

KONINKLIJK NEDERLANDS  
METEOROLOGISCH INSTITUUT

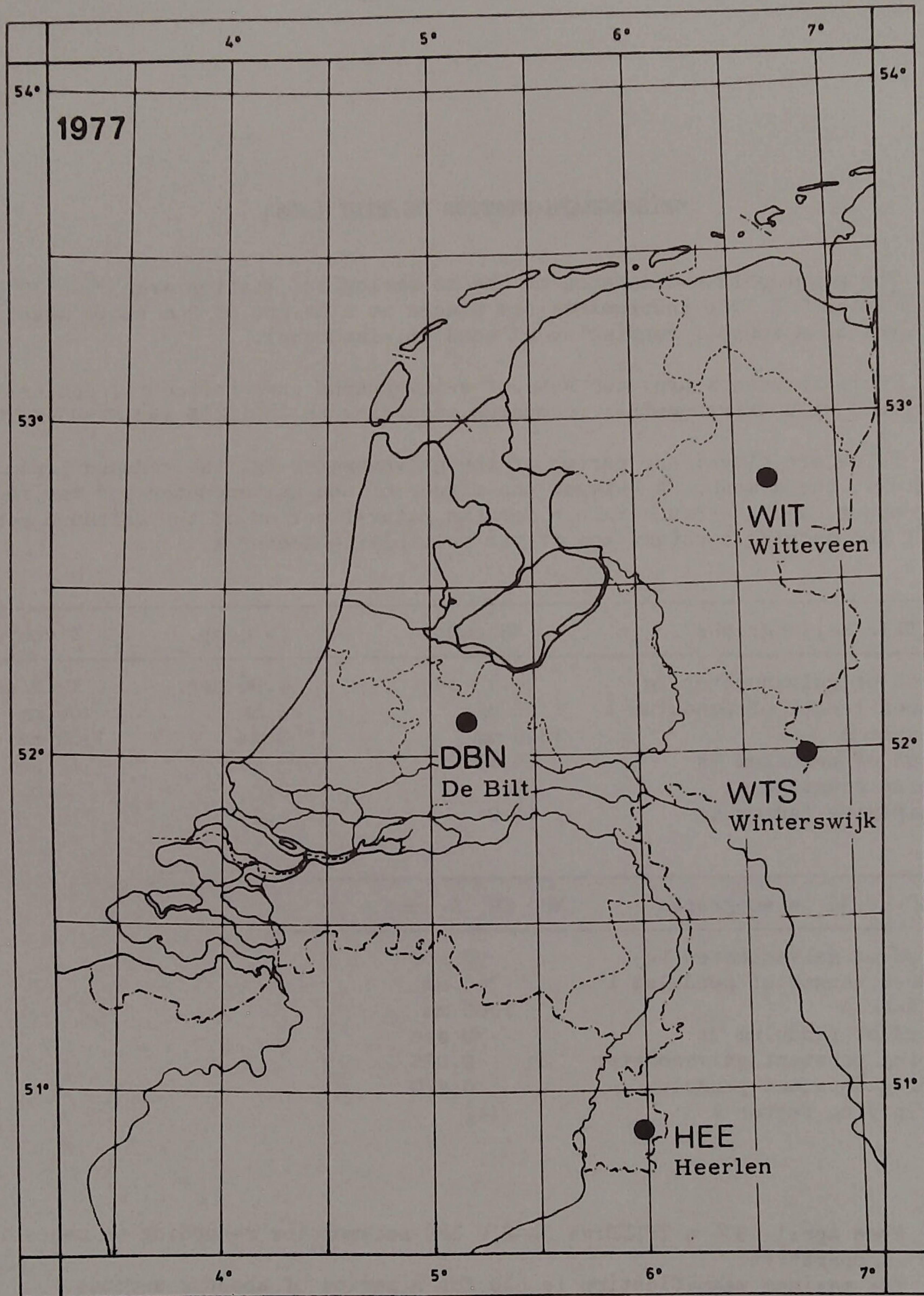
SEISMOLOGICAL BULLETIN  
of the seismograph stations  
in The Netherlands.

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De Bilt 1981

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Seismograph Stations



Geographical coordinates of the stations

Code	Latitude (North)	Longitude (East)	Elevation (above m.s.l.)
DBN	52°06'10"	5°10'36"	2 m
HEE	50°53'06"	5°58'56"	115 m
WIT	52°48'48"	6°40'11"	17 m
WTS	51°59'44"	6°48'36"	43 m

### SEISMOGRAPH STATION DE BILT (DBN)

The geographic co-ordinates of the seismological station are  $52^{\circ}06'10''\text{N}$  and  $5^{\circ}10'36''\text{E}$ . The instruments are placed at a height of 2 m above mean sealevel on a subsoil consisting of sand (pleistocene).

The instruments are: two sets of seismographs (two horizontal and one vertical) with galvanometric recording according to GALITZIN and PRESS-EWING.

Below are given: the period of the galvanometer  $T_g$ , the reduced pendulum length  $l$ , the distance  $A$  between the mirror of the galvanometer and the recording paper, and the rough values for the natural period of the undamped pendulum  $T$ , of the damping constant and of the multiplying factor  $k$ .

GALITZIN seismographs	NS comp.	EW comp.	Z comp.
Period of galvanometer $T_g$	24.43 sec	24.96 sec	12.0 sec
Reduced length of pendulum $l$	123 mm	123 mm	406 mm
Distance $A$	1380 mm	1380 mm	1380 mm
Period of pendulum $T_s$	25 sec	25 sec	12 sec
Damping constant	0.0	0.0	0.0
Multiplying factor $k$	11.0	11.0	175

PRESS-EWING seismographs	NS	EW	Z comp.
Period of galvanometer $T_g$	90 sec.		
Reduced length of pendulum $l$	360 mm		
Distance $A$	1000 mm		
Period of pendulum $T_s$	30 sec		
Damping constant galvanometer	0.025		
Damping constant pendulum	0.470		
Multiplying factor $k$	147		

From April 1976 a TELEDYNE SL-210 LPZ seismometer recording on magnetic tape is operative.

The maximum magnification is 640 for a period of about 2 seconds.

SEISMOGRAPH STATION HEERLEN (HEE)

The geographic co-ordinates of the seismological station are:  $50^{\circ}53'06''N$  and  $5^{\circ}58'56''E$ .

The instruments, a horizontal seismograph (EW-component,  $M = 450$  kg), and one vertical WILLMORE seismograph, are placed at a height of 115 m above mean sealevel on a subsoil consisting of loess.

The mean values of the constants for the horizontal seismograph are:

T	$\epsilon$	V	V max.	T max.
2	3	400	600	2

The constants for the vertical WILLMORE seismograph are: T seismograph 1.7 sec., maximum amplification 15.000 for a period of about 1 second.

SEISMOGRAPH STATION WITTEVEEN (WIT)

The geographic co-ordinates of the seismological station are:  $52^{\circ}48'48''N$  and  $6^{\circ}40'11''E$ .

The instrument, a GRENET vertical seismograph with galvanometric record, is placed at a height of 17 m above mean sealevel on a subsoil consisting of pleistocene sand.

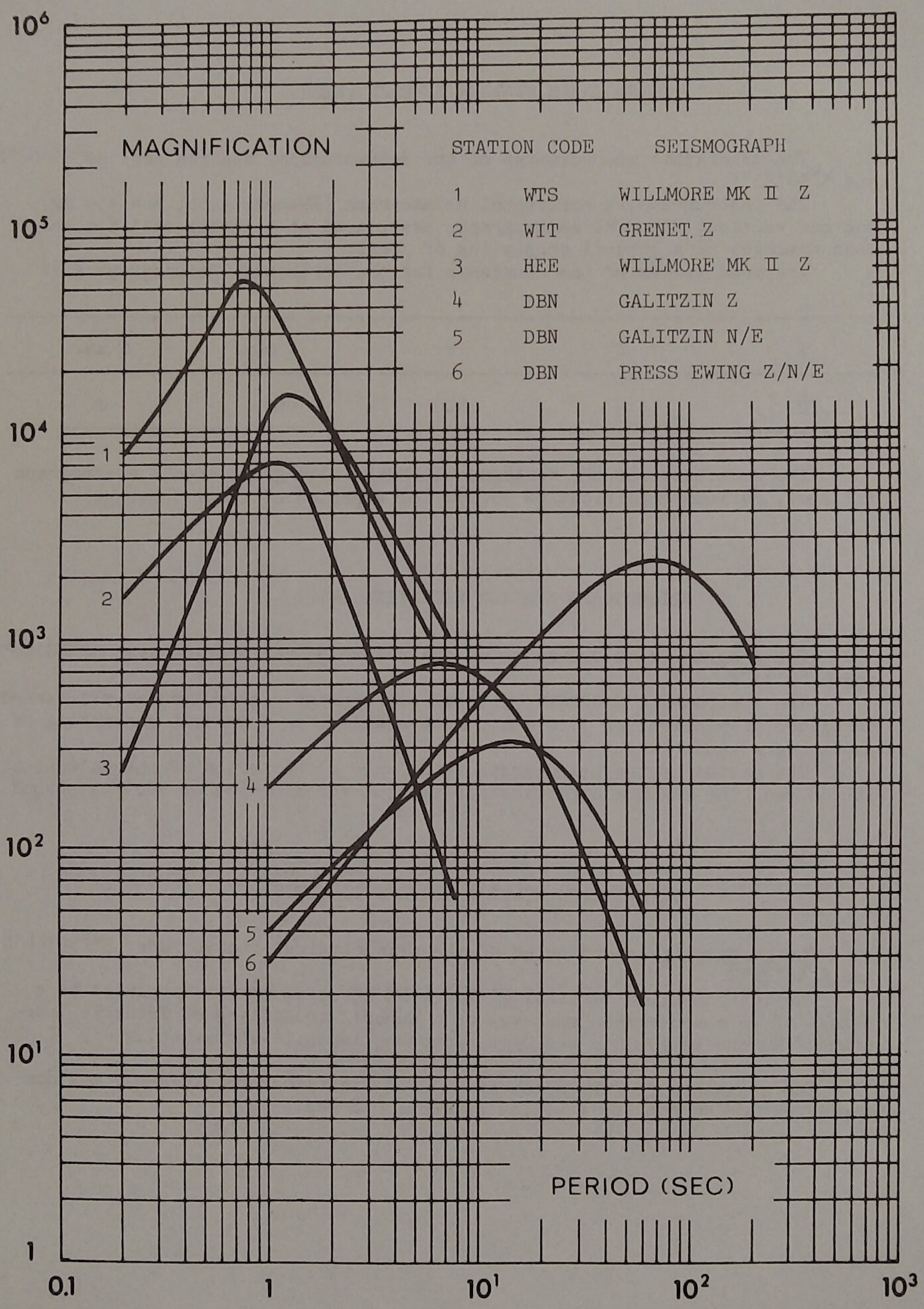
The period of the seismograph is 2.3 sec., the period of the galvanometer is 0.8 sec. The maximum amplification is 6500 for a period of about 1 second.

SEISMOGRAPH STATION WINTERSWIJK (WTS)

The geographic co-ordinates of the seismological station are:  $51^{\circ}59'44''N$  and  $6^{\circ}48'36''E$ .

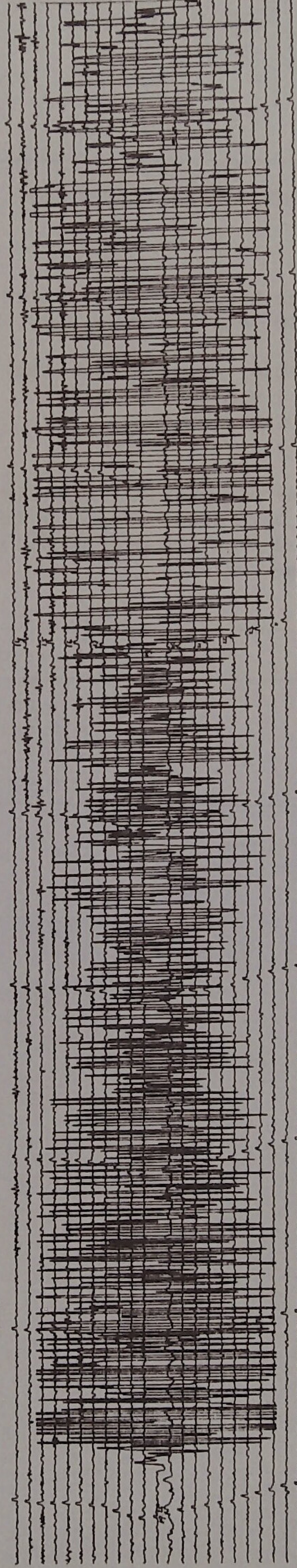
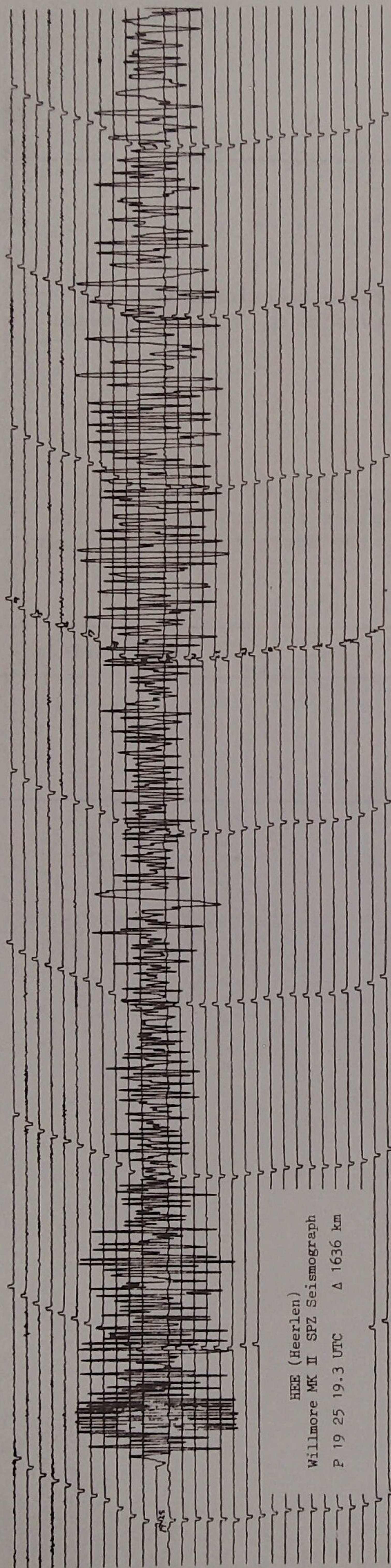
The instrument, a vertical Willmore MK II seismometer, is placed at a height of 43 m above mean sealevel on a subsoil consisting of Triassic limestones (Muschelkalk), covered by pleistocene deposits with a thickness of about 15 m.

The constants for the seismograph are: T seismograph 1.5 sec., maximum amplification 50.000 for a period of about 0.8 sec.



SEISMIC RECORDS AT HEERLEN AND THE NEW STATION WINTERSWIJK

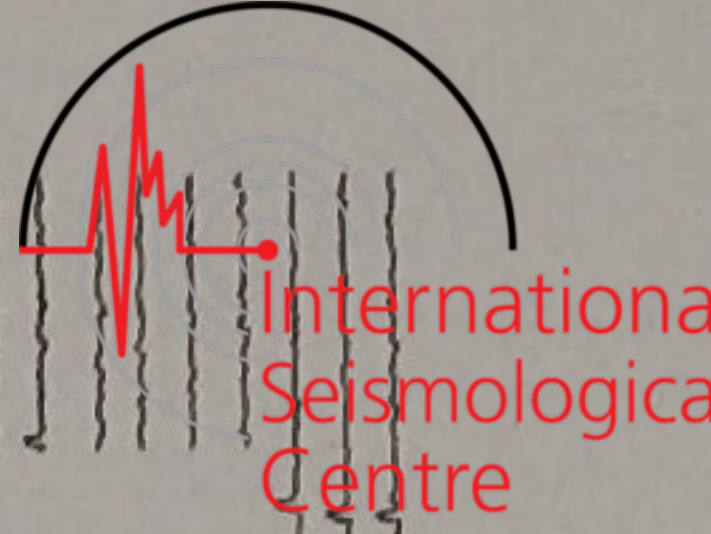
OF THE RUMANIA EARTHQUAKE OF MARCH 4 1977



WTS (Winterswijk)  
Willmore MK II SPZ Seismograph  
P 19 25 16.4 UTC Δ 1612 km

USGS / NATIONAL EARTHQUAKE INFORMATION SERVICE

MARCH 1977		ORIGIN TIME		GEOGRAPHIC COORDINATES		DEPTH	MAGNITUDES		REGION AND COMMENTS:
DAY	UTC	HR	MIN	SEC	LAT	LONG	KM	GS	
4		19	21	54.1	45.8 N	26.8 E	94	6.4	RUMANIA 1.500 REPORTED KILLED, 10.500 INJURED, AND MAJOR DAMAGE IN BUCHAREST AREA. DEATHS REPORTED IN BULGARIA AND INJURIES IN YUGOSLAVIA. FELT ROME TO MOSCOW AND TURKEY TO FINLAND. MAG. 7.2 MB (PAS)



International  
Seismological  
Centre

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THE MICROSEISMIC ACTIVITY.

The table on page 7 shows the character of the microseismic activity (see also 1915 page 101 and 1916 page 101). The numbers 0, 1, 2 and 3 mean:

- 0 = very weak and weak
- 1 = moderate
- 2 = strong
- 3 = very strong

For measuring the microseismic activity the records of the horizontal GALITZIN seismograph were used. The table below gives the amplitudes of the oscillations (measured from the medium line) and the corresponding amplitudes of the movement of the surface.

Character	Ampl. record	Ampl. surface
0	0 - $\frac{1}{2}$ mm	0 - $1\frac{1}{4}$ $\mu$
1	$\frac{1}{2}$ - 2 mm	$1\frac{1}{4}$ - 5 $\mu$
2	2 - 4 mm	5 - 10 $\mu$
3	> 4 mm	> 10 $\mu$



Character of the microseismic movement

Date 1977	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	2 1	1	1	3 2	1	1	1	1 0	1	122	1	1
2	1	1	1	2 1	1	1	1	0	121	1	1	1
3	1	1	1	1	1	1	1	0	1	1	121	1 2
4	1	1	1	1	1	100	0	001	112	1	1	2 1
5	1	112	211	1	1 0	1	0	1	221	1	1	1
6	122	2	1	1	0	1	0	1	1	1	1 2	1
7	2 1	2	1	1	011	1	0	1	1	1	221	1
8	1	2 1	112	1	1	1	0	1	1	1	122	1
9	1 2	112	2	1 0	1	1 0	0	101	1	1	1	1
10	2	223	2	001	1	0	011	1	1	1	1 2	112
11	2 1	332	2	1	1	1 0	1	001	1	1	2	2 1
12	1	2	1	1	1	0	100	100	1	2 1	232	1
13	112	1	1	1	1	0	0 1	0	1	1	2 1	1
14	2 1	1	122	1	1 0	0	1	0	1	1	123	1 2
15	1	1	2	1	0	0 1	1	0	2 1	1	332	2 1
16	1	1	2	1	1	1	100	001	1	1	211	1
17	2	1	2 1	1	1	1	001	1	1	1	1	1
18	2	1	1	1	1	100	1	1	1	1	1	1 0
19	221	2 1	1 0	1	1	1 0	1	1	1	100	112	0 1
20	1	1	0	1	1	1	110	1 0	1	0	211	1
21	112	2	100	1	110	1	0	001	1	1	1	1 2
22	2 1	221	0	1	001	101	0	1	1	1	1	2
23	1 2	1	0	1	0	0	001	100	1	1	122	2
24	2	1	001	1	0	0	1	011	1	1	2	221
25	2	1	1	112	0	0	1	1	1	1	2	1
26	3 2	1	1	2 1	0	0	1	1	1	1	1	1 0
27	2 1	1	1	1	0	0	1	1	1	1	1	1 2
28	1 2	1	122	1	0	0	1	1	1	1	0	211
29	1		1	1	001	0	1	1 2	1	1	0	112
30	1		1 2	1	1	011	100	1	1	112	001	2
31	1		233		1		001	1		1		212

## EXPLANATION OF THE TABLES

The data given for De Bilt have been obtained from the GALITZIN and the PRESS-EWING records. The velocity of the recording paper is 30 mm and 15 mm per minute, respectively. The data from the seismographs at Heerlen, Witteveen and Winterswijk are also mentioned.

The time is Greenwich Mean Time.

In the column "first motion" + means an upward movement of the soil (compression), - means a downward movement (dilatation). Uncertain data have been given in parentheses.

The following nomenclature has been used:

### Seismic phases.

- P,S : direct longitudinal or transverse waves propagating in the mantle.  
 PKP (P') : direct longitudinal wave traversing the core without detailed identification (core waves).  
 PKP2 : core wave propagating only through the outer core.  
 PKIKP : core wave propagating through the inner core.  
 PKHKP : core wave refracted in the intermediate zone between the inner and outer core.  
 PP,PPP,SS,SSS : P or S waves reflected once or twice at the Earth's surface.  
 PcP,ScS : P or S waves reflected at the core boundary.  
 PcS,ScP : P or S waves transformed on reflection at the core boundary.  
 PKKP : P wave reflected from the inside surface of the core, thereby passing twice through the core.  
 P'P' : PKP wave reflected from the Earth's surface, passing twice through the core.  
 SKS (S') : S wave passing through the core as P wave, transformed back into S wave on emergence.  
 SKKS : S wave transformed on refraction at the core boundary into P wave, reflected from the inside surface of the core and finally transformed back into S wave at the core boundary.  
 PS,SP,PPS,SPP, PSP etc. : P and S waves reflected and transformed at the Earth's surface.  
 SKP : S wave transformed into P wave on refraction into the core.  
 PKS : P wave transformed into S wave on refraction when leaving the core.  
 Pdif : P wave diffracted around the core.  
 pP,pPKP,pPP, sP,sPP etc. : P or S waves leaving the focus in an upward direction and reflected from the surface as P waves.  
 pS,sS,pSS etc. : P or S waves leaving the focus in an upward direction and reflected from the surface as S waves.  
 Pg,Sg : P or S waves in the upper crust (granitic layer).  
 Pb(P<sup>\*</sup>),Sb(S<sup>\*</sup>) : P or S waves in the lower crust (basaltic layer) or along the Conrad discontinuity.  
 Pn,Sn : P or S waves refracted below the crust following the Mohorovičić discontinuity.  
 L : Long waves, unidentified, the beginning of the surface wave group.

### Additional notations.

- F : finish or end of the discernible movement on the record.  
 i : impulsive or sharp beginning of a phase (e.g. iP, iPKP etc.).  
 e : emerging or gentle beginning of a phase (e.g. eS, ePP etc.).  
 H : origin time (focal time).  
 h : depth of focus.  
 h N : normal depth of focus (5-60 km).  
 Ms : Magnitude determined by surface waves.  
 Mb : Magnitude determined by body waves.  
 Ml : Magnitude of local shock determined by near stations.

The indices Z, NS and EW refer to vertical, north-south and east-west components of the movement.

The distance of the epicenter and the depth of focus have been calculated by means of curves constructed with the aid of the time tables of Jeffreys and Bullen (1940).

The data given in the column "amplitude" are the maximum amplitudes measured from the medium line (Galitzin records). The amplitudes have been calculated by means of the formula:

$$V = \frac{A k T_b}{\pi l} \frac{1}{\left\{ 1 + \left( \frac{T_b}{T} \right)^2 \right\}^2}$$

In this formula A is the distance between galvanometer mirror and recording paper, k is the multiplying factor,  $T_b$  the period of the wave, l the reduced length of the pendulum, T the free period of the undamped seismograph, and V the magnification. The period of the galvanometer is assumed to be equal to the free period of the undamped seismograph.

For the horizontal components of the Galitzin records the following mean values were used:  $k = 11,0$  and  $T = 24,5$  sec, and for the vertical component  $k = 175$  and  $T = 12,0$  sec.

Whenever it was possible the amplitudes and periods of the first P waves have been given. As the movement of these waves is irregular in general, the accuracy of these data is small. The amplitudes and periods of the maxima of L-waves have been given in case of strong earthquakes.

The magnitudes have been calculated by means of the formula:

$$M = \log \left( \frac{A}{T} \right) + 1.66 \log \Delta + 3.3$$

A = maximum amplitude of the L-wave in microns (measured from the medium line).  
 T = the period of the concerning L-wave in seconds.  
 $\Delta$  = distance in degrees.

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Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JAN. 1977											
1.	DBN: ePP eSP eSS eL F WTS: ePP HEE: ePP e	19 19 19 19 20 19 19 19	20 30 36 56 43 20 20 20	49 15 25  48.0 44.0 54.5		22		7.3	6.5	6.2	2.5S 126.6E, H: 19 01 39.6 h 33 km. Mb 6.0, Ms 6.1 Ceram Sea.
1.	DBN: eP ePP eS eL F WTS: iP HEE: eP i WIT: eP	21 21 21 22 23 21 21 21 21	49 51 57 07 21 49 49 49 49	39 49 52  33.0 39.5 42.2 35.0	+	22	18.2			6.2	38.1N 91.0E, H: 21 39 41.3 h 27 km. Mb 5.9, Ms 6.3 Tsinghai Province, China.
2.	DBN: ePP iSKP eSKS iSP eSPP eSS eL F	10 10 10 10 10 10 10 12.7	14 17 20 24 25 30.7 47	51 31 54 27 39		22			11.4	6.4	10.2S 119.0E, H: 09 55 28.4 h 19 km. Mb 5.8, Ms 6.3 Sumba Island region.
2.	WTS: eP	19	43	16							39.2N 43.6E, H: 19 37 25.2 h 34 km. Mb 4.9 Turkey.
4.	WTS: iP HEE: eP	15 15	09 09	18.5 18.5	+						15.3N 94.4W, H: 14 56 46.1 h 33 km. Mb 5.2 Near coast of Oaxaca, Mexico.
4.	WTS: eP	16	16	48.5	+						33.1N 47.9E, H: 16 09 58.5 h 45 km. Mb 5.1 Western Iran.
5.	DBN: eL F WTS: eP i HEE: eP WIT: eP	06 06 05 05 05 05	08 30 52 54 52 52	  48.0 32.5 50.0 50.5	  + - +						27.5N 56.2E, H: 05 44 39.9 h 29 km. Mb 5.5, Ms 5.2 Southern Iran.
5.	DBN: eL F	11 11	28 51								26.0N 142.6E, H: 10 37 23.8 h 21 km. Mb 5.1, Ms 4.5 Bonin Islands region.
5.	WTS: iPKP	13	45	35.0	-						ISC: 18.9S 177.7W, H: 13 26 35.4, h 389 km. Fiji region.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JAN. 1977											
5.	WTS: iPKP i HEE: ePKP e i WIT: iPKP i	13 13 13 13 13 13	48 48 48 48 48 48	27.9 31.5 30.0 35.0 42.7 30.2 30.8	+ - + - + - +						20.8S 178.3W, H: 13 29 48.1 h 575 km. Mb 5.2 Fiji Islands region.
5.	WTS: eP	14	22	10							25.4N 95.2E, H: 14 10 56.5 h 104 km. Mb 4.8 Burma - India border region.
6.	WTS: ePKP HEE: iPKP WIT: ePKP	04 04 04	28 28 28	50.0 54.0 48.0	- - -						17.9S 178.5W, H: 04 10 17.8 h 621 km. Mb 4.6 Fiji Islands region.
6.	DBN: iPP iPPP iPS iPPS eSS eSSS eL F WTS: ePKP e ePP HEE: ePKP ePP WIT: ePKP	06 06 06 06 06 06 07 09.9 06 06 06 06 06 06 06	32 34 41 43 48.5 53.0 02 09.9 30 30 32 30 32 30	03 40 56 11 48.5 53.0 02 09.9 33 37.5 00 39.0 13.5 39.0	- - - - - - - - - - - - - - +	20	71		7.3	3.6S 144.4E, H: 06 11 40.7 h 33 km. Mb 6.0, Ms 6.6 Near north coast of Papua New Guinea.	
6.	WTS: eP e HEE: eP e WIT: i	08 08 08 08 08	07 08 07 08 08	40.5 04.0 48.0 12.0 03.2	- - - - +						49.3N 155.5E, H: 07 55 57.5 h 33 km. Mb 5.4 Kuril Islands.
6.	DBN: eL F WTS: eP ipP HEE: eP	16 17 16 16 16	39 04 13 14 14	57.0 11.0 04.0	+ + +						51.5N 175.5W, H: 16 02 07.6 h 38 km. Mb 5.2, Ms 5.3 Andreanof Islands, Aleutian Islands.
6.	WTS: iP ipP HEE: eP WIT: eP	18 18 18 18	43 43 43 43	33.0 38.0 28.0 38.5	- - + +						2.5S 28.7E, H: 18 33 43.5 h 21 km. Mb 5.3 Lake Tanganyika region.
6.	WTS: eP e	22 22	00 00	20.0 28.0	- -						31.0N 88.1E, H: 21 50 08.1 h 33 km. Mb 5.2 Tibet.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JAN. 1977											
7.	DBN: eL F	15	26 35								31.3S 13.2W, H: 14 38 22.4 h 33 km. Mb 5.3, Ms 5.5 South Atlantic Ridge.
7.	DBN: eL F WTS: eP e HEE: eP	20 20.9	22	30.0 45.5 37.5		20	3.6	3.6	5.8		21.2N 120.3E, H: 19 36 46.9 h 33 km. Mb 5.7, Ms 5.1 Taiwan region.
7.	DBN: eL F	22	20 43								18.7N 120.8E, H: 21 31 27.3 h 52 km. Mb 4.9, Ms 4.5 Luzon, Philippine Islands.
8.	DBN: eL F HEE: eP	07 07	34 54	19.5							15.3N 121.9E, H: 06 41 04.1 h 36 km. Mb 5.3 Luzon, Philippine Islands.
8.	DBN: eL F	08 09	53 37								11.3S 166.1E, H: 07 40 41.9 h 42 km. Mb 5.5, Ms 5.6 Santa Cruz Islands.
8.	DBN: eL F	13 13	33 44								5.6S 151.0E, H: 12 24 45.4 h 61 km. Mb 5.3 New Britain region.
8.	WTS: ePKP HEE: ePKP	21 21	56	55.0 59.0							22.2S 170.3E, H: 21 37 16.0 h 58 km. Mb 5.1 Loyalty Islands region.
9.	WTS: ePn e HEE: ePn e e e	14 14 14 14 14	28	15.5 22.0 11 17 22.0 42.5							46.2N 13.1E, H: 14 26 26.7 h 3 km. Northeastern Italy.
10.	DBN: eL F	09 09	10 37								8.3N 125.2E, H: 08 18 59.9 h 38 km. Mb 5.4, Ms 4.9 Mindanao, Philippine Islands.
10.	WTS: iPKP epPKP HEE: ePKP WIT: iPKP	09 09 09 09	50	25.0 58.5 28.0 24.0	-						20.7S 179.2W, H: 09 31 49.6 h 653 km. Mb 5.5 Fiji Islands region.
10.	WTS: ePKP HEE: ePKP e WIT: ePKP e	23 23 23 23 23	37	47.5 49.5 52.8 47.5 54.5	+  -						21.5S 168.7E, H: 23 18 07.0 h 16 km. Mb 5.2 Loyalty Islands.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JAN. 1977											
12.	WTS: ePKP HEE: ePKP	08	00	22.0 26.0							21.4S 168.6E, H: 07 40 41.9 h 33 km. Loyalty Islands.
12.	WTS: e	08	17	32.5							No determination of epicenter
12.	WTS: eP	18	51	45.0	-						44.5N 149.1E, H: 18 39 54.5 h 117 km. Mb 4.7 Kuril Islands.
12.	DBN: eP epP eSKS eSS ePS eSS F WTS: iP ipP HEE: eP ipP WIT: eP epP e	23 23 23 23 23 00 00.8 23 23 23 23 23 23 23	48 48 58 58 59 04  48 48 48 48 48 48 49	08 50 28 52 54 56  03.1 48.0 06.5 51.0 03.5 48.5 07.5	       +   -						1.6N 99.9E, H: 23 35 19.1 h 178 km. Mb 5.6 Northern Sumatra.
13.	DBN: eL F WTS: iP e HEE: eP WIT: e(P)	09 09 09 09 09 09	25.5 38 21 23 21 21	  44.0 46 39.0 57.5	  +    						43.5N 17.1E, H: 09 19 06.1 h 20 km. Mb 5.3 Yugoslavia.
14.	DBN: eL F	12 12	40 47								35.7N 82.7E, H: 12 09 33.1 h 33 km. Mb 4.7 Tibet.
14.	WTS: iP HEE: iP WIT: ePKP	18 18 18	17 17 17	39.2 43.1 38.0	- - 						19.8S 177.5W, H: 17 58 35.2 h 350 km. Mb 5.2 Fiji Islands region.
14.	DBN: eL F	23 23	27 30								40.2N 118.8E, H: 22 46 56.9 h 33 km. Mb 4.9 Northeastern China.
15.	DBN: eL F	11 12	41 05								13.0N 126.0E, H: 10 49 05.8 h 33 km. Mb 5.6, Ms 4.6 Philippine Islands region.
16.	DBN: eL F	10 10	51 57								35.5N 37.0W, H: 10 34 57.3 h 33 km. Mb 5.1 North Atlantic Ridge.

