33	46 14.90	118 55.38	2.73	1.3	11/12	122	0.16	BC	E3	X
17	21:27:31.60	47 40.84	120 03.52	3.65	1.6	6/10	153	0.08	BC	N3	
18	03:02:15.14	46 13.73	118 57.27	2.74	1.2	6/08	218	0.10	AD	E3	X
18	03:27:06.35	46 14.54	118 56.18	2.43	1.3	9/11	190	0.18	BD	E3	X
18	05:12:01.09	46 14.83	118 55.13	2.36	1.3	9/10	194	0.13	AD	E3	X
19	00:47:52.94	45 41.15	122 44.14	22.67	1.6	10/14	180	0.16	BC	C3	
19	19:58:10.32	46 14.39	118 56.62	0.66	1.0	8/09	197	0.10	AD	E3	X
19	21:43:07.38	46 14.70	118 56.76	0.48	1.1	6/06	196	0.11	AD	E3	X
19	22:55:11.79	46 43.35	122 47.06	0.09	2.2	15/15	97	0.10	AC	P3	X
19	23:01:43.46	46 14.10	118 56.47	3.35	1.2	6/08	188	0.15	BD	E3	X
20	00:58:17.83	47 48.61	121 57.99	0.02*	1.2	4/07	140	0.13	AD	P3	P
20	01:43:11.89	46 14.42	118 54.80	2.35	1.2	10/13	84	0.19	BC	E3	X
20	02:59:20.00	46 14.24	118 55.48	4.35	1.5	12/15	87	0.18	BC	E3	X
20	07:45:02.31	46 14.44	118 55.13	2.54	1.3	13/18	85	0.20	BC	E3	X
20	09:05:19.20	46 14.40	118 55.78	1.99	1.3	12/15	87	0.16	BC	E3	X
20	21:15:51.85	46 57.08	119 04.44	2.55	1.6	11/13	220	0.14	AD	E3	
21	00:23:32.12	46 13.22	118 54.47	1.18	1.1	9/10	218	0.17	BD	E3	X
21	00:46:09.21	46 14.83	118 55.64	3.84	1.3	11/14	85	0.11	AC	E3	X
21	04:10:20.36	46 14.41	118 56.53	0.40*	1.2	6/07	197	0.08	AD	E3	X
21	05:58:22.47	47 38.76	120 11.96	6.44	1.2	5/07	135	0.07	AD	N3	
21	08:58:19.72	46 14.29	118 56.14	1.82	1.2	12/13	89	0.20	BC	E3	X
21	13:03:04.67	47 28.56	122 00.83	10.95	1.8	8/11	139	0.11	AC	P3	
22	00:53:43.58	46 21.64	122 24.42	1.83	1.8	24/29	101	0.21	BB	S3	P
22	03:44:39.81	46 15.13	118 55.13	1.29	1.2	12/14	122	0.22	BC	E3	X
22	07:09:19.99	46 14.61	118 55.99	1.28	1.1	12/13	87	0.19	BC	E3	X
22	08:36:41.73	46 14.36	118 55.28	0.08	1.2	11/11	209	0.19	BD	E3	X
22	11:04:40.64	48 14.49	121 42.69	8.42$	1.2	7/10	152	0.23	BC	P3	
22	14:40:00.75	46 14.05	118 54.74	2.23	1.2	11/14	127	0.16	BC	E3	X
22	15:29:21.37	46 14.56	118 56.07	1.97	1.2	10/12	88	0.13	AC	E3	X
22	21:28:44.30	46 47.70	122 21.90	1.01	1.3	20/24	66	0.13	AC	P3	P
22	22:48:12.07	46 29.37	123 14.36	1.21	1.3	8/08	216	0.08	BD	P3	X
23	00:18:12.33	47 11.45	119 00.52	0.53	1.7	9/10	125	0.23	BC	N3	
23	06:21:21.62	46 14.61	118 54.50	1.63	1.3	10/12	83	0.12	AC	E3	X
23	06:40:21.11	46 14.62	118 55.95	0.47	1.2	7/08	120	0.11	AC	E3	X
23	16:46:47.79	47 36.02	122 24.98	22.61	3.0	28/32	43	0.08	AA	P3	F
23	17:29:39.89	46 14.15	118 55.01	7.01	1.1	8/11	126	0.27	BC	E3	X

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
23	23:38:01.06	46 21.03	122 25.06	3.22	1.1	6/06	153	0.08	AC	S3	P
24	13:49:52.21	46 14.57	118 55.34	1.53	1.3	9/12	123	0.22	BC	E3	
28	21:12:25.93	46 15.56	118 51.68	3.56	1.2	6/07	172	0.28	BC	E3	X
28	21:35:41.85	47 33.71	121 44.51	10.92	2.7	21/26	58	0.19	BB	P3	F
29	05:41:38.72	47 33.80	121 44.34	10.24	1.2	7/09	136	0.08	AC	P3	
29	17:27:54.39	47 41.72	122 36.94	18.70	1.0	10/12	78	0.14	AB	P3	
29	22:25:03.90	48 41.01	121 42.40	16.08$	1.2	4/05	203	0.27	CD	P3	P
30	00:32:56.34	46 07.94	122 50.34	7.52	2.0	9/09	218	0.06	AD	C3	P
30	00:37:34.79	47 48.53	121 57.75	1.04	1.0	4/05	140	0.11	AD	P3	P
30	04:13:18.51	45 49.61	120 00.94	0.03*	2.3	6/06	240	0.23	BD	E3	
30	05:51:30.41	46 40.89	119 16.27	3.76	1.1	7/09	129	0.15	CC	E3	
30	06:04:42.69	46 15.01	118 53.22	3.94	1.2	9/09	131	0.17	BC	E3	X
30	08:49:52.70	46 13.98	118 55.84	2.54	1.4	9/10	122	0.24	BC	E3	X
30	23:14:34.51	46 46.07	122 26.94	0.02*	1.4	9/09	154	0.11	AC	P3	P
31	00:59:22.70	46 30.39	121 56.88	2.68	1.0	8/10	130	0.12	BB	C3	
31	04:51:53.13	46 14.61	118 55.58	2.73	1.0	9/10	122	0.18	BC	E3	X
31	08:10:54.08	46 14.00	118 55.54	6.91	1.2	11/12	124	0.31	CC	E3	X
31	15:19:48.14	48 20.03	122 07.92	0.89	1.5	6/09	205	0.11	AD	P3	
31	16:09:53.06	46 13.38	118 55.49	8.87$	1.2	9/10	126	0.25	DC	E3	X

Feb 1981

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
1	11:23:39.07	47 36.14	122 24.82	22.39	1.0	10/12	133	0.09	AB	P3	
2	01:23:18.30	46 15.77	120 59.34	1.98*	4.0	54/54	31	0.31	CC	C3	F
2	01:56:55.40	46 16.95	120 58.31	0.03*	1.6	11/12	239	0.28	BD	C3	H
2	21:21:44.99	48 32.09	122 11.43	0.02*	1.2	3/04	244	0.22	BD	P3	P
2	22:21:51.36	45 29.19	121 55.52	1.24	1.7	6/06	310	0.12	DD	C3	
3	01:21:23.14	47 39.52	120 22.37	4.52	1.2	7/11	146	0.07	AC	N3	
3	02:48:53.68	48 01.10	121 37.34	9.06$	1.5	9/14	102	0.11	AC	P3	
3	06:00:06.23	48 25.44	123 04.45	25.83	1.1	9/16	109	0.16	BB	P3	
3	06:15:47.91	46 15.19	118 52.75	4.09	1.2	11/15	151	0.16	BC	E3	X
3	09:19:08.23	48 23.52	122 16.81	15.86*	1.9	13/19	84	0.17	BB	P3	
4	02:52:57.55	46 14.89	118 54.45	1.85	1.3	12/14	128	0.11	AC	E3	X
4	05:16:14.29	46 15.59	118 53.75	1.05	1.3	10/12	181	0.28	BD	E3	X
4	07:07:33.38	46 15.08	118 52.57	0.73	1.6	12/14	131	0.19	BC	E3	X
4	16:51:33.11	46 15.43	118 44.17	4.95	1.2	11/13	168	0.39	CC	E3	X
4	21:41:13.80	48 15.18	121 51.47	0.03*	1.5	6/08	122	0.14	AC	P3	
4	23:28:34.15	46 18.62	119 53.17	0.03*	1.5	10/10	196	0.18	BD	E3	P
5	22:10:02.40	47 00.87	122 13.80	10.89	1.5	5/07	188	0.08	AD	P3	X
6	00:53:59.36	46 42.62	122 25.37	20.58	1.8	23/36	63	0.10	AA	P3	
6	01:02:25.46	46 14.82	122 54.89	28.29	2.0	9/12	199	0.30	CD	C3	P
6	07:13:05.29	46 14.54	118 56.38	3.22	1.2	8/08	189	0.23	BD	E3	X
6	20:37:59.71	47 48.97	121 58.60	4.00	1.4	5/07	90	0.45	CD	P3	P
6	22:39:43.86	47 10.02	118 23.46	10.23	2.0	18/20	199	0.24	BD	N3	P
6	23:43:21.27	47 57.28	122 03.08	18.30	1.1	7/10	177	0.14	AC	P3	
7	00:02:27.55	46 19.89	122 26.70	0.86	1.8	16/18	110	0.17	BB	S3	P
7	04:05:48.78	46 14.37	118 56.67	2.02	1.2	7/07	196	0.07	AD	E3	X
7	07:17:48.96	46 14.59	118 55.54	2.27	1.3	9/11	122	0.22	BC	E3	X
7	15:41:59.09	46 12.14	118 51.86	0.17	1.2	7/08	304	0.19	CD	E3	X
8	03:13:18.23	46 14.46	118 56.69	1.92	1.5	6/06	196	0.03	AD	E3	X
8	05:41:31.31	48 19.14	122 35.97	19.25	1.1	11/16	81	0.13	AA	P3	
9	16:04:25.33	47 22.24	122 37.03	24.94	1.4	16/22	50	0.16	BA	P3	
9	20:03:11.52	46 27.45	122 20.27	16.34	1.0	12/17	91	0.09	AB	S3	
9	20:29:38.69	46 44.46	122 22.56	0.03*	1.4	11/11	142	0.19	BC	P3	P
10	00:45:18.34	48 05.53	121 56.40	0.03*	1.5	6/07	165	0.06	AC	P3	P
10	21:19:30.38	46 14.76	118 49.83	14.14	1.2	6/10	235	0.26	CD	E3	X
10	23:23:07.30	46 14.92	118 50.35	16.46	1.4	5/08	232	0.23	CD	E3	X
11	00:20:50.47	46 56.63	119 28.04	0.04*	1.8	8/08	171	0.05	AC	E3	P
11	01:25:22.73	46 14.96	118 53.57	1.11	1.5	6/06	130	0.09	AC	E3	X
11	03:24:55.32	46 14.79	118 54.91	2.16	1.4	10/10	124	0.17	BC	E3	X
11	08:32:34.72	46 09.96	119 49.59	8.95*	1.4	6/07	301	0.12	AD	E3	P
11	10:35:01.47	46 07.91	119 54.26	9.08	1.5	6/06	309	0.07	CD	E3	P
11	14:35:55.77	46 13.37	118 49.40	3.11	1.4	5/06	288	0.21	CD	E3	X
11	17:18:40.72	46 14.51	118 56.00	5.80*	1.6	5/05	191	0.01	AD	E3	X

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
11	20:01:40.35	47 16.65	123 44.50	0.04*	1.2	5/05	135	0.27	BD	P3	
11	21:49:41.03	46 30.20	117 53.99	0.05*	2.3	11/11	271	0.39	CD	E3	
11	21:53:11.54	46 14.66	118 55.18	1.97	1.9	10/10	123	0.13	AC	E3	X
11	23:18:36.74	46 40.72	119 18.06	0.40	1.2	7/07	157	0.03	AC	E3	
12	00:02:28.11	46 19.69	122 26.14	3.71	1.7	14/15	109	0.18	BB	S3	X
12	04:05:13.34	46 14.62	118 55.66	0.05*	1.3	9/09	121	0.13	AC	E3	X
12	15:16:16.90	46 13.87	118 54.83	5.47*	1.6	6/06	214	0.12	AD	E3	X
12	16:53:31.22	46 15.08	118 51.36	5.58	1.5	6/09	209	0.21	BD	E3	X
12	20:09:49.94	46 52.64	119 28.40	15.18	1.4	5/08	144	0.09	AD	E3	X
12	20:39:46.02	46 40.53	119 18.57	2.68	1.7	10/12	119	0.10	AC	E3	
12	22:42:52.31	46 19.39	119 52.54	1.66	1.5	7/07	223	0.06	AD	E3	X
13	02:35:10.59	46 14.26	118 55.15	0.98*	1.3	7/07	125	0.04	AC	E3	X
13	04:34:00.84	46 14.94	118 55.18	1.82	1.1	9/10	123	0.17	BC	E3	X
13	23:15:36.49	47 11.93	120 53.96	7.83	1.6	11/14	79	0.17	BC	C3	
14	14:33:22.35	46 14.98	118 54.93	1.40	1.1	6/07	124	0.18	BC	E3	X
14	18:52:34.75	48 22.52	121 47.99	9.93	1.9	6/09	145	0.08	AC	P3	
14	21:51:23.98	46 14.28	118 54.23	3.80	1.1	10/12	129	0.18	BC	E3	X
15	03:33:55.61	46 14.63	118 54.80	3.85	1.3	9/10	125	0.15	BC	E3	X
15	07:43:41.07	46 14.94	118 54.74	1.40	1.2	9/09	125	0.21	BC	E3	X
15	08:13:13.24	47 11.83	120 54.33	5.80	2.6	29/32	74	0.44	CC	C3	
15	20:00:35.70	45 38.00	122 37.71	14.46$	1.6	9/12	200	0.12	CD	C3	
15	21:38:25.11	45 37.75	122 37.12	10.47	1.8	7/09	174	0.08	AD	C3	
16	02:20:41.28	47 12.57	120 54.10	0.93$	1.5	13/16	99	0.40	CC	C3	
16	07:33:59.45	46 40.80	119 21.36	11.27	1.1	5/07	142	0.10	BD	E3	
18	02:34:35.66	46 29.99	122 18.37	18.33	1.4	15/24	59	0.11	AA	S3	
18	05:39:03.29	46 14.37	118 54.60	3.23	1.1	10/12	127	0.31	CC	E3	X
18	06:09:38.71	47 11.84	120 53.55	3.37	4.2	37/37	51	0.20	BC	C3	F
18	10:39:11.16	47 11.92	120 54.19	0.03*	2.0	24/25	74	0.38	CC	C3	
18	16:14:08.41	46 14.40	118 54.48	3.83	1.2	10/11	127	0.19	BC	E3	X
18	16:19:48.44	48 32.33	122 31.81	15.84	1.4	8/14	125	0.12	AB	P3	
18	20:20:38.37	46 14.49	118 54.91	1.72	1.0	10/13	125	0.24	BC	E3	X
19	00:35:58.98	46 56.82	119 28.48	0.49	2.1	17/18	95	0.13	AC	E3	
19	02:31:56.10	46 14.37	118 55.18	3.47	1.3	10/12	124	0.18	BC	E3	X
19	03:25:08.00	46 14.57	118 56.84	0.40$	1.2	7/07	169	0.18	BC	E3	X
19	06:20:34.23	46 14.81	118 55.55	0.04*	1.3	9/09	121	0.17	BC	E3	X
19	14:57:53.33	46 40.68	119 18.86	2.44	1.3	8/10	118	0.18	BC	E3	
19	16:43:36.73	46 14.38	118 53.55	3.87	1.1	14/18	79	0.21	BC	E3	X
19	17:19:23.14	46 40.73	119 18.28	0.04*	2.7	16/17	104	0.14	AC	E3	
20	00:24:01.42	46 40.63	119 18.59	0.05*	1.5	9/11	119	0.10	AC	E3	
20	03:07:23.56	46 14.85	118 55.28	1.79	1.1	10/10	123	0.21	BC	E3	X
20	06:18:37.80	46 14.63	118 55.32	0.02*	1.1	8/08	123	0.07	AC	E3	X
20	15:43:39.84	46 14.80	118 55.07	1.80	1.2	11/11	124	0.16	BC	E3	X
20	19:42:56.07	46 14.72	118 55.24	1.08	1.2	9/09	123	0.08	AC	E3	X
20	22:34:16.20	46 14.52	118 55.55	0.51	1.2	11/11	122	0.23	BC	E3	X
21	02:04:53.70	46 14.50	118 55.42	0.04*	1.3	10/10	123	0.10	AC	E3	X
21	02:17:36.74	47 41.73	121 54.40	7.37	2.0	15/15	95	0.12	AC	P3	
21	03:58:28.79	46 36.60	121 51.14	7.38	1.0	11/14	91	0.19	BC	C3	
21	22:07:59.70	46 14.57	118 55.46	1.51	1.1	14/14	85	0.19	BC	E3	X
22	02:06:35.46	46 43.79	121 01.65	4.23	1.7	22/24	62	0.21	BC	C3	
22	02:11:03.59	46 44.36	121 01.73	4.10	1.5	18/19	69	0.24	BC	C3	
22	03:34:42.35	46 14.78	118 55.66	0.05*	1.0	14/15	85	0.12	AC	E3	X
23	04:23:40.42	47 33.60	119 46.65	6.89	2.0	13/18	70	0.10	AC	N3	
23	17:20:46.15	46 14.67	118 56.14	0.29*	1.4	9/10	172	0.13	AC	E3	X
23	17:55:23.06	47 19.73	122 19.95	15.59	1.8	26/28	66	0.15	BB	P3	
23	22:17:38.54	46 14.68	118 55.62	1.59	1.3	10/10	121	0.14	AC	E3	X
23	22:46:20.71	46 29.56	122 11.08	1.66	1.5	16/16	43	0.12	CC	S3	P
23	22:50:59.76	46 14.68	118 56.61	0.75	1.2	8/08	170	0.14	AC	E3	X
24	02:24:56.53	46 14.77	118 55.54	1.62	1.3	9/09	122	0.14	AC	E3	X
24	02:52:47.14	46 14.52	118 56.85	0.43*	1.2	7/07	196	0.12	AD	E3	X
24	08:27:47.11	46 13.72	118 55.24	8.05	1.0	7/08	126	0.21	BC	E3	X
24	16:44:59.03	46 14.75	118 55.81	1.25	1.2	11/11	120	0.12	AC	E3	X
24	19:10:35.32	48 43.48	122 02.17	0.02*	1.5	5/05	223	0.51	DD	P3	
25	00:45:37.66	47 54.21	121 52.09	1.07	1.5	5/06	122	0.10	AD	P3	P
25	00:48:33.49	46 14.23	118 55.45	4.51	1.7	10/15	106	0.21	BC	E3	X
25	01:30:56.07	48 07.14	122 48.54	22.97	1.4	15/20	56	0.16	BA	P3	

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
25	15:15:56.42	46 14.66	118 55.89	0.61	1.1	9/09	120	0.09	AC	E3	X
25	15:43:58.03	46 14.28	118 55.79	2.74	1.4	9/10	191	0.20	BD	E3	X
25	20:31:09.35	47 03.63	122 13.08	0.50	1.7	18/20	45	0.13	AA	P3	P
25	22:37:40.73	46 14.53	118 56.52	0.57	1.2	7/08	198	0.02	AD	E3	X
26	01:13:35.16	46 14.71	118 55.78	2.00	1.5	9/11	86	0.09	AC	E3	X
26	07:22:21.27	46 14.59	118 55.53	4.15	1.2	9/09	85	0.19	BC	E3	X
26	14:29:43.67	46 13.95	118 55.71	10.93$	1.2	8/09	123	0.26	BB	E3	X
26	14:48:56.95	46 14.80	118 55.60	0.51	1.2	8/09	121	0.11	AC	E3	X
26	16:56:59.56	48 09.28	123 06.72	45.68	1.3	9/11	110	0.23	BB	P3	
26	17:58:46.96	46 14.56	118 55.11	2.34	1.7	9/09	85	0.24	BC	E3	X
26	20:13:38.18	46 14.45	118 56.09	1.80	1.2	7/07	120	0.13	AC	E3	X
26	23:57:12.64	46 19.40	122 27.25	0.91	1.4	16/17	56	0.16	BB	S3	X
27	00:37:40.93	46 14.69	118 56.09	2.45	1.2	8/10	172	0.17	BC	E3	X
27	03:36:18.06	46 14.72	118 55.46	2.42	1.4	9/10	122	0.16	BC	E3	X
27	06:33:27.00	46 14.65	118 55.92	0.04*	1.1	8/09	120	0.09	AC	E3	X
27	14:22:49.31	46 14.88	118 55.67	0.95	1.4	10/11	121	0.22	BC	E3	X
27	19:31:47.85	46 14.87	118 55.09	2.26	1.3	8/09	194	0.17	BD	E3	X
27	20:36:57.16	46 14.14	118 56.25	3.44	1.4	9/11	189	0.26	BD	E3	X
27	22:26:31.71	46 17.62	122 36.98	2.94	1.4	7/07	101	0.09	AC	C3	P
27	22:45:32.63	46 56.73	119 33.55	0.61	2.7	23/23	61	0.18	BC	E3	
28	08:09:53.55	46 14.69	118 56.19	2.00	1.1	7/08	200	0.09	AD	E3	X
28	14:45:30.38	48 07.91	119 10.06	0.59	1.2	9/13	197	0.24	BD	N3	H
28	16:06:08.38	46 13.98	118 55.29	3.28	1.5	11/12	87	0.17	BC	E3	X
28	23:32:25.02	49 10.01	123 48.33	59.09	2.6	18/19	263	0.40	DD	P3	

