

# Global Seismicity: 1900–1999

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## 1. Introduction

The goal of this chapter is to produce a comprehensive and self-consistent catalog of global seismicity spanning the 20th century and with uniformly computer-determined hypocenters whenever possible. Seismicity data spanning long periods of time are essential for a thorough understanding of earthquake phenomena. Seismic activity is nonuniform over time, and the rate of seismic moment release exhibits large temporal variations. Since the average recurrence interval for great earthquakes along any particular plate boundary is on the order of several decades, with longer intervals in regions away from plate boundaries, at best only one seismic cycle has been recorded by the modern global networks, and only the last three decades of that cycle have been intensively studied. Creation of a digital catalog for the century will support and advance comprehensive seismic hazard analyses, as well as studies of global and regional seismotectonics, the seismic cycle, the rupture zones of large earthquakes, the spatial–temporal pattern of seismic moment release along seismic zones or faults, and the repeat time of large damaging earthquakes.

We approach the problem of assembling this centennial catalog by first combining existing global catalogs of earthquake locations and magnitudes into a single catalog. Second, we assign a single magnitude to each event depending on availability. For shallow earthquakes we preferably use the moment magnitude  $M_w$  or the surface-wave magnitude  $M_s$ . For earthquakes deeper than 60 km we use the moment magnitude  $M_w$ , or the body-wave magnitude  $m_B$  (broadband) or  $m_b$  (short period). Third, we use these assigned magnitudes to determine the magnitude completeness thresholds of the database and to assign magnitude cut-off values as a function of time.

Finally, using a modern Earth model (ak135) and location algorithm (Engdahl *et al.*, 1998), we relocate all events which are within the magnitude cut-off thresholds of the catalog and for which there are digital phase arrival-time data.

## 2. Seismicity Catalogs

Excellent primary and secondary sources of catalog information about earthquake hypocenters and magnitudes can be found in the archival systems of the International Seismological Centre (ISC) and the US Geological Survey's National Earthquake Information Center (NEIC). These systems are multi-catalog earthquake databases of source parameters, available in computer-readable format, that are either directly determined by the ISC and NEIC or derived from published papers and institutional contributions.

The most valuable catalog included in these databases for the historical period (before 1964; Lee *et al.*, 1988) is the one derived from Gutenberg and Richter's book "Seismicity of the Earth" (Gutenberg and Richter, 1954), which provides hypocenters and magnitudes for most of the larger earthquakes occurring between 1904 and 1952. Before 1904 the main source of hypocenters and magnitudes is Abe and Noguchi (1983a,b). Other catalogs of large earthquakes, such as Abe (1981, 1984), Abe and Noguchi (1983a,b), Båth and Duda (1979), Geller and Kanamori (1977), Pacheco and Sykes (1992), Rothé (1969), and Utsu (1979, 1982a,b), are used mainly as sources of magnitude information. All these catalogs (listed in Appendix 3) are combined into a single catalog by using a hierarchical scheme to integrate the hypocenters for matched events between catalogs and to carry along the associated magnitude estimates. In the end, all hypocenter and magnitude entries in these catalogs are accounted for.

## 3. Seismic Phase Bulletins

Bulletins differ from catalogs in that they contain reported arrival times for  $P$ ,  $S$  and additional seismic phases for each earthquake, which are used to determine a hypocenter for that event when enough consistent phase data are available. A historical account of the international organizations involved in the collection of phase arrival data and global teleseismic

earthquake location can be found in Chapter 2 by Adams. The primary sources of historical phase data are the bulletins of the International Seismological Summary (ISS) and their predecessors. Unfortunately, bulletins for the historical period are mainly preserved in printed form and are not in a computer-ready, digital format. Recently, a project to relocate all instrumentally recorded earthquakes during the period 1900–1963 was initiated (Villaseñor *et al.*, 1997). In this project the printed bulletins are being converted into digital form by scanning the bulletin pages and applying an optical character recognition procedure. We also have obtained a data tape of hand-entered observations from the ISC that contains almost all of the arrival time data for earthquakes reported by the ISS between 1918 and 1942.

From 1953 to 1963 the ISS only processed events with magnitudes greater than or equal to 6. For this period the bulletins of the Bureau Central International de Séismologie (BCIS) fill in the gaps, but the BCIS phase data have not yet been converted in to a digital format and hence were not used in this study.

For the modern period (1964–1999) instrumental phase data for moderate-to-large earthquakes worldwide are already available in digital form from both the ISC and the NEIC. Data from all these sources are integrated and converted into the ISC 96-byte data format adopted for the centennial phase arrival-time database. (Note: please see CENT.DAT on the Handbook CD, under the directory \41Engdahl.)

#### 4. Earth Models and Earthquake Location

Although earthquakes have been instrumentally recorded for more than 100 years, source parameters (locations, magnitudes, and focal mechanisms) for events that occurred before the full implementation of the World-Wide Standardized Seismograph Network (WWSSN) are in general poorly known. In most cases, this is the result of inherent limitations in the station distribution, timing, or low magnification of the instruments. However, many locations for pre-1964 earthquakes are poorly constrained because electronic computers and adequate Earth models were not available at the time the earthquakes occurred and the locations were produced.

In the first part of the century travel-time tables for seismic phases, empirically derived from the historical data, were rudimentary at best. The earliest of these, the Zöppritz–Turner tables (used by the ISS from 1913 to 1929) were inaccurate and incomplete, and valid only for shallow-focus earthquakes. Deep earthquakes had to be accounted for with *ad hoc* corrections. This situation greatly improved with the introduction of the Jeffreys–Bullen (J-B) tables (Jeffreys and Bullen, 1940) which provided a complete, remarkably accurate representation of  $P$ ,  $S$ , and other later-arriving phases. These tables are

still used by the ISC (the successor agency of the ISS) and the NEIC for routine earthquake location.

Earthquake location procedures during the historical period suffered from the lack of electronic computers to implement them. For example, new earthquakes reported to the ISS were commonly assigned epicenters coincident with those determined for previously reported events in the same region. A new epicenter was only adopted if the phase data appeared significantly incompatible with any preexisting locations. The existence of deep earthquakes was discovered by H.H. Turner in the late 1920s during the production of the ISS bulletins (this discovery was also done, almost simultaneously, by K. Wadati). However, depths for approximately 75% of the earthquakes listed in the ISS bulletins were simply reported as shallow (surface focus). A so-called “abnormal” focal depth was calculated only if the phase data were clearly incompatible with a shallow-focus solution. Thus, constraints on the focal depths of many ISS hypocenters were limited.

In an effort to remedy this situation, Villaseñor *et al.* (1997) are extending the current global catalog of computer-determined hypocenters by producing a comprehensive catalog of all globally detected earthquakes during the historical period with locations determined in a uniform fashion. Relocation of historical earthquakes is accomplished by using a new algorithm for teleseismic location (Engdahl *et al.*, 1998). This algorithm, hereafter referred to as EHB, uses travel-time tables derived from an improved Earth model and incorporates  $P$ ,  $S$ , and other later-arriving phases in the location procedure. The Earth model used is ak135 (Kennett *et al.*, 1995), a derivation of the iasp91 model (Kennett and Engdahl, 1991). Because most seismic stations are in continental areas, the ak135 model was developed with an average continental crust and upper mantle. The most significant differences between the travel times predicted by these models and the older J-B tables are for upper mantle and core phases. The ak135 model more accurately predicts the observed travel times of later-arriving phases, and is in better agreement with  $S$ -wave data than the J-B tables.

Corrections for lateral variations from the average crust and upper mantle velocities and ellipticity have also been incorporated. The location procedure uses arrival times for the first arriving  $P$  and  $S$  phases, core phases ( $PKP$ ) and depth phases ( $pP$ ,  $pwP$ , and  $sP$ ). By far the most significant improvements provided by the EHB algorithm are in depth determination, through the inclusion of the teleseismic depth phases (with free-surface and sea-bottom bounce points)  $pP$ ,  $pwP$ , and  $sP$ . The ISS bulletins reported depth phases, primarily  $pP$ , but they were not fully used by the ISS to calculate the hypocenter. These phases, reidentified using a new statistical procedure (Engdahl *et al.*, 1998), are now used to minimize mislocation errors introduced by lateral heterogeneity and to provide powerful constraints on focal depth.

The EHB method has already been successfully applied to earthquakes reported by the ISC and NEIC during the modern

period, providing a uniform database of well-constrained, significantly improved hypocenters. The application of this method to historical earthquakes will also result in a comprehensive and homogeneous digital earthquake catalog for the entire century. However, it is important to point out that the EHB procedure cannot entirely account for the effects of the Earth's lateral heterogeneity on teleseismic earthquake location. Most deeper-than-normal earthquakes occur in subduction zones where aspherical variations in seismic wave velocities are large (i.e., on the order of 5–10%). Such lateral variations in seismic velocity, the uneven spatial distribution of seismological stations, and the specific choice of seismic data used to determine the earthquake hypocenter can easily combine to produce bias in teleseismic earthquake locations of up to several tens of kilometers (Engdahl *et al.*, 1998). The most accurate earthquake locations are best determined using a regional velocity model with phase arrival times from a dense local network, which may differ significantly (especially in focal depth) from the corresponding teleseismic locations. Similarly, for historical earthquakes (especially before the 1930s), locations obtained from macroseismic or geological data (e.g., surface rupture) can be more accurate than teleseismic locations computed using arrival-time data alone.

## 5. Seismic Station Information

Creation of a comprehensive digital earthquake catalog also requires a comprehensive global seismic station catalog. The ISC and NEIC maintain listings of seismograph station codes and coordinates for stations distributed worldwide (Presgrave *et al.*, 1985). These listings are an invaluable resource to investigators using cataloged earthquake data, representing the only nearly complete listing of station locations, codes, and dates of operation. We have been assisting NEIC in maintaining and updating this listing, particularly for stations operating prior to the installation of the WWSSN, by examining a variety of alternative sources of historical station information. This effort has resulted in establishing consistent station codes for stations having no prior code assigned, defining date ranges over which station codes and coordinates are available, and compiling lists of alternate spellings for listed stations. (Note: please see CENT.STN on the Handbook CD, under the directory \41Engdahl.)

## 6. Earthquake Magnitudes and Catalog Completeness

Construction of the earthquake hypocenter catalog must include magnitude information. The ISS bulletins do not list earthquake magnitudes, and other organizations did not start reporting magnitudes until the early 1950s. The main source for magnitudes of historical earthquakes is Gutenberg and Richter (1954) which reports magnitudes for approximately 13% of the

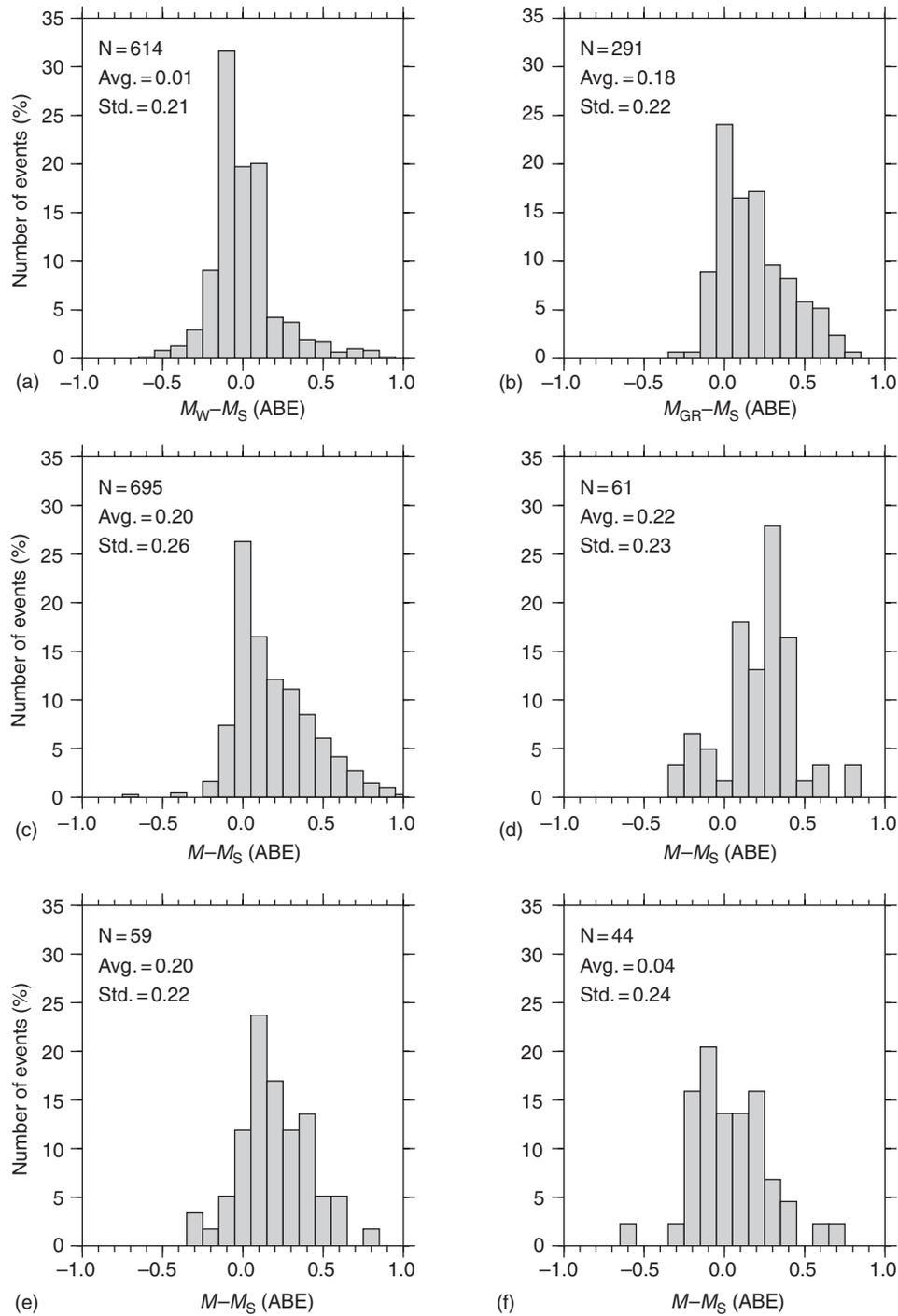
earthquakes listed by the ISS and occurring before 1952. Gutenberg and Richter never published the details of the method used to compute magnitudes in “Seismicity of the Earth” (hereafter referred to as  $M_{GR}$ ) although their relationship with other magnitude scales has been intensively investigated (Geller and Kanamori, 1977; Abe, 1981). For the historical period other commonly reported magnitudes are  $M_S$  (surface-wave magnitude as defined by Gutenberg, 1945) and  $m_B$  (body-wave magnitude for periods of 5–10 sec as defined in Gutenberg and Richter, 1956). (See Chapter 44 by Utsu for a comparison of magnitude scales.)

For recent earthquakes the main sources of magnitude information are the bulletins of the ISC and the NEIC Preliminary Determination of Epicenters (PDE). The most commonly reported magnitudes in this period for teleseismically recorded earthquakes are  $M_S$  (determined using the Prague formula; Vaněk *et al.*, 1962) and  $m_b$  (body-wave magnitude for periods around 1 sec as defined by Gutenberg and Richter, 1956). However, from 1964 to 1976  $M_S$  was not systematically reported by the ISC, and to compensate for this we included in the catalog, reliable single station magnitude estimates, such as those reported by Pasadena and Berkeley (California), and Palisades (New York).

When available, moment magnitude ( $M_w$ ) estimates based on the scalar seismic moment  $M_0$  are preferred (Kanamori, 1977; Hanks and Kanamori, 1979). These values of  $M_0$  are frequently determined with modern methods that use body and/or surface wave waveforms (e.g., Dziewonski *et al.*, 1980; Sipkin, 1982). Reliable estimates of  $M_w$  are generally available from the Harvard CMT catalog for most events with  $M_S$  larger than about 5.4 during the period 1976–1999. Pacheco and Sykes (1992) report scalar seismic moments for large, shallow events during 1900–1980, and Huang *et al.* (1994, 1997) for large, deep events during 1962–1976.

Combining magnitudes from different types and sources into a single catalog requires some understanding of the relationships between the different magnitude scales. There is an overwhelmingly large set of literature devoted to this subject (for a review see Båth, 1981) but our goal is to produce a set of simple rules for obtaining a single magnitude for each event that results in an earthquake catalog which is representative of the rate of earthquake occurrence for the century at or above specified magnitude thresholds in time. The rules we have used are the following: if  $M_0$  is available the preferred magnitude is  $M_w$ ; for earthquakes with focal depth  $h \leq 60$  km if  $M_0$  is not available then  $M_S$ ,  $m_B$ , or  $m_b$  is selected, in this order of preference; for events with  $h > 60$  km if  $M_0$  is not available then  $m_B$  or  $m_b$  is selected, in this order of preference.

Because of the different magnitude scales used, the magnitudes in the resulting catalog are very heterogeneous. In order to evaluate the completeness of the catalog and to establish a cut-off magnitude and select the earthquakes above that cut-off, all magnitudes must be corrected and reduced to a common reference magnitude scale. It is worth noting that



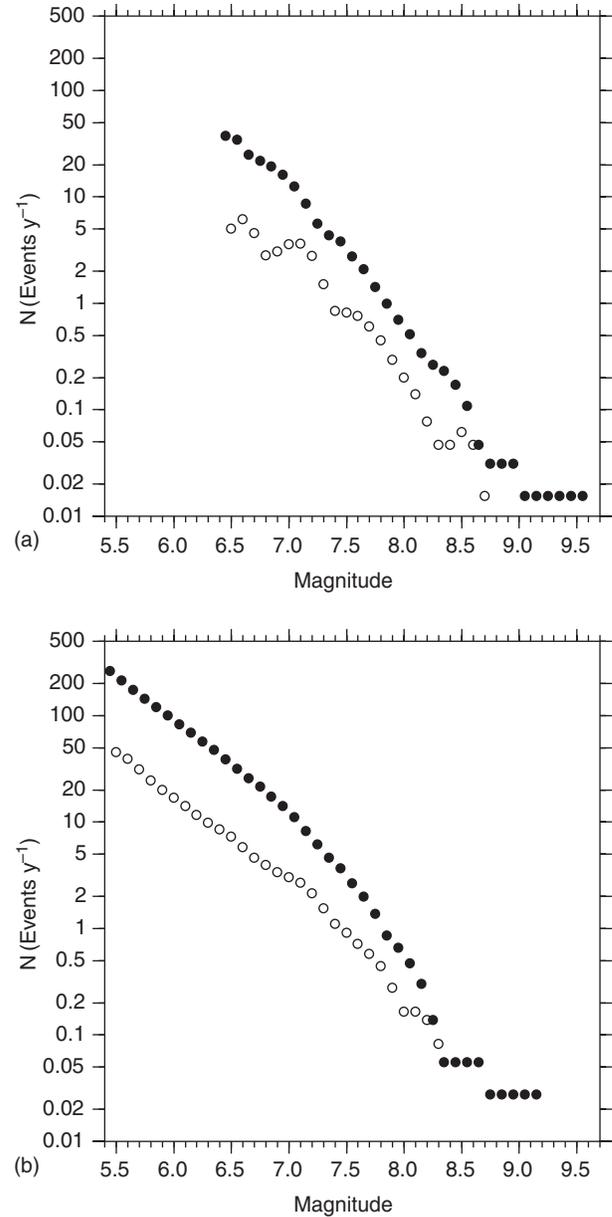
**FIGURE 1** Comparison between magnitudes reported by different catalogs relative to surface wave magnitudes ( $M_S$ ) reported in Abe's catalog (Abe, 1981, 1984; Abe and Noguchi, 1983a,b). The bin width for all histograms is 0.1 magnitude units, and the number of events in each bin is shown as a percentage of the total number of events. N, total number of events; Avg, average residual; Std, standard deviation of the residuals. Catalogs compared: (a) Pacheco and Sykes (1992); (b) Gutenberg and Richter (1954); (c) Båth and Duda (1979); (d) Rothé (1969); (e) Pasadena single-station magnitude for events before 1960; (f) Pasadena magnitudes after 1959.

these corrections are used exclusively to calculate the catalog completeness (as a whole and as a function of time) and to determine which earthquakes are included in the catalog. The magnitudes listed in the catalog are the uncorrected values from the original sources. We have chosen  $M_S$  as the reference magnitude scale for the catalog, and investigated its relationship with other magnitude scales.

Moment magnitude  $M_w$  agrees very well with  $M_S$  for shallow earthquakes larger than a magnitude of  $\sim 6.5$ , but for smaller earthquakes  $M_w$  is larger than  $M_S$ . Ekström and Dziewonski (1988) introduced an empirical moment magnitude relationship which, for each value of  $M_0$  (or  $M_w$ ), provides a magnitude that approximates the global average of  $M_S$  for that scalar moment. We use this empirical magnitude for the purpose of event selection and to obtain frequency–magnitude relationships. For deeper earthquakes the relationship of reported magnitudes to  $M_S$  is problematic and, lacking a well-determined empirical relationship, we assume it to be equivalent to  $M_w$ ,  $m_B$ , and  $m_b$  (in order of preference).

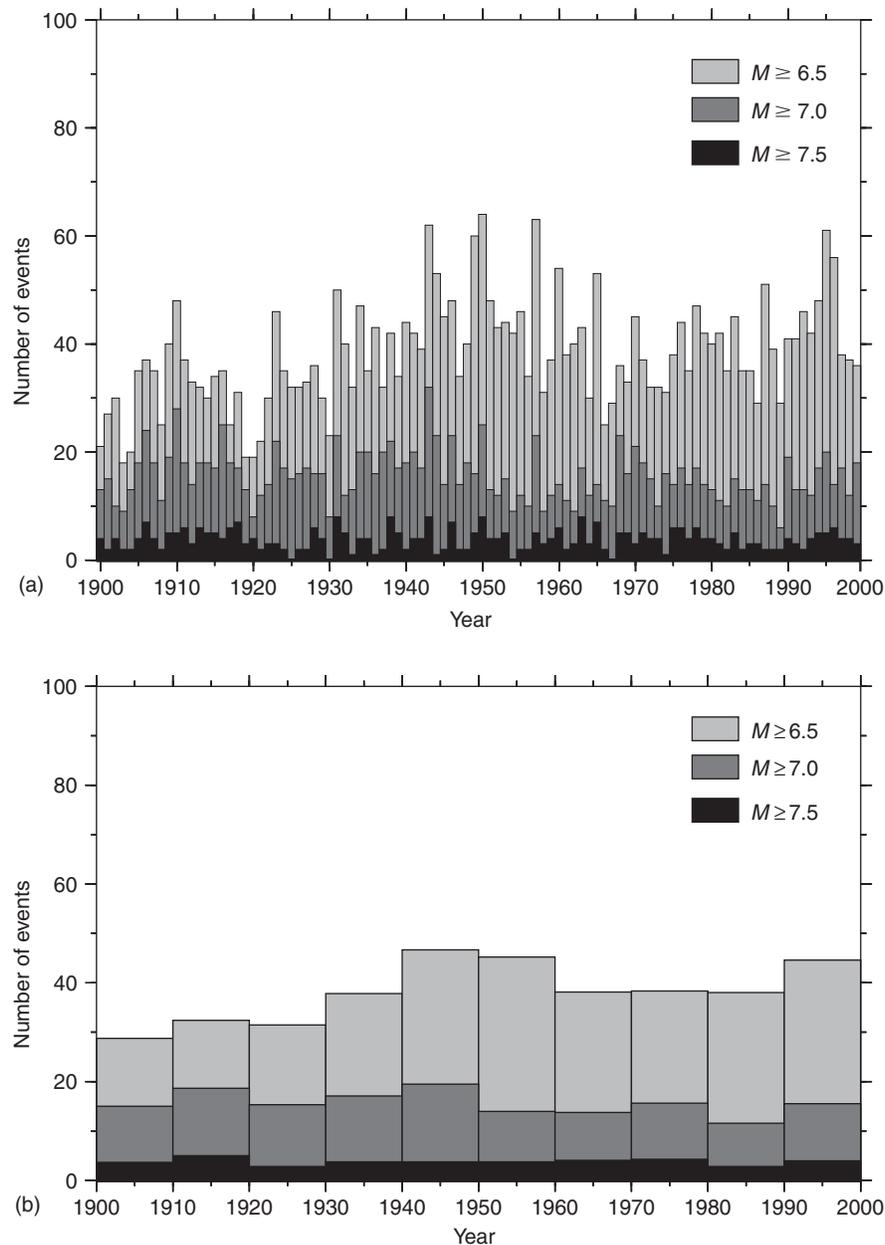
Figure 1a shows the distribution of magnitude differences between  $M_w$  from Pacheco and Sykes (1992) and  $M_S$  from Abe (1981) for events common to both catalogs. These events have magnitudes greater than 7.0 and the agreement between both magnitudes is very good (the residuals are small and normally distributed with an average value close to zero). Figure 1b shows the comparison between  $M_{GR}$  (Gutenberg and Richter, 1954) and  $M_S$  (Abe, 1981). Values of  $M_{GR}$  are systematically larger than  $M_S$  by 0.2 magnitude units on average, and in this case the magnitude residuals are not normally distributed. Abe (1981) analyzed in detail the nature of these differences and found that the distribution of residuals changed with focal depth. Figures 1c and 1d show comparisons between  $M_S$  (Abe, 1981) and magnitudes reported by Båth and Duda (1979) and Rothé (1969), respectively. Figures 1e and 1f show differences between  $M_S$  (Abe, 1981) and magnitudes reported by Pasadena before and after 1960, respectively. The distribution of magnitude residuals for Pasadena before 1960 is similar to the distribution for  $M_{GR}$ , with predominantly positive residuals. However, after 1960 the agreement with  $M_S$  (Abe, 1981) is better, and the residual distribution has zero mean. From this analysis we conclude that magnitudes reported by Gutenberg and Richter (1954), Båth and Duda (1979), Rothé (1969), and Pasadena before 1960 must be decreased by 0.2 magnitude units in order to be reduced to the common reference magnitude of the catalog. A similar magnitude bias has been previously found by Pérez and Scholz (1984). The correction applied here is an obvious oversimplification, but a detailed analysis of the causes of the magnitude differences is beyond the scope of this chapter.