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JAN. 1977											
17.	DBN: eL F	05	31								39.2N 43.5E, H: 05 19 23.7 h 33 km. Mb 5.0 Turkey.
	WTS: eP e	05	25	19.5							
		05	25	23.5							
17.	DBN: eP ePP eSKP ePS eL F	06	36	50							26.7N 142.6E, H: 06 23 36.1 h 33 km. Mb 5.6, Ms 5.6 Bonin Islands region.
	WTS: eP ePP	06	40	32							
		06	47	26							
		06	49	13							
		07	08		20				4.4	5.9	
		08	35								
	WTS: eP ePP	06	36	46.0							
		06	40	27							
	HEE: eP WIT: eP	06	36	53.0							
		06	36	45.5							
17.	DBN: eL F	20	11								14.9S 177.2W, H: 19 04 37.4 h 36 km. Mb 5.3, Ms 5.9 Fiji Islands region.
	WTS: ePKP	19	24	04.0	+						
17.	DBN: eP iZ iPP iPPP iSKS iS iSP iPPS eSS eL F	21	40	57							24.8S 68.7W, H: 21 27 12.6 h 33 km. Mb 6.3, Ms 6.1 Chile-Argentina border region.
		21	41	31							
		21	45	02							
		21	47	18							
		21	51	32							
		21	52	32							
		21	53	56							
		21	54	54							
		21	59	32							
		22	10			20			9.0	6.3	
		23.8									
	WTS: eP i i ePP ePKKP i	21	40	58.5	+						
		21	41	00.0	-						
		21	41	43.5	+						
		21	45	00							
		21	57	20.5							
		21	57	46.2	-						
	HEE: eP i e e ePKKP e e e eP'P'	21	40	56.0							
		21	41	01.2	-						
		21	41	39.5							
		21	44	08.5							
		21	57	24.5							
		21	57	51.0							
		21	58	18.0							
		22	05	40							
	WIT: eP e e ePKKP eP'P'	21	41	01.0							
		21	41	06.0							
		21	41	45.5							
		21	57	44.0							
		22	05	37.0							



SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JAN. 1977											
18.	DBN: ePP ePPP eL F WTS: iPKP2 HEE: ePKP2 e WIT: ePKP2	06 06 07 07 06 06 06 06	09 13 02 55 02 03 03 02	00 40  49.3 02 08.5 57.0	+    +   +	20	2.6		6.1	41.7S 174.3E, H: 05 41 49.6 h 50 km. Mb 4.9, Ms 6.0 Cook Strait, New Zealand.	
18.	WTS: eP i HEE: eP WIT: eP	08 08 08 08	55 56 55 55	45.0 16.4 47.5 48.0	+  +  +					33.2N 48.0E, H: 08 48 54.1 h 48 km. Mb 5.2 Western Iran.	
18.	DBN: eL F	12 12	18 49							4.6S 132.7E, H: 11 17 20.8 h 57 km. Mb 5.1 West Irian region.	
19.	DBN: iP eS eL F WTS: iP i HEE: iP i e WIT: iP i	00 01 01 02 00 00 00 00 00 00 00	56 05 15 16 56 56 56 56 57 56 56	38 10  32.4 38.6 38.6 45.2 14.5 31.0 37.2	+    + + + + + + +	6 22	6.1 11.5		6.0	37.0N 95.7E, H: 00 46 18.3 h 33 km. Mb 5.9, Ms 5.8 Tsinghai Province, China.	
19.	DBN: eSS eL F WTS: eP HEE: eP	14 14 15 14 14	27 45 41 08 08	40   03.5 10.0		22	5.7		6.1	5.0N 126.6E, H: 13 54 04.5 h 50 km. Mb 5.8, Ms 5.9 Mindanao, Philippine Islands.	
19.	WTS: iPKP HEE: iPKP WIT: iPKP	15 15 15	13 13 13	43.4 48.8 42.9	+ + +					20.8S 178.7W, H: 14 55 05.7 h 634 km. Mb 5.0 Fiji Islands region.	
19.	DBN: eL F WTS: iP e HEE: e(P) e WIT: eP	20 21 20 20 20 20 20	55.0 04 50 51 50 50 50	  35.3 16.5 26.5 36.5 46	+       					36.6N 8.5E, H: 20 46 53.3 h 22 km. Mb 5.1 Tunisia.	
20.	DBN: eL F	04 04	44.0 52							65.7N 16.8W, H: 04 34 37.8 h 10 km. Mb 4.3 Iceland.	

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JAN. 1977											
20.	WTS: iPKP WIT: iPKP	12	52	51.0 50.0	+						23.5S 179.9W, H: 12 33 59.2 h 546 km. Mb 5.0 South of Fiji Islands.
20.	DBN: eL F	20 21	57 15								21.0N 120.3E, H: 20 10 09.7 h 30 km. Mb 5.2 Taiwan region.
20.	DBN: eL F	21 22	43 10								8.4N 123.0E, H: 20 51 14.9 h 37 km. Mb 5.4, Ms 4.9 Mindanao, Philippine Islands.
21.	DBN: eL F	03 03	06 28								23.8N 121.9E, H: 02 20 06.3 h 36 km. Mb 5.3, Ms 5.2 Taiwan.
21.	DBN: iPKP epPKP WTS: iPKP i epPKP HEE: ePKP i epPKP WIT: ePKP	06 06 06 06 06 06 06 06 06	29 32 29 29 31 29 29 32 29	39 03 37.9 39.2 59.5 42.0 42.8 01.0 37.5	-  + +  - +						18.0S 178.4W, H: 06 11 05.6 h 604 km. Mb 5.8 Fiji Islands region.
21.	WTS: ePKP HEE: ePKP	09 09	46 46	33 43.5							16.5S 177.1W, H: 09 27 03.8 h 33 km. Mb 5.0, Ms 4.3 Fiji Islands region.
21.	HEE: ePKP	09	59	54.5							16.8S 176.5W, H: 09 40 17.6 h 49 km. Fiji Islands region.
22.	HEE: ePKP	05	50	06							15.8S 173.1W, H: 05 30 30.9 h 33 km. Mb 5.3 Tonga Islands.
23.	DBN: eL F WTS: ePKP e HEE: ePKP WIT: ePKP	02 03.8 01 01 01 01	50  57 57 57 57	  45.5 49.0 50.5 47.5							13.4S 166.5E, H: 01 38 23.5 h 39 km. Mb 5.5, Ms 5.6 New Hebrides Islands.
23.	WTS: ePP	05	56	27.5							18.0N 145.5E, H: 05 38 47.6 h 219 km. Mb 5.1 Mariana Islands.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JAN. 1977											
23.	HEE: eP	17	13	02.5							13.9N 91.7W, H: 17 00 39.3 h 85 km. Mb 5.1 Near coast of Guatemala.
24.	WTS: iPKP	20	02	45.7	-						23.8S 178.8E, H: 19 43 47.3
	HEE: ePKP	20	02	49.0	+						h 464 km. Mb 4.9
	WIT: ePKP	20	02	44.5							South of Fiji Islands.
25.	DBN: eL	01	48								33.6S 68.4W, H: 00 50 47.9
	F	02	04								h 17 km. Mb 5.3, Ms 5.3 Mendoza Province, Argentina.
25.	DBN: eL	03	32								1.9S 134.4E, H: 02 37 41.6
	F	04	13								h 33 km. Mb 5.4, Ms 5.4 West Irian.
25.	DBN: eL	06	59								7.6N 37.2W, H: 06 34 55.1
	F	07	21								h 33 km. Mb 5.0
	WTS: eP	06	44	42.5							Central Mid-Atlantic Ridge.
25.	DBN: eL	11	42								10.9S 164.7E, H: 10 31 04.9
	F	12	00								h 25 km. Mb 5.7, Ms 5.2 Santa Cruz Islands region.
26.	DBN: eL	23	40								57.5N 33.0W, H: 23 29 13.2
	F	23	44								h 33 km. Mb 4.5 North Atlantic Ocean.
27.	WTS: ePKP	14	18	40							6.5S 152.8E, H: 13 59 45.0
	HEE: ePKP	14	18	41.5							h 58 km. Mb 5.7 New Britain region.
27.	WTS: eP	16	27	18.5							43.3N 147.6E, H: 16 15 16.4
											h 41 km. Mb 5.0 Kuril Islands.
28.	DBN: eL	00	59.0								50.3N 29.3W, H: 00 48 12.6
	F	01	04								h 33 km. Mb 4.7
	WTS: eP	00	53	12.0							North Atlantic Ridge.
	e	00	53	18							
	HEE: eP	00	53	09.0							
	e	00	53	15.0							
28.	DBN: eL	01	23.0								50.2N 29.3W, H: 01 12 47.9
	F	01	30								h 33 km. Mb 4.7, Ms 4.6
	WTS: eP	01	17	45.5	+						North Atlantic Ridge.
	e	01	17	53.5							
	WIT: eP	01	17	44.0							
28.	DBN: eL	14	22.8								57.7N 33.0W, H: 14 11 31.0
	F	14	26								h 33 km. Mb 4.9 North Atlantic Ocean.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JAN. 1977											
28.	DBN: eL F	19	16								17.4S 168.7E, H: 18 00 51.8 h 14 km. Mb 5.4, Ms 5.6 New Hebrides Islands.
29.	WTS: ePKP HEE: ePKP WIT: ePKP	01	11	49.0							5.2S 151.8E, H: 00 52 52.7 h 55 km. Mb 5.6, Ms 5.2 New Britain region.
29.	DBN: eL F	05	56								15.2N 96.5E, H: 05 10 52.7 h 40 km. Mb 4.9, Ms 4.6 South Burma.
29.	DBN: eL F	14	50								33.8S 56.3E, H: 13 56 06.0 h 33 km. Mb 5.3, Ms 5.3 Atlantic-Indian Rise.
30.	DBN: eL F	01	35								62.4S 155.1E, H: 00 13 28.4 h 33 km. Mb 4.8, Ms 5.3 Balleny Islands region.
30.	DBN: eL F	04	51								39.5N 118.0E, H: 04 11 57.3 h 33 km. Mb 5.2, Ms 4.3 Northeastern China.
30.	DBN: eL F WTS: eP	11	01								39.6N 73.4E, H: 10 36 06.4 h 33 km. Mb 5.0, Ms 4.8 Tadzhik-Sinkiang border region.
31.	WTS: eP HEE: eP	14	25	27.5	+						5.3S 68.4E, H: 14 13 34.4 h 33 km. Mb 5.1 Chagos Archipelago region.
31.	DBN: iP iPP iS eSS eL F WTS: iP ePP eL HEE: eP ePP WIT: iP ePP	14	34	36	+	7	6.6				40.0N 70.9E, H: 14 26 14.8 h 20 km. Mb 6.1, Ms 5.9 Tadzhik SSR.
						20			12.5	5.9	
31.	DBN: eL F HEE: ePKP	21	44								16.5S 175.2W, H: 20 37 20.4 h 49 km. Mb 5.2, Ms 5.2 Tonga Islands.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
FEBRUARY 1977											
1.	WTS: iP	13	14	50.8	-						48.2N 154.5E, H: 13 03 03.7 h 42 km. Mb 5.4 Kuril Islands.
1.	DBN: eI F	15 11 15 27									40.3N 127.0W, H: 14 33 12.0 h 15 km. Mb 5.1 Off coast of northern California.
1.	DBN: eI F	21 25 22 14									3.4S 148.7E, H: 20 23 11.7 h 33 km. Mb 5.2 Bismarck Sea.
2.	WTS: iP HEE: iP WIT: ePKP	23 08 09.0 23 08 12.7 23 08 07.5			-						18.2S 178.3W, H: 22 49 38.9 h 646 km. Mb 4.9 Fiji Islands region.
3.	WTS: iP WIT: eP	10 50 20.6 10 50 17.5			- -						45.4N 150.4E, H: 10 38 23.4 h 33 km. Mb 5.5 Kuril Islands.
3.	HEE: ePKP	20 32 08									21.5S 169.5E, H: 20 12 19.8 h 33 km. Mb 4.7 Loyalty Islands region.
4.	DBN: iP ipP isP iPP ipPP iSKS iS isSKS F WTS: iP epP ePP HEE: eP ePP WIT: eP ePP	07 59 09 08 01 16 08 02 04 08 03 14 08 05 22 08 08 53 08 09 51 08 12 55 09 55 07 59 11.7 08 01 18.0 08 03 15.0 07 59 07.5 08 03 07.5 07 59 13.5 08 03 18.0			-          +   +  +	5	4.3				24.7S 63.4W, H: 07 46 33.8 h 549 km. Mb 6.0 Salta Province, Argentina.

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
FEBRUARY 1977											
5.	DBN: ePKP iZ ePP iPKS eSS eSSS eL F	03	48	30	+						66.4S 82.6W, H:03 29 18.9 h 33 km. Mb 6.2, Ms 6.2 Southern Pacific Ocean.
	WTS: ePKP i ePP	03	48	26	-						
	HEE: ePKP ePP	03	48	35.5							
	WIT: ePKP e	03	48	30.5							
		03	48	37.5							
5.	DBN: eL F	16	15								19.6N 70.2W, H:15 42 44.3 h 33 km. Mb 5.0, Ms 4.8 Dominican Republic region.
	WTS: iP	15	53	35.5	+						
	HEE: eP	15	53	32.5							
6.	WTS: iP	00	40	24.0	+						17.9N 49.5W, H:00 30 49.9 h 33 km. Mb 5.2 North Atlantic Ocean.
	HEE: eP e	00	40	18.0	-						
	WIT: eP	00	40	31.5							
		00	40	25.0							
6.	DBN: ePKP eL F	03	28	57							21.8S 175.3W, H: 03 09 14.0 h 33 km. Mb 5.6, Ms 5.7 Tonga Islands.
	WTS: ePKP i i	03	28	57.5							
		03	29	02.5	-						
		03	29	06.0							
	HEE: ePKP	03	29	04.5	+						
	WIT: ePKP	03	29	00.5	+						
7.	HEE: ePKP	23	47	59.5	+						15.3S 174.1W, H:23 28 38.6 h 132 km. Mb 5.2 Tonga Islands.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
FEBRUARY 1977											
9.	DBN: eL F	14	04								36.6N 8.4E, H: 13 55 02.0 h 33 km. Mb 4.9 Tunisia.
10.	WTS: iPKP HEE: iPKP WIT: ePKP	03	46	39.4	+						21.9S 169.8E, H: 03 26 59.0 h 38 km. Mb 4.9, Ms 5.0 Loyalty Islands region.
10.	DBN: eL F WTS: iPKP HEE: iPKP WIT: iPKP	09	12								21.8S, 169.9E, H: 07 55 56.7 h 41 km. Mb 5.2, Ms 5.4 Loyalty Islands region.
10.	DBN: eL F	23	37								60.9S 23.1W, H: 22 41 06.2 h 33 km. Mb 6.3, Ms 6.2 South Sandwich Islands region.
11.	DBN: eL F	12	27								1.1N 90.5W, H: 11 41 26.6 h 33 km. Mb 5.1 Galapagos Islands region.
11.	DBN: eL F WTS: eP i i HEE: eP e WIT: eP	22	12								50.6N 30.0W, H: 22 01 36.3 h 33 km. Mb 4.8 North Atlantic Ridge.
12.	WTS: eP	04	57	37.0	+						37.0N 71.3E, H: 04 49 16.0 h 98 km. Mb 5.4 Afghanistan-USSR border region

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
FEBRUARY 1977											
13.	DBN: eP eZ eS eSP ePPS eSS eL F WTS: eP HEE: eP WIT: eP	04 04 04 04 04 04 04 05 04 04 04	20 20 31 32 32 37.5 53 38 20 20 20	23 39 28 29 56  17.0 21.5 15.5	+	21	3.7		5.8	15.7N 119.2E, H: 04 07 14.5 h 33 km. Mb 5.7, Ms 4.8 Luzon, Philippine Islands.	
13.	DBN: ePP ePS eL F WTS: ePP	13 13 14 14 13	25 35 01 41 25	40 16  36.0						0.1S 125.1E, H: 13 06 51.3 h 33 km. Mb 5.8, Ms 5.0 Molucca Sea.	
13.	WTS: ePKP HEE: ePKP WIT: ePKP	14 14 14	21 21 21	47.0 51 47.0						22.0S 169.9E, H: 14 02 08.2 h 33 km. Mb 5.2 Loyalty Islands region.	
13.	HEE: eP	15	13	21.5						70.8N 14.0W, H: 15 08 29.8 h 33 km. Mb 4.5 Jan Mayen Island region.	
14.	DBN: eL F	00 01	51 00							33.6N 73.3E, H: 00 22 38.4 h 33 km. Mb 5.2 Pakistan.	
15.	WTS: ePKP HEE: ePKP WIT: ePKP	23 23 23	00 00 00	44.5 48.5 42.5						19.4S 175.2W, H: 22 41 10.2 h 89 km. Mb 5.2 Tonga Islands.	
16.	DBN: eL F WTS: iP HEE: iP WIT: iP	01 01 00 00 00	06 29 56 56 56	  31.5 22.5 34.9	+					26.0N 26.3W, H: 00 49 31.2 h 33 km. Mb 5.5 North Atlantic Ocean.	
16.	DBN: eSP eL F	11 11 12	08 37 13	22		22		2.9	5.8	0.5N 126.0E, H: 10 40 20.9 h 33 km. Mb 6.1, Ms 5.6 Molucca Passage.	



SEISMOLOGICAL BULLETIN



Date FEBRUARY 1977	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
16.	WTS: e(P)	19	36	25.5							46.0N 16.0E, H: 19 34 12.2 h 15 km. Yugoslavia.
17.	WTS: eP	13	43	29.0	-						58.9N 163.8E, H: 13 32 31.7 h 33 km. Mb 5.2, Ms 4.1 Kamchatka.
17.	DBN: eL F	21 21	15 25								45.5S 19.1W, H: 20 25 20.5 h 33 km. Mb 5.7, Ms 5.2 South Atlantic Ridge.
18.	WTS: ePKP WIT: ePKP	02 02	16 16	42 36.5							24.7S 176.0W, H: 01 56 47.3 h 35 km. Mb 5.0 South of Fiji Islands.
18.	DBN: eP eL F WTS: eP HEE: eP WIT: eP	04 04 05 04 04 04	20 46 19 20 20 20	24   20.5 27.5 17.5	-	22		3.8		5.7	41.4N 142.0E, H: 04 08 13.4 h 5 km. Mb 5.5, Ms 5.6 Hokkaido, Japan region.
18.	DBN: eP ePP eS eL F WTS: eP ePP HEE: eP WIT: eP e	21 21 21 21 22 21 21 21 21 21	04 07 14 32 23 04 07 04 04 04	15 34 46   08.0 24 14.0 05.5 20.0	+ +	19		3.5		5.7	33.1N 140.8E, H: 20 51 29.8 h 42 km. Mb 6.0, Ms 5.7 South of Honshu, Japan.
19.	WTS: iP HEE: eP WIT: eP	06 06 06	24 24 24	53.5 59.5 54.5	+ +						31.8N 78.4E, H: 06 15 25.0 h 40 km. Mb 5.4 Tibet-India border region.
19.	DBN: eL F	08 09	54 34								41.4S 80.6E H: 07 53 23.3 h 33 km. Mb 5.8, Ms 6.0 Mid-Indian Rise.

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
FEBRUARY 1977											
19.	DBN: iP iPPP iS eSS eL F WTS: iP i i i ePP HEE: iP i i WIT: iP i i	22 22 22 23 23 03.1 22 22 22 22 22 22 22 22 22 22 22 22 22 22	45 50 55 00.0 10  45 45 45 45 48 45 45 45 45 45 45 45 45 45 45 45 45	38 15 12   37.1 39.0 42.3 53.8 12 44.4 49.5 57.1 33.3 38.4 46.7	+	20			28.5	6.6	53.6N 170.0E, H: 22 34 04.1 h 33 km. Mb 6.2, Ms 6.7 Near Islands, Aleutian Islands.
19.	DBN: eL F WTS: eP	24 in prec.shock 23	12  52			20		28.5		6.3	34.7N 81.3E, H: 23 43 26.4 h 19 km. Mb 5.1 Tibet.
21.	WTS: e HEE: e(P) e	17 17 17	48 48 48	29 14.5 25.0							37.5N 20.5E, H: 17 44 15.3 h 53 km. Mb 4.8 Ionian Sea.
21.	WTS: eP	20	13	12.5	+						55.9N 161.9W, H: 20 02 06.0 h 167 km. Mb 5.0 Alaska Peninsula.
22.	DBN: eL F	15 15	10 36								45.6N 75.3W, H: 14 10 08.7 h 33 km. Mb 5.2, Ms 5.4 Off coast of southern Chile.
22.	DBN: eL F WTS: iP HEE: eP WIT: eP	20 20 19 19 19	06.8 43 56 55 56	03.3 57.0 04.0	+	20			2.7	5.0	32.2N 40.4W, H: 19 48 35.2 h 33 km. Mb 5.2, Ms 4.8 North Atlantic Ridge.
23.	HEE: ePKP e	00 00	26 27	53.0 05.5							15.3S 173.7W, H: 00 07 18.2 h 33 km. Mb 4.9 Tonga Islands.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
FEBRUARY 1977	23. WTS: iPKP <sub>2</sub>	00	41	28.5	-						22.0S 179.6W, H: 00 22 47.3 h 643 km. Mb 5.2 South of Fiji Islands.
	HEE: ePKP <sub>2</sub>	00	41	31.5	-						
	e	00	41	41.5							
	WIT: iPKP <sub>2</sub>	00	41	27.4	-						
	23. WTS: epP	20	25	30.5							37.0N 22.0E, H: 20 21 18.0 h 80 km. Mb 4.3 Southern Greece.
	24. WTS: ePKP	04	57	02.0							18.5S 174.5W, H: 04 37 40.7 h 186 km. Mb 4.8 Tonga Islands.
	HEE: ePKP	04	57	06.5							
	WIT: ePKP	04	57	02.5							
	24. DBN: eS	09	10	48							11.7S 13.6W, H: 08 51 16.6 h 33 km. Mb 5.1, Ms 5.5 Ascension Island region.
	eSS	09	15	00							
	eL	09	20			21			5.5	5.7	
	F	10	03								
	WTS: eP	09	02	01.5							
	24. DBN: eL	12	20								42.4N 142.5E, H: 11 40 00.0 h 75 km. Mb 5.3 Hokkaido, Japan region.
	F	12	50								
	WTS: iP	11	51	54.3	+						
	i	11	51	58.0	-						
	HEE: eP	11	52	02.5							
	WIT: eP	11	51	51.0	+						
	epP	11	52	12.5	+						
	24. WTS: ePKP	16	29	43.5	+						17.6S 178.9W, H: 16 11 05.4 h 543 km. Mb 4.9 Fiji Islands region.
	HEE: ePKP	16	29	47.0	+						
	WIT: iPKP	16	29	41.8	+						
	24. WTS: eP	16	49	24.5							45.7N 151.0E, H: 16 37 29.6 h 45 km. Mb 5.1 Kuril Islands.
	24. DBN: eS	20	55	44							38.7N 27.7E, H: 20 47 21.3 h 43 km. Mb 5.0 Turkey.
	eL	20	58.0								
	F	21	21								
	WTS: iP	20	51	50.0	+						
	HEE: iP	20	51	48.7	+						
	e	20	51	52.3							
	WIT: eP	20	51	55.0							

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
FEBRUARY 1977											
24.	WTS: ePKP HEE: ePKP WIT: ePKP	22	23	36.0 39.0 34.0							20.2S 178.2W, H: 22 04 54.8 h 597 km. Mb 4.8 Fiji Islands region.
25.	DBN: ePS eSPP eL F WTS: ePKP	01	30	30 50 03 in next shock 01 18 34.0							6.3S 147.6E, H: 00 59 38.5 h 49 km. Mb 5.4, Ms 5.5 East Papua New Guinea region.
25.	DBN: ePP ePS eSPP eL F WTS: iPKP HEE: ePKP WIT: ePKP	01	39	36 44 08 22 03.9 01 37 47.7 01 37 49.5 01 37 46.5		20	5.3		6.2		6.3S 147.5E, H: 01 18 52.8 h 52 km. Mb 5.9, Ms 5.9 East Papua New Guinea region.
25.	WTS: eP HEE: eP	04	44	17.0 19.5							32.5N 49.4E, H: 04 37 15.9 h 66 km. Mb 4.8 Western Iran.
25.	WTS: ePKP HEE: ePKP WIT: ePKP	18	40	09.0 13.5 08.0	+						18.0S 178.3W, H: 18 21 35.2 h 605 km. Mb 4.3 Fiji Islands region.
26.	WTS: ePKP e WIT: ePKP	00	40	13.0 16.0 10.0	-						19.0S 174.1W, H: 00 20 30.6 h 33 km. Mb 5.3 Tonga Islands.
26.	DBN: eL F WTS: ePKP HEE: ePKP	15	21	14 54 14 27 33.0 14 27 35.0							17.3S 177.0W, H: 14 07 42.1 h 74 km. Mb 4.8 Fiji Islands region.
26.	DBN: eL F WTS: iP WIT: eP	22	56	23 12 22 50 11.0 22 50 15.0							28.5N 20.8W, H: 22 43 48.9 h 10 km. Mb 4.7 Canary Islands region.
27.	DBN: eL F	04	17	04 22							37.5N 31.9W, H: 04 03 09.4 h 33 km. Mb 4.6, Ms 4.8 Azores Islands region.

SEISMOLOGICAL BULLETIN



Date FEBRUARY 1977	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
27.	WTS: iP WIT: eP	09	30	19.1 18.5	-						38.1N 72.7E, H: 09 21 57.2 h 112 km. Mb 5.1 Tadzhik SSR.
28.	DBN: eS eL F WTS: eP HEE: eP	01 01 02 01 01	55 12 37 44 44	10   43.0 43.5	   + +						4.0N 82.5W, H: 01 32 02.0 h 33 km. Mb 5.1, Ms 5.2 South of Panama.
28.	DBN: eL F HEE: eP	02 03 02	44 03 04	  16.5							9.2N 126.1E, H: 01 50 31.9 h 64 km. Mb 5.7 Mindanao, Philippine Islands.
28.	DBN: eL F	09 09	13 24								14.9N 55.0E, H: 08 43 55.7 h 33 km. Mb 5.1, Ms 4.7 Arabian Sea.
28.	WTS: iPg i i HEE: ePg e iSg WIT: ePg	16 16 16 16 16 16 16	46 46 46 46 46 46 46	21.3 23.1 40.5 29.5 31.0 45.3 35.5	    +  						BNS: H: 16 46 11.6 Mloc.2.9 Rockburst in the Ruhr-Coal District, W. Germany.
28.	DBN: eL F WTS: eP HEE: eP WIT: eP	18 18 17 17 17	03 20 44 44 44	  26.0 27.0 30.0							14.8N 55.0E, H: 17 35 06.5 h 33 km. Mb 5.1, Ms 4.6 Arabian Sea.
28.	DBN: eL F WTS: eP	18 19 18	36 00 02	  52.3							44.6N 146.8E, H: 17 50 54.4 h 10 km. Mb 5.3, Ms 4.7 Kuril Islands.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MARCH 1977											
1.	DBN: eL F	01 28 01 48									6.9N 124.0E, H: 00 35 00.8 h 45 km. Mb 5.5, Ms 5.0 Mindanao, Philippine Islands.
1.	WTS: eP e HEE: eP	20 49 44.0 20 49 48.5 20 49 41.5			+						6.3N 77.6W, H: 20 37 25.1 h 23 km. Mb 4.9 Near west coast of Colombia.
2.	DBN: eL F WTS: ePKP i HEE: iPKP e WIT: ePKP	06 18 07 11 05 25 02.0 05 25 07.3 05 25 05.3 05 25 29.5 05 25 00.0			- +						16.4S 178.0E, H: 05 05 23.6 h 33 km. Mb 5.5, Ms 5.1 Fiji Islands.
2.	DBN: iP iPP ipPP eSKS eSP eL F WTS: iP ipP ePP HEE: eP epP WIT: iP epP i	10 07 12 10 11 24 10 11 43 10 17 46 10 20 16 10 39 12.6 10 07 08.6 10 07 22.8 10 11 20.0 10 07 13.0 10 07 27.0 10 07 08.2 10 07 12.6 10 07 22.9			+	6	2.3				6.8N 123.7E, H: 09 53 23.2 h 52 km. Mb 6.1, Ms 6.1 Mindanao, Philippine Islands.
						20		12.4	11.8	6.5	
4.	HEE: ePKP	05 12 59.0			+						ISC: 16.1S 172.7W, H: 04 53 22.9, h 40 km, Mb 4.9. Samoa region.
4.	DBN: iP iS eL F WTS: iP i eL HEE: iP i i iS eL WIT: iP i i eL	19 25 30 19 28 37 19 30 23.2 19 25 16.4 19 25 18.6 19 30.0 19 25 19.3 19 25 20.3 19 25 22.4 19 28 34.5 19 30.0 19 25 21.0 19 25 23.2 19 25 26.3 19 30			- + + + - + - + - +	11	244				45.8N 26.8E, H: 19 21 54.1 h 94 km. Mb 6.4 1500 reported killed. Rumania.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MARCH 1977											
4.	HEE: e	20	01	09.5							No determination of epi-center.
5.	WTS: iPKP HEE: ePKP WIT: ePKP	16 16 16	33 33 33	54.5 56.5 53.5	+						23.3S 178.8E, H: 16 15 07.3 h 597 km. Mb 5.1 South of Fiji Islands.
6.	DBN: eL F	13 14	44 17								8.3S 123.6E, H: 12 47 18.3 h 39 km. Mb 5.2, Ms 5.7 Flores Island region.
7.	DBN: eL F WTS: eP	01 01.9 00	06			20		6.2	5.9		40.0N 118.7E, H: 00 28 47.4 h 33 km. Mb 5.3, Ms 5.0 Northeastern China
7.	WTS: iPn iPg iSn i HEE: (e i i WIT: ePg	08 08 08 08 08 08 08 08	18 18 19 19 18 18 18 19	53.9 59.4 16.4 18.9 36.5 46.0 52.3 10.0	+						50.3N 8.2E, H: 08 18 17.0 h 33 km. Germany.
7.	WTS: ePKP	09	22	39.0							ISC: 22.6S 177.7W, H: 09 03 25.3, h 328 km, Mb 4.7. South of Fiji.
7.	DBN: eL F WTS: eP	09 10 09	58 07 24		+						43.1N 145.8E, H: 09 12 28,1 h 24 km. Mb 5.4 Hokkaido, Japan region.
7.	DBN: eL F WTS: eP	11 11 10	07 21 49		+						7.4N 36.0W, H: 10 39 20.9 h 33 km. Mb 4.9 Central Mid-Atlantic Ridge.
7.	DBN: eL F	14 15	52 00								2.0N 123.1E, H: 13 47 31.0 h 58 km. Mb 5.4 Celebes Sea.
8.	WTS: ePKP HEE: ePKP WIT: iPKP	03 03 03	21 21 21	11.0 13.5 07.5	+						17.8S 178.7W, H: 03 02 32.8 h 571 km. Mb 5.3 Fiji Islands region.
8.	DBN: eL F	09 10	11 08								8.3S 156.2E, H: 08 07 19.7 h 33 km. Mb 5.3, Ms 5.8 Solomon Islands.
8.	DBN: eL F WTS: iP HEE: eP	13 14 13 13	51 34 22 22		+						12.0S 74.2W, H: 13 08 56.3 h 41 km. Mb 5.6, Ms 5.6 Peru.

SEISMOLOGICAL BULLETIN



Date MARCH 1977	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
8.	DBN: eL F WTS: iP HEE: eP WIT: eP	23	31								12.1S 74.0W, H: 22 46 04.8 h 14 km. Mb 5.6, Ms 5.4 Peru.
8.	DBN: eL F WTS: eP i HEE: eP WIT: eP	23	55	01.5		20			4.3	5.9	0.5N 100.0E, H: 23 17 28.0 h 22 km. Mb 5.5, Ms 6.0 Northern Sumatra.
9.	DBN: eL F WTS: eP HEE: eP WIT: eP	04	43								46.4N 153.9E, H: 03 59 27.2 h 30 km. Mb 5.2 Kuril Islands.
9.	WTS: eP	04	26	56.0							46.1N 154.1E, H: 04 14 58.6 h 38 km. Mb 5.0 Kuril Islands region.
9.	WTS: eP	06	42	29.0							41.2N 138.2E, H: 06 30 32.2 h 33 km. Mb 5.0 Eastern Sea of Japan.
9.	DBN: iP ipP iPP iPPP iS esS eL F WTS: iP ipP i iPP eS HEE: eP i e ipP WIT: eP i i ipP	14	38	44		7	18.0				41.6N 130.9E, H: 14 27 53.6 h 528 km. Mb 5.9 North Korea.
9.	WTS: e	15	05	45							No determination of epi- center.



SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MARCH 1977											
10.	WTS: eP HEE: eP	17	49	27.0 25.5	-						17.9N 81.9W, H: 17 37 44.8 h 33 km. Mb 4.9 Caribbean Sea.
11.	DBN: eL F	07 08	44 09								19.1N 121.2E, H: 06 58 02.3 h 42 km. Mb 5.4 Philippine Islands region.
12.	DBN: iS eL F WTS: eP e HEE: eP e WIT: eP e	03 03 04.2 03 03 03 03 03	13 19.3 04.2 06 06 06 06 06	28 19.3 04.2 31.5 41.5 26.5 35.5 34.0 42.0	- +	20	11.3		5.9		23.7N 45.2W, H: 02 57 50.6 h 33 km. Mb 5.4, Ms 5.6 North Atlantic Ridge.
13.	WTS: eP	05	07	53.0							17.0S 69.8W, H: 04 54 42.0 h 128 km. Mb 5.2 Peru-Bolivia border region.
13.	DBN: eL F	15 15	31.5 39								No determination of epi- center.
13.	DBN: eP epP eSKS F WTS: eP i i ipP HEE: eP i e WIT: eP e e	21 21 21 22 21 21 21 21 21 21 21 21 21	27 28 37 11 27 27 27 27 27 27 27 27 27	14 02 44 11 18.5 21.3 26.5 58.6 15.0 17.4 22.5 20.0 22.0 27.5	+    + +  + +						8.0S 74.4W, H: 21 14 32.2 h 161 km. Mb 5.1 Peru-Brazil border region.
14.	WTS: iPKP i epPKP HEE: iPKP i epPKP WIT: ePKP i	19 19 19 19 19 19 19 19	21 21 24 21 22 24 21 21	46.3 50.2 05.5 53.8 01.6 11 45.0 48.8	+ -  - -  +						20.7S 178.5W, H: 19 03 07.8 h 577 km. Mb 5.4 Fiji Islands region.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MARCH 1977											
14.	WTS: ePKP2 HEE: iPKP2	21	12	29.0	-						31.0S 179.9E, H: 20 52 38.2 h 368 km. Mb 5.0 Kermadec Islands region.
15.	DBN: eL F	01 01	36 48								31.4N 89.3E, H: 01 01 39.9 h 33 km. Mb 4.7 Tibet.
15.	DBN: eSPP iZ eL F	09 09 09 10	24 25 49 26	09 24							5.0S 131.0E, H: 08 54 58.8 h 41 km. Mb 5.8, Ms 5.6 Banda Sea.
15.	DBN: eL F	20 22	53 19								6.7S 155.0E, H: 19 55 42.6 h 31 km. Mb 5.5, Ms 5.8 Solomon Islands.
16.	DBN: eL F	13 13	32 41								31.3N 89.4E, H: 12 56 52.0 h 33 km. Mb 4.8 Tibet.
17.	DBN: eL F WTS: eP HEE: eP WIT: eP	00 00 00 00 00	34 49 06 06 06	21.5 29.0 23.0							25.8N 99.5E, H: 23 55 01.6 h 33 km. Mb 5.1, Ms 4.7 Yunnan Prov., China.
17.	WTS: eP WIT: eP	00 00	08 08	58.5 57.5							25.6N 100.0E, H: 23 57 34.0 h 33 km. Mb 5.0 Yunnan Prov., China.

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MARCH 1977											
18.	DBN: iP i(PP) iPPP iS iSP iSS iSSS eL F	21 22 22 22 22 22 22 22	57 01 02 07 09 14 17	01 00 46 56 24 10 44	+	12	20.0				16.8N 122.3E, H: 21 43 52.4 h 37 km. Mb 6.2, Ms 7.0 Luzon, Philippine Islands.
	WTS: eP i ipP e eSP ePKKP i eP'P' eL	21 21 21 21 22 22 22 22	56 56 57 59	57.0 58.6 08.1 58	-						
	HEE: eP i e eSP eL	21 21 22 22 22	57 57 00	02.0 03.5 08.5							
	WIT: eP e ipP eSP eL	21 21 21 22 22	56 56 57	56.0 57.5 06.4	-						
19.	WTS: eP HEE: eP WIT: eP	00 00 00	10 10 10	45.5 50.0 43.0							16.8N 122.5E, H: 23 57 38.1 h 33 km. Mb 5.3 Luzon, Philippine Islands.
19.	WTS: iPKP HEE: ePKP e WIT: ePKP	00 00 00 00	54 54 54	27.0 20.0 30.0	-						21.5S 178.9W, H: 00 35 41.5 h 584 km. Mb 5.0 Fiji Islands region.
19.	DBN: eL F WTS: eP HEE: eP WIT: eP	02 03 02 02 02	43 07 06 06 06	 21.5 26.5 21							17.1N 122.4E, H: 01 53 19.2 h 49 km. Mb 5.3 Luzon, Philippine Islands.
19.	DBN: eL F	03 04	51 11								17.1N 122.5E, H: 03 02 42.6 h 34 km. Mb 5.1 Luzon, Philippine Islands.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MARCH 1977											
19.	DBN: eL F WTS: eP	09	12 35								16.7N 122.4E, H: 08 22 16.4 h 45 km. Mb 4.9, Ms 4,5 Luzon, Philippine Islands.
19.	WTS: iPKP HEE: iPKP	09	42	02.8 06.2	-						17.7S 174.7W, H: 09 22 42.4 h 176 km. Mb 5.1 Tonga Islands.
19.	DBN: iP eL F WTS: iP HEE: iP WIT: iP	11	08	22	+	4	3.0				44.2N 148.2E, H: 10 56 25.1 h 70 km. Mb 6.0 Kuril Islands.
19.	DBN: eL F HEE: eP	13	06			20		1.4		5.4	16.6N 122.4E, H: 12 17 03.6 h 33 km. Mb 5.4, Ms 4.5 Luzon, Philippine Islands.
19.	DBN: eL F WTS: eP HEE: eP	13	43		+	20		2.8		5.7	16.7N 122.5E, H: 12 56 03.7 h 33 km. Mb 5.3, Ms 5.1 Luzon, Philippine Islands.
19.	HEE: ePKP	19	22	12.5							19.0S 169.3E, H: 19 02 54.1 h 182 km. Mb 4.4 New Hebrides Islands.
19.	DBN: iP ePP eS eL F WTS: eP HEE: iP i WIT: eP	19	48	18	+	7	1.6				16.8N 122.4E, H: 19 35 08.0 h 39 km. Mb 5.6, Ms 5.8 Luzon, Philippine Islands.
						20		6.0		6.1	
19.	WTS: ePKP i HEE: ePKP WIT: ePKP e	23	20	22.5 31.4	-						21.9S 139.0W, H: 23 00 58.2 h 0 km. Mb 5.9, Ms 5.5 Tuamotu Archipelago region.
20.	DBN: eL F	02	47								20.4N 122.1E, H: 01 57 09.2 h 33 km. Mb 4.6, Ms 4.1 Philippine Islands region.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MARCH 1977											
21.	DBN: eL F	05	32								13.2N 145.3E, H: 04 36 00.6 h 56 km. Mb 5.4 Mariana Islands.
21.	DBN: eL F	07	51								13.2N 145.3E, H: 06 57 44.4 h 33 km. Mb 5.5, Ms 5.6 Mariana Islands.
21.	DBN: eL F	08	44								13.1N 145.3E, H: 07 51 35.9 h 54 km. Mb 5.2, Ms 5.1 Mariana Islands.
21.	DBN: iP iPP iS iSS eL F	21	27	10	+	9	54.0				27.6N 56.4E, H: 21 18 54.2 h 29 km. Mb 6.2, Ms 6.9 (At least 167 killed) Southern Iran.
						22		140		6.9	
	WTS: iP i eS	21	27	02.5	+						
	HEE: eP eS	21	27	04.5	+						
	WIT: iP iPP eS	21	27	04.8	+						
		21	28	55.0							
		21	33	48							
21.	WTS: eP HEE: eP WIT: eP	21	41	26.0	+						27.5N 56.4E, H: 21 33 18.2 h 33 km. Mb 5.1 Southern Iran.
		21	41	28.5							
		21	41	29.0							
21.	WTS: iP i HEE: iP WIT: iP e	22	50	14.4	+						27.6N 56.5E, H: 22 42 06.5 h 36 km. Mb 5.8 Southern Iran.
		22	50	35.0	-						
		22	50	16.5	+						
		22	50	16.2	+						
		22	50	33.0							
22.	WTS: eP HEE: eP	02	34	05.0							27.5N 56.3E, H: 02 25 58.8 h 43 km. Mb 5.2 Southern Iran.
		02	34	08.0							
22.	WTS: ePKP e HEE: ePKP e WIT: ePKP e	02	42	38.0	+						33.6S 179.1E, H: 02 23 17.8 h 336 km. Mb 5.6 South of Kermadec Islands.
		02	43	23.0							
		02	42	39.5	+						
		02	43	28.5	-						
		02	42	38.0							
		02	43	20.0							

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MARCH 1977											
22.	DBN: eL F WTS: eP HEE: eP	03 05 in next shock 02 50 14.5 02 50 17.5									27.7N 56.5E, H: 02 42 10.2 h 60 km. Mb 4.9 Southern Iran.
22.	DBN: eL F	03 20 04 09									No determination of epi- center.
22.	WTS: e	04 22 41.0									12.5S 14.7W, H: 04 11 37.7 h 33 km. Mb 5.1, Ms 4.7 South Atlantic Ridge.
22.	WTS: eP i	05 39 36.0 05 39 40.3		+							29.5N 51.5E, H: 05 32 04.5 h 38 km. Mb 4.2 Southern Iran.
22.	DBN: eL F WTS: eP HEE: eP	09 36 10 33 09 22 48.5 09 22 51.0			22		4.2		5.4		27.6N 56.6E, H: 09 14 39.7 h 33 km. Mb 5.0, Ms 5.2 Southern Iran.
22.	DBN: iP ePP iS eSS eL F WTS: iP HEE: eP WIT: eP	12 05 46 12 07 34 12 12 24 12 15 40 12 18 14.4 12 05 38.6 12 05 41.0 12 05 40.0		+	7	4.7					27.6N 56.5E, H: 11 57 30.9 h 39 km. Mb 5.7, Ms 5.9 Southern Iran.
					22		15.4		6.0		
22.	WTS: eP HEE: eP	12 41 02.5 12 41 05.5									27.6N 56.6E, H: 12 32 57.3 h 62 km. Mb 4.8 Southern Iran.
22.	DBN: eL F	18 16.9 18 20									No determination of epi- center.
22.	DBN: eL F	21 58 22 09									27.7N 56.4E, H: 21 31 02.6 h 33 km. Mb 4.8 Southern Iran.
23.	WTS: ePKP HEE: ePKP WIT: ePKP	00 05 46.5 00 05 49.5 00 05 44.5		+							20.2S 178.0W, H: 23 47 02.4 h 567 km. Mb 4.7 Fiji Islands region.
23.	DBN: eL F	00 43 00 55									27.6N 56.4E, H: 00 17 50.8 h 33 km. Mb 4.9 Southern Iran.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MARCH 1977											
23.	DBN: eL F WTS: eP i i HEE: iP WIT: eP	02 03 02 02 02 02	52 13 22 22 23 22	  58.0 59.0 04.5 56.3 58.5	  +   +						6.8N 73.0W, H: 02 11 14.6 h 164 km. Mb 5.5 Northern Colombia.
23.	DBN: eL F WTS: iP e	04 04 03 03	27 57 58 58	  03.0 13.5							43.4N 146.9E, H: 03 46 01.3 h 36 km. Mb 5.3, Ms 4.6 Kuril Islands.
23.	DBN: eL F	06 06	19 53								14.8S 178.2W, H: 05 00 41.0 h 33 km. Mb 5.0, Ms 5.1 Fiji Islands region.
23.	DBN: iP ePP eSS eL F WTS: ePKP WIT: ePKP	07 07 08 08 10.3 07 07	38 41 00 29  38 38	44 51 34   47 48	-       	6   18	1.8   5.4	   6.8	6.4		14.5S 177.9W, H: 07 19 11.1 h 33 km. Mb 5.5, Ms 6.3 Fiji Islands region.
23.	WTS: eP HEE: eP	07 07	55 55	04.0 06.5							27.7N 56.4E, H: 07 46 59.4 h 54 km. Mb 5.0, Ms 5.5 Southern Iran.
23.	DBN: ePKP eSS eL F HEE: ePKP e	17 17 18 20 17 17	29 51.6 19 00 29 30	50    56.0 05.0		20	3.6	4.5	6.2		14.4S 178.0W, H: 17 10 19.5 h 2 km. Mb 5.6, Ms 6.0 Fiji Islands region.
23.	HEE: ePKP	19	17	08.0							15.0S 173.2W, H: 18 57 36.6 h 33 km. Mb 5.1 Tonga Islands.
23.	WTS: eP e HEE: eP WIT: eP	20 20 20 20	49 50 49 49	05.0 46.5 08.0 07.0							27.5N 56.5E, H: 20 40 57.9 h 42 km. Mb 4.9 Southern Iran.
23.	DBN: eL F	23 23	54.0 58								No determination of epi- center.
23.	DBN: iP eS eL F WTS: iP e ePP HEE: iP WIT: eP	23 00 00 01.1 23 00 00 23 23 23	59 06 12  59 00 01 59 59 59	32 13   24.0 05.5 07.0 26.3 25.5	    +    +   + +	6	3.0				27.6N 56.6E, H: 23 51 15.8 h 35 km. Mb 5.8, Ms 5.4 Southern Iran.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MARCH 1977											
24.	WTS: eP e ePP HEE: eP WIT: eP	00	21	59.0							27.6N 56.5E, H: 00 13 52.3 h 45 km. Mb 5.1 Southern Iran.
24.	DBN: eL F WTS: eP e ePP HEE: eP WIT: eP	05	06								27.6N 56.6E, H: 04 42 24.3 h 32 km. Mb 5.3 Southern Iran.
24.	WTS: ePn i e HEE: ePn e e e	07	33	54.0	-						51.3N 15.8E, H: 07 32 30.5 h 33 km. Mb 5.0, Ms 3.5 Poland.
24.	DBN: eL F WTS: iP i	08	08								3.2N 78.5W, H: 07 27 17.2 h 24 km. Mb 5.2 South of Panama.
24.	DBN: eL F	09	35								63.6N 19.2W, H: 09 25 33.9 h 10 km. Mb 4.6 Iceland.
24.	DBN: eL F	10	30								No determination of epi- center.
24.	DBN: eL F	20	23								16.7N 122.6E, H: 19 33 33.0 h 33 km. Mb 5.1 Luzon, Philippine Islands.
25.	DBN: eS eL F WTS: eP HEE: eP e WIT: eP	02	50	32							38.6N 40.0E, H: 02 39 58.2 h 21 km. Mb 5.2, Ms 4.9 30 reported killed Turkey.
25.	WTS: eP	23	03	29.0							27.8N 56.6E, H: 22 55 23.7 h 56 km. Mb 4.9 Southern Iran.



SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MARCH 1977											
26.	DBN: eL F	00	42								52.0N 30.2W, H: 00 32 04.6 h 33 km. Mb 4.5 North Atlantic Ridge.
26.	DBN: iP iS eSS eL F WTS: iP HEE: eP WIT: iP	04 04 05 05 07.8 04 04 04	47 57 03.0 13  47 48 47	59 48    59.7 05.5 55.2	+     + + +	6   18	4.6   6.8				52.3N 168.3W, H: 04 36 14.7 h 38 km. Mb 5.7, Ms 6.0 Fox Islands, Aleutian Islands.
26.	DBN: ePKP WTS: ePKP i ipPKP HEE: ePKP i epPKP WIT: iP epPKP	08 08 08 08 08 08 08 08 08	38 38 38 39 38 38 39 38 39	51 49.0 51.0 15.0 51.5 54.8 18.0 49.2 15.5	+ + +  + +  +						18.6S 174.1W, H: 08 19 18.5 h 93 km. Mb 5.6 Tonga Islands.
26.	WTS: iP HEE: ePKP WIT: ePKP	19 19 19	16 16 16	22.5 38.0 21.0	-  						24.1S 179.2W, H: 18 57 11.7 h 396 km. Mb 4.6 South of Fiji Islands.
26.	DBN: eP eS eL F WTS: iP i HEE: iP WIT: eP	22 22 22 23 22 22 22 22	36 44 51 35 36 36 36 36	32 14   28.4 36.8 20.3 33.5	    + - -	20		3.6	5.4		1.0S 13.5W, H: 22 26 54.7 h 33 km. Mb 5.3, Ms 5.3 North of Ascension Island.
27.	WTS: ePKP WIT: ePKP	07 07	44 44	34.5 33.0	- 						23.8S 179.8W, H: 07 25 33.2 h 441 km. Mb 4.5 South of Fiji Islands.
28.	DBN: eL F WTS: ePKP epPKP eSKP e HEE: ePKP eSKP e	02 02 01 01 01 01 01 01 01 01	22 43 34 35 38 38 34 38 38	 43 59.0 30.5 24.0 35.5 56.5 28.0 41.5							14.7S 167.1E, H: 01 15 41.8 h 109 km. Mb 5.7 New Hebrides Islands.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MARCH 1977											
28.	DBN: eL F	13	18.0								34.6N 36.7W, H: 13 00 15.9 h 33 km. Mb 4.8, Ms 4.5 North Atlantic Ridge.
29.		13	21								HEE: No records from March 29 - April 14.
29.	WTS: eP	04	05	03.5							49.8N 78.1E, H: 03 56 57.7 h 0 km. Mb 5.4 Eastern Kazakh SSR.
29.	WTS: iPKP i WIT: iPKP	18	02	08.8	-						20.3S 178.3W, H: 17 43 23.5 h 543 km. Mb 5.0 Fiji Islands region.
29.	DBN: eL F WTS: eP	22	53								27.6N 56.4E, H: 22 29 16.8 h 35 km. Mb 5.2, Ms 4.9 Southern Iran.
30.	DBN: eL F WIT: eP	12	06								31.5N 140.2E, H: 11 20 35.7 h 33 km. Mb 5.3, Ms 5.3 South of Honshu, Japan.
30.	WTS: eP WIT: eP	17	53	18.0	+						52.6N 172.5E, H: 17 41 38.0 h 31 km. Mb 5.0 Near Islands, Aleutian Is.
30.	DBN: eL F	21	47								23.5N 45.0W, H: 21 24 24.3 h 33 km. Mb 4.7 North Atlantic Ridge.
30.	DBN: eL F	21	58								23.4N 45.0W, H: 21 36 12.5 h 33 km. Mb 4.6, Ms 4.9 North Atlantic Ridge.
30.	DBN: eL F	22	05								23.3N 45.0W, H: 21 42 28.0 h 33 km. Mb 4.8 North Atlantic Ridge.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms	
		h	m	s			Z	NS	EW			
APRIL 1977	1. DBN: iP	13	44	44	-	7	9.4				27.5N 56.3E, H: 13 36 24.7 h 33 km. Mb 6.2, Ms 6.0 Southern Iran.	
	ePP	13	46	29								
	eS	13	51	16								
	eSS	13	54	20								
	eL	13	57			20		14.2		5.9		
	F	14.9										
	WTS: eP	13	44	32.0								
	e	13	45	01.0								
	WIT: eP	13	44	34.5								
	e	13	46	21.0								
	2. DBN: iP	07	34	55	+	14	250					16.7S 172.1W, H: 07 15 22.7 h 33 km. Mb 6.8, Ms 7.6 Samoa Islands region.
	iPP	07	38	14								
ePS	07	48	44									
eL	08.4				19	136			7.6			
F	12.3											
WTS: iP	07	34	56.7	+								
i	07	34	58.6	-								
WIT: eP	07	34	56.0									
2. WTS: eP	20	51	04.5							16.9N 92.8W, H: 20 39 06.2 h 249 km. Mb 5.3 Chiapas, Mexico.		
3. DBN: eL	03	22.6								46.2N 13.1E, H: 03 18 15.7 h 33 km. Northern Italy.		
F	03	25										
WTS: eP	03	20	01.0									
e	03	20	08.0									
eL	03	22.0										
WIT: e	03	20	21									
e	03	20	47.5									
eL	03	22.6										
4. DBN: eL	03	25								60.6S 27.2W, H: 02 29 32.6 h 33 km. Mb 5.1, Ms 5.2 South Sandwich Islands region.		
F	03	41										
4. DBN: iP	18	01	52	+	5	2.3				7.3N 34.9W, H: 17 52 19.7 h 33 km. Mb 5.5, Ms 6.0 Central Mid-Atlantic Ridge.		
ePP	18	03	54									
eS	18	09	38									
eSS	18	13	34									
eSSS	18	15	30									
eL	18	17			20			14.2	6.0			
F	19	41										
WTS: iP	18	01	57.6	+								
WIT: eP	18	02	01.5									
e	18	02	43.5									

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
APRIL 1977	4. WTS: eP	18	08	35.5							14.9N 94.1W, H: 17 56 00.3 h 28 km. Mb 4.9 Off coast of Chiapas, Mexico.
	e	18	08	46.0							
	5. DBN: eL	11	37								12.0N 144.2E, H: 10 42 35.0 h 17 km. Mb 5.6, Ms 5.5 South of Mariana Islands.
		12	13								
	5. WTS: iP	15	12	02.2	+						37.1N 116.1W, H: 15 00 00.2 h 0 km. Mb 5.6, Ms 5.3 Southern Nevada.
	e	15	12	23.0							
	WIT: eP	15	11	59.5							
	6. DBN: e(P)	13	44	04							32.0N 50.7E, H: 13 36 37.1 h 41 km. Mb 5.5, Ms 5.9 348 reported killed. Iran.
	ePP	13	45	36							
	eS	13	49	58							
	iZ	13	50	40	-						
	eSS	13	52	28							
	eL	13	54			20	8.9	12.4	5.7		
	F	15.4									
	WIT: eP	13	43	53.5							
	9. WTS: iPg	03	05	43.6	+						BNS: Rockburst in Ruhr-Coal District Mloc. 2.8 West Germany.
	e	03	06	02.0							
	WIT: e	03	05	59.5							
	9. DBN: eP	04	16	12	-						10.0S 71.2W, H: 04 04 12.5 h 564 km. Mb 5.5 Peru-Brazil border region.
	epP	04	18	13							
	eSKS	04	26	10							
	eH	04	27	26							
	F	05.5									
	WTS: eP	04	16	16.0							
	epP	04	18	18.5							
	WIT: eP	04	16	19.0							
	9. DBN: ePKP	21	35	50							19.1S 169.6E, H: 21 16 14.6 h 25 km. Mb 5.4, Ms 5.4 New Hebrides Islands.
	ePP	21	39	34							
	eL	22.4									
	F	23.2									
	WTS: ePKP	21	35	48.5							
	10. DBN: ePKP	01	13	54							19.0S 169.6E, H: 00 54 16.5 h 18 km. Mb 4.9, Ms 5.0 New Hebrides Islands.
	ePP	01	17	20							
	eL	02	08								
	F	03.1									
	WTS: ePKP	01	13	51							

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
APRIL 1977											
10.	WTS: ePKP	04	30	16.0							19.3S 178.1W, H: 04 11 29.1 h 505 km. Mb 4.8 Fiji Islands region.
10.	WTS: eP	08	43	24.0							44.5N 147.5E, H: 08 31 33.4 h 84 km. Mb 5.4 Kuril Islands.
	WIT: eP	08	43	22.0							
10.	WTS: ePKP	18	28	36.0	-						21.0S 179.3W, H: 18 09 58.9 h 647 km. Mb 4.8 Fiji Islands region.
10.	WTS: iP	18	56	36.5	-						52.6N 158.9E, H: 18 45 07.2 h 34 km. Mb 4.7 Near east coast of Kamchatka.
	WIT: eP	18	56	31.5							
11.	WTS: eP	16	22	54							7.4S 30.5E, H: 16 12 19.4 h 33 km. Mb 4.8 Lake Tanganyika region.
11.	WTS: eP	16	27	56.0							36.9N 30.7E, H: 16 23 01.9 h 93 km. Mb 4.6 Turkey.
	e	16	28	20.0							
11.	DBN: eL	18	14								59.1N 30.5W, H: 18 04 27.2 h 33 km. Mb 4.3, Ms 4.3 North Atlantic Ocean.
	F	18	20								
11.	DBN: eP	22	31	16							59.6N 30.2W, H: 22 26 29.6 h 33 km. Mb 4.5, Ms 4.7 North Atlantic Ocean.
	eL	22	36.5								
	F	in next shock									
	WTS: eP	22	31	23.0							
	WIT: eP	22	31	19							
11.	DBN: eP	22	32	15							59.6N 30.1W, H: 22 27 30.2 h 33 km. Mb 4.7 North Atlantic Ocean.
	eL	in prec. shock									
	F	22	46								
	WTS: eP	22	32	24.0							
11.	DBN: eP	22	49	28							59.5N 30.3W, H: 22 44 42.3 h 33 km. Mb 4.6, Ms 4.7 North Atlantic Ocean.
	eL	22	54.7								
	F	23	00								
	WTS: eP	22	49	36.0							
	e	22	49	57.0							
	WIT: eP	22	49	30.0							

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
APRIL 1977	11. DBN: eL F	23	13 18								59.7N 30.3W, H: 23 03 00.4 h 33 km. Mb 4.2 North Atlantic Ocean.
	11. DBN: eL F WTS: eP	23	31 36 25	36							59.4N 30.3W, H: 23 20 42.4 h 33 km. Mb 4.5, Ms 4.8 North Atlantic Ocean.
	11. DBN: eL F	23	49 00	02							No determination of epicenter.
	12. DBN: eL F WTS: iP WIT: eP	11	25 42 51 51	26.2 22.0	-						31.8N 131.5E, H: 10 38 49.8 h 44 km. Mb 5.1 Kyushu, Japan.
	13. DBN: eL F WTS: iP ipP e	11	53 08 42 42 43	04.8 52.0 14.0							36.5N 70.9E, H: 11 33 51.8 h 196 km. Mb 5.3 Hindu Kush region.
	13. WTS: ePKP	19	30	51.0	+						22.2S 179.6E, H: 19 12 02.8 h 555 km. Mb 5.0 South of Fiji Islands.
	14.										HEE: No records from March 29 - April 14.
	14. WTS: ePKP e HEE: iP WIT: iP	04	24	09.0 29.0 14.2 09.1	- - -						17.7S 178.7E, H: 04 05 31.2 h 535 km. Mb 5.2 Fiji Islands region.
	14. DBN: eL F	07	25.4 31			18		5.3	4.7		36.3N 5.7E, H: 07 17 09.0 h 18 km. Mb 4.7, Ms 4.3 Algeria.
	16. WTS: ePKP HEE: ePKP WIT: ePKP	06	49	56.0 59.5 55.0							21.5N 179.2W, H: 06 31 13.7 h 600 km. Mb 5.2 Fiji Islands region.
	17. WTS: eP	02	54	29.0							33.3S 68.9W, H: 02 41 17.6 h 47 km. Mb 5.1, Ms 4.2 Mendoza Province, Argentina.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
APRIL 1977	18. DBN: eP	00	21	21						36.5N 70.8E, H: 00 13 04.6 h 217 km. Mb 5.4 Hindu Kush region.	
	eZ	00	22	34							
	e(L)	00	32								
	F	00	50								
	WTS: iP	00	21	14.6	+						
	ePP	00	23	09							
	HEE: iP	00	21	19.7	+						
	ePP	00	23	15.5							
WIT: eP	00	21	14.0	+							
19.	WTS: eP	04	31	12.0	-					71.1N 13.9W, H: 04 26 22.8 h 10 km. Mb 4.3 Jan Mayen Island region.	
19.	WTS: eP	06	27	19.0	+					36.5N 140.6E, H: 06 14 59.6 h 65 km. Mb 5.3 Near east coast of Honshu, Japan.	
WIT: eP	06	27	17.0								
20.	DBN: eL	00	37.5							44.9N 17.4E, H: 00 31 53.8 h 33 km. Mb 4.6, Ms 3.7 Yugoslavia.	
F	00	43									
WTS: eP	00	34	17.5								
e	00	34	26.5								
eL	00	37.4									
HEE: eP	00	34	16.0								
eL	00	37.3									
WIT: eP	00	34	32.0								
20.	WTS: ePKP2	03	34	20.0						29.9S 178.3W, H: 03 14 07.7 h 138 km. Mb 5.3 Kermadec Islands.	
WIT: ePKP2	03	34	16.5								
20.	DBN: eL	04	47							26.9N 55.5E, H: 04 22 24.8 h 33 km. Mb 5.1, Ms 4.4 Southern Iran.	
F	05	06									
WTS: iP	04	30	31.2	+							
e	04	30	33.5								
HEE: eP	04	30	33.5	+							
20.	DBN: eP	20	16	24	+					30.6N 137.5E, H: 20 04 29.4 h 493 km. Mb 5.5 South of Honsu, Japan.	
eSP	20	27	26								
eL	20	49									
F	21	06									
WTS: eP	20	16	22.0								
WIT: eP	20	16	20.5								

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
APRIL 1977	20. DBN: ePKP	23	32	24	+	7	5.0			9.8S 160.3E, H: 23 13 10.4 h 33 km. Mb 6.4, Ms 6.7 Solomon Islands.	
	ePP	23	34	56							
	eSS	23	52	36							
	eL	00	11								
	F	in next shock									
	WTS: ePKP	23	32	23.0							
	ePP	23	34	51.0							
	WIT: ePKP	23	32	23							
	ePP	23	34	45.0							
	21. DBN: eL	00	41								21
F	in next shock										
WTS: ePKP	00	02	06.5								
i	00	02	19.7								
ePP	00	04	38.0								
WIT: ePKP	00	02	05								
e	00	02	17.0								
e	00	02	26.5								
ePP	00	04	35								
21. WTS: ePKP	00	08	33						9.8S 160.8E, H: 23 49 13.1 h 33 km. Mb 6.8, Ms 7.5 Solomon Islands.		
ePP	00	11	00								
WIT: ePKP	00	08	33.0								
ePP	00	10	57.0								
21. WTS: eP	01	58	59.0						26.9N 142.4E, H: 01 45 50.2 h 33 km. Mb 5.8, Ms 6.2 Bonin Islands region.		
ePP	02	02	41.0								
WIT: eP	01	58	56.5								
21. WTS: eP	04	04	43.0	+					70.9N 14.2W, H: 03 59 56.2 h 10 km. Mb 4.9 Jan Mayen Island region.		
e	04	05	23.0								
WIT: eP	04	04	47.5								
21. DBN: ePKP	04	43	23	9	14.4				10.0S 160.7E, H: 04 24 09.6 h 33 km. Mb 6.6, Ms 7.5 18 reported killed. Solomon Islands.		
ePP	04	45	54								
ePPP	04	48	46								
eSP	04	56	14								
eSS	05	03	56								
eL	05	22									
F	09.7										
WTS: ePKP	04	43	22.5								
ePP	04	45	54								
WIT: e(PKP)	04	43	26.5								
ePP	04	45	47.5								
21. WTS: eP	10	12	06.0						40.1N 70.8E, H: 10 03 55.8 h 47 km. Mb 5.1 Tadzhik SSR.		
e	10	12	10.0								



SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
APRIL 1977	21. DBN: eL F	10 11	56 22							10.3S 160.7E, H: 09 45 38.2 h 33 km. Mb 5.6, Ms 5.6 Solomon Islands.	
	22. WTS: eP WIT: eP	01 01	02 02	48.0 45.0						52.3N 153.8E, H: 00 52 01.6 h 380 km. Mb 4.8 Northwest of Kuril Islands.	
	22. DBN: eL F	04 05	22 19			19	2.8		6.0	10.2S 160.7E, H: 03 11 00.2 h 51 km. Mb 5.6, Ms 6.0 Solomon Islands.	
	22. DBN: eL F	08 09	59 03							44.3N 129.3W, H: 08 16 04.5 h 15 km. Mb 5.2, Ms 4.7 Off coast of Oregon.	
	22. DBN: eL F	14 15	57 10							27.4N 126.7E, H: 14 07 27.8 h 33 km. Mb 5.0 East China Sea.	
	22. WTS: iPKP HEE: iPKP WIT: iPKP	23 23 23	30 30 30	27.3 31.4 25.5	- - -						17.7S 178.3W, H: 23 11 47.9 h 538 km. Mb 5.5 Fiji Islands region.
	23. WTS: iPKP	09	47	27.8	+						20.9S 178.9W, H: 09 28 41.8 h 559 km. Mb 4.5 Fiji Islands region.
	24. DBN: eL F WIT: eP	21 21 20	27 35 54								40.1N 142.7E, H: 20 42 43.2 h 44 km. Mb 5.0, Ms 4.1 Near east coast of Honshu, Japan.
	25. WTS: iP HEE: eP WIT: eP	04 04 04	15 15 15	03.9 12.0 02.0	+						49.8N 78.2E, H: 04 06 57.8 h 0 km. Mb 5.1 Eastern Kazakh SSR.
	25. DBN: eL F	05 05	48 51								39.4N 27.7E, H: 05 34 28.2 h 33 km. Turkey.
25. WTS: ePKP	15	23	01							24.4S 175.6W, H: 15 03 03.9 h 33 km. Mb 5.3 South of Tonga Islands.	