Mar 1981

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
1	01:36:28.90	46 14.75	118 56.11	1.45	1.2	9/09	119	0.13	AC	E3	X
1	02:05:49.55	47 59.40	123 00.01	0.05*	1.7	15/17	74	0.25	BA	P3	P
1	03:55:58.72	46 14.21	118 57.06	3.99	1.1	11/12	168	0.20	BC	E3	X
1	20:49:43.16	47 54.65	121 34.18	15.10	1.3	8/10	174	0.11	BC	C3	
2	08:14:54.83	47 13.89	121 45.73	18.57	1.3	5/07	134	0.12	BD	C3	
2	11:34:24.59	47 11.93	120 53.45	0.03*	2.8	29/29	51	0.24	BC	C3	
2	12:24:00.41	47 44.11	121 59.30	18.92	1.3	4/06	184	0.14	BD	P3	
2	16:38:05.87	46 14.16	118 56.16	2.40	1.0	10/11	120	0.19	BC	E3	X
2	21:02:43.56	46 53.85	123 25.24	0.02*	1.8	16/16	174	0.14	AC	P3	P
2	21:19:35.04	46 14.60	118 56.76	3.20	1.1	7/07	187	0.14	AD	E3	X
2	22:26:02.75	47 00.45	122 10.06	0.02*	1.3	5/06	135	0.18	BD	P3	P
3	01:35:34.23	46 14.06	118 56.96	3.15	1.1	9/10	169	0.22	BC	E3	X
3	02:05:00.59	46 21.26	122 31.52	0.04*	1.4	12/14	67	0.18	BB	C3	P
3	07:29:06.67	46 14.16	118 57.14	4.04	1.0	8/09	168	0.19	BC	E3	X
3	09:18:25.59	46 14.51	118 56.82	3.29	1.0	8/08	169	0.17	BC	E3	X
3	19:17:53.89	46 21.40	122 24.22	2.32	1.0	10/12	123	0.13	AB	S3	P
3	21:45:28.60	48 41.98	122 50.69	10.14	1.6	5/07	217	0.14	BD	P3	H
4	04:06:35.82	46 14.19	118 57.06	3.13	1.1	10/11	168	0.24	BC	E3	X
4	20:53:04.15	48 39.23	121 43.49	0.03*	2.0	6/07	187	0.60	DD	P3	
4	23:29:28.51	46 14.16	118 57.49	1.84	1.1	11/12	166	0.31	CC	E3	X
5	00:04:01.30	46 19.15	122 27.38	2.02	1.7	17/18	57	0.17	BC	S3	P
5	00:32:17.29	47 52.95	118 09.01	8.25	1.9	13/13	130	0.16	BC	N3	X
5	18:40:45.04	47 39.34	121 50.13	15.35	1.7	10/12	146	0.08	AC	P3	
5	18:42:32.38	46 14.43	118 56.38	2.67	1.0	11/11	125	0.21	BC	E3	X
5	21:54:05.81	46 17.05	122 38.15	1.29	1.7	10/10	85	0.14	AC	C3	P
6	03:09:47.52	46 14.31	118 57.28	4.43	1.3	7/08	185	0.13	AD	E3	X
6	12:47:25.69	46 40.69	119 19.04	6.09	1.2	7/08	117	0.09	AC	E3	
6	14:19:07.26	47 11.92	120 53.19	0.02*	2.9	38/38	51	0.28	BC	C3	F
6	15:56:55.68	46 14.78	118 56.04	2.00	1.1	9/09	119	0.14	AC	E3	X
6	16:54:08.31	47 43.36	120 00.69	6.71	1.4	6/11	107	0.13	AC	N3	
6	18:35:55.33	47 37.52	121 16.96	5.38	1.4	8/09	124	0.20	BC	C3	
6	19:22:23.46	46 14.55	118 56.94	2.49	1.0	11/11	116	0.17	BC	E3	X
6	22:13:09.90	47 01.78	119 57.84	0.04*	1.4	16/19	61	0.35	CB	N3	
7	00:10:17.25	46 11.41	122 57.13	14.20	2.0	9/10	218	0.20	BD	C3	P
7	19:28:02.79	47 49.18	119 49.21	2.76	2.5	19/24	74	0.10	AC	N3	P
7	20:08:06.66	46 14.29	118 56.02	6.14	1.4	9/11	190	0.20	BD	E3	X
7	22:39:37.28	46 14.18	118 56.29	3.60	1.2	8/10	189	0.29	BD	E3	X

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
8	03:48:25.21	46 13.60	118 55.43	4.55	1.2	11/13	125	0.33	CC	E3	X
8	15:30:51.10	47 02.82	121 54.81	14.95	1.1	8/09	163	0.08	AC	C3	
9	04:35:47.74	48 19.70	123 10.60	40.74	2.1	21/27	62	0.20	BA	P3	
9	14:01:34.41	47 55.64	121 55.10	13.95	1.3	5/07	140	0.22	BD	P3	
9	19:52:47.23	48 16.72	121 33.18	2.19*	1.0	4/04	221	0.02	AD	C3	
10	00:10:55.97	46 22.02	122 24.54	1.77	1.5	15/19	65	0.10	AB	S3	P
10	19:20:35.41	48 36.81	122 52.20	16.98	1.5	8/09	236	0.12	BD	P3	
10	22:22:14.08	47 26.24	121 49.73	22.52	1.3	6/08	180	0.09	BC	P3	
10	22:50:03.75	47 26.94	121 20.43	8.49	2.6	28/31	83	0.26	BC	C3	
10	23:24:50.12	46 41.58	122 27.26	1.14	1.6	10/11	78	0.12	AC	P3	P
11	05:09:18.43	47 29.61	121 50.58	23.01	1.4	11/14	107	0.12	AB	P3	
11	16:36:45.82	46 14.53	118 55.57	2.69	1.2	7/07	192	0.18	BD	E3	X
11	16:53:25.00	46 14.33	118 56.74	3.48	1.1	8/09	169	0.20	BC	E3	X
11	18:05:03.86	48 31.54	123 41.68	25.00*	1.6	11/17	85	0.31	CA	P3	
11	19:27:37.95	46 11.51	118 51.11	1.32	1.2	7/08	291	0.17	BD	E3	X
11	20:42:21.45	46 07.09	122 59.22	17.42	1.5	4/07	237	0.31	CD	C3	P
11	22:10:16.55	46 21.92	122 24.70	1.23	1.6	11/15	90	0.12	AB	S3	P
12	01:08:59.80	46 13.97	118 57.54	1.84	1.0	8/09	191	0.21	BD	E3	X
12	03:35:46.88	46 14.24	118 56.40	3.52	1.0	9/10	189	0.21	BD	E3	X
12	07:06:59.26	46 14.35	118 56.04	2.94	1.0	13/13	125	0.19	BC	E3	X
12	14:04:09.58	46 14.70	118 56.58	2.12	1.1	9/09	117	0.14	AC	E3	X
12	14:13:44.19	46 14.42	118 56.31	2.67	1.0	10/10	119	0.13	AC	E3	X
12	17:28:07.10	46 14.10	118 56.75	3.23	1.1	11/12	187	0.17	BD	E3	X
12	17:42:16.80	46 36.49	123 51.14	33.24	1.1	7/09	247	0.50	DD	P3	
12	17:52:05.21	46 14.44	118 56.34	2.86	1.1	11/11	143	0.26	BC	E3	X
12	21:51:46.86	46 14.35	118 57.17	1.65	1.0	9/09	193	0.02	AD	E3	X
13	00:04:34.01	46 19.35	122 27.10	1.84	1.7	24/25	56	0.22	BB	S3	X
13	01:39:09.64	46 14.06	118 57.49	3.03	1.1	11/12	166	0.24	BC	E3	X
13	02:37:58.90	46 13.92	118 56.81	2.75	1.1	10/11	169	0.20	BC	E3	X
13	06:14:03.87	46 14.32	118 56.27	2.30	1.1	9/10	171	0.21	BC	E3	X
13	06:28:58.57	46 14.13	118 57.48	3.21	1.1	9/10	166	0.21	BC	E3	X
13	09:02:58.65	46 14.53	118 56.43	2.88	1.1	10/11	118	0.17	BC	E3	X
13	15:04:31.58	46 14.23	118 55.94	2.84	1.0	13/14	87	0.21	BC	E3	X
13	16:33:44.03	46 14.10	118 56.73	4.06	1.0	11/12	124	0.19	BC	E3	X
13	21:00:47.61	46 14.41	118 55.94	2.56	1.0	10/10	121	0.19	BC	E3	X
13	23:11:41.28	46 30.03	119 24.05	5.66$	1.0	6/07	130	0.21	BC	E3	P
14	00:06:19.31	46 35.32	123 37.62	69.61	1.1	4/06	235	0.36	DD	P3	
14	00:39:59.14	46 14.11	118 57.03	3.97	1.0	10/11	168	0.24	BC	E3	X
14	02:17:37.13	46 14.52	118 56.37	3.21	1.0	10/10	119	0.16	BC	E3	X
14	04:09:59.06	46 14.17	118 56.07	3.06	1.2	13/14	121	0.20	BC	E3	X
14	07:05:40.89	46 14.33	118 55.93	3.08	1.1	12/13	121	0.23	BC	E3	X
14	07:58:59.46	46 14.62	118 56.44	3.17	1.2	11/11	118	0.16	BC	E3	X
14	16:12:36.74	46 14.44	118 56.63	2.72	1.0	11/12	118	0.24	BC	E3	X
14	16:28:52.57	46 14.47	118 56.55	3.86	1.1	10/11	170	0.22	BC	E3	X
14	17:08:31.15	47 58.84	121 33.95	8.70	1.6	7/09	199	0.11	BD	C3	
14	21:12:17.01	46 14.18	118 57.23	3.32	1.1	10/11	185	0.18	BD	E3	X
15	02:44:59.32	46 14.32	118 56.21	3.11	1.2	12/13	120	0.24	BC	E3	X
15	06:32:56.52	46 13.44	118 55.89	3.03	1.1	12/13	137	0.20	BC	E3	X
15	07:18:58.68	46 14.27	118 56.68	3.18	1.1	12/13	124	0.19	BC	E3	X
15	07:24:06.85	47 59.24	121 29.58	5.35	3.6	29/29	109	0.29	BC	C3	F
15	07:26:36.27	47 58.97	121 32.18	7.12	1.4	8/11	180	0.15	BC	C3	
15	07:36:34.80	47 59.12	121 30.63	5.81	1.5	9/11	182	0.14	BD	C3	
15	07:36:59.98	47 58.86	121 32.80	7.53	1.4	6/07	242	0.05	AD	C3	
15	07:55:28.22	47 59.26	121 31.23	7.09	1.6	6/07	203	0.17	CD	C3	
15	07:59:48.46	47 59.39	121 31.91	7.25	1.4	7/08	202	0.14	CD	C3	
15	08:01:17.90	47 58.95	121 32.19	7.36	1.3	6/08	236	0.13	BD	C3	
15	08:28:38.47	47 58.82	121 32.80	7.27	1.4	4/06	248	0.15	CD	C3	
15	09:39:31.07	47 58.96	121 35.49	9.17	1.1	5/07	230	0.12	BD	C3	
15	11:51:39.70	47 59.12	121 34.50	8.87	1.1	5/07	232	0.13	BD	C3	
15	12:52:52.76	47 59.20	121 30.50	5.83	1.9	10/11	130	0.15	BC	C3	
16	09:47:51.52	47 58.95	121 33.45	8.18	1.0	5/07	233	0.16	CD	C3	
16	14:21:23.32	47 35.50	121 42.77	6.99	2.4	23/28	60	0.21	BC	P3	
16	19:27:18.78	46 35.83	122 07.48	3.89	1.4	16/17	72	0.24	BC	C3	P
16	19:35:57.49	46 14.04	118 54.72	8.01	1.0	8/09	145	0.27	BC	E3	X
16	20:28:42.41	46 14.63	118 56.39	3.02	1.1	9/09	118	0.13	AC	E3	X

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
16	21:01:22.42	47 57.68	122 28.39	50.80	1.5	14/16	79	0.06	AA	P3	
16	22:21:08.61	47 01.83	122 10.77	0.02*	1.1	6/06	114	0.07	AC	P3	P
16	23:53:34.81	46 14.40	118 53.88	4.67	1.0	6/07	130	0.21	BC	E3	X
17	00:31:16.62	47 02.75	119 57.61	0.02*	1.7	18/21	105	0.34	CC	N3	
17	00:46:53.66	48 39.16	123 06.59	16.88*	2.3	18/24	51	0.14	AA	P3	
17	01:09:58.50	46 14.47	118 56.60	1.98	1.6	12/13	118	0.24	BC	E3	X
17	02:57:47.03	47 58.84	121 33.44	7.90	1.4	6/07	233	0.16	CD	C3	
17	04:13:06.84	47 58.64	121 34.27	9.07	1.0	3/04	244	0.	AD	C3	
17	07:31:58.97	46 14.78	118 56.50	2.40	1.1	9/09	117	0.13	AC	E3	X
17	14:54:23.19	47 59.01	121 33.98	8.80*	1.1	7/08	199	0.20	BD	C3	
17	15:49:05.04	46 14.20	118 56.32	2.05	1.1	11/12	120	0.19	BC	E3	X
18	01:40:51.21	45 35.47	121 08.30	32.77	1.3	6/07	190	0.33	CD	C3	
18	01:48:17.94	46 14.11	118 57.47	3.50	1.0	9/10	184	0.17	BD	E3	X
18	02:42:40.62	46 14.11	118 56.12	3.14	1.1	10/11	121	0.19	BC	E3	X
18	20:09:23.82	46 14.26	118 57.95	0.81	1.0	6/06	189	0.01	AD	E3	X
18	20:21:57.68	46 07.73	119 22.31	11.02*	1.0	6/07	271	0.07	AD	E3	
18	22:42:04.16	46 14.26	118 57.00	3.13	1.0	7/08	186	0.20	BD	E3	X
18	23:23:40.27	46 14.21	118 57.58	4.67	1.0	7/08	184	0.15	BD	E3	X
18	23:33:26.16	47 19.73	121 52.93	16.08$	1.1	4/07	158	0.38	CD	P3	P
18	23:34:56.72	46 05.67	119 21.41	7.71	1.6	14/16	191	0.11	AD	E3	
19	00:32:20.38	46 19.15	122 27.06	2.42	1.3	15/17	56	0.16	BB	S3	P
19	02:10:17.58	46 14.61	118 56.17	3.10	1.1	8/08	119	0.09	AC	E3	X
19	04:00:28.94	46 14.22	118 56.86	4.70	1.0	6/07	187	0.10	AD	E3	X
19	04:55:18.59	46 14.12	118 57.63	3.83	1.1	7/08	166	0.19	BC	E3	X
19	07:50:18.23	46 14.25	118 56.25	4.05	1.1	9/10	120	0.16	BC	E3	X
19	14:35:04.72	46 14.36	118 55.72	3.68	1.0	7/08	122	0.17	BC	E3	X
19	23:19:40.73	46 12.75	122 55.78	4.31#	1.8	13/13	205	0.13	AD	C3	P
20	00:03:20.06	45 56.02	118 33.99	4.37	1.7	11/13	184	0.11	BD	E3	P
20	02:06:58.85	45 35.59	121 07.64	42.74	1.1	5/08	178	0.43	CD	C3	
20	20:08:13.89	48 09.04	121 55.44	0.03*	1.1	5/06	161	0.16	BD	P3	P
20	21:26:02.62	46 28.59	119 25.12	3.42*	1.6	9/09	89	0.13	AC	E3	X
21	00:39:26.01	47 25.20	122 08.30	5.68	1.2	9/09	127	0.13	BC	P3	
21	14:53:12.35	46 43.97	123 54.17	37.22	1.1	6/10	243	0.25	BD	P3	
21	23:34:55.11	47 29.37	122 23.74	17.22	1.7	23/24	36	0.14	AA	P3	
22	07:04:46.12	46 14.36	118 54.72	3.35	1.0	11/12	82	0.24	BC	E3	X
22	20:52:45.80	47 32.36	120 37.86	3.63*	1.1	18/21	52	0.30	BC	C3	
23	21:59:54.35	45 53.48	122 59.35	1.01	1.0	8/09	277	0.70	DD	C3	P
23	23:26:02.06	47 02.25	119 57.20	0.35	1.8	21/21	63	0.26	BB	N3	
24	14:14:33.31	48 44.78	122 01.63	2.75$	1.4	5/09	232	0.24	DD	P3	
24	15:48:47.49	48 51.65	122 32.47	4.83$	1.4	8/13	233	1.00	DD	P3	
25	00:28:56.55	47 52.89	118 08.82	7.85	2.0	12/14	131	0.12	AC	N3	
25	00:47:28.33	46 21.38	122 25.33	0.89	1.1	10/13	159	0.08	AC	S3	P
25	10:03:01.67	48 09.24	122 38.97	25.29	2.4	26/27	77	0.48	CA	P3	
25	17:39:19.95	46 14.35	118 55.86	3.13	1.0	13/14	121	0.22	BC	E3	X
25	18:48:42.34	47 59.17	121 29.89	2.61	1.5	10/12	127	0.13	AC	C3	
25	21:33:35.22	46 14.35	118 56.21	2.74	1.0	13/14	87	0.22	BC	E3	X
25	21:57:01.25	45 50.70	118 36.30	2.36	1.5	11/12	240	0.12	BD	E3	
26	16:13:18.89	47 58.90	121 32.73	7.75	1.2	6/08	201	0.19	CD	C3	
26	21:42:17.34	47 02.15	119 56.95	0.57	1.9	17/17	74	0.38	CB	N3	P
26	22:30:25.55	44 56.56	121 51.35	12.67	1.5	8/10	189	0.35	CD	C3	
28	23:43:33.46	47 18.19	122 07.64	19.27	1.3	15/17	164	0.12	AC	P3	
30	19:36:24.85	46 19.52	122 39.18	7.77*	1.2	12/14	90	0.23	BC	C3	P
31	01:32:14.47	47 27.38	122 51.67	1.90	2.0	13/15	66	0.13	AC	P3	

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
1	10:14:33.12	48 10.74	122 41.68	25.05*	2.2	15/18	82	0.21	BA	P3	H
1	16:45:30.37	47 40.48	120 20.44	0.50	2.7	20/22	79	0.24	BA	N3	
2	00:29:33.32	47 53.19	118 08.90	8.76	1.9	16/17	130	0.20	BC	N3	
2	05:52:37.72	46 51.70	119 38.47	13.56	1.3	16/19	93	0.15	BB	E3	
2	07:15:42.06	47 27.63	123 04.53	0.03*	2.5	35/38	45	0.28	BC	P3	
2	07:29:26.51	47 28.01	123 05.05	7.30$	2.0	22/26	44	0.29	BC	P3	
2	16:31:39.82	47 23.76	122 41.57	23.10	2.7	35/41	44	0.24	BA	P3	
2	21:33:28.99	45 49.70	122 50.15	7.49	1.4	15/17	267	0.16	BD	C3	P