For the historical period (1900–1963) a frequency–magnitude plot (Fig. 2a) shows a gentle roll-off in the number of earthquakes per year for  $M_S \leq 7.0$  (both for incremental and cumulative number of events). The irregular shape of the curve for the incremental number of events is caused by



**FIGURE 2** Frequency–magnitude (Gutenberg and Richter) relations for the centennial catalog. Open circles represent single frequencies (incremental number of earthquakes with magnitudes in  $M \pm \delta M/2$ ) and filled circles represent cumulative frequencies (total number of earthquakes with magnitudes  $\geq M$ ). The width of the magnitude interval  $\delta M$  is 0.1 magnitude units. The single and cumulative frequencies are normalized to events per year, and the magnitudes have been adjusted to  $M_S$  (see text): (a) historical seismicity (1900–1963), and (b) recent seismicity (1964–1999).

magnitudes reported with precisions of 0.25 and 0.5 magnitude units. Most missed earthquakes in the  $M_S = 6.5$ –7.0 range probably occur during the 1900–1930 period. Hence, to include as many events as possible we have chosen a magnitude of 6.5 as our magnitude cut-off for the historical period.



**FIGURE 3** Number of events in the centennial catalog as a function of time for the three magnitude levels specified in the legend: (a) number of events per year; (b) number of events in 10 y intervals. The total number of events in each interval is divided by the interval width to allow direct comparison between the two histograms.

For the modern period (1964–1999) Engdahl *et al.* (1998) have shown that the global catalog is nearly complete to a magnitude of 5.2, where the magnitude is defined as (in descending order of preference) either  $M_w$ ,  $M_S$ , or  $m_b$ , depending on availability. A frequency–magnitude plot for the modern period (Fig. 2b) shows that the number of earthquakes per year is consistent with a magnitude threshold of at least  $M_S$  5.5. Hence, with the possible exception of the 1960s when less-reliable magnitudes were available and taking into account

normal yearly fluctuations in the rate of occurrence (Fig. 3a), the centennial catalog seems to be complete to at least  $M_S$  6.5 during the period 1930–1963 and  $M_S$  5.5 during the period 1964–1999, and complete to  $M_S$  7.0 for the entire century.

If our magnitude assumptions are valid, then the rate of earthquake occurrence at any given magnitude threshold should be constant provided that the global rates of seismicity are assumed constant on a timescale of decades (Pacheco and Sykes, 1992) and the catalog is complete at that threshold.

TABLE 1 List of Earthquakes (Magnitude >= 7) for 1900-1999. Please See Explanations at the End of the Table

Year	M	d	h:min	sec	Lat.	Long.	Dep.	Mag.	sc	icat	mdo	Region:	Earthquake Name
1900	1	5	19:00	0.0	-3.00	102.00	7.0	Ms	ABE	AN2			
1900	1	11	9:07	0.0	-5.00	148.00	7.0	Ms	ABE	AN2			
1900	1	20	6:35	0.0	20.00	-105.00	7.5	Mw	ABE	P&S			
1900	1	31	19:22	0.0	48.00	146.00	4.50	7.5	Mj	UTSU	UTSU		
1900	5	11	17:23	0.0	38.70	141.10	5	7.0	Mj	UTSU	UTSU		
1900	6	21	20:52	0.0	10.00	-85.50	7.2	Mw	P&S	P&S			
1900	7	29	6:59	0.0	-10.00	165.00	7.6	Mw	ABE	P&S			
1900	9	17	21:45	0.0	-5.00	148.00	7.1	Mw	ABE	P&S			
1900	10	9	12:28	0.0	57.09	-153.48	7.7	Mw	P&S	P&S			
1900	10	29	9:11	0.0	11.00	-66.00	7.7	Mw	ABE	P&S			Venezuela: Caracas
1900	11	9	16:10	0.0	13.00	-90.00	7.0	Ms	ABE	AN2			
1900	11	24	7:57	0.0	43.50	148.00	35	7.0	Ms	UTSU	AN2		
1900	12	25	5:09	0.0	43.00	146.00	35	7.1	Mw	UTSU	P&S		
1901	1	7	0:29	0.0	-2.00	-82.00	7.2	Mw	ABE	P&S			
1901	1	18	4:59	0.0	60.00	-135.00	7.1	Mw	ABE	P&S			
1901	4	5	23:30	0.0	44.50	149.00	35	7.3	Mw	UTSU	P&S		
1901	5	25	0:32	0.0	-10.00	160.00	7.2	Mw	ABE	P&S			
1901	6	15	9:34	0.0	39.00	143.00	35	7.0	Mj	UTSU	UTSU		
1901	6	24	7:02	0.0	28.00	130.00	35	7.2	Mw	UTSU	P&S		
1901	8	9	9:23	0.0	40.50	142.50	35	7.2	Mw	UTSU	P&S		
1901	8	9	13:01	0.0	-22.00	170.00	7.9	Mw	ABE	P&S			
1901	8	9	18:33	0.0	40.60	142.30	35	7.5	Mw	UTSU	P&S		
1901	10	8	2:14	0.0	13.00	-87.00	7.1	Mw	ABE	P&S			
1901	11	25	1:51	0.0	3.00	127.00	7.0	Ms	BJI	BJI			
1901	12	9	2:17	0.0	26.00	-110.00	7.1	Mw	ABE	P&S			
1901	12	14	22:57	0.0	14.00	122.00	7.0	Ms	ABE	AN2			
1901	12	31	9:02	0.0	52.00	-177.00	7.1	Mw	ABE	P&S			
1902	1	1	5:20	0.0	55.00	-165.00	7.0	Ms	ABE	AN2			
1902	1	12	22:18	0.0	3.00	122.00	7.0	Ms	BJI	BJI			
1902	1	24	23:27	0.0	-8.00	150.00	7.2	Mw	ABE	P&S			
1902	4	19	2:23	0.0	14.00	-91.00	7.5	Mw	ABE	P&S			Guatemala
1902	5	2	11:31	0.0	39.00	144.00	35	7.0	Mj	UTSU	UTSU		
1902	8	22	3:00	0.0	40.00	77.00	7.7	Mw	ABE	P&S			China/Kyrgyzstan
1902	9	23	20:18	0.0	18.00	146.00	7.5	Mw	ABE	P&S			
1902	9	23	20:18	0.0	16.00	-93.00	7.8	Mw	ABE	P&S			
1902	10	6	9:15	0.0	36.50	70.50	200	7.2	Ms	BJI	BJI		
1902	12	12	23:10	0.0	29.00	-114.00	7.1	Mw	ABE	P&S			
1903	1	4	5:07	0.0	-20.00	-175.00	400	8.0	UK	B&D	B&D		
1903	1	14	1:47	0.0	15.00	-98.00	7.4	Mw	ABE	P&S			
1903	1	17	16:05	0.0	50.00	-170.00	7.0	Ms	ABE	AN2			
1903	2	1	9:34	0.0	48.00	98.00	7.1	Mw	ABE	P&S			
1903	2	27	0:33	0.0	-8.00	106.00	7.3	Mw	ABE	P&S			
1903	4	29	3:59	0.0	-20.00	-175.00	7.1	Mw	ABE	P&S			
1903	5	13	6:54	0.0	-17.00	168.00	7.0	Ms	ABE	AN2			
1903	8	11	4:52	54.0	36.36	22.97	80	8.3	UK	UK	B&D		
1903	12	28	2:56	0.0	7.00	127.00	7.1	Mw	ABE	P&S			
1904	1	20	14:52	6.0	7.00	-79.00	7.2	Mw	G&R	P&S			
1904	3	19	6:28	0.0	-29.00	-71.00	7.0	Ms	ABE	AN2			
1904	4	10:26	0.0	41.75	23.25	7.1	Mw	G&R	P&S				China: Shanan
1904	5	1	15:24	0.0	2.00	130.00	7.0	Ms	ABE	AN2			

(continued)

Year	M	d	h:min	sec	Lat.	Long.	Dep.	Mag.	sc	icat	mdo	Region:	Earthquake Name
1904	6	7	8:17	54.0	39.00	135.00	350	7.4	mb	UTSU	ABE1		
1904	6	25	14:45	36.0	52.00	159.00	7.5	Mw	G&R	P&S			Kamchatka
1904	6	25	21:00	30.0	52.00	159.00	7.2	Mw	G&R	P&S			
1904	6	27	0:09	0.0	52.00	159.00	35	7.1	Mw	UTSU	P&S		
1904	8	24	20:59	54.0	30.00	131.00	90	7.8	mb	G&R	ABE1		
1904	8	27	21:56	6.0	64.00	-151.00	7.0	Mw	G&R	P&S			
1904	10	3	3:05	0.0	12.00	58.00	7.0	Ms	G&R	AN2			
1904	10	28	13:51	0.0	8.00	113.00	7.0	Ms	BJI	BJI			
1904	12	20	5:44	18.0	8.50	-83.00	7.2	Mw	G&R	P&S			
1905	1	22	2:43	54.0	1.00	123.00	60	7.5	UK	B&D	P&S		
1905	2	14	8:46	36.0	53.00	-178.00	7.2	Mw	G&R	P&S			
1905	3	18	0:58	0.0	-27.50	-173.00	60	7.5	UK	B&D	B&D		
1905	3	18	23:56	0.0	-10.00	168.00	7.2	Mw	ABE	P&S			
1905	3	22	3:38	0.0	50.00	180.00	7.0	Ms	ABE	AN2			
1905	4	4	0:50	0.0	33.00	76.00	7.8	Mw	G&R	P&S			India: Kangra
1905	6	2	5:39	42.0	34.10	132.50	55	7.0	mb	UTSU	ABE1		
1905	6	14	11:50	0.0	-20.00	-175.00	7.0	Ms	ABE	AN2			
1905	6	30	17:07	0.0	-20.00	-175.00	7.1	Mw	P&S	P&S			
1905	7	6	16:21	0.0	37.40	141.80	35	7.1	Mw	UTSU	P&S		
1905	7	9	9:40	24.0	49.00	99.00	8.5	Mw	G&R	P&S			Mongolia
1905	7	11	8:38	0.0	49.50	97.30	20	7.0	Ms	BJI	BJI		
1905	7	11	15:37	30.0	22.00	143.00	450	7.2	mb	UTSU	ABE1		
1905	7	23	2:46	12.0	45.00	98.00	6.4	Mw	G&R	P&S			Mongolia
1905	9	1	2:45	36.0	45.00	143.00	250	7.3	mb	UTSU	ABE1		
1905	9	15	6:02	0.0	55.00	165.00	7.3	Mw	ABE	P&S			
1905	10	21	11:01	37.0	42.00	42.00	60	7.5	UK	B&D	B&D		
1905	12	17	5:27	0.0	17.00	-113.00	7.1	Mw	ABE	P&S			
1906	1	21	13:49	35.0	34.00	137.00	350	7.7	mb	UTSU	ABE1		
1906	1	31	15:36	0.0	1.00	-81.50	8.6	Mw	G&R	P&S			Ecuador/Colombia
1906	2	19	1:59	0.0	-10.00	160.00	7.1	Mw	ABE	P&S			
1906	3	2	6:15	15.0	43.00	80.00	60	7.3	UK	B&D	B&D		
1906	4	10	21:18	0.0	20.00	-110.00	7.2	Mw	ABE	P&S			
1906	4	13	19:18	0.0	23.60	120.40	5	7.1	Mj	UTSU	UTSU		
1906	4	18	13:12	0.0	38.00	-123.00	7.9	Mw	G&R	P&S			Calif.: San Francisco
1906	6	1	4:30	0.0	0.00	145.00	7.1	Mw	ABE	P&S			
1906	6	24	11:17	49.0	15.00	92.00	60	7.3	UK	B&D	B&D		
1906	8	17	0:10	42.0	51.00	179.00	7.8	Mw	G&R	P&S			Aleutian Is
1906	8	17	0:40	0.0	-33.00	-72.00	8.5	Mw	G&R	P&S			Chile: Valparaiso
1906	8	26	5:59	0.0	-4.00	149.00	7.0	Ms	ABE	AN2			
1906	8	30	2:38	0.0	-21.00	-70.00	7.1	Mw	ABE	P&S			
1906	9	7	18:52	0.0	34.00	141.00	35	7.0	Ms	UTSU	AN2		
1906	9	14	16:04	18.0	-7.00	149.00	8.0	Mw	G&R	P&S			New Britain
1906	9	28	15:24	54.0	-2.00	-79.00	150	7.5	mb	G&R	ABE1		
1906	10	12	1:50	0.0	-4.00	149.00	7.2	Mw	ABE	P&S			
1906	10	17	9:40	0.0	19.00	121.00	60	7.3	UK	B&D	B&D		
1906	11	19	7:18	18.0	-22.00	109.00	7.2	Mw	G&R	P&S			
1906	12	3	22:59	24.0	15.00	-61.00	100	7.2	mb	G&R	ABE1		
1906	12	19	1:14	0.0	-19.00	-172.00	7.2	Mw	ABE	P&S			
1906	12	22	18:21	0.0	43.50	85.00	7.2	Mw	G&R	P&S			
1906	12	25	17:22	0.0	56.85	-133.90	7.2	Mw	P&S	P&S			

TABLE 1 (Continued)

Year	M	d	h:min	sec	Lat.	Long.	Dep.	Mag.	sc	icat	mdo	Region:	Earthquake Name	
1906	12	26	5:54	0.0	-20.00	-73.00	7.0	Ms	ABE	AN2				
1907	1	2	11:57	0.0	-21.10	-175.10	7.3	Mw	G&R	P&S				
1907	1	4	5:19	12.0	2.00	94.50	50	7.5	Mw	G&R	P&S		Indonesia	
1907	2	3	19:34	57.0	-6.00	148.00	60	7.2	UK	B&D	B&D			
1907	3	29	20:46	30.0	3.00	122.00	500	7.2	mb	G&R	ABE1			
1907	3	31	22:00	36.0	-18.00	-177.00	400	7.2	mb	G&R	ABE1			
1907	4	15	6:08	6.0	17.00	-100.00	7.9	Mw	G&R	P&S			Mexico	
1907	4	18	20:59	48.0	14.00	123.00	7.1	Mw	G&R	P&S				
1907	4	18	23:52	24.0	13.50	123.00	7.0	Ms	G&R	AN2				
1907	5	4	6:51	0.0	-7.50	153.70	60	7.7	UK	B&D	B&D			
1907	5	25	14:02	8.0	50.50	148.00	600	7.4	mb	UTSU	ABE1			
1907	6	1	8:45	0.0	0.00	-82.00	7.0	Ms	ABE	AN2				
1907	6	5	3:18	0.0	0.00	-86.00	7.0	Ms	ABE	AN2				
1907	6	25	17:54	36.0	1.00	127.00	200	7.5	mb	G&R	ABE1			
1907	8	17	17:27	54.0	52.00	157.00	120	7.2	mb	G&R	ABE1			
1907	9	2	16:01	30.0	52.00	173.00	7.3	Mw	G&R	P&S				
1907	10	16	14:57	18.0	28.00	-112.50	7.2	Mw	G&R	P&S				
1907	10	21	4:23	36.0	38.00	69.00	7.2	Mw	G&R	P&S			Uzbekistan/Tajikistan	
1907	12	30	5:26	0.0	12.10	-86.50	7.2	Mw	ABE	AN2				
1908	1	15	12:56	0.0	37.30	141.80	35	7.3	UK	UTSU	B&D			
1908	2	9	18:13	0.0	26.00	100.00	60	7.3	UK	B&D	B&D			
1908	3	26	23:03	30.0	18.00	-99.00	80	7.7	mb	G&R	ABE1			
1908	3	27	3:45	0.0	17.00	-101.00	7.0	Ms	ABE	AN2				
1908	4	22	23:45	0.0	-38.00	48.00	7.0	Ms	ABE	AN2				
1908	5	15	8:31	36.0	59.00	-141.00	7.0	Ms	G&R	AN2				
1908	8	17	10:32	0.0	-60.00	-40.00	7.2	Mw	ABE	P&S				
1908	10	24	21:16	36.0	70.50	220	7.0	mb	G&R	ABE1				
1908	12	12	12:08	0.0	-14.00	-78.00	60	8.2	UK	B&D	B&D			
1908	12	12	12:54	54.0	26.50	97.00	7.0	Ms	G&R	AN2				
1908	12	28	4:20	24.0	38.00	15.50	7.0	Ms	G&R	AN2			Italy: Messina	
1909	1	23	2:48	18.0	33.00	53.00	7.0	Ms	G&R	AN2			Iran	
1909	2	22	9:21	42.0	-18.00	-179.00	550	7.6	mb	G&R	ABE1			
1909	3	13	14:29	0.0	34.50	141.50	35	7.6	mb	UTSU	ABE1			
1909	4	10	19:36	0.0	52.00	175.00	7.0	Ms	ABE	AN2				
1909	4	14	19:53	42.0	25.00	122.50	5	7.1	mb	UTSU	ABE1			
1909	4	25	22:36	0.0	4.00	127.00	100	7.1	mb	G&R	ABE1			
1909	4	27	12:44	0.0	0.00	147.00	7.1	Mw	ABE	P&S				
1909	5	17	8:02	54.0	-20.00	-64.00	250	7.0	mb	G&R	ABE1			
1909	5	30	21:01	18.0	-8.00	131.00	100	7.1	mb	G&R	ABE1			
1909	6	3	18:40	48.0	-2.00	101.00	7.2	Mw	G&R	P&S				
1909	6	8	5:46	30.0	-26.50	-70.50	7.2	Mw	G&R	P&S				
1909	7	7	21:37	50.0	36.50	70.50	230	7.6	mb	G&R	ABE1			
1909	7	30	10:51	54.0	17.00	-100.50	7.6	Mw	G&R	P&S				
1909	8	18	0:39	30.0	-22.00	172.00	100	7.2	mb	G&R	ABE1			
1909	9	8	16:49	48.0	52.50	-169.00	90	7.0	mb	G&R	ABE1			
1909	10	20	23:41	12.0	30.00	68.00	7.0	Ms	G&R	AN2			India/Pakistan	
1909	11	10	6:13	30.0	32.30	131.10	150	7.5	mb	UTSU	ABE1			
1909	11	21	7:36	0.0	25.50	122.00	5	7.3	UK	UTSU	B&D			
1909	12	9	15:33	0.0	-8.00	161.00	7.0	Ms	ABE	AN2			Burma	
1910	1	1	11:02	0.0	16.50	-84.00	60	7.1	Mw	G&R	P&S			Peru
1910	1	30	3:45	0.0	-22.00	170.00	7.0	Ms	ABE	AN2				
1910	2	4	14:00	0.0	-17.00	168.00	7.0	Ms	ABE	AN2				
1910	2	12	18:10	6.0	33.00	138.00	350	7.2	mb	UTSU	ABE1			
1910	3	30	16:55	48.0	-21.00	170.00	80	7.1	mb	G&R	ABE1			
1910	3	31	18:13	0.0	-71.00	-6.00	7.1	Ms	ABE	AN2				
1910	4	12	0:22	13.0	25.00	123.00	200	7.6	mb	UTSU	ABE1			
1910	4	20	22:22	0.0	-20.00	-177.00	330	7.0	mb	G&R	ABE1			
1910	5	1	18:30	36.0	-20.00	169.00	80	7.1	mb	G&R	ABE1			
1910	5	31	4:54	0.0	10.00	-105.00	7.0	Ms	ABE	AN2				
1910	6	1	5:55	30.0	-20.00	169.00	80	7.3	mb	G&R	ABE1			
1910	6	1	6:48	18.0	-20.00	169.00	80	7.1	mb	G&R	ABE1			
1910	6	16	6:50	42.0	-19.00	169.50	100	7.9	mb	G&R	ABE1			
1910	6	29	10:45	0.0	-32.00	-176.00	7.2	Mw	G&R	P&S				
1910	8	21	5:38	36.0	-17.00	-179.00	600	7.4	mb	G&R	ABE1			
1910	9	1	0:45	0.0	21.00	122.00	7.0	Ms	ABE	AN2				
1910	9	6	19:59	0.0	-25.00	-70.00	7.1	Mw	ABE	P&S				
1910	9	7	7:11	18.0	-6.00	151.00	80	7.2	mb	G&R	ABE1			
1910	9	9	1:13	18.0	51.50	-176.00	25	7.0	Ms	G&R	AN2			
1910	10	4	23:00	6.0	-22.00	-69.00	120	7.2	mb	G&R	ABE1			
1910	11	9	6:02	0.0	-16.00	166.00	70	7.5	mb	G&R	ABE1			
1910	11	10	12:19	54.0	-14.00	166.50	90	7.1	mb	G&R	ABE1			
1910	11	15	14:21	48.0	-58.00	-22.00	60	7.2	Mw	G&R	P&S			
1910	11	26	4:41	18.0	-14.00	167.00	50	7.2	Mw	G&R	P&S			
1910	12	10	9:26	42.0	-11.00	162.50	50	7.2	Mw	G&R	P&S			
1910	12	13	11:37	24.0	-8.00	31.00	31.00	7.6	Mw	G&R	P&S			
1910	12	14	20:46	12.0	-21.00	-178.00	600	7.2	mb	G&R	ABE1			
1910	12	16	14:45	0.0	4.50	126.50	7.6	Mw	G&R	P&S				
1911	1	3	23:25	45.0	43.50	77.50	7.8	Mw	G&R	P&S			Kazak./China:Tien Shan	
1911	2	18	18:41	3.0	40.00	73.00	7.2	Mw	G&R	P&S			Tajikistan: Pamir	
1911	4	4	15:43	54.0	36.50	25.50	140	7.0	mb	G&R	ABE1			
1911	4	10	18:42	24.0	9.00	-74.00	100	7.0	mb	G&R	ABE1		Iran	
1911	5	4	23:56	54.0	51.00	157.00	240	7.4	mb	G&R	ABE1			
1911	6	7	11:02	42.0	17.50	-102.50	7.6	Mw	G&R	P&S			Mexico	
1911	6	15	14:26	0.0	28.00	130.00	90	8.1	mb	UTSU	ABE1			
1911	7	4	13:33	26.0	36.00	70.50	190	7.4	mb	G&R	ABE1			
1911	7	5	18:40	6.0	-7.50	117.50	370	7.0	mb	G&R	ABE1			
1911	7	12	4:07	36.0	9.00	126.00	7.5	Mw	G&R	P&S				
1911	8	16	22:41	18.0	7.00	137.00	7.7	Mw	G&R	P&S				
1911	8	21	16:28	55.0	-21.00	-176.00	300	7.2	mb	G&R	ABE1			
1911	9	6	0:54	18.0	46.00	143.00	350	7.0	mb	UTSU	ABE1			
1911	9	15	13:10	0.0	-20.00	-72.00	7.1	Mw	G&R	P&S				
1911	9	17	3:26	0.0	51.00	180.00	7.1	Mw	ABE	P&S				
1911	10	20	17:44	0.0	-12.50	166.00	160	7.0	mb	G&R	ABE1			
1911	11	22	23:05	24.0	-15.00	169.00	200	7.3	mb	G&R	ABE1			
1911	12	16	19:14	18.0	17.00	-100.50	50	7.6	Mw	G&R	P&S			
1912	1	31	20:11	48.0	61.00	-147.50	80	7.0	mb	G&R	ABE1			
1912	5	6	19:00	0.0	64.00	-20.00	7.0	Ms	G&R	AN2				
1912	5	23	2:24	0.0	21.00	97.00	7.7	Mw	G&R	P&S			Burma	
1912	7	7	7:57	36.0	64.00	-147.00	7.2	Mw	G&R	P&S				
1912	7	24	11:59	0.0	-5.00	-80.00	7.0	Ms	ABE	AN2			Peru	