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
APRIL 1977	26. DBN: eL	16	42							32.7N 48.9E, H: 16 25 29.0 h 47 km. Mb 5.4, Ms 4.8 Western Iran.	
	F	17	05								
	WTS: iP	16	32	28.0	+						
	i	16	32	33.0							
	HEE: iP	16	32	29.7	+						
	i	16	32	35.0							
WIT: eP	16	32	30.5								
26.	DBN: eL	23	54							43.4N 148.0E, H: 23 06 40.4 h 34 km. Mb 5.0, Ms 5.0 Kuril Islands region.	
	F	00	15								
27.	WTS: ePKP	04	13	47						55.2S 127.2W, H: 03 53 57.5 h 33 km. Mb 5.1, Ms 5.0 South Pacific Cordillera.	
	HEE: ePKP2	04	13	54.0							
28.	DBN: eL	04	58							12.7N 145.0E, H: 04 03 12.9 h 45 km. Mb 5.0, Ms 5.1 South of Mariana Islands.	
	F	05	40								
29.	DBN: eL	06	41.5							No determination of epicenter.	
	F	06	43								
29.	WTS: ePKP	19	27	00						18.7S 177.6W, H: 19 08 27.4 h 633 km. Mb 5.1 Fiji Islands region.	
30.	WTS: eP	06	20	52.0	+					32.5N 48.9E, H: 06 13 52.4 h 48 km. Mb 4.6 Western Iran.	
	HEE: eP	06	20	54.0							
30.	WTS: iP	14	43	44.9	+					27.6N 56.5E, H: 14 35 37.3 h 38 km. Mb 5.0, Ms 4.8 Southern Iran.	
	e	14	44	22.5							
	e	14	45	34							
	HEE: eP	14	43	47.0	+						
	WIT: eP	14	43	47.0							
30.	DBN: eL	16	41			20			1.8	4.9	32.4N 40.3W, H: 16 22 45.3 h 33 km. Mb 4.6, Ms 5.1 North Atlantic Ridge.
	F	17	00								
	WTS: eP	16	30	16.0							
	HEE: eP	16	30	12.0							
	WIT: eP	16	30	16.5							
30.	DBN: eL	21	20								15.0S 75.6W, H: 20 31 47.7 h 10 km. Mb 5.3, Ms 4.8 Near coast of Peru.
	F	21	43								

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
APRIL 1977	DBN: eL F	22	34							51.6N 173.4W, H: 21 49 40.7 h 42 km. Mb 4.8, Ms 4.8 Andreanof Islands, Aleutian Islands.	
		23	09								
30.	DBN: eL F	23	43							68.2N 10.5E, H: 23 32 42.2 h 14 km. Mb 4.1 Norwegian Sea.	
		23	45								

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MAY 1977											
1.	WTS: iP HEE: eP epP	00	21	58.4	-						6.1S 77.1W, H: 00 09 06.2 h 123 km. Mb 4.9 Northern Peru.
1.	DBN: eL F	02	10								32.3N 40.4W, H: 01 50 46.1 h 33 km. Mb 4.6 North Atlantic Ridge.
1.	DBN: eL F	03	29								63.2N 150.9W, H: 01 56 00.7 h 134 km. Mb 4.0 Central Alaska.
1.	DBN: eL F	17	01			20		1.5		5.3	35.2N 132.6E, H: 06 23 01.7 h 6 km. Mb 4.5, Ms 4.6 Southern Honshu, Japan.
1.	WTS: ePKP HEE: ePKP	18	58	29.5							7.2S 154.4E, H: 18 39 23.8 h 32 km. Mb 5.6 Solomon Islands.
2.	DBN: eL F	05	52								No determination of epicenter.
2.	WTS: iP HEE: iP WIT: ePKP	07	43	39.8	+						21.2S 178.8W, H: 07 24 56.0 h 579 km. Mb 4.9 Fiji Islands region.
2.	WTS: eP	15	24	30.0							37.0N 55.2E, H: 15 17 48.9 h 19 km. Mb 5.3 Iran-USSR border region.
2.	DBN: eL F	16	32								19.1N 67.4W, H: 16 00 54.9 h 50 km. Mb 5.2 Mona Passage.
2.	DBN: eP eZ ePP eSKS eL F WTS: eP e HEE: eP	22	07	44							7.2N 123.3E, H: 21 53 56.5 h 24 km. Mb 5.7, Ms 5.5 Mindanao, Philippine Islands.
						18		2.3		5.8	
3.	WTS: eP HEE: eP	03	27	37.5							27.4N 140.2E, H: 03 15 07.6 h 312 km. Mb 4.8 Bonin Islands region.
3.	DBN: eL F	13	06								27.4N 101.1E, H: 12 26 33.0 h 33 km. Mb 5.0 Szechwan Province, China.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MAY 1977											
3.	DBN: eL F	23	09								26.6N 130.3E, H: 22 25 07.9 h 33 km. Mb 4.9 Ryukyu Islands region.
4.	WTS: eP e HEE: eP	02	08	39.0 41.0 41.5							31.8N 50.9E, H: 02 01 25.7 h 46 km. Mb 4.8 Iran.
4.	WTS: eP e e	02	46	09.0 43.0 35.0							36.9N 71.4E, H: 02 37 44.4 h 122 km. Mb 5.3 Afghanistan-USSR border region.
4.	WTS: iPKP e	08	36	02.7 07.0	+						20.3S 178.4W H: 08 17 20.5 h 587 km. Mb 4.7 Fiji Islands region.
4.	WTS: eP HEE: eP	23	56	40.0 43.5							No determination of epicenter.
5.	DBN: eL F WTS: iP epP	22	56		+						41.9N 142.3E, H: 22 14 34.7 h 71 km. Mb 5.0 Hokkaido, Japan region.
5.	DBN: eL F	23	26								34.6N 24.8E, H: 23 13 07.3 h 16 km. Mb 4.2 Crete.
6.	DBN: eL F WTS: eP WIT: eP	04	35		+						45.9N 152.1E, H: 03 53 30.2 h 29 km. Mb 5.4, Ms 4.5 Kuril Islands region.
6.	DBN: eL F	13	44								15.9S 75.0W, H: 12 52 38.1 h 33 km. Mb 5.0, Ms 4.4 Near coast of Peru.
6.	DBN: eL F WTS: eP e WIT: eP	22	17								46.5N 154.0E, H: 21 37 38.4 h 35 km. Mb 5.2 Kuril Islands region.
7.	DBN: eP eS eL F WTS: iP ePPP HEE: iP e WIT: eP epP	02	18	02 43 22.9 12 05.8 38.5 17.2 04.5 57.5 08.0		11 20	6.0 3.4				71.8N 1.8W, H: 02 13 32.7 h 33 km. Mb 5.4, Ms 5.1 4.7 Jan Mayen Island region.

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MAY 1977											
7.	WTS: ePKP HEE: ePKP	15	31	17.0 21.0							18.2S 172.4W, H: 15 11 37.2 h 33 km. Mb 5.0 Tonga Islands region.
7.	DBN: eL F WTS: iP HEE: eP	16 17	33 01	11.0 19.5	-						46.8N 153.8E, H: 15 55 16.2 h 33 km. Mb 5.0, Ms 4.3 Kuril Islands.
7.	WTS: eP	16	46	23.0							47.0N 153.7E, H: 16 34 27.0 h 16 km. Mb 5.1 Kuril Islands.
7.	WTS: ePKP epPKP	18 18	44 46	40.0 34.5							25.7S 179.9E, H: 18 25 33.4 h 450 km. Mb 5.4 South of Fiji Islands.
7.	WTS: ePKP HEE: ePKP WIT: ePKP	19 19 19	55 55 55	11.0 15.0 10.0							18.0S 172.6W, H: 19 35 32.2 h 33 km. Mb 5.0, Ms 4.5 Tonga Islands region.
8.	WTS: ePKP HEE: ePKP WIT: ePKP	04 04 04	57 57 57	14.0 18.0 12.0							19.6S 175.9W, H: 04 37 31.5 h 33 km. Mb 5.0, Ms 4.5 Tonga Islands.
8.	DBN: eP eS eL F WTS: eP HEE: eP	16 17 17 18.1 16 16	58 08 26 18.1 58 58	08 58 16.0 11.5							1.3S 81.1W, H: 16 45 16.0 h 27 km. Mb 5.1, Ms 4.9 Off coast of Ecuador.
8.	DBN: eL F	18 19	42 04								1.2S 81.1W, H: 18 00 00.0 h 42 km. Mb 5.1, Ms 4.6 Off coast of Ecuador.
8.	DBN: eL F	20 20	10 40			20			1.2		ISC: 31.1N 139.0E, H: 19 24 53.9, h 33 km, Mb 4.6. South of Honshu.
8.	DBN: eP eL F WTS: eP HEE: eP	21 21 21 21 21	12 18 27 12 12	30 33.0 43.5							71.5N 12.5W, H: 21 07 47.4 h 33 km. Mb 4.3, Ms 4.4 Jan Mayen Island region.
8.	WTS: ePn HEE: ePn iSn WIT: ePn	23 23 23 23	09 09 10 10	57.5 48.0 06.4 15.0	-						49.8N 7.4E, H: 23 09 24.1 h 33 km. Germany.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
May 1977											
9.	DBN: eL F	02 03	54 12								18.7N 62.9W, H: 02 24 59.0 h 68 km. Mb 5.0 Leeward Islands.
9.	WTS: ePKP	07	42	51.0							17.7S 178.5W, H: 07 24 15.5 h 571 km. Mb 4.8 Fiji Islands region.
9.	DBN: eL F WTS: eP HEE: eP WIT: eP	15 16 15 15 15	49 06 15 15 15								27.1N 126.8E, H: 15 02 44.6 h 109 km. Mb 5.4 East China Sea.
10.	WTS: ePKP HEE: ePKP WIT: ePKP	02 02 02	21 21 21	06.5 10.0 04.5							17.8S 178.8W, H: 02 02 29.7 h 569 km. Mb 4.9 Fiji Islands region.
10.	DBN: eL F	23 00	22 03								1.0S 127.3E, H: 22 28 31.9 h 20 km. Mb 5.6, Ms 4.9 Halmahera.
11.	WTS: ePKP	14	18	55.5	+						23.4S 180.0E, H: 14 00 03.9 h 545 km. Mb 4.6 South of Fiji Islands.
12.	DBN: eL F	02 03	38 03								46.3S 73.9W, H: 01 42 48.2 h 33 km. Mb 4.9, Ms 5.0 Near coast of southern Chile.
12.	DBN: eL F	08 09	57 24			19		2.6		5.7	13.0N 121.7E, H: 08 09 52.9 h 33 km. Mb 5.4, Ms 4.8 Mindora, Philippine Islands.
12.	DBN: eL F WTS: iP HEE: iP WIT: eP	11 in next shock 11 11 11	55 29 29 29			20 20		3.8 21.4		5.7 6.6	39.3N 117.7E, H: 11 17 53.1 h 22 km. Mb 5.8, Ms 5.4 Northeastern China.
12.	DBN: eL F WTS: eP HEE: eP	12 13 12 12	57 41 31 31			20		7.5		6.0	21.7N 93.0E, H: 12 20 00.7 h 40 km. Mb 5.4, Ms 5.7 Burma.
12.	DBN: eL F	14 15	47 15			19			4.8	5.9	16.0N 121.2E, H: 14 00 57.0 h 16 km. Mb 5.0, Ms 4.9 Luzon, Philippine Islands.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MAY 1977											
12.	WTS: iPKP HEE: iPKP WIT: ePKP	15	44	17.7	-						18.2S 177.6W, H: 15 25 46.2 h 628 km. Mb 4.8 Fiji Islands region.
12.	DBN: eL F	21	33								No determination of epicenter.
12.	WTS: iP HEE: eP e WIT: eP	21	49	00.3	+						50.2N 155.0E, H: 21 37 33.4 h 126 km. Mb 5.3 Kuril Islands.
13.	DBN: eL F	02	09								38.3N 142.0E, H: 01 26 43.0 h 50 km. Mb 4.9, Ms 3.8 Near east coast of Honshu, Japan.
13.	DBN: eL F	03	02								13.0N 121.7E, H: 02 15 55.1 h 39 km. Mb 5.2 Mindoro, Philippine Islands.
13.	DBN: iP epP iPP eZ eS eSP esS eSS F WTS: iP ePP HEE: eP WIT: eP ePP	11	25	47	-	6	3.9				28.4N 139.5E, H: 11 13 31.2 h 430 km. Mb 5.8 Bonin Islands region.
13.	DBN: eP eS eL F WTS: eP e HEE: iP	18	22	08							39.1N 23.5E, H: 18 17 46.1 h 12 km. Aegean Sea.
13.	WTS: ePKP HEE: ePKP e	20	00	50.5							22.4S 179.6W, H: 19 42 07.8 h 627 km. Mb 4.8 South of Fiji Islands.



SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MAY 1977											
14.	WTS: eP eL HEE: ePP eL	03 03 03 03	41 45 42 44.5	57.0							43.1N 16.0E, H: 03 39 22.1 h 47 km. Mb 4.7 Yugoslavia.
14.	DBN: eP ePP eS ePS eSS eSSS eL F WTS: eP	06 06 06 06 06 06 06 06 06 06	17 20 28 29 34 37 45	38 56 14 30 14 16		20	2.3			5.6	1.5N 85.3W, H: 06 04 39.7 h 33 km. Mb 5.2, Ms 5.7 Off coast of Ecuador.
14.	DBN: eL F	07 08.7	40								1.6N 85.3W, H: 06 58 49.9 h 33 km. Mb 5.1, Ms 5.5 Off coast of Ecuador.
14.	DBN: eL F	17 17	13 26								18.6N 120.3E, H: 16 23 01.2 h 36 km. Mb 4.4 Luzon, Philippine Islands.
14.	DBN: eL F	21 22	54 29								38.7N 40.0E, H: 21 43 38.1 h 10 km. Mb 4.7 Turkey.
15.	WTS: eP HEE: eP e WIT: eP	00 00 00 00	32 32 32 32	16.5 25.0 28.0 13.0							50.0N 152.9E, H: 00 20 59.6 h 221 km. Mb 5.0 Northwest of Kuril Islands.
15.	DBN: eP eL F WTS: eP HEE: eP WIT: eP	16 16 17 16 16 16	02 28 19	31 31.5 38.0 27.5							52.4N 168.0W, H: 15 50 47.1 h 33 km. Mb 5.3 Ms 4.7 Fox Islands, Aleutian Islands.
15.	WTS: eP	22	05	04.5							6.2N 77.5W, H: 21 52 43.9 h 9 km. Mb 4.9, Ms 3.6 Near west coast of Colombia.
15.	DBN: ePKP epPKP WTS: ePKP i epPKP HEE: ePKP i ePKP2 epPKP WIT: ePKP	23 23 23 23 23 23 23 23 23 23 23	31 33 31 31 33 31 31 31 33 31 31	41 38 38.5 41.2 37.5 40.0 44.2 48.0 41.0 39.0		5	1.5				19.1S 177.7W, H: 23 12 53.6 h 499 km. Mb 5.5 Fiji Islands region.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MAY 1977											
16.	WTS: eP	08	20	49.5							35.4N 26.5E, H: 08 16 00.6 h 47 km. Mb 4.3 Crete.
16.	DBN: ePKP	11	33	55							17.4S 167.9E, H: 11 14 30.7 h 30 km. Mb 5.1, Ms 5.3 New Hebrides Islands.
	epPKP	11	34	09							
	ePP	11	37	22							
	eL	12	26								
	F	13	19								
	HEE: ePKP	11	34	02.0							
16.	DBN: eL	16	25								16.9N 100.0W, H: 15 47 55.4 h 33 km. Mb 4.4 Near coast of Guerrero, Mexico.
	F	16	36								
16.	DBN: eL	16	38								No determination of epicenter Probably Iceland region.
	F	in next shock									
16.	DBN: eP	16	52	07		8	2.1				63.9N 22.4W, H: 16 47 48.6 h 10 km. Mb 4.6, Ms 4.8
	eS	16	55	29							4.7 Iceland region.
	eL	16	56.5			20	3.8				
	F	17	23								
17.	WTS: eP	14	27	39.0							7.4N 78.0W, H: 14 15 21.9 h 8 km. Mb 5.1, Ms 4.5 Panama.
	HEE: eP	14	27	36.5							
18.	DBN: eL	04	39								55.7N 160.8E, H: 03 57 13.4 h 158 km. Mb 5.1 Kamchatka.
	F	05	03								
	WTS: iP	04	08	12.7	+						
	HEE: eP	04	08	20.0							
	WIT: eP	04	08	08.5							
18.	WTS: ePKP	07	02	31.0							19.0S 169.2E, H: 06 43 21.1 h 217 km. Mb 5.2 New Hebrides Islands.
	HEE: ePKP	07	02	35.0							
	epPKP	07	03	28.0							
	e	07	03	40.5							
19.	WTS: iP	00	15	44.5	+						29.8N 51.2E, H: 00 08 15.5 h 40 km. Mb 4.9 Southern Iran.
	HEE: eP	00	15	49.0							
	WIT: eP	00	15	46.5							
19.	DBN: eL	18	01								60.4S 26.6W, H: 17 02 53.0 h 33 km. Mb 5.2 South Sandwich Islands region.
	F	18	20								
19.	DBN: eL	18	29								60.6S 26.7W, H: 17 35 15.0 h 33 km. Mb 5.1 South Sandwich Islands region.
	F	18	54								

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MAY 1977											
19.	DBN: eL F	23	17	00.0							27.1N 55.3E, H: 22 58 30.8 h 30 km. Mb 5.2 Southern Iran.
	WTS: iP	23	06	37.0	+						
	HEE: iP	23	06	38.8	+						
	e	23	07	00.0							
	WIT: eP	23	06	38.5							
19.	WTS: iP	23	12	58.9	+						27.1N 55.3 E, H: 23 04 53.6 h 35 km. Mb 5.3 Southern Iran.
	HEE: iP	23	13	00.2	+						
	WIT: eP	23	13	00.5							
20.	WTS: iP	14	30	39.4	-						20.4S 177.7W, H: 14 11 52.3 h 533 km. Mb 5.0 Fiji Islands region.
	HEE: ePKP	14	30	43.0							
	WIT: ePKP	14	30	38.0							
20.	WTS: ePKP	21	24	39.5							23.9S 176.6W, H: 21 04 58.0 h 48 km. Mb 5.6, Ms 4.5 South of Fiji Islands.
	epPKP	21	24	48.5							
	HEE: epPKP	21	24	52.0							
	e	21	25	02.5							
	WIT: epPKP	21	24	48.0							
20.	DBN: eL F	23	48	00.4							4.4S 102.0E, H: 22 51 13.9 h 37 km. Mb 5.7, Ms 5.3 Southern Sumatra.
21.	DBN: eL F	01	03	01.8							10.2S 160.6E, H: 23 56 27.6 h 33 km. Mb 5.4, Ms 5.7 Solomon Islands.
21.	DBN: eP	05	48	15							15.7N 120.8E, H: 05 35 22.5 h 189 km. Mb 5.7 Luzon, Philippine Islands.
	epP	05	49	00							
	ePP	05	51	55							
	eSKS	05	58	31							
	eSP	06	00	14							
	eSS	06	05	22							
	eSKKS	06	12	32							
	eL	06	20								
	F	07.0									
	WTS: iP	05	48	10.0	-						
	e	05	51	51.0							
	HEE: eP	05	48	15.0							
	WIT: eP	05	48	10.5							
21.	WTS: iP	13	53	20.7	+						27.9N 140.0E, H: 13 40 55.0 h 340 km. Mb 5.1 Bonin Islands region.
	ePP	13	57	00.0							
	HEE: eP	13	53	26.0							
22.	WTS: ePKP	23	46	07.0							19.5S 177.3W, H: 23 27 03.8 h 350 km. Mb 5.2 Fiji Islands region.
	epPKP	23	47	27.0							

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MAY 1977											
23.	DBN: eL F	18	14								47.9S 99.4E, H: 17 07 42.4 h 33 km. Mb 5.0 Southeast Indian Rise.
23.	DBN: eL F WTS: iP epP HEE: eP epP WIT: eP	22	45								0.7N 98.7E, H: 21 55 54.1 h 40 km. Mb 5.5, Ms 4.7 Northern Sumatra.
24.	DBN: eL F	06	08								16.7N 122.4E, H: 05 20 26.8 h 33 km. Mb 4.9 Luzon, Philippine Islands.
24.	DBN: eL F WTS: eP ePP	08	32								25.5N 142.5E, H: 07 46 13.5 h 9 km. Mb 5.7, Ms 5.3 Volcano Islands region.
24.	DBN: eP ePP eZ eL F	10	37	41		7	1.1				18.8N 145.4E, H: 10 23 23.4 h 207 km. Mb 5.7 Mariana Islands.
24.	WTS: eP HEE: eP	12	51	32.5							27.1N 55.5E, H: 12 43 28.7 h 45 km. Mb 4.8 Southern Iran.
24.	WTS: eP HEE: eP	13	07	18.0							27.1N 55.5E, H: 12 59 09.3 h 27 km. Mb 4.7 Southern Iran.
24.	DBN: eL F	18	15								No determination of epicenter.
25.	DBN: eL F	02	57								No determination of epicenter.
25.	DBN: eL F	06	26								18.5N 120.4E, H: 05 40 58.6 h 57 km. Mb 4.5 Luzon, Philippine Islands.
25.	DBN: eL F	06	57								17.0S 177.1W, H: 05 49 46.6 h 42 km. Mb 4.7, Ms 5.0 Fiji Islands region.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MAY 1977											
25.	DBN: eL F	11	17								34.9N 52.1E, H: 11 01 45.5 h 26 km. Mb 5.4, Ms 4.3 Iran.
	WTS: eP	11	08	50.4	+						
	HEE: eP	11	08	53.5							
	WIT: eP	11	08	51.5							
25.	WTS: ePKP	12	28	33.5							17.9S 178.6W, H: 12 10 01.2 h 578 km. Mb 5.4 Fiji Islands region.
	ePKP2	12	28	37.5							
	HEE: ePKP	12	28	38.0							
	ePKP2	12	28	41.5							
	WIT: ePKP2	12	28	36.5							
25.	DBN: eP	15	08	28		7	1.7				4.2N 95.8E, H: 14 55 45.0 h 56 km. Mb 5.9 Northern Sumatra.
	ePP	15	11	52							
	eH	15	18	50							
	eS	15	19	00							
	eSP	15	19	48							
	eSS	15	24	42							
	eL	15	35								
	F	17.9									
	WTS: iP	15	08	21.6	+						
	epP	15	08	37.0							
	HEE: eP	15	08	25.0							
	WIT: eP	15	08	21.5							
	epP	15	08	37.0							
25.	WTS: eP	17	12	02.5							37.1N 116.0W, H: 17 00 00.1 h 0 km. Mb 5.3 Southern Nevada.
	HEE: eP	17	12	05.5							
	WIT: eP	17	12	00.0							
25.	WTS: eP	21	14	22.5							29.3N 53.4E, H: 21 06 38.3 h 22 km. Mb 4.8 Southern Iran.
	HEE: eP	21	14	25.0							
25.	DBN: eL	21	53								No determination of epicenter.
	F	22.1									
26.	DBN: eS	01	46	13							38.9N 44.4E, H: 01 35 13.8 h 37 km. Mb 5.2, Ms 5.4 Turkey-Iran border region.
	eSS	01	47.8			18	8.4		5.4		
	eL	01	50								
	F	03.1									
	WTS: eP	01	41	12.0							
	e	01	41	14.0							
	HEE: e(P)	01	41	17.0							
26.	DBN: eL	04	02								No determination of epicenter.
	F	04	07								

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MAY 1977											
26.	DBN: eP ePP eS eSP eL F	06 06 06 06 06 07	32 36 43 44 59 43	41 14 30 28		9   19	1.8   1.0			5.3	1.9S 81.2W, H: 06 19 40.8 h 10 km. Mb 5.0, Ms 5.1 Off coast of Ecuador.
27.	WTS: eP	02	40	47.0							37.6N 72.2E, H: 02 32 25.9 h 123 km. Mb 4.9 Tadzhik SSR.
27.	WTS: eP epP HEE: eP	22 22 22	36 37 36	37.0 18.5 35.5							35.2N 26.5E, H: 22 31 49.1 h 68 km. Mb 4.7 Crete.
27.	DBN: eL F WTS: ePKP	23 00.9 23	59	  17 26.5							9.4S 159.0E, H: 22 58 13.3 h 33 km. Mb 5.3, Ms 4.9 Solomon Islands.
28.	DBN: eL F	03 04	34 17			18	1.4			5.5	6.3N 124.0E, H: 02 41 32.9 h 48 km. Mb 5.1, Ms 4.5 Mindanao, Philippine Islands.
28.	DBN: eP ePP eS eSP eSS eL F WTS: eP e e HEE: ePP e	06 06 06 06 06 06 09.0 06 06 06 06 06 06	06 10 18 19 25 40	14 32 00 30 08							1.7S 120.5E, H: 05 51 48.1 h 54 km. Mb 5.9, Ms 5.8 Sulawesi.
28.	DBN: ePKP eL F WTS: ePKP	15 16 17 15	30 30 21 30	08		20	1.3			5.8	64.9S 175.7E, H: 15 10 13.0 h 33 km. Mb 5.7, Ms 5.4 Balleny Islands region.
29.	DBN: eP eS eL F WTS: eP	02 02 02 03 02	31 39 48 24 31	23 00  14.0							23.4N 64.6E, H: 02 22 03.8 h 33 km. Mb 4.9, Ms 4.5 Near coast of Pakistan.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
MAY 1977											
29.	DBN: eL F	03	25								49.9N 78.8E, H: 02 56 57.8 h 0 km. Mb 5.6, Ms 5.0 Eastern Kazakh SSR.
	WTS: iP ePcP	03	05	06.0	+						
	HEE: iP ePcP	03	05	14.1	+						
	ePP	03	06	56.0							
	WIT: iP ePcP	03	07	05.0							
		03	05	03.6	+						
		03	06	42.5							
29.	DBN: eL F	04	37								34.7S 179.1W, H: 03 20 28.2 h 33 km. Mb 5.5, Ms 5.1 South of Kermadec Islands.
29.	DBN: eL F	16	50								40.5N 29.5W, H: 16 37 20.5 h 12 km. Mb 4.7, Ms 4.6 Azores Islands region.
	WTS: eP	17	03								
	HEE: eP	16	43	07.0							
		16	43	00.5							
30.	DBN: eP eS eSS eSSS eL F	15	27	48		10	3.4				52.4N 169.7W, H: 15 16 01.6 h 33 km. Mb 5.6, Ms 6.0 Fox Islands, Aleutian. Islands.
	WTS: eP e	15	37	37							
	HEE: eP	15	42	34							
	WIT: eP	15	45	46.		19	4.8			5.8	
		15	51								
		18.3									
	WTS: eP	15	27	46.0							
		15	28	32.0							
	HEE: eP	15	27	53.0							
	WIT: eP	15	27	42.0							
31.	WTS: ePKP	15	07	07.0							11.8S 166.5E, H: 14 47 59.1 h 138 km. Mb 5.6 Santa Cruz Islands.
31.	DBN: eL F	20	09								37.9S 177.3E, H: 18 51 07.1 h 125 km. Mb 5.2 Off east coast of north Island, New Zealand.
		20.8									

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JUNE 1977											
1.	DBN:ePKP eL F WTS:ePKP i e	09 10 11.2 09 09 09	17 19  17 17 17	20   18.0 24.0 33.0	   +  						21.2S 174.4W, H: 08 57 30.9 h 33 km. Mb 5.2, Ms 5.2 Tonga Islands.
1.	DBN:iP ePcP eS eL F WTS:iP i i HEE:eP e WIT:eP epP e	13 13 13 13 14 12 12 13 12 13 12 13 13	00 03 04 06.0 00 59 59 07 59 07 59 00 07	02 48 28   53.3 53.8 10.8 53.0 11.5 59.0 14.0 13.0	-     - - - -  -  	4   22        	2.3            				36.2N, 31.3E, H: 12 54 49.2 h 67 km. Mb 5.7 Turkey.
1.	DBN:eL F	23 23.7	12								13.8N 122.2E, H: 22 23 38.1 h 46 km. Mb 4.8 Luzon, Philippine Islands.
2.	WTS:iPn iPg HEE:ePn eP* ePg WIT:ePg e	13 13 13 13 13 13 13	32 33 33 33 32 32	52.8 00.6 07.0 15.5 23.5 50.5 59.0	+ -     						53.1N 9.6E, H: 13 32 14.8 h 0 km. Germany.
2.	DBN:eP eS eL F WTS:eP e HEE:eP e WIT:eP	14 15 15 15.9 14 14 14 14 14	59 03 04.9  59 59 59 59	38 26 04.9  44.0 56.0 36.5 48.0 37.0	-    - - -  	18	15.2	13.6	5.2		63.7N 19.0W, H: 14 55 31.9 h 10 km. Mb 4.9, Ms 5.0 Iceland.
2.	DBN:eL F	17 17	35.9 40								35.2N 27.7E, H: 17 20 19.5 h 33 km. Mb 4.3 Dodecanese Islands.



SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JUNE 1977											
2.	DBN:eL F WTS:eP e HEE:eP e	19 19 19 19 19	47 58 42 42 42	  18.5 25.5 18.0 25.0							54.2N 35.2W, H: 19 36 56.4 h 33 km. Mb 4.4, Ms 4.2 North Atlantic Ocean.
3.	DBN:eL F WTS:eP e e HEE:eP e	01 02.4 01 01 01 01 01	29  13 14 14 13 15	  41.5 07.5 43.5 52 39.5		20		6.8	5.6		39.9N 71.8E, H: 01 05 23.7 h 24 km. Mb 5.1, Ms 5.0 Tadzhik SSR.
3.	WTS:eP	02	33	08.5	+						52.1N 159.1E, H: 02 21 36.8 h 33 km. Mb 4.7 Off east coast of Kamchatka.
3.	DBN:iP ipP ePP iS esS F WTS:iP epP ePP HEE:iP ePP WIT:eP	02 02 02 02 02 03.9 02 02 02 02 02 02	39 40 41 46 47  39 40 41 39 41 39	23 08 18 04 21  15.3 00.0 09.0 20.7 16.0 15.0	+	5	4.2				36.4N 70.8E, H: 02 31 04.7 h 210 km. Mb 5.5 Hindu Kush region.
3.	WTS:iPKP i HEE:ePKP e WIT:ePKP	14 14 14 14	51 51 51 51	46.1 49.4 49.5 54.0 44.0	- -						18.9S 177.6W, H: 14 33 07.0 h 573 km. Mb 5.3 Fiji Islands region.
3.	DBN:eL F WTS:ePKP	16 17.4 15	27  36	  49.0							14.1S 166.6E, H: 15 17 25.1 h 38 km. Mb 5.4, Ms 5.4 New Hebrides Islands.
4.	DBN:eL F WTS:eP	15 15 15	28 49 10	  08.5							56.3N 111.6E, H: 15 00 33.4 h 33 km. Mb 4.9, Ms 4.2 Lake Baikal region.
5.	DBN:eP ePP eSKS ePS eL F	02 03 03 03 03 04.7	59 03 10 12 33  04.7	46 52 24 52   20					2.1	5.6	23.9S 70.2W, H: 02 46 05.9 h 32 km. Mb 5.6, Ms 5.4 Near coast of northern Chile.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JUNE 1977											
5.	DBN:iP ePP eS eL F WTS:iP HEE:eP WIT:eP	04 04 04 05 06.7 04 04 04	52 53 57 01.5  52 52 52	12 35 53   03.5 05.0 06.5	+     + + +	9	7.2				32.6N 48.1E, H: 04 45 07.6 h 40 km. Mb 5.5, Ms 5.8 Western Iran.
5.	WTS:iP HEE:eP	05 05	06 06	08.6 10.0	+ +						32.7N 47.9E, H: 04 59 15.5 h 58 km. Mb 4.9 Iran-Iraq border region.
5.	WTS:eP	06	05	48.0							32.4N 48.0E, H: 05 58 51.3 h 33 km. Mb 4.6 Western Iran.
5.	WTS:eP	06	34	32.0							32.5N 48.3E, H: 06 27 33.6 h 33 km. Mb 4.7 Western Iran.
5.	WTS:eP	07	55	35.0							32.4N 48.1E, H: 07 48 38.2 h 33 km. Mb 4.7 Western Iran.
5.	DBN:eP eL F WTS:iP e HEE:eP WIT:eP	08 08 09.0 08 08 08 08	32 47  32 32 32 32	40   28.2 48.0 30.0 37.5	   +  +						32.6N 48.2E, H: 08 25 30.8 h 33 km. Mb 5.1 Western Iran.
5.	WTS:eP	08	52	07.0							32.7N 47.9E, H: 08 45 13.0 h 54 km. Mb 4.6 Iran-Iraq border region.
5.	DBN:eL F WTS:iP HEE:eP WIT:eP	14 14 14 14 14	09 17 03 02 03	  05.0 56.5 14	  -  						37.9N 14.5E, H: 13 59 21.7 h 8 km. Mb 4.9 Sicily.
6.	DBN:eL F	00 00	31 37								60.2S 47.3W, H: 23 26 10.2 h 33 km. Mb 5.3, Ms 5.2 Scotia Sea.
6.	DBN:eL F	02 in next shock	06								55.1S 29.0W, H: 01 14 24.1 h 33 km. Mb 5.3 South Sandwich Islands region.
6.	DBN:eL F	02 03	22 19								55.2S 28.9W, H: 01 29 59.3 h 33 km. Mb 5.3, Ms 5.0 South Sandwich Islands region.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JUNE 1977											
6.	DBN:eL F	03	34								55.2S 28.9W, H: 02 39 20.7 h 33 km. Mb 5.1 South Sandwich Islands region.
6.	DBN:eL F	04	43								37.1N 21.7E, H: 04 32 57.2 h 33 km. Mb 4.2 Southern Greece.
6.	DBN:eL F	07	10								19.4N 69.5W, H: 06 38 46.1 h 49 km. Mb 4.9, Ms 4.2 Dominican Republic region.
6.	DBN:eL F	10	57.5								37.8N 1.8W, H: 10 49 12.7 h 33 km. Mb 4.2, Ms 3.8 Spain.
6.	WTS:ePKP epPKP HEE:ePKP	13	05	27.0							19.2S 175.6W, H: 12 46 11.8 h 253 km. Mb 5.1 Tonga Islands.
6.	WTS:eP	18	47	18.0							29.7N 51.1E, H: 18 39 47.4 h 30 km. Mb 4.9 Southern Iran.
6.	WTS:ePKP HEE:ePKP WIT:ePKP	20	10	32.0	+						18.0S 178.4W, H: 19 51 59.3 h 609 km. Mb 4.8 Fiji Islands region.
8.	WTS:iPKP HEE:iPKP WIT:ePKP	14	25	04.2	-						22.1S 177.0W, H: 14 05 39.3 h 226 km. Mb 5.2 South of Fiji Islands.
8.	DBN:eL F WTS:iP ipP HEE:eP WIT:eP epP	15	08								38.5N 141.5E, H: 14 25 46.5 h 78 km. Mb 5.5 Near east coast of Honshu, Japan.
8.	WTS:ePP	21	35	23.0							5.9S 113.1E, H: 21 18 03.2 h 636 km. Mb 5.4 Java Sea.
9.	DBN:eL F WTS:eP	17	17								25.1S 13.6W, H: 16 39 46.2 h 33 km. Mb 5.0 South Atlantic Ridge.
10.	DBN:eL F	01	20								39.6N 117.9E, H: 00 41 00.0 h 46 km. Mb 5.1 Northeastern China.
10.	DBN:eL F	03	25								3.1S 101.5E, H: 02 35 14.0 h 33 km. Mb 5.4, Ms 5.2 Southern Sumatra.