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
3	09:27:14.92	47 30.31	123 09.48	19.65	1.3	6/09	172	0.31	CC	P3	
3	10:00:20.03	48 30.38	122 11.37	2.95	1.9	9/10	163	0.18	BC	P3	
3	14:19:13.92	47 59.05	121 31.58	4.33$	1.7	14/16	108	0.49	CC	C3	
4	00:57:57.94	47 08.76	118 38.55	8.24	2.5	20/20	172	0.20	BC	N3	P
4	08:30:02.04	47 33.90	121 44.50	10.97	1.3	6/10	146	0.08	AC	P3	
4	09:16:09.33	47 46.09	122 00.79	16.43	1.5	10/11	127	0.10	AB	P3	
4	11:21:48.93	47 33.78	121 44.50	8.80	2.0	24/30	58	0.20	BB	P3	
4	11:37:34.38	47 33.75	121 44.56	9.71	1.9	16/18	74	0.16	BB	P3	
5	07:55:53.00	47 26.94	122 05.63	23.08	1.1	9/11	164	0.09	AC	P3	
6	03:29:33.30	47 09.32	118 22.71	9.85$	1.5	15/17	201	0.31	CD	N3	
6	18:20:36.75	47 45.30	120 10.90	4.08	1.7	7/09	137	0.09	BC	N3	
7	23:00:55.83	47 37.03	121 45.46	13.89	1.8	14/15	66	0.10	AB	P3	
8	01:19:18.21	47 42.66	122 35.51	18.56	1.3	12/15	77	0.09	AB	P3	
8	06:30:43.63	47 25.41	122 43.26	26.73	1.3	11/11	79	0.07	AB	P3	
8	13:11:42.81	47 27.43	123 04.52	0.05*	2.5	30/32	53	0.28	BC	P3	
8	14:05:28.68	47 27.72	123 05.01	4.74$	1.7	11/13	137	0.27	BC	P3	
8	21:06:48.26	47 09.13	119 14.78	0.36	1.3	12/12	93	0.23	BC	N3	
9	22:15:12.96	48 39.67	122 26.37	0.04*	1.6	4/05	156	0.62	DD	P3	H
10	18:25:15.76	47 44.14	120 11.30	4.31	1.3	5/08	118	0.10	AD	N3	
11	04:54:21.03	45 46.45	120 53.54	6.77$	1.7	10/13	100	0.41	DC	C3	
11	05:11:58.49	48 37.90	121 56.82	0.02*	1.4	4/05	144	0.09	AD	P3	
11	10:11:18.06	48 47.33	123 22.29	14.88	1.3	12/13	238	0.14	BD	P3	
11	10:11:40.76	48 46.73	123 22.25	20.24	1.6	7/09	237	0.09	AD	P3	
11	19:05:59.70	47 28.99	122 43.20	24.75	2.5	27/28	39	0.13	AA	P3	
12	17:05:01.99	47 56.14	124 26.58	25.44	1.3	9/11	177	0.29	BC	P3	
12	17:30:31.11	47 56.39	124 25.91	23.22	1.6	10/12	174	0.32	CC	P3	
13	07:05:53.25	46 44.73	119 21.51	4.48	1.4	10/13	60	0.16	BB	E3	
13	22:06:38.55	47 02.17	122 10.89	0.04*	1.5	7/07	142	0.34	CC	P3	P
14	13:15:42.05	48 29.19	122 01.36	3.57	1.8	8/08	93	0.16	BB	P3	
15	08:36:03.92	47 58.96	121 33.45	8.08	1.9	6/08	233	0.17	CD	C3	
15	15:21:53.32	46 51.94	121 55.59	16.50	1.1	4/05	162	0.02	AD	C3	H
15	23:07:26.51	46 30.32	119 25.94	0.57	1.1	7/07	96	0.03	AC	E3	P
16	03:36:58.25	47 20.06	122 46.14	24.16	1.3	4/04	210	0.	AD	P3	H
16	04:52:19.23	48 45.42	123 20.49	14.80*	1.7	12/16	234	0.17	BD	P3	
16	18:26:55.10	46 30.81	119 25.44	1.27	1.3	10/11	70	0.16	CB	E3	
16	21:42:06.65	46 29.65	119 27.69	0.76	1.4	9/09	79	0.04	AC	E3	X
16	23:01:12.22	46 30.55	119 25.59	0.30	1.6	9/09	70	0.12	AC	E3	X
17	02:44:31.75	47 53.92	119 16.22	0.51	1.5	7/09	170	0.30	BC	N3	H
17	17:27:03.56	48 57.31	121 39.25	0.03*	2.1	9/11	218	0.47	CD	P3	
17	22:56:18.20	48 30.76	122 11.78	3.97	2.4	10/10	104	0.16	BB	P3	
18	11:42:12.21	48 29.18	122 42.22	23.74	1.0	6/08	191	0.09	BD	P3	H
18	19:18:04.21	47 37.32	121 44.31	15.01	1.3	8/12	126	0.09	AB	P3	
19	12:00:06.85	48 34.11	122 18.78	11.07	1.5	8/10	123	0.13	BB	P3	H
19	14:30:13.65	47 25.50	122 04.84	17.47	2.4	35/39	37	0.18	BB	P3	
19	19:20:06.25	46 48.96	120 40.52	16.44	2.1	25/27	70	0.25	BA	E3	
20	20:07:54.40	46 31.22	119 26.57	5.72	1.0	11/11	75	0.12	AB	E3	P
20	22:55:46.71	45 53.45	121 34.25	0.04*	1.7	18/19	175	0.25	BC	C3	
21	00:46:16.96	47 55.51	121 53.13	16.23	1.1	9/11	112	0.12	AB	P3	
21	17:27:03.74	46 29.78	119 24.96	0.58	1.2	5/05	113	0.05	AD	E3	P
21	20:21:53.60	46 29.41	119 24.20	0.40	1.5	8/08	94	0.13	AC	E3	X
21	21:42:23.75	46 30.47	119 25.01	3.46	1.5	7/08	94	0.10	BC	E3	X
21	22:35:11.84	46 29.47	119 23.51	7.31	1.3	5/07	103	0.13	AD	E3	P
21	22:42:40.44	46 37.20	121 26.34	7.90	1.7	22/24	119	0.22	BC	C3	
21	23:12:42.18	48 17.49	121 57.27	12.97	1.1	6/07	150	0.27	CC	P3	
22	02:09:22.38	47 29.58	122 42.39	22.40	1.2	6/07	174	0.14	BC	P3	H
22	03:00:01.63	47 52.90	120 00.12	9.24	1.8	14/19	84	0.14	AA	N3	
22	17:37:55.83	46 30.25	119 25.38	6.16	1.6	6/07	114	0.15	BC	E3	X
22	22:38:12.40	46 28.81	119 26.47	0.38	1.1	6/06	113	0.07	AC	E3	P
23	00:05:48.53	47 43.67	120 19.21	3.25	1.1	5/09	118	0.08	AD	N3	
23	18:26:24.70	45 51.74	122 49.93	7.06	1.9	8/10	284	0.14	BD	C3	H
23	18:36:32.89	47 37.35	119 53.95	3.34	2.7	20/23	61	0.12	BB	N3	P
23	19:48:59.22	46 27.87	119 26.71	7.26$	1.5	6/09	111	0.18	CC	E3	X
23	22:51:28.73	46 28.72	119 25.68	7.63	1.5	10/11	68	0.21	BB	E3	X
24	16:34:17.20	47 51.17	122 32.94	29.52	1.7	12/14	62	0.20	BB	P3	
24	23:45:30.61	46 18.65	124 06.50	11.05	1.9	7/08	287	0.16	BD	P3	P

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
24	23:51:38.40	47 29.86	120 12.46	0.18	1.9	11/11	103	0.66	DB	N3	H
25	00:59:56.06	48 19.43	121 54.22	0.47	1.5	9/11	105	0.17	BC	P3	
27	04:41:56.52	47 35.94	122 45.79	12.86*	1.5	6/07	88	0.07	AC	P3	H
27	04:59:27.25	47 35.55	122 45.48	13.16	2.1	19/22	55	0.14	AA	P3	
27	06:23:31.58	47 58.91	121 30.09	2.80	1.4	6/08	212	0.19	BD	C3	
27	20:56:21.36	47 00.35	122 09.42	0.02*	1.1	5/07	117	0.24	BD	P3	P
27	22:27:38.06	48 03.32	118 42.21	8.45	1.7	16/19	195	0.18	BD	N3	P
28	00:21:36.52	45 40.03	119 58.09	0.02*	1.8	18/18	161	0.25	BC	E3	
28	05:25:01.37	48 33.77	123 29.06	19.47	1.2	4/05	286	0.01	AD	P3	H
28	20:35:08.73	47 25.89	122 20.89	17.57	1.6	13/14	115	0.16	BB	P3	
29	21:53:05.86	46 44.58	122 26.74	0.02*	1.2	6/07	111	0.10	AC	P3	H
29	21:56:27.40	45 35.74	121 33.07	0.03*	1.7	9/10	101	0.29	BC	C3	

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
1	14:45:35.02	46 52.73	121 56.54	8.50	1.4	9/10	140	0.08	AC	C3	
1	16:30:23.80	47 55.85	121 54.55	17.44	1.3	6/10	129	0.08	AC	P3	
1	17:05:10.97	47 30.57	120 11.57	3.26	1.9	16/19	61	0.32	CC	N3	P
1	17:16:53.56	47 37.23	119 53.90	0.02*	2.0	17/18	70	0.21	BB	N3	P
1	20:48:04.36	46 08.83	122 44.70	0.03#	1.3	7/10	205	0.18	BD	C3	P
1	20:58:41.10	48 19.60	121 54.55	0.70	1.7	11/13	99	0.18	BC	P3	
1	21:21:17.57	48 18.92	121 53.32	5.40	2.0	14/18	62	0.27	BC	P3	
1	21:30:41.69	48 18.98	121 54.48	1.62	1.6	8/10	100	0.20	BC	P3	
1	21:51:07.90	48 19.17	121 53.57	1.61	2.5	13/16	70	0.26	BC	P3	
1	22:07:07.73	48 19.58	121 54.01	1.14	1.4	10/11	105	0.18	BC	P3	
2	00:01:09.56	48 18.67	121 55.32	8.10	1.3	5/07	149	0.07	AD	P3	
2	01:52:15.31	47 35.31	122 45.43	13.59	1.9	16/18	59	0.08	AA	P3	P
2	04:20:32.63	48 19.35	121 54.77	0.99	1.5	7/10	138	0.10	AC	P3	
3	03:26:30.00	47 54.61	122 39.52	20.04	1.4	15/19	69	0.15	BB	P3	
3	15:22:25.64	48 18.68	121 54.93	2.91	1.3	5/07	146	0.10	AD	P3	
3	15:45:44.78	45 59.24	122 34.43	20.59	1.3	15/22	151	0.17	BC	C3	
3	19:48:01.35	48 19.25	121 54.54	1.43	1.5	9/11	105	0.12	AC	P3	
3	22:13:46.49	47 19.20	124 04.57	28.09	1.6	10/12	190	0.21	BD	P3	
4	04:17:14.30	47 44.45	120 05.85	7.05	1.1	5/10	123	0.11	AD	N3	
4	10:29:49.91	46 32.52	121 23.71	11.82	2.1	21/23	58	0.18	CC	C3	
4	19:10:08.03	48 22.66	121 48.45	0.03*	1.2	7/08	107	0.19	BC	P3	
4	21:46:48.74	47 02.65	121 54.10	17.43	1.7	16/19	93	0.17	BB	C3	
5	07:05:29.69	48 21.60	122 16.06	14.22	1.4	9/12	94	0.09	AB	P3	
5	07:17:12.67	47 22.55	122 40.44	19.29$	1.0	7/08	95	0.12	BC	P3	H
5	08:39:12.78	47 22.45	122 40.01	21.53	1.3	12/13	62	0.09	AA	P3	
5	09:18:48.73	47 52.58	122 02.28	25.59	1.5	14/18	89	0.11	AA	P3	
6	11:58:54.44	47 29.55	122 16.82	27.69	1.1	5/06	114	0.08	AD	P3	H
6	12:16:30.92	45 20.72	121 42.79	4.99	1.3	5/10	132	0.24	BD	C3	
8	03:26:41.85	48 19.05	121 54.28	3.47	1.4	8/11	106	0.17	BC	P3	
8	18:44:28.88	46 18.13	122 46.96	21.74	1.3	16/21	129	0.17	BB	C3	
8	19:01:35.21	47 37.38	119 54.04	1.70	2.2	20/22	40	0.19	CB	N3	X
9	08:40:12.30	47 44.47	122 55.62	47.68	1.4	13/15	130	0.15	BB	P3	H
9	22:10:54.59	46 44.22	122 28.03	4.01	1.2	7/08	115	0.18	BC	P3	H
10	01:24:53.63	47 13.38	121 01.12	8.01	1.1	10/12	132	0.15	AB	C3	
10	09:21:46.48	47 34.67	122 35.18	32.49	1.8	28/29	46	0.07	AA	P3	
10	14:12:15.67	47 40.92	121 59.26	4.09	1.2	5/06	130	0.05	AD	P3	H
12	22:41:42.07	47 34.54	122 46.05	15.23	1.0	4/06	162	0.04	AD	P3	H
13	06:12:26.04	48 17.45	122 50.45	28.86	2.4	25/30	41	0.31	CA	P3	
14	10:22:48.81	47 37.49	122 12.39	24.96*	1.2	7/08	106	0.06	AB	P3	H
14	11:08:35.51	48 10.12	122 44.06	21.65	2.0	23/27	46	0.18	BB	P3	
14	21:13:21.34	46 42.96	121 31.87	6.00	1.0	16/17	104	0.10	AC	C3	P
15	07:45:47.84	47 35.00	122 53.62	30.07*	1.3	4/05	211	0.09	BD	P3	H
15	22:44:08.39	47 14.57	118 51.56	0.05*	2.0	19/21	139	0.26	BC	N3	
16	22:20:51.96	47 49.14	121 57.59	0.03*	1.3	6/09	93	0.24	BC	P3	
16	23:34:45.51	46 53.26	121 53.82	3.40	1.3	11/15	82	0.16	BC	C3	
17	05:22:53.71	47 47.29	122 18.74	23.79	2.4	26/27	84	0.09	AA	P3	
18	12:04:44.58	47 59.51	121 30.01	6.33	1.5	4/05	249	0.01	AD	C3	H
18	15:58:08.40	48 11.47	121 55.86	1.42	1.3	9/09	140	0.15	BC	P3	
19	16:08:46.70	47 40.03	122 06.64	11.22*	1.7	18/19	66	0.17	BB	P3	

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
19	20:40:30.26	46 53.68	123 24.52	0.05*	1.5	12/12	202	0.12	AD	P3	P
20	03:50:44.45	47 45.48	122 01.77	18.68#	1.0	6/07	200	0.12	AD	P3	H
21	00:33:50.52	45 45.07	118 30.20	2.57	1.3	11/11	208	0.18	BD	E3	P
21	13:31:44.99	47 46.27	120 06.88	4.45	1.2	12/15	79	0.07	AB	N3	
22	16:52:56.70	47 36.23	121 43.60	2.54	1.6	9/11	117	0.15	BC	P3	
22	17:50:32.49	48 27.94	121 46.20	3.54	1.6	9/12	110	0.14	BC	P3	
23	11:52:52.44	46 02.58	119 39.03	10.05	1.1	5/06	154	0.05	AD	E3	
23	12:31:57.34	46 02.71	119 41.67	9.52*	1.1	10/10	141	0.19	BC	E3	
23	12:42:34.26	46 03.79	119 48.16	12.91	1.1	5/06	213	0.04	AD	E3	
23	16:36:02.58	45 54.43	122 39.76	16.94	1.5	22/24	195	0.17	BD	C3	
24	01:42:49.54	47 31.29	122 29.23	19.34*	1.2	8/09	114	0.18	BB	P3	H
26	02:42:04.64	47 33.67	121 44.07	9.95	1.6	10/14	122	0.14	BB	P3	
26	17:59:24.61	46 37.04	123 04.41	5.32	1.7	6/08	133	0.06	AC	P3	P
26	19:30:45.15	46 25.27	121 30.66	0.25	1.3	9/09	93	0.13	AC	C3	P
26	20:14:07.17	48 44.41	122 41.98	11.23$	1.4	4/05	261	0.38	DD	P3	H
26	21:10:23.91	47 39.45	120 17.16	2.74$	2.6	25/25	55	0.18	BC	N3	
28	00:47:49.82	46 15.06	123 27.26	0.04*	1.9	7/09	262	0.19	BD	P3	H
28	08:56:02.54	46 31.80	121 23.91	2.98	4.6	51/51	29	0.21	BC	C3	F
28	09:09:02.36	46 31.44	121 23.24	2.35$	1.8	7/07	115	0.06	AC	C3	
28	09:10:45.90	46 31.52	121 23.64	3.22	5.0	52/52	29	0.20	BC	C3	F
28	09:14:01.41	46 31.64	121 23.65	1.96	1.5	20/20	59	0.12	AC	C3	
28	09:14:23.49	46 30.66	121 23.20	1.36*	1.3	11/13	112	0.26	BC	C3	
28	09:28:54.73	46 42.52	121 40.76	0.04*	1.6	4/04	296	0.48	CD	C3	H
28	09:33:19.31	46 35.14	121 46.43	0.39	1.1	4/07	347	0.68	DD	C3	H
28	09:52:51.98	46 31.77	121 23.98	2.28	2.4	38/39	53	0.15	BC	C3	
28	12:47:50.97	47 41.48	121 55.03	6.48	1.4	6/10	160	0.19	BC	P3	H
28	15:08:03.10	46 32.29	121 23.91	2.02$	1.6	16/17	102	0.22	BC	C3	
28	15:13:06.83	48 38.07	121 56.69	0.05*	1.5	6/07	144	0.29	BC	P3	
28	16:07:11.77	48 38.34	121 53.89	0.02*	1.8	7/07	127	0.38	CC	P3	
28	18:19:37.13	46 43.39	122 26.22	0.05*	1.1	11/11	130	0.14	AC	P3	P
28	20:15:42.06	46 32.56	121 24.12	1.79	1.9	20/20	101	0.22	BC	C3	
28	20:26:32.97	46 31.87	121 23.72	3.71	1.8	22/23	108	0.22	BC	C3	
28	23:10:44.50	46 32.75	121 24.44	3.57	1.7	27/28	100	0.33	CC	C3	
29	15:12:30.73	47 37.44	119 54.12	1.17*	2.5	22/27	50	0.18	BB	N3	
29	17:20:16.65	46 31.26	121 22.83	7.78	2.9	44/54	45	0.21	BC	C3	
29	23:35:36.88	46 45.62	122 34.35	0.56	1.8	25/26	40	0.14	AC	P3	X
30	10:06:24.36	46 32.52	121 23.77	5.92	1.7	21/24	106	0.29	BC	C3	
31	21:08:33.00	47 24.72	122 48.34	55.65	1.0	4/05	146	0.02	AD	P3	H

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
1	02:42:24.34	48 30.05	123 39.40	19.99	1.7	6/07	277	0.13	CD	P3	H
1	17:51:44.50	46 41.88	119 15.69	27.20	1.1	4/06	167	0.28	BD	E3	
1	19:44:07.38	46 42.17	122 10.89	0.83	1.7	13/13	63	0.27	BB	C3	P
1	20:56:06.57	48 18.46	122 10.91	0.02*	1.2	4/06	221	0.27	BD	P3	H
1	21:33:11.15	47 41.41	121 59.10	0.04*	1.2	7/09	112	0.17	BC	P3	
1	21:34:50.90	46 33.18	119 19.86	2.60$	1.0	6/06	92	0.09	AC	E3	P
2	00:09:27.25	47 41.14	121 59.71	0.03*	1.2	9/10	115	0.16	BC	P3	
2	00:46:58.04	45 22.03	122 22.21	14.29*	1.1	6/07	177	0.07	AC	C3	
2	14:27:58.37	47 40.57	122 01.00	3.81	1.0	4/05	206	0.07	AD	P3	H
2	23:31:32.59	46 32.26	121 23.38	5.06	1.3	12/14	108	0.19	BC	C3	
2	23:35:22.86	47 41.30	121 59.42	0.36	1.1	5/06	194	0.22	BD	P3	
3	03:26:15.65	47 46.60	122 43.90	21.29*	2.5	23/25	116	0.07	AB	P3	
3	15:29:35.39	47 41.54	121 59.14	0.02*	1.5	10/11	113	0.21	BC	P3	
3	15:36:42.16	47 41.20	122 00.08	0.03*	1.4	6/07	185	0.09	AD	P3	
3	16:04:28.03	47 41.43	121 59.25	0.02*	1.9	9/10	99	0.17	BC	P3	
3	23:33:11.66	47 52.92	118 07.18	9.87$	1.4	14/14	143	0.57	DD	N3	P
4	04:34:28.42	46 31.79	121 22.95	6.52	2.0	27/29	109	0.24	BC	C3	
4	07:00:12.34	46 32.57	121 23.22	3.51	1.1	10/11	153	0.17	BC	C3	
4	08:31:03.58	47 53.37	122 37.02	0.04*	1.1	6/08	118	0.06	AC	P3	H
4	11:02:03.53	46 31.82	121 22.07	5.10$	1.0	12/14	118	0.13	AC	C3	
4	19:23:27.23	46 43.80	121 50.28	0.02*	1.6	19/19	54	0.15	AA	C3	
4	20:17:48.22	46 24.58	121 55.87	1.48	1.9	22/26	39	0.20	BB	S3	
4	23:24:10.49	47 32.77	121 52.80	0.03*	1.0	9/09	107	0.19	BC	P3	

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
5	21:13:29.20	46 29.69	119 25.61	4.46	1.6	5/05	113	0.06	AD	E3	X
5	22:19:17.10	47 05.46	123 51.84	0.03*	1.2	9/11	141	0.55	DC	P3	P
6	01:54:07.57	47 31.75	121 56.26	3.14$	1.4	9/10	113	0.07	CC	P3	
6	02:25:28.90	46 47.41	121 53.40	9.01	1.4	9/12	122	0.12	AB	C3	
6	11:04:22.89	46 31.52	121 22.86	6.65	2.0	27/30	59	0.20	BC	C3	
6	12:54:50.67	47 25.62	121 35.64	14.21	2.4	31/32	84	0.22	BB	C3	
6	15:15:56.78	47 30.98	122 15.02	5.62	1.0	7/08	128	0.12	AB	P3	
7	05:24:05.85	47 40.81	120 01.98	7.83	1.2	6/09	144	0.06	AC	N3	
7	08:36:33.83	46 32.34	121 23.63	5.93	2.0	25/29	107	0.22	BC	C3	
7	14:42:31.67	46 30.77	122 36.13	18.72	1.4	19/22	69	0.16	BA	C3	
7	15:36:51.89	46 30.85	122 35.75	18.99	1.3	15/19	69	0.10	AA	C3	
8	04:44:23.63	48 30.62	123 10.37	36.12	1.9	6/06	238	0.31	DD	P3	H
9	18:32:29.68	47 50.38	122 47.06	52.09	2.3	19/23	93	0.15	BB	P3	
10	02:57:51.47	46 45.45	121 54.72	4.31	1.0	9/13	190	0.12	AD	C3	
10	07:10:46.78	47 35.30	122 45.78	12.69	1.2	6/09	98	0.10	AC	P3	H
10	16:56:01.97	47 37.82	120 02.17	0.04*	2.8	13/14	134	0.27	BB	N3	
10	23:18:19.05	46 47.33	122 36.87	0.02*	1.4	7/08	70	0.12	AC	P3	P
11	03:05:06.37	46 50.56	121 46.69	4.32	1.7	7/09	92	0.28	BC	C3	
11	04:57:32.50	46 32.00	121 22.71	3.43	1.2	11/14	191	0.25	BD	C3	
11	23:01:25.92	47 00.52	122 09.95	0.04*	1.7	16/18	73	0.15	AB	P3	P
12	06:20:49.85	48 39.19	121 55.99	0.04*	1.8	6/08	146	0.44	CC	P3	
12	19:00:30.68	48 39.35	121 55.87	0.02*	1.9	7/08	117	0.25	BC	P3	
13	08:06:04.99	46 32.52	121 22.98	3.93	1.1	8/10	153	0.24	BC	C3	
13	12:10:09.36	46 31.94	121 22.99	7.74	1.1	8/11	155	0.26	BC	C3	
14	04:23:11.21	46 31.30	121 23.51	0.02*	1.0	6/08	138	0.34	CC	C3	
14	13:12:56.81	45 57.70	120 30.42	13.58	3.2	28/29	97	0.31	CC	E3	
14	20:21:47.27	47 37.17	121 46.12	14.01	1.0	9/10	160	0.05	AC	P3	
15	18:20:46.66	46 36.82	123 04.55	6.94	2.1	16/16	105	0.12	AC	P3	P
15	22:52:05.31	48 07.96	121 29.25	10.25	1.5	3/05	232	0.50	DD	C3	
16	00:14:02.98	46 16.62	121 55.18	0.02*	1.3	13/13	88	0.13	AC	S3	P
16	01:22:07.78	47 32.96	121 51.26	19.48	1.1	5/08	182	0.14	DD	P3	
16	19:12:18.53	48 14.36	121 39.44	10.20	1.5	5/07	165	0.18	BD	P3	
17	01:00:49.15	48 36.26	122 44.26	44.56	1.0	5/06	192	0.12	BD	P3	H
17	02:02:35.27	46 15.72	121 37.78	0.03*	1.7	16/18	118	0.20	BC	C3	P
17	15:45:42.49	46 31.82	121 23.27	7.10	2.0	33/34	94	0.27	BC	C3	
17	19:24:31.13	48 39.45	121 56.77	0.03*	1.3	6/09	153	0.30	BC	P3	
18	01:19:27.91	46 50.84	121 45.74	2.13	1.6	22/26	62	0.17	BC	C3	
18	01:40:42.42	47 47.27	122 01.68	25.38	1.1	11/12	124	0.13	AB	P3	
18	06:20:02.41	48 32.81	122 37.66	19.00	1.1	12/16	77	0.13	AB	P3	
18	18:11:19.30	47 37.90	120 01.82	0.03*	2.6	19/20	52	0.28	BB	N3	P
18	18:32:15.92	47 41.43	121 59.49	0.02*	1.6	12/13	77	0.20	BC	P3	
18	18:46:49.96	47 41.38	121 59.69	0.04*	1.6	8/08	115	0.13	AC	P3	
19	01:33:50.61	47 41.12	121 59.88	0.03*	1.6	11/13	77	0.12	AC	P3	
19	22:11:28.94	47 11.65	121 47.52	0.02#	1.9	5/07	186	0.26	BD	C3	P
20	16:30:27.34	46 56.04	121 53.90	5.01	1.8	16/18	66	0.21	BC	C3	P
21	05:29:10.78	46 29.47	122 22.41	19.43	1.0	10/15	97	0.08	AB	S3	
21	17:35:52.59	47 33.92	121 44.75	10.67	1.1	7/10	148	0.11	BC	P3	
21	17:58:47.89	47 33.74	121 44.94	10.95	1.4	12/14	75	0.13	AB	P3	
22	07:41:55.58	44 32.15	123 47.73	58.01	2.5	9/11	299	0.38	DD	P3	
23	00:05:28.95	48 51.12	122 07.51	5.73$	3.4	16/19	149	0.33	CC	P3	F
23	00:06:27.78	48 50.90	122 08.11	2.15	2.3	7/09	222	0.19	CD	P3	F
23	00:07:36.57	48 49.72	122 08.31	1.69$	2.1	9/10	213	0.39	DD	P3	
23	00:10:13.93	48 51.15	122 07.39	2.76	2.7	14/20	150	0.27	BC	P3	
23	00:18:58.54	48 50.39	122 07.87	1.89$	2.1	14/18	144	0.29	CC	P3	
23	01:15:37.01	48 50.51	122 07.51	1.87$	2.1	11/14	206	0.30	CD	P3	
23	04:05:32.16	48 50.92	122 07.45	2.39$	2.3	12/14	148	0.29	CC	P3	
23	09:31:57.02	48 50.27	122 09.49	0.04*	1.3	6/07	291	0.39	CD	P3	H
23	15:47:51.58	48 50.26	122 07.05	10.30	1.9	10/11	145	0.22	BC	P3	
24	01:55:12.00	47 26.34	122 20.78	18.81	1.6	29/31	39	0.13	AA	P3	
24	03:18:13.47	47 47.96	120 10.14	8.19	1.3	11/15	83	0.27	BB	N3	
24	04:16:16.62	47 26.13	122 20.93	17.71	1.7	29/31	39	0.11	AA	P3	
24	05:18:20.37	47 26.17	122 20.88	17.54	1.7	29/31	39	0.13	AA	P3	
24	18:19:36.05	47 38.05	120 02.18	0.50	2.4	16/16	64	0.20	BB	N3	P
25	00:02:22.92	46 32.80	121 15.61	4.86	1.3	24/25	63	0.22	BC	C3	
25	08:03:27.12	48 36.48	123 04.66	7.02	1.2	5/08	252	0.11	BD	P3	H