Year	M	d	h:min	sec	Lat.	Long.	Dep.	Mag.	sc	icat	mdo	Region:Earthquake Name
1912	8	6	21:11	18.0	-14.00	167.00	260	7.3	mb	G&R	ABE1	Turkey
1912	8	9	1:29	0.0	40.50	27.00		7.6	Mw	G&R	P&S	
1912	8	17	19:11	48.0	-4.50	127.00		7.2	Mw	G&R	P&S	
1912	9	1	4:10	0.0	-4.50	155.00	430	7.0	mb	G&R	ABE1	
1912	9	29	20:51	30.0	7.00	138.00		50	7.5	Mw	G&R	P&S
1912	10	26	9:00	36.0	14.50	166.00	130	7.0	mb	G&R	ABE1	
1912	11	7	7:40	20.0	57.50	155.00		90	7.3	Mw	G&R	ABE1
1912	12	7	22:46	50.0	-29.00	-62.50	620	7.3	mb	G&R	ABE1	
1912	12	9	8:52	24.0	15.50	-93.00		7.1	Mw	ABE	P&S	
1913	1	11	13:16	54.0	1.50	122.00		7.2	Mw	G&R	P&S	
1913	2	20	8:58	48.0	41.00	144.00		7.0	Ms	ISS	AN1	
1913	3	14	8:45	0.0	4.50	126.50		7.9	Mw	G&R	P&S	
1913	3	23	20:47	18.0	24.00	142.00	80	7.1	mb	G&R	ABE1	
1913	4	25	17:56	8.0	9.50	128.80		7.2	Mw	ISS	P&S	
1913	5	18	2:08	53.0	14.50	145.50		7.0	Ms	ISS	AN1	
1913	5	30	11:46	46.0	-5.00	154.00		7.7	Mw	ISS	P&S	
1913	6	22	13:49	52.0	48.00	-178.00		7.2	UK	ISS	B&D	
1913	6	26	4:57	12.0	-20.00	-174.00		7.7	Mw	G&R	P&S	
1913	7	28	5:39	18.0	-17.00	-74.00		7.0	Ms	G&R	AN1	
1913	8	1	17:10	57.0	47.50	155.50		7.7	UK	ISS	B&D	
1913	8	6	22:14	24.0	-17.00	-74.00		7.8	Mw	G&R	P&S	
1913	8	13	4:25	42.0	-5.50	105.00	75	7.3	mb	G&R	ABE1	
1913	10	11	4:06	3.0	-7.00	148.00		7.0	Ms	ISS	AN1	
1913	10	14	8:08	48.0	-19.50	169.00	230	7.6	mb	G&R	ABE1	
1913	11	10	21:12	30.0	-18.00	169.00		80	7.2	mb	G&R	ABE1
1913	11	15	5:27	6.0	-23.00	171.00	150	7.1	mb	G&R	ABE1	
1913	12	21	15:37	48.0	24.50	102.00		7.2	Mw	ISS	P&S	
1914	1	20	12:00	13.0	52.90	159.60	60	7.2	UK	B&D		
1914	1	30	3:56	0.0	-35.00	-73.00		7.5	Mw	G&R	P&S	
1914	2	26	4:58	12.0	-18.00	-67.00		130	7.2	mb	G&R	ABE1
1914	3	14	20:00	0.0	39.50	140.40		5	7.0	Ms	UTSU	AN1
1914	3	30	0:41	18.0	17.00	-92.00	150	7.2	mb	G&R	ABE1	
1914	4	11	16:30	24.0	-12.00	163.00		50	7.2	Mw	G&R	P&S
1914	5	26	14:22	42.0	-2.00	137.00		7.9	Mw	G&R	P&S	
1914	6	20	7:20	30.0	-12.00	166.00		50	7.0	Ms	G&R	AN1
1914	6	25	19:07	18.0	-4.50	102.50		7.6	Mw	G&R	P&S	
1914	7	4	23:58	54.0	-5.50	129.00	200	7.1	mb	G&R	ABE1	
1914	8	4	22:41	36.0	43.50	91.50		7.2	Mw	G&R	P&S	
1914	10	3	17:22	12.0	16.00	-61.00	100	7.4	mb	G&R	ABE1	
1914	10	3	22:06	34.0	37.50	32.50		7.1	Mw	ISS	P&S	
1914	10	11	16:17	6.0	12.00	94.00	80	7.2	mb	G&R	ABE1	
1914	10	23	6:18	34.0	6.00	132.50		7.6	Mw	ISS	P&S	
1914	11	22	8:14	18.0	-39.00	176.00	100	7.0	mb	G&R	ABE1	
1914	11	24	11:53	30.0	22.00	143.00	110	7.9	mb	G&R	ABE1	
1915	1	5	14:33	15.0	-15.00	168.00	200	7.3	mb	G&R	ABE1	
1915	1	25	23:26	42.0	25.00	123.30	150	7.3	mb	UTSU	ABE1	
1915	2	28	18:59	5.0	23.60	123.50		600	7.1	mb	G&R	ABE1
1915	3	17	18:45	0.0	42.10	143.60	35	7.2	mb	UTSU	ABE1	
1915	5	1	5:00	0.0	47.50	154.50		35	7.9	Mw	UTSU	P&S
1915	5	30	4:07	15.0	-7.50	128.00	100	7.3	mb	G&R	ABE1	
1915	6	21:29	37.0	-18.50	-68.50	160	7.3	mb	G&R	ABE1		
1915	7	31	1:51	24.0	54.00	162.00		7.5	Mw	G&R	P&S	
1915	8	6	13:12	7.0	43.00	150.50		7.1	Mj	ISS	UTSU	
1915	9	7	1:20	48.0	14.00	-89.00	80	7.4	mb	G&R	ABE1	
1915	10	3	6:52	48.0	40.50	-117.50		7.6	Mw	G&R	P&S	
1915	10	8	15:36	3.0	32.80	139.10	200	7.0	mb	UTSU	ABE1	
1915	11	1	7:24	0.0	38.30	142.90		35	7.5	Mw	UTSU	P&S
1915	11	1	9:01	0.0	38.00	143.00		35	7.0	Mj	UTSU	UTSU
1915	11	18	4:04	0.0	37.00	143.10		35	7.0	Mj	UTSU	UTSU
1915	11	21	0:13	42.0	-115.00			7.1	Ms	G&R	AN1	
1915	12	3	2:39	19.0	29.50	91.50		7.0	Ms	ISS	AN1	
1916	1	13:20	36.0	-4.00	154.00			7.7	Mw	G&R	P&S	
1916	1	13	6:18	30.0	-3.00	136.00		7.3	Mw	G&R	P&S	
1916	1	13	8:20	48.0	-3.00	135.50		7.6	Mw	G&R	P&S	
1916	1	24	6:55	7.0	41.00	37.00		7.2	Mw	ISS	P&S	
1916	2	1	7:36	22.0	29.50	131.50		7.4	Mj	ISS	UTSU	
1916	2	6	21:51	19.0	48.50	178.50		7.7	UK	ISS	B&D	
1916	2	27	20:20	48.0	12.00	-90.00		7.3	Mw	G&R	P&S	
1916	4	7	9:26	12.0	-30.00	55.00		7.2	Mw	G&R	P&S	
1916	4	18	4:01	48.0	53.25	-170.00	170	7.4	mb	G&R	ABE1	
1916	4	21	11:31	48.0	32.50	141.80		35	7.0	Ms	UTSU	AN1
1916	4	24	4:26	42.0	18.50	-85.00	80	7.0	mb	G&R	ABE1	
1916	4	24	8:02	12.0	11.00	-85.00		7.2	Mw	G&R	P&S	
1916	4	26	2:21	30.0	10.00	-85.00		7.1	Ms	G&R	AN1	
1916	6	2	13:59	24.0	17.50	-95.00		150	7.0	mb	G&R	ABE1
1916	6	21	21:32	30.0	-28.50	-63.00	600	7.4	mb	G&R	ABE1	
1916	7	8	9:34	30.0	-18.00	180.00	600	7.1	mb	G&R	ABE1	
1916	7	27	11:52	42.0	4.00	96.50	100	7.0	mb	G&R	ABE1	
1916	8	3	1:30	2.0	-4.00	144.50		7.1	Mw	ISS	P&S	
1916	8	25	9:44	42.0	-21.00	-68.00	180	7.0	mb	G&R	ABE1	
1916	8	28	6:39	42.0	30.00	81.00		7.2	Mw	G&R	P&S	
1916	8	28	7:27	5.0	23.90	120.50		5	7.2	Mj	UTSU	UTSU
1916	9	11	6:30	36.0	-9.00	113.00	100	7.1	mb	G&R	ABE1	
1916	9	15	7:01	18.0	34.40	141.20		35	7.1	mb	UTSU	ABE1
1916	10	3	1:26	13.0	-14.00	-74.50		7.1	Ms	ISS	AN1	
1916	10	31	15:30	33.0	45.40	154.00		7.6	Mw	P&S	P&S	
1917	1	30	2:45	36.0	56.50	163.00		7.7	Mw	G&R	P&S	
1917	2	20	19:29	48.0	19.50	-78.50		7.2	Mw	G&R	P&S	
1917	4	21	0:49	49.0	37.00	70.50	220	7.1	mb	G&R	ABE1	
1917	5	1	18:26	30.0	-29.00	-177.00		8.0	Mw	G&R	P&S	
1917	5	31	8:47	20.0	54.50	-160.00		7.5	Mw	ISS	P&S	
1917	6	26	5:49	42.0	-15.50	-173.00		8.5	Mw	G&R	P&S	
1917	7	4	5:38	20.0	25.00	123.00		7.2	Mw	ISS	P&S	
1917	7	4	5:36	30.0	25.00	123.00		7.2	UK	ISS	B&D	
1917	7	27	1:01	18.0	19.00	-67.50	50	7.0	Ms	G&R	AN1	
1917	7	29	14:32	15.0	41.00	144.00		7.0	Ms	ISS	AN1	
1917	7	29	21:52	24.0	-3.50	141.00		7.6	Mw	G&R	P&S	
1917	7	30	23:54	5.0	29.00	104.00		7.3	Mw	ISS	P&S	
1917	7	31	3:25	15.0	42.00	131.00	500	7.4	mb	UTSU	ABE1	
1917	8	30	4:07	10.0	-7.50	128.00	100	7.3	mb	G&R	ABE1	

(continued)

Nevada: Pleasant Valley

China

Turkey

China: E' sh

TABLE 1 (continued)

Year	M	d	h:min	sec	Lat.	Long.	Dep.	Mag.	sc	icat	mdo	Region:	Earthquake Name
1917	8	31	11:36	24.0	4.00	-74.00	7.1	Ms	G&R	AN1			
1917	11	4	12:03	30.0	4.80	96.80	7.1	Ms	ISS	AN1			
1917	11	16	3:19	30.0	-29.00	-177.50	7.3	Mw	G&R	P&S			
1917	12	29	22:50	20.0	15.00	-97.00	7.7	UK	ISS	B&D			
1918	1	30	21:18	36.4	45.45	136.74	330	7.4	Mb	EHF	ABE1		
1918	2	7	5:20	33.9	6.78	126.69	218	7.2	Mb	EHF	ABE1		
1918	2	13	6:07	14.0	23.54	117.24	15	7.2	Mw	EHF	P&S		China: Nan'ao
1918	4	10	2:03	53.8	43.48	130.92	565	7.0	Mb	EHF	ABE1		
1918	5	20	14:36	5.3	7.34	-34.80	15	7.1	Mw	EHF	P&S		
1918	5	20	17:55	10.9	-28.90	-71.89	35	7.6	Mb	EHF	ABE1		
1918	5	22	6:30	46.0	-17.47	-176.49	35	7.1	Mb	EHF	ABE1		
1918	7	3	6:52	8.7	3.47	143.22	35	7.2	Mw	EHF	P&S		
1918	7	8	10:22	7.8	24.81	90.72	15	7.5	Mw	EHF	P&S		
1918	8	15	12:18	16.5	5.65	123.56	35	8.2	Mw	EHF	P&S		Philippines: Mindanao
1918	9	7	17:15	43.9	46.81	150.25	242	7.6	Mb	EHF	ABE1		Kurite Is.
1918	10	11	14:14	40.8	18.47	-67.63	35	7.3	Mw	EHF	P&S		Puerto Rico
1918	10	27	17:06	40.4	-1.12	150.28	35	7.2	Mw	EHF	P&S		
1918	11	8	4:38	10.8	43.82	152.77	64	7.5	Mb	EHF	ABE1		
1918	11	18	8:21	44.3	-7.17	129.21	35	7.5	Mb	EHF	ABE1		
1918	11	23	22:57	48.6	-8.28	126.57	218	7.1	Mb	EHF	ABE1		
1918	12	4	11:47	39.0	-27.27	-73.46	25	7.5	Mw	EHF	P&S		
1919	1	1	1:33	50.1	7.18	126.94	35	7.1	Mw	EHF	P&S		
1919	1	1	3:00	4.3	-19.97	-177.91	203	7.7	Mb	EHF	ABE1		
1919	3	2	3:26	51.4	-41.40	-72.22	15	7.2	Mw	EHF	P&S		
1919	3	2	11:45	16.2	-42.28	-76.45	15	7.1	Mw	EHF	P&S		
1919	4	30	7:17	12.5	-19.82	-172.21	35	8.2	Mw	EHF	P&S		Tonga Is.
1919	5	3	0:52	6.7	41.01	145.23	35	7.3	Mw	EHF	P&S		
1919	6	19	4:00	38.1	-5.48	152.63	233	7.6	Mb	EHF	ABE1		
1919	6	1	6:51	4.8	27.07	123.32	35	7.1	Mb	EHF	ABE1		
1919	8	18	16:55	22.3	-19.76	-178.11	215	7.0	Mb	EHF	ABE1		
1919	8	29	5:44	5.5	-2.68	127.49	35	7.0	Ms	EHF	ABE1		
1919	8	31	17:20	35.1	-15.88	167.34	35	7.3	Mb	EHF	ABE1		
1919	12	20	19:33	0.0	22.50	122.50	35	7.1	MJ	UTSU			Japan: Kanto
1919	12	20	20:37	40.8	23.54	121.21	35	7.0	Mb	EHF	ABE1		
1920	2	2	11:22	14.1	-6.47	151.68	35	7.6	Mw	EHF	P&S		
1920	2	22	17:35	50.6	47.25	146.24	355	7.1	Mb	EHF	ABE1		
1920	3	20	18:31	24.0	-35.70	-110.83	15	7.0	Ms	EHF	ABE1		
1920	6	5	4:21	35.4	23.81	122.08	35	7.9	Mw	EHF	P&S		
1920	9	20	14:59	5.9	-19.92	168.53	35	7.8	Mw	EHF	P&S		
1920	10	18	8:11	38.5	45.55	149.40	35	7.1	Ms	EHF	ABE1		
1920	12	16	12:05	41.0	-39.46	-74.99	35	7.2	Mw	EHF	P&S		
1920	12	16	12:05	54.7	36.60	105.32	25	8.3	Mw	EHF	P&S		
1921	2	4	8:22	43.7	15.41	-90.78	35	7.4	Mb	EHF	ABE1		
1921	2	27	18:23	40.0	-18.65	-173.18	35	7.1	Mw	EHF	P&S		
1921	3	28	7:49	33.2	13.36	-87.36	35	7.2	Mw	EHF	P&S		
1921	4	2	9:36	0.0	23.00	123.00	35	7.2	MJ	UTSU			
1921	7	4	14:18	12.5	28.89	129.91	35	7.4	Mb	EHF	ABE1		
1921	9	11	4:01	26.0	-13.10	110.18	25	7.3	Mw	EHF	P&S		
1921	9	13	2:36	56.4	-56.26	-28.62	35	7.0	Mb	EHF	ABE1		
1921	10	20	6:03	20.6	-20.06	-68.96	114	7.2	Mb	EHF	ABE1		
1921	11	11	18:36	26.2	-13.36	-87.36	35	7.2	Mw	EHF	P&S		
1921	11	11	18:36	26.2	-13.36	-87.36	35	7.2	Mw	EHF	P&S		
1921	11	15	20:36	33.8	36.12	70.72	152	7.6	Mb	EHF	ABE1		Philippines
1921	12	8	12:31	0.0	36.00	140.20	35	7.0	MJ	UTSU			
1921	12	18	15:29	28.8	-4.04	-71.22	545	7.5	Mb	EHF	ABE1		
1922	1	6	14:10	43.8	-20.41	-76.39	25	7.1	Mw	EHF	P&S		
1922	1	9	5:09	33.8	23.22	-45.93	15	7.0	Ms	EHF	ABE1		
1922	1	17	3:50	1.5	-6.48	-71.86	359	7.4	Mb	EHF	ABE1		
1922	1	31	13:17	28.7	40.70	-125.55	15	7.2	Mw	EHF	P&S		Calif.: Cape Mendocino
1922	3	4	13:07	44.7	52.92	157.18	241	7.1	Mb	EHF	ABE1		
1922	3	28	3:58	1.3	-21.45	-68.13	136	7.1	Mb	EHF	ABE1		
1922	9	1	19:16	9.2	24.51	122.04	35	7.5	Mw	EHF	P&S		
1922	9	14	19:31	42.5	24.38	122.64	35	7.1	Mw	EHF	P&S		
1922	10	11	14:50	6.1	16.12	-72.39	140	7.6	Mb	EHF	ABE1		
1922	10	24	21:21	3.4	47.27	152.19	35	7.5	Mb	EHF	ABE1		
1922	11	7	23:00	15.5	-28.44	-72.19	25	7.1	Ms	EHF	ABE1		
1922	11	11	4:32	45.2	-28.55	-70.75	35	8.7	Mw	EHF	P&S		Chile
1922	12	6	13:55	41.0	36.44	70.94	240	7.3	Mb	EHF	ABE1		
1922	12	31	7:20	11.4	45.74	150.80	35	7.0	Ms	EHF	ABE1		
1923	1	22	9:04	19.5	40.49	-125.32	15	7.1	Mw	EHF	P&S		
1923	2	2	5:07	42.7	54.02	161.52	35	7.1	Mw	EHF	P&S		
1923	2	3	16:01	48.8	53.85	160.76	35	8.5	Mw	EHF	P&S		Kamchatka
1923	2	24	7:34	44.2	55.94	162.62	35	7.2	Mw	EHF	P&S		
1923	3	2	16:48	44.6	7.49	124.93	87	7.1	Mw	EHF	P&S		
1923	3	16	22:01	43.7	6.49	127.06	35	7.0	Ms	EHF	ABE1		
1923	3	24	12:40	19.9	30.55	101.26	25	7.2	Mw	EHF	P&S		China: Luhuo-Dawu
1923	4	13	15:31	0.3	55.42	162.59	35	7.1	Mw	EHF	P&S		
1923	5	4	16:26	46.6	53.76	-156.99	25	7.1	Ms	EHF	ABE1		
1923	6	1	17:24	46.5	53.67	141.77	35	7.1	Mw	EHF	P&S		
1923	6	1	20:14	0.0	36.00	142.00	35	7.1	MJ	UTSU			
1923	6	22	6:44	38.5	22.59	98.68	25	7.2	Mw	EHF	P&S		
1923	7	13	11:13	41.2	31.00	130.90	35	7.1	Ms	EHF	ABE1		
1923	9	1	2:58	37.0	35.40	139.08	35	7.9	Mw	EHF	P&S		
1923	9	1	3:03	0.0	35.10	139.50	35	7.3	MJ	UTSU			Japan: Kanto
1923	9	1	3:48	0.0	35.40	139.80	35	7.0	MJ	UTSU			
1923	9	2	2:46	46.5	34.90	140.20	35	7.6	Mw	EHF	P&S		
1923	9	2	9:27	0.0	34.90	140.50	35	7.1	MJ	UTSU			Bangladesh/India
1923	9	9	22:03	53.2	24.94	90.32	35	7.1	Ms	EHF	ABE1		
1923	10	7	3:29	42.1	-1.20	129.49	35	7.2	Mw	EHF	P&S		
1923	11	2	21:08	11.5	-4.65	154.23	145	7.2	Mb	EHF	ABE1		
1923	11	5	21:28	2.2	29.65	129.64	35	7.1	Mw	EHF	P&S		
1924	1	14	20:50	0.0	35.50	139.20	5	7.3	MJ	UTSU			
1924	1	16	21:37	59.2	-22.03	-177.91	350	7.0	Mb	EHF	ABE1		
1924	3	4	10:07	52.5	9.56	-83.84	35	7.0	Ms	EHF	P&S		
1924	4	14	16:20	41.4	7.02	125.95	35	8.2	Mw	EHF	P&S		Philippines: Mindanao
1924	5	4	16:51	51.4	-21.50	-178.44	562	7.2	Mb	EHF	ABE1		
1924	5	6	16:09	31.3	15.94	118.95	35	7.0	Ms	EHF	ABE1		
1924	5	28	9:52	0.3	48.38	145.75	432	7.0	Mb	EHF	ABE1		
1924	6	26	1:57	32.5	-56.41	158.49	15	8.3	Mw	EHF	P&S		
1924	6	30	15:44	25.8	44.74	147.42	140	7.2	Mb	EHF	ABE1		
1924	7	3	4:40	14.8	36.63	83.90	35	7.1	Mw	EHF	P&S		China: Minfeng