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JUNE 1977											
10.	WTS:ePKP HEE:ePKP WIT:ePKP	03	42	48.0 52.0 46.0							18.2S 178.0W, H: 03 24 05.4 h 532 km. Mb 5.1 Fiji Islands region.
10.	DBN:eL F	23	14.8 20								35.1N 22.8E, H: 23 02 32.3 h 33 km. Mb 4.2 Mediterranean Sea.
11.	DBN:eL F	00	41 19								3.2S 130.5E, H: 23 43 31.9 h 39 km. Mb 5.3, Ms 4.6 Ceram.
11.	DBN:eL F WTS:eP	20	50 07 40	42.5							33.9N 39.0W, H: 20 33 30.7 h 33 km. Mb 4.8, Ms 4.5 North Atlantic Ridge.
12.	WTS:eP HEE:eP	08	59	36.0 42.5	+						42.4N 142.1E, H: 08 47 46.2 h 108 km. Mb 5.1 Hokkaido, Japan region.
12.	WTS:iPKP e HEE:iPKP e e	12	36	14.7 27.0 19.3 31.0 45.5	+						19.8S 169.1E, H: 12 16 49.2 h 106 km. Mb 5.0 New Hebrides Islands.
12.	WTS:ePKP HEE:ePKP	15	33	43.0 47.0							18.0S 178.7W, H: 15 15 06.9 h 574 km. Mb 4.5 Fiji Islands region.
12.	WTS:ePKP e	19	33	30.0 48.5							23.0S 176.2W, H: 19 13 49.2 h 123 km. Mb 4.7 South of Fiji Islands.
13.	DBN:ePKP i eL F WTS:ePKP HEE:ePKP WIT:ePKP	10	28	20 26 22 50 26.0 28.0 24.5	+	5 20	3.8	2.1	5.9		18.5S 174.1W, H: 10 08 48.0 h 41 km. Mb 5.5, Ms 5.3 Tonga Islands.
13.	DBN:eL F	12	34 18								13.3N 124.6E, H: 11 47 41.4 h 35 km. Mb 5.6, Ms 5.3 Luzon, Philippine Islands.
13.	WTS:iP	13	49	13.0	+						36.4N 71.3E, H: 13 40 50.3 h 121 km. Mb 5.0 Afghanistan-USSR border region
13.	WTS:e(Pn) e e(L) HEE:e(L) WIT:e(L)	14	46	14.5 22.0 36.5 48.5 55							ISC: 50.7N 8.9E, H: 14 45 45.1 h 33 km Germany.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JUNE 1977	14.	HEE:ePKP	02	20	30.5	+					15.8S 173.9W, H: 02 00 58.1 h 47 km. Mb 5.0, Ms 5.0 Tonga Islands.
	e	02	20	40.0							
	14.	DBN:eL	08	48							11.0N 126.0E, H: 07 51 21.4 h 49 km. Mb 5.1, Ms 4.5 Philippine Islands region.
	F	09	11								
	14.	WTS:iPKP	08	56	25.4	-					18.0S 175.1W, H: 08 37 09.8 h 223 km. Mb 5.0 Tonga Islands.
	HEE:ePKP	08	56	29.0	-						
	WIT:iPKP	08	56	23.9	+						
	14.	DBN:eL	19	20							No determination of epicenter
	F	20	06								
	14.	WTS:eP	21	01	02						33.9N 25.6E, H: 20 56 03.1 h 33 km. Eastern Mediterranean Sea.
	HEE:eP	21	01	01							
	14.	DBN:eP	21	50	35	-					14.1S 14.4W, H: 21 39 35.2 h 33 km. Mb 6.0, Ms 5.4 South Atlantic Ridge.
	eS	21	59	36							
	eSS	22	03	54							
	eL	22	09								
	F	23.3									
	WTS:eP	21	50	34.5							
	i	21	50	35.9	+						
	i	21	50	41.7	+						
	ePP	21	53	06.0							
	HEE:eP	21	50	27.5							
	e	21	50	29.0	+						
	e	21	50	35.0	-						
	e	21	52	52							
	WIT:eP	21	50	41.0							
	e	21	50	46.0							
	ePP	21	53	12							
	15.	DBN:eP	00	03	14						16.5N 46.6W, H: 23 53 49.9 h 33 km. Mb 5.3 North Atlantic Ridge.
	eS	00	10	52							
	eL	00	16								
	F	01	06								
	WTS:eP	00	03	19.5							
	HEE:eP	00	03	13.0							
	e	00	03	14.5	+						
	WIT:eP	00	03	21.0							
	15.	WTS:eP	00	20	51.0						14.1S 14.4W, H: 00 09 49.0 h 33 km. Mb 4.9 South Atlantic Ridge.
	16.	HEE:ePKP	04	37	09.5						15.2S 172.8W, H: 04 17 35.7 h 33 km. Mb 5.0, Ms 5.1 Samoa Islands region.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JUNE 1977	17.	DBN:ePKP	02	47	40	-					19.9S 179.1W, H: 02 29 09.8 h 690 km. Mb 5.7 Fiji Islands region.
		epPKP	02	50	13						
		F	03.6								
		WTS:iPKP	02	47	36.2	-					
		i	02	47	40.4	-					
		epPKP	02	50	12.5						
		HEE:ePKP	02	47	39.0	-					
		i	02	47	44.1	-					
		i	02	47	50.7	+					
		epPKP	02	50	16						
		WIT:ePKP	02	47	36.0	+					
		i	02	47	39.0	-					
		epPKP	02	50	11.5						
	17.	WTS:iPP	15	02	53.8						
17.	WTS:iPKP	21	00	01.4	-					21.0S 178.7W, H: 20 41 20.5 h 608 km. Fiji Islands region.	
	e	21	00	06.5							
	HEE:iPKP	21	00	05.0	-						
	e	21	00	13.0	+						
18.	HEE:ePKP	00	09	35.0	-					15.5S 174.4W, H: 23 50 06.6 h 55 km. Mb 5.1 Tonga Islands.	
18.	WTS:ePKP	02	08	14.0						15.3S 166.1E, H: 01 48 48.0 h 37 km. Mb 5.4, Ms 4.8 New Hebrides Islands.	
	HEE:ePKP	02	08	16.0							
18.	DBN:eL	05	13							14.1S 14.3W, H: 04 40 10.2 h 33 km. Mb 4.5 South Atlantic Ridge.	
	F	05	24								
18.	WTS:ePKP	10	22	47.5						20.3S 178.0W, H: 10 04 08.3 h 567 km. Mb 5.0 Fiji Islands region.	
	i	10	22	51.7	-						
	i	10	22	56.2							
	HEE:iPKP	10	22	55.0	-						
	i	10	23	01.5							
	WIT:ePKP	10	22	50.0	-						
18.	WTS:eL	11	57	19						46.2N 13.1E, H: 11 54 15.8 h 33 km. Mb 4.7 Northern Italy.	
18	DBN:eL	14	47							42.0N 44.0E, H: 14 32 31.2 h 33 km. Mb 4.5 Western Caucasus.	
	F	14	57								
	WTS:eP	14	38	16.5	+						
	HEE:eP	14	38	25.5							

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JUNE 1977											
18.	DBN:ePP iS eSP eL F WTS:eP HEE:eP WIT:eP	17 17 17 17 18 17 17 17	06 13 15 38 10 03 02 03	52 26 26   01.0 57.5 03.0							20.9S 68.5W, H: 16 49 40.9 h 131 km. Mb 5.4 Chile-Bolivia border region.
18.	WTS:eP e	18 18	51 51	16.5 22.0	+						13.8S 14.2W, H: 18 40 18.9 h 33 km. Mb 4.7 South Atlantic Ridge.
18.	DBN:eL F WTS:eP	21 21 20	12 28 49	  45.5	+						13.7S 14.6W, H: 20 38 46.6 h 33 km. Mb 5.5 South Atlantic Ridge.
18.	DBN:eL F	21 21	39 56								14.5N 92.9W, H: 20 56 20.8 h 33 km. Mb 5.1, Ms 4.3 Near coast of Chiapas, Mexico.
18.	DBN:ePKP ePP eSKP iH eL F WTS:ePKP ePP HEE:ePKP	22 22 22 22 22 00 22 22 22	30 32 33 34 09 56 30 32 30	10 38 36 28   07.0 30 12.5		20			2.0	5.8	9.8S 159.7E, H: 22 10 49.6 h 11 km. Mb 5.6, Ms 5.7 Solomon Islands.
18.	WTS:ePKP WIT:ePKP	22 22	52 52	49.0 47.5	-						24.2S 179.1E, H: 22 33 56.0 h 543 km. Mb 5.2 South of Fiji Islands.
19.	WTS:ePKP HEE:ePKP i e	07 07 07 07	41 41 41 45	47.0 50.0 54.0 48.5	- - -						16.3S 172.1W, H: 07 22 13.2 h 33 km. Mb 4.7 Samoa Islands region.
19.	WTS:e(PKP) HEE:e(PKP)	07 07	50 50	05.0 08.0							4.7N 124.9E, H: 07 32 13.8 h 271 km. Mb 5.7 Celebes Sea.
19.	DBN:iP eS eL F WTS:iP HEE:iP i epP WIT:eP e epP	11 12 12 13 11 11 11 11 11 11 11	59 08 29 00 58 59 59 59 58 59 59	00 36   58.5 05.7 10.0 45 54.5 00.5 36	- - - - - - - - - - -	5	2.2				47.2N 151.1E, H: 11 47 23.4 h 149 km. Mb 5.6 Kuril Islands.

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JUNE 1977											
19.	DBN:eL F WTS:eP HEE:eP	18 18 18 18	40 53 27 27	  15.5 09.0	   +						15.5N 46.7W, H: 18 17 39.2 h 33 km. Mb 5.3, Ms 4.6 North Atlantic Ridge.
20.	DBN:ePKP i eL F WTS:ePKP i HEE:ePKP i i WIT:ePKP	20 20 21 22 20 20 20 20 20 20	27 28 21 18 27 27 27 27 27 27	46 08   45.0 46.8 48.5 50.3 59.4 42.5	 -   - + - + - -						22.7S 170.6E, H: 20 08 02.1 h 45 km. Mb 5.2, Ms 5.0 Loyalty Islands region.
21.	WTS:ePKP HEE:ePKP	09 09	17 17	18.5 23.0							15.7S 174.8W, H: 08 58 21.1 h 306 km. Mb 4.7 Tonga Islands.
21.	DBN:e F	12 12	16 17.3	52							Local shock.
21.	WTS:ePKP e HEE:ePKP e WIT:ePKP e	19 19 19 19 19 19	10 10 10 10 10 10	33.0 43.0 36.5 46.5 31.5 41.0	 +    						22.0S 170.1E, H: 18 50 50.9 h 22 km. Mb 5.0 Loyalty Islands region.
21.	DBN:eL F WTS:iP ePP HEE:eP	19 19 19 19 19	26 33 18 19 18	  27.2 11.5 26.0	  -  						35.6N 29.6E, H: 19 13 26.1 h 46 km. Mb 4.7 Eastern Mediterranean Sea.
22.	DBN:eL F	07 08	56 12								35.5N 140.4E, H: 07 11 27.5 h 35 km. Mb 5.1, Ms 4.5 Near east coast of Honshu, Japan.



SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JUNE 1977											
22.	DBN:ePdif. iPKP iZ iPKS eH ePPS eSS eSSS eL F	12 12 12 12 12 12 12 12 13 20.0	26 28 28 32 41 45 51 57.5 21	02 14 16 08 02 06 16	- - - - - - - - - -	4	65				22.9S 175.9W, H: 12 08 33.4 h 65 km. Mb 6.8 Tonga Islands region.
22.	WTS:iPKP iSKP i HEE:iPKP i WIT:iPKP i	12 12 12 12 12 12 12	28 32 33 28 33 28 28	14.0 09.0 25 16.0 20.0 12.8 18.3	- - - - - - -						
22.	WTS:eP	16	02	38.0							33.1N 76.0E, H: 15 53 27.6 h 36 km. Mb 4.8 Kashmir-India border region.
22.	DBN:eL F	20 20	11 29								3.5S 145.5E, H: 19 08 37.8 h 33 km. Mb 5.0 Near north coast of Papua New Guinea.
23.	WTS:ePKP HEE:ePKP	02 02	13 13	55.0 59.0							20.1S 179.2W, H: 01 55 19.9 h 675 km. Mb 4.9 Fiji Islands region.
23.	WTS:ePKP e	09 09	53 53	45.0 51.0	+ +						22.3S 175.9W, H: 09 34 06.9 h 128 km. Mb 4.6 Tonga Islands region.
23.	WTS:ePKP HEE:ePKP e	18 18 18	21 21 21	10 13.5 22.0							22.8S 176.1W, H: 18 01 27.5 h 98 km. Mb 4.8 South of Fiji Islands.
24.	DBN:ePKP ePP eL F WTS:ePKP i HEE:ePKP i i WIT:ePKP	00 00 01 02 00 00 00 00 00 00	50 54 41 41 50 50 50 50 50 50	13 00   06.0 11.4 08.0 14.5 24.1 09.5	    + + + +						22.9S 175.9W, H: 00 30 20.9 h 33 km. Mb 5.5, Ms 5.1 Tonga Islands region.
24.	DBN:eL F	13 13	28 36								39.5N 73.0E, H: 13 00 55.1 h 43 km. Mb 4.9 Tadzhik-Sinkiang border region

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JUNE 1977											
25.	WTS:eP	00	44	27.5							32.7N 48.0E, H: 00 37 33.6 h 62 km. Mb 4.4 Western Iran.
25.	DBN:eL	07	42								No determination of epicenter.
	F	07	54								
25.	WTS:ePKP	15	43	14.0	+						21.3S 179.2W, H: 15 24 42.9
	i	15	43	22.0	-						h 633 km. Mb 5.4
	epPKP	15	45	45.0	+						Fiji Islands region.
	e	15	45	47.5							
	HEE:ePKP	15	43	25.0	-						
	e	15	43	33.5	+						
	epPKP	15	45	52.0							
	e	15	46	21.0							
	WIT:ePKP	15	43	20.0	-						
	epPKP	15	45	45.0							
25.	DBN:eL	19	26								32.3N 139.6E, H: 18 38 22.0
	F	19	45								h 34 km. Mb 5.1, Ms 4.3 South of Honshu, Japan.
25.	DBN:eL	19	51								42.0N 126.7W, H: 19 09 26.0
	F	20	00								h 18 km. Mb 4.7, Ms 4.0 Off coast of Oregon.
25.	DBN:eL	22	32								42.0N 89.8E, H: 22 02 11.5
	F	22	40								h 26 km. Mb 4.9, Ms 3.6
	WTS:eP	22	11	45.0							Northern Sinkiang Prov.,
	HEE:eP	22	11	47.5							China.
	e	22	11	52.5							
26.	DBN:eL	00	54								45.5N 150.7E, H: 00 10 58.2
	F	01	15								h 47 km. Mb 5.2, Ms 4.6
	WTS:iP	00	22	53.3	+						Kuril Islands.
	HEE:eP	00	23	04.0							
	WIT:eP	00	22	49.5	+						
26.	WTS:eP	02	33	37.5	+						27.5N 56.1E, H: 02 25 29.4
	HEE:eP	02	33	40.0	-						h 39 km. Mb 4.8 Southern Iran.
26.	WTS:ePKP	04	27	44.0							22.4S 175.7W, H: 04 07 53.4
	HEE:ePKP	04	27	51.5							h 33 km. Mb 4.7 Tonga Islands region.
26.	WTS:ePKP	05	54	38.5	+						21.2S 174.7W, H: 05 34 51.5
	e	05	54	43.5	-						h 33 km. Mb 4.8
	HEE:ePKP	05	54	42.0							Tonga Islands.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JUNE 1977	26.	DBN:eL	07	15							22.7S 175.5W, H: 05 59 21.2 h 51 km. Mb 5.4, Ms 5.1 Tonga Islands region.
		F	07	45							
		WTS:iPKP	06	19	08.3	+					
		HEE:ePKP	06	19	11.5	+					
	WIT:iPKP	06	19	07.0							
	26.	DBN:eL	10	50							19.3N 69.3W, H: 10 15 39.0 h 35 km. Mb 4.7, Ms 4.2 Dominican Republic region.
	F	11	01								
		WTS:eP	10	26	28.0	+					
	26.	WTS:iPKP	11	16	57.5	-					ISC: 19.8S 175.4W, H: 10 57 38, h 241 km, Mb 4.5. Tonga.
		HEE:ePKP	11	17	01.0						
	27.	WTS:ePKP	00	12	41.0						22.3S 175.8W, H: 23 52 57.2 h 33 km. Mb 5.0 Tonga Islands region.
	27.	DBN:eL	12	38.5							44.3N 11.6E, H: 12 33 36.9 h 33 km. Northern Italy.
		F	12	44							
		WTS:e	12	35	53.0						
		i	12	36	31.8						
		eL	12	38.1							
		HEE:e(Pn)	12	35	34.5						
		e	12	36	07.0						
		eL	12	37.7							
	27.	DBN:eL	15	35							24.2S 176.9W, H: 14 11 46.4 h 33 km. Mb 5.2, Ms 5.3 South of Fiji Islands.
		F	16	16							
		WTS:ePKP	14	31	37.5	-					
		i	14	31	44.5						
		i	14	31	51.6	+					
		HEE:ePKP	14	31	39.5						
		e	14	31	47.5						
		e	14	31	54.0						
		WIT:ePKP	14	31	36.5						
		e	14	31	50.0						
	27.	WTS:ePKP	15	58	16						ISC: 23.4S 177.3W, H: 15 38 32, h 33 km. South of Fiji.
	27.	WTS:ePKP	16	09	06.5						ISC: 23.4S 177.1W, H: 15 49 15.2, h 33 km. South of Fiji.
	27.	WTS:ePKP	16	26	30.5						24.2S 177.0W, H: 16 06 37.5 h 32 km. Mb 5.0 South of Fiji Islands.
		WIT:ePKP	16	26	30						
	27.	WTS:iP	19	10	08.7	+					1.8S 77.1W, H: 18 57 20.4 h 27 km. Mb 5.0 Ecuador.
		e	19	10	14.0						
		ipP	19	10	17.4						
		HEE:eP	19	10	05.5						
		epP	19	10	14.0						
	27.	WTS:e	21	03	24.5						No determination of epicenter.

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms	
		h	m	s			Z	NS	EW			
JUNE 1977												
27.	WTS:ePKP e	22 41 06.0 22 41 16.0									24.1S 177.0W, H: 22 21 14.2 h 33 km. Mb 4.5 South of Fiji Islands.	
27.	DBN:eL F WTS:eP	23 56 00 04 23 38 45.5									10.6N 42.9W, H: 23 28 55.8 h 33 km. Mb 4.8, Ms 4.2 North Atlantic Ridge.	
28.	WTS:ePKP i HEE:ePKP WIT:ePKP	01 43 20.0 01 43 25.6 01 43 24.0 01 43 20			+						21.0S 175.2W, H: 01 23 39.7 h 68 km. Mb 5.2 Tonga Islands.	
28.	DBN:eL F	03 33 03 49									32.8N 130.7E, H: 02 46 41.8 h 18 km. Mb 4.7, Ms 4.2 Kyushu, Japan.	
28.	WTS:eP HEE:eP	03 53 01.0 03 53 03.0									27.6N 56.1E, H: 03 44 55.1 h 46 km. Mb 4.9 Southern Iran.	
28.	WTS:ePKP	06 03 17.0									ISC: 23.2S 175.0W, H: 05 43 13.2, h 43 km, Mb 4.6. Tonga region.	
28.	DBN:iP iZ i F WTS:iP HEE:iP i WIT:iP	07 16 12 07 16 24 07 18 57 07 42 07 16 04.9 07 15 56.2 07 15 56.9 07 16 13.8			- +	4	4.6				38.6N 14.7E, H: 07 12 49.3 h 261 km. Mb 5.3 Sicily.	
28.	DBN:iP iS eL F WTS:eP i HEE:eP WIT:eP	15 47 17 15 54 20 16 00.3 in next shock 15 47 24.5 15 47 25.8 15 47 18.5 15 47 28.0				5	1.6			4.5	5.5	22.6N 45.1W, H: 15 38 37.0 h 33 km. Mb 5.3, Ms 5.6 North Atlantic Ridge.
28.	DBN:eP iS eL F WTS:eP HEE:eP WIT:eP	16 27 00 16 34 00 16 40.0 18.6 16 27 02.5 16 26 56.5 16 27 04.0				19				7.6	5.7	22.7N 45.1W, H: 16 18 15.2 h 33 km. Mb 5.5, Ms 5.7 North Atlantic Ridge.
28.	WTS:eP	19 05 35.5										22.5N 45.1W, H: 18 56 47.6 h 33 km. Mb 4.6 North Atlantic Ridge.

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Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JUNE 1977											
28.	DBN:iP iS eL F	19 19 19	27 34 40.0	17 21	-	3	2.7				22.6N 45.1W, H: 19 18 35.8 h 33 km. Mb 5.8, Ms 6.0 North Atlantic Ridge.
	WTS:eP HEE:eP WIT:eP	19 19 19	27 27 27	22.5 17.5 25.0	+				12.0	5.9	
28.	WTS:eP HEE:iP WIT:eP	19 19 19	43 43 43	50.0 44.0 51.0	+						22.6N 45.1W, H: 19 35 01.9 h 33 km. Mb 4.9 North Atlantic Ridge.
28.	WTS:e HEE:ePKP e	21 21 21	47 47 47	53.0 32.0 56.5							16.9S 173.6W, H: 21 27 53.7 h 37 km. Mb 4.5 Tonga Islands.
28.	DBN:eL F	22 23.6	59								0.1S 125.1E, H: 22 02 42.5 h 33 km. Mb 5.6, Ms 4.8 Molucca Sea.
29.	WTS:eP e HEE:eP e WIT:eP	03 03 03 03	15 16 15 17 15	06.5 53.5 14.5 06.0 04.0	+						50.0N 78.9E, H: 03 06 58.0 h 0 km. Mb 5.3, Ms 5.2 Eastern Kazakh SSR.
29.	DBN:ePKP ePP eL F WTS:ePKP HEE:ePKP2 WIT:ePKP	03 03 04 05 03 03 03	31 35 31 31 31 31 31	31 06 24 44 27.0	+						23.2S 175.2W, H: 03 11 39.8 h 38 km. Mb 5.2, Ms 5.2 Tonga Islands region.
29.	DBN:ePP eSKP eSP eL F WTS:ePKP ePP eSP HEE:ePKP WIT:ePKP	07 07 07 08 09.2 07 07 07 07 07	44 46 53 20 20 43 44 53 43 43	06 36 36 01.0 03.0 39.5 03.0 01.0	+						7.6S 127.7E, H: 07 24 24.8 h 58 km. Mb 6.0 Banda Sea.
29.	WTS:eP HEE:eP	13 13	09 09	57.0 56.0	+						14.7S 66.5E, H: 12 57 27.3 h 33 km. Mb 5.2 Mid-Indian Rise.
29.	WTS:ePKP2 HEE:ePKP2 WIT:ePKP2	19 19 19	50 50 50	39.5 43.0 38.5							23.5S 175.3W, H: 19 30 36.4 h 33 km. Mb 4.7 Tonga Islands region.

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Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JUNE 1977	29. WTS:ePKP	21	45	03.0							22.6S 175.4W, H: 21 25 13.7 h 33 km. Mb 4.9 Tonga Islands region.
	HEE:ePKP	21	45	07.0							
	e	21	45	14.0							
	WIT:ePKP	21	45	02.0							
	30. WTS:ePKP	03	04	14.0	+						22.9S 175.9W, H: 02 44 23.0 h 33 km. Mb 4.7 Tonga Islands region.
	e	03	04	25.5	+						
	30. DBN:eSKS	03	09	48							19.4S 69.5W, H: 02 46 03.8 h 106 km. Mb 5.4 Northern Chile.
	eL	03	31								
	F	03	53								
	30. WTS:i	03	11	55.0	+						No determination of epicenter.
	HEE:e	03	11	58.0							
	WIT:e	03	11	48.0							
30. WTS:ePKP	03	34	03.0							23.8S 175.6W, H: 03 14 09.4 h 33 km. Mb 4.8 Tonga Islands region.	
HEE:ePKP	03	34	06.5								
WIT:ePKP	03	34	02.0								
30. WTS:ePKP	09	11	03.0							17.4S 173.5W, H: 08 51 26.1 h 68 km. Mb 5.3 Tonga Islands.	
30. WTS:ePKP	17	46	26.0							ISC: 23.3S 174.6W, H: 17 26 32, h 33 km. Tonga region.	
30. WTS:ePKP	18	51	37.0							ISC: 22.3S 174.8W, H: 18 31 45.9, h 33 km. Tonga region.	
30. DBN:eL	19	36								38.6N 12.0E, H: 19 28 37.2 h 33 km. Mb 4.6 Sicily.	
F	19	48									
WTS:eP	19	31	58.0								
HEE:eP	19	31	46.5								

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms												
		h	m	s			Z	NS	EW														
JULY 1977	1. WTS: iP	14	52	18.4	+					36.4N 71.1E, H: 14 44 10.3 h 257 km. Mb 4.7 Afghanistan-USSR border region.													
	epP	14	53	13.0																			
	e	14	53	41.5																			
	HEE: eP	14	52	24.0																			
	epP	14	53	19.0																			
	1. DBN: eL	16	15								19	1.7		5.8	45.1N 151.5E, H: 15 32 41.2 h 36 km. Mb 5.0, Ms 4.5 Kuril Islands.								
	F	16.7																					
	WTS: eP	15	44	38.0																			
	epP	15	44	49.0																			
	WIT: eP	15	44	35.0																			
	2. DBN: ePKP	01	14	29												19	1.7		5.8	10.0S 160.5E, H: 00 55 09.0 h 16 km. Mb 5.7, Ms 5.8 Solomon Islands.			
	ePP	01	16	52																			
	ePKS	01	17	58																			
	ePPP	01	19	36																			
	eL	01	53																				
F	03.7																						
WTS: ePKP	01	14	31.0																				
epPKP	01	14	36.0																				
HEE: ePKP	01	14	31.5																				
2. DBN: eL	05	58		19	1.7		5.8	25.9S 70.8W, H: 05 09 05.6 h 32 km. Mb 5.4, Ms 5.0 Near coast of northern Chile.															
F	06.7																						
3. WTS: eP	11	46	46.5						19	1.7		5.8	46.2N 13.1E, H: 11 44 56.6 h 33 km. Northern Italy.										
e	11	48	02.0																				
e	11	48	55.0																				
HEE: eP	11	46	39.0																				
e	11	47	52.5																				
3. WTS: eP	12	15	13.5											19	1.7		5.8	44.8N 6.7E, H: 12 13 27.5 h 33 km. Mb 4.7 France.					
e	12	15	49.0																				
e	12	17	29.0																				
HEE: eP	12	14	58.0																				
e	12	16	51.5																				
3. DBN: eL	13	34																	19	1.7		5.8	52.5N 167.5W, H: 12 55 41.4 h 33 km. Mb 5.0, Ms 4.6 Fox Islands, Aleutian Islands.
F	14.0																						
WTS: eP	13	07	25.0																				
HEE: eP	13	07	31.5																				
WIT: eP	13	07	21.0																				

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Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JULY 1977	3. DBN: eP	14	53	29						1.4N 126.4E, H: 14 29 14.1 h 51 km. Mb 5.9 Molucca Passage.	
	ePP	14	57	58							
	eSKS	15	04	06							
	eS	15	05	31							
	eSP	15	07	08							
	eSS	15	12	40							
	eP'PKS	15	21	16							
	eL	15	24			20		3.9	6.0		
	F	17.3									
	WTS: eP	14	53	30.0							
e	14	56	53.0								
ePP	14	57	53.0								
WIT: eP	14	53	28.5								
3. WTS: eP	17	41	33.0						52.6N 167.5W, H: 17 29 49.3 h 33 km. Mb 4.7, Ms 4.5 Fox Islands, Aleutian Islands.		
4. DBN: eL	02	18							57.4N 33.0W, H: 02 07 41.9 h 33 km. Mb 4.3 North Atlantic Ocean.		
F	02.5										
WTS: e	02	12	49.0								
HEE: e	02	12	49.5								
WIT: e	02	12	44.5								
4. WTS: ePKP	06	00	03.0	-					20.1S 178.8W, H: 05 41 25.6 h 631 km. Mb 4.4 Fiji Islands region.		
e	06	00	07.5								
HEE: ePKP	06	00	06.0								
e	06	00	13.0								
WIT: ePKP	06	00	02.0								
4. WTS: ePKP	07	33	51.0						18.1S 178.2W, H: 07 15 02.7 h 464 km. Mb 5.0 Fiji Islands region.		
e	07	34	01.0								
epPKP	07	35	38.0								
HEE: ePKP	07	33	55.0								
epPKP	07	35	43.0								
WIT: ePKP	07	33	49.0								
4. DBN: eL	09	43							52.9S 118.5W, H: 08 32 21.2 h 33 km. Mb 5.3, Ms 5.3 Easter Island Cordillera.		
F	10	08									
WTS: ePKP	08	52	03.0								
4. WTS: eP	16	44	31.5						48.1N 146.5E, H: 16 33 39.9 h 457 km. Mb 4.6 Sea of Okhotsk.		
4. WTS: eP	21	10	21.0						37.3N 72.0E, H: 21 01 57.5 h 146 km. Mb 5.0 Tadzhik SSR.		