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
25	17:24:28.14	46 31.20	121 22.61	5.15	1.9	22/25	111	0.23	BC	C3	
25	23:07:02.07	46 50.64	119 20.34	1.93	1.1	8/12	122	0.11	AB	E3	P
26	03:46:04.69	48 08.83	122 42.02	26.41	1.5	20/25	44	0.17	BA	P3	
26	10:42:04.68	47 26.20	122 20.96	17.84	1.7	27/29	43	0.15	BA	P3	
26	20:31:34.95	45 56.14	122 11.26	3.20	1.3	14/15	145	0.13	AC	C3	P
27	08:10:45.92	46 54.56	119 21.98	2.77	1.2	6/09	173	0.08	AC	E3	
27	11:53:46.77	46 55.21	119 21.65	0.03*	2.3	21/22	86	0.16	BC	E3	
27	13:02:02.05	48 50.72	122 07.63	2.71$	2.2	12/16	146	0.25	CC	P3	
27	17:30:04.11	48 50.27	122 07.73	8.01	1.9	8/10	143	0.24	BC	P3	
27	22:31:18.10	48 05.61	121 57.74	0.03*	1.3	7/09	170	0.20	BC	P3	P
27	23:36:52.53	48 50.75	122 07.73	2.29$	2.3	13/18	146	0.27	CC	P3	
28	01:29:48.93	48 49.51	122 07.92	4.12*	1.9	6/07	212	0.26	BD	P3	
28	07:32:34.42	48 49.17	122 07.31	1.76$	1.9	8/10	210	0.36	DD	P3	
28	10:42:39.33	48 49.89	122 07.81	4.08	1.2	5/07	215	0.14	BD	P3	H
28	14:40:56.39	48 50.52	122 07.67	2.89$	2.0	7/08	220	0.30	DD	P3	
28	18:18:23.69	48 50.10	122 07.52	2.73$	2.5	10/13	217	0.30	BD	P3	
28	23:21:21.18	46 02.83	122 26.37	17.48	1.2	18/21	89	0.18	BA	S3	
29	00:19:25.11	47 01.85	120 13.17	0.28	2.7	29/29	43	0.42	CC	N3	P
29	02:08:02.13	47 33.30	122 17.90	3.51	1.1	8/09	123	0.20	BB	P3	
29	06:04:23.69	46 32.05	121 23.12	6.08	1.0	9/11	136	0.17	BC	C3	
29	12:52:24.31	48 50.39	122 08.24	2.34$	1.9	11/12	143	0.35	CC	P3	
29	19:00:13.34	47 11.65	121 47.58	0.02#	2.1	10/10	172	0.20	BC	C3	P
29	19:21:39.50	48 50.77	122 07.60	8.07	2.1	10/12	147	0.23	BC	P3	
29	19:23:14.88	48 51.02	122 06.80	9.96	1.8	10/14	151	0.30	CC	P3	
29	20:18:18.78	46 32.13	121 23.93	5.57	1.0	7/09	252	0.16	BD	C3	
30	09:16:11.74	48 14.82	121 40.41	11.44	1.5	6/06	139	0.10	BC	P3	
30	17:53:24.69	47 04.20	121 50.80	0.70	1.1	5/05	213	0.13	CD	C3	P
30	18:26:37.21	48 12.52	121 58.04	0.02*	1.1	5/05	116	0.07	AD	P3	H
30	20:33:03.94	47 01.42	120 13.30	0.33	2.0	25/25	53	0.31	CC	N3	

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
1	01:49:49.97	46 31.06	121 22.74	4.86	1.5	17/18	127	0.15	AC	C3	
1	07:13:25.94	47 34.92	120 19.61	2.31	1.0	7/08	154	0.03	AC	N3	
1	15:38:29.74	47 41.79	121 59.10	1.15	1.7	12/13	75	0.20	BC	P3	
1	18:09:45.36	48 39.14	123 06.55	16.74	2.3	20/24	62	0.14	AA	P3	
1	20:07:56.94	46 46.96	122 41.96	0.04*	1.4	7/08	135	0.17	BC	P3	P
2	07:08:33.45	47 30.95	122 01.40	17.35	1.5	10/12	126	0.14	AB	P3	
2	12:46:59.51	46 31.89	121 23.12	5.41	2.2	26/30	50	0.32	CC	C3	
2	12:54:19.55	46 31.53	121 23.06	4.60	1.2	9/11	110	0.18	BC	C3	
2	13:09:35.35	46 31.77	121 23.26	5.24	1.0	9/11	137	0.26	BC	C3	
2	15:36:43.24	47 41.48	121 59.50	0.05*	1.5	8/10	114	0.17	BC	P3	
2	20:00:04.29	46 32.38	121 23.32	6.12	2.4	34/35	44	0.29	BC	C3	
2	20:58:41.57	46 31.98	121 23.37	5.01	2.2	20/23	108	0.25	BC	C3	
2	21:39:32.92	46 31.51	121 22.84	6.52	1.3	14/17	110	0.24	BC	C3	
2	23:10:31.89	46 31.55	121 23.21	3.04	1.1	13/13	109	0.15	AC	C3	
2	23:10:33.35	46 30.84	121 23.86	4.68	1.7	17/18	110	0.36	CC	C3	
3	02:41:34.70	46 31.52	121 22.96	3.69	1.4	15/17	110	0.19	BC	C3	
3	08:34:12.85	46 32.39	121 23.18	5.19	2.2	33/35	49	0.26	BC	C3	
3	08:50:33.34	46 31.94	121 22.83	5.54	1.1	11/14	109	0.23	BC	C3	
3	14:45:25.73	47 42.42	120 18.98	0.78	1.2	15/19	84	0.08	AC	N3	
3	20:02:40.46	46 36.91	121 50.26	8.34	1.2	8/11	130	0.18	BB	C3	P
4	07:51:42.62	46 50.86	119 20.31	0.04*	1.0	8/10	133	0.11	AB	E3	
4	08:41:43.47	46 49.58	119 23.90	1.35$	1.2	4/04	176	0.13	DD	E3	H
4	20:26:31.20	47 49.41	122 44.01	52.11	2.8	31/33	56	0.22	BA	P3	
5	04:17:56.06	47 33.05	123 36.78	39.13	2.0	22/25	51	0.21	BA	P3	
5	05:54:36.26	46 51.66	121 47.65	1.20	1.0	6/09	173	0.16	BC	C3	
5	10:54:50.80	48 51.20	122 06.02	3.47	1.9	13/16	172	0.25	BC	P3	
5	20:53:59.43	47 30.89	120 37.00	7.67	1.6	12/12	74	0.26	BC	C3	
6	11:08:25.23	46 24.48	122 17.30	10.92	1.4	23/32	45	0.14	AA	S3	
6	13:29:38.48	46 31.43	121 23.17	6.47	2.0	25/28	59	0.17	BC	C3	
6	21:18:21.21	47 35.46	122 44.98	13.49	1.7	12/15	59	0.08	AA	P3	
6	22:19:16.13	47 39.41	121 48.83	12.59	1.8	18/22	66	0.12	AB	P3	
6	23:00:17.06	44 55.07	122 07.41	7.27	1.7	7/10	99	0.39	CC	C3	

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
7	00:33:21.07	47 48.74	121 57.50	0.88	1.0	4/05	135	0.10	AD	P3	P
7	18:06:45.41	47 38.41	120 02.71	0.31	2.2	18/18	63	0.32	CB	N3	
7	20:33:57.59	46 23.97	119 10.96	2.01$	1.6	16/16	63	0.25	BB	E3	
7	22:40:12.22	47 15.36	122 12.66	16.94	1.1	14/15	68	0.14	BB	P3	
8	07:37:25.43	47 31.03	120 37.66	0.66$	1.6	16/19	51	0.22	BC	C3	
8	07:41:16.69	47 30.86	120 37.21	5.51	1.4	13/16	73	0.14	AC	C3	
9	13:50:34.91	47 06.63	122 05.96	7.41	1.4	11/12	118	0.08	AC	P3	
9	16:42:38.66	48 15.76	124 27.10	0.05*	1.4	6/09	174	0.34	CC	P3	
9	17:53:28.61	48 52.20	122 07.53	9.97*	1.9	10/12	232	0.20	BD	P3	
9	20:15:34.24	47 24.34	122 41.99	23.36	1.9	22/23	56	0.15	BA	P3	
9	22:00:40.19	47 11.81	121 48.09	0.02*	1.3	5/05	197	0.14	AD	C3	P
10	02:42:03.01	46 17.75	118 26.69	2.33	2.6	14/14	211	0.27	CD	E3	
10	12:32:20.67	46 55.00	121 53.22	6.55	1.0	8/11	144	0.14	AC	C3	
11	01:25:53.16	46 58.92	122 11.98	0.03*	1.3	24/28	49	0.16	BC	P3	
11	14:05:29.96	47 31.32	121 46.46	15.75	1.3	14/16	103	0.20	BB	P3	
13	09:00:51.04	46 32.21	119 53.43	0.02*	1.0	4/04	301	0.34	CD	E3	
13	23:05:31.46	47 05.00	121 51.29	0.03*	1.0	4/05	216	0.04	AD	C3	H
14	12:50:15.36	48 38.82	123 07.09	15.08	1.6	18/19	50	0.16	BA	P3	
14	22:23:00.09	47 00.87	122 09.96	4.22	1.2	9/10	145	0.12	BC	P3	
15	17:21:28.58	45 18.13	121 28.00	0.03*	2.3	6/07	240	0.29	BD	C3	P
15	22:46:29.98	49 28.92	120 32.41	0.03#	1.5	9/09	285	0.37	CD	C3	
15	23:27:29.08	47 53.74	118 07.11	7.93	1.7	5/06	314	0.13	CD	N3	P
16	12:12:39.15	45 39.61	121 57.15	5.10	1.1	12/13	130	0.14	AC	C3	
17	00:54:15.88	48 50.14	122 07.29	3.23	2.0	15/18	143	0.22	BC	P3	
17	11:19:45.18	48 15.04	121 39.63	2.67	2.0	16/18	89	0.40	CC	P3	
17	12:34:18.34	48 20.56	121 47.60	20.93	1.3	7/10	117	0.51	DB	P3	
18	03:21:52.74	48 38.59	122 59.49	17.11	1.0	7/08	252	0.08	BD	P3	H
18	13:35:32.87	46 16.95	121 31.21	5.81	2.0	5/05	202	0.38	DD	C3	
18	21:34:21.53	46 53.62	123 05.06	0.02*	1.6	21/21	128	0.18	BB	P3	P
18	23:15:53.69	47 00.42	122 01.06	2.78	1.9	11/11	167	0.16	CC	C3	P
20	22:28:57.92	48 02.05	122 45.56	9.64	1.6	13/13	74	0.26	BB	P3	P
21	19:21:00.13	47 59.76	117 39.17	7.33#	1.6	8/08	313	0.32	DD	N3	P
21	22:11:02.63	45 54.58	122 08.70	8.44	2.9	30/32	83	0.18	BB	C3	
21	22:22:41.75	46 53.33	123 27.35	0.02#	1.1	4/05	211	0.20	BD	P3	P
21	23:18:17.66	45 54.34	122 07.74	8.08	1.1	19/21	129	0.14	AB	C3	
22	06:05:50.38	47 46.65	120 17.28	9.53	3.0	28/28	52	0.26	BB	N3	F
22	13:26:47.92	47 55.44	123 23.51	44.18	2.3	27/30	37	0.15	BA	P3	
23	00:17:23.16	48 02.68	122 44.87	2.43	1.6	17/17	75	0.30	CC	P3	P
23	04:43:05.95	46 31.58	121 23.63	1.38$	1.1	19/22	137	0.39	CC	C3	
23	16:46:20.30	48 41.49	122 08.75	7.32	1.8	10/12	151	0.22	BC	P3	
23	21:56:46.03	46 52.40	119 26.90	3.47	1.0	6/10	160	0.13	AC	E3	
24	00:39:26.23	46 23.34	122 31.56	0.04*	1.0	13/14	114	0.18	BB	C3	P
24	05:29:52.53	48 38.15	122 59.50	16.00*	2.1	23/27	54	0.23	BA	P3	
24	11:53:00.31	47 27.15	122 42.07	17.37	1.4	17/18	56	0.14	AA	P3	
24	17:58:13.75	47 40.93	120 19.88	0.54	1.2	5/09	226	0.07	AD	N3	
24	18:53:23.78	47 35.77	122 45.48	11.03	1.0	6/10	88	0.07	AC	P3	H
24	20:27:48.68	46 41.18	122 21.24	1.06*	1.1	17/17	162	0.30	CC	C3	P
25	02:22:22.55	46 31.09	121 22.54	2.70	1.4	16/17	139	0.12	AC	C3	
25	16:32:10.26	46 36.67	123 04.52	7.43$	1.6	15/15	127	0.13	AC	P3	P
25	20:37:42.81	47 06.50	122 05.50	3.45$	1.8	23/23	81	0.15	AC	P3	
25	21:15:46.59	45 55.31	122 10.69	4.16	1.1	12/14	146	0.22	BC	C3	
27	06:52:02.00	46 51.19	121 45.50	0.65	1.6	5/05	157	0.25	BD	C3	
27	17:44:32.19	47 55.39	122 04.89	9.69	1.3	10/13	113	0.18	BB	P3	
28	17:08:22.20	45 53.67	119 41.79	3.31	2.4	16/17	152	0.25	BD	E3	P
28	23:25:43.61	48 50.50	122 08.36	2.92	1.3	5/08	219	0.27	BD	P3	H
29	03:48:10.23	46 55.09	122 26.52	21.18	1.6	17/19	68	0.11	AB	P3	
29	20:26:35.33	47 51.03	118 09.41	6.55	1.9	12/14	268	0.21	BD	N3	X
30	01:21:09.83	48 18.98	122 05.75	10.46	1.3	14/15	66	0.11	AB	P3	
30	07:49:56.24	47 57.14	122 10.01	14.57	1.9	14/16	81	0.15	AB	P3	
30	10:03:42.96	48 50.30	122 07.95	3.89$	2.1	13/18	143	0.23	BC	P3	
30	15:39:07.04	47 39.58	120 10.67	0.50	2.3	25/26	52	0.20	BB	N3	
30	21:13:09.82	47 11.73	121 47.98	0.04*	1.5	8/08	174	0.12	AC	C3	P
31	02:50:18.68	46 31.72	121 24.25	7.88#	1.2	8/11	136	0.10	AC	C3	
31	06:56:33.30	48 52.50	121 15.33	3.39$	1.2	4/06	296	0.05	BD	C3	H
31	23:54:50.53	46 20.58	123 41.83	15.66$	1.3	5/07	306	0.14	CD	P3	H

July 1981 cont'd

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP

Aug 1981

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
1	09:58:02.53	47 33.94	122 08.22	19.36	1.1	8/10	78	0.15	BA	P3	
1	15:19:13.52	46 31.58	121 24.82	7.57	1.5	10/11	142	0.24	BC	C3	
1	18:44:16.65	46 53.59	121 55.58	9.68	1.5	10/12	157	0.07	AC	C3	
1	21:16:18.88	46 31.39	123 02.78	23.55	1.4	4/06	183	0.40	CD	P3	H
3	01:31:16.10	46 30.15	121 23.12	2.48	1.1	8/10	141	0.11	AC	C3	
4	08:34:12.35	47 38.59	123 03.79	43.85	1.9	21/30	67	0.23	BA	P3	
4	22:14:06.28	47 45.00	121 59.00	0.03*	1.7	14/17	69	0.23	BC	P3	
4	22:34:16.97	46 35.58	121 16.39	8.12	1.9	32/34	57	0.42	CC	C3	
6	12:32:28.51	46 28.76	121 19.98	4.01	2.8	40/43	40	0.27	BC	C3	
6	13:06:21.31	46 28.34	121 20.26	2.94	1.2	8/11	149	0.12	AC	C3	
6	22:56:14.02	48 38.10	122 59.78	17.32	1.1	16/22	54	0.19	BA	P3	
7	16:09:06.52	46 14.94	118 51.14	1.55	1.1	9/10	201	0.19	BD	E3	X
7	21:44:36.94	45 35.60	121 34.70	1.94	1.8	10/10	98	0.21	BC	C3	P
7	22:02:38.57	46 31.30	119 35.96	15.45	1.5	16/22	54	0.30	BA	E3	
8	12:17:26.23	47 38.63	122 37.45	22.77	2.4	30/34	37	0.12	AA	P3	
9	00:00:50.52	47 40.19	120 03.35	5.66	1.1	6/09	108	0.08	AC	N3	
11	01:38:43.50	45 33.75	119 32.80	0.02*	2.3	11/11	181	0.19	BD	E3	P
11	02:28:14.35	46 36.79	123 04.79	7.72$	1.8	8/08	129	0.08	BC	P3	P
11	05:44:03.93	45 02.61	122 22.44	18.97	1.0	7/08	117	0.07	AB	C3	
11	06:27:05.96	48 19.67	123 10.06	21.59	1.1	18/22	74	0.34	CB	P3	
11	23:30:37.96	47 52.09	118 02.14	11.71	1.4	9/10	294	0.41	DD	N3	X
12	09:59:52.29	46 56.32	121 39.88	0.03*	1.4	6/06	171	0.37	CC	C3	L
12	18:16:13.95	46 52.58	121 46.19	1.03	1.9	4/04	218	0.32	CD	C3	L
12	20:20:07.77	46 51.37	121 45.24	0.03*	1.9	12/12	78	0.30	BC	C3	L
12	23:07:40.16	48 15.75	121 45.47	4.10	1.4	6/06	191	0.09	BD	P3	
13	17:17:59.52	45 14.41	121 25.49	0.10	1.8	7/09	183	0.24	BD	C3	P
13	17:20:18.77	46 31.20	121 24.46	3.47	1.5	15/18	137	0.22	BC	C3	
14	11:12:15.70	47 50.49	122 34.82	23.76	1.2	17/19	63	0.09	AB	P3	
14	12:02:04.28	48 38.11	121 56.53	11.33	1.9	15/16	237	0.29	CD	P3	
14	16:36:59.24	47 06.61	121 19.20	11.00	1.2	13/19	88	0.19	BB	C3	
15	02:22:03.91	46 30.49	121 23.63	3.81	1.1	10/12	140	0.18	BC	C3	
15	20:24:50.83	47 03.13	123 13.42	0.02*	1.1	10/11	162	0.17	BC	P3	H
15	21:17:25.42	48 52.22	122 13.30	13.04*	2.4	13/16	142	0.26	BC	P3	
17	18:30:44.26	47 03.44	122 13.03	1.14	2.0	26/28	37	0.18	BA	P3	
17	19:35:03.52	49 12.87	123 38.68	23.04	1.1	4/05	289	0.07	BD	P3	H
17	23:21:35.50	45 23.07	121 14.24	0.03*	1.7	4/05	295	0.54	DD	C3	P
18	00:01:35.88	46 25.12	121 35.13	2.16	2.3	31/32	101	0.20	BC	C3	
18	17:47:11.34	45 34.84	122 00.87	29.61	1.1	7/07	158	0.31	CC	C3	P
18	23:31:00.01	47 56.34	117 58.14	14.90$	1.9	9/10	295	0.16	CD	N3	X
18	23:59:37.23	46 15.77	121 39.25	0.03*	1.1	13/14	142	0.18	BC	C3	P
19	14:04:04.98	48 13.60	124 26.89	0.04*	1.3	9/12	125	0.43	CC	P3	
19	18:06:28.10	47 54.44	119 51.00	3.71*	1.1	12/14	144	0.37	CC	N3	
19	22:36:15.08	45 35.87	119 34.50	2.73	1.8	17/18	176	0.30	BC	E3	
20	04:19:12.45	46 55.39	123 44.20	36.63	1.9	24/28	193	0.22	BD	P3	
20	20:44:03.28	47 11.74	121 45.95	0.02*	1.1	9/10	89	0.16	BA	C3	P
20	23:31:56.48	47 55.02	118 01.65	0.50	1.8	7/08	293	0.13	BD	N3	X
21	20:13:13.61	47 33.74	123 39.16	40.52	2.8	26/31	51	0.23	BA	P3	
21	20:53:10.74	45 33.55	122 01.14	28.51	1.0	4/05	257	0.29	DD	C3	P
22	19:38:27.80	46 37.14	123 03.33	0.02*	1.2	6/08	134	0.58	DC	P3	P
23	09:41:16.64	47 44.89	120 04.51	0.53	1.5	20/28	61	0.41	CB	N3	
24	03:16:45.11	46 51.25	121 45.47	1.50$	1.0	15/19	112	0.25	CC	C3	L
24	15:02:58.18	46 31.57	121 22.78	0.02*	1.7	19/20	137	0.20	BC	C3	
25	06:54:17.87	46 51.29	121 44.00	0.97	1.5	7/07	111	0.50	DB	C3	L
25	22:15:22.16	46 14.53	121 37.06	7.69	1.1	6/09	240	0.23	BD	C3	P
26	14:20:09.88	46 31.38	121 23.12	6.06	2.0	23/25	132	0.25	BC	C3	
26	14:48:46.91	46 31.05	121 22.82	3.01	1.3	15/17	139	0.29	BC	C3	
26	22:06:15.47	46 53.29	123 26.41	0.02*	1.5	20/21	177	0.27	BC	P3	P
26	22:08:38.61	47 59.61	121 37.11	5.80	1.1	5/08	195	0.14	BD	P3	H
26	23:04:39.55	47 16.73	122 47.45	23.05	2.1	33/37	58	0.19	BB	P3	
27	01:54:28.61	46 19.28	118 23.16	5.36	1.2	10/11	235	0.17	BD	E3	
27	21:51:16.61	49 02.47	122 34.35	38.10	1.5	5/06	260	0.23	CD	P3	H