Year	M	d	h:min	sec	Lat.	Long.	Dep.	Mag.	sc	icat	mdo	Region:	Earthquake Name
1924	7	11	19:44	45.2	36.79	83.96	35	7.1	Mw	EHB	P&S		
1924	7	24	4:55	22.1	-49.86	159.82	35	7.0	Ms	EHB	ABE1		
1924	8	14	18:02	39.8	36.13	141.89	35	7.0	Ms	EHB	ABE1		
1924	8	30	3:05	2.5	8.45	126.53	35	7.2	Mw	EHB	P&S		
1924	10	13	16:17	46.1	36.52	70.83	179	7.2	mb	EHB	ABE1		
1924	12	27	11:21	53.6	44.16	146.37	35	7.0	Ms	EHB	ABE1		
1924	12	28	22:55	4.8	43.40	146.58	35	7.0	Ms	EHB	ABE1		
1925	1	18	12:05	57.2	47.91	153.63	35	7.2	Mw	EHB	P&S		
1925	2	20	1:02	0.0	45.50	150.50	35	7.0	Mj	UTSU	UTSU		
1925	3	16	14:42	18.8	25.69	100.49	25	7.0	Ms	EHB	ABE1	China: Dali	
1925	3	22	8:42	0.3	-18.58	168.53	35	7.1	Mw	EHB	P&S		
1925	4	16	19:52	43.6	21.80	121.11	35	7.1	Ms	EHB	ABE1		
1925	5	3	17:21	47.5	-1.22	126.58	35	7.1	Ms	EHB	ABE1		
1925	5	15	11:57	5.3	-25.50	-57.95	15	7.0	Ms	EHB	ABE1		
1925	6	3	4:33	59.6	1.47	126.19	35	7.0	Ms	EHB	ABE1		
1925	6	9	13:40	22.9	-4.14	143.10	35	7.0	Ms	EHB	ABE1		
1925	8	19	12:07	33.7	55.13	167.68	35	7.0	Ms	EHB	ABE1		
1925	10	13	17:40	37.7	10.60	-42.13	15	7.0	Ms	EHB	ABE1		
1925	11	10	13:50	40.9	-0.63	130.27	35	7.2	Mw	EHB	P&S		
1925	11	13	12:14	53.4	12.73	124.85	35	7.2	Mw	EHB	P&S		
1925	11	16	11:55	1.4	18.37	-106.81	25	7.0	Ms	EHB	ABE1		
1926	1	25	0:36	29.3	-9.99	159.03	35	7.2	Mw	EHB	P&S		
1926	2	8	15:17	57.4	12.01	-88.79	35	7.1	Mw	EHB	P&S		
1926	3	21	14:19	14.3	-60.63	-23.67	35	7.1	Ms	EHB	ABE1		
1926	3	27	10:48	21.1	-8.56	160.55	35	7.1	Mw	EHB	P&S		
1926	4	12	8:52	34.1	-10.71	160.63	35	7.2	Mw	EHB	P&S		
1926	4	28	11:13	39.3	-22.67	-68.16	35	7.1	mb	EHB	ABE1		
1926	6	3	4:47	3.8	-15.05	168.19	77	7.1	mb	EHB	ABE1		
1926	6	26	19:46	41.0	36.60	26.89	102	7.7	mb	EHB	ABE1	Greece	
1926	6	29	14:27	3.8	26.99	127.47	142	7.4	mb	EHB	ABE1		
1926	8	25	5:44	47.9	-23.01	171.82	35	7.0	Ms	EHB	ABE1		
1926	8	30	11:58	9.7	36.90	23.00	85	7.1	mb	EHB	ABE1		
1926	9	10	10:34	27.8	-9.15	110.70	35	7.0	mb	EHB	ABE1		
1926	10	3	19:38	1.7	-49.81	161.70	15	7.3	Mw	EHB	P&S		
1926	10	13	19:08	16.9	51.77	-175.36	35	7.0	Ms	EHB	ABE1		
1926	10	26	3:44	43.6	-3.22	139.10	35	7.5	Mw	EHB	P&S		
1926	11	5	7:55	30.1	12.67	-86.74	35	7.1	mb	EHB	ABE1		
1927	1	24	1:05	47.5	-18.39	168.23	35	7.1	Ms	EHB	ABE1		
1927	2	16	1:55	27.7	46.62	153.07	35	7.0	Ms	EHB	ABE1		
1927	3	3	1:05	14.9	-6.62	121.81	35	7.0	Ms	EHB	ABE1		
1927	3	7	9:27	42.1	35.80	134.92	10	7.1	Mw	EHB	P&S		
1927	4	1	19:05	38.5	-19.80	-177.48	35	7.0	mb	EHB	ABE1		
1927	4	14	6:23	30.3	-32.48	-69.68	35	7.2	mb	EHB	ABE1		
1927	4	19	17:50	11.5	15.25	120.45	139	7.1	mb	EHB	ABE1		
1927	5	22	22:32	48.0	37.39	102.31	25	7.7	Mw	EHB	P&S		
1927	6	3	7:12	18.0	-7.07	130.96	169	7.2	mb	EHB	ABE1		
1927	7	1	8:18	58.5	36.38	22.72	35	7.0	mb	EHB	ABE1		
1927	8	5	21:12	58.8	37.87	142.19	35	7.1	Ms	EHB	ABE1		
1927	8	10	11:36	15.7	-0.53	131.67	35	7.1	Mw	EHB	P&S		
1927	10	24	15:59	56.2	57.44	-136.37	15	7.1	Ms	EHB	ABE1		
1927	11	4	23:12	30.9	-45.11	-121.03	15	7.0	Ms	EHB	ABE1		
1927	11	26	12:54	0.4	-24.32	-66.96	179	7.0	mb	EHB	ABE1		
1927	12	28	18:20	34.2	55.66	160.04	35	7.5	Mw	EHB	P&S		
1928	3	9	18:05	27.8	-2.95	88.80	15	7.7	Mw	EHB	P&S		
1928	3	13	18:31	35.1	-7.21	153.87	35	7.0	mb	EHB	ABE1		
1928	3	16	5:01	10.2	-22.28	170.48	35	7.5	Mw	EHB	P&S		
1928	3	22	4:17	8.4	16.13	-96.50	35	7.5	Mw	EHB	P&S		
1928	3	29	5:06	8.4	31.68	137.73	434	7.0	mb	EHB	ABE1		
1928	5	14	22:14	51.5	-5.26	-78.56	35	7.2	Mw	EHB	P&S		
1928	5	27	9:50	27.5	39.81	143.00	35	7.1	Ms	EHB	ABE1		
1928	6	15	6:12	42.3	12.73	120.82	35	7.0	Ms	EHB	ABE1		
1928	6	17	3:19	33.0	16.03	-97.04	35	7.7	Mw	EHB	P&S		
1928	6	29	22:49	45.5	-15.66	170.70	35	7.1	Ms	EHB	ABE1		
1928	8	4	18:26	20.0	16.42	-98.27	35	7.2	Mw	EHB	P&S	Indonesia	
1928	8	12	8:08	44.6	1.83	127.24	35	7.0	mb	EHB	ABE1		
1928	8	24	21:43	31.1	-14.29	168.50	220	7.0	mb	EHB	ABE1		
1928	10	9	3:01	14.2	16.23	-97.53	35	7.5	Mw	EHB	P&S	Chile	
1928	12	1	4:06	15.2	-35.09	-71.68	35	7.7	Mw	EHB	P&S		
1928	12	19	11:37	17.2	6.98	124.86	35	7.3	Mw	EHB	P&S	Philippines	
1929	1	13	0:03	3.2	50.45	154.87	35	7.4	mb	EHB	ABE1		
1929	2	1	17:14	26.0	36.46	70.93	208	7.0	mb	EHB	ABE1		
1929	2	22	20:41	49.8	10.48	-41.88	15	7.0	Ms	EHB	ABE1		
1929	3	7	1:34	42.8	50.79	-169.52	25	7.8	Mw	EHB	P&S		
1929	5	1	15:37	37.1	37.96	57.69	25	7.1	Mw	EHB	P&S	Iran	
1929	5	26	22:40	2.6	51.24	-130.56	15	7.0	Ms	EHB	ABE1		
1929	6	4	15:15	24.4	6.02	125.64	35	7.1	mb	EHB	ABE1		
1929	6	13	9:24	38.2	7.95	126.81	35	7.1	Mw	EHB	P&S	NZ: West Nelson	
1929	6	16	22:47	32.2	-41.83	172.29	35	7.5	Mw	EHB	P&S		
1929	6	27	12:47	14.9	-54.71	-29.55	35	8.0	Mw	EHB	P&S		
1929	7	5	14:19	8.7	51.42	-178.14	35	7.0	Ms	EHB	ABE1		
1929	7	21	23:16.5	51.35	-177.91	-177.91	35	7.2	Mw	EHB	P&S		
1929	10	19	10:12	51.4	-23.04	-68.74	35	7.4	mb	EHB	ABE1		
1929	11	15	18:50	32.2	7.52	142.74	25	7.1	Ms	EHB	ABE1		
1929	11	18	20:32	0.8	44.54	-56.01	15	7.4	Mw	EHB	P&S	Atlantic: Grand Banks	
1929	12	17	10:58	44.3	53.78	171.51	35	7.7	Mw	EHB	P&S		
1930	1	5	1:19	48.7	49.96	153.58	108	7.0	mb	EHB	ABE1		
1930	5	5	13:45	59.8	17.67	96.54	35	7.2	Mw	EHB	P&S	Myanmar	
1930	5	6	22:34	27.8	38.15	44.69	25	7.1	Mw	EHB	P&S	Iran	
1930	6	11	0:49	42.6	-5.87	148.89	35	7.1	Ms	EHB	ABE1		
1930	7	2	21:03	44.6	25.64	90.25	35	7.1	Ms	EHB	ABE1		
1930	10	24	20:15	12.9	18.35	146.57	35	7.0	Ms	EHB	ABE1		
1930	12	3	18:51	49.7	17.97	96.42	35	7.3	Mw	EHB	P&S		
1930	12	21	14:51	12.9	19.99	121.58	35	7.0	mb	EHB	ABE1		
1931	1	15	1:50	47.1	16.05	-96.61	35	7.8	Mw	EHB	P&S	Mexico	
1931	1	27	20:09	22.1	25.67	96.75	35	7.6	Mw	EHB	P&S		
1931	1	28	21:24	10.9	10.78	144.80	35	7.1	Ms	EHB	ABE1		
1931	2	2	22:46	51.3	-39.77	176.02	35	7.7	Mw	EHB			



Year	M	d	h:min	sec	Lat.	Long.	Dep.	Mag.	sc	icat	mdo	Region:	Earthquake Name
1937	7	2	2	37	16.7	-13.86	167.05	35	7.0	mb	EHB	ABE1	
1937	7	19	19	35	28.0	-1.98	-76.40	184	7.1	mb	EHB	ABE1	
1937	7	22	17	09	35.3	64.49	-146.85	35	7.2	Mw	EHB	P&S	
1937	4	16	3	01	38.0	-20.77	-177.14	349	7.5	Mw	EHB	ABE1	
1937	6	21	15	:13	5.9	-8.44	-79.85	42	7.1	Ms	EHB	ABE1	
1937	7	2	2	37	16.7	-13.86	167.05	35	7.0	mb	EHB	ABE1	
1937	7	19	19	35	28.0	-1.98	-76.40	184	7.1	mb	EHB	ABE1	
1937	7	22	17	09	35.3	64.49	-146.85	35	7.2	Mw	EHB	P&S	
1937	7	26	19	:56	34.5	38.40	142.17	35	7.1	mb	EHB	ABE1	
1937	8	11	0	:55	48.3	-9.68	117.53	35	7.2	mb	EHB	ABE1	
1937	8	20	11	:59	22.3	14.32	121.55	35	7.3	Mw	EHB	P&S	
1937	9	3	18	:48	11.0	52.45	-177.40	35	7.2	mb	EHB	ABE1	
1937	9	8	0	:40	14.8	-56.54	-26.91	219	7.1	mb	EHB	ABE1	
1937	9	15	12	:27	32.0	-10.50	161.50	80	7.2	mb	EHB	ABE1	
1937	9	27	8	:55	16.5	-9.03	110.80	35	7.0	Ms	EHB	ABE1	
1937	11	14	10	:58	13.1	36.57	70.67	200	7.1	mb	EHB	ABE1	
1937	12	8	8	:32	15.0	22.87	121.01	39	7.0	Ms	EHB	ABE1	
1937	12	23	13	:18	6.2	17.43	-98.29	35	7.4	Mw	EHB	P&S	
1938	1	24	10	:31	50.1	-60.55	-35.58	15	7.0	Ms	EHB	ABE1	
1938	2	1	19	:04	21.6	-5.05	131.62	35	8.4	Mw	EHB	P&S	Banda Sea
1938	5	12	15	:59	5.8	-6.27	147.80	35	7.3	Mw	EHB	P&S	
1938	5	19	17	:08	36.1	-0.37	119.53	49	7.5	Mw	EHB	P&S	
1938	5	23	7	:18	32.5	36.46	141.76	35	7.7	Mw	EHB	P&S	
1938	5	23	8	:21	54.1	18.05	119.99	35	7.0	mb	EHB	ABE1	
1938	5	30	14	:29	52.2	-19.88	169.16	35	7.0	mb	EHB	ABE1	
1938	6	9	19	:15	11.4	-3.14	126.95	25	7.0	Ms	EHB	ABE1	
1938	6	10	9	:53	44.6	25.21	125.11	35	7.6	Mw	EHB	P&S	
1938	6	16	2	:15	19.7	27.58	129.54	35	7.2	Mw	EHB	P&S	
1938	8	16	4	:27	56.7	22.96	93.88	35	7.1	Mw	EHB	P&S	
1938	9	7	4	:03	23.7	23.74	121.41	47	7.0	Ms	EHB	ABE1	
1938	10	10	20	:48	10.6	2.39	126.55	35	7.2	Mw	EHB	P&S	
1938	10	20	2	:19	24.5	-9.27	123.24	35	7.3	mb	EHB	ABE1	
1938	11	5	8	:43	22.6	37.01	142.04	35	7.9	Mw	EHB	P&S	
1938	11	5	10	:50	16.8	37.11	142.08	35	7.8	Mw	EHB	P&S	
1938	11	6	8	:53	55.0	37.29	142.28	35	7.7	Mw	EHB	P&S	
1938	11	6	21	:38	46.2	36.87	142.62	35	7.0	Ms	EHB	ABE1	
1938	11	10	20	:18	47.0	55.33	-158.37	35	8.0	Mw	EHB	P&S	Alaska
1938	11	13	22	:31	32.9	36.73	142.36	35	7.0	Ms	EHB	ABE1	
1938	11	17	3	:54	40.5	55.22	-157.55	35	7.2	Mw	EHB	P&S	
1938	12	6	23	:00	55.6	22.61	121.40	39	7.0	Ms	EHB	ABE1	
1939	1	25	3	:32	0.0	-36.20	-72.20	35	7.7	Mw	P&S	Chile: Chillan	
1939	1	30	2	:18	30.0	-7.08	155.39	35	7.7	Mw	EHB	P&S	
1939	2	3	5	:26	26.5	-9.48	159.36	35	7.1	Ms	EHB	ABE1	
1939	3	2	7	:00	20.1	-4.38	143.15	35	7.0	mb	EHB	ABE1	
1939	3	21	1	:11	13.6	-1.28	89.40	15	7.0	Ms	EHB	ABE1	
1939	4	5	16	:42	45.0	-19.71	168.98	35	7.0	mb	EHB	ABE1	
1939	4	18	6	:22	43.8	-27.14	-70.71	35	7.3	mb	EHB	ABE1	
1939	4	30	2	:55	29.1	-9.30	159.23	35	7.9	Mw	EHB	P&S	Solomon Is.
1939	5	1	5	:58	32.6	39.84	139.97	35	7.0	Ms	EHB	ABE1	
1939	6	8	20	:46	51.4	-15.27	-173.93	35	7.0	mb	EHB	ABE1	
1939	8	12	2	:07	29.2	-16.06	168.15	172	7.0	mb	EHB	ABE1	
1939	10	17	6	:22	11.4	-14.81	167.29	101	7.3	mb	EHB	ABE1	
1939	12	16	10	:46	31.2	43.62	147.80	35	7.1	mb	EHB	ABE1	
1939	12	21	20	:54	53.3	9.99	-84.55	35	7.2	Mw	EHB	P&S	
1939	12	21	21	:00	33.2	0.21	122.57	35	7.8	mb	EHB	ABE1	
1939	12	26	23	:57	22.6	39.77	39.53	35	7.7	Mw	EHB	P&S	Turkey: Erzincan
1940	1	6	14	:03	29.7	-21.69	170.78	80	7.2	mb	EHB	ABE1	
1940	1	17	1	:14	58.7	17.24	148.22	31	7.3	mb	EHB	ABE1	
1940	2	20	2	:18	23.6	-13.78	167.14	191	7.0	mb	EHB	ABE1	
1940	4	16	6	:43	9.6	52.82	173.35	35	7.1	Ms	EHB	ABE1	
1940	5	19	4	:36	48.9	33.22	-115.70	15	7.1	Ms	EHB	ABE1	Calif.: Imperial Valley
1940	5	24	16	:33	58.1	-11.12	-77.63	50	7.5	Mw	EHB	P&S	Peru
1940	5	28	9	:40	47.8	-2.32	139.15	35	7.0	Ms	EHB	ABE1	
1940	7	10	5	:49	58.6	44.39	130.78	578	7.3	mb	EHB	ABE1	
1940	7	14	5	:52	54.4	52.12	178.16	35	7.4	mb	EHB	ABE1	
1940	8	1	15	:08	26.4	44.51	139.83	35	7.5	Mw	EHB	P&S	
1940	8	22	3	:27	18.0	53.00	-165.50	60	7.0	Ms	G&R	ABE1	
1940	9	12	13	:17	10.0	-4.50	153.00	40	7.1	Ms	G&R	ABE1	
1940	9	19	18	:19	48.0	-24.00	171.00	80	7.0	mb	G&R	ABE1	
1940	9	22	22	:51	56.0	8.00	124.00	680	7.0	mb	ABE1	ABE1	
1940	10	4	7	:54	50.1	-20.59	-70.72	24	7.1	mb	EHB	ABE1	
1940	10	11	18	:41	13.7	-42.04	-73.93	15	7.0	Ms	EHB	ABE1	
1940	11	10	1	:39	8.4	45.77	26.66	122	7.3	mb	EHB	ABE1	Romania
1940	12	28	16	:37	46.6	18.14	147.53	35	7.3	mb	EHB	ABE1	
1941	1	15	16	:27	40.1	-4.72	152.32	35	7.0	Ms	EHB	ABE1	
1941	2	4	14	:03	19.8	10.08	124.00	602	7.0	mb	EHB	ABE1	
1941	4	3	15	:21	30.7	-22.58	-66.64	150	7.2	mb	EHB	ABE1	
1941	4	7	23	:29	18.7	17.26	-78.59	15	7.0	Ms	EHB	ABE1	
1941	4	15	19	:09	57.0	18.68	-102.96	35	7.6	Mw	EHB	P&S	Mexico
1941	5	17	2	:24	58.5	-10.46	166.14	35	7.2	Mw	EHB	P&S	
1941	6	26	11	:52	6.6	12.15	92.48	49	7.7	Mw	EHB	P&S	
1941	8	2	11	:41	29.1	-29.77	-177.61	35	7.1	Ms	EHB	ABE1	
1941	9	4	10	:21	40.9	-5.07	153.69	35	7.1	mb	EHB	ABE1	
1941	9	18	13	:14	9.7	-13.93	-72.29	61	7.0	mb	EHB	ABE1	
1941	11	8	23	:37	28.4	0.72	122.86	35	7.2	Mw	EHB	P&S	
1941	11	15	4	:19	57.3	-59.80	-26.99	35	7.1	mb	EHB	ABE1	
1941	11	18	10	:14	41.7	-60.76	-55.37	35	7.1	Ms	EHB	ABE1	
1941	11	18	16	:46	0.0	32.00	132.00	7.7	Mw	P&S	P&S		
1941	11	24	21	:46	21.9	28.28	-177.61	35	7.0	mb	EHB	ABE1	
1941	11	25	18	:03	58.7	37.17	-18.96	25	8.1	Mw	EHB	P&S	North Atlantic
1941	12	5	20	:47	4.4	8.75	-83.16	35	7.3	Ms	EHB	P&S	
1941	12	6	21	:24	44.7	8.14	-84.40	35	7.0	Ms	EHB	ABE1	
1941	12	16	19	:19	45.7	23.25	120.39	35	7.1	Mw	EHB	P&S	Taiwan: Chiayi
1941	12	26	14	:48	3.1	21.08	99.14	25	7.0	Ms	EHB	ABE1	
1942	1	27	13	:29	11.3	-4.32	134.84	18	7.1	Ms	EHB	ABE1	
1942	1	29	9	:23	48.9	-19.32	169.04	118	7.0	mb	EHB	ABE1	
1942	3	5	19	:48	19.0	44.27	141.63	259	7.0	mb	EHB	ABE1	
1942	4	8	15	:40	28.8	12.85	120.55	41	7.3	Mw	EHB	P&S	

(continued)

TABLE 1 (continued)

Year	M	d	h:min	sec	Lat.	Long.	Dep.	Mag.	sc	icat	mdo	Region:	Earthquake	Name
1942	5	14	2:13	28.3	0.01	-79.90	35	7.8	Mw	EHB	P&S	Peru/Ecuador		
1942	5	28	1:01	55.0	-0.07	123.78	104	7.4	mb	EHB	ABE1			
1942	6	14	3:09	58.0	14.55	148.01	49	7.0	Ms	EHB	ABE1			
1942	6	18	9:31	0.9	9.12	140.10	35	7.0	Ms	EHB	ABE1			
1942	6	24	11:16	30.7	-41.53	175.63	35	7.0	Ms	EHB	ABE1	NZ: Mairarapa		
1942	7	8	6:55	43.1	-24.60	-70.19	35	7.0	mb	EHB	ABE1			
1942	8	6	23:37	0.4	13.78	-90.91	35	7.7	Mw	EHB	P&S			
1942	8	24	22:50	31.7	-14.98	-74.92	32	7.7	Mw	EHB	P&S	Peru		
1942	10	20	13:21	52.2	7.73	122.60	35	7.2	Mw	EHB	P&S			
1942	11	10	11:41	28.1	-49.73	29.95	15	8.0	Mw	EHB	P&S			
1942	11	26	14:27	31.5	45.40	150.18	76	7.4	mb	EHB	ABE1			
1942	11	28	10:38	46.6	7.28	-35.64	15	7.1	Ms	EHB	ABE1			
1942	12	20	14:03	11.1	40.67	36.45	35	7.2	Mw	EHB	P&S	Turkey: Anatolia		
1943	2	22	9:20	45.0	17.75	-101.50	7.4	Mw	G&R	P&S				
1943	2	28	12:54	35.0	36.50	70.50	210	7.1	mb	G&R	ABE1			
1943	3	9	9:48	55.0	-60.00	-27.00	7.1	Mw	G&R	P&S				
1943	3	14	18:37	56.0	-20.00	-69.50	150	7.1	mb	G&R	ABE1			
1943	3	21	20:35	43.0	-5.75	152.25	7.1	Ms	G&R	ABE1				
1943	3	25	18:27	15.0	-60.00	-27.00	7.0	Ms	G&R	ABE1				
1943	4	1	14:18	8.0	-6.50	105.50	7.1	Ms	G&R	ABE1				
1943	4	6	16:07	15.0	-30.75	-72.00	8.2	Mw	G&R	P&S				
1943	5	2	17:18	9.0	6.50	-80.00	7.0	Ms	G&R	ABE1				
1943	5	3	1:59	12.0	12.50	125.50	7.2	Mw	G&R	P&S				
1943	5	25	23:07	36.0	7.50	128.00	7.6	Mw	G&R	P&S				
1943	6	8	20:42	46.0	-1.00	101.00	50	7.2	Mw	G&R	P&S			
1943	6	9	3:06	22.0	-1.00	101.00	50	7.5	Mw	G&R	P&S			
1943	6	13	5:11	49.0	42.75	143.25	60	7.1	Mw	G&R	P&S			
1943	7	29	3:02	16.0	19.25	-67.50	7.6	mb	G&R	ABE1				
1943	9	6	3:41	30.0	-53.00	159.00	7.6	Mw	G&R	P&S				
1943	9	10	8:36	53.0	35.25	134.00	7.0	Mw	G&R	P&S				
1943	9	14	2:01	12.0	-22.00	171.00	50	7.2	Mw	G&R	P&S			
1943	9	14	3:47	15.0	-20.00	170.00	50	7.1	Ms	G&R	ABE1			
1943	9	14	7:18	8.0	-30.00	-177.00	60	7.4	Ms	G&R	ABE1			
1943	9	27	22:03	44.0	-30.00	-178.00	90	7.0	mb	G&R	ABE1			
1943	10	23	17:23	16.0	26.00	93.00	7.1	Mw	G&R	P&S				
1943	11	2	18:08	22.0	-57.00	-26.00	7.2	Mw	G&R	P&S				
1943	11	3	14:32	17.0	61.75	-151.00	7.2	Mw	G&R	P&S				
1943	11	6	8:31	37.0	-6.00	134.50	7.6	Mw	G&R	P&S				
1943	11	13	18:43	57.0	-19.00	170.00	7.2	Mw	G&R	P&S				
1943	11	26	21:25	22.0	-2.50	100.00	130	7.1	mb	G&R	ABE1			
1943	11	26	22:20	36.0	41.00	34.00	7.5	Mw	G&R	P&S				
1943	12	1	6:04	55.0	-4.75	144.00	120	7.3	mb	G&R	ABE1			
1943	12	1	10:34	46.0	-19.50	-69.75	80	7.1	mb	G&R	ABE1			
1943	12	23	19:00	10.0	-5.50	153.50	50	7.2	Mw	G&R	P&S			
1944	1	7	2:49	20.0	-4.50	143.50	120	7.0	mb	G&R	ABE1			
1944	1	15	23:49	30.0	-31.25	-68.75	50	7.1	Mw	G&R	P&S	Argentina: San Juan		
1944	2	1	3:22	36.0	41.50	32.50	7.2	Mw	G&R	P&S				
1944	2	29	3:41	53.0	-14.50	-70.50	200	7.1	mb	G&R	ABE1			
1944	2	29	16:28	7.0	0.50	76.00	7.1	Ms	G&R	ABE1				
1944	3	9	22:12	58.0	44.00	84.00	7.1	Ms	G&R	ABE1				
1944	3	22	0:43	18.0	-8.50	123.50	220	7.2	mb	G&R	ABE1			
1944	3	31	2:51	43.0	-7.00	130.50	60	7.0	Ms	G&R	P&S			
1944	4	27	14:38	9.0	-0.50	133.50	50	7.2	Mw	G&R	P&S			
1944	5	19	0:19	19.0	-2.50	152.75	50	7.0	Ms	G&R	ABE1			
1944	5	25	1:06	37.0	-21.50	-179.50	640	7.0	mb	G&R	ABE1			
1944	5	25	12:58	5.0	-2.50	152.75	7.3	Mw	G&R	P&S				
1944	6	21	10:58	20.0	-22.00	169.00	50	7.0	Ms	G&R	ABE1			
1944	6	28	7:38	34.0	15.00	-92.50	7.1	Ms	G&R	ABE1				
1944	7	27	0:04	23.0	54.00	-165.50	70	7.1	mb	G&R	ABE1			
1944	9	23	12:13	20.0	54.00	160.00	40	7.1	Mw	G&R	P&S			
1944	10	5	17:28	27.0	-22.50	172.00	120	7.0	Ms	G&R	ABE1			
1944	11	15	20:47	1.0	4.50	127.50	7.0	Ms	G&R	ABE1				
1944	11	16	12:10	58.0	-12.50	167.00	7.2	Mw	G&R	P&S				
1944	11	24	4:49	3.0	-19.00	169.00	170	7.4	mb	G&R	ABE1			
1944	11	29	18:51	21.0	-19.00	169.00	170	7.1	mb	G&R	ABE1			
1944	12	7	4:35	42.0	33.75	136.00	8.1	Mw	G&R	P&S	Japan: Tonamakai			
1944	12	10	16:24	58.0	-18.00	168.00	50	7.0	Ms	G&R	ABE1			
1945	2	1	10:35	51.0	-22.00	170.00	60	7.0	ms	G&R	ABE1			
1945	2	1	12:13	40.0	-22.00	170.00	60	7.2	mb	G&R	ABE1			
1945	2	10	4:57	56.0	41.25	142.50	50	7.1	Ms	G&R	ABE1			
1945	3	23	23:14	13.0	-62.00	153.00	7.0	Ms	G&R	ABE1				
1945	4	15	2:35	22.0	57.00	164.00	7.1	Mw	G&R	P&S				
1945	7	15	5:35	13.0	17.50	146.50	120	7.1	mb	G&R	ABE1			
1945	8	29	10:22	40.0	-15.00	168.00	50	7.1	Ms	G&R	ABE1			
1945	9	1	22:44	10.0	-46.50	165.50	7.1	Ms	G&R	ABE1				
1945	9	5	21:48	45.0	-5.00	153.50	50	7.1	Ms	G&R	ABE1			
1945	9	13	11:17	11.0	-33.25	-70.50	100	7.0	mb	G&R	ABE1			
1945	10	9	14:36	33.0	43.50	147.50	80	7.0	mb	G&R	ABE1			
1945	11	27	21:56	50.0	24.50	63.00	8.0	Mw	G&R	P&S	Iran/Pakistan			
1945	12	8	1:04	2.0	-6.50	151.00	7.1	Ms	G&R	ABE1				
1945	12	28	17:48	45.0	-6.00	150.00	7.6	Mw	G&R	P&S				
1946	1	5	19:57	20.0	-16.00	167.00	50	7.1	Mw	G&R	P&S			
1946	1	17	9:30	35.0	-7.50	147.50	100	7.2	mb	G&R	ABE1			
1946	4	1	12:28	54.0	52.75	-163.50	8.0	Mw	G&R	P&S	Aleutians			
1946	4	11	1:52	20.0	-1.00	-14.50	7.2	Mw	G&R	P&S				
1946	5	3	22:23	43.0	-6.00	154.00	7.2	Mw	G&R	P&S				
1946	5	8	5:20	22.0	0.00	99.50	7.1	Ms	G&R	ABE1				
1946	6	23	17:13	22.0	49.75	-124.50	7.6	Mw	G&R	P&S				
1946	7	9	13:13	50.0	-19.00	169.00	170	7.2	mb	G&R	ABE1			
1946	8	2	19:18	48.0	-26.50	-70.50	50	7.1	Ms	G&R	ABE1			
1946	8	4	17:51	5.0	19.25	-69.00	7.9	Mw	G&R	P&S	Dominica/Puerto Rico			
1946	8	8	13:28	28.0	19.50	-69.50	7.5	Mw	G&R	P&S				
1946	8	28	22:28	15.0	-26.00	-63.00	580	7.1	mb	G&R	ABE1			
1946	9	12	15:17	15.0	23.50	96.00	7.3	Mw	G&R	P&S				
1946	9	12	15:20	20.0	23.50	96.00	7.7	Mw	G&R	P&S				
1946	9	23	23:50	0.0	-6.00	145.00	100	7.1	mb	G&R	ABE1			
1946	9	29	3:01	55.0	-4.50	153.50	7.6	Mw	G&R	P&S				
1946	11	1	11:14	24.0	51.50	-174.50	40	7.0	Ms	G&R	ABE1			
1946	11	2	18:28	25.0	41.50	72.50	7.3	Mw	G&R	P&S				