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Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JULY 1977											
	4. DBN: eL F	22	30								40.3N 126.7W, H: 21 52 06.1 h 15 km. Mb 5.1, Ms 4.3 Off coast of northern California.
	5. DBN: eL F	23	59								14.5N 95.6W, H: 23 18 27.5 h 67 km. Mb 4.7 Near coast of Chiapas, Mexico.
	5. DBN: eL F WTS: eP WIT: eP	16	48								28.8N 130.1E, H: 16 00 16.9 h 31 km. Mb 5.2, Ms 4.1 Ryukyu Islands.
	6. DBN: eZ eL F	00	31	40							ISC: 63.5N 23.5W, H: 00 27 22.0, h 33 km. Iceland region.
	6. DBN: eP eS ePS eSS eL F WTS: eP HEE: eP WIT: eP	04	54	58	-	5	1.4				5.3N 82.7W, H: 04 42 23.6 h 33 km. Mb 5.4, Ms 5.5 South of Panama.
						21			3.7	5.8	
	6. DBN: eP eL F WTS: eP HEE: eP	08	58	56	-	4	1.1				6.2S 29.5E, H: 08 48 38.2 h 33 km. Mb 5.1 Lake Tanganyika region.
		09	20								
		10.0									
		08	58	51.0							
		08	58	48.0							
	6. DBN: ePKP1 iPKHKP epPKP ePP WTS: iPKP1 iPKHKP epPKP i HEE: iPKP1 iPKHKP iPKP2 epPKP i epPKP2 WIT: ePKP1 iPKHKP epPKP	11	47	09	-	4	3.4				21.1S 178.6W, H: 11 28 31.5 h 594 km. Mb 5.8 Fiji Islands region.
		11	47	14							
		11	49	28							
		11	50	28							
		11	47	08.8	-						
		11	47	13.9							
		11	49	29.0							
		11	49	33.3							
		11	47	11.1	-						
		11	47	16.9							
		11	47	25.1							
		11	49	31.5							
		11	49	37.5							
		11	49	45.0							
		11	47	07.5	-						
		11	47	12.2							
		11	49	29.0							

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JULY 1977											
7.	WTS: eP	10	16	56.0							17.1S 174.4W, H: 09 57 35.4 h 153 km. Mb 5.1 Tonga Islands.
8.	WTS: eP	05	33	39.0	+						36.6N 71.1E, H: 05 25 27.4 h 212 km. Mb 4.9 Afghanistan-USSR border region.
	HEE: eP	05	33	44.5							
	WIT: eP	05	33	39.0							
8.	DBN: eP	06	31	52	-						10.9N 39.6E, H: 06 23 02.4 h 38 km. Mb 5.0 Ethiopia.
	eL	06	44								
	F	07	22								
	WTS: iP	06	31	46.3	-						
	HEE: eP	06	31	43.5	-						
	WIT: eP	06	31	52.0							
8.	WTS: ePKP	09	47	15.0							22.3S 176.7W, H: 09 27 56.8 h 269 km. Mb 4.3 South of Fiji Islands.
	e	09	47	19.5							
8.	DBN: eL	22	55			19	2.0			5.5	28.8N 127.8E, H: 22 13 15.1 h 33 km. Mb 5.0 East China Sea.
	F	23.7									
9.	WTS: eP	10	29	01.0							35.2N 23.5E, H: 10 24 26.5 h 73 km. Mb 4.2 Crete.
	HEE: eP	10	28	57.5							
	e	10	29	18.5							
9.	DBN: eL	15	34								28.8N 127.8E, H: 14 54 05.7 h 31 km. Mb 5.2, Ms 4.0 East China Sea.
	F	16	03								
9.	DBN: eL	18	06								22.5S 175.1W, H: 16 44 09.4 h 33 km. Mb 5.5, Ms 4.9 Tonga Islands region.
	F	18	49								
	WTS: ePKP	17	03	54.0							
	ePKHKP	17	03	59.0							
	HEE: ePKP	17	03	56.5							
	e	17	04	02.5							
	WIT: epPKP	17	03	57.5							
9.	DBN: eL	21	04								40.2N 118.8E, H: 20 27 52.4 h 33 km. Mb 4.9 Northeastern China.
	F	21	22								
10.	DBN: eL	01	02								37.9S 49.7E, H: 00 15 58.8 h 33 km. Mb 5.4, Ms 4.6 Atlantic-Indian Rise.
	F	01.6									

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
10. JULY 1977	DBN: epPP	02	02	02						56.1S 27.6W, H: 01 42 36.5 h 122 km. Mb 6.1 South Sandwich Islands region.	
	eSP	02	11	13							
	eSS	02	17	00							
	eSSS	02	20	56							
	eL	02	28			19	1.7		5.6		
	F	0.35									
	WTS: e	02	01	55.0							
10.	DBN: ePKP	02	56	52						19.2S 168.4E, H: 02 37 14.6 h 12 km. Mb 5.5, Ms 5.5 New Hebrides Islands.	
	eL	03	39								
	F	05.0									
	WTS: ePKP	02	56	52.0							
	HEE: iPKP	02	56	54.3	-						
	e	02	57	00.0							
	WIT: ePKP	02	56	49.0							
10.	WTS: ePKP	04	39	10.0	+					21.8S 179.3W, H: 04 20 25.5 h 582 km. Mb 5.3 Fiji Islands region.	
	epPKP	04	41	30.5							
	HEE: ePKP	04	39	13.5							
	epPKP	04	41	34.0							
	WIT: ePKP	04	39	08.0							
10.	DBN: ePKP1	05	30	17						21.9S 179.3W, H: 05 11 40.8 h 607 km. Mb 5.4 Fiji Islands region.	
	epPKP	05	32	42							
	eL	06	26								
	F	07.4									
	WTS: ePKP1	05	30	24.0							
	epPKP	05	32	44.0							
	HEE: ePKP1	05	30	27.0							
	ePKP2	05	30	36.0							
epPKP	05	32	47.5								
WIT: ePKP1	05	30	23.0								
10.	WTS: ePKP	09	18	02.0	-					20.8S 178.8W, H: 08 59 18.7 h 577 km. Mb 4.8 Fiji Islands region.	
	WIT: ePKP	09	18	00.5							
10.	HEE: ePKP	11	12	49.0						19.1S 168.4E, H: 10 53 09.6 h 15 km. Mb 4.4 New Hebrides Islands.	
	epPKP	11	12	55.0							
10.	HEE: ePKP	12	08	57.0						19.1S 168.5E, H: 11 49 18.7 h 29 km. Mb 4.3 New Hebrides Islands.	
11.	WTS: ePKP	05	04	41.5						23.2S 175.6W, H: 04 44 50.5 h 42 km. Mb 4.6, Ms 5.1 Tonga Islands region.	

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms	
		h	m	s			Z	NS	EW			
JULY 1977	11. DBN: eP	09	50	25							51.4N 176.3E, H: 09 38 32.4 h 13 km. Mb 5.1, Ms 4.8 Rat Islands, Aleutian Islands.	
	eL	10	15									
	F	11.2										
	WTS: eP	09	50	23.0								
	e	09	50	48.5								
	e	09	51	17.0								
	HEE: eP	09	50	31.5								
	WIT: eP	09	50	20.0								
	11. WTS: eP	12	47	33.0								48.0N 155.7E, H: 12 35 42.1 h 33 km. Mb 5.0, Ms 4.7 Kuril Islands.
	epP	12	47	41.5								
WIT: eP	12	47	28.0									
11. WTS: ePKP	19	30	26.5							19.1S 168.5E, H: 19 10 51.2 h 20 km. Mb 5.3 New Hebrides Islands.		
HEE: iPKP	19	30	29.7	-								
e	19	31	10.5									
11. DBN: eL	23	34								0.5N 135.0E, H: 22 39 52.2 h 33 km. Mb 5.6, Ms 4.9 West Irian region.		
F	00.5											
13. DBN: eL	08	33								29.9N 67.5E, H: 08 09 15.7 h 10 km. Mb 5.1, Ms 5.5 Pakistan.		
F	09.8											
WTS: eP	08	18	06.0									
HEE: eP	08	18	11.0									
e	08	18	17.0									
13. WTS: ePKP	14	25	47.0							23.2S 175.3W, H: 14 06 00.0 h 63 km. Mb 5.0, Ms 5.0 Tonga Islands region.		
HEE: ePKP	14	25	50.5									
e	14	26	01.0									
WIT: ePKP	14	25	46.5									
14. DBN: eL	01	32								No determination of epicenter.		
F	01	44										
14. DBN: eP	05	56	52							40.3N 63.7E, H: 05 49 08.7 h 33 km. Mb 5.5, Ms 5.4 Uzbek SSR.		
ePP	05	58	26									
eS	06	03	15									
eSS	06	06	00									
eL	06	08			20		6.2		5.5			
F	06.9											
WTS: iP	05	56	43.2	+								
ePP	05	58	15.0									
HEE: eP	05	56	49.0									
ePP	05	58	25.0									
WIT: eP	05	56	42.0									

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JULY 1977	14. DBN: eL	07	23							64.5N 17.5W, H: 07 15 37.2 h 33 km. Mb 4.7 Iceland.	
	F	07	32								
	WTS: eP	07	19	44.5							
	HEE: eP	07	19	52.0							
14.	WTS: eP	15	31	55.0						27.0N 53.5E, H: 15 23 57.3 h 33 km. Mb 4.3 Southern Iran.	
	HEE: eP	15	31	57.0							
14.	DBN: eL	21	10							39.8N 118.3E, H: 20 36 14.8 h 33 km. Mb 4.7 Northeastern China.	
	F	21	25								
15.	DBN: eP	02	25	34						24.1N 122.2E, H: 02 12 54.4 h 33 km. Mb 5.5, Ms 5.7 Taiwan region.	
	ePP	02	28	59							
	eS	02	36	14							
	eL	02	52		20	5.6	3.5	6.2	6.0		
	F	03	53								
	WTS: eP	02	25	31.0							
	HEE: iP	02	25	36.6	+						
	WIT: eP	02	25	29.5							
15.	DBN: eL	05	47							29.4S 112.3W, H: 04 46 08.7 h 33 km. Mb 5.2, Ms 5.6 Easter Island region.	
	F	06	25								
16.	WTS: ePKP	00	06	29.0						22.1S 176.4W, H: 23 46 40.2 h 54 km. Mb 4.9 South of Fiji Islands.	
	HEE: ePKP	00	06	32.5							
	WIT: ePKP	00	06	29.5							
16.	WTS: iP	11	36	08.5	-					18.7S 172.8W, H: 11 16 29.4 h 51 km. Mb 4.9, Ms 4.6 Tonga Islands region.	
	e	11	36	18.5							
	HEE: ePKP	11	36	12.0							
	epPKP	11	36	27.0							
	WIT: ePKP	11	36	04.5							
16.	DBN: eL	13	17.7							46.3N 14.3E, H: 13 13 29.6 h 6 km. Mb 4.6 Yugoslavia.	
	F	13	27								
	WTS: iP	13	15	23.2	-						
	eL	13	17	41							
	HEE: eP	13	15	19.5	+						
	WIT: e	13	15	42.5							
16.	DBN: eL	00.9								27.5S 176.7W, H: 23 38 21.4 h 33 km. Mb 5.5, Ms 4.6 Kermadec Islands region.	
	F	01.7									
	WTS: ePKP1	23	58	12.0							
	ePKP2	23	58	37.0							
	HEE: ePKP2	23	58	43.5							
	WIT: ePKP1	23	58	12.0							

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JULY 1977	17. DBN: eL	11	45							62.9S 168.2E, H: 10 26 19.0 h 33 km. Mb 5.6, Ms 5.2 Balleny Islands region.	
	F	12.6									
	WTS: ePKP	10	46	18.0							
	e		47	43.0							
18.	WTS: eP	14	31	22.0	-					35.5N 70.3E, H: 14 22 52.6 h 69 km. Mb 5.2 Hindu Kush region.	
	HEE: eP	14	31	12.5							
18.	DBN: eL	19	41							15.6S 175.5W, H: 18 31 52.2 h 33 km. Mb 5.2, Ms 5.0 Tonga Islands.	
	F	20.2									
	HEE: ePKP	18	51	26.5							
18.	WTS: ePKP	21	44	55.0						22.2S 179.6W, H: 21 26 08.1 h 573 km. Mb 5.3 South of Fiji Islands.	
	HEE: ePKP	21	44	58.0							
	WIT: ePKP	21	44	52.5							
18.	DBN: eL	22	33							No determination of epicenter.	
	F	22	46								
20.	WTS: eP	13	35	53.5						54.6N 161.6W, H: 13 24 25.9 h 53 km. Mb 5.3 Alaska Peninsula.	
21.	DBN: eL	03	13							5.9S 147.6E, H: 02 11 28.8 h 107 km. Mb 5.4 East Papua New Guinea region.	
	F	03	38								
21.	DBN: iPKP1	12	13	22	+					53.9S 158.6E, H: 11 53 22.5 h 33 km. Mb 6.4, Ms 6.7 Macquarie Islands region.	
	ePKP2	12	14	20							
	ePP	12	18	04							
	ePPP	12	21	55							
	ePcPP'	12	23	33							
	eSKKS	12	28	31							
	ePPS	12	32	00							
	eSS	12	38	36							
	eSSS	12	44	24							
	eL	13.1				20	9.5		6.7		
	F	in next shock									
	WTS: ePKP1	12	13	22.5							
	ePKP2	12	14	15.0							
	ePP	12	18	01.0							
	ePPP	12	21	53.0							
	HEE: ePKP1	12	13	23.0							
	ePKP2	12	14	15.5							
	ePP	12	18	05.0							
	ePPP	12	21	52.5							
	e	12	23	17.0							
	WIT: ePKP1	12	13	23.5							
ePKP2	12	14	18.5								
ePP	12	18	02.0								

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms				
		h	m	s			Z	NS	EW						
JULY 1977	21. DBN: eP	13	59	03	+	20	83	178	178	7.2	16.9N 122.4E, H: 13 45 54.0 h 33 km. Mb 6.1, Ms 6.9 Luzon, Philippine Islands.				
	eS	14	09	50											
	eSP	14	11	14											
	eL	14	32												
	F	18.7													
	WTS: iP	13	58	59.4											
	ePP	14	02	24.0											
HEE: eP	13	59	04.5												
WIT: eP	13	58	58.0												
21. DBN: eL	19	44								17.2N 122.4E, H: 18 55 34.6 h 46 km. Mb 5.1 Luzon, Philippine Islands.					
F	20	04													
22. WTS: ePKP2	00	39	57.0							30.8S 178.8E, H: 00 20 27.1 558 km. Mb 4.8 Kermadec Islands region.					
HEE: ePKP2	00	40	03.0												
22. DBN: eL	05	57								17.3N 122.3E, H: 05 13 39.8 h 46 km. Mb 5.1 Luzon, Philippine Islands.					
F	06.5														
22. WTS: eP	17	01	46.0	-						2.9N 84.5W, H: 16 48 54.5 h 33 km. Mb 4.8, Ms 4.9 Off coast of central America.					
HEE: eP	17	01	44.0	-											
22. DBN: ePKP1	17	36	38	+	6	2.3				33.8S 179.7W, H: 17 16 40.3 h 31 km. Mb 6.0, Ms 5.9 South of Kermadec Islands.					
ePKP2	17	37	22												
ePP	17	41	04												
ePPP	17	44	43												
ePcPP	17	46	44												
eSKKS	17	48	52												
eSPP	17	54	38												
eL	18	33													
F	20.0														
WTS: ePKP1	17	36	37.5												
ePKP2	17	37	21.5												
ePP	17	41	02.5												
HEE: ePKP1	17	26	39.0												
ePKP2	17	37	27.0												
ePP	17	41.1													
WIT: ePKP1	17	36	37.0												
23. DBN: eP	07	06	13		20	4.6	3.2	3.2	5.6	42.2N 83.4E, H: 06 57 03.7 h 33 km. Mb 5.1, Ms 5.1 Northern Sinkiang Prov., China.					
eL	07	22													
F	08	09													
WTS: eP	07	06	02.5												
HEE: eP	07	06	10.5												
23. WTS: ePKP	09	33	36.5	-											21.6S 176.4W, H: 09 14 19.7 h 294 km. Mb 4.9 Fiji Islands region.
23. WTS: iP	13	56	27.4	+											
HEE: eP	13	56	33.0												
WIT: eP	13	56	23.0												

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JULY 1977											
24.	WTS: eP	05	56	14.5	-						10.8N 68.9W, H: 05 44 43.9 h 15 km. Mb 4.8, Ms 3.7 Near coast of Venezuela.
24.	DBN: ePKP	06	42	24		6	3.0				15.3S 173.2W, H: 06 22 51.3 h 33 km. Mb 6.0, Ms 6.2
	ePP	06	45	36							Tonga Islands.
	eL	07.6				20	7.6			6.4	
	F	09.3									
	WTS: ePKP	06	42	21.0							
	HEE: ePKP	06	42	25.0							
24.	DBN: eS	20	21	12							19.5N 144.7E, H: 19 55 36.8 h 409 km. Mb 5.4 Mariana Islands.
	eL	20	45								
	F	21.2									
	HEE: eP	20	08	44.0							
25.	DBN: eL	05	26								17.9N 81.7W, H: 04 51 40.6 h 33 km. Mb 4.9, Ms 4.0 Caribbean Sea.
	F	05	43								
	WTS: eP	05	03	20.5	-						
	HEE: eP	05	03	20.5	-						
25.	WTS: eP	22	33	34.5	+						35.1N 23.8E, H: 22 28 54.9 h 46 km. Mb 4.3 Crete.
	HEE: eP	22	33	32.0							
	WIT: eP	22	33	41.5							
25.	HEE: ePKP	23	00	42.0	+						19.2S 168.4E, H: 22 41 04.5 h 30 km. Mb 5.1 New Hebrides Islands.
26.	WTS: eP	17	07	41.5	-						69.5N 90.6E, H: 16 59 57.6 h 0 km. Mb 4.9 Central Siberia.
27.	WTS: ePKP	03	14	43.0	-						17.1S 173.4W, H: 02 55 08.5 h 46 km. Mb 4.8 Tonga Islands.
	e	03	14	54.5							
	HEE: ePKP	03	14	47.0	+						
	e	03	14	57.0							
27.	WTS: ePKP	08	29	44.5							15.9S 171.9W, H: 08 09 58.8 h 33 km. Mb 4.6 Samoa Islands region.
27.	DBN: eL	18	11								17.1N 122.5E, H: 17 25 16.2 h 41 km. Mb 5.4, Ms 4.0 Luzon, Philippine Islands.
	F	18.6									
	WTS: eP	17	38	20.5							
	HEE: eP	17	38	25.5	-						
	epP	17	38	37.5							
	WIT: eP	17	38	19.0							



SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JULY 1977	28. WTS: ePKP	00	16	36.0							21.2S 178.1W, H: 23 57 33.0 h 390 km. Mb 4.2 Fiji Islands region.
	HEE: ePKP	00	16	39.0							
	WIT: ePKP	00	16	34.5							
	28. DBN: eL	01	39								No determination of epicenter.
	F	in next shock									
	28. DBN: eP	01	57	10		6	2.7				1.1S 14.0W, H: 01 47 32.7 h 33 km. Mb 5.3, Ms 5.3 North of Ascension Island.
	ePP	01	59	18							
	eS	02	04	56							
	eSS	02	08	48							
	eL	02	12.5		20		3.6	7.1	5.8		
	F	03.4									
	WTS: iP	01	57	08.8	-						
	e	01	57	12.0							
	epP	01	57	18.0							
	HEE: eP	01	57	00.0							
	WIT: eP	01	57	13.5							
	e	01	57	17.5							
	28. DBN: eP	15	34.2								44.2N 129.0W, H: 15 22 18.5 h 15 km. Mb 5.1, Ms 5.4 Off coast of Oregon.
	eL	15	54		20	2.6			5.5		
	F	17	15								
	WTS: eP	15	34	14.0							
	HEE: eP	15	34	17.5							
	28. WTS: ePKP	16	30	22.0							ISC: 24.2S 175.4W, H: 16 10 27.0, h 33 km, Mb 5.1. South of Tonga.
	29. DBN: eL	00	56								No determination of epicenter.
	F	01	03								
	29. DBN: eL	05	09								61.6N 146.2W, H: 04 38 07.1 h 55 km. Southern Alaska.
	F	05	17								
	29. WTS: iP	09	22	42.2	+						38.2N 75.2E, H: 09 14 08.3 h 102 km. Mb 5.2 Southern Sinkiang Prov., China.
	HEE: eP	09	22	48.0							

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JULY 1977	29. DBN: ePdif	11	31	51							8.0S 155.5E, H: 11 15 45.3 h 33 km. Mb 6.4, Ms 7.2 Solomon Islands.
	ePKP	11	34	55		5	4.3				
	ePP	11	37	13							
	eSKS	11	38	22							
	eSP	11	47	04							
	eSPP	11	48	44							
	eSS	11	54	30							
	eSSS	11	59	30							
	eL	12	09			22	5.5			7.3	
	F	17.0									
	WTS: ePKP	11	34	53.0							
	ePP	11	37	09.5							
	HEE: ePKP	11	34	55.0							
	eSKP	11	38	23.0							
WIT: ePKP	11	34	53.0								
29. WTS: ePKP	17	10	36.0							19.5S 175.0W, H: 16 51 06.0 h 129 km. Mb 5.1 Tonga Islands.	
e	17	11	12.0								
HEE: ePKP	17	10	40.0								
e	17	11	16.0								
WIT: ePKP	17	10	34.5								
29. DBN: eL	20	48								4.6S 105.7W, H: 19 58 47.4 h 33 km. Mb 4.7 Northern Easter Island Cordillera.	
F	21.3										
29. WTS: iP	20	46	03.3	-						23.6S 179.1E, H: 20 27 12.1 h 550 km. Mb 5.1 South of Fiji Islands.	
HEE: ePKP2	20	46	19.0								
WIT: ePKP	20	46	02.0								
29. HEE: eP	22	36	41.0							18.6N 121.1E, H: 22 23 41.2 h 40 km. Mb 5.2, Ms 4.5 Luzon, Philippine Islands.	
WIT: e	22	36	39.0								
30. WTS: iP	02	05	04.2	+						49.8N 78.2E, H: 01 26 58.0 h 0 km. Mb 5.3 Eastern Kazakh SSR.	
e	02	05	17.5								
HEE: eP	02	05	12.0								
WIT: eP	02	05	02.0								
e	02	05	04.0								
30. DBN: eL	07	59								3.2S 12.2W, H: 07 31 07.0 h 33 km. Mb 5.1, Ms 4.7 North of Ascension Island.	
F	08	26									
HEE: eP	07	40	46.0								

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
JULY 1977	30. DBN: eP	16	14	18							71.9N 1.9W, H: 16 09 43.7 h 33 km. Mb 4.4 Jan Mayen Island region.
	eL	16	21								
	F	16	30								
	WTS: eP	16	14	19.5							
	HEE: eP	16	14	30.0							
	epP	16	14	38.0							
30. DBN: eL	20	02								36.8N 21.7E, H: 19 51 37.5 h 51 km. Mb 4.8 Southern Greece.	
F	20	11									
WTS: eP	19	55	51.5								
HEE: eP	19	55	46.0								
e	19	56	14.5								
31. WTS: ePKP	03	01	13.5							19.4S 176.0E, H: 02 41 34.2 h 15 km. Mb 5.0 South of Fiji Islands.	
HEE: ePKP	03	01	18.5								
WIT: ePKP	03	01	12.5								
31. WTS: ePKP	03	26	25.5							22.7S 175.4W, H: 03 06 46.4 h 123 km. Mb 4.5 Tonga Islands region.	

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
AUGUST 1977											
1.	WTS: eP	00	10	56.0							20.2N 94.0E, H: 23 59 25.8 h 91 km. Mb 4.5 Burma
1.	DBN: eL F	01 56 02 37									4.1N 126.9E, H: 01 01 22.2 h 58 km. Mb 5.2 Talaud Islands
1.	WTS: ePKP e HEE: ePKP e	10 40 45.0 10 40 55.5 10 40 49.0 10 41 02.5									23.3S 170.3E, H: 10 20 58.4 h 24 km. Mb 5.2 Loyalty Islands region
1.	DBN: ePKP epPKP eL F WTS: ePKP epPKP ePP HEE: ePKP WIT: ePKP ePP	13 52 19 13 52 44 14 46 15 00 13 52 15.0 13 52 45.0 13 55 44.5 13 52 20.0 13 52 14.0 13 55 42.5									20.5S 169.6E, H: 13 32 48.8 h 108 km. Mb 5.5 New Hebrides Islands
1.	WTS: ePKP i e e HEE: ePKP i e e WIT: ePKP	19 30 32.0 19 30 36.5 19 30 41.0 19 31 24.5 19 30 35.0 19 30 40.0 19 30 46.5 19 31 17.5 19 30 32.0			-						20.0S 178.2W, H: 19 11 57.4 h 599 km. Mb 5.3 Fiji Islands region
2.	WTS: ePKP HEE: ePKP WIT: ePKP	00 34 44.0 00 34 48.0 00 34 41.0			+						17.7S 178.8W, H: 00 16 06.3 h 552 km. Mb 4.8 Fiji Islands region
2.	DBN: eL F	02 01 02 27									No determination of epicenter
2.	DBN: eL F	03 00 03 26									17.4N 122.8E, H: 02 10 06.8 h 33 km. Mb 5.1 Luzon, Philippine Islands
2.	DBN: eL F	20 45 21 02									27.4N 142.0E, H: 19 54 00.6 h 33 km. Mb 5.0 Bonin Islands region
3.	WTS: eP HEE: eP	01 23 48.0 01 23 56.0									30.3N 94.9E, H: 01 13 06.8 h 33 km. Mb 4.7 Tibet

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
AUGUST 1977											
3.	WTS: eP HEE: eP WIT: eP	02	37	14.0 11.5 13.0							8.1N 77.5W, H: 02 25 04.4 h 33 km. Mb 4.7 Panama-Colombia border region
3.	WTS: iPKP HEE: ePKP	11	20	07.3 10.5	+						23.0S 176.3W, H: 11 00 25.1 h 115 km. Mb 4.8 South of Fiji Islands
3.	WTS: eP HEE: eP	17	59	10.0 08.0							6.9N 77.6W, H: 17 46 53.9 h 18 km. Mb 4.7 Near west coast of Colombia
4.	DBN: ePP eSP eL F WTS: ePKP e e HEE: ePKP	01	30	24 38 00 02.8 33.0 12.0 44.0 31.0							56.0S 27.8W, H: 01 11 11.3 h 112 km. Mb 6.1 South Sandwich Islands region
4.	DBN: eL F WTS: eP e HEE: eP e	14	00	46 14.5 32.5 13.0 31.0							12.3N 87.3W, H: 13 20 52.5 h 33 km. Mb 5.4, Ms 5.0 Near coast of Nicaragua
4.	WTS: eP HEE: eP WIT: eP	16	52	02.5 05.0 59.5							37.1N 116.0W, H: 16 40 00.1 h 0 km. Mb 5.0, Ms 5.7 Southern Nevada
5.	DBN: eL F WTS: eP HEE: eP	13	34	38 53.0 49.5							34.3N 25.8E, H: 13 19 54.8 h 24 km. Mb 4.4 Crete
5.	DBN: eL F	22	25	42							7.9S 155.8E, H: 21 21 13.4 h 45 km. Mb 5.0, Ms 4.6 Solomon Islands
6.	WTS: ePKP epPKP HEE: ePKP	05	46	34.0 04.5 37.0	+						22.2S 176.0W, H: 05 26 56.0 h 122 km. Mb 5.1 South of Fiji Islands
6.	DBN: eL F WTS: ePKP HEE: ePKP WIT: ePKP	12	31	13.2 12.0 14.5 10.0							7.1S 155.8E, H: 11 26 12.2 h 83 km. Mb 5.4 Solomon Islands

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
AUGUST 1977	6. WTS: ePKP	12	12	31.0							18.6S 174.1W, H: 11 52 50.6 h 44 km. Mb 5.2, Ms 4.6 Tonga Islands
	e	12	12	49.5							
	HEE: ePKP	12	12	34.5							
	WIT: ePKP	12	12	28.5							
6.	HEE: eP	23	56	13.5							35.5N 140.8E, H: 23 43 39.7 h 52 km. Mb 4.8 Near east coast of Honshu, Japan
7.	DBN: ePKP	02	04	32							12.4S 166.3E, H: 01 45 09.3 h 36 km. Mb 5.2, Ms 5.7 Santa Cruz Islands
	ePP	02	07	16							
	eSS	02	25	25							
	eL	02	51			20		1.4	1.8	5.8	
	F	04.4									
	WTS: ePKP	02	04	29.5							
	e	02	04	40.5							
	HEE: ePKP	02	04	24.0							
e	02	04	35.0								
7.	WTS: ePKP	02	14	19.0							12.4S 166.1E, H: 01 54 56.3 h 47 km. Mb 5.2 Santa Cruz Islands
	HEE: ePKP	02	14	19.5							
7.	DBN: eP	07	20	24	+	11	2.0				8.6N 82.8W, H: 07 08 05.6 h 33 km. Mb 5.2, Ms 5.7 Panama-Costa Rica border region
	ePP	07	23	32							
	eS	07	30	38							
	ePS	07	31	28							
	eSS	07	36.0								
	eSSS	07	39.4								
	eL	07	46			19	5.1			5.9	
	F	10.1									
	WTS: eP	07	20	32.5							
	e	07	20	57.0							
HEE: eP	07	20	28.5								
	e	07	20	53.5							
7.	DBN: eL	12	08								3.6N 62.7E, H: 11 34 43.5 h 33 km. Mb 4.8, Ms 5.1 Carlsberg Ridge
	F	12.8									
	WTS: eP	11	45	35.0							
	HEE: eP	11	45	35.0							
WIT: eP	11	45	37.5								
8.	DBN: eL	07	39								6.9N 77.8W, H: 07 00 06.3 h 33 km. Mb 5.2, Ms 4.6 Near west coast of Colombia
	F	08.1									
	WTS: iP	07	12	21.2	+						
	e	07	12	27.0							
	HEE: iP	07	12	18.8	+						
	e	07	12	25.0							
WIT: eP	07	12	21.0								
e	07	12	27.0								

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
AUGUST 1977											
8.	DBN: eL F	14 15	04 20								10.6S 161.3E, H: 12 58 45.0 h 32 km. Mb 5.8, Ms 5.5 Solomon Islands
8.	WTS: iPKP HEE: iPKP WIT: ePKP	15 15 15	24 24 24	23.5 27.5 22.0	+ + +						17.8S 178.7W, H: 15 05 46.5 h 562 km. Mb 5.1 Fiji Islands region
8.	WTS: ePKP HEE: ePKP e	17 17 17	34 34 34	13.0 19.5 34.0							23.3S 174.9W, H: 17 14 27.6 h 34 km. Mb 4.9 Tonga Islands region
8.	WTS: iPKP epPKP e HEE: ePKP e WIT: ePKP	22 22 22 22 22 22	39 41 44 39 40 39	55.3 41.5 37.0 58.5 11.5 54.0	-						23.8S 179.4W, H: 22 20 51.5 h 436 km. Mb 5.2 South of Fiji Islands
9.	DBN: eL F	01 02	57.5 04								31.0N 41.5W, H: 01 38 16.6 h 33 km. Mb 4.5, Ms 4.1 North Atlantic Ridge
9.	DBN: eL F WTS: eP	22 22 21	09 17 50	35.5							36.8N 60.0E, H: 21 43 00.3 h 21 km. Mb 4.5 Iran-USSR border region
10.	DBN: eL F	01 01	22 37								No determination of epicenter
10.	DBN: eL F	03 03	08 52								No determination of epicenter
10.	DBN: eL F WTS: eP e HEE: eP e WIT: eP	10 11 09 09 09 09 09	12 03 47 47 47 47 47	11.5 19.0 18.0 27.0 08.0							56.6N 152.7W, H: 09 35 58.7 h 33 km. Mb 5.0, Ms 4.6 Kodiak Island region
10.	DBN: ePKP epPKP esPKP eZ F WTS: ePKP e epPKP ePP HEE: ePKP i epPKP ePP WIT: ePKP i epPKP	18 18 18 18 18 18 18 18 18 18 18 18 18 18 18 18 18 18 18 18	45 48 49 52 19.4 45 45 48 49 45 45 48 49 45 45 48 49 45 45 48	48 06 00 26  48.0 52.5 05.0 38.0 49.5 55.5 10.5 39.0 47.5 50.7 08.0	-     - -  - - - - - - -						20.7S 178.5W, H: 18 27 09.6 h 585 km. Mb 5.4 Fiji Islands region

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
AUGUST 1977											
10.	WTS: eP HEE: eP	22	10	02.5 10.5							50.9N 110.8E, H: 21 59 58.8 h 2 km. Mb 5.2 Lake Baikal region
11.	DBN: iP ipPKP ePS iSS eSSS eL F WTS: iP epPKP HEE: iP i epPKP WIT: iP epPKP	02	02	21 54 18 20 29.5 43 05.0 21.1 53.0 23.6 25.2 57.0 18.9 52.0	-	7	12.9				17.6S 174.4W, H: 01 42 47.5 h 57 km. Mb 6.3 Tonga Islands
11.	WTS: ePKP HEE: ePKP	08	12	37.0 42.0							ISC: 16.9S 172.1W, H: 07 53 03, h 69 km, Mb 5.0. Samoa region.
12.	WTS: ePKP HEE: ePKP epPKP WIT: ePKP e	00	26	53.0 56.0 34.5 52.0 08.0							6.5S 155.0E, H: 00 07 51.8 h 58 km. Mb 5.9 Solomon Islands
12.	DBN: eL F	02	05	03.4							No determination of epicenter
12.	DBN: eL F	08	15	08 30							36.5S 78.7E, H: 07 06 34.9 h 33 km. Mb 4.8 Mid-Indian Rise
12.	WTS: ePKP HEE: ePKP WIT: ePKP	20	25	33.0 37.0 32.0							22.5S 175.9W, H: 20 05 43.2 h 33 km. Mb 4.9 Tonga Islands region
12.	DBN: eL F	22	50	23 13							9.2S 148.3E, H: 21 45 37.3 h 33 km. Mb 5.5, Ms 4.6 East Papua New Guinea region
13.	WTS: eP	19	45	07.0							43.1N 145.6E, H: 19 33 09.7 h 62 km. Mb 4.9 Hokkaido, Japan region



SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
AUGUST 1977	14. DBN: eP	04	33	36							11.0N 62.4W, H: 04 22 49.7 h 112 km. Mb 4.9 Windward Islands
	epP	04	34	04							
	eS	04	42	24							
	esS	04	43	16							
	eSS	04	46	52							
	eSSS	04	50	16							
	F	05.5									
	WTS: iP	04	33	43.8	+						
	epP	04	34	14.5							
	HEE: eP	04	33	39.5	+						
	epP	04	34	08.5							
	WIT: eP	04	33	44.0							
	epP	04	34	15.0							
	14. DBN: eL	12	16								
F	12.5										
14. HEE: eP	16	04	37.5							23.6N 121.5E, H: 15 51 55.5 h 33 km. Mb 4.8 Taiwan	
14. WTS: eP	19	15	32.0							22.8S 12.8W, H: 19 03 44.2 h 33 km. Mb 4.9, Ms 5.7 South Atlantic Ridge	
HEE: eP	19	15	26.0								
14. DBN: eP	19	16	06							22.7S 12.7W, H: 19 04 20.3 h 33 km. Mb 5.6, Ms 5.1 South Atlantic Ridge	
eS	19	25	52								
eSS	19	30	47								
eL	19	40			18		1.2	1.4	5.3		
F	21.0										
WTS: eP	19	16	08.0	-							
HEE: eP	19	16	00.5								
14. DBN: eP	21	52	52								7.8S 107.6E, H: 21 38 51.5 h 33 km. Mb 5.7, Ms 5.7 Java
eZ	21	56	21								
eSP	22	06	10								
eL	22	26			20		2.7	2.7	5.8		
F	in next shock										
WTS: eP	21	52	49.0								
e	21	56	09.0								
14. DBN: eL	23	44								No determination of epicenter	
F	00	24									
15. DBN: eL	00	28								41.7N 138.6E, H: 23 49 13.4 h 33 km. Mb 4.9 Eastern Sea of Japan	
F	01.1										
WTS: eP	00	01	08.5								
epP	00	01	18.0								
HEE: eP	00	01	15.5								
epP	00	01	25.0								
WIT: eP	00	01	05.0								
epP	00	01	15.0								

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
AUGUST 1977											
15.	DBN: eL F	07	08								23.3S 175.4W, H: 05 41 12.1 h 33 km. Mb 5.3, Ms 5.1 Tonga Islands region
	WTS: ePKP i	06	00	57.0	-						
	HEE: ePKP	06	01	06.0							
	WIT: ePKP	06	01	01.5							
15.	DBN: eL F	21	06								2.9N 84.3W, H: 20 23 44.1 h 23 km. Mb 5.2 Off coast of Central America
	WTS: eP epP e	20	36	36.5 44.0 50.5	-						
	HEE: eP epP e	20	36	34.0 41.0 48.0	-						
	WIT: eP epP	20	36	36.0 43.5							
15.	DBN: eP eS eL F	21	14	12 10 18.4							38.8N 17.0E, H: 21 10 32.5 h 54 km. Mb 5.0 Southern Italy
	WTS: eP i	21	14	05.0 09.3	+						
	HEE: eP	21	13	56.5							
	WIT: eP	21	14	17.5							
16.	WTS: ePKP HEE: ePKP e	05	06	52.0 58.0 07.0							17.4S 171.8W, H: 04 47 12.6 h 8 km. Mb 4.9 Tonga Islands region
16.	DBN: eL F	05	19								36.4N 58.3E, H: 04 56 52.7 h 33 km. Mb 4.5 Iran
16.	DBN: ePKP eL F	06	34	52 27 08.4							19.3S 167.7E, H: 06 15 16.7 h 12 km. Mb 5.5, Ms 4.9 New Hebrides Islands region
	WTS: iP e	06	34	52.1 04.0	+						
	HEE: iP e	06	34	57.2 08.0	+						
16.	WTS: ePKP HEE: ePKP e	07	22	33.0 38.0 49.5							19.0N 167.6E, H: 07 03 01.3 h 33 km. Mb 5.1 New Hebrides Islands region
16.	WTS: iP i e	08	58	06.0 29.7 38.5	-						BNS: H: 08 57 53.7 Mloc 2.6 (BNS) Ruhr-Coal District, probably rockburst West Germany

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Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
AUGUST 1977											
17.	DBN: ePKP eL F WTS: ePKP HEE: ePKP WIT: ePKP	03 04.4 04 03 03 03	27  40 27 27 27	10   09.5 13.0 07.0							17.9S 172.5W, H: 03 07 29.2 h 15 km. Mb 5.1, Ms 4.9 Tonga Islands region
17.	WTS: eP HEE: eP	04 04	35 35	04.0 12.0							49.8N 78.2E, H: 04 26 57.7 h 0 km. Mb 5.0 Eastern Kazakh SSR
17.	HEE: ePKP	06	01	54.0	+						19.1S 168.3E, H: 05 42 16.9 h 33 km. Mb 4.6 New Hebrides Islands
17.	DBN: eL F	11 11	37 54								40.9S 42.9E, H: 10 41 41.4 h 33 km. Mb 5.1 Atlantic-Indian Rise
17.	DBN: eL F WTS: eP HEE: eP	17 17 17 17	27 47 00 00	  16.5 23.5							51.9N 175.3W, H: 16 48 31.3 h 57 km. Mb 5.4 Andreanof Is., Aleutian Is.
18.	DBN: eL F	06 06	49 52								39.7N 25.5E, H: 06 38 36.3 h 4 km. Mb 4.7 Aegean Sea
18.	DBN: iP epP iS iZ eL F WTS: iP HEE: eP WIT: eP	09 09 09 09 09 10 09 09 09	32 32 36 36 38.4 22 32 32 32	26 36 20 51   17.9 14.0 25.5	+	4	3.0				35.2N 23.4E, H: 09 27 40.0 h 42 km. Mb 5.2, Ms 5.3 Crete
18.	DBN: iP eS eL F WTS: eP HEE: eP WIT: eP	12 12 12 14.0 12 12 12	11 21 39  11 11 11	37 29   36.0 43.0 32.5	+				20	1.4	46.6N 153.7E, H: 11 59 41.2 h 33 km. Mb 5.7, Ms 5.0 5.2 Kuril Islands
18.	WTS: eP HEE: eP WIT: eP	13 13 13	08 08 08	42.5 49.5 39.0							50.9N 174.7E, H: 12 56 51.9 h 33 km. Mb 5.3 Aleutian Islands region
18.	DBN: eL F	15 15	02 28								No determination of epicenter

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
AUGUST 1977											
18.	DBN: eL F	15	52								No determination of epicenter
18.	WTS: eP	16	41	08.5							No determination of epicenter
19.	DBN: ePP ePPP eSP eL F WTS: ePP	05	28	09 38 44 04 in next shock 03							11.1S 118.4E, H: 05 08 41.6 h 33 km. Mb 6.1, Ms 5.4 South of Sumbawa Island
19.	DBN: ePdiff iPP iPPP eSKKS eSP eL F WTS: ePdiff ePKP e HEE: ePdiff ePKP ePP WIT: ePKP ePP	06	23	46 28 50 14 00 03 12.0 47.0 23.0 26.0 51.0 28.0 29.0 25.0 27.0		18	340			7.9	11.1S 118.5E, H: 06 08 55.2 h 33 km. Mb 7.0, Ms 7.9 (At least 100 killed) South of Sumbawa Island
19.	DBN: ePP ePS eL F	13	43	00 38 24 16.3		20	2.6			5.8	10.8S 119.2E, H: 13 23 37.0 h 33 km. Mb 5.8, Ms 5.7 Sumba Island region
19.	WTS: iP HEE: eP WIT: eP	18	07	02.4 05.0 59.5	+						37.1N 116.1W, H: 17 55 00.1 h 0 km. Mb 5.6 Southern Nevada
19.	DBN: ePP ePS eL F	19	58	27 08.0 37 in next shock							10.8S 119.1E, H: 19 38 59.7 h 33 km. Mb 5.8, Ms 5.4 Sumba Island region
19.	DBN: eL F	21	19	in next shock							10.9S 119.1E, H: 20 20 18.6 h 33 km. Mb 5.8, Ms 5.2 Sumba Island region
19.	DBN: eL F	22	34	23.2							10.9S 119.2E, H: 21 35 03.3 h 33 km. Mb 5.8, Ms 5.1 Sumba Island region

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
AUGUST 1977											
20.	DBN: eP eS ePS eSS eL F WTS: eP ipP HEE: eP ipP WIT: eP	02 03 03 03 03 in next shock 02 02 02 02 02	58 08 08 13 22  58 58 58 58 58	14 07 38 12  16.0 20.3 15.0 19.0 18.0		19	4.3		5.8	16.6N 86.9W, H: 02 46 11.8 h 14 km. Mb 5.3, Ms 5.7 Caribbean Sea	
20.	DBN: eP eS ePS eSS eSSS eL F WTS: eP epP HEE: eP epP WIT: eP	04 04 04 04 04 04 07.2 04 04 04 04 04	03 13 14 18 22 28  03 04 03 04 03	52 47 20 47 13  57.0 08.0 55.0 06.0 59.0		18	5.4		5.9	16.7N 86.6W, H: 03 51 54.7 h 36 km. Mb 5.6, Ms 5.9 Caribbean Sea	
20.	DBN: ePP eSP eL F	09 09 10 12.5	41 50 16	27 55						11.1S 119.1E, H: 09 21 50.3 h 33 km. Mb 5.7, Ms 5.8 South of Sumba Island	
20.	WTS: ePKP HEE: ePKP	12 12	41 41	10.0 11.0						12.4S 167.1E, H: 12 22 11.1 h 242 km. Mb 5.1 Santa Cruz Islands	
20.	DBN: ePdiff ePP ePPP eSP eSS eL F WTS: ePP HEE: ePP	19 19 19 19 19 20 22.9 19 19	31 35 38 45 52.0 09  35 35	20 53 30 28  09  53.5 55.5		20	8.2		6.3	11.0S 119.1E, H: 19 16 32.7 h 33 km. Mb 6.0, Ms 6.1 South of Sumba Island	
20.	WTS: eP	22	08	25.5	+					64.2N 99.6E, H: 21 59 58.7 h 0 km. Mb 5.0 Central Siberia	
21.	WTS: ePKP	00	35	02.5						22.9S 173.9W, H: 00 15 16.1 h 33 km. Mb 4.8 Tonga Islands region	

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
AUGUST 1977											
21.	DBN: eL F	01 42 02 10									8.3N 104.1W, H: 00 57 14.2 h 33 km. Mb 4.5 Off coast of Mexico
21.	DBN: eL F	03 11 03 48									11.2S 119.0E, H: 02 12 25.5 h 33 km. Mb 5.4, Ms 5.0 South of Sumba Island
21.	DBN: e(P) eS eL F WTS: eP	05 32 14 05 42 28 06 01 06 55 05 32 03.5			18	2.0			5.5		Near east coast of Honshu, Japan
21.	DBN: ePKP2 eL F WTS: ePKP2 HEE: ePKP2	13 57 10 14 51 16.2 13 57 05.0 13 57 01.0									55.0S 136.0W, H: 13 36 32.6 h 33 km. Mb 4.8 South Pacific Cordillera
21.	WTS: ePKP2 HEE: ePKP2 WIT: ePKP2	19 55 29.0 19 55 34.5 19 55 26.0									30.0S 177.9W, H: 19 35 05.6 h 59 km. Mb 5.7 Kermadec Islands
21.	DBN: eL F	21 27 22.2									10.9S 119.2E, H: 20 29 41.5 h 33 km. Mb 5.6, Ms 5.4 Sumba Island region
23.	DBN: eL F WTS: ePKP e HEE: ePKP2	09 31 10 13 08 27 07.0 08 27 19.0 08 27 25.5									25.6S 176.2W, H: 08 07 12.9 h 49 km. Mb 5.4, Ms 4.9 South of Fiji Islands
23.	DBN: eL F WTS: ePP	11 26 11.9 10 43 32									11.4S 117.7E, H: 10 24 12.1 h 33 km. Mb 5.7, Ms 4.9 South of Sumbawa Island
23.	DBN: eL F WTS: eP	13 21 13.7 12 49 08.5									40.2N 143.3E, H: 12 36 55.2 h 17 km. Mb 5.0 Off east coast of Honshu, Japan
24.	DBN: eL F WTS: eP HEE: eP	04 30 05.1 03 57 30.0 03 57 37.0									27.0N 130.0E, H: 03 44 47.8 h 33 km. Mb 5.2 Ryukyu Islands
24.	DBN: eL F WTS: eP	10 49 10 57 10 24 03.0									54.1N 110.3E, H: 10 14 20.8 h 32 km. Mb 4.8, Ms 4.0 Lake Baikal region

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
AUGUST 1977											
24.	WTS: ePKP HEE: ePKP WIT: ePKP	13	51	29.5 33.5 27.5							17.9S 175.1W, H: 13 32 08.9 h 170 km. Mb 4.8 Tonga Islands
25.	WTS: ePKP HEE: ePKP epPKP	01	41	55.0 58.0 13.5							19.0S 169.4E, H: 01 22 48.2 h 254 km. Mb 4.8 New Hebrides Islands
25.	DBN: eL F WTS: ePKP	08 09 07	54 05 55	08							15.0S 177.3W, H: 07 35 33.7 h 33 km. Mb 5.1, Ms 5.2 Fiji Islands region
25.	WTS: iPKP HEE: ePKP	16	40	09.0 12.0	+						ISC: 18.0S 178.3W, H: 16 21 33.0, h 580 km, Mb 4.3. Fiji region.
25.	DBN: ePP ePPP eSP eSS eSSS eL F WTS: ePKP e HEE: ePKP e	18 18 18 18 18 18 21.1 18 18 18 18	24 27 34 40 44 56  23 34 23 34	32 08 08 20 42  47.0 38.0 49.0 31.5		19	5.2		6.1		10.7S 119.3E, H: 18 05 10.8 h 33 km. Mb 6.1, Ms 6.0 Sumba Island region
25.	DBN: eL F	22	50	23.7							10.8S 119.3E, H: 21 40 12.2 h 33 km. Mb 5.4, Ms 5.5 Sumba Island region
26.	WTS: eP	04	59	34.0							36.6N 71.3E, H: 04 51 18.2 h 186 km. Mb 4.7 Afghanistan-USSR border regio
26.	DBN: ePP eSP eL F WTS: e	08 08 09 11.2 08	46 55 23  45	05 44   48.5		20	2.7		5.8		10.7S 119.3E, H: 08 26 37.5 h 33 km. Mb 5.6, Ms 5.7 Sumba Island region
26.	HEE: ePKP WIT: ePKP	14	25	43.0 36.5							20.5S 169.8E, H: 14 06 17.8 h 164 km. Mb 5.0 New Hebrides Islands
26.	DBN: ePdiff ePP eSKS ePS eSS eSSS eL F WTS: ePKP eSP HEE: ePKP eSP	20 20 20 20 20 20 20 00.7 20 20 20 20	04 09 15 19 25 29 36  08 19 08 19	53 31 31 13 16 20  42.0 20.0 37.5 15.0		18	53		7.1		59.4S 20.5W, H: 19 50 01.4 h 33 km. Mb 6.3, Ms 7.1 Southwestern Atlantic Ocean

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
AUGUST 1977											
27.	DBN: ePdiff iPP eSKS iSP eSS eSSS eZ eL F WTS: ePKP e eSP HEE: ePKP ePP eSP WIT: ePKP eSP	07 07 07 07 07 07 07 08.1 12.9 07 07 07 07 07 07 07 07 07 07	27 32 37 41 48.0 52.4 53 53 31 31 41 31 32 41 31 41 31 41	13 05 48 35  37   05.0 52.0 33.0 06.0 03.5 38.0 04.5 29.5		19	2.6		6.8	8.1S 125.3E, H: 07 12 22.5 h 25 km. Mb 6.4, Ms 6.8 Timor	
28.	DBN: eP eS eL F WTS: eP HEE: eP e eS WIT: eP	09 09 09 10.7 09 09 09 09 09 09	48 51 52.0 10.7 48 48 48 51 48 48	40 20 0 36.0 21.0 27.0 20.0 46.5		18	8.0		4.8	38.2N 8.2E, H: 09 45 14.5 h 10 km. Mb 5.1, Ms 5.0 Western Mediterranean Sea	
28.	DBN: ePKP1 ePKP2 eL F WTS: ePKP HEE: ePKP	14 14 15 16.7 14 14	31 32 27 16.7 31 31	22 56 27 22.0 22.0						29.1S 177.1W, H: 14 11 30.3 h 44 km. Mb 5.5, Ms 5.5 Kermadec Islands	
28.	DBN: eSP eL F	20 21 22.7	40 05 22.7	15						1.1S 146.2E, H: 20 10 05.0 h 33 km. Mb 5.2, Ms 5.5 Admiralty Islands region	
28.	WTS: eP HEE: eP	23 23	58 58	29.5 31.5						28.0N 54.9E, H: 23 50 32.3 h 45 km. Mb 4.7 Southern Iran	
29.	DBN: eL F	08 08.5	19 08.5							1.2S 146.4E, H: 07 11 49.0 h 33 km. Mb 5.0, Ms 4.4 Admiralty Islands region	
29.	DBN: eL F	13 14.3	28 14.3							59.5S 21.3W, H: 12 32 39.6 h 33 km. Mb 5.2, Ms 5.4 Southwestern Atlantic Ocean	



SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
AUGUST 1977	29.	DBN: eP	14	36	44						17.4N 119.9E, H: 14 23 40.5 h 12 km. Mb 6.0, Ms 6.2 Philippine Islands region
	ePP	14	40	00							
	eS	14	47	19							
	eSP	14	48	43							
	eSS	14	53	51							
	eL	15	06			18	20.0			6.6	
	F	17.5									
	WTS: iP	14	36	40.3	+						
	ePP	14	40	17.0							
	HEE: eP	14	36	45.0	+						
ePP	14	40	22.0								
WIT: eP	14	36	38.5								
29.	DBN: eP	21	11	50						51.6N 174.0W, H: 20 59 59.2 h 25 km. Mb 5.4, Ms 5.1 Andreanof Is., Aleutian Is.	
eS	21	21	40								
eL	21	36									
F	22	45									
WTS: eP	21	11	50.0								
WIT: eP	21	11	46.0								
30.	DBN: eL	14	56.4							36.6N 21.6E, H: 14 45 03.6 h 36 km. Mb 4.6 Southern Greece	
F	15	01									
WTS: eP	14	49	21.5								
HEE: eP	14	49	18.0	+							
WIT: eP	14	49	30.0								
30.	DBN: eL	15	54							51.4N 173.8W, H: 15 12 27.6 h 33 km. Mb 5.4, Ms 5.0 Andreanof Is., Aleutian Is.	
F	16.7										
WTS: eP	15	24	18.0								
e	15	24	34.5								
HEE: eP	15	24	24.5								
WIT: eP	15	24	14.0								
30.	WTS: ePKP	20	01	45.0						ISC: 23.2S 174.7W, H: 19 41 44.2, h 33 km, Mb 5.0. Tonga region.	
HEE: ePKP	20	01	54.0								
31.	DBN: iP	00	54	09	+	10	7.5			7.3N 76.3W, H: 00 42 05.4 h 33 km. Mb 5.7, Ms 6.4 Northern Colombia	
iS	01	04	04								
ePS	01	04	52								
eSS	01	09	21								
eH	01	15	24								
eL	01	19			20	21.0			6.5		
F	04.9										
WTS: eP	00	54	13.0								
HEE: eP	00	54	10.0								
WIT: eP	00	54	13.0								
31.	WTS: eP	01	30	42.0						7.4N 76.2W, H: 01 18 35.1 h 95 km. Mb 4.9 Northern Colombia	

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
AUGUST 1977											
31.	DBN: eL F	06	58								No determination of epicenter
31.	DBN: eP eS eL F WTS: eP HEE: eP	08	26	25							37.7N 21.2E, H: 08 22 15.3 h 73 km. Mb 4.7 Southern Greece
31.	DBN: eL F	18	44								36.4N 68.9E, H: 18 20 04.2 h 44 km. Mb 4.9 Hindu Kush region

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
SEPT. 1977											
1.	DBN: eL F	00	29								29.1S 176.8W, H: 23 03 39.5 h 69 km. Mb 5.1 Kermadec Islands region
1.	DBN: eL F WTS: iP ePcP HEE: iP ePcP WIT: iP	03	16								73.4N 54.6E, H: 02 59 57.5 h 0 km. Mb 5.7 Novaya Zemlya
1.	DBN: eL F WTS: eP e e e HEE: eP e e WIT: eP	18	15								7.4N 76.3W, H: 17 37 06.8 h 28 km. Mb 5.3, Ms 4.9 Northern Colombia
1.	DBN: eL F	22	04								32.5S 179.6W, 20 46 06.8 h 38 km. Mb 5.1, Ms 4.9 South of Kermadec Islands
2.	WTS: iP HEE: ePKP2 WIT: ePKP	00	20	57.9	+						22.9S 179.1E, H: 00 02 11.1 h 590 km. Mb 4.9 South of Fiji Islands
2.	WTS: eP HEE: eP WIT: eP	05	54	15.5							26.4N 126.4E, H: 05 41 45.6 h 97 km. Mb 5.6 Ryukyu Islands
2.	DBN: ePP eSP eL F WTS: ePP	10	55	54		20	4.9		6.1		11.0S 119.1E, H: 10 36 28.3 h 33 km. Mb 6.0, Ms 5.9 South of Sumba Island
2.	WTS: eP ePcP HEE: eP WIT: eP	17	28	04.5	+						52.5N 158.9E, H: 17 16 35.1 h 33 km. Mb 4.9 Near east coast of Kamchatka
2.	WTS: ePn ePb ePg eSg HEE: ePn i ePg e eSg	22	48	20.0							48.0N 9.3E, H: 22 47 14.5 h 33 km. Germany

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
SEPT. 1977											
3.	DBN: eL F HEE: ePKP	13	04	13.4							15.3S 173.2W, H: 11 56 18.4 h 18 km. Mb 5.4, Ms 5.1 Tonga Islands
3.	WTS: eP	15	44	43.0							18.3N 71.2W, H: 15 33 43.4 h 50 km. Mb 4.5 Dominican Republic region
3.	DBN: eP eL F WTS: eP epP ePP HEE: eP epP	22	45	24 23 11 23.7 22 45 23.5 22 45 45.5 22 48 40.0 22 45 23.0 22 45 44.5							12.5N 87.5W, H: 22 33 07.0 h 79 km. Mb 5.3 Near coast of Nicaragua
4.	WTS: eP HEE: (eP)	08	22	37.0 25.0							34.1N 8.9E, H: 08 18 26.1 h 33 km. Mb 4.5 Tunisia
4.	DBN: ePKP ePP ePPP ePS ePPS eSKKS eSS eSSS eL F WTS: ePKP ePP HEE: ePKP ePP eSKP WIT: ePKP eSKP	09	07	56 49 54 08 16 36 11 34.0 52.0 12.2 09 08 01.0 09 10 51.0 09 07 57.5 09 11 00.0 09 11 39.0 09 08 01.0 09 11 33.5	9	4.5					13.7S 166.7E, H: 08 48 39.2 h 33 km. Mb 6.0, Ms 6.5 New Hebrides Islands
4.	DBN: eP ePPP eS ePS eSS eL F WTS: eP HEE: eP WIT: eP	15	52	48 40 36 14 38 18 in next shock 15 52 48.0 15 52 54.5 15 52 44.5		10	15.0				51.2N 178.4E, H: 15 40 57.3 h 34 km. Mb 5.6, Ms 6.4 Rat Is., Aleutian Is.
4.	WTS: eP HEE: eP WIT: eP	16	52	29.0 35.0 27.5		19	15.5			6.3	33.3N 140.7E, H: 16 39 48.5 h 17 km. Mb 5.6 South of Honshu, Japan

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
SEPT. 1977											
4.	DBN: eP eS F WTS: eP HEE: eP ePP WIT: eP	17 17 in next 17 17 17 17	22 32 shock 22 22 28 22	23 19  22.0 28.5 12.0 18.0							51.1N 178.3E, H: 17 10 30.6 h 31 km. Mb 5.5, Ms 6.4 Rat Is., Aleutian Is.
4.	DBN: eP eS F WTS: eP HEE: eP WIT: eP	17 17 21.8 17 17 17	36 46  36 36 36	38 36  37.0 44.0 33.5							51.1N 178.0E, H: 17 24 42.8 h 8 km. Mb 5.8, Ms 6.6 Rat Is., Aleutian Is.
4.	WTS: eP HEE: eP WIT: eP	17 17 17	50 50 50	14.5 20.5 11.0							51.2N 177.8E, H: 17 38 24.8 h 45 km. Mb 5.3 Rat Is., Aleutian Is.
4.	WTS: eP HEE: eP WIT: eP	18 18 18	37 37 37	39.0 46.0 35.5							51.2N 177.8E, H: 18 25 49.8 h 41 km. Mb 5.3 Rat Is., Aleutian Is.
4.	WTS: eP WIT: eP	19 19	34 34	52.0 48.5							51.2N 177.7E, H: 19 23 00.5 h 35 km. Mb 5.0, Ms 4.7 Rat Is., Aleutian Is.
4.	DBN: eL F WTS: eP HEE: eP WIT: eP	23 00.4 23 23 23	58  32 32 32	58  35.5 42.0 31.5							51.2N 178.2E, H: 23 70 44.9 h 41 km. Mb 5.5, Ms 5.3 Rat Is., Aleutian Is.
5.	WTS: iP ePcP HEE: iP WIT: eP e	03 03 03 03 03	11 12 11 11 12	06.1 52.5 14.2 03.5 41.5	+						50.1N 79.0E, H: 03 02 57.8 h 0 km. Mb 5.9 Eastern Kazakh SSR
6.	DBN eL F	05 06.2	39  06.2								10.4S 161.0E, H: 04 33 27.9 h 61 km. Mb 5.5 Solomon Islands
6.	DBN: eL F WTS: ePKP HEE: ePKP	09 11.3 09 09	57  11 11	57  24.5 24.5							6.1S 143.1E, H: 08 52 29.9 h 33 km. Mb 5.4, Ms 5.6 Papua New Guinea
6.	WTS: ePKP HEE: ePKP ePKP2 WIT: ePKP	17 17 17 17	56 56 56 56	04.5 07.5 18.0 02.5	+						22.2S 179.7W, H: 17 37 18.2 h 583 km. Mb 4.8 South of Fiji Islands

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
SEPT. 1977											
6.	WTS: ePKP HEE: ePKP ePKP2 WIT: ePKP	23	20	08.0 11.0 21.0 06.5							21.8S 179.1W, H: 23 01 24.3 h 593 km. Mb 5.1 Fiji Islands region
7.	DBN: eL F	02	18	02.9							11.1S 119.5E, H: 01 19 23.5 h 33 km. Mb 5.5, Ms 4.9 South of Sumba Island
7.	DBN: eL F	18	10	18.8							3.7S 151.3E, H: 17 10 44.1 h 14 km. Mb 5.0, Ms 4.8 New Ireland region
7.	WTS: eL F HEE: eL F	22	55.3	22 57 22 55.1 22 57							43.3N 0.3W, H: 22 50 35.7 h 33 km. Pyrenees
8.	WTS: ePKP epPKP HEE: ePKP epPKP WIT: ePKP	03	19	06.0 07.0 09.0 12.0 04.5							20.8S 177.9W, H: 03 00 15.2 h 505 km. Mb 5.1 Fiji Islands region
9.	WTS: eP e	02	45	44.5 47.0							43.0N 131.4E, H: 02 34 59.5 h 499 km. Mb 4.9 E. USSR-N.E. China border region
9.	WTS: iPKP ePKP2 HEE: iPKP ePKP2 WIT: ePKP	17	57	00.2 04.5 03.4 09.5 59.0	- -						20.1S 177.7W, H: 17 38 16.4 h 561 km. Mb 4.8 Fiji Islands region
10.	WTS: eP HEE: eP	01	01	03.5 02.0							34.6N 26.2E, H: 00 56 09.7 h 64 km. Mb 4.1 Crete
10.	WTS: ePKP HEE: ePKP WIT: ePKP	01	38	53.5 56.5 52.5							22.1S 179.5W, H: 01 20 08.4 h 587 km. Mb 5.1 South of Fiji Islands
10.	DBN: eS eL F WTS: eP ePP HEE: eP ePP WIT: eP	06	40	35 42.7 07.0 22.5 51.5 17.5 45.5 37.5							34.9N 23.0E, H: 06 31 41.8 h 33 km. Mb 4.6, Ms 5.1 Crete

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
SEPT. 1977											
10.	WTS: ePKP HEE: ePKP	09	43	35.0 39.0							15.7S 174.9W, H: 09 24 29.1 h 240 km. Mb 4.7 Tonga Islands
10.	WTS: eP HEE: eP WIT: eP	10	33	37.0 36.0 36.0							13.9N 91.7W, H: 10 21 11.5 h 78 km. Mb 5.6 Near coast of Guatamala
11.	DBN: eL F	06	31	07.4							59.6S 150.3E, H: 05 07 29.7 h 33 km. Mb 5.4, Ms 5.1 West of Maquarie Island
11.	DBN: eL F WTS: ePKP HEE: ePKP e epPKP	15	20	in next shock 14 27 38.5 14 27 35.0 14 27 39.0 14 27 46.0							15.4S 173.2W, H: 14 08 04.6 h 33 km. Mb 5.4, Ms 5.6 Tonga Islands
11.	DBN: ePKP ePP HEE: ePKP e	14	32	00 15 05.0 46.5							15.4S 173.3W, H: 14 12 29.9 h 33 km. Mb 5.3, Ms 5.6 Tonga Islands
11.	DBN: eP eS eL F WTS: iP HEE: eP WIT: eP	23	24	11 04 29 01.6 02.4 58.5 08.5	+	18	44.0	71.0	6.2		35.0N 23.0E, H: 23 19 23.7 h 33 km. Mb 5.8, Ms 6.0 Crete
11.	WTS: eP HEE: e(P)	23	36	25.5 25.0	-						35.1N 23.0E, H: 23 31 47.5 h 33 km. Mb 4.0 Crete
12.	DBN: eL F	02	13	03.0							No determination of epicenter
12.	DBN: eL F WTS: eP HEE: e(P)	03	09	03 18 03 02 35.0 03 02 33.0							35.0N 23.2E, H: 02 57 55.0 h 36 km. Mb 4.5 Crete
12.	DBN: eP eL F WTS: eP epP HEE: eP	14	29	00 51 15.5 14 29 01.5 14 29 08.0 14 28 54.5		5 19	2.2 3.4			5.6	12.8S 14.7W, H: 14 18 06.6 21 km. Mb 5.3, Ms 5.3 South of Atlantic Ridge

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
SEPT. 1977											
12.	WTS: eP ePP eS HEE: eP eS e	22	22	57.0 08.0 50.0 44.0 29.5 40.0							43.1N 1.0W, H: 22 20 28.9 h 33 km. Pyrenees
12.	WTS: eP HEE: eP	23	28	45.0 52.0							41.8N 138.4E, H: 23 16 50.7 h 32 km. Mb 5.2, Ms 5.1 Eastern Sea of Japan
12.	DBN: eL F	23	35								59.4S 25.9W, H: 22 39 58.1 h 33 km. Mb 5.3, Ms 5.2 South Sandwich Islands region
13.	DBN: ePKP ePP eL F WTS: ePKP HEE: ePKP	00	41	22 36 30 03.4 24.0 27.5		9 19	2.7 5.1			6.3	15.5S 173.3W, H: 00 21 52.6 h 33 km. Mb 5.7, Ms 6.0 Tonga Islands
13.	HEE: ePKP	04	19	19.0							15.5S 173.0W, H: 03 59 44.8 h 33 km. Mb 5.1 Tonga Islands
13.	DBN: eL F WTS: eP HEE: eP	13	18								35.0N 23.1E, H: 13 04 09.9 h 33 km. Mb 4.3 Crete
13.	DBN: eL F WTS: eP HEE: eP	19	07								15.5N 60.4W, H: 18 38 28.8 h 33 km. Mb 4.8 Leeward Islands
14.	DBN: eL F	06	28								37.0N 79.6E, H: 05 55 20.7 h 16 km. Mb 4.8 Southern Sinkiang Prov., China
14.	DBN: eSP eL F	15	19	57 44 in next shock							56.4S 25.7W, H: 14 51 03.9 h 38 km. Mb 5.9, Ms 5.9 South Sandwich Islands region
14.	DBN: eL F	17	06								No determination. of epicenter 17.6
14.	DBN: eL F WTS: eP HEE: eP e	19	03.6								35.0N 23.1E, H: 18 49 07.6 h 33 km. Mb 4.5 Crete



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Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
SEPT. 1977											
15.	DBN: eL F	12	01								10.4S 117.4E, H: 11 13 24.9 h 33 km. Mb 5.1, Ms 5.1 South of Sumbawa Island
15.	WTS: eP HEE: eP	15	58	18.5							34.9N 23.0E, H: 15 53 38.9 h 33 km. Mb 4.5 Crete
16.	WTS: ePKP2 HEE: ePKP2	03	30	07.0							29.7S 178.8W, H: 03 10 04.0 h 207 km. Mb 5.0 Kermadec Islands
16.	WTS: eP HEE: eP	07	12	35.5							30.1N 51.5E, H: 07 05 07.4 h 33 km. Mb 4.4 Iran
16.	DBN: eL F	22	28								56.4S 25.9W, H: 21 35 05.9 h 33 km. Mb 4.9, Ms 5.1 South Sandwich Islands region
16.	DBN: eP iS eL F WTS: iP HEE: iP i WIT: eP	23	50	03							46.3N 13.0E, H: 23 48 08.4 h 25 km. Mb 5.1, Ms 5.1 Northern Italy
		23	51	41							
		23	52.0								
		00.7									
		23	49	51.9	+						
		23	49	45.9	+						
		23	49	47.4	-						
		23	50	02.5							
17.	DBN: eP ePP eSKS eSP eSPP eSS eL F WTS: ePKP HEE: ePP e	05	37	48							11.8N 143.1E, H: 05 23 30.2 h 33 km. Mb 6.0, Ms 6.1 South of Mariana Islands
		05	42	07							
		05	48	30							
		05	51	32							
		05	52	19							
		05	57	27							
		06	11			18	7.0			6.2	
		08.3									
		05	41	52.0							
		05	42	06.0							
		05	42	13.0							
17.	WTS: eP eL HEE: eP eL	23	18	37.5							46.3N 12.9E, H: 23 16 51.5 h 10 km. Northern Italy
		23	20.7								
		23	18	30.5							
		23	20.4								
18.	WTS: eP HEE: eP	05	56	27.0							13.6N 90.0W, H: 05 44 09.3 h 108 km. Mb 5.0 Near coast of Guatamala
		05	56	26.5							
18.	WTS: eP	06	01	59.5							34.9N 23.3E, H: 05 57 19.3 h 33 km. Mb 4.3 Crete