Aug 1981 cont'd

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
27	23:34:08.03	47 05.62	121 55.20	5.52	1.7	22/23	52	0.22	BC	C3	P
28	16:51:11.68	47 21.00	122 20.45	17.63	1.3	12/13	74	0.05	AB	P3	
28	17:51:38.32	47 52.10	122 52.17	16.78	1.1	6/10	124	0.10	AC	P3	H
28	22:31:15.64	46 45.01	122 08.49	7.93	1.0	19/20	54	0.17	BB	C3	P
29	01:25:02.41	47 36.29	121 39.83	4.84$	1.9	13/16	137	0.21	CC	P3	
29	23:12:20.68	47 27.72	122 11.82	55.11	1.1	10/13	132	0.12	AB	P3	
31	04:01:31.06	49 15.33	123 37.55	14.70	1.9	13/17	143	0.26	BD	P3	
31	05:28:46.31	46 51.25	121 44.90	0.48	1.5	8/08	111	0.30	BC	C3	L
31	20:05:59.72	47 10.47	123 21.11	0.03*	1.1	5/09	189	0.32	CD	P3	P
31	23:13:56.02	45 22.89	119 41.41	0.54*	2.1	14/14	229	0.21	BD	E3	P

Sept 1981

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
1	01:35:16.44	48 28.64	121 53.07	9.05	1.3	5/06	175	0.29	DD	P3	
1	06:06:44.89	47 22.74	122 07.76	14.22	1.1	19/20	51	0.11	AB	P3	
1	13:33:03.97	48 11.52	119 53.99	0.50*	2.4	20/21	128	0.23	BC	N3	
2	00:56:27.96	47 06.11	123 11.93	0.03*	1.1	5/07	154	0.20	BD	P3	P
2	01:21:46.65	46 30.90	121 22.32	2.01	1.0	9/10	140	0.10	AC	C3	
2	15:13:56.13	46 29.98	122 17.08	4.83	1.5	22/31	54	0.11	AB	S3	
2	20:09:34.63	46 14.63	118 52.00	1.62	1.1	7/07	218	0.23	BD	E3	X
2	21:03:34.17	46 49.91	119 21.38	2.95	2.0	20/21	87	0.15	AA	E3	
3	01:05:43.10	48 39.60	121 57.84	0.02*	1.3	6/09	162	0.22	BC	P3	
3	18:45:06.77	46 39.77	121 35.59	1.02	1.1	6/08	143	0.11	AC	C3	P
3	22:35:27.72	45 14.22	121 11.64	0.04*	1.6	6/06	204	0.21	CD	C3	
4	15:06:49.56	45 34.60	121 33.46	0.35#	1.7	12/12	133	0.31	CC	C3	P
4	18:05:00.78	46 39.55	121 35.57	0.44*	1.1	6/09	147	0.13	AC	C3	P
4	18:57:30.96	47 08.67	121 27.51	8.43$	1.3	4/06	231	0.10	CD	C3	H
4	19:27:10.01	46 16.07	121 38.87	0.02*	1.3	14/15	153	0.22	BC	C3	P
4	22:47:24.21	45 19.13	119 35.99	31.25	1.6	7/09	268	0.20	BD	E3	
4	22:47:33.73	45 56.70	122 27.66	4.82	1.6	13/15	138	0.21	BC	C3	P
5	19:38:56.01	45 18.14	122 22.86	13.78	1.2	6/08	185	0.11	BD	C3	
6	00:57:47.78	46 36.85	123 04.65	7.76	2.4	23/23	114	0.21	BC	P3	P
6	03:52:38.55	47 35.43	122 45.08	13.27	1.4	16/18	59	0.12	AA	P3	
6	05:35:01.21	47 19.47	122 16.18	7.87	2.3	31/33	43	0.15	AC	P3	
6	05:58:09.19	47 35.69	122 45.79	16.02#	1.3	12/13	69	0.07	AB	P3	
6	19:34:46.47	46 40.78	123 51.06	37.61	3.3	38/41	216	0.23	BD	P3	F
7	13:02:03.66	46 53.83	121 50.60	6.95$	1.5	6/06	200	0.11	BD	C3	L
7	21:16:31.34	46 55.78	121 57.63	9.72	1.0	10/12	131	0.13	AC	C3	
8	11:45:02.53	47 55.93	121 59.03	9.56	1.4	10/13	91	0.09	AB	P3	
8	23:52:00.01	45 44.46	122 31.50	9.88$	1.4	23/27	152	0.15	BC	C3	
9	00:09:31.65	46 31.79	121 46.77	7.82	1.1	13/18	130	0.13	AB	C3	
9	15:11:28.90	45 48.87	122 05.37	5.84	1.1	16/17	116	0.12	AC	C3	
9	22:39:16.29	47 12.01	121 47.22	0.02*	1.2	9/10	100	0.09	AB	C3	P
10	00:06:51.97	46 30.96	121 23.02	3.99	2.0	31/37	60	0.20	BC	C3	
10	06:45:55.97	46 30.48	121 23.54	0.02*	1.6	13/15	63	0.36	CC	C3	
10	07:13:13.10	47 35.44	122 45.57	13.74	2.4	28/36	32	0.16	BA	P3	
10	08:33:52.82	46 31.19	121 23.22	0.04*	2.4	34/35	45	0.25	BC	C3	
10	12:37:50.12	46 20.60	119 42.41	6.14	1.1	12/13	102	0.17	BB	E3	
10	17:41:55.89	46 33.43	121 43.70	0.83	1.0	9/13	129	0.15	AB	C3	
10	21:55:03.42	47 10.86	123 19.69	0.02*	1.0	5/08	181	0.25	BD	P3	P
10	23:00:02.10	45 00.81	122 02.22	10.04	1.6	4/05	147	0.03	AD	C3	
11	17:18:53.38	47 17.98	121 44.58	3.97	1.1	17/17	134	0.22	BC	P3	
12	05:35:35.99	46 30.99	121 23.80	0.76$	1.2	13/15	138	0.23	CC	C3	
12	06:42:28.06	47 41.45	121 59.00	0.04*	1.1	9/10	112	0.16	BC	P3	
12	17:03:16.58	46 55.01	121 56.25	10.01	1.5	23/27	61	0.12	AC	C3	
12	18:21:20.30	46 39.64	121 35.82	1.01	1.0	7/09	83	0.09	AB	C3	P
14	07:52:23.01	47 23.94	122 01.01	68.59	1.4	18/24	58	0.21	BA	P3	
14	10:06:38.00	47 31.43	122 47.01	22.70	1.3	19/20	62	0.17	BA	P3	
14	14:55:29.85	47 05.83	122 13.96	3.69	1.2	5/05	257	0.11	CD	P3	L
14	19:23:23.57	46 38.83	121 32.17	7.01	1.0	7/09	110	0.13	BB	C3	P
14	20:05:55.89	47 43.42	121 28.96	18.20*	1.1	5/07	203	0.13	AD	C3	H
15	09:28:09.87	47 08.19	122 27.14	53.95	1.6	24/27	40	0.15	AA	P3	
16	22:10:42.29	46 35.68	123 25.87	4.86$	1.2	7/07	231	0.09	BD	P3	P
17	06:21:56.16	48 41.69	120 10.71	4.80	1.8	11/14	230	0.45	CD	N3	

Sept 1981 cont'd

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
17	11:41:38.30	46 48.29	119 23.85	0.03*	1.1	7/09	86	0.10	AB	E3	
17	21:01:43.48	46 13.33	123 44.77	0.02*	1.4	6/07	308	0.12	AD	P3	H
18	01:48:38.04	47 34.93	121 53.76	0.05*	1.0	6/08	169	0.09	AC	P3	
19	03:01:15.10	48 53.33	122 14.47	12.72$	1.8	11/12	233	0.20	BD	P3	
19	10:33:18.20	47 59.31	121 29.43	2.76*	1.9	10/12	128	0.14	AC	C3	
19	14:23:48.06	48 17.53	121 45.56	4.89*	1.1	6/07	134	0.11	AC	P3	
19	18:24:08.24	47 10.34	123 19.58	0.02*	1.0	6/10	118	0.34	CC	P3	P
20	12:24:04.71	46 08.51	119 27.16	9.64	2.2	18/22	81	0.16	BB	E3	
20	12:47:38.96	46 08.58	119 27.26	7.96	1.8	17/23	114	0.20	BB	E3	
20	13:25:13.48	46 29.68	121 21.53	3.05	1.0	12/14	144	0.14	AC	C3	
21	13:16:59.92	49 00.14	122 41.41	11.28$	1.5	9/10	255	0.19	BD	P3	
21	21:24:00.52	46 20.84	121 52.77	1.35	1.2	18/21	130	0.18	BC	S3	P
21	21:37:03.77	46 39.78	121 35.62	0.58$	1.1	11/14	84	0.20	CB	C3	P
22	20:26:39.56	48 12.16	121 55.85	0.04*	1.7	6/09	162	0.14	AC	P3	H
22	21:58:21.70	46 08.76	119 27.01	7.65	1.2	9/12	91	0.08	AB	E3	
23	10:15:23.79	47 51.96	122 34.76	22.48	1.3	19/22	55	0.10	AB	P3	
23	16:28:39.08	46 31.34	119 43.49	19.58	2.3	24/29	52	0.19	BA	E3	
24	20:03:28.96	46 40.52	122 06.18	0.03*	1.3	14/14	115	0.15	BC	C3	P
25	10:35:06.59	47 41.21	121 58.92	0.05*	1.7	10/11	101	0.24	BC	P3	
27	03:58:40.01	47 58.71	121 33.70	8.70	1.1	6/08	177	0.33	CC	C3	
27	05:41:39.27	48 23.90	122 15.70	11.66	1.3	6/07	144	0.02	AC	P3	
27	13:42:09.04	48 23.25	122 15.64	11.29	1.3	6/08	140	0.10	AC	P3	
27	15:12:09.51	47 24.26	121 58.28	2.14	1.9	22/24	85	0.10	AC	P3	
28	00:54:22.42	46 57.65	119 39.81	0.96	2.6	23/24	107	0.16	BC	E3	
28	03:30:28.41	47 06.20	122 04.27	7.24	1.3	14/16	130	0.09	AC	P3	
28	11:47:47.80	46 08.53	119 27.46	5.36	1.4	13/16	110	0.29	BC	E3	
28	17:59:50.79	46 31.02	121 22.59	5.44	1.2	10/12	149	0.09	AC	C3	
28	20:40:30.88	47 32.89	122 13.56	0.03*	1.8	18/21	56	0.15	BA	P3	
28	21:15:28.90	45 47.31	118 00.81	2.32	2.0	13/15	292	0.28	CD	E3	
28	22:56:20.53	46 07.50	121 39.73	4.13	1.5	9/10	247	0.26	CD	C3	
28	23:38:08.96	47 53.06	118 09.20	6.88	1.8	10/11	139	0.11	AC	N3	X
29	20:06:47.19	46 46.79	122 50.38	5.44*	1.6	14/14	106	0.14	AC	P3	P
30	22:56:06.22	46 13.48	121 42.31	4.97	1.3	20/20	108	0.16	BC	C3	P

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
2	16:50:49.12	47 41.67	121 59.54	6.90	1.9	19/21	74	0.14	AC	P3	
2	21:42:11.29	47 41.76	118 15.28	8.50*	1.9	11/14	209	0.40	CD	N3	P
2	21:43:10.59	48 01.83	118 44.33	9.13	1.4	13/14	234	0.23	BD	N3	X
2	23:25:33.42	47 01.12	122 09.45	0.04*	1.4	25/25	34	0.16	BB	P3	P
3	11:22:59.91	47 25.46	121 48.87	18.31	1.0	5/07	177	0.08	BD	P3	
3	16:19:50.08	47 32.27	122 16.72	22.48	1.1	10/11	89	0.03	AA	P3	
3	20:51:17.03	47 45.23	122 29.51	22.58	1.8	30/32	41	0.16	BB	P3	
4	18:26:01.21	47 43.66	121 57.70	23.26	1.0	9/11	124	0.06	AB	P3	
5	00:22:19.37	48 05.47	121 53.92	0.02*	1.0	9/10	127	0.22	BC	P3	P
5	01:52:06.24	46 40.05	119 48.77	16.47	1.3	15/19	84	0.11	AB	E3	
6	04:22:05.03	47 25.65	121 48.66	20.27	1.0	10/12	107	0.19	BB	P3	
6	10:38:19.65	47 11.42	118 59.24	11.10$	1.4	5/08	252	0.26	DD	N3	H
6	12:40:06.31	47 22.98	122 32.50	19.87	1.7	28/28	44	0.10	AB	P3	
6	19:29:12.66	45 43.43	122 59.87	22.81$	1.0	14/16	132	0.17	BD	P3	
6	20:49:26.65	46 43.23	122 47.56	0.03*	1.1	13/13	86	0.10	AC	P3	P
7	10:27:00.42	46 11.79	119 27.35	4.57	1.1	4/05	308	0.06	BD	E3	H
7	12:10:56.86	46 31.27	121 22.53	4.05	2.6	39/47	45	0.28	BC	C3	
7	17:40:46.53	46 52.37	119 36.33	2.07	1.0	8/09	144	0.14	AC	E3	
8	01:21:10.32	47 16.02	122 51.03	22.32	1.2	22/24	65	0.10	AB	P3	
8	23:58:58.63	47 36.39	118 16.31	7.22	1.6	10/11	155	0.30	BD	N3	P
9	13:06:05.35	48 51.89	122 07.83	8.03	1.3	7/09	229	0.19	CD	P3	
9	20:15:34.56	46 39.91	122 06.82	2.36	1.2	14/14	110	0.17	BC	C3	P
10	13:40:59.05	47 00.94	120 38.76	10.89$	1.6	7/08	132	0.23	BD	N3	H
10	20:25:50.38	46 20.09	122 38.36	4.45	1.9	18/18	87	0.10	AC	C3	P
11	04:01:37.65	46 51.31	121 46.03	4.96	1.0	7/11	114	0.14	AC	C3	
12	00:36:45.35	47 46.50	122 24.56	16.92	1.1	8/13	90	0.11	AC	P3	H
12	08:59:27.20	46 09.02	120 29.54	12.91$	1.9	24/26	101	0.38	CC	E3	
12	20:35:37.27	46 36.65	123 03.13	4.85*	1.7	4/05	140	0.24	BD	P3	P

Oct 1981 cont'd

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
13	01:47:24.11	47 48.89	122 31.19	21.88*	1.4	16/19	57	0.13	AB	P3	
13	21:34:30.51	46 40.12	121 36.43	0.03*	1.6	7/08	79	0.18	BB	C3	P
13	23:31:28.06	47 52.80	118 07.82	7.97	1.5	8/08	252	0.23	DD	N3	X
14	10:00:54.54	46 40.12	122 09.30	19.36	1.9	32/36	66	0.13	AA	C3	
15	03:41:01.85	47 45.01	122 48.00	20.39	1.0	9/12	96	0.05	AB	P3	
15	08:49:18.15	46 58.05	120 26.22	8.74	2.3	30/31	39	0.18	BB	E3	
15	13:33:10.72	46 58.76	120 26.80	2.34$	1.2	5/06	182	0.17	BD	E3	H
15	21:27:13.01	47 10.60	118 23.01	9.31	1.6	9/10	174	0.35	CD	N3	
15	22:19:45.21	46 53.41	119 35.71	0.04*	1.4	11/12	190	0.22	BD	E3	
17	05:34:24.47	46 31.20	121 23.41	5.43$	1.0	8/10	174	0.16	BC	C3	
17	08:12:56.38	47 35.45	122 45.32	13.67	1.1	23/24	54	0.16	BA	P3	
19	18:48:37.01	46 42.12	123 50.83	33.37	1.8	18/21	191	0.18	BD	P3	
19	20:02:58.40	46 32.99	121 21.14	1.55$	1.6	20/23	59	0.40	CC	C3	
19	21:27:14.07	46 47.14	122 50.54	5.47*	1.9	11/11	92	0.11	AC	P3	P
20	05:35:56.13	47 23.28	121 57.01	9.79	1.6	11/13	121	0.14	AB	P3	
20	07:05:18.16	47 50.52	122 23.17	15.11	1.1	5/08	170	0.06	AD	P3	H
20	12:59:18.77	46 31.49	121 21.98	4.47	1.1	15/16	138	0.18	BC	C3	
21	01:51:27.23	46 37.63	117 41.87	21.99$	2.0	17/19	200	0.40	CD	E3	P
21	12:17:26.78	48 48.04	122 48.54	16.68	1.3	7/09	274	0.05	AD	P3	H
21	20:57:23.71	46 40.11	121 34.97	0.03*	1.0	6/08	88	0.12	AC	C3	P
21	23:44:05.56	46 52.26	119 35.62	0.37*	1.6	9/10	144	0.05	AC	E3	
22	18:52:47.60	46 39.74	122 12.51	7.73	1.1	10/11	138	0.29	BC	C3	P
22	23:28:55.65	47 52.92	118 08.16	4.00*	1.8	6/09	152	0.31	CC	N3	X
23	17:07:06.20	46 27.54	121 52.16	1.52*	1.2	17/17	78	0.36	CC	S3	P
23	21:33:54.33	46 41.42	122 25.98	2.88	1.0	23/23	46	0.28	BC	C3	P
24	00:57:19.25	45 55.41	122 06.68	5.91	1.5	18/18	124	0.17	BC	C3	P
24	09:21:11.00	47 12.10	122 45.13	0.77	1.0	8/10	104	0.08	AC	P3	H
24	17:17:03.88	46 41.09	123 17.49	16.12	1.5	4/06	188	0.33	CD	P3	P
24	22:54:54.90	46 36.23	123 02.88	0.05*	1.5	6/06	140	0.24	BC	P3	P
25	01:56:58.34	47 40.62	121 31.42	86.58	1.3	9/14	92	0.20	BB	C3	
25	03:21:03.67	47 45.51	120 11.77	7.58	3.2	24/24	66	0.14	AB	N3	F
25	07:48:20.56	47 38.33	121 20.18	10.06	1.1	5/06	228	0.14	BD	C3	
26	02:30:41.09	47 37.21	122 16.89	0.03*	1.1	5/06	222	0.49	CD	P3	H
26	21:54:39.46	46 46.25	122 34.51	0.02*	1.6	12/12	99	0.09	AC	P3	P
27	22:19:41.55	46 31.83	117 17.35	8.92$	2.2	16/18	224	0.51	DD	E3	
29	23:10:48.56	46 58.18	120 25.82	8.57#	2.1	14/15	69	0.25	BB	E3	
29	23:25:12.51	46 57.72	119 48.03	0.21	1.0	6/07	120	0.08	AC	E3	H
29	23:45:38.63	46 56.31	119 47.97	4.59$	1.4	5/05	193	0.14	CD	E3	P
30	00:11:11.90	48 02.90	118 43.67	9.12	2.4	13/17	130	0.26	BD	N3	X
31	16:41:22.96	47 26.01	121 48.04	18.94	1.9	21/24	62	0.09	AA	P3	
31	21:51:10.62	47 46.47	121 52.53	6.52	1.2	7/09	130	0.07	AB	P3	