Year	M	d	h:min	sec	Lat.	Long.	Dep.	Mag.	sc	icat	mdo	Region:Earthquake Name	
1946	11	4	21:47	47.0	39.75	54.50	7.1	Mw	G&R	P&S		Turkmenistan/Kazandzh.	
1946	11	12	17:28	41.0	-20.00	-173.50	7.1	Mw	G&R	P&S			
1946	11	28	15:51	35.0	-18.50	-174.00	290	7.0	Mb	G&R	ABE1		
1946	12	20	19:19	5.0	32.50	134.50	8.1	Mw	G&R	P&S		Japan: Nankai	
1946	12	21	10:18	49.0	44.00	149.00	7.2	Mw	G&R	P&S			
1947	1	26	10:06	46.0	12.50	-86.25	170	7.0	Mb	G&R	ABE1		
1947	1	29	8:17	50.0	-26.00	-63.00	580	7.0	Mb	G&R	ABE1		
1947	3	17	8:19	32.0	33.00	99.50	7.5	Mw	G&R	P&S			
1947	3	25	20:32	14.0	-38.75	178.50	7.0	Mb	G&R	ABE1			
1947	4	2	5:39	11.0	-1.50	138.00	7.2	Mw	G&R	P&S			
1947	4	14	7:15	33.0	44.00	148.50	7.1	Ms	G&R	ABE1			
1947	5	6	20:30	32.0	-6.50	148.50	7.3	Mw	G&R	P&S			
1947	5	27	5:58	54.0	-1.50	135.25	7.2	Mw	G&R	P&S			
1947	6	12	9:02	30.0	1.50	126.50	4.0	7.1	Ms	G&R	ABE1		
1947	7	29	13:43	22.0	28.50	94.00	7.3	Mw	G&R	P&S			
1947	9	26	16:01	57.0	24.75	123.00	110	7.4	Mb	G&R	ABE1		
1947	10	16	2:09	47.0	64.50	-147.50	7.1	Mw	G&R	P&S			
1947	11	1	14:58	53.0	-10.50	-75.00	7.7	Mw	G&R	P&S		Peru	
1947	11	4	0:09	10.0	44.00	140.50	7.1	Ms	G&R	ABE1			
1948	1	24	17:46	40.0	10.50	122.00	8.1	Mw	G&R	P&S		Philippines	
1948	1	27	11:58	28.0	-20.50	-178.00	630	7.0	Mb	G&R	ABE1		
1948	1	28	3:47	21.0	1.50	126.50	80	7.1	Mb	G&R	ABE1		
1948	3	1	12:28	0	-3.00	127.50	50	7.1	Ms	G&R	ABE1		
1948	3	3	9:09	54.0	18.50	119.00	7.1	Mw	G&R	P&S			
1948	4	17	16:11	28.0	33.00	135.75	7.2	Mw	G&R	P&S			
1948	4	21	20:22	2.0	19.25	-69.25	40	7.1	Ms	G&R	ABE1		
1948	5	11	8:55	41.0	-17.50	-70.25	70	7.4	Mb	G&R	ABE1		
1948	5	14	22:31	43.0	54.50	-161.00	7.3	Mw	G&R	P&S			
1948	5	25	7:11	21.0	29.50	100.50	7.2	Mw	G&R	P&S		China: Litang	
1948	6	28	7:13	30.0	36.50	136.00	7.0	Mw	G&R	P&S		Japan: Fukui	
1948	7	20	11:02	17.0	-17.00	-75.00	70	7.1	Mb	G&R	ABE1		
1948	9	2	23:34	50.0	10.00	125.50	7.0	Ms	G&R	ABE1			
1948	9	8	15:09	11.0	-21.00	-174.00	8.0	Mw	G&R	P&S			
1948	10	5	20:12	5.0	37.50	58.00	7.2	Mw	G&R	P&S		Turkmenistan:Ashkhabad	
1948	11	19	1:04	24.0	10.00	-83.50	80	7.0	Mb	G&R	ABE1		
1948	11	26	5:36	37.0	-5.00	145.00	70	7.0	Mb	G&R	ABE1		
1949	2	23	16:08	8.0	41.00	83.50	7.3	Mw	G&R	P&S			
1949	3	4	10:19	25.0	36.00	70.50	230	7.4	Mb	G&R	ABE1		
1949	3	27	6:34	5.0	3.50	127.50	7.1	Mw	G&R	P&S			
1949	4	20	3:29	7.0	-38.00	-73.50	70	7.1	Mb	G&R	ABE1	Chile	
1949	4	23	11:15	39.0	-8.00	121.00	80	7.0	Mb	G&R	ABE1		
1949	4	25	13:54	59.0	-19.75	-69.00	110	7.2	Mb	G&R	ABE1		
1949	4	30	1:23	32.0	6.50	125.00	130	7.3	Mb	G&R	ABE1		
1949	7	10	3:53	36.0	39.00	70.50	7.6	Mw	G&R	P&S		Tajikistan: Khait	
1949	7	23	10:26	45.0	-18.50	170.00	150	7.2	Mb	G&R	ABE1		
1949	8	6	0:35	37.0	-18.50	-174.50	70	7.2	Mb	G&R	ABE1		
1949	8	22	4:01	11.0	53.75	133.25	8.0	Mw	G&R	P&S		Queen Charlotte Is.	
1949	10	19	21:00	19.0	-3.50	134.00	60	7.5	Mw	G&R	P&S		
1949	11	22	0:51	49.0	-28.50	-178.50	180	7.1	Mb	G&R	ABE1		
1949	12	17	6:53	30.0	-54.00	-71.00	7.8	Mw	G&R	P&S			
1949	12	17	15:07	55.0	-54.00	-71.00	7.8	Mw	G&R	P&S			
1949	12	29	3:03	54.0	18.00	121.00	7.2	Mw	G&R	P&S			
1950	2	2	23:53	59.0	22.00	100.00	144.00	340	7.1	Mw	G&R	ABE1	
1950	2	28	10:20	57.0	46.00	144.00	90	7.1	Mb	G&R	ABE1		
1950	5	25	18:35	7.0	13.00	143.50	90	7.1	Mb	G&R	ABE1		
1950	7	9	4:40	4.0	-8.00	-70.75	650	7.0	Mb	G&R	ABE1		
1950	7	9	4:50	5.0	-8.00	-70.75	650	7.0	Mb	G&R	ABE1		
1950	7	9	16:10	24.0	36.70	70.50	223	7.5	Ms	ISS	BJI		
1950	7	29	16:46	6.0	2.20	126.90	96	7.0	Mb	ISS	ABE1		
1950	8	14	22:51	24.0	-27.25	-62.50	650	7.2	Mb	G&R	ABE1		
1950	8	15	14:09	30.0	28.50	96.50	8.6	Mw	G&R	P&S		India: Assam	
1950	8	31	7:05	47.0	5.50	126.00	96	7.0	Mb	ISS	ABE1		
1950	9	10	15:16	8.0	-15.50	167.00	100	7.1	Mb	G&R	ABE1		
1950	10	5	16:09	31.0	11.00	-85.00	7.8	Mw	G&R	P&S			
1950	10	8	3:23	9.0	-3.75	128.25	7.5	Mw	G&R	P&S			
1950	10	23	16:13	20.0	14.50	-91.50	7.5	Mw	G&R	P&S			
1950	11	2	15:27	56.0	-6.50	129.50	50	7.4	Mb	G&R	ABE1		
1950	11	8	2:18	12.0	-10.00	159.50	7.1	Mw	G&R	P&S			
1950	12	2	19:51	49.0	-18.25	167.50	60	7.2	Mw	G&R	P&S		
1950	12	2	19:55	27.0	-18.25	167.50	60	7.2	Mw	G&R	P&S		
1950	12	4	16:28	3.0	-5.00	153.50	110	7.3	Mb	G&R	ABE1		
1950	12	9	21:58	48.0	-23.50	-67.50	100	7.7	Mb	G&R	ABE1		
1950	12	10	2:50	42.0	-14.25	-75.75	80	7.1	Mb	G&R	ABE1		
1950	12	10	13:23	4.0	-28.00	-178.50	250	7.2	Mb	G&R	ABE1		
1950	12	14	1:52	49.0	-19.25	-175.75	200	7.5	Mb	G&R	ABE1		
1950	12	14	14:15	51.0	17.00	-97.50	7.3	Mw	G&R	P&S			
1951	2	13	22:12	57.0	56.00	-156.00	7.2	Mw	G&R	P&S			
1951	2	17	21:07	7.0	-7.00	146.00	180	7.2	Mb	G&R	ABE1		
1951	3	10	21:57	29.0	-15.00	167.50	130	7.2	Mb	G&R	ABE1		
1951	5	21	8:27	20.0	-6.00	154.50	150	7.0	Mb	G&R	ABE1		
1951	6	12	22:40	39.0	36.30	71.00	223	7.5	Ms	ISS	BJI		
1951	10	21	21:34	14.0	23.75	121.50	7.5	Mw	G&R	P&S		Taiwan: Hualien	
1951	10	22	3:29	27.0	23.75	121.25	7.2	Mw	G&R	P&S			
1951	10	22	4:28	5.0	23.90	121.70	7.0	Ms	ISS	BJI			
1951	10	22	5:43	1.0	24.00	121.25	7.1	Mw	G&R	P&S			
1951	11	6	16:40	5.0	47.75	154.25	7.2	Mw	G&R	P&S		Tibet	
1951	11	18	9:35	47.0	30.50	91.00	7.7	Mw	G&R	P&S			
1951	11	24	18:50	18.0	23.00	122.50	7.3	Mw	G&R	P&S			
1951	12	8	4:14	12.0	-34.00	57.00	7.5	Mw	G&R	P&S			
1952	2	14	3:38	12.0	-7.50	126.50	7.2	Mw	G&R	P&S			
1952	3	4	1:22	43.0	42.50	143.00	8.1	Mw	G&R	P&S		Japan: Tokachi-Oki	
1952	3	4	1:40	4.0	42.20	143.90	7.1	Ms	ISS	BJI			
1952	3	9	17:03	47.0	42.50	143.00	7.2	Mw	G&R	P&S			
1952	3	19	10:57	12.0	9.50	127.25	7.7	Mw	G&R	P&S		Calif.: Kern County	
1952	7	21	11:52	14.0	35.00	-119.00	7.3	Mw	G&R	P&S			
1952	8	17	16:02	7.0	30.50	91.50	7.7	Mw	G&R	P&S		China: Damxung	
1952	9	21	2:30	35.0	-21.75	-65.75	260	7.1	Mb	G&R	ABE1		
1952	11	4	16:58	26.0	52.75	159.50	9.0	Mw	G&R	P&S		Russia: Kamchatka	
1952	11	6	19:47	21.0	-4.60	144.90	7.1	Mw	ISS	P&S			
1952	12	6	10:41	18.0	-8.00	156.50	7.2	Mw	G&R	P&S			

(continued)

TABLE 1 (continued)

Year	M	d	h:min	sec	Lat.	Long.	Dep.	Mag.	sc	icat	mdo	Region:Earthquake Name	
1952	12	24	18:39	38.0	-5.50	152.00	7.1	Mw	G&R	P&S			
1953	1	5	7:48	20.0	53.00	171.50	7.2	Mw	ISS	P&S			
1953	1	5	10:06	30.0	49.00	155.50	4.0	7.1	Mw	ABE	P&S		
1953	3	26	11:42	27.0	-11.20	163.90	7.1	Mw	ISS	P&S		Turkey: Anatolia	
1953	3	18	19:06	13.0	40.00	27.30	7.2	Mw	ISS	P&S			
1953	3	19	8:27	52.0	14.00	-61.20	128	7.1	mB	ISS	ABE1		
1953	4	23	16:24	22.0	-4.50	153.30	7.6	Mw	ISS	P&S			
1953	5	6	17:16	50.0	-36.50	-72.60	64	7.5	mB	ISS	ABE1		
1953	7	2	6:56	59.0	-19.00	169.00	223	7.4	mB	ISS	ABE1		
1953	8	12	9:23	52.0	38.30	20.80	7.2	Mw	ISS	P&S		Greece	
1953	9	29	1:56	46.0	-36.90	177.10	287	7.0	mB	ISS	ABE1		
1953	11	4	3:49	7.0	-13.00	166.40	7.5	Mw	ISS	P&S			
1953	11	10	23:40	23.0	-7.20	157.10	33	7.0	mB	ISS	ABE1		
1953	11	25	17:48	54.0	34.00	141.70	33	7.9	Mw	UTSU	P&S		
1953	12	7	2:05	24.0	-22.10	-68.70	128	7.2	mB	ISS	ABE1		
1953	12	12	17:31	25.0	-3.40	-80.60	7.5	Mw	ISS	P&S			
1954	2	11	0:50	18.0	38.80	101.20	33	7.1	Mw	ISS	P&S		
1954	2	20	18:35	5.0	-7.20	124.70	540	7.0	mB	ISS	ABE1		
1954	2	22	12:03	35.0	-56.50	-26.30	96	7.0	mB	ISS	ABE1		
1954	3	21	23:42	17.0	44.20	95.10	223	7.4	mB	ISS	ABE1		
1954	3	29	6:17	5.0	37.00	-3.50	603	7.0	mB	ISS	ABE1		
1954	3	31	18:25	45.0	12.40	57.90	7.1	Mw	ISS	P&S			
1954	4	29	11:34	36.0	29.20	-112.80	7.1	Mw	ISS	P&S			
1954	9	17	11:03	18.0	-21.30	-176.70	223	7.0	mB	ISS	ABE1		
1954	12	16	11:07	12.0	39.20	-118.00	101.70	7.5	Mw	ISS	P&S		Nevada: Fairview Peak
1955	1	5	0:50	18.0	-49.70	162.70	7.1	Mw	ISS	P&S			
1955	2	27	20:43	24.0	-28.30	-175.50	7.8	Mw	ISS	P&S			
1955	3	18	0:06	50.0	54.30	161.00	64	7.2	mB	ISS	ABE1		
1955	3	31	18:17	19.0	8.10	123.20	96	7.3	mB	ISS	ABE1		
1955	4	14	1:29	0.0	30.00	101.70	7.5	Mw	ISS	P&S		China: Kangding	
1955	4	15	3:40	52.0	39.90	74.70	7.1	Mw	ISS	P&S			
1955	5	17	14:49	49.0	6.70	93.70	7.2	Mw	ISS	P&S			
1955	5	30	12:31	43.0	24.20	142.50	572	7.1	mB	ISS	ABE1		
1955	8	6	8:31	24.0	-21.10	-177.50	287	7.0	mB	ISS	ABE1		
1955	10	10	8:57	46.0	-5.10	152.80	7.3	Mw	ISS	P&S			
1955	10	13	9:26	49.0	-10.00	160.70	33	7.1	mB	ISS	ABE1		
1955	11	10	1:44	5.0	-15.60	-173.60	64	7.2	Ms	ISS	ROTHE		
1956	2	1	13:41	52.7	18.85	145.06	380	7.0	mB	EBH	ABE1		
1956	2	18	7:34	24.7	30.17	138.27	480	7.1	mB	EBH	ABE1		
1956	5	23	20:48	29.7	-15.52	-178.59	403	7.2	mB	EBH	ABE1		
1956	6	9	23:13	56.4	35.03	67.48	35	7.6	Mw	EBH	P&S	Afghanistan	
1956	7	9	3:11	45.2	36.58	26.04	35	7.8	Mw	EBH	P&S	Greece	
1956	7	16	15:07	8.9	22.08	95.82	25	7.1	Mw	EBH	P&S		
1956	7	18	6:19	32.6	-5.05	130.36	106	7.2	mB	EBH	ABE1		
1956	10	11	2:24	37.7	45.90	150.61	101	7.3	mB	EBH	ABE1		
1956	10	24	14:42	17.0	11.62	-86.44	35	7.2	Mw	EBH	P&S		
1956	12	27	0:14	11.5	-23.41	-176.88	196	7.0	mB	EBH	ABE1		
1957	2	23	20:26	17.2	23.87	121.49	50	7.2	Mw	EBH	P&S		
1957	3	9	14:52	33.3	51.59	-175.42	35	8.5	Mw	EBH	P&S		
1957	3	9	20:59	23.6	52.47	-169.48	31	7.2	Mw	EBH	P&S		
1957	3	11	9:58	51.4	52.54	-168.90	36	7.1	Mw	EBH	P&S		
1957	3	12	11:44	59.8	51.74	-176.66	32	7.1	Mw	EBH	P&S		
1957	3	14	14:47	52.0	51.33	-176.62	35	7.2	Mw	EBH	P&S		
1957	3	16	2:34	18.5	51.52	-178.78	32	7.1	Mw	EBH	P&S		
1957	3	22	14:21	13.8	53.69	-165.69	42	7.1	Mw	EBH	P&S		
1957	3	23	5:12	42.3	-5.49	130.91	127	7.1	mB	EBH	ABE1		
1957	4	14	19:18	5.5	-15.40	-173.14	35	7.5	Mw	EBH	P&S		
1957	4	16	4:04	9.6	-4.51	107.27	602	7.2	mB	EBH	ABE1		
1957	4	25	2:25	41.2	36.35	28.70	35	7.1	Mw	EBH	P&S	Turkey/Greece	
1957	5	26	6:33	35.3	40.67	31.04	17	7.2	Mw	EBH	P&S	Turkey	
1957	6	22	23:50	30.5	-2.01	136.68	35	7.3	Mw	EBH	P&S		
1957	6	27	0:09	32.5	56.42	116.44	15	7.4	Mw	EBH	P&S		
1957	7	2	0:42	28.5	36.07	52.69	35	7.1	Mw	EBH	P&S	Iran	
1957	7	14	6:24	2.0	-27.14	-177.74	201	7.0	mB	EBH	ABE1		
1957	7	28	8:40	10.3	16.89	-99.29	41	7.8	Mw	EBH	P&S	Mexico	
1957	9	24	8:21	12.5	5.24	127.12	35	7.7	Mw	EBH	P&S		
1957	9	28	14:20	3.0	-20.69	-178.16	587	7.2	mB	EBH	ABE1		
1957	11	29	22:19	42.9	-20.54	-67.23	159	7.4	mB	EBH	ABE1		
1957	12	4	3:37	51.0	45.18	99.22	25	8.1	Mw	EBH	P&S	Mongolia: Gobi-Altai	
1957	12	17	13:50	22.4	-12.47	166.67	124	7.2	mB	EBH	ABE1		
1958	1	15	19:14	30.9	-16.78	-72.49	69	7.0	mB	EBH	ABE1		
1958	1	19	14:07	24.8	0.99	-79.49	19	7.8	Mw	EBH	P&S		
1958	3	11	0:25	53.0	23.81	124.16	35	7.2	mB	EBH	ABE1		
1958	4	7	15:30	44.1	65.89	-156.34	15	7.3	Mw	EBH	P&S		
1958	5	31	19:32	34.2	-15.32	168.54	12	7.1	Mw	EBH	P&S		
1958	7	10	6:15	58.2	58.47	-136.28	15	7.8	Mw	EBH	P&S	Alaska	
1958	7	26	17:37	14.4	-13.28	-69.41	615	7.2	mB	EBH	ABE1		
1958	11	6	22:58	9.4	44.31	148.65	35	8.4	Mw	EBH	P&S		
1958	11	12	20:23	32.9	44.05	148.82	35	7.0	Mw	EBH	P&S	Kurile Is.	
1959	1	22	5:10	31.0	37.56	142.48	32	7.2	Mw	EBH	P&S		
1959	3	1	16:49	14.5	-0.99	134.17	44	7.0	mB	EBH	ABE1		
1959	4	26	20:40	37.9	24.68	122.77	118	7.5	mB	EBH	ABE1		
1959	5	4	7:15	46.1	53.37	159.66	35	8.0	Mw	EBH	P&S		
1959	5	24	19:17	41.7	17.46	-97.18	70	7.0	mB	EBH	ABE1		
1959	6	14	0:11	57.9	-20.27	-68.83	35	7.5	mB	EBH	ABE1		
1959	7	19	15:06	16.2	-15.09	-70.33	210	7.1	mB	EBH	ABE1		
1959	8	15	8:57	5.7	21.98	120.95	27	7.2	Mw	EBH	P&S		
1959	8	17	21:04	49.8	-7.89	156.34	35	7.1	Mw	EBH	P&S		
1959	8	18	6:37	19.9	44.57	-110.65	15	7.3	Mw	EBH	P&S		
1959	9	14	14:09	46.2	-28.73	-177.07	35	7.8	Mw	EBH	P&S		
1959	11	19	11:08	49.9	-5.91	146.49	128	7.0	mB	EBH	ABE1		
1960	1	13	15:40	22.9	-15.88	-73.06	35	7.5	mB	EBH	ABE1	Peru	
1960	3	8	16:33	41.5	-17.01	168.71	244	7.2	mB	EBH	ABE1		
1960	3	20	17:07	33.8	39.85	143.40	35	7.8	Mw	EBH	P&S		
1960	5	21	10:02	54.1	-37.83	-73.38	12	8.2	Mw	EBH	P&S		
1960	5	22	18:56	4.0	-38.15	-72.98	35	7.9	Mw	EBH	P&S	Chile: Great Chilean	
1960	5	22	19:11	17.5	-38.20	-73.05	35	9.6	Mw	EBH	P&S		
1960	6	6	5:55	49.1	-45.70	-73.50	15	7.2	Mw	EBH	P&S		
1960	6	20	2:01	15.3	-38.26	-73.32	35	7.0	Mw	EBH	P&S		
1960	6	20	12:59	46.0	-39.21	-73.32	25	7.1	Mw	EBH	P&S		

Year	M	d	h:min	sec	Lat.	Long.	Dep.	Mag.	sc	icat	mdo	Region:Earthquake Name
1960	7	25	11:12	9.1	53.65	158.89	139	7.2	mb	EHB	ABE1	
1960	11	20	22:02	0.1	-6.70	-80.62	35	7.8	Mw	EHB	P&S	
1960	11	24	6:52	47.4	-24.71	-176.38	36	7.1	Mw	EHB	P&S	
1960	12	2	9:10	43.3	-24.67	-70.08	14	7.2	Mw	EHB	P&S	
1960	12	13	7:36	17.7	-52.04	160.98	15	7.2	Mw	EHB	P&S	
1961	1	2	15:54	5.0	-4.23	143.21	141	7.1	mb	EHB	ABE1	
1961	8	19	5:09	51.4	-10.83	131.51	37	7.7	Mw	EHB	P&S	
1961	3	7	10:10	39.4	-29.26	-175.26	35	7.1	Mw	EHB	P&S	
1961	3	28	9:36	6.0	0.05	123.63	139	7.3	Mw	EHB	ABE1	
1961	7	23	21:51	10.6	-18.42	168.40	35	7.3	Mw	EHB	P&S	
1961	8	11	15:51	34.8	42.88	145.33	35	7.2	Mw	EHB	P&S	
1961	8	19	5:09	51.4	-10.83	-70.84	616	7.2	mb	EHB	ABE1	
1961	8	31	1:48	39.0	-10.70	-70.90	598	7.0	mb	EHB	ABE1	
1961	8	31	1:57	9.6	-10.34	-71.00	601	7.3	mb	EHB	ABE1	
1961	9	1	0:09	38.8	-59.26	-26.58	130	7.2	mb	EHB	ABE1	
1961	9	8	11:26	32.1	-56.25	-27.28	104	7.6	mb	EHB	ABE1	
1962	2	14	6:36	4.4	-38.09	-73.00	41	7.5	mb	EHB	ABE1	
1962	3	17	20:47	33.9	10.81	-43.31	15	7.0	mb	EHB	ABE1	
1962	4	12	0:52	43.0	38.08	142.74	25	7.2	Mw	EHB	P&S	
1962	4	26	7:26	26.3	-17.86	-178.69	551	7.5	UK	EHB	BRK	
1962	5	11	14:11	55.9	17.18	-99.64	35	7.3	Mw	EHB	P&S	
1962	5	21	15:40	6.6	-20.00	-177.38	438	7.5	Mw	EHB	HRV	
1962	7	26	8:14	45.7	7.49	-82.78	24	7.2	Mw	EHB	P&S	
1962	8	3	8:56	18.7	-23.29	-68.01	113	7.2	mb	EHB	ABE1	
1962	8	21:27	20.9	-25.82	-63.28	589	7.2	Mw	EHB	HRV		
1963	2	13	8:50	4.8	24.35	122.06	35	7.3	Mw	EHB	P&S	
1963	2	26	20:14	11.2	-7.57	146.22	181	7.3	mb	EHB	ABE1	
1963	3	16	8:44	52.6	46.62	154.89	35	7.2	Mw	EHB	P&S	
1963	3	26	9:48	20.1	-30.11	-177.54	35	7.4	Mw	EHB	P&S	
1963	4	16	1:29	23.1	-1.14	128.01	35	7.2	Mw	EHB	P&S	
1963	5	1	10:03	21.0	-19.06	169.07	144	7.1	mb	EHB	ABE1	
1963	8	15	17:25	8.2	-13.72	-69.32	550	7.7	Mw	EHB	HRV	
1963	8	25	12:18	13.7	-17.70	-178.54	571	7.1	Mw	EHB	HRV	
1963	9	15	0:46	54.3	-10.47	165.76	35	7.5	Mw	EHB	P&S	
1963	9	17	19:20	11.8	-10.28	165.41	30	7.5	Mw	EHB	P&S	
1963	10	12	11:27	0.2	44.43	149.27	48	7.1	Mw	EHB	P&S	
1963	10	13	5:17	55.1	44.76	149.80	26	8.6	Mw	EHB	P&S	
1963	10	20	0:53	10.8	44.76	150.57	27	7.9	Mw	EHB	P&S	
1963	11	4	1:17	5.8	-6.74	-71.54	577	7.7	Mw	EHB	HRV	
1963	11	9	21:15	30.3	-8.98	-71.54	577	7.7	Mw	EHB	HRV	
1963	12	15	19:34	48.3	-4.77	108.06	667	7.1	Mw	EHB	HRV	
1963	12	18	0:30	2.6	-24.78	-176.51	35	7.7	Mw	EHB	P&S	
1964	2	6	13:07	22.6	55.64	-156.07	4	7.1	Mw	EHB	P&S	
1964	3	28	3:36	12.7	61.02	-147.63	6	9.2	Mw	EHB	P&S	
1964	4	23	3:32	48.5	-5.42	133.94	6	7.1	Mw	EHB	P&S	
1964	5	26	10:59	12.9	-56.24	-27.63	116	7.5	mb	EHB	ABE1	
1964	6	16	4:01	40.1	38.44	139.23	10	7.6	Mw	EHB	P&S	
1964	6	23	1:26	38.4	43.27	146.15	75	7.2	mb	EHB	ABE1	
1964	7	6	7:22	12.8	18.19	-100.51	92	7.2	mb	EHB	ABE1	
1964	7	8	11:55	44.5	-5.60	129.74	207	7.0	mb	EHB	ABE1	
1964	7	9	16:39	0.4	41.60	142.79	11	7.8	Mw	EHB	P&S	
1964	8	13	23:04	52.6	39.88	143.22	9	7.2	UK	EHB	B&D	
1964	8	20	21:09	45.5	44.80	150.36	45	7.1	Mw	EHB	P&S	
1964	8	23	17:24	20.1	-41.74	172.12	47	7.2	Mw	EHB	P&S	
1964	8	28	13:27	20.4	-2.92	139.41	64	7.2	Mw	EHB	ABE1	

(continued)

Year	M	d	h:min	sec	Lat.	Long.	Dep.	Mag.	sc	icat	mdo	Region:Earthquake Name
1964	7	9	16:39	51.2	-15.58	167.75	131	7.4	mb	EHB	ABE1	
1964	8	13	0:31	15.4	-5.49	154.28	386	7.0	Mw	EHB	HRV	
1964	10	17	12:32	25.9	-7.18	123.81	582	7.0	Mw	EHB	HRV	
1964	11	17	8:15	41.4	-5.75	150.73	51	7.1	Mw	EHB	P&S	
1965	1	24	0:11	17.1	-2.45	125.96	29	8.2	Mw	EHB	P&S	Indonesia
1965	2	4	5:01	21.7	51.21	178.50	29	8.7	Mw	EHB	P&S	Aleutian Is
1965	2	4	8:40	38.7	51.40	179.56	8	7.8	Mw	EHB	P&S	
1965	3	14	15:33	7.8	36.40	70.71	210	7.5	mb	EHB	ABE1	
1965	3	28	16:33	16.7	-32.49	-71.21	71	7.4	mb	EHB	ABE1	Chile
1965	5	20	0:40	12.2	-14.64	167.50	10	7.6	Mw	EHB	P&S	
1965	6	11	3:33	46.8	44.61	148.94	46	7.1	Mw	EHB	P&S	
1965	8	11	3:40	57.1	-15.47	166.99	17	7.2	Mw	EHB	P&S	
1965	8	11	22:31	52.3	-15.80	167.26	46	7.6	Mw	EHB	P&S	
1965	8	13	12:40	8.3	-15.81	166.96	21	7.3	Mw	EHB	P&S	
1965	8	23	19:46	1.6	16.18	-95.85	11	7.4	Mw	EHB	BRK	
1965	9	12	22:02	35.5	-6.48	70.75	29	7.0	UK	EHB	P&S	
1966	3	12	16:31	19.6	24.31	122.69	28	7.4	Mw	EHB	P&S	
1966	3	20	1:42	51.1	0.85	29.87	15	7.2	UK	EHB	B&D	Uganda/Zaire
1966	6	15	0:59	42.8	-10.35	160.88	3	7.1	Mw	EHB	P&S	
1966	6	15	1:32	53.7	-10.11	161.03	13	7.3	Mw	EHB	P&S	
1966	6	22	20:29	6.3	-7.26	124.45	527	7.0	Mw	EHB	HRV	
1966	7	4	18:33	38.8	51.82	179.87	15	7.3	Mw	EHB	P&S	
1966	9	8	21:15	52.9	2.35	128.38	81	7.2	mb	EHB	ABE1	
1966	10	17	21:41	57.5	-10.80	-78.68	34	8.2	Mw	EHB	P&S	Peru
1966	12	28	8:18	7.2	-25.50	-70.66	30	7.7	Mw	EHB	P&S	
1966	12	31	18:23	11.1	-11.89	166.44	83	7.3	mb	EHB	ABE1	
1966	12	31	22:15	16.8	-12.33	166.68	24	7.2	Mw	EHB	P&S	
1967	1	5	0:14	39.8	48.20	102.92	14	7.0	Mw	EHB	P&S	
1967	2	9	15:24	47.0	2.89	-74.80	41	7.2	Mw	EHB	P&S	Colombia
1967	2	15	16:11	12.8	-9.12	-71.33	601	7.0	Mw	EHB	HRV	
1967	3	13	16:06	53.9	-40.19	-74.84	24	7.3	UK	EHB	BRK	
1967	7	22	16:56	55.3	40.63	30.74	4	7.4	Mw	EHB	P&S	Turkey
1967	10	9	17:21	49.1	-21.30	-179.06	636	7.3	Mw	EHB	HRV	
1967	10	25	0:59	24.1	24.46	122.22	67	7.0	mb	EHB	ABE1	
1967	12	21	2:25	24.7	-21.86	-69.95	45	7.4	Mw	EHB	P&S	
1967	12	25	1:23	34.2	-5.29	153.76	52	7.2	Mw	EHB	P&S	
1967	12	27	9:17	54.7	-21.21	-68.18	116	7.0	mb	EHB	ABE1	
1968	1	29	10:19	7.1	43.59	146.70	39	7.3	Mw	EHB	P&S	
1968	2	12	5:44	43.6	-5.50	153.40	23	7.4	Mw	EHB	P&S	
1968	2	19	22:45	43.8	39.37	24.94	9	7.2	Mw	EHB	P&S	
1968	2	26	10:50	17.9	22.76	121.41	17	7.2	Mw	EHB	P&S	
1968	4	1	0:42	4.9	32.48	132.19	29	7.5	Mw	EHB	P&S	
1968	4	9	2:29	1.8	33.16	-116.19	15	7.0	Ms	EHB	ABE1	
1968	5	16	0:49	0.4	40.90	143.35	26	8.3	Mw	EHB	P&S	Japan: Tokachi-oki
1968	5	16	10:39	0.4	41.60	142.79	11	7.8	Mw	EHB	P&S	
1968	5	16	23:04	52.6	39.88	143.22	9	7.2	UK	EHB	B&D	
1968	5	20	21:09	45.5	44.80	150.36	45	7.1	Mw	EHB	P&S	
1968	5	23	17:24	20.1	-41.74	172.12	47	7.2	Mw	EHB	P&S	
1968	5	28	13:27	20.4	-2.92	139.41	64	7.2	Mw	EHB	ABE1	

(continued)

TABLE 1 (continued)

Year	M	d	h:min	sec	Lat.	Long.	Dep.	Mag.	sc	icat	mdo	Region:Earthquake Name
1968	6	12	13:41	51.0	39.50	142.89	31	7.1	Mw	EHB	P&S	
1968	7	25	7:23	9.4	-30.81	-178.14	65	7.1	mb	EHB	ABE1	
1968	8	1	20:19	25.0	16.38	122.08	52	7.7	Mw	EHB	P&S	Philippines
1968	8	2	14:06	46.1	16.49	-97.77	49	7.3	Mw	EHB	P&S	
1968	8	3	4:54	36.0	25.65	128.47	29	7.1	Mw	EHB	P&S	
1968	8	10	2:07	4.0	1.42	126.26	19	7.6	Mw	EHB	P&S	
1968	8	14	22:14	20.2	0.06	119.69	17	7.3	Mw	EHB	P&S	Indonesia
1968	8	18	18:38	31.8	-10.20	159.96	54	7.3	Mw	EHB	HRV	
1968	8	31	10:47	40.0	34.04	58.96	12	7.2	Mw	EHB	P&S	Iran: Dasht-i Biyaz
1968	10	19	19:20	21.8	26.29	140.68	51	7.3	Mw	EHB	HRV	
1968	10	23	21:04	42.9	-3.37	143.32	10	7.1	Mw	EHB	P&S	
1969	1	5	13:26	43.2	-7.99	158.97	63	7.3	mb	EHB	ABE1	
1969	1	19	7:02	9.0	44.89	143.21	238	7.3	mb	EHB	ABE1	
1969	1	30	10:29	42.5	4.76	127.44	74	7.1	mb	EHB	ABE1	
1969	2	10	22:58	5.7	-22.80	178.79	65	7.2	Mw	EHB	HRV	
1969	2	11	22:16	12.5	-6.79	126.68	42	7.2	Mw	EHB	HRV	
1969	2	28	2:40	33.7	35.92	-10.58	21	7.8	Mw	EHB	P&S	
1969	5	14	19:32	55.3	51.28	-179.85	17	7.0	Ms	EHB	USCGS	
1969	7	18	5:24	46.7	38.42	119.45	11	7.2	Mw	EHB	P&S	
1969	8	2	5:13	10.2	1.24	126.19	27	7.0	Ms	EHB	USCGS	
1969	8	11	21:27	37.6	43.48	147.82	46	8.2	Mw	EHB	P&S	Kurite Is.
1969	8	17	23:52	57.0	1.83	126.34	27	7.1	Mw	EHB	P&S	
1969	8	18	20:14	59.7	24.84	-109.69	32	7.2	UK	EHB	B&D	
1969	11	22	2:05	35.2	1.97	94.57	10	7.6	Mw	EHB	P&S	
1969	11	22	23:09	35.3	57.73	163.60	9	7.8	Mw	EHB	P&S	
1969	12	25	21:32	29.4	15.73	59.65	11	7.2	Mw	EHB	P&S	
1970	1	4	17:00	40.5	24.15	102.46	14	7.2	Mw	EHB	P&S	China: Tonha
1970	1	8	17:12	42.9	-34.88	178.85	208	7.0	mb	EHB	ABE1	
1970	1	10	12:07	8.9	6.79	126.69	60	7.3	Ms	EHB	ABE1	
1970	1	20	7:19	48.2	-25.86	-177.17	45	7.2	mb	EHB	ABE1	
1970	3	28	21:02	25.7	39.17	29.55	24	7.4	UK	EHB	B&D	Turkey
1970	3	30	16:46	45.6	6.76	126.62	63	7.1	mb	EHB	ABE1	
1970	4	7	5:34	6.9	15.77	121.66	30	7.2	Mw	EHB	P&S	
1970	4	12	4:01	44.5	15.09	122.01	16	7.0	Ms	EHB	USCGS	
1970	4	20	10:39	13.8	-18.81	169.37	246	7.0	mb	EHB	ABE1	
1970	4	29	14:01	21.8	14.46	-92.76	50	7.3	Mw	EHB	P&S	
1970	5	27	12:05	9.2	27.19	140.23	403	7.1	Mw	EHB	HRV	
1970	5	31	20:23	32.2	-9.25	-78.84	73	7.5	mb	EHB	ABE3	Peru: Peru
1970	6	11	16:46	33.5	-59.42	159.23	15	7.3	Mw	EHB	P&S	
1970	6	15	11:14	30.2	-54.37	-64.11	4	7.0	Ms	EHB	USCGS	
1970	7	25	22:41	13.7	32.24	131.68	45	7.0	Mw	EHB	P&S	
1970	7	31	17:08	6.1	-1.49	-72.56	64	7.5	mb	EHB	ABE1	
1970	8	11	10:22	23.8	-14.10	166.57	40	7.5	Ms	EHB	ISC	
1970	8	30	17:46	10.6	52.35	151.62	65	7.3	Mw	EHB	HRV	
1970	10	31	17:53	7.1	-4.91	145.47	8	7.3	UK	EHB	B&D	
1970	12	2	15:54	17.2	-11.01	163.49	3	7.0	Ms	EHB	USCGS	
1970	12	10	4:34	39.1	-4.08	-80.66	20	7.1	Mw	EHB	P&S	Peru/Ecuador
1971	1	3	17:35	41.6	-55.64	-2.47	27	7.1	Mw	EHB	NETS	
1971	1	10	7:17	7.7	-3.23	139.74	55	7.7	Mw	EHB	P&S	
1971	2	4	15:33	33.1	0.55	98.67	60	7.1	Ms	EHB	NETS	
1971	2	8	21:04	20.5	-63.42	-61.41	15	7.0	Ms	EHB	NETS	
1971	5	2	6:08	25.8	51.43	-177.25	31	7.1	Ms	EHB	NETS	
1971	6	17	21:00	41.8	-25.42	-69.05	90	7.2	mb	EHB	ABE1	
1971	7	9	3:03	19.8	-32.56	-71.08	59	7.8	Mw	EHB	P&S	Chile
1971	7	14	6:11	30.6	-5.52	153.90	45	8.0	Mw	EHB	P&S	
1971	7	14	7:41	13.2	-5.60	153.77	56	7.1	Mw	EHB	P&S	
1971	7	19	0:14	45.9	-5.75	153.86	31	7.1	Ms	EHB	NETS	
1971	7	26	1:23	22.2	-4.89	153.18	37	8.1	Mw	EHB	P&S	
1971	7	27	2:02	46.2	-2.83	-77.36	94	7.3	mb	EHB	ABE1	
1971	8	2	7:24	58.5	41.38	143.46	54	7.2	Mw	EHB	P&S	
1971	8	5	1:58	51.9	-0.93	-22.08	22	7.0	Ms	EHB	NETS	
1971	9	5	18:35	28.6	46.56	141.19	17	7.3	Mw	EHB	P&S	
1971	9	21	5:57	12.8	-11.88	166.62	115	7.1	mb	EHB	ABE1	
1971	11	24	19:35	31.7	52.81	159.17	116	7.4	mb	EHB	ABE1	
1971	12	15	8:29	55.9	56.02	163.17	22	7.8	Mw	EHB	P&S	
1972	1	23	21:17	55.8	-13.23	166.37	52	7.1	Ms	EHB	NETS	
1972	1	25	2:06	21.4	-22.45	122.32	31	7.5	Mw	EHB	P&S	
1972	1	25	3:41	22.1	23.04	122.12	12	7.0	Ms	EHB	NETS	
1972	2	14	23:29	53.5	11.43	166.41	106	7.3	mb	EHB	ABE1	
1972	2	29	9:23	1.6	33.57	140.88	59	7.5	Mw	EHB	P&S	
1972	3	30	5:34	52.2	-25.74	179.63	496	7.3	Mw	EHB	HRV	
1972	4	25	19:30	8.4	13.39	120.31	30	7.2	Mw	EHB	P&S	
1972	4	28	23:32	11.2	-5.14	154.23	409	7.2	Mw	EHB	HRV	
1972	5	22	20:45	58.0	-17.83	-175.01	225	7.2	mb	EHB	ABE1	
1972	6	11	16:41	3.3	3.86	124.23	330	7.8	Mw	EHB	HRV	
1972	7	30	21:45	13.8	56.69	-136.10	8	7.6	Mw	EHB	P&S	
1972	8	17	23:44	8.5	-6.00	152.93	15	7.1	Ms	EHB	NETS	
1972	11	2	19:55	24.8	-20.03	169.01	39	7.0	Ms	EHB	NETS	
1972	12	2	0:19	54.2	6.46	126.65	83	7.4	mb	EHB	ABE1	
1972	12	4	10:16	13.9	33.33	140.71	71	7.3	mb	EHB	ABE3	
1973	1	30	21:01	13.5	18.45	-102.96	37	7.6	Mw	EHB	P&S	Mexico
1973	2	6	10:37	8.6	31.36	100.50	6	7.4	Mw	EHB	P&S	China: Luhuo
1973	2	28	6:37	55.3	50.48	156.62	60	7.1	Mw	EHB	P&S	
1973	5	17	8:50	54.9	13.40	122.79	45	7.0	Ms	EHB	NETS	
1973	6	17	3:55	4.0	43.22	145.74	44	7.8	Mw	EHB	P&S	
1973	6	24	2:43	25.0	43.36	146.42	31	7.3	Mw	EHB	P&S	
1973	8	28	9:50	41.0	18.23	-96.61	81	7.3	mb	EHB	ABE1	
1973	9	29	0:44	1.3	41.91	130.98	570	7.8	Mw	EHB	HRV	
1973	10	6	15:07	37.1	-60.95	-21.63	15	7.5	Ms	EHB	ISC	
1973	12	28	13:41	47.1	-14.51	166.78	24	7.3	Mw	EHB	P&S	
1974	1	2	10:42	33.4	-22.45	-68.32	121	7.1	mb	EHB	ABE1	
1974	1	10	8:51	17.0	-14.53	166.96	54	7.1	Mw	EHB	P&S	
1974	1	31	23:30	7.2	-7.40	155.95	36	7.3	Mw	EHB	P&S	
1974	2	1	3:12	35.6	-7.21	155.74	35	7.4	Mw	EHB	P&S	
1974	3	23	14:28	34.7	-24.02	179.96	520	7.0	Mw	EHB	HRV	
1974	5	8	23:33	28.9	34.57	138.77	12	7.2	UK	EHB	B&D	
1974	7	2	23:26	23.6	-29.15	-175.82	4	7.4	Mw	EHB	P&S	
1974	7	4	19:30	42.1	-45.19	93.94	16	7.5	UK	EHB	B&D	
1974	7	13	1:18	22.9	7.74	-77.63	3	7.2	Mw	EHB	P&S	
1974	7	30	5:12	41.9	36.37	70.73	210	7.1	mb	EHB	ABE1	