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
2	16:21:01.82	48 38.12	122 52.06	0.02*	1.3	4/07	201	0.52	DD	P3	H
2	19:09:39.24	46 40.38	122 41.86	0.02*	1.0	11/11	104	0.17	BB	P3	P
4	00:32:44.91	46 26.87	121 57.02	1.57	1.4	15/18	127	0.11	AB	S3	P
4	09:51:57.50	47 31.16	121 45.66	16.92	1.3	8/11	127	0.09	AB	P3	
5	21:37:06.77	46 26.58	121 56.69	1.27*	1.9	22/26	78	0.11	AB	S3	P
6	23:40:32.38	46 38.76	122 58.48	23.08	1.2	4/07	228	0.36	DD	P3	P
8	04:44:11.34	47 45.69	120 11.57	5.87	2.0	23/24	104	0.11	AC	N3	
8	07:54:00.96	45 35.89	122 28.52	6.79	2.4	34/42	82	0.15	BC	C3	F
9	12:03:56.95	45 07.33	120 56.41	6.95	1.3	5/06	169	0.12	BD	C3	
9	15:36:34.11	48 06.26	121 42.80	13.87	1.0	4/07	188	0.07	BD	P3	H
9	20:36:25.92	46 42.97	123 53.13	0.03*	1.4	6/07	243	0.32	CD	P3	P
11	04:33:15.94	46 50.39	119 43.76	2.54	1.8	22/23	62	0.23	BB	E3	
11	05:01:15.72	47 16.37	121 29.45	13.68	1.3	8/10	119	0.16	BB	C3	
11	13:06:56.76	47 42.23	120 04.53	0.63	1.8	13/17	58	0.17	BB	N3	
11	21:16:31.90	47 30.92	122 20.01	22.83	1.5	15/17	63	0.10	AA	P3	
12	00:25:37.93	46 27.60	122 35.42	0.51	1.4	9/09	76	0.20	BB	C3	P
12	18:10:25.35	47 56.60	122 24.30	26.58	3.7	35/35	55	0.21	BB	P3	F
12	18:20:39.92	47 56.38	122 24.22	25.60	1.2	9/10	82	0.07	AB	P3	
14	00:48:22.26	46 27.10	121 57.32	0.97	1.0	19/19	82	0.15	CB	C3	X
14	09:33:19.63	46 50.30	119 43.79	1.46	1.6	19/22	62	0.13	AB	E3	

Nov 1981 cont'd

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
14	22:07:58.41	45 28.04	121 32.38	2.28$	1.7	7/08	94	0.31	CC	C3	P
15	18:58:35.19	46 39.11	122 07.05	18.60	1.7	30/38	51	0.14	AA	C3	
16	19:19:32.48	47 52.64	118 08.51	9.45	2.0	8/09	132	0.10	AC	N3	X
16	23:06:51.46	47 20.20	123 13.67	14.15	1.1	5/09	123	0.14	BD	P3	H
19	01:10:31.65	46 31.19	121 23.27	5.33	1.9	23/25	104	0.22	BC	C3	
19	18:43:24.21	45 53.76	118 19.88	6.62	1.5	5/06	315	0.51	DD	E3	H
19	19:44:16.62	47 12.24	121 47.06	0.03#	1.1	5/05	98	0.21	BD	C3	P
19	21:41:07.05	47 41.18	121 53.99	9.36	1.0	7/11	156	0.08	AC	P3	
20	03:49:46.27	46 22.29	121 07.04	0.02*	1.2	20/22	69	0.37	CC	C3	
20	20:16:46.13	45 29.78	118 39.38	11.35$	2.1	10/10	259	0.38	DD	E3	
20	21:58:12.01	48 03.49	121 54.75	0.04*	1.1	9/10	149	0.18	BC	P3	P
20	23:59:16.89	45 48.06	118 17.88	2.23	2.2	13/14	257	0.33	CD	E3	
21	15:43:59.83	45 52.35	122 49.67	8.70	1.7	22/24	172	0.19	BC	C3	P
22	23:12:48.42	47 58.70	121 33.43	8.34*	1.1	6/09	139	0.07	AC	C3	
23	11:10:21.11	46 12.73	123 20.96	23.87	1.6	23/26	150	0.14	AC	P3	
23	21:22:57.82	47 53.30	118 09.24	7.10	2.0	15/16	129	0.14	AC	N3	X
23	21:26:27.29	46 47.56	122 22.06	0.05*	1.2	28/30	47	0.14	AC	P3	P
24	12:51:14.13	46 46.78	119 17.45	0.02*	1.1	6/08	100	0.17	BC	E3	
25	10:22:39.27	46 52.81	119 26.31	1.08	1.2	10/14	89	0.12	AB	E3	
26	03:49:32.00	46 51.86	121 44.40	0.51	1.5	6/06	111	0.26	BC	C3	L
26	12:30:01.08	47 38.76	122 37.33	21.95	3.5	31/33	35	0.15	AA	P3	F
27	11:21:11.72	47 40.72	120 20.48	0.52	1.4	14/16	78	0.30	CA	N3	
28	15:24:49.16	48 04.28	122 34.85	46.92	1.1	12/12	77	0.14	AA	P3	
29	10:20:46.67	47 33.48	121 46.35	17.97	1.3	14/18	127	0.12	AB	P3	
29	22:03:09.30	45 13.17	120 53.99	1.85	2.0	14/15	82	0.28	BC	C3	X
30	20:39:45.28	47 16.19	122 12.23	18.10	1.0	6/09	197	0.12	AD	P3	
30	22:04:55.47	47 53.65	121 38.11	10.30	1.2	10/13	110	0.12	AB	P3	
30	22:34:45.52	47 40.71	122 18.37	21.34	1.3	14/19	67	0.09	AA	P3	

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
1	14:39:16.44	47 40.43	120 02.81	7.99	1.6	15/19	53	0.09	AA	N3	
1	22:14:07.07	46 12.61	118 56.27	1.42	1.3	9/10	162	0.25	BC	E3	X
2	16:13:54.54	46 13.84	118 56.25	3.02	1.2	10/11	121	0.25	BC	E3	X
2	20:01:51.75	46 13.99	118 55.11	4.60	1.0	10/12	86	0.32	CC	E3	X
2	22:43:00.47	46 14.66	118 56.55	1.77	1.0	12/12	117	0.24	BC	E3	X
3	02:25:14.83	46 13.95	118 56.18	3.96	1.2	10/11	121	0.20	BC	E3	X
3	02:45:38.07	47 35.37	123 16.94	46.50	1.8	20/24	119	0.17	BB	P3	
3	03:27:16.40	46 14.43	118 57.11	3.65	1.2	15/17	115	0.14	AC	E3	X
3	05:16:48.08	46 14.49	118 56.44	2.99	1.4	10/11	89	0.15	AC	E3	X
3	14:36:29.37	46 14.39	118 56.68	2.74	1.2	13/13	89	0.16	BC	E3	X
3	15:06:05.44	46 14.14	118 56.98	4.22	1.1	9/10	117	0.22	BC	E3	X
3	18:15:45.08	46 14.34	118 56.34	6.92	1.0	9/11	88	0.34	CC	E3	X
3	20:20:09.27	46 14.25	118 56.26	4.27	1.2	11/11	88	0.15	AC	E3	X
3	21:52:56.74	46 14.54	118 56.27	3.63	1.0	10/12	87	0.22	BC	E3	X
3	22:21:09.13	47 53.20	118 08.95	9.02	2.1	10/11	140	0.12	AC	N3	X
3	23:02:59.53	46 14.14	118 56.06	4.26	1.0	10/11	121	0.20	BC	E3	X
4	01:16:16.15	46 14.23	118 56.86	4.37	1.4	10/12	92	0.19	BC	E3	X
4	01:58:17.21	46 14.05	118 56.24	7.04	1.3	11/13	120	0.29	BC	E3	X
4	03:39:16.11	46 14.39	118 56.87	3.62	1.2	12/14	90	0.16	BC	E3	X
4	05:04:49.50	46 14.16	118 56.73	3.83	1.2	13/13	90	0.19	BC	E3	X
4	05:27:19.11	48 00.38	122 02.84	0.80	1.9	15/18	68	0.26	BC	P3	
4	23:44:31.07	44 33.56	121 34.47	0.04*	2.2	5/07	247	0.68	DD	C3	
5	01:40:49.00	46 14.65	118 56.91	1.36	1.3	14/14	71	0.13	AC	E3	X
5	05:31:47.33	46 14.25	118 56.57	3.95	1.3	14/15	118	0.32	CC	E3	X
5	06:48:15.62	46 14.24	118 57.06	3.03	1.1	14/15	116	0.15	AC	E3	X
5	16:33:06.95	47 10.59	122 10.76	9.15	1.0	7/10	149	0.10	AC	P3	
6	00:27:39.50	46 27.35	120 10.90	2.35$	1.8	6/07	116	0.34	CC	E3	H
6	13:39:42.36	48 06.04	120 51.04	0.53$	1.6	12/18	102	0.55	DC	C3	
6	14:42:15.38	45 58.88	118 29.23	1.64$	1.7	5/07	180	0.36	DD	E3	H
7	03:13:31.36	47 13.94	121 13.86	11.23	1.5	8/12	97	0.11	AB	C3	
7	16:52:30.08	46 14.91	118 56.84	1.74	1.1	14/15	107	0.14	AC	E3	X
7	21:12:25.32	45 26.00	121 35.63	0.02*	1.7	9/10	90	0.16	BB	C3	P
8	01:43:43.83	46 14.12	118 55.95	2.57	1.5	19/20	74	0.24	BC	E3	X

Dec 1981 cont'd

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
8	03:16:41.11	48 25.20	120 12.85	0.69$	1.9	10/13	183	0.26	CD	N3	
8	04:11:14.90	46 14.10	118 56.01	2.60	1.4	19/20	74	0.23	BC	E3	X
8	07:38:14.07	46 14.24	118 55.90	3.36	1.3	16/17	74	0.23	BC	E3	X
8	20:48:33.33	48 18.13	122 39.75	24.26	1.6	9/11	93	0.18	BB	P3	
8	21:52:29.83	47 53.52	118 09.25	6.02	2.1	10/11	128	0.20	BC	N3	X
8	23:03:52.26	46 14.29	118 56.37	1.72	1.3	17/18	109	0.25	BC	E3	X
9	02:00:12.47	46 14.24	118 55.90	3.42	1.4	17/18	74	0.22	BC	E3	X
9	02:49:38.17	46 52.98	121 43.19	0.83	1.3	5/05	113	0.85	DD	C3	L
10	09:16:11.82	46 14.42	118 55.32	3.69	1.6	13/14	84	0.26	BC	E3	X
11	01:58:11.04	46 14.77	118 55.97	1.82	1.5	13/13	120	0.14	AC	E3	X
14	23:38:36.29	45 25.79	121 35.76	0.04*	1.7	11/12	93	0.21	BB	C3	P
15	14:40:08.31	47 58.99	121 33.10	9.44$	1.1	5/07	178	0.08	BD	C3	
16	18:09:59.55	46 51.16	121 45.62	0.53	1.0	11/17	113	0.19	BC	C3	
17	05:14:19.65	46 06.00	118 48.86	7.55$	1.4	8/11	190	0.39	CD	E3	
17	10:05:05.88	47 37.65	122 12.00	23.67	1.1	9/10	105	0.05	AB	P3	
17	22:35:00.42	46 28.74	122 11.35	1.98	1.9	19/22	44	0.16	BA	S3	P
18	06:57:42.29	46 31.03	121 22.74	5.69	2.0	39/43	60	0.25	BC	C3	
18	23:18:15.29	45 35.44	121 17.12	0.05*	1.7	6/07	115	0.23	BC	C3	
18	23:43:20.90	46 26.66	121 56.52	1.13*	2.0	16/19	130	0.11	AB	S3	P
21	02:47:01.16	47 49.41	119 37.19	3.61	2.2	23/26	55	0.21	BC	N3	
21	13:23:15.60	45 10.09	121 48.89	1.30$	1.2	9/13	111	0.61	DC	C3	
21	13:37:12.89	47 45.07	122 29.73	23.32	1.2	24/26	53	0.14	AB	P3	
21	14:07:53.53	48 34.35	121 43.78	19.98$	1.2	5/06	148	0.56	DD	P3	
21	22:11:05.02	46 41.32	123 15.81	0.03*	1.7	4/04	181	0.04	AD	P3	P
22	22:36:22.78	46 18.59	122 59.33	30.85	1.8	8/10	181	0.30	BD	P3	P
23	09:35:30.99	47 26.26	122 50.72	3.35$	1.0	14/17	72	0.41	CC	P3	
23	19:45:08.59	47 26.37	122 51.72	3.61$	1.4	18/20	78	0.14	AC	P3	
23	21:18:19.11	46 11.58	122 42.17	0.02*	1.1	17/20	94	0.10	AB	P3	X
24	01:51:34.88	46 54.98	121 56.56	9.66	1.7	13/16	75	0.08	AC	C3	
24	16:06:03.19	48 18.84	122 30.34	16.44	1.3	5/06	151	0.05	AD	P3	H
26	00:14:45.14	48 18.54	122 04.16	12.25	1.3	11/15	127	0.10	AB	P3	
27	16:35:53.49	47 32.71	121 44.52	9.42	1.1	6/07	142	0.10	BC	P3	
28	06:04:03.68	48 18.75	122 04.78	11.79	1.5	9/10	125	0.13	BB	P3	
28	09:38:45.93	47 37.96	121 51.49	15.01	1.4	11/13	75	0.09	AB	P3	
28	13:00:26.81	48 18.64	122 02.61	13.90	1.1	7/10	135	0.06	AB	P3	
28	19:59:50.03	46 14.34	118 54.92	4.24	1.6	12/13	85	0.28	BC	E3	X
29	04:13:20.70	47 43.34	121 56.70	16.56	1.2	4/06	161	0.35	CD	P3	H
29	07:10:00.35	46 14.56	118 55.15	3.16	1.6	19/20	84	0.26	BC	E3	X
29	15:40:14.63	46 14.40	118 55.27	3.15	1.5	15/16	84	0.22	BC	E3	X
30	22:45:45.76	46 18.66	122 58.82	25.01	1.5	6/08	101	0.27	BC	P3	P
30	23:17:15.42	46 36.70	123 04.97	4.22	1.5	4/05	137	0.35	CD	P3	P
31	13:56:27.55	47 47.48	122 04.82	20.65	1.8	15/16	65	0.11	AA	P3	

APPENDIX II

EARTHQUAKE CATALOG 1981

Mount St. Helens region only lat. 46°-46.4°N, long. 122°-122.4°W

Jan 1981

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
1	04:13:04.32	46 11.51	122 11.59	0.04*	1.4	5/05	124	0.18	BD	S3	
1	15:07:35.66	46 14.66	122 09.28	0.91	1.4	5/05	214	0.10	CD	S3	
1	23:58:29.07	46 11.97	122 10.54	0.02*	1.3	7/07	144	0.67	DC	S3	
5	17:51:50.69	46 11.55	122 11.96	0.03*	1.4	6/06	172	0.06	AC	S3	
6	16:09:50.90	46 12.35	122 12.02	1.05	1.7	8/08	146	0.25	BC	S3	
20	13:22:32.68	46 11.66	122 11.86	2.82	1.1	4/04	178	0.	AD	S3	
24	19:45:24.69	46 11.98	122 11.58	1.40	1.4	13/13	58	0.18	BA	S3	
30	21:52:31.36	46 19.30	122 22.94	0.27	1.4	6/09	138	0.06	AC	S3	P
31	05:27:06.66	46 13.76	122 10.53	0.05*	1.3	4/04	272	0.32	CD	S3	

Feb 1981

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
2	11:36:51.24	46 12.54	122 10.80	1.34	1.7	7/07	98	0.06	AB	S3	
2	11:40:14.49	46 12.79	122 11.26	0.51	1.8	12/12	72	0.11	AA	S3	
3	00:52:09.21	46 20.74	122 22.54	1.99	1.0	11/14	130	0.16	BB	S3	P
3	09:04:33.49	46 12.79	122 12.14	1.66	2.9	4/04	244	0.	AD	S3	
3	20:20:08.46	46 12.24	122 10.74	2.74	3.1	10/10	67	0.06	AA	S3	
4	02:21:37.84	46 12.09	122 11.27	2.54	2.6	8/08	82	0.11	AA	S3	
4	02:26:44.77	46 13.78	122 11.13	0.02*	1.7	6/06	194	0.06	AD	S3	
4	14:21:56.26	46 11.92	122 10.75	2.60	2.7	5/05	193	0.01	AD	S3	L
4	16:07:20.04	46 12.30	122 11.06	2.19*	1.4	5/05	152	0.15	AD	S3	
4	17:47:00.95	46 12.95	122 11.57	1.78	1.3	4/04	249	0.	AD	S3	
4	18:06:39.38	46 18.32	122 07.51	20.72	2.1	5/05	309	0.13	CD	S3	
4	19:10:54.14	46 12.21	122 13.02	1.97*	2.1	16/16	57	0.20	BA	S3	L
4	20:42:29.86	46 13.52	122 12.14	0.82	2.9	7/07	189	0.19	BD	S3	
4	21:20:27.63	46 13.55	122 11.70	1.53	2.4	5/05	271	0.11	BD	S3	
4	22:08:25.82	46 11.51	122 11.35	0.03*	2.2	4/04	167	0.03	AD	S3	
5	00:22:57.44	46 12.37	122 08.26	0.03*	2.5	6/06	199	0.35	CD	S3	
5	00:55:54.31	46 13.04	122 10.91	0.41	2.9	10/11	89	0.22	BA	S3	
5	02:23:38.74	46 10.63	122 12.30	0.85	2.9	8/08	80	0.22	BA	S3	L
5	05:10:22.39	46 12.44	122 11.62	2.25	3.0	7/07	85	0.17	BB	S3	
5	06:59:45.29	46 12.57	122 12.53	0.02*	2.7	9/09	87	0.26	BA	S3	
5	07:45:45.67	46 12.57	122 09.74	0.31	2.9	8/08	106	0.14	AB	S3	
5	08:13:01.84	46 12.84	122 11.17	0.03*	2.7	8/08	88	0.20	BA	S3	
5	08:44:22.12	46 13.43	122 11.37	0.04*	2.3	7/07	94	0.42	CB	S3	
5	09:10:24.92	46 15.09	122 05.28	0.94$	2.6	4/04	288	0.12	DD	S3	
5	09:17:18.37	46 12.62	122 11.45	0.04*	2.7	13/13	71	0.18	BA	S3	
5	09:39:48.69	46 12.27	122 11.30	0.36	2.6	5/05	214	0.06	AD	S3	
5	09:56:41.81	46 12.11	122 11.51	0.02*	2.6	8/08	82	0.09	AA	S3	
5	12:05:06.07	46 11.65	122 04.46	7.40	2.3	5/05	225	0.08	BD	S3	
5	12:16:39.92	46 08.80	122 16.54	11.62	2.6	6/06	243	0.05	BD	S3	
7	06:58:38.30	46 10.82	122 13.39	0.03*	2.4	6/06	104	0.37	CC	S3	
7	12:26:18.63	46 14.44	122 06.36	10.53	1.2	12/19	69	0.06	AA	S3	
11	07:58:00.73	46 19.73	122 12.57	3.26	2.5	24/29	39	0.14	AC	S3	
11	08:52:44.32	46 20.01	122 12.58	3.51*	1.9	16/21	75	0.12	AC	S3	
14	06:09:27.21	46 20.96	122 14.16	7.28	5.2	26/26	41	0.16	BB	S3	F
14	06:13:11.27	46 19.97	122 13.87	9.27	3.8	28/29	45	0.21	BA	S3	
14	06:14:29.89	46 19.87	122 13.80	7.69$	2.2	18/18	58	0.14	AB	S3	
14	06:19:20.39	46 21.33	122 14.50	9.82	2.5	21/25	54	0.12	AA	S3	
14	06:20:47.16	46 21.40	122 14.31	7.74	2.4	24/32	45	0.14	AB	S3	
14	06:24:39.84	46 20.77	122 14.13	7.44	1.8	20/36	77	0.14	AB	S3	
14	06:25:36.98	46 19.73	122 13.91	8.86	2.1	21/23	58	0.13	AA	S3	
14	06:27:18.82	46 20.57	122 13.69	7.55	1.1	14/16	76	0.17	BB	S3	
14	06:27:19.95	46 22.10	122 14.34	8.19	1.2	8/08	122	0.11	AB	S3	
14	06:28:43.65	46 21.59	122 14.47	8.65	2.0	20/28	47	0.17	BB	S3	
14	06:34:44.15	46 21.61	122 14.42	8.50	1.2	16/19	78	0.11	AB	S3	
14	06:45:18.04	46 20.92	122 14.21	8.68	2.0	23/25	41	0.15	AB	S3	
14	06:50:58.82	46 21.13	122 14.48	10.26	3.5	14/14	96	0.16	BB	S3	F
14	06:53:18.09	46 19.94	122 13.79	12.49	3.4	14/14	97	0.22	BB	S3	F