Year	M	d	h:min	Sec	Lat.	Long.	Dep.	Mag.	sc	icat	mdo	Region:	Earthquake Name
1974	8	11	1:13	56.1	39.38	73.80	3	7.1	Mw	EHB	P&S		
1974	8	18	10:44	10.3	-38.43	-73.46	9	7.1	Mw	EHB	NETS		
1974	10	3	14:21	34.5	-12.25	-77.52	36	8.1	Mw	EHB	P&S	Peru: Lima	
1974	10	23	6:14	54.8	-8.45	154.14	35	7.1	Mw	EHB	P&S		
1974	11	9	12:59	51.7	-12.53	-77.63	7	7.1	Mw	EHB	P&S		
1974	11	29	22:05	24.1	30.68	138.36	424	7.1	Mw	EHB	HRV		
1975	2	4	8:43	41.5	53.03	173.59	13	7.1	Mw	EHB	P&S		
1975	5	10	14:37	41.8	38.73	130.09	556	7.1	Mw	EHB	HRV		
1975	5	10	14:37	42.5	-6.61	155.10	61	7.5	Mb	EHB	ABE3		China: Haicheng
1975	7	20	19:54	29.7	-7.08	155.21	45	7.3	Mw	EHB	P&S		
1975	10	1	3:30	1.8	-4.86	102.15	38	7.0	Mw	EHB	NETS		Azores
1975	10	13:47	19.3	43.13	147.65	31	7.0	Mb	EHB	NETS			
1975	6	29	10:37	41.8	38.73	130.09	556	7.1	Mw	EHB	HRV		
1975	7	20	14:37	42.5	-6.61	155.10	61	7.5	Mb	EHB	ABE3		
1975	7	20	19:54	29.7	-7.08	155.21	45	7.3	Mw	EHB	P&S		
1975	10	1	3:30	1.8	-4.86	102.15	38	7.0	Mw	EHB	NETS		
1975	10	11	16:35	18.0	-24.91	-175.11	21	7.4	Mw	EHB	P&S		
1975	10	31	8:28	4.1	12.54	126.00	51	7.5	Mw	EHB	P&S		
1975	11	1	1:17	34.7	13.85	144.81	108	7.1	Mb	EHB	ABE3		
1975	11	29	14:47	40.9	19.45	-155.03	2	7.5	Mw	EHB	P&S		
1975	12	26	15:56	38.1	-16.24	-172.36	15	7.7	Mw	EHB	P&S		
1976	1	1	1:29	39.7	-28.71	-177.43	49	7.3	Mw	EHB	HRV		
1976	1	14	15:56	34.2	-29.84	-177.64	59	7.2	Mw	EHB	HRV		
1976	1	14	16:47	37.7	-29.11	-177.40	36	7.9	Mw	EHB	HRV		
1976	1	21	10:05	25.1	44.78	149.14	38	7.2	Mw	EHB	HRV		Kermadec Is.
1976	2	4	9:01	46.3	15.30	-89.14	15	7.5	Mw	EHB	HRV		Guatemala: Guatemala
1976	3	24	4:46	5.1	-29.87	-177.70	28	7.1	Mw	EHB	HRV		
1976	5	5	4:52	55.2	-29.84	-177.64	59	7.2	Mw	EHB	HRV		
1976	6	3	16:44	40.1	-5.09	153.58	79	7.0	Mw	EHB	HRV		
1976	6	20	20:53	12.7	3.44	96.25	15	7.0	Mw	EHB	HRV		
1976	6	25	19:18	54.6	-4.52	140.10	3	7.2	Mw	EHB	HRV		Indonesia
1976	7	11	20:41	51.3	7.37	-78.07	17	7.3	Mw	EHB	HRV		
1976	7	27	19:42	55.9	39.60	117.89	17	7.6	Mw	EHB	HRV		China: Tangshan
1976	7	28	10:45	35.9	39.72	118.36	18	7.0	Mw	EHB	HRV		
1976	8	16	16:11	11.9	6.29	124.09	59	8.0	Mw	EHB	HRV		Philippines: Mindanao
1976	8	17	4:19	28.9	7.26	122.96	20	7.1	Mw	EHB	HRV		
1976	11	24	12:22	17.1	39.08	44.03	9	7.0	Mw	EHB	HRV		Turkey/Iran
1976	11	30	0:40	58.1	-20.55	-68.87	74	7.6	Mw	EHB	HRV		
1977	3	4	19:21	55.6	45.78	26.70	89	7.5	Mw	EHB	HRV		Romania
1977	3	18	21:43	54.7	16.75	122.27	43	7.3	Mw	EHB	HRV		
1977	4	2	7:15	21.9	-16.77	-171.94	16	7.3	Mw	EHB	HRV		
1977	4	20	23:42	54.6	-9.90	160.46	39	7.3	Mw	EHB	HRV		
1977	4	20	23:49	12.2	-9.57	160.65	16	7.1	Mw	EHB	HRV		
1977	4	21	4:26	12.3	-10.01	160.81	43	7.4	Mw	EHB	HRV		
1977	6	22	12:08	34.4	-22.91	-175.75	64	8.1	Mw	EHB	HRV		Tonga Is.
1977	7	29	11:15	42.2	-8.04	155.58	2	7.2	Mw	EHB	HRV		
1977	8	19	6:08	54.9	-11.12	118.38	21	8.3	Mw	EHB	HRV		Indonesia: Sumbawa
1977	8	26	19:50	0.1	-59.57	-20.51	12	7.2	Mw	EHB	HRV		
1977	8	27	7:12	26.5	-8.14	125.33	44	7.1	Mw	EHB	HRV		
1977	10	10	11:53	51.2	-25.85	-175.28	8	7.3	Mw	EHB	HRV		
1977	10	17	17:26	41.4	-27.99	173.21	32	7.0	Mw	EHB	HRV		
1977	11	23	9:26	26.3	-31.08	-67.78	17	7.5	Mw	EHB	HRV		
1978	2	9	21:35	20.9	-30.56	-177.52	89	7.0	Mw	EHB	HRV		Argentina: Caucete
1978	3	7	2:48	48.0	31.94	137.46	44	7.1	Mw	EHB	HRV		
1978	3	23	0:31	1.9	44.29	148.95	28	7.1	Mw	EHB	HRV		
1978	3	23	5:14	21.3	44.36	149.12	7	7.5	Mb	EHB	ISC		
1978	3	23	3:15	20.6	44.98	148.52	23	7.6	Mw	EHB	HRV		
1978	3	24	19:47	49.3	44.23	148.92	12	7.5	Mw	EHB	HRV		
1978	6	12	8:14	29.1	38.22	142.02	53	7.7	Mw	EHB	HRV		Japan: Miyagi-ken-oki
1978	6	17	15:11	30.4	-17.10	-172.17	3	7.0	Mw	EHB	HRV		
1978	7	23	14:42	41.3	22.24	121.42	38	7.3	Mw	EHB	HRV		
1978	8	23	0:58	30.0	10.22	-85.20	25	7.0	Mw	EHB	HRV		
1978	9	16	15:35	53.5	33.24	57.38	3	7.4	Mw	EHB	HRV		Iran
1978	11	4	22:29	25.5	-11.33	162.24	42	7.0	Mw	EHB	HRV		
1978	11	5	22:02	10.4	-11.13	162.21	43	7.0	Mw	EHB	HRV		
1978	11	29	19:52	50.1	16.01	-96.60	24	7.8	Mw	EHB	HRV		Mexico: Oaxaca
1978	12	6	14:02	8.4	44.56	146.59	145	7.8	Mw	EHB	HRV		
1979	2	16	10:08	54.7	-16.54	-72.55	55	7.2	Mw	EHB	HRV		
1979	2	28	21:27	8.7	60.66	-141.66	24	7.5	Mw	EHB	HRV		
1979	3	14	11:07	15.0	17.76	-101.22	24	7.5	Mw	EHB	HRV		Mexico: Guerrero
1979	4	10	1:42	23.8	2.99	126.96	40	7.0	Mw	EHB	HRV		
1979	4	15	6:19	44.7	42.00	19.15	15	7.0	Mw	EHB	HRV		
1979	5	1	13:03	40.2	-21.26	169.87	95	7.0	Mw	EHB	HRV		Yugoslavia: Montenegro
1979	7	24	19:31	18.3	-11.19	107.63	15	7.0	Mw	EHB	HRV		
1979	9	12	5:17	56.2	-1.69	135.97	20	7.5	Mw	EHB	HRV		
1979	10	17	10:25	19.5	-46.69	165.82	7	7.3	Mw	EHB	HRV		
1979	10	17	5:43	3.3	18.52	145.41	590	7.0	Mw	EHB	HRV		Ecuador/Colombia
1979	10	23	9:51	8.3	-10.64	161.35	22	7.0	Mw	EHB	HRV		
1979	11	23	23:40	31.1	4.79	-76.19	108	7.2	Mw	EHB	HRV		Colombia
1979	11	27	17:10	34.5	34.06	59.76	7	7.1	Mw	EHB	HRV		
1979	12	12	7:59	4.7	1.60	-79.36	24	8.1	Mw	EHB	HRV		
1980	1	2	20:58	43.0	5.99	126.15	38	7.0	Mw	EHB	HRV		
1980	2	23	5:51	4.1	43.59	146.68	37	7.1	Mw	EHB	HRV		
1980	3	8	22:12	12.7	-22.64	171.45	41	7.2	Mw	EHB	HRV		Santa Cruz Is.
1980	3	24	3:59	53.1	52.95	-167.71	35	7.0	Mw	EHB	HRV		
1980	4	13	18:04	40.6	-23.59	-177.22	149	7.6	Mw	EHB	HRV		
1980	7	8	23:19	24.1	-12.48	166.48	56	7.5	Mw	EHB	HRV		
1980	7	16	19:56	48.7	-4.43	143.58	86	7.3	Mw	EHB	HRV		
1980	7	17	19:42	24.6	-12.48	166.00	32	7.8	Mw	EHB	HRV		
1980	10	10	12:25	25.5	36.14	1.40	12	7.1	Mw	EHB	HRV		Algeria: El-Asnam
1980	10	24	14:53	35.6	18.18	-98.24	65	7.2	Mw	EHB	HRV		Mexico
1980	10	25	7:00	8.5	-22.02	170.13	25	7.1	Mw	EHB	HRV		
1980	10	25	11:00	7.4	-21.94	170.05	38	7.5	Mw	EHB	HRV		
1980	11	8	10:27	35.2	41.11	-124.30	17	7.3	Mw	EHB	HRV		
1981	1	18	18:17	27.7	38.71	142.79	46	7.0	Mw	EHB	HRV		
1981	1	30	8:52	46.5	51.83	176.18	37	7.0	Mw	EHB	HRV		
1981	5	25	5:25	12.2	-48.72	164.65	11	7.6	Mw	EHB			

TABLE 1 (continued)

Year	M	d	h:min	sec	Lat.	Long.	Dep.	Mag.	sc	icat	mdo	Region:Earthquake Name
1981	7	28	17:22	24.1	29.99	57.77	14	7.3	Mw	EHB	HRV	Iran
1981	9	1	9:29	31.5	-15.11	-173.02	17	7.5	Mw	EHB	HRV	Iran
1981	10	25	3:25	43.1	-33.20	-73.05	32	7.1	Mw	EHB	HRV	Iran
1981	10	26	3:22	15.8	18.12	-102.00	20	7.2	Mw	EHB	HRV	Iran
1981	11	7	3:29	52.1	-32.23	-71.38	64	7.0	Mw	EHB	HRV	Iran
1981	12	26	17:05	32.0	-29.94	-177.65	21	7.1	Mw	EHB	HRV	Iran
1982	1	3	14:09	53.8	-0.99	-21.87	20	7.1	Mw	EHB	HRV	Iran
1982	1	11	6:10	6.7	13.83	124.34	32	7.1	Mw	EHB	HRV	Iran
1982	5	7	5:38	36.8	-60.70	-20.97	11	7.0	Mw	EHB	HRV	Iran
1982	6	19	6:21	58.4	13.34	-89.31	73	7.3	Mw	EHB	HRV	Iran
1982	6	22	4:18	42.3	-7.36	126.05	460	7.5	Mw	EHB	HRV	Iran
1982	6	30	1:57	34.1	44.72	151.12	20	7.1	Mw	EHB	HRV	Iran
1982	7	7	10:43	5.7	-51.30	160.67	15	7.0	Mw	EHB	HRV	Iran
1982	7	23	14:23	53.9	36.30	141.78	24	7.0	Mw	EHB	HRV	Iran
1982	8	5	20:32	51.9	-12.48	166.19	9	7.0	Mw	EHB	HRV	Iran
1982	12	19	17:43	57.0	-24.19	-175.58	33	7.5	Mw	EHB	HRV	Iran
1983	1	26	16:02	21.2	-30.45	-179.21	230	7.0	Mw	EHB	HRV	Iran
1983	3	18	9:05	51.7	-4.89	153.59	91	7.7	Mw	EHB	HRV	Iran
1983	4	3	2:50	4.9	8.72	-85.13	57	7.5	Mw	EHB	HRV	Iran
1983	4	5	2:51	37.4	5.72	94.69	94	7.0	Mw	EHB	HRV	Iran
1983	4	12	12:07	58.2	-4.85	-78.09	126	7.0	Mw	EHB	HRV	Iran
1983	5	26	2:59	59.9	40.47	139.09	15	7.7	Mw	EHB	HRV	Iran
1983	7	11	12:56	29.5	-60.92	-53.12	9	7.0	Mw	EHB	HRV	Iran
1983	8	17	10:55	58.7	55.79	161.32	93	7.0	Mw	EHB	HRV	Iran
1983	10	4	18:52	15.8	-26.54	-70.50	24	7.7	Mw	EHB	HRV	Iran
1983	10	22	4:21	34.0	-60.69	-25.50	5	7.1	Mw	EHB	HRV	Iran
1983	10	28	14:06	9.6	44.08	-113.80	16	7.0	Mw	EHB	HRV	Iran
1983	11	24	5:30	37.3	-7.51	128.11	196	7.4	Mw	EHB	HRV	Iran
1983	11	30	17:46	2.4	-6.84	72.06	10	7.7	Mw	EHB	HRV	Iran
1983	12	2	3:09	3.7	14.06	-91.91	35	7.0	Mw	EHB	HRV	Iran
1983	12	30	23:52	41.4	36.39	70.71	215	7.4	Mw	EHB	HRV	Iran
1984	1	7	9:03	41.2	33.65	136.79	386	7.2	Mw	EHB	HRV	Iran
1984	2	7	21:53	21.6	-9.97	160.57	9	7.6	Mw	EHB	HRV	Iran
1984	3	5	3:53	52.9	8.15	123.75	655	7.3	Mw	EHB	HRV	Iran
1984	3	6	2:17	22.4	29.38	138.88	460	7.4	Mw	EHB	HRV	Iran
1984	3	19	20:28	40.0	40.34	63.33	15	7.0	Mw	EHB	HRV	Iran
1984	3	24	9:44	3.7	44.17	148.16	38	7.2	Mw	EHB	HRV	Iran
1984	5	30	7:49	44.9	-4.84	151.59	171	7.1	Mw	EHB	HRV	Iran
1984	8	6	12:01	53.7	-0.08	122.42	244	7.4	Mw	EHB	HRV	Iran
1984	10	15	10:21	8.6	-15.87	-173.56	127	7.1	Mw	EHB	HRV	Iran
1984	11	1	4:48	52.3	8.15	-38.81	12	7.0	Mw	EHB	HRV	Iran
1984	11	15	2:46	23.5	-22.04	171.02	126	7.1	Mw	EHB	HRV	Iran
1984	11	17	6:49	30.8	0.18	97.96	28	7.1	Mw	EHB	HRV	Iran
1984	11	20	8:15	15.2	5.12	125.11	180	7.5	Mw	EHB	HRV	Iran
1985	3	3	22:47	8.4	-33.14	-71.76	35	8.0	Mw	EHB	HRV	Iran
1985	3	4	0:32	24.0	-33.24	-71.74	40	7.4	Mw	EHB	HRV	Iran
1985	4	9	1:57	1.9	-34.12	-71.51	49	7.1	Mw	EHB	HRV	Iran
1985	5	10	15:33	54.3	-5.60	151.06	47	7.2	Mw	EHB	HRV	Iran
1985	7	3	4:36	54.9	-6.45	152.88	47	7.2	Mw	EHB	HRV	Iran
1985	7	29	7:54	45.8	36.16	70.86	100	7.4	Mw	EHB	HRV	Iran
1985	8	23	12:41	60.0	39.44	75.24	20	7.0	Mw	EHB	HRV	China
1985	9	19	13:17	49.6	18.45	-102.37	20	8.0	Mw	EHB	HRV	China
1985	9	21	9:37	13.5	-17.83	-101.62	18	7.6	Mw	EHB	HRV	Mexico: Michoacan
1985	11	17	9:40	23.3	-1.67	134.94	10	7.1	Mw	EHB	HRV	Mexico: Michoacan
1985	11	28	2:25	42.8	-14.03	166.34	25	7.0	Mw	EHB	HRV	Mexico: Michoacan
1985	11	28	3:49	57.7	-13.98	166.28	49	7.0	Mw	EHB	HRV	Mexico: Michoacan
1985	12	21	1:13	23.7	-14.01	166.63	44	7.1	Mw	EHB	HRV	Mexico: Michoacan
1986	1	15	20:17	31.7	-21.46	170.44	140	7.1	Mw	EHB	HRV	Mexico: Michoacan
1986	4	30	7:07	19.0	18.37	-103.00	23	7.0	Mw	EHB	HRV	Mexico: Michoacan
1986	5	7	22:47	10.5	51.56	-174.81	20	8.0	Mw	EHB	HRV	Andreeanof Is.
1986	5	26	19:06	16.9	-20.22	178.95	541	7.1	Mw	EHB	HRV	Andreeanof Is.
1986	6	16	10:48	27.7	-21.99	-178.87	560	7.1	Mw	EHB	HRV	Andreeanof Is.
1986	6	24	3:11	34.6	-4.44	144.01	123	7.2	Mw	EHB	HRV	Andreeanof Is.
1986	8	14	19:59	14.5	1.80	126.48	30	7.5	Mw	EHB	HRV	Andreeanof Is.
1986	8	30	21:28	37.1	45.52	26.27	136	7.2	Mw	EHB	HRV	Andreeanof Is.
1986	10	20	6:46	11.4	-28.16	-176.29	30	7.7	Mw	EHB	HRV	Andreeanof Is.
1986	10	30	1:28	55.9	-21.67	-176.55	190	7.2	Mw	EHB	HRV	Andreeanof Is.
1986	11	14	21:20	5.4	23.98	121.72	25	7.4	Mw	EHB	HRV	Andreeanof Is.
1987	1	30	22:59	38.5	-60.16	-27.01	8	7.0	Mw	EHB	HRV	Andreeanof Is.
1987	2	8	18:53	58.8	-6.02	147.66	42	7.3	Mw	EHB	HRV	Andreeanof Is.
1987	3	5	9:17	5.1	-24.40	-70.10	46	7.6	Mw	EHB	HRV	Andreeanof Is.
1987	3	5	10:55	14.0	-24.44	-70.57	31	7.0	Mw	EHB	HRV	Andreeanof Is.
1987	3	6	4:10	44.8	0.08	-77.79	18	7.2	Mw	EHB	HRV	Ecuador/Colombia
1987	4	1	1:48	7.1	-22.90	-66.25	230	7.0	Mw	EHB	HRV	Ecuador/Colombia
1987	4	17	1:32	57.0	-5.59	130.84	85	7.1	Mw	EHB	HRV	Ecuador/Colombia
1987	8	8	15:48	58.0	-19.09	-70.01	71	7.2	Mw	EHB	HRV	Ecuador/Colombia
1987	9	3	6:40	12.5	-58.94	158.51	15	7.4	Mw	EHB	HRV	Ecuador/Colombia
1987	10	6	4:19	8.1	-17.98	-172.17	22	7.3	Mw	EHB	HRV	Ecuador/Colombia
1987	10	12	13:57	6.8	-7.27	154.42	28	7.0	Mw	EHB	HRV	Ecuador/Colombia
1987	10	16	20:48	0.8	-6.22	149.12	30	7.4	Mw	EHB	HRV	Ecuador/Colombia
1987	11	17	8:46	50.6	58.79	-143.20	3	7.2	Mw	EHB	HRV	Ecuador/Colombia
1987	11	30	19:23	17.8	58.83	-142.60	15	7.9	Mw	EHB	HRV	Ecuador/Colombia
1988	1	19	7:50	30.7	-24.67	-70.51	15	7.0	Mw	EHB	HRV	Ecuador/Colombia
1988	2	5	14:01	4.1	-24.79	-70.48	37	7.2	Mw	EHB	HRV	Ecuador/Colombia
1988	2	24	3:52	6.7	13.47	124.55	40	7.3	Mw	EHB	HRV	Ecuador/Colombia
1988	3	6	22:35	36.8	57.26	-142.75	6	7.8	Mw	EHB	HRV	Ecuador/Colombia
1988	4	12	23:19	56.3	-17.25	-72.25	30	7.1	Mw	EHB	HRV	Ecuador/Colombia
1988	7	23	15:17	11.7	-6.53	152.81	31	7.0	Mw	EHB	HRV	Ecuador/Colombia
1988	8	6	0:56	26.0	25.09	95.11	90	7.3	Mw	EHB	HRV	Ecuador/Colombia
1988	8	10	4:58	28.2	-10.32	160.93	34	7.6	Mw	EHB	HRV	Ecuador/Colombia
1988	10	8	4:46	26.4	-18.83	-172.32	41	7.1	Mw	EHB	HRV	China: Lancang
1988	11	6	13:03	22.4	22.87	99.57	23	7.0	Mw	EHB	HRV	China: Lancang
1989	2	10	11:15	26.0	2.28	126.68	46	7.1	Mw	EHB	HRV	China: Lancang
1989	5	5	18:28	40.3	-8.31	-71.40	593	7.1	Mw	EHB	HRV	China: Lancang
1989	5	23	10:54	46.1	-52.51	160.60	2	8.1	Mw	EHB	HRV	China: Lancang
1989	9	4	13:14	59.1	55.59	-156.86	6	7.1	Mw	EHB	HRV	Macquarie Is.
1989	11	1	18:25	36.7	39.92	142.79	29	7.4	Mw	EHB	HRV	Macquarie Is.
1989	12	15	18:43	47.1	8.37	126.69	24	7.5	Mw	EHB	HRV	Macquarie Is.
1990	3	3	12:16	29.7	-21.96	175.26	36	7.6	Mw			

Year	M	d	h:min	Sec	Lat.	Long.	Dep.	Mag.	sc	icat	mdo	Region:Earthquake Name
1990	3	25	13:16	9.4	9.85	-84.77	33	7.1	Ms	EHB	ISC	
1990	3	25	13:22	57.0	9.94	-84.78	22	7.3	Mw	EHB	HRV	
1990	4	18	13:39	22.5	15.16	147.61	23	7.4	Mw	EHB	HRV	
1990	5	12	4:50	10.1	1.20	122.82	37	7.6	Mw	EHB	HRV	
1990	5	20	2:22	1.7	5.11	141.87	615	7.2	Mw	EHB	HRV	
1990	5	24	20:00	9.6	5.34	31.84	16	7.1	Mw	EHB	HRV	
1990	5	24	20:09	24.2	-7.36	120.35	588	7.1	Mw	EHB	HRV	
1990	5	30	10:40	7.7	45.85	26.65	90	7.0	Mw	EHB	HRV	
1990	6	14	7:40	55.7	11.39	122.04	18	7.1	Mw	EHB	HRV	
1990	6	20	21:00	13.2	37.01	49.21	18	7.4	Mw	EHB	HRV	Iran
1990	7	16	7:26	36.0	15.72	121.18	24	7.7	Mw	EHB	HRV	Philippines: Luzon
1990	7	27	12:38	0.9	-15.33	167.54	127	7.2	Mw	EHB	HRV	
1990	8	12	21:25	23.2	-19.44	169.24	140	7.1	Mw	EHB	HRV	
1990	10	17	14:30	13.9	-11.03	-70.74	599	7.0	Mw	EHB	HRV	
1990	11	6	20:14	31.5	53.49	169.82	26	7.1	Mw	EHB	HRV	
1990	12	30	19:14	21.5	-3.09	151.02	188	7.5	Mw	EHB	HRV	
1991	1	5	14:57	13.2	23.57	95.87	18	7.0	Mw	EHB	HRV	
1991	4	22	21:56	53.9	9.67	-83.07	13	7.6	Mw	EHB	HRV	Costa Rica/Panama
1991	4	29	9:12	48.0	42.43	43.67	7	7.0	Mw	EHB	HRV	Georgia
1991	5	30	13:17	43.2	54.52	-161.71	29	7.0	Mw	EHB	HRV	
1991	6	9	7:45	4.5	-20.24	-176.15	278	7.0	Mw	EHB	HRV	
1991	6	20	5:18	34.2	1.21	122.77	33	7.5	Mw	EHB	HRV	
1991	6	25	21:22	30.0	-26.78	-63.27	562	7.3	Mw	EHB	HRV	
1991	7	17	22:17	14.4	41.75	-125.59	7	7.1	Mw	EHB	HRV	
1991	9	30	0:21	47.5	-20.82	-178.50	567	7.0	Mw	EHB	HRV	
1991	10	14	15:58	16.5	-9.05	158.55	38	7.2	Mw	EHB	HRV	
1991	11	19	22:28	33.3	4.55	-77.36	25	7.2	Mw	EHB	HRV	
1991	12	22	8:43	15.1	45.59	151.04	25	7.6	Mw	EHB	HRV	
1991	12	27	4:06	0.9	-55.97	-25.06	22	7.2	Mw	EHB	HRV	
1992	4	25	18:06	6.4	40.35	-124.07	19	7.2	Mw	EHB	HRV	
1992	5	15	7:05	7.7	-6.06	147.62	66	7.2	Mw	EHB	HRV	
1992	5	17	9:49	20.8	7.33	126.67	36	7.1	Mw	EHB	HRV	
1992	5	17	10:15	36.3	7.24	126.75	64	7.2	Mw	EHB	HRV	
1992	5	27	5:13	40.4	-11.08	165.29	20	7.0	Mw	EHB	HRV	
1992	6	28	11:57	38.4	34.18	-116.53	11	7.3	Mw	EHB	HRV	Calif.: Landers
1992	7	11	10:44	21.9	-22.47	-178.32	389	7.2	Mw	EHB	HRV	
1992	8	19	2:04	36.7	42.11	73.61	13	7.2	Mw	EHB	HRV	Kyrgyzstan
1992	9	2	0:16	2.7	11.73	-87.39	40	7.7	Mw	EHB	HRV	Nicaragua
1992	10	11	19:24	28.1	-19.26	169.02	136	7.4	Mw	EHB	HRV	
1992	10	18	15:11	59.8	7.09	-76.76	3	7.1	Mw	EHB	HRV	Indonesia
1992	12	12	5:29	28.6	-8.49	121.83	33	7.8	Mw	EHB	HRV	
1992	12	20	20:32	48.4	-6.59	130.40	76	7.3	Mw	EHB	HRV	
1993	1	15	11:06	7.7	43.03	144.15	100	7.6	Mw	EHB	HRV	
1993	3	6	3:05	52.0	-10.91	164.27	23	7.1	Mw	EHB	HRV	
1993	5	11	18:26	52.8	7.25	126.62	62	7.0	Mw	EHB	HRV	
1993	5	24	23:51	26.7	-23.13	-66.47	218	7.0	Mw	EHB	HRV	
1993	6	13	03	34.7	51.19	157.76	61	7.5	Mw	EHB	HRV	
1993	7	12	13:17	12.7	42.90	139.24	12	7.7	Mw	EHB	HRV	Japan: Hokkaido-nanse.
1993	8	8	8:34	25.9	13.00	144.87	57	7.8	Mw	EHB	HRV	S. Mariana Is.: Guam