Feb 1981 cont'd

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
14	07:03:42.78	46 20.65	122 14.31	9.68	1.7	24/28	39	0.11	AA	S3	
14	07:07:26.55	46 20.12	122 13.81	11.52	2.9	27/35	43	0.17	BA	S3	
14	07:26:48.90	46 21.20	122 14.19	10.73	1.4	7/11	114	0.06	AB	S3	
14	07:31:04.93	46 20.12	122 14.31	12.15	1.0	15/20	86	0.10	AA	S3	
14	07:36:06.77	46 20.88	122 14.62	10.34	1.2	16/22	62	0.13	AA	S3	
14	07:52:18.41	46 21.56	122 14.40	9.53	1.5	21/22	47	0.12	AB	S3	
14	07:52:24.19	46 21.73	122 14.38	4.55	2.4	12/15	114	0.16	BC	S3	
14	08:06:44.49	46 21.50	122 14.48	9.71	1.8	23/31	47	0.14	AA	S3	
14	08:10:28.84	46 21.56	122 14.34	8.18	1.8	23/29	46	0.12	AB	S3	
14	08:15:21.65	46 21.24	122 15.09	11.18	1.9	24/28	48	0.14	AA	S3	
14	08:15:23.09	46 20.80	122 14.18	8.69	1.9	13/14	77	0.15	AB	S3	
14	08:43:45.85	46 21.20	122 14.69	11.50	3.8	29/29	45	0.21	BA	S3	F
14	08:47:01.07	46 21.52	122 14.75	10.83	1.8	20/23	48	0.17	BA	S3	
14	08:54:09.32	46 21.53	122 14.63	11.19	1.7	21/30	48	0.14	AA	S3	
14	08:55:31.58	46 20.42	122 14.00	11.36	1.6	23/32	40	0.13	AA	S3	
14	09:01:45.12	46 21.24	122 14.32	7.65*	1.9	26/32	44	0.16	BB	S3	
14	09:05:19.09	46 20.56	122 13.97	9.08*	1.5	17/25	76	0.13	AB	S3	
14	09:05:51.46	46 21.64	122 14.34	9.51	2.8	27/30	47	0.15	AB	S3	F
14	09:07:06.59	46 21.30	122 14.72	11.59	1.6	20/25	46	0.10	AA	S3	
14	09:16:53.06	46 21.49	122 14.43	8.86	1.5	19/25	46	0.12	AB	S3	
14	09:17:41.92	46 20.06	122 13.84	11.14	2.0	23/31	44	0.12	AA	S3	
14	09:46:42.70	46 20.65	122 13.82	8.39	1.7	23/31	39	0.18	BB	S3	
14	09:53:10.49	46 20.08	122 13.78	8.31	3.0	28/29	44	0.17	BB	S3	
14	10:51:36.46	46 21.54	122 14.54	10.64	1.7	18/25	78	0.15	AA	S3	
14	11:17:14.52	46 20.60	122 14.18	8.77	1.9	20/30	38	0.12	AB	S3	
14	11:43:37.02	46 20.28	122 14.27	9.59*	2.1	21/26	41	0.14	AA	S3	
14	12:14:32.49	46 20.16	122 14.20	10.32	1.1	18/25	55	0.13	AA	S3	
14	14:23:43.20	46 21.60	122 14.33	8.38	2.1	21/28	47	0.13	AB	S3	
14	14:50:23.26	46 20.06	122 13.95	11.23	1.2	18/26	74	0.12	AA	S3	
14	14:51:35.73	46 21.72	122 14.57	8.89	2.0	23/27	49	0.13	AB	S3	
14	15:00:11.24	46 20.67	122 14.50	10.78	3.0	26/31	40	0.18	BA	S3	F
14	15:10:32.64	46 20.27	122 14.19	9.16	1.0	12/17	95	0.10	AB	S3	
14	17:04:42.05	46 21.10	122 14.24	8.04	2.3	21/28	43	0.13	AB	S3	
14	17:25:12.72	46 20.06	122 13.63	8.85	2.2	23/28	44	0.16	BB	S3	
14	17:42:58.77	46 21.80	122 14.32	8.09	1.2	14/22	66	0.10	AB	S3	
14	20:52:33.57	46 21.04	122 14.69	11.03	1.1	16/23	59	0.11	AA	S3	
14	21:27:43.77	46 20.46	122 13.89	8.09	3.8	27/27	40	0.17	BB	S3	F
14	21:29:33.44	46 21.02	122 13.92	8.25	1.2	8/12	113	0.07	AB	S3	
14	22:17:49.15	46 19.76	122 13.53	9.65	1.9	21/25	47	0.12	AA	S3	
14	22:35:45.20	46 20.36	122 14.22	9.59	1.1	17/25	59	0.15	BA	S3	
14	22:41:08.48	46 20.68	122 14.16	7.95	1.4	18/25	40	0.12	AB	S3	
15	01:58:03.53	46 21.68	122 14.66	8.91	1.8	19/24	49	0.09	AB	S3	
15	03:42:43.22	46 19.88	122 14.14	10.23	1.5	17/23	74	0.13	AA	S3	
15	03:48:56.71	46 20.08	122 13.53	6.99	1.2	15/20	75	0.13	AB	S3	
15	04:03:00.52	46 21.28	122 14.68	11.35	1.5	16/23	77	0.11	AA	S3	
15	04:42:59.39	46 21.73	122 14.80	10.49	1.2	11/17	95	0.09	AB	S3	
15	05:18:26.69	46 21.74	122 14.75	8.17	1.7	19/25	50	0.10	AB	S3	
15	05:59:12.73	46 21.78	122 14.69	9.27	1.8	20/26	50	0.13	AB	S3	
15	06:57:08.86	46 20.69	122 14.22	10.27	1.0	13/20	97	0.12	AB	S3	
15	07:17:56.72	46 21.23	122 14.60	11.33	1.0	16/24	77	0.10	AA	S3	
15	10:37:57.56	46 20.28	122 14.34	10.88	1.9	21/28	41	0.12	AA	S3	
15	10:41:23.48	46 22.02	122 14.86	9.78	1.6	19/27	52	0.13	AB	S3	
15	10:43:12.91	46 22.18	122 14.69	9.65	1.7	22/28	52	0.13	AB	S3	
15	11:26:01.78	46 20.43	122 14.07	7.15	1.5	20/26	40	0.12	AB	S3	
15	11:38:52.95	46 21.47	122 14.48	10.69	2.6	25/28	47	0.13	AA	S3	
15	13:50:05.17	46 20.54	122 14.49	10.73	1.3	19/25	58	0.13	AA	S3	
15	15:57:45.94	46 21.32	122 14.46	9.72	1.8	18/24	54	0.11	AA	S3	
15	17:29:34.42	46 21.42	122 14.50	8.33	1.5	18/23	60	0.11	AB	S3	
15	19:03:42.24	46 21.76	122 14.44	8.48	2.4	23/24	48	0.13	AB	S3	
15	22:45:47.71	46 19.75	122 13.81	10.66	2.9	23/23	47	0.12	AA	S3	
16	02:56:13.06	46 21.18	122 14.50	10.98	1.7	21/25	44	0.16	BA	S3	
16	03:05:18.44	46 21.77	122 14.89	11.06	1.6	14/22	63	0.13	AA	S3	
16	10:26:12.15	46 19.71	122 13.64	11.09	2.3	24/24	47	0.20	BA	S3	
16	10:26:14.84	46 19.75	122 13.42	6.80$	3.1	20/20	75	0.23	CC	S3	
16	14:19:44.40	46 20.59	122 14.12	8.69	1.2	9/15	110	0.09	AB	S3	

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
16	20:17:47.32	46 20.13	122 13.78	8.87*	1.4	14/20	55	0.13	AB	S3	
16	20:19:48.05	46 21.97	122 14.65	9.31	2.2	19/28	51	0.13	AB	S3	
17	01:23:28.09	46 21.11	122 14.01	8.37	2.4	19/21	58	0.18	BB	S3	
17	03:02:23.82	46 20.88	122 14.28	8.49	1.3	11/18	98	0.12	AB	S3	
17	22:44:12.27	46 20.59	122 14.66	11.09	1.0	14/22	75	0.14	AA	S3	
18	01:03:26.31	46 22.18	122 14.58	8.04	2.2	22/27	52	0.14	AB	S3	
18	16:20:29.19	46 20.97	122 13.47	6.11*	1.6	15/19	58	0.12	AB	S3	
18	17:08:56.85	46 21.40	122 14.50	9.68	1.8	17/28	54	0.13	AA	S3	
18	18:26:23.47	46 20.07	122 14.01	10.67	1.9	17/29	61	0.09	AA	S3	
18	20:49:10.89	46 20.27	122 14.10	8.66	2.2	19/31	61	0.13	AB	S3	
18	22:03:15.43	46 20.99	122 13.82	7.67	1.2	18/25	40	0.12	AB	S3	
19	04:48:02.91	46 20.91	122 14.53	9.81	1.9	17/21	57	0.15	BA	S3	
19	17:01:25.78	46 20.92	122 14.22	8.40	2.2	17/21	74	0.12	AB	S3	
19	19:57:11.42	46 21.11	122 14.11	7.73*	1.2	16/24	77	0.12	AB	S3	
20	00:11:56.66	46 21.40	122 14.48	9.16	2.1	21/24	40	0.14	AB	S3	
20	12:17:09.85	46 20.29	122 13.96	8.39	2.4	22/25	61	0.12	AB	S3	
20	18:19:38.50	46 21.54	122 14.29	8.08	2.1	23/31	40	0.15	AB	S3	
20	22:11:15.90	46 20.78	122 14.29	10.98	1.5	21/26	54	0.14	AA	S3	
21	02:44:14.63	46 21.32	122 14.42	10.04	1.4	19/23	40	0.13	AA	S3	
21	03:41:27.10	46 20.40	122 13.96	9.11*	2.3	21/26	37	0.13	AB	S3	
21	16:20:05.69	46 21.39	122 14.21	9.66	1.1	17/20	47	0.11	AB	S3	
21	18:01:26.68	46 20.63	122 14.40	9.04	2.5	27/31	39	0.17	BA	S3	
21	21:29:38.35	46 22.01	122 14.65	9.64	2.1	22/28	41	0.13	AB	S3	
22	00:55:25.96	46 21.80	122 13.87	7.17	1.2	16/21	58	0.13	AB	S3	
22	01:58:20.32	46 23.10	122 15.25	10.79	1.9	19/23	42	0.15	AB	S3	
22	09:35:55.63	46 20.53	122 14.46	10.87	1.9	20/26	40	0.16	BA	S3	
22	12:09:33.60	46 20.29	122 13.95	9.11	1.0	13/17	75	0.16	BA	S3	
22	13:50:30.44	46 20.42	122 14.73	10.76	1.8	19/25	39	0.14	AA	S3	
23	00:57:56.81	46 20.21	122 14.09	10.60	2.1	22/28	37	0.13	AA	S3	
23	05:50:38.01	46 06.85	122 08.31	10.04	1.1	10/14	121	0.12	AB	S3	
24	02:48:32.66	46 21.48	122 15.06	10.70	1.7	20/27	52	0.15	AA	S3	
24	06:48:58.15	46 20.62	122 13.35	3.41$	1.0	17/23	76	0.21	BC	S3	
24	22:46:46.23	46 20.07	122 13.55	5.11	1.3	14/18	75	0.15	AB	S3	
26	00:33:33.91	46 21.54	122 13.02	3.62*	1.1	13/17	65	0.15	AC	S3	P
26	08:15:53.81	46 21.68	122 14.51	9.29	1.0	15/19	53	0.15	AB	S3	
26	09:08:22.19	46 21.67	122 14.45	8.52	1.1	17/22	60	0.12	AB	S3	
26	11:01:31.40	46 21.36	122 14.53	8.07	2.0	21/26	40	0.13	AB	S3	
26	14:58:07.27	46 23.87	122 14.53	5.55	2.0	20/23	54	0.14	AC	S3	
27	14:00:42.40	46 20.76	122 14.15	6.95	2.1	18/23	57	0.13	AB	S3	
27	18:09:43.41	46 21.29	122 14.37	8.92	1.7	17/24	54	0.13	AB	S3	
28	00:56:58.09	46 19.82	122 14.06	8.77	1.2	17/22	63	0.12	AA	S3	
28	14:46:45.45	46 20.93	122 13.89	8.03	1.3	10/16	112	0.12	AB	S3	
28	15:21:15.16	46 20.84	122 14.14	7.25	2.5	26/30	39	0.15	AB	S3	
28	19:51:40.17	46 21.08	122 14.41	7.46	1.8	14/18	77	0.13	AB	S3	
28	21:45:48.02	46 21.85	122 23.39	1.01	1.4	14/17	52	0.15	BB	S3	P

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
1	06:29:05.63	46 21.90	122 15.26	11.19	1.5	17/22	50	0.13	AA	S3	
2	04:22:05.73	46 20.67	122 14.19	8.32	1.8	17/22	58	0.13	AB	S3	
2	10:04:00.34	46 20.86	122 14.31	7.14	2.1	29/34	40	0.19	BB	S3	
2	23:41:01.98	46 21.67	122 22.40	1.63	1.6	11/17	91	0.13	AB	S3	P
3	03:18:14.55	46 21.35	122 14.78	12.24	1.8	21/28	53	0.14	AA	S3	
4	00:45:07.56	46 20.25	122 14.25	8.04	1.6	17/23	60	0.14	AB	S3	
4	07:53:15.61	46 21.97	122 14.69	9.42	1.7	20/26	50	0.12	AB	S3	
5	02:07:02.19	46 12.19	122 10.12	7.12	1.4	10/13	68	0.06	AA	S3	
5	12:49:23.12	46 20.64	122 14.89	8.82	1.5	16/24	57	0.09	AB	S3	
6	03:32:45.48	46 21.67	122 14.55	8.96	1.2	16/19	53	0.11	AB	S3	
7	01:05:55.59	46 21.81	122 14.79	9.38	1.9	24/31	41	0.14	AB	S3	
7	19:37:26.75	46 21.79	122 23.02	2.53	1.3	15/18	51	0.20	BB	S3	P
7	20:16:22.74	46 21.50	122 15.41	11.48	1.0	18/24	52	0.12	AA	S3	
10	01:09:56.59	46 21.70	122 14.87	9.76	2.1	28/35	41	0.18	BA	S3	
12	19:48:22.53	46 22.76	122 14.94	6.60	2.2	9/09	141	0.15	BC	S3	H
12	20:29:35.42	46 21.17	122 14.77	11.51	2.0	25/31	40	0.16	BA	S3	

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
13	01:01:31.44	46 21.77	122 23.35	1.66	1.9	12/13	82	0.24	BB	S3	P
13	08:24:02.62	46 19.97	122 14.04	11.28	1.4	18/25	48	0.14	AA	S3	
13	21:04:34.00	46 21.80	122 14.50	9.64	1.3	17/24	53	0.17	BB	S3	H
16	23:09:53.50	46 18.87	122 20.36	1.11	1.9	9/10	125	0.19	BB	S3	P
17	07:52:37.12	46 19.35	122 14.48	14.33	2.0	19/22	78	0.17	BA	S3	
17	08:51:35.18	46 21.39	122 15.13	12.10	1.2	16/20	80	0.13	AA	S3	
18	11:41:16.68	46 13.28	122 09.57	5.74	1.4	14/20	95	0.19	BB	S3	
20	20:48:56.68	46 21.59	122 15.42	12.49	2.1	23/28	75	0.19	BA	S3	
21	04:34:46.36	46 09.48	122 06.37	8.19	1.8	15/18	56	0.19	BA	S3	
22	00:23:45.97	46 20.10	122 14.08	11.26	1.3	13/16	75	0.15	BB	S3	
22	01:30:56.55	46 21.22	122 16.00	13.84	1.0	9/13	150	0.15	AC	S3	
22	18:05:51.46	46 18.89	122 14.37	18.68	1.4	16/20	72	0.16	BA	S3	
24	13:42:35.78	46 19.56	122 14.54	11.49	1.0	13/17	76	0.11	AA	S3	
24	21:01:41.67	46 22.04	122 14.73	9.70	1.3	17/24	63	0.11	AB	S3	
27	11:30:04.61	46 10.69	122 12.82	2.39*	1.7	6/06	152	0.24	BC	S3	L
28	09:25:32.17	46 21.78	122 14.70	9.91	1.3	20/24	41	0.10	AA	S3	
28	16:58:26.16	46 20.06	122 14.20	8.86	1.8	26/33	35	0.15	BA	S3	
29	03:16:27.85	46 20.15	122 14.82	12.92	1.8	26/34	36	0.16	BA	S3	
29	10:17:48.13	46 11.90	122 11.33	0.05*	1.2	6/06	125	0.15	AC	S3	L
29	13:52:21.76	46 14.90	122 11.09	0.73*	2.7	6/06	260	0.31	CD	S3	
30	09:43:38.61	46 21.47	122 14.64	9.27	1.4	17/27	98	0.11	AB	S3	
31	05:02:27.38	46 12.69	122 10.34	1.52	1.0	9/09	178	0.08	AC	S3	L

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
1	01:26:10.53	46 13.52	122 10.58	0.04*	1.5	7/07	195	0.12	AD	S3	L
1	01:30:29.00	46 11.30	122 11.81	1.24	1.1	9/09	86	0.14	AA	S3	L
3	22:06:43.75	46 21.61	122 24.00	1.05	1.6	11/15	91	0.13	AB	S3	P
4	10:37:48.45	46 20.51	122 14.40	9.38	1.1	11/14	80	0.08	AA	S3	
6	03:24:06.73	46 13.39	122 11.05	2.45	1.6	7/07	183	0.19	BD	S3	L
6	12:40:56.10	46 12.03	122 11.64	0.02*	2.2	12/12	76	0.19	BA	S3	
7	11:26:14.12	46 19.46	122 14.48	11.92	1.4	14/18	95	0.08	AB	S3	
7	21:28:40.18	46 11.75	122 11.32	1.77	1.9	20/20	44	0.19	BA	S3	L
8	19:33:55.61	46 20.86	122 14.44	7.03	1.0	16/23	76	0.15	AB	S3	
9	07:02:23.10	46 12.31	122 10.78	1.17	2.4	13/13	86	0.19	BA	S3	
9	19:48:41.36	46 12.64	122 11.49	0.03*	1.6	7/07	146	0.18	BC	S3	L
9	20:47:11.58	46 12.08	122 11.08	0.03*	1.0	4/04	203	0.02	AD	S3	L
9	22:29:58.78	46 21.39	122 14.94	11.12	1.9	12/17	80	0.10	AB	S3	
9	22:57:03.44	46 21.57	122 14.82	12.32	2.1	18/22	76	0.12	AB	S3	
10	02:46:24.10	46 11.86	122 11.17	0.62	1.6	10/10	65	0.16	BA	S3	L
10	04:22:28.39	46 12.29	122 10.58	1.08	1.0	7/07	161	0.18	BC	S3	L
10	04:54:29.55	46 12.14	122 11.60	0.02*	1.4	7/07	73	0.12	AB	S3	L
10	05:52:26.31	46 21.88	122 15.10	10.58	1.0	15/20	80	0.10	AA	S3	
10	08:10:21.54	46 12.73	122 11.02	0.04*	2.0	8/08	96	0.30	CB	S3	L
10	10:37:38.09	46 10.93	122 10.26	0.04*	1.7	8/08	87	0.34	CA	S3	L
10	12:02:07.89	46 12.29	122 11.48	0.04*	1.7	11/11	78	0.26	BA	S3	L
10	12:19:42.09	46 12.41	122 10.91	0.91	1.1	9/09	87	0.17	BA	S3	
10	12:37:58.45	46 12.14	122 11.27	0.36	1.1	7/07	74	0.13	AB	S3	L
10	12:57:31.83	46 12.08	122 11.23	0.03*	1.9	11/11	71	0.25	BA	S3	L
10	13:15:01.55	46 12.13	122 11.03	0.03*	1.9	12/12	72	0.28	BA	S3	L
10	13:33:44.84	46 11.69	122 11.47	1.60	1.8	11/11	68	0.26	BA	S3	L
10	14:18:18.34	46 11.55	122 11.22	1.24	1.7	8/08	123	0.08	AB	S3	L
10	16:01:37.35	46 11.33	122 12.21	0.04*	1.8	7/07	116	0.68	DB	S3	L
10	16:20:21.10	46 12.34	122 11.41	0.04*	2.0	8/08	80	0.16	BA	S3	L
10	17:14:47.26	46 11.90	122 11.48	0.18	2.0	7/07	74	0.25	BB	S3	L
10	18:20:56.53	46 13.02	122 10.79	0.95$	1.6	5/05	255	0.27	DD	S3	L
10	19:17:03.14	46 12.77	122 11.50	0.04*	2.3	6/06	182	0.10	AD	S3	L
10	19:52:46.82	46 12.41	122 10.92	0.03*	1.4	7/07	87	0.18	BB	S3	L
10	20:15:10.07	46 12.05	122 10.77	1.86	2.0	8/08	74	0.17	BA	S3	L
10	21:37:45.85	46 12.32	122 12.76	2.74	1.5	5/05	169	0.24	CD	S3	L
10	23:59:47.55	46 11.92	122 11.16	0.02*	1.8	14/14	54	0.43	CA	S3	L
11	00:49:11.11	46 11.53	122 12.25	2.43	1.7	10/10	66	0.18	BA	S3	L
11	00:57:04.10	46 11.76	122 11.37	1.86	1.4	5/05	131	0.04	AD	S3	L
11	01:39:57.71	46 12.10	122 11.95	1.14	1.7	11/11	80	0.22	BA	S3	L