(continued)

Year	M	d	h:min	Sec	Lat.	Long.	Dep.	Mag.	sc	icat	mdo	Region:Earthquake Name
1993	8	9	12:42	48.9	36.33	70.87	211	7.0	Mw	EHB	HRV	
1993	8	10	0:51	54.6	-45.22	167.01	29	7.0	Mw	EHB	HRV	
1993	9	10	19:12	56.3	14.76	-92.64	34	7.2	Mw	EHB	HRV	
1993	11	13	1:18	5.8	51.94	158.63	35	7.0	Mw	EHB	HRV	
1993	12	29	7:48	13.2	-20.24	169.92	17	7.0	Mw	EHB	HRV	
1994	1	21	2:24	31.4	1.04	127.77	19	7.0	Mw	EHB	HRV	
1994	2	12	17:58	25.6	-20.55	169.47	30	7.0	Mw	EHB	HRV	
1994	3	9	23:28	7.9	-17.97	-178.36	564	7.6	Mw	EHB	HRV	
1994	3	14	4:30	17.6	-1.09	-23.55	5	7.0	Mw	EHB	HRV	
1994	6	2	18:17	38.5	-10.41	112.93	34	7.8	Mw	EHB	HRV	Indonesia
1994	6	2	18:17	52.2	-10.44	113.18	35	7.1	Ms	EHB	ISC	
1994	6	9	0:33	17.5	-13.88	-67.53	635	8.2	Mw	EHB	HRV	Northern Bolivia
1994	7	13	2:35	58.3	-16.60	167.54	35	7.2	Mw	EHB	HRV	
1994	7	21	18:36	32.6	42.31	132.87	472	7.3	Mw	EHB	HRV	
1994	9	1	15:15	54.5	40.38	-125.78	10	7.0	Mw	EHB	HRV	
1994	10	4	13:23	0.3	43.83	147.33	33	8.3	Mw	EHB	HRV	Kuril Is.
1994	10	4	15:24	17.2	43.60	147.87	17	7.1	Ms	EHB	ISC	
1994	10	4	16:01	4.5	43.78	148.03	18	7.1	Ms	EHB	ISC	
1994	10	9	7:55	41.4	43.97	147.89	34	7.3	Mw	EHB	HRV	
1994	10	9	8:07	5.9	43.75	148.03	36	7.3	Ms	EHB	ISC	
1994	11	14	19:15	31.4	13.54	121.06	28	7.1	Mw	EHB	HRV	Philippines
1994	12	12	12:19	23.3	40.54	143.44	16	7.8	Mw	EHB	HRV	
1995	1	6	23:37	36.2	40.35	142.22	28	7.0	Mw	EHB	HRV	
1995	2	5	22:51	8.8	-37.82	178.88	41	7.1	Mw	EHB	HRV	
1995	4	7	22:06	59.6	-15.34	-173.43	33	7.4	Mw	EHB	HRV	
1995	4	21	0:34	49.9	12.10	125.45	35	7.2	Mw	EHB	HRV	
1995	5	5	3:53	48.4	12.66	125.22	27	7.1	Mw	EHB	HRV	
1995	5	16	20:12	45.3	-22.94	169.99	19	7.7	Mw	EHB	HRV	
1995	5	27	13:03	55.3	52.60	142.82	18	7.1	Mw	EHB	HRV	Russia: Sakhalin
1995	7	3	19:50	52.1	-29.40	-177.45	41	7.2	Mw	EHB	HRV	
1995	7	30	5:11	24.5	-23.34	-70.26	41	8.0	Mw	EHB	HRV	Chile
1995	8	16	10:27	28.2	-5.78	154.29	16	7.7	Mw	EHB	HRV	
1995	8	16	23:10	30.0	-5.77	154.35	75	7.2	Mw	EHB	HRV	
1995	8	23	7:06	4.8	18.82	145.29	607	7.1	Mw	EHB	HRV	
1995	9	14	14:04	33.9	16.85	-98.61	28	7.4	Mw	EHB	HRV	
1995	10	3	1:51	25.2	-2.79	-77.82	24	7.0	Mw	EHB	HRV	Mexico: Manzanillo
1995	10	9	15:35	54.1	19.05	-104.21	26	8.0	Mw	EHB	HRV	
1995	10	18	10:37	28.6	28.07	130.28	32	7.1	Mw	EHB	HRV	
1995	10	21	2:38	58.5	16.83	-93.47	162	7.2	Mw	EHB	HRV	
1995	11	22	4:15	13.7	28.76	34.81	13	7.2	Mw	EHB	HRV	
1995	12	3	18:01	9.6	44.71	149.26	26	7.9	Mw	EHB	HRV	Kurile Is.
1995	12	25	4:43	26.0	-6.92	129.20	145	7.1	Mw	EHB	HRV	Indonesia
1996	1	1	8:05	12.5	0.71	119.90	25	7.9	Mw	EHB	HRV	
1996	2	7	21:36	47.0	45.37	149.90	33	7.2	Mw	EHB	HRV	
1996	2	17	5:59	32.4	-0.92	136.98	36	8.2	Mw	EHB	HRV	Indonesia: West Irian
1996	2	21	12:51	4.3	-9.71	-79.85	15	7.5	Mw	EHB	HRV	
1996	2	25	3:08	16.7	15.93	-98.11	18	7.1	Mw	EHB	HRV	
1996	4	16	0:30	55.3	-24.28	-176.90	110	7.2	Mw	EHB	HRV	
1996	4	29	14:40	43.0	-6.54	155.10	49	7.2	Mw	EHB	HRV	
1996	6	10	4:03	36.3	51.59	-177.59	29	7.9	Mw	EHB	HRV	Andreanof Is.

TABLE 1 (continued)

Year	M	d	h:min	sec	Lat.	Long.	Dep.	Mag.	sc	icat	mco	Region:Earthquake Name
1996	6	10	15:24	58.0	51.43	-176.84	27	7.3	Mw	EHB	HRV	
1996	6	11	18:22	58.1	12.58	125.12	39	7.1	Mw	EHB	HRV	
1996	6	17	11:22	19.8	-7.15	122.51	591	7.9	Mw	EHB	HRV	
1996	7	22	14:19	36.9	1.02	120.41	30	7.0	Mw	EHB	HRV	
1996	8	5	22:38	23.3	-20.80	-178.23	557	7.4	Mw	EHB	HRV	
1996	11	12	16:59	43.4	-14.96	-75.56	17	7.7	Mw	EHB	HRV	
1997	1	11	20:28	27.8	18.18	-102.81	35	7.2	Mw	EHB	HRV	
1997	1	23	2:15	23.2	-22.04	-65.66	269	7.1	Mw	EHB	HRV	
1997	2	27	21:08	3.2	29.94	68.19	24	7.1	Mw	EHB	HRV	Pakistan
1997	4	21	12:02	27.3	-12.56	166.80	28	7.7	Mw	EHB	HRV	Pakistan
1997	5	10	7:57	31.9	33.83	59.80	12	7.2	Mw	EHB	HRV	Iran
1997	5	25	23:22	34.7	-32.26	179.93	341	7.1	Mw	EHB	HRV	Iran
1997	7	9	19:24	12.9	10.47	-63.53	10	7.0	Mw	EHB	HRV	Venezuela
1997	9	20	16:11	33.1	-28.80	-177.44	30	7.0	Mw	EHB	HRV	Venezuela
1997	10	14	9:53	18.3	-22.26	-176.63	163	7.7	Mw	EHB	HRV	Venezuela
1997	10	15	1:03	35.2	-30.89	-71.15	62	7.1	Mw	EHB	HRV	
1997	10	28	6:15	18.7	-4.36	-76.60	112	7.2	Mw	EHB	HRV	
1997	11	8	10:02	53.3	35.11	87.37	24	7.5	Mw	EHB	HRV	
1997	11	15	18:59	26.0	-15.11	167.44	127	7.0	Mw	EHB	HRV	
1997	11	25	12:14	35.0	1.20	122.49	24	7.0	Mw	EHB	HRV	
1997	12	5	11:26	56.8	54.80	162.00	37	7.8	Mw	EHB	HRV	
1997	12	5	11:48	41.7	54.42	162.26	28	7.3	Ms	EHB	ISC	
1997	12	22	2:05	52.8	-5.56	147.88	191	7.2	Mw	EHB	HRV	
1998	1	4	6:12	0.2	-23.25	171.01	100	7.5	Mw	EHB	HRV	
1998	1	30	12:16	10.2	-23.85	-70.15	41	7.1	Mw	EHB	HRV	
1998	3	25	3:12	28.3	-62.90	149.61	20	8.1	Mw	EHB	HRV	Baltney Is.
1998	3	29	19:48	16.9	-17.71	-178.91	538	7.2	Mw	EHB	HRV	Baltney Is.
1998	4	1	17:56	21.9	-0.56	99.19	32	7.0	Mw	EHB	HRV	
1998	5	3	23:30	22.1	22.43	125.37	24	7.5	Mw	EHB	HRV	
1998	7	16	11:56	35.6	-11.03	166.27	93	7.0	Mw	EHB	HRV	
1998	7	17	8:49	14.3	-2.97	142.69	10	7.0	Mw	EHB	HRV	Papua New Guinea
1998	8	4	18:59	20.9	-0.60	-80.31	26	7.2	Mw	EHB	HRV	Papua New Guinea
1998	8	20	6:40	55.6	28.98	139.39	425	7.1	Mw	EHB	HRV	Papua New Guinea
1998	11	9	5:38	45.3	-6.98	128.93	31	7.0	Mw	EHB	HRV	
1998	11	29	14:10	31.9	-1.94	124.82	21	7.7	Mw	EHB	HRV	
1999	1	19	3:35	31.4	-4.55	153.41	75	7.0	Mw	EHB	HRV	
1999	2	6	21:48	1.1	-12.82	166.78	90	7.3	Mw	EHB	HRV	
1999	3	4	8:52	2.8	5.42	121.87	29	7.1	Mw	EHB	HRV	
1999	4	5	11:08	3.9	-5.60	149.65	138	7.4	Mw	EHB	HRV	
1999	4	8	13:10	35.7	43.62	130.34	574	7.1	Mw	EHB	HRV	
1999	5	10	20:33	1.7	-5.16	150.98	124	7.1	Mw	EHB	HRV	
1999	5	16	0:51	18.8	-4.71	152.61	46	7.1	Mw	EHB	HRV	
1999	6	15	20:42	6.9	18.36	-97.45	67	7.0	Mw	EHB	HRV	
1999	8	17	0:01	40.6	40.75	29.94	17	7.6	Mw	EHB	HRV	Turkey: Kocaeli
1999	9	20	17:47	19.7	23.79	120.95	31	7.7	Mw	EHB	HRV	Taiwan: Chi-Chi
1999	9	30	16:31	14.8	16.05	-96.87	40	7.5	Mw	EHB	HRV	
1999	10	16	9:46	46.8	34.51	-116.43	5	7.2	Mw	EHB	HRV	Calif.: Hector Mine
1999	11	12	16:57	21.2	40.78	31.21	10	7.2	Mw	EHB	HRV	Turkey: Duzce
1999	11	15	5:42	45.4	-1.35	88.87	13	7.0	Mw	EHB	HRV	
1999	11	19	13:56	49.5	-6.36	148.81	46	7.0	Mw	EHB	HRV	

## Explanations:

(1) Earthquake origin time is given in UTC by: Year, Month (M), Day (d), hour (h), Minute (min), and Second (sec).

(2) Earthquake hypocenter is given by: Latitude (Lat.) in degrees (positive for northern hemisphere, and negative for southern hemisphere); Longitude (Long.) in degrees (positive for eastern hemisphere, and negative for western hemisphere); and Focal Depth (Dep.) in kilometers.

(3) Preferred Magnitude is given by: Magnitude (Mag.) and Magnitude Scale (sc).

Moment magnitude (Mw): Value is computed from the scalar moment (Mo). Mw is related to the scalar moment by the formula  $M_w = 2/3 \log Mo - 10.7$  (Hanks and Kanamori, 1979).

Surface-wave magnitude (Ms): Value is computed by ISC/NEIC for earthquakes at depths generally less than 50 km (NEIC) or 60 km (ISC) based on the maximum ground amplitude of surface waves with periods between 18 and 22 seconds that are recorded at distances between 20 and 160 degrees.

Broad-band body-wave magnitude (mb): Value is computed as defined by Gutenberg and Richter (1956) based on the maximum ground amplitude of seismic body-waves with periods of 5-10 s that are recorded at distances greater than or equal to 5 degrees.

Body-wave magnitude (mb): Value is computed by ISC/NEIC based on the maximum ground amplitude of seismic body-waves with periods of 0.1-3 s that are recorded at distances greater than or equal to 5 degrees.

Japan Meteorological Agency magnitude (Mj): Value is computed using either maximum ground displacement or maximum ground velocity.

Unknown magnitudes (UK): The computational method was unknown and could not be determined from published sources. Examples of unknown magnitudes are the ones calculated by Gutenberg and Richter in "Seismicity of the Earth" (MGR).

(4) Source catalog is given in the "icat" column. EHB = EHB origin time and hypocenter (otherwise from other earthquake catalogs).

(5) Source for magnitude (Mag) is given in the "mco" column.

(6) For some well-known earthquakes, the "Region:Earthquake Name" column gives the geographical region where the earthquake occurred, and a commonly cited name for the earthquake in the literature. "NZ" = New Zealand, "Calif." = California, and "Is." = Island.

(7) Please see Appendix 3 for further explanations of (4) and (5).

**TABLE 2** Frequency–Magnitude Distribution for 1900–1999

Incremental			Cumulative	
$\leq M <$	Events	$y^{-1}$	$M \geq$	Events
				$y^{-1}$
5.5	6.0	164 <sup>a</sup>	5.5	264 <sup>a</sup>
6.0	6.5	62 <sup>a</sup>	6.0	100 <sup>a</sup>
6.5	7.0	22	6.5	38
7.0	7.5	12	7.0	16
7.5	8.0	3	7.5	4
8.0	—	0.7	8.0	0.7

<sup>a</sup>For magnitudes smaller than 6.5 the number of events is based on the period 1964–1999.

Figure 3b shows a histogram of the number of events per 10-year period in different magnitude intervals for the entire century. We note a slight increase in the number of earthquakes with magnitudes greater than or equal to 6.5 during the 1940–1960 period. Most of the magnitudes for events less than magnitude 7 during this period were those listed by Gutenberg and Richter (1954), suggesting that many of the  $M_{GR}$  magnitudes, even after applying the correction previously described, may remain too high when compared to other magnitudes such as those reported by Abe (1981).

In summary, our full global earthquake database is given in CENT.CAT on the Handbook CD, under the directory \41Engdahl, and a subset of earthquakes with magnitude greater than or equal to 7.0 is given in CENT7.CAT in the same directory. For general reference, essential information from CENT7.CAT is listed in Table 1 with names for some well-known earthquakes. According to our analysis, this list is complete for the 20th century. Frequency–magnitude distributions for the century have been estimated from our database and are presented in Table 2. We believe these distributions to be reasonably representative of the rate of earthquake occurrence during the last century.

## 7. Discussion

The earthquake locations listed in our catalog for the historical period are of variable quality, as not all of the phase data listed in ISS bulletins have been converted into digital format and we were only able to relocate events during the 1918–1942 and 1956–1999 periods. Hence, hypocentral errors, especially in depth, may remain quite large during the missing years (as well as for many relocated events before 1930). Maps of the distribution of earthquake locations in our catalog are shown in Color Plates 15 and 16.

Magnitude issues, such as the hierarchical selection process, are more contentious, especially for earthquakes less than about magnitude 6.5. Since the seismic moment  $M_0$  is a more stable measurement than  $M_S$  we chose to convert the Harvard  $M_0$  (when available) to an empirical  $M_S$  using the

relationship derived by Ekström and Dziewonski (1988). This empirical  $M_S$  approximates the global average value of  $M_S$  observed for that scalar moment and thereby ensures that the assignment of magnitudes for most of the modern period (1976–1999) remains reasonably consistent with reported magnitudes for earlier periods, which are largely  $M_S$ . We also confirmed that magnitude estimates listed by Abe (1981, 1984) and by Pacheco and Sykes (1992) for larger events were consistent with Harvard  $M_w$  estimates. However, when we made a similar comparison to magnitudes reported by Gutenberg and Richter (1954) and by Båth and Duda (1979), we found that those estimates were consistently about 0.2 magnitude units higher than the Abe (1981, 1984) values. Moreover, it was impossible to match the seismicity rates of the historical period to those of the modern period without making a reduction in the older magnitudes by about 0.2 units. However, final resolution of this problem is presently beyond the scope of this study so that, for example, the apparent higher seismicity rate during the 1940–1960 period (Fig. 3b) will remain problematic.

Our magnitude adjustment and selection process will undoubtedly raise concerns about earthquakes which have been cited in the literature as reputedly higher magnitude than we are able to confirm. However, many of these earthquakes cannot be found in our catalog simply because the selection process put them below the magnitude cut-off of 6.5 for the historical period or 5.5 for the modern period.

Both the location and magnitude issues raised here mean that correcting and updating our catalog will be an ongoing process. Hence, as new versions of the catalog are produced, we will make every effort to have them generally available to the global seismological community via the World Wide Web, CD-ROMs, and technical and general publications.

## 8. Summary and Conclusions

The goal of this research was to produce a comprehensive digital hypocenter and phase arrival-time database for most globally detected earthquakes during the 20th century, including a complete station list with codes, locations, and dates of operation. For the historical period (1900–1963) we have chosen a magnitude cut-off value of 6.5 although the resulting catalog is complete only to magnitude 7.0. For the recent period (1964–1999) the magnitude cut-off is 5.5, and the catalog is complete at this magnitude threshold.

For the earthquake research community, this database should provide a reliable starting point for a wide range of studies, including (but not limited to) source parameter studies, delineation of rupture zones of large earthquakes from after-shock distributions, further improvements in Earth models, and detailed studies of the seismicity of active regions. The new database may also be of great utility in providing fundamental information for reliable seismic hazard assessment,

especially in developing countries located in active seismic belts whose seismic history is poorly known.

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## Appendix 1. Centennial Catalog Format Description

The file CENT.CAT, or CENT7.CAT, may be read by the following FORTRAN read statement:

```
read(1, 100) icat, asol, isol, yr, mon, day, hr, min, sec,
& glat, glon, dep, greg, ntel, (mag(k), msc(k), mdo(k), k=1, 8)
100 format (a6, a1, a5, i2, 2i3, 1x, 2i3, f6.2, 1x, 2f8.3, f6.1, 2i4,
& 8(f4.1, 1x, a2, 1x, a5))
```

Variable definitions are:

icat	source catalog EHB = EHB origin time and hypocenter (otherwise from other catalogs)
asol	open azimuth of teleseismic stations ( $\Delta > 28^\circ$ ) used for the period 1900–1963 blank = unknown A = $< 180$ deg B = $< 210$ deg and $> 180$ deg C = $< 240$ deg and $> 210$ deg D = $< 270$ deg and $> 240$ deg F = $> 270$ deg for the period 1964–1999 blank = $< 180$ deg Z = $\geq 180$ deg
isol	solution type HEQ = origin time and hypocenter fixed DEQ = depth free LEQ = depth fixed by program FEQ = depth fixed by Engdahl based on independent information XEQ = poor solution
other info	M = focal mechanism available
yr	year
mon	month

day	day
hr	origin hour (UTC)
min	origin minute
sec	origin second
glat	geographic latitude (degrees: negative value = south)
glon	geographic longitude (degrees: negative value = west)
dep	focal depth (kilometers)
greg	Flinn–Engdahl geographic region number (Flinn <i>et al.</i> , 1974)
ntel	number of teleseismic observations ( $\Delta > 28^\circ$ ) used in solution
magnitudes (up to 8):	first listed is magnitude adopted for the event
mag	magnitude
msc	scale
mdo	source

## Appendix 2. Magnitude Scale (msc) Descriptors

Moment magnitude ( $M_w$ ): Value is computed from the scalar moment ( $M_0$ ).  $M_w$  is related to the scalar moment by the formula  $M_w = 2/3 \log M_0 - 10.7$  (Hanks and Kanamori, 1979).

Surface-wave magnitude ( $M_S$ ): Value is computed by ISC/NEIC for earthquakes at depths generally less than 50 km (NEIC) or 60 km (ISC) based on the maximum ground amplitude of surface waves with periods between 18 and 22 sec that are recorded at distances between 20 and 160 deg.

Energy magnitude ( $M_E$ ): Value is computed by NEIC from the seismic radiated energy ( $E_S$ ) obtained from energy spectral density of broadband  $P$  waves using the formula  $M_E = 2/3 \log E_S - 2.9$  (Choy and Boatwright, 1995).

Broadband body-wave magnitude ( $m_B$ ): Value is computed as defined by Gutenberg and Richter (1956) based on the maximum ground amplitude of seismic body waves with periods of 5–10 sec that are recorded at distances greater than or equal to 5 deg.

Body-wave magnitude ( $m_B$ ): Value is computed by ISC/NEIC based on the maximum ground amplitude of seismic body waves with periods of 0.1–3 sec that are recorded at distances greater than or equal to 5 deg.

Japan Meteorological Agency magnitude ( $M_J$ ): Value is computed using either maximum ground displacement or maximum ground velocity.

Unknown magnitudes (UK): The computational method was unknown and could not be determined from published sources. Examples of unknown magnitudes are the ones calculated by Gutenberg and Richter (1954) ( $M_{GR}$ ).

### Appendix 3. Source Catalog (icat) and Magnitude Source (mdo) Descriptors

ABE: Catalog of large earthquakes, mostly magnitude 6.8 and larger, 1897–1980, from Abe (1981, 1984) and Abe and Noguchi (1983a,b). The magnitude sources AN1, AN2, ABE1 and ABE2 listed in the mdo column of Table1 are from this catalog.

B&D: Catalog of large earthquakes, 1897–1977, compiled by Båth and Duda (1979).

BRK: Magnitudes reported by the Seismographic Station, University of California, Berkeley, USA.

BJI: Catalog of hypocenters and magnitudes reported by the State Seismological Bureau, Beijing, China.

G&R: Catalog of hypocenters and magnitudes, 1904–1952 (Gutenberg and Richter, 1954).

ISC: Hypocenters and magnitudes from bulletins prepared by the International Seismological Centre, Newbury, UK, 1964–1998.

ISS: Hypocenters listed in the International Seismological Summary, 1918–1963. The same code is used for hypocenters listed in the British Association for the Advancement of Science bulletins (1913–1917), the predecessor of the ISS.

JMA: Catalog of hypocenters and magnitudes, 1926–present, reported by the Japan Meteorological Agency, Tokyo, Japan.

MOS: Catalog of earthquakes occurring in the former USSR, 1950–1961.

P&S: Complete and uniform catalog of worldwide earthquakes with  $M_S$  magnitudes of 7.0 and larger at depths less than or equal to 70 km, 1900–1989 (Pacheco and Sykes, 1992).

PAS: Magnitudes reported by the California Institute of Technology, Pasadena, USA.

NEIC, NEIS and C&GS: Catalogs of earthquakes located by the US Geological Survey's NEIC and its predecessors.

ROTHE: Catalog of worldwide earthquakes with magnitudes of 5.5 or larger, 1953–1965 (Rothé, 1969).

UTSU: Catalog of earthquakes in the Japan region, 1885–1925 (Utsu, 1979, 1982a,b).

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## Editor’s Note

Computer readable data files for this Chapter are given on the Handbook CD, under the directory \41Engdahl.