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
11	02:10:14.59	46 11.32	122 11.51	1.22	1.9	7/07	109	0.14	AB	S3	L
11	02:24:18.60	46 11.96	122 10.33	0.61	2.5	9/09	73	0.45	CA	S3	L
11	02:45:15.36	46 13.43	122 10.68	0.04*	1.5	6/06	194	0.13	AD	S3	L
11	03:01:53.65	46 10.39	122 12.06	0.04*	1.6	6/06	125	0.33	CC	S3	L
11	03:29:55.56	46 12.27	122 11.37	1.54	1.9	15/15	52	0.31	CA	S3	L
11	07:11:04.98	46 10.75	122 12.13	0.04*	1.4	7/07	96	0.31	CB	S3	L
11	07:46:56.72	46 11.35	122 11.20	0.03*	1.6	8/08	68	0.19	BA	S3	L
11	08:03:53.21	46 12.61	122 11.04	0.03*	2.0	6/06	167	0.20	BC	S3	L
11	11:30:25.12	46 11.84	122 11.61	0.04*	1.6	7/07	76	0.56	DB	S3	L
11	18:53:03.86	46 21.38	122 14.93	10.97	2.3	29/32	41	0.20	BA	S3	
13	16:42:32.96	46 11.83	122 11.54	1.45	1.9	12/12	76	0.20	BA	S3	L
14	08:26:40.80	46 11.03	122 18.34	12.76	1.0	11/14	106	0.07	AB	S3	
14	12:14:00.95	46 20.71	122 14.60	9.31	2.4	26/29	40	0.18	BA	S3	
14	17:55:20.66	46 16.89	122 12.75	3.91$	1.7	27/34	43	0.19	BB	S3	
14	18:21:05.16	46 14.99	122 12.37	0.46	1.7	6/06	300	0.14	CD	S3	
15	02:23:47.55	46 16.74	122 12.60	5.01	1.8	26/32	44	0.19	BB	S3	
15	23:56:26.11	46 23.03	122 19.30	1.96	1.0	12/14	79	0.17	BB	S3	P
17	22:01:02.70	46 11.76	122 19.53	12.40	1.1	10/13	80	0.08	AA	S3	
18	05:52:12.17	46 21.02	122 14.84	12.15	2.1	24/29	40	0.16	BA	S3	
18	08:46:04.15	46 21.85	122 15.16	10.84	2.0	22/29	41	0.10	AA	S3	
21	03:53:50.72	46 10.35	122 19.02	12.79	1.5	19/21	54	0.18	BA	S3	
25	02:26:25.05	46 05.91	122 17.51	2.14*	1.2	19/21	70	0.16	BB	S3	
30	06:43:08.71	46 21.92	122 15.35	11.79	2.6	28/33	41	0.19	BA	S3	
30	21:15:20.10	46 20.78	122 14.53	9.30	2.0	20/26	56	0.14	AA	S3	

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DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
1	10:06:22.93	46 21.93	122 15.33	11.88	3.1	27/27	41	0.20	BA	S3	F
1	11:17:31.62	46 12.21	122 11.48	0.78	1.6	6/06	146	0.10	BC	S3	
1	18:00:56.81	46 21.06	122 14.74	9.81	2.0	17/25	80	0.13	AA	S3	
1	23:04:19.19	46 17.53	122 21.12	2.19*	1.9	15/17	81	0.18	BA	S3	P
2	05:44:53.78	46 22.06	122 15.10	10.59	1.0	16/23	53	0.13	AA	S3	
3	00:02:42.44	46 20.23	122 14.28	9.04	1.8	20/27	61	0.12	AA	S3	
4	17:47:41.24	46 15.32	122 02.85	11.59	2.1	25/31	69	0.12	AA	S3	
4	18:44:03.00	46 15.62	122 02.83	12.84	1.1	12/18	69	0.07	AA	S3	
5	04:50:22.02	46 07.07	122 07.33	6.00	1.7	11/20	121	0.09	AB	S3	
11	02:33:20.58	46 20.11	122 14.45	11.92	1.3	17/26	60	0.12	AA	S3	
11	05:48:04.91	46 22.54	122 14.16	7.34	1.4	20/31	40	0.13	AB	S3	
11	08:35:45.09	46 20.27	122 15.21	12.58	1.9	25/32	39	0.14	AA	S3	
12	10:16:38.09	46 15.76	122 03.12	11.61	1.5	11/19	136	0.07	AC	S3	
12	16:01:26.22	46 20.26	122 14.54	11.02	2.7	26/28	36	0.17	BA	S3	
13	05:00:36.18	46 21.77	122 14.89	10.85	4.5	32/32	41	0.28	BA	S3	F
13	05:04:30.26	46 21.83	122 15.00	10.60	3.0	31/32	41	0.26	BA	S3	
13	05:55:19.93	46 21.69	122 14.83	11.26	1.0	19/26	65	0.12	AA	S3	
14	22:52:23.17	46 22.25	122 18.07	1.43	1.6	17/19	78	0.16	BB	S3	P
15	12:38:43.38	46 20.24	122 14.27	12.25	1.5	21/26	35	0.12	AA	S3	
16	00:46:13.39	46 21.36	122 14.18	8.49	1.6	25/33	40	0.12	AB	S3	
26	13:44:59.64	46 21.41	122 14.67	9.16*	1.5	22/28	64	0.14	AB	S3	
27	05:08:05.49	46 12.86	122 10.90	0.05*	1.5	9/11	104	0.11	AB	S3	
27	10:02:44.08	46 22.08	122 15.13	10.75	3.2	33/34	46	0.31	CA	S3	F
27	11:27:28.17	46 22.15	122 14.86	10.84	1.6	23/27	63	0.13	AA	S3	
30	17:04:57.90	46 18.97	122 22.60	2.04	1.3	14/20	67	0.15	AA	S3	P
31	04:18:22.43	46 21.35	122 14.79	11.94	1.0	18/24	54	0.11	AA	S3	

June 1981

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
1	23:15:00.61	46 21.92	122 11.84	0.07	1.2	13/13	73	0.19	BC	S3	P
2	04:11:38.78	46 03.56	122 22.18	16.53	1.3	19/23	112	0.16	BB	S3	
3	17:00:12.78	46 22.32	122 13.56	3.86$	1.2	11/13	87	0.11	BC	S3	P
4	07:32:58.52	46 12.48	122 11.77	0.82	1.7	8/08	85	0.16	BA	S3	
4	19:10:38.32	46 12.69	122 11.18	0.04*	2.1	12/12	70	0.13	AA	S3	
5	04:26:45.40	46 21.80	122 15.21	11.34	1.6	27/32	41	0.14	AA	S3	
5	05:06:50.83	46 12.92	122 11.42	0.65*	1.1	7/09	89	0.35	CB	S3	

June 1981 cont'd

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
5	11:57:44.12	46 12.44	122 11.42	0.02*	2.1	4/06	224	0.09	AD	S3	
5	23:47:46.36	46 21.11	122 13.52	2.77	1.2	9/09	131	0.11	AC	S3	P
6	03:40:00.38	46 20.57	122 14.42	9.51	2.3	25/28	39	0.12	AA	S3	
9	21:46:50.23	46 12.99	122 21.59	0.70	1.8	7/08	175	0.16	BC	S3	P
10	11:22:22.58	46 12.67	122 11.05	1.13	1.6	12/12	72	0.17	BA	S3	
10	20:39:29.43	46 13.69	122 18.70	1.22	1.0	16/19	71	0.14	AB	S3	P
12	03:15:43.75	46 12.49	122 11.42	0.02*	1.2	5/06	227	0.06	AD	S3	
12	04:36:56.77	46 12.29	122 11.65	0.02*	1.7	7/08	220	0.17	BD	S3	H
13	22:33:30.63	46 12.80	122 11.01	0.15	1.1	8/10	86	0.07	AA	S3	
14	01:40:56.54	46 12.42	122 11.11	0.03*	1.6	6/06	114	0.24	BC	S3	
14	17:23:36.47	46 12.88	122 10.70	3.63$	1.8	6/06	139	0.10	AC	S3	
14	20:15:57.50	46 10.73	122 23.48	1.39	1.4	17/17	77	0.22	BA	S3	P
15	07:33:26.68	46 12.62	122 10.30	0.05*	1.8	8/08	86	0.26	BA	S3	
15	09:58:48.72	46 22.41	122 14.99	10.34	1.3	13/17	95	0.09	AB	S3	
15	12:53:20.69	46 12.40	122 10.90	0.61	2.3	11/11	69	0.25	BA	S3	
15	21:00:04.73	46 22.42	122 14.73	9.59	1.6	22/26	41	0.13	AB	S3	
15	23:16:59.81	46 13.26	122 11.58	0.03*	1.4	6/06	234	0.04	AD	S3	
16	01:40:48.08	46 20.22	122 14.06	8.89	2.5	31/36	36	0.16	BB	S3	
16	07:51:30.84	46 12.75	122 11.21	0.39*	1.1	6/06	87	0.05	AC	S3	
16	10:01:46.22	46 12.33	122 11.08	0.03*	2.5	19/19	85	0.21	BA	S3	
16	10:02:34.41	46 12.54	122 11.27	0.02*	1.7	12/12	80	0.18	BA	S3	
16	13:57:11.35	46 12.14	122 10.88	2.56	2.1	16/16	85	0.25	BA	S3	
17	17:56:36.40	46 12.06	122 11.28	0.02*	1.7	4/04	200	0.03	AD	S3	
17	21:22:23.14	46 12.51	122 11.18	0.58*	1.5	11/11	76	0.08	AA	S3	F
18	05:54:13.97	46 12.32	122 11.26	0.69	1.9	20/20	58	0.23	BA	S3	
18	10:59:36.15	46 12.50	122 11.03	0.03*	1.2	8/10	77	0.10	AA	S3	
18	15:30:09.86	46 12.42	122 11.10	0.02*	1.1	5/06	224	0.06	AD	S3	
18	21:01:57.63	46 12.54	122 10.75	0.28*	1.3	8/09	97	0.10	AB	S3	
18	22:25:44.41	46 12.57	122 10.97	0.38*	1.1	10/10	97	0.12	AB	S3	
19	04:05:18.70	46 12.68	122 11.93	0.90$	2.2	8/08	107	0.14	BB	S3	
19	05:56:44.11	46 12.63	122 12.80	0.36	1.7	5/05	208	0.16	BD	S3	
19	06:39:42.15	46 13.07	122 11.88	1.11	2.2	6/06	169	0.26	BC	S3	
19	08:36:33.26	46 12.05	122 11.53	12.87	2.5	8/08	124	0.13	BB	S3	
19	08:39:21.49	46 11.74	122 11.24	0.04*	1.8	6/06	116	0.12	AC	S3	
19	09:35:44.13	46 11.39	122 10.72	0.02*	2.1	10/10	81	0.49	CA	S3	
19	10:04:33.71	46 09.27	122 13.37	0.14	1.5	7/07	183	0.37	CD	S3	
19	10:33:58.16	46 12.78	122 10.69	0.69	2.4	10/10	91	0.12	AB	S3	
19	12:42:39.43	46 11.82	122 12.59	0.02*	1.9	10/10	75	0.77	DA	S3	
19	14:40:53.50	46 12.39	122 11.58	0.03*	1.9	7/07	153	0.18	BC	S3	
19	22:58:42.99	46 12.28	122 12.11	0.05*	1.4	8/08	145	0.58	DC	S3	
20	03:35:08.00	46 13.98	122 06.19	10.74	1.1	19/28	57	0.13	AA	S3	
20	07:01:07.29	46 22.16	122 15.12	10.86	1.5	20/26	53	0.10	AA	S3	
22	23:02:58.57	46 12.35	122 22.71	0.64	1.0	13/15	79	0.22	BA	S3	P
25	22:42:46.39	46 22.11	122 14.32	8.27	1.5	18/26	50	0.10	AB	S3	
27	04:18:59.51	46 21.55	122 14.79	10.42	2.6	30/36	40	0.16	BA	S3	
29	23:31:14.57	46 16.70	122 12.46	9.03	1.1	22/31	45	0.15	AA	S3	
30	17:24:13.99	46 12.64	122 21.72	0.83	1.1	10/11	86	0.10	AA	S3	P

July 1981

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
1	23:09:40.76	46 19.46	122 13.27	0.26	1.4	14/16	69	0.12	AB	S3	P
3	03:51:34.08	46 20.06	122 14.23	8.87	1.2	19/23	56	0.12	AA	S3	
4	05:14:35.55	46 19.82	122 13.84	9.08	1.1	20/28	53	0.12	AA	S3	
4	18:51:06.14	46 05.44	122 08.28	9.00	1.4	22/29	65	0.20	BA	S3	
5	12:34:54.53	46 16.43	122 12.26	3.97$	1.3	24/33	46	0.21	BB	S3	
5	18:42:49.25	46 05.18	122 07.68	10.13*	1.0	12/16	142	0.11	AC	S3	
9	19:04:43.00	46 20.04	122 13.07	1.74	1.4	14/14	71	0.14	AB	S3	P
10	00:30:01.93	46 12.83	122 21.51	0.07*	1.1	7/08	141	0.09	AC	S3	P
11	01:09:12.37	46 22.36	122 14.67	9.71	3.1	31/36	51	0.17	BB	S3	
20	02:46:38.31	46 09.11	122 10.21	9.63	1.1	16/23	129	0.16	BB	S3	
20	22:29:38.47	46 21.04	122 03.77	1.98	1.4	13/15	55	0.12	AA	S3	P
21	19:54:15.47	46 20.50	122 14.04	7.23	2.7	32/34	37	0.22	BB	S3	
22	11:48:44.79	46 22.77	122 17.71	15.28	1.0	14/23	87	0.07	AA	S3	
23	20:16:28.46	46 21.72	122 14.99	11.11	1.7	23/29	47	0.11	AA	S3	

July 1981 cont'd

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
24	13:36:04.61	46 19.87	122 14.36	11.95	1.7	22/29	67	0.12	AA	S3	
25	23:51:14.29	46 21.77	122 15.31	10.81	2.2	25/30	79	0.15	AA	S3	
26	00:15:55.92	46 21.83	122 15.11	10.86	1.7	21/28	80	0.11	AA	S3	
29	22:29:15.75	46 22.73	122 18.04	15.15	1.1	20/25	71	0.11	AA	S3	
29	22:31:44.70	46 21.52	122 14.83	10.45	1.5	21/30	81	0.11	AA	S3	

Aug 1981

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
3	18:18:46.45	46 21.01	122 14.23	8.10	1.3	15/22	82	0.10	AB	S3	
4	02:08:40.33	46 12.37	122 11.34	0.12*	1.3	12/12	90	0.11	AA	S3	
4	16:28:27.69	46 13.09	122 18.58	8.50	1.1	23/27	94	0.14	AB	S3	
5	03:50:58.07	46 12.40	122 11.20	1.12	1.2	13/15	65	0.15	AA	S3	
6	09:09:28.83	46 21.98	122 16.34	15.10	1.8	21/28	75	0.10	AA	S3	
10	07:18:32.16	46 12.28	122 11.63	0.21	1.3	14/15	71	0.17	BA	S3	L
11	20:24:17.59	46 11.91	122 11.08	0.33	1.7	7/07	103	0.09	AB	S3	L
12	16:19:44.81	46 11.76	122 11.54	0.02*	1.0	5/05	135	0.10	AD	S3	L
13	04:37:57.64	46 12.48	122 11.18	0.17	1.6	8/08	91	0.11	AB	S3	L
16	04:04:31.33	46 12.27	122 11.38	0.70	1.1	20/21	56	0.21	BA	S3	L
16	15:48:57.40	46 11.98	122 11.53	0.45	1.4	9/09	103	0.15	BB	S3	L
17	05:26:56.61	46 12.18	122 11.72	0.35	1.5	21/23	53	0.22	BA	S3	L
17	05:41:24.52	46 12.14	122 11.90	1.06	1.1	16/17	66	0.17	BA	S3	L
17	05:42:18.41	46 12.25	122 11.63	0.82	1.0	20/21	54	0.21	BA	S3	L
20	08:03:48.76	46 11.98	122 11.43	0.84	1.1	18/20	54	0.21	BA	S3	L
20	17:14:15.70	46 21.53	122 14.78	8.66	1.5	29/34	81	0.22	BB	S3	
22	16:14:39.14	46 12.05	122 11.35	0.52	1.2	14/14	70	0.24	BA	S3	L
23	08:20:11.62	46 12.21	122 11.52	0.55	1.2	20/22	53	0.22	BA	S3	L
23	16:22:17.32	46 21.56	122 14.49	8.27	3.4	35/36	52	0.21	BB	S3	F
27	12:43:24.16	46 12.13	122 11.54	0.37	1.1	20/22	51	0.15	BA	S3	L
27	20:07:23.23	46 19.95	122 12.63	0.04*	1.4	20/21	84	0.16	BC	S3	X
29	11:49:26.56	46 12.49	122 11.41	1.23	1.2	14/19	62	0.11	AA	S3	L
30	15:45:49.05	46 12.00	122 11.85	1.89	1.6	9/09	125	0.24	BB	S3	L
31	16:55:56.94	46 11.92	122 10.11	0.02*	1.2	5/05	128	0.16	BD	S3	L

Sept 1981

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
1	09:34:30.87	46 12.23	122 11.44	1.18	1.8	24/24	49	0.21	BA	S3	L
1	20:41:10.27	46 12.18	122 11.53	1.43	1.6	15/16	53	0.16	BA	S3	L
2	06:50:35.29	46 12.01	122 11.41	1.01	1.3	13/14	98	0.18	BB	S3	L
2	18:46:20.27	46 20.31	122 13.31	4.25	1.9	27/31	51	0.15	AB	S3	
3	06:52:49.95	46 20.26	122 13.21	4.51*	1.7	22/27	52	0.15	AB	S3	
3	10:59:34.81	46 12.23	122 11.20	0.62	1.9	25/28	50	0.23	BA	S3	L
4	06:47:55.91	46 12.09	122 11.05	1.05	1.0	8/08	94	0.10	AB	S3	
5	15:47:14.21	46 12.28	122 11.28	1.24	1.6	24/26	50	0.36	CA	S3	L
5	22:38:45.71	46 11.59	122 21.61	0.41	1.0	11/12	76	0.11	AA	S3	P
6	00:26:29.78	46 11.36	122 12.15	0.52	1.4	15/15	58	0.13	AA	S3	L
6	07:33:02.51	46 10.82	122 10.62	0.03*	1.2	6/06	160	0.20	BC	S3	L
6	10:57:44.98	46 12.02	122 10.86	0.90	1.2	12/12	90	0.13	AA	S3	
6	11:24:40.96	46 12.54	122 11.32	0.34	1.0	9/09	68	0.18	BA	S3	L
6	14:35:48.28	46 11.95	122 11.30	0.73	1.1	13/15	56	0.13	AA	S3	L
6	18:48:50.80	46 11.74	122 11.30	0.05*	1.6	13/13	64	0.36	CA	S3	L
6	20:53:29.17	46 12.18	122 11.09	0.60	1.9	14/14	67	0.09	AA	S3	L
7	10:43:39.39	46 11.98	122 11.57	1.00	1.1	8/09	94	0.18	BB	S3	L
7	23:36:43.65	46 12.18	122 11.54	0.02*	1.3	12/12	87	0.38	CA	S3	L
10	20:07:54.78	46 11.51	122 21.63	0.04*	1.1	11/14	76	0.12	AA	S3	P
12	07:54:27.86	46 15.51	122 04.98	3.32*	1.4	21/25	61	0.15	BA	S3	
13	14:04:56.99	46 11.42	122 11.16	0.46	1.1	13/13	58	0.15	AA	S3	
19	23:17:51.62	46 11.55	122 21.64	0.22	1.6	13/16	76	0.16	BA	S3	X
27	18:30:07.51	46 11.63	122 21.38	0.34	1.3	10/11	81	0.10	AA	S3	P
29	00:38:07.54	46 20.69	122 14.59	8.91	1.8	24/32	53	0.18	BA	S3	
29	21:35:12.20	46 12.41	122 11.24	0.55	1.3	16/18	84	0.21	BA	S3	L
30	23:21:41.51	46 11.43	122 21.59	0.04*	1.0	17/20	99	0.18	BB	S3	P

Oct 1981

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
5	01:04:21.58	46 21.78	122 14.95	10.86	1.0	14/19	90	0.09	AA	S3	

Oct 1981 cont'd

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
7	06:04:54.85	46 14.18	122 12.78	0.45	1.3	19/20	54	0.27	BA	S3	L
10	21:44:51.14	46 21.77	122 15.29	10.86	1.0	18/25	79	0.09	AA	S3	
12	06:57:05.42	46 12.33	122 11.29	0.02*	1.4	11/11	91	0.26	BB	S3	
14	20:41:22.42	46 19.69	122 13.06	1.58	1.3	18/18	85	0.16	BB	S3	
15	19:58:29.61	46 16.36	122 18.34	1.21	1.0	19/21	45	0.14	AA	S3	P
20	20:28:23.41	46 16.29	122 18.21	2.16	1.0	16/17	115	0.16	BB	S3	P
23	17:55:06.73	46 12.50	122 12.29	2.88	1.6	13/13	56	0.19	BA	S3	L
26	00:22:36.17	46 12.29	122 11.07	0.09*	1.1	7/07	132	0.09	AB	S3	L
26	11:57:44.26	46 22.00	122 15.19	10.74	1.1	24/31	53	0.14	AA	S3	
29	06:09:45.93	46 12.43	122 11.39	0.55	1.1	12/12	64	0.15	BA	S3	L
30	01:19:46.30	46 16.43	122 11.32	0.03#	1.0	4/04	305	0.52	DD	S3	L

Nov 1981

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
2	23:22:15.76	46 20.68	122 04.79	0.66	1.1	14/19	75	0.12	AA	S3	
8	20:16:47.03	46 22.62	122 14.87	9.23	1.7	27/37	41	0.11	AB	S3	
13	20:23:45.88	46 11.68	122 00.65	1.05$	1.6	9/10	84	0.14	BB	S3	P
16	16:41:01.50	46 19.88	122 14.07	9.65	1.1	16/24	55	0.09	AA	S3	

Dec 1981

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
1	01:30:49.82	46 21.17	122 14.57	6.02*	2.7	23/27	81	0.11	AB	S3	
9	09:47:49.85	46 21.42	122 15.28	10.55	1.2	23/30	47	0.11	AA	S3	
9	23:34:06.50	46 21.17	122 04.20	1.43	1.0	16/17	66	0.11	AA	S3	P
17	03:09:30.21	46 21.10	122 14.75	11.41	1.6	24/31	40	0.11	AA	S3	
18	09:20:11.32	46 16.28	122 12.24	2.41$	2.7	38/38	47	0.21	CB	S3	
19	07:41:52.64	46 11.87	122 11.38	0.03*	1.0	7/07	105	0.49	CB	S3	L
22	23:40:35.76	46 20.52	122 03.79	1.42	1.1	23/28	66	0.16	BC	S3	X
26	16:52:56.01	46 20.47	122 15.14	12.48	1.3	21/28	60	0.11	AA	S3	