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
SEPT. 1977											
18.	DBN: eL F WTS: ePKP HEE: ePKP	11 11 10 10	56 16 05 05	  33.0 26.0							13.6S 166.7E, H: 09 46 10.4 h 73 km. Mb 5.5 New Hebrides Islands
19.	WTS: ePb i HEE: ePn	00 00 00	01 01 01	12.5 25.2 58.0							48.0N 9.2E, H: 00 00 00.2 h 33 km. Germany
19.	WTS: iP HEE: eP WIT: eP	00 00 00	30 30 30	37.3 39.0 39.0	+						29.6N 51.3E, H: 00 23 06.0 h 35 km. Mb 4.7 Southern Iran
19.	DBN: ePdif) e(PKP) ePP ePPP eSKS eSP eSPP eSS eL F WTS: ePKP	05 05 05 05 05 05 05 05 06 08.1 05	27 31 32 34 38 41 42 47 05  31	46 46 13 40 23 40 44 40  37.0		18	2.3		5.8		2.0S 126.6E, H: 05 13 09.2 h 33 km. Mb 5.9, Ms 5.9 Ceram Sea
19.	WTS: eP	05	45	37.0							44.2N 149.7E, H: 05 33 38.0 h 56 km. Mb 4.9 Kuril Islands
19.	DBN: eL F HEE: ePKP	14 14 13	07 32 09	  22.5	+						16.4S 178.0E, H: 12 49 46.2 h 22 km. Mb 5.5, Ms 5.1 Fiji Islands
19.	WTS: ePKP ePKP2 HEE: ePKP ePKP2	14 14 14 14	37 37 37 37	34.0 50.0 37.5 56.0							27.8S 178.0W, H: 14 17 54.1 h 206 km. Mb 5.1 Kermadec Islands region
19.	WTS: eP	14	49	52.0							44.4N 149.5E, H: 14 37 52.3 h 33 km. Mb 5.0 Kuril Islands
20.	WTS: eP	02	11	57.0							44.0N 149.5E, H: 01 59 56.3 h 48 km. Mb 4.7 Kuril Islands
20.	DBN: eL F	17 18.0	11	 18.0							23.4S 68.3W, H: 16 23 13.3 h 114 km. Mb 5.3 Northern Chile
20.	WTS: eP eL	20 20	31 34.9	16.0  34.9							43.2N 18.6E, H: 20 28 18.8 h 33 km. Mb 4.6 Yugoslavia

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
SEPT. 1977	21.	DBN: eL	03	52							46.1N 141.3E, 03 12 42.5 h 59 km. Mb 4.8 Sakhalin Island
		F	04	11							
		WTS: eP	03	24	18.0						
		WIT: eP	03	24	15.0						
21.	DBN: ePKP	09	47	52							23.5S 175.2W, H: 09 27 59.5 h 15 km. Mb 5.5, Ms 5.3 Tonga Islands region
	eL	10	44								
	F	11.8									
	WTS: ePKP	09	47	48.5							
	e	09	47	54.5							
	HEE: ePKP	09	47	57.5							
	WIT: ePKP	09	47	53.5							
21.	DBN: eP	13	28	50							20.0N 109.2W, H: 13 15 57.3 h 33 km. Mb 5.7, Ms 4.7 Revilla Gigedo Islands region
	ePP	13	32	19							
	eS	13	39	36							
	ePS	13	40	36							
	eL	13	55								
	F	14	50								
21.	WTS: eP	15	01	09.5	-						56.7N 152.4W, H: 14 49 54.6 h 20 km. Mb 4.8 Kodiak Island region
21.	DBN: eL	18	11								55.7N 162.3E, H: 17 39 38.8 h 48 km. Mb 5.1, Ms 4.9 Near east coast of Kamchatka
	F	19.0									
	WTS: eP	17	50	51.5							
21.	DBN: iP	21	12	52	-	7	5.5				51.8N 155.2E, H: 21 01 44.0 h 231 km. Mb 5.6 Northwest of Kuril Islands
	epP	21	13	49							
	ePP	21	15	26							
	epPP	21	16	31							
	eS	21	22	08							
	esS	21	23	44							
	F	00.0									
	WTS: iP	21	12	50.8	-						
	epP	21	13	50.5							
	HEE: eP	21	12	58.0	-						
	WIT: iP	21	12	47.3	-						
	epP	21	13	47.0							
	23.	DBN: eL	03	05.3							
F		03.5									
WTS: iP		03	01	27.9	-						
eS		03	04	12.0							
eL		03	05.5								
HEE: eP		03	01	16.0							
eS		03	04	08.5							
eL		03	05.5								
WIT: ePP		03	01	39.0							

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
SEPT. 1977											
23.	DBN: ePP eL F WTS: ePP HEE: ePP WIT: ePP	06 06 08.5 06 06 06	17 55  17 17 17	12   11.0 16.5 13.0							11.2S 118.2E, H: 05 57 55.6 h 33 km. Mb 6.0, Ms 5.4 South of Sumbawa Island
23.	DBN: eL F	14 14	24 32								No determination of epicenter
24.	WTS: eP HEE: eP	20 20	47 47	45.0 44.5							35.1N 23.2E, H: 20 43 08.9 h 64 km. Mb 4.3 Crete
25.	WTS: eP HEE: eP	03 03	17 16	01.5 57.0	+						34.9N 23.1E, H: 03 12 23.5 h 64 km. Mb 4.2 Crete
25.	DBN: eL F	07 07.6	11								55.5S 26.5W, H: 06 12 54.2 h 33 km. Mb 5.2, Ms 5.0 South Sandwich Islands region
25.	DBN: eL F	16 16.9	39								55.6S 26.4W, H: 15 39 08.8 h 33 km. Mb 5.1 South Sandwich Islands region
25.	WTS: iPKP epPKP HEE: ePKP e epPKP WIT: ePKP	16 16 16 16 16 16	33 36 33 34 36 33	48.9 12.0 52.0 01.5 13.5 47.5	-						21.8S 179.5W, H: 16 15 05.9 h 606 km. Mb 5.4 Fiji Islands region
25.	DBN: eL F	19 20.1	30								11.3S 117.2E, H: 18 31 39.1 h 33 km. Mb 5.6, Ms 4.9 South of Sumbawa Island
25.	WTS: eP HEE: eP	20 20	01 01	46.5 46.5							38.7N 31.0E, H: 19 56 56.7 h 18 km. Mb 4.3 Turkey
26.	WTS: eP WIT: eP	01 01	48 48	24.5 20.5							52.7N 159.4E, H: 01 36 55.4 h 33 km. Mb 4.6 Off east coast of Kamchatka
26.	DBN: ePKP eSS eL F	05 05 06 07.6	16 41 14	56 24		18	2.3		6.0		60.0S 150.6E, H: 04 56 57.1 h 33 km. Mb 5.3, Ms 5.7 West of Maquarie Island
26.	WTS: eP e	08 08	32 32	48.5 50.5							53.4N 160.7E, H: 08 21 21.7 h 43 km. Mb 4.8, Ms 4.6 Near east coast of Kamchatka

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
SEPT. 1977											
26.	DBN: eL F WTS: eP	20	22								25.4N 68.2E, H: 19 48 48.5 h 33 km. Mb 4.5 Pakistan
27.	DBN: eL F	04	00								62.8S 168.2E, H: 02 37 41.5 h 33 km. Mb 5.0 Balleny Islands region
27.	WTS: ePKP e HEE: ePKP WIT: ePKP	17	41	53.5	+						21.5S 174.3W, H: 17 22 05.8 h 33 km. Mb 5.0 Tonga Islands
28.	WTS: ePP HEE: eP e	01	45	07.5							46.2N 12.9E, H: 01 43 13.8 h 10 km. Northern Italy
28.	WTS: ePKP HEE: ePKP WIT: ePKP	12	31	58.0							21.5S 174.2W, H: 12 12 10.3 h 33 km. Mb 5.6, Ms 4.8 Tonga Islands
29.	DBN: eL F	02	51								No determination of epicenter
29.	WTS: ePKP e HEE: ePKP WIT: iPKP	18	51	09.0							18.3S 172.8W, H: 18 31 29.4 h 33 km. Mb 5.3 Tonga Islands region
30.	WTS: eP HEE: e(P)	07	05	39.5							47.8N 48.1E, H: 06 59 55.6 h 0 km. Mb 5.1 Western Kazakh SSR
30.	DBN: eL F WTS: epP HEE: epP	07	48								11.2N 85.8W, H: 07 10 25.3 h 66 km. Mb 5.2 Nicaragua
30.	HEE: iPKP	21	42	33.8	+						16.0S 172.9W, H: 21 22 57.5 h 33 km. Mb 5.4, Ms 5.5 Samoa Islands region

SEISMOLOGICAL BULLETIN

Date OCT. 1977	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms	
		h	m	s			Z	NS	EW			
2.	DBN: eL F	13	53			18	6.2			6.1	11.6N 121.6E, H: 13 02 57.2 h 33 km. Mb 5.4 Ms 5.6 Panay, Philippine Islands.	
2.	DBN: eL F	19	33								9.0S 79.2W, H: 18 46 35.6 h 46 km. Mb 5.3 Ms 4.7 Off coast of northern Peru.	
3.	DBN: eL F WTS: eP	05	03								14.1N 48.2W, H: 04 38 33.7 h 33 km. Mb 5.1 Ms 4.7 North Atlantic Ocean.	
3.	WTS: ePKP e	05	08	11.0							20.4S 168.3E, H: 04 48 33.6 h 33 km. Mb 5.4 Loyalty Islands.	
3.	DBN: eL F	06	19								2.6S 149.9E, H: 05 19 50.2 h 12 km. Mb 4.9 Ms 5.1 New Ireland region.	
3.	WTS: ePKP e HEE: ePKP e	12	40	01.5							20.4S 168.3E, H: 12 20 21.5 h 11 km. Mb 5.1 Loyalty Islands.	
3.	WTS: iPKP HEE: ePKP WIT: ePKP	19	22	46.8	+						20.4S 178.2W, H: 19 04 01.5 h 547 km. Mb 4.6 Fiji Islands region.	
3.	HEE: ePKP2	19	56	17.0	-						30.1S 176.8W, H: 19 35 30.1 h 33 km. Mb 4.8 Kermadec Islands region.	
3.	WTS: eP	22	57	57.5	-						0.5N 98.7E, H: 22 44 52.3 h 13 km. Mb 5.5 Ms 4.7 Northern Sumatra.	
4.	WTS: eP	13	55	59.0							10.4N 62.3W, H: 13 44 52.0 h 21 km. Mb 5.1 Ms 4.9 Near coast of Venezuela.	
5.	DBN: iP iS eL F WTS: iP eS eL HEE: iP eS eL WIT: iP	05	39	45	-	5	8.0			23.0	5.6	41.0N 33.4E, H: 05 34 46.8 h 33 km. Mb 5.3 Ms 5.8 Turkey.

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Date OCT. 1977	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
	5. DBN: eL F	11	57								29.0S 176.9W, H: 10 27 46.3 h 56 km. Mb 5.4 Ms 5.7 Kermadec Islands region.
	5. WTS: iPKP	13	48	40.5	-						22.6S 175.7W, H: 13 28 50.6 h 33 km. Mb 4.8 Tonga Islands region.
	5. DBN: ePKP ePP WTS: iPKP i ePP HEE: ePKP i ePP WIT: iPKP	14	34	03	-						18.6S 177.7W, H: 14 15 24.3 h 573 km. Mb 5.6 Fiji Islands region.
	5. HEE: eP	16	11	25.0							ISC: 34.7N 23.0E, H: 16 07 35, h 42 km, Mb 4.6. Mediterranean Sea.
	6. DBN: eL F	07	38								56.7N 34.4W, H: 07 26 52.0 h 33 km. Mb 4.5 North Atlantic Ocean.
	6. WTS: iP	14	39	20.5	-						No determination of epicenter.
	7. DBN: ePP eSP eSSS eL F	05	05	06							10.0S 117.3E, H: 04 45 43.2 h 33 km. Mb 5.7 Ms 5.6 South of Sumbawa Island.
	7. DBN: ePP eSP eSS eL F WTS: ePP HEE: ePP	12	30	04		20	6.8		6.2		10.0S 117.3E, H: 12 10 43.7 h 33 km. Mb 5.9 Ms 6.3 South of Sumbawa Island.
	7. DBN: eL F	15	48								11.3S 119.3E, H: 14 38 36.6 h 33 km. Mb 5.5 South of Sumba Island.
	7. DBN: eL F	17	57								9.9S 117.3E, H: 17 01 13.2 h 33 km. Mb 5.6 Ms 5.6 Sumbawa Island region.

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
OCT. 1977											
7.	DBN: eL F	18	35								9.8S 117.3E, H: 17 36 46.2 h 33 km. Mb 5.8 Ms 5.8 Sumbawa Island region.
7.	DBN: eL F	20	01								10.0S 117.2E, H: 19 04 16.8 h 33 km. Mb 5.7 Ms 5.4 South of Sumbawa Island.
7.	DBN: eL F	22	31								9.9S 117.3E, H: 21 36 11.3 h 33 km. Mb 5.8 Ms 5.5 Sumbawa Island region.
7.	DBN: eL F	23	51								9.9S 117.4E, H: 22 47 03.9 h 33 km. Mb 5.3 Ms 5.7 Sumbawa Island region.
8.	WTS: eP e ipP HEE: eP e ipP WIT: e(P) e epP	03	16	48.0							9.5S 74.7W, H: 03 03 51.5 h 129 km. Mb 5.5 Peru.
		03	17	19.0							
		03	17	22.0							
		03	16	45.0							
		03	17	16.5							
		03	17	19.0							
		03	16	56.5							
		03	17	20.0							
		03	17	22.5							
8.	WTS: iPKP HEE: ePKP e WIT: iPKP	17	38	10.0	-						21.6S 179.3W, H: 17 19 27.9 h 605 km. Mb 5.0 Fiji Islands region.
		17	38	13.0	-						
		17	38	23.0	-						
		17	38	08.2	-						
8.	DBN: iPP eL F WTS: eP HEE: eP ePP	21	24	21		20	5.7	3.5	6.0		13.3N 124.5E, H: 21 06 52.8 h 32 km. Mb 5.4 Ms 5.5 Luzon, Philippine Islands.
		21	54								
		22.8									
		21	20	22.0							
		21	20	26							
		21	24	13							
9.	DBN: eL F	11	07								9.9S 117.3E, H: 10 03 21.9 h 33 km. Mb 5.6 Ms 5.1 Sumbawa Island region.
		11	28								
9.	WTS: eP	11	06	04.0							73.6N 53.2E, H: 11 00 00.3 h 0 km. Mb 4.5 Novaya Zemlya.
10.	WTS: ePn HEE: ePg WIT: eSn	06	07	53.5							46.0N 1.5W, H: 06 05 55.9 h 33 km. France.
		06	08	11.5							
		06	09	40							



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Date OCT. 1977	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
10.	DBN: iPKP	12	13	43	-	9	54				25.9S 175.4W, H: 11 53 53.6 h 33 km. Mb 6.6 Ms 7.2 South of Tonga Islands.
	iZ	12	13	46	-						
	iPP	12	17	38							
	eSS	12	37	20							
	eSSS	12	43.3								
	eL	12.9				19		62	7.4		
	F	17.5									
	WTS: ePKP	12	13	42.0	-						
	i	12	13	44.4	-						
	i	12	13	49.9							
	ePP	12	17	37.0							
	e	12	27	05							
	HEE: ePKP	12	13	44.5							
	i	12	13	52.4	-						
	ePP	12	17	46.5							
e	12	27	07								
WIT: ePKP	12	13	44.0	-							
i	12	13	49.8								
ePP	12	17	30								
10.	WTS: ePKP	13	22	07.5	+					26.0S 175.5W, H: 13 08 40.7, h 33 km, Mb 5.4.	
	iPKP?	13	22	18.1	-					South of Tonga.	
10.	WTS: ePKP	13	28	39.5						26.0S 175.5W, H: 13 08 40.7	
	e	13	28	52.0						h 33 km. Mb 5.4 South of Tonga Islands.	
11.	DBN: eL	15	06							29.5N 128.3E, H: 14 21 10.4	
	F	15	28							h 27 km. Mb 5.0 East China Sea.	
11.	WTS: ePn	19	09	48.5						ISC: 51.2N 11.6E, H: 19 08 56, h 33 km. Germany.	
12.	WTS: ePKP	05	37	44.0	+					21.5S 179.3W, H: 05 19 03.8	
	HEE: ePKP	05	37	47.0						h 620 km. Mb 5.0 Fiji Islands region.	
13.	WTS: iPKP	01	04	30.6	+					18.2S 178.4W, H: 00 45 56.0	
	HEE: iPKP	01	04	34.4	+					h 596 km. Mb 5.1	
	WIT: ePKP	01	04	28.5	+					Fiji Islands region.	
13.	DBN: eL	01	55							54.5S 144.7E, H: 00 39 36.3	
	F	02	47							h 33 km. Mb 5.3 Ms 5.7 West of Macquarie Island.	
13.	WTS: iP	07	09	40.0	+					9.5N 93.9E, H: 06 57 27.5	
	WIT: eP	07	09	41.5						h 33 km. Mb 5.0 Nicobar Islands region.	

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Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
OCT. 1977	13. DBN: eL	10	22							No determination of epicenter.	
	F	10	40								
13.	DBN: eL	12	09							23.5N 93.4E, H: 11 32 09.3 h 61 km. Mb 5.2 Burma-India border region.	
	F	12	22								
	WTS: iP	11	43	15.6	+						
	ipP	11	43	32.1	+						
HEE: ipP	11	43	36.8	+							
13.	DBN: eL	22	00							9.5N 93.8E, H: 21 18 56.9 h 33 km. Mb 5.1 Ms 4.9 Nicobar Islands region.	
	F	22	27								
	WTS: eP	21	31	10.5							
	HEE: eP	21	31	15.0							
	e	21	31	21.5							
WIT: eP	21	31	08.5								
13.	DBN: eL	23	59							12.2S 78.0W, H: 23 16 27.2 h 26 km. Mb 5.2 Ms 4.5 Off coast of Peru.	
	F	00	21								
14.	DBN: ePKP	05	15	04	+					15.7S 173.0W, H: 04 55 34.8 h 33 km. Mb 5.9 Ms 5.7 Tonga Islands.	
	eL	06	05								
	F	07	10								
	WTS: iPKP	05	15	05.8	-						
	HEE: iPKP	05	15	09.3	+						
	e	05	17	43.5							
WIT: iPKP	05	14	59.4	+							
14.	WTS: ePKP	11	11	34.5						19.2S 175.7W, H: 10 52 19.7 h 250 km. Mb 5.2 Tonga Islands.	
	WIT: iPKP	11	11	32.6	+						
14.	WTS: ePKP	12	48	22.5						15.4S 167.4E, H: 12 29 13.8 h 125 km. Mb 5.7 New Hebrides Islands.	
	HEE: ePKP	12	48	27.5							
	WIT: ePKP	12	48	30.0							
14.	DBN: eL	20	03							40.0S 16.1W, H: 19 16 56.1 h 33 km. Mb 4.8 South Atlantic Ridge.	
	F	20	13								
14.	WTS: e(P)	20	13	50.0						46.2N 12.9E, H: 20 11 58.1 h 33 km. Northern Italy.	
	e	20	14	49.0							
	HEE: e	20	13	59.0							
15.	WTS: ePKP	21	17	26.0						22.4S 178.2W, H: 20 58 15.0 h 346 km. Mb 4.5 South of Fiji Islands.	
	HEE: ePKP	21	17	30.5							

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms	
		h	m	s			Z	NS	EW			
OCT. 1977	16. DBN: iP	02	11	31	+	5	3.6				47.1N 153.9E, H: 01 59 36.6 h 33 km. Mb 5.6 Ms 5.6 Kuril Islands.	
	ePP	02	14	28								
	eS	02	21	23								
	eSS	02	27.0									
	eL	02	34			20		3.8	3.6	5.7		
	F	03	30									
	WTS: eP	02	11	29.0	+							
	i	02	11	30.0	-							
	HEE: eP	02	11	36.0	+							
	i	02	11	37.0	-							
	WIT: eP	02	11	26.0								
	i	02	11	26.8	-							
	16. DBN: eL	03	43									18.6S 12.8W, H: 03 07 50.5 h 21 km. Mb 5.3 South Atlantic Ridge.
	F	04	13									
WTS: iP	03	19	16.8	+								
ipP	03	19	22.8									
HEE: eP	03	19	09.5									
epP	03	19	16.0									
ePP	03	21	47									
16. WTS: eP	10	57	07.5							47.4N 153.6E, H: 10 45 17.6 h 42 km. Mb 4.7 Kuril Islands.		
16. DBN: ePKP2	13	34	47							30.1S 176.9W, H: 13 14 05.0 h 20 km. Mb 5.2 Ms 5.7 Kermadec Islands region.		
eZ	13	38	38									
eL	14	36										
F	15	31										
WTS: iP	13	34	34.1	+								
HEE: ePKP2	13	34	39.0									
16. DBN: eL	19	52								47.1N 153.9E, H: 19 11 08.9 h 33 km. Mb 5.1 Kuril Islands.		
F	20	16										
WTS: eP	19	23	01.5									
HEE: eP	19	23	09.0	-								
WIT: eP	19	22	59.0									
16. DBN: ePP	21	28	28								9.7S 117.1E, H: 21 09 17.7 h 33 km. Mb 5.6 Ms 5.8 Sumbawa Island region.	
eL	22	01			20			3.9	6.0			
F	23.7											
WTS: ePKP	21	27	50.0									
17. WTS: iP	03	58	08.6	+						25.9N 98.8E, H: 03 46 49.3 h 33 km. Mb 4.7 Burma-China border region.		
HEE: eP	03	58	13.5									
WIT: eP	03	58	07.5	+								

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Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
OCT. 1977											
17.	WTS: eP	06	41	47.0							18.4N 70.3W, H: 06 30 52.1 h 58 km. Mb 4.7 Ms 4.0 Dominican Republic region.
17.	DBN: eL F	11 12	40 12								0.9S 126.9E, H: 10 41 09.1 h 70 km. Mb 5.6 Molucca Passage.
17.	DBN: iPKP ePPS eSS eSSS eL F	17 18 18 18 18	46 03 10.0 16.0 27	31 32	+	6	4.5				27.9S 173.1E, H: 17 26 40.4 h 33 km. Mb 6.3 Ms 6.7 North of New Zealand.
	WTS: iPKP i ePP	17 17 17	46 46 50	29.8 38.0 30	+						
	HEE: iPKP e iPKP2 ePP	17 17 17 17	46 46 46 50	32.0 40.0 56.8 33	+						
	WIT: ePKP i e ePKP2	17 17 17 17	46 46 46 46	29.0 37.0 43.5 55.5	+						
17.	HEE: ePKP2 e	19 19	32 32	37.0 44.5							27.9S 173.7E, H: 19 12 20.2 h 33 km. Mb 5.1 North of New Zealand.
18.	DBN: eL F	07 07	08 27								2.0N 132.7E, H: 06 07 21.8 h 33 km. Mb 5.1 Ms 4.3 West Irian region.
18.	DBN: eL F WTS: eP HEE: eP WIT: eP	21 21 20 20 20	06 30 34 34 34	14.0 23.0 12.5							46.9N 154.3E, H: 20 22 20.2 h 33 km. Mb 5.1 Kuril Islands region.
18.	DBN: ePKP WTS: iPKP epPKP HEE: iPKP epPKP WIT: ePKP	23 23 23 23 23 23	43 43 45 43 45 43	12 13.0 39.0 16.3 47.0 11.0	+						18.0S 178.4W, H: 23 24 39.2 h 603 km. Mb 5.3 Fiji Islands region.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms	
		h	m	s			Z	NS	EW			
OCT. 1977	19. DBN: ePKP	02	41	26							20.7S 174.0W, H: 02 21 40.4 h 33 km. Mb 5.3 Ms 5.5 Tonga Islands.	
	eL	03	34									
	F	04.7										
	WTS: ePKP	02	41	23.0								
	HEE: ePKP	02	41	29.5								
	WIT: ePKP	02	41	25.0								
	19. DBN: eP	06	43	18	+	6	1.5					27.8N 54.9E, H: 06 35 10.9 h 33 km. Mb 5.6 Ms 5.2 Southern Iran.
	ePP	06	45	08								
	eS	06	49	48								
	eSS	06	53.0									
eL	06	56			20		2.6		5.6			
F	08.0											
WTS: iP	06	43	10.2	+								
ePP	06	45	04									
HEE: iP	06	43	12.3	+								
WIT: iP	06	43	12.3	+								
19. WTS: iP	08	01	35.6	-						18.1S 175.2W, H: 07 42 24.5 h 259 km. Mb 5.1 Tonga Islands.		
HEE: iP	08	01	39.2	-								
WIT: iP	08	01	33.4	-								
19. DBN: eL	17	57								39.2N 91.0E, H: 17 29 24.8 h 33 km. Mb 5.1 Ms 4.0 Southern Sinkiang Province, China.		
F	18	22										
WTS: eP	17	39	12.0									
e	17	39	15.0									
HEE: eP	17	39	18.5									
e	17	39	21.0									
19. DBN: eP	21	32	22							49.3N 155.6E, H: 21 20 41.6 h 62 km. Mb 5.3 Kuril Islands.		
eL	21	59										
F	22	29										
WTS: iP	21	32	22.0	-								
HEE: eP	21	32	29.0	-								
WIT: eP	21	32	18.0	-								
19. WTS: eP	21	34	08.0							34.8N 24.9E, H: 21 29 21.1 h 56 km. Mb 4.3 Crete.		
e	21	34	11.5									
HEE: e	21	34	18									
19. DBN: eL	23	24								22.6N 121.6E, H: 22 39 34.1 h 158 km. Mb 5.5 Taiwan region.		
F	23	45										
WTS: iP	22	52	00.6	-								
e	22	52	19.5									
HEE: iP	22	52	05.9	-								
e	22	52	16.0									
WIT: iP	22	51	59.4	-								

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
OCT. 1977	20. DBN: iP	05	52	00	+	20			2.6	5.5	47.2N 154.1E, H: 05 40 05.7 h 44 km. Mb 5.4 Ms 5.4 Kuril Islands.
	eS	06	01	48							
	eL	06	15								
	F	07	48								
	WTS: eP	05	51	57.5	+						
	HEE: eP	05	52	04.0							
	WIT: eP	05	51	56.0							
	e	05	52	06.0							
20. WTS: eP	06	17	15.0								47.2N 154.1E, H: 06 05 22.1 h 33 km. Mb 5.0 Kuril Islands.
20. WTS: eP	08	09	03.5								47.2N 153.9E, H: 07 57 10.1 h 37 km. Mb 5.2 Kuril Islands.
20. DBN: eL	08	53			-						56.4N 164.1E, H: 08 18 07.0 h 40 km. Mb 5.2 Ms 4.9 Komandorsky Islands region.
F	09	40									
WTS: eP	08	29	18.5								
HEE: eP	08	29	25.5								
WIT: eP	08	29	15.0	+							
epP	08	29	25.5								
20. DBN: eL	10	02									
	F	10	18								
20. DBN: eL	12	35									9.8S 117.1E, H: 11 35 23.5 h 33 km. Mb 5.3 Ms 5.3 Sumbawa Island region.
	F	13	21								
21. WTS: eP	00	57	54.5								47.2N 154.0E, H: 00 46 02.0 h 33 km. Mb 4.8 Kuril Islands.
21. DBN: eL	01	45									30.9N 131.5E, H: 01 00 30.1 h 68 km. Mb 5.0 Kyushu, Japan.
	F	02	00								
22. WTS: eP	01	35	09.0								7.1N 72.9W, H: 01 23 27.0 h 169 km. Mb 5.3 Northern Colombia.
	epP	01	35	49.5							
	HEE: eP	01	35	07.0							
	epP	01	35	46.0							
	WIT: epP	01	35	49							

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
OCT. 1977	22. DBN: eP	10	06	56						35.0N 23.2E, H: 10 02 09.1 h 33 km. Mb 5.0 Ms 4.3 Crete.	
	eS	10	10	50							
	eL	10	13								
	F	10	32								
	WTS: iP	10	06	48.9	+						
	HEE: eP	10	06	47.0	+						
	WIT: eP	10	06	56.5							
22. WTS: eP	18	07	29.5						28.0S 62.9W, H: 17 54 45.9 h 603 km. Mb 5.3 Santiago del Estero Province, Argentina.		
HEE: iP	18	07	25.4	+							
22. DBN: iP	18	09	56	-					28.0S 63.0W, H: 17 57 17.4 h 614 km. Mb 6.1 Santiago del Estero Province, Argentina.		
ipP	18	12	10								
esP	18	13	09								
iPP	18	14	04								
iPPP	18	16	03								
iZ	18	17	11								
iSKS	18	19	37								
iS	18	20	37								
eSP	18	22	08								
eSSS	18	31	09								
F	20.4										
WTS: iP	18	09	59.8	-							
ipP	18	12	15.0								
ePP	18	14	04.0								
ePPP	18	16	01								
HEE: iP	18	09	55.0	-							
ipP	18	12	12.0								
ePP	18	14	05.0								
e	18	15	50.0								
WIT: eP	18	10	04.0	-							
ePP	18	14	15.0								
ePPP	18	16	10								
22. WTS: iPKP	21	17	05.3	-					15.6S 177.0W, H: 20 58 15.9 h 392 km. Mb 4.5 Fiji Islands region.		
HEE: iPKP	21	17	09.1	+							
22. WTS: iPKP	23	53	08.2	+					22.0S 179.1W, H: 23 34 14.4 h 510 km. Mb 4.7 South of Fiji Islands.		
HEE: ePKP	23	53	11.0								
WIT: ePKP	23	53	06.5								
23. WTS: iPKP	03	04	45.4	-					21.7S 179.4W, H: 02 46 02.2 h 592 km. Mb 5.0 Fiji Islands region.		
e	03	04	50.5	+							
HEE: ePKP	03	04	48.5	-							
e	03	04	58.0	+							
WIT: ePKP	03	04	43.5	-							

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms				
		h	m	s			Z	NS	EW						
OCT. 1977	23. DBN: iPKP	10	51	28	-	5	2.1			21.5S 170.3E, H: 10 31 53.1 h 89 km. Mb 5.6 Loyalty Islands region.					
	epPKP	10	51	49											
	eL	11	45												
	F	12	03												
	WTS: iPKP	10	51	24.8	-										
	i	10	51	25.0	+										
	ipPKP	10	51	49.6	+										
	HEE: ePKP	10	51	27.5	+										
	i	10	51	30.8	-										
	ipPKP	10	51	53.8											
	WIT: ePKP	10	51	24.0	+										
	i	10	51	25.4	-										
	epPKP	10	51	47.5											
	23. DBN: eL	19	37												52.7N 31.1W, H: 19 26 25.4 h 33 km. Mb 4.5 Ms 4.2 North Atlantic Ridge.
	F	19	48												
WTS: eP	19	31	31.0												
HEE: eP	19	31	31.0												
24. WTS: ePKP2	00	40	35.0							30.5S 177.8W, H: 00 20 05.7 h 19 km. Mb 5.4 Kermadec Islands.					
HEE: ePKP2	00	40	40.0												
24. WTS: eP	05	43	18							34.5N 26.8E, H: 05 38 18.5 h 33 km. Mb 4.4 Crete.					
HEE: e(P)	05	43	19.5												
24. DBN: eP	06	03	24							52.2N 31.6W, H: 05 58 27.8 h 33 km. Mb 4.9 Ms 5.0 North Atlantic Ridge.					
iS	06	07	32												
eL	06	09.0													
F	06	34													
WTS: iP	06	03	34.6	+											
i	06	03	37.7	-											
HEE: eP	06	03	32.5												
i	06	03	34.2	+											
24. DBN: eL	20	06								63.5S 172.2E, H: 18 43 42.5 h 33 km. Mb 5.1 Ms 5.2 Balleny Islands region.					
F	20	46													
25. DBN: eL	07	49								9.7S 117.2E, H: 06 50 44.6 h 33 km. Mb 5.6 Ms 5.4 Sumbawa Island region.					
F	08	22													
25. DBN: eL	18	29								40.8N 79.1E, H: 18 00 35.1 h 29 km. Mb 4.7 Southern Sinkiang Province, China.					
F	18	39													



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Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
OCT. 1977	25. DBN: eZ	19	08	.2						No determination of epicenter.	
	F	19	09								
26.	DBN: eL	03	34							15.6S 177.3W, H: 02 20 35.1 h 33 km. Mb 4.8 Ms 5.5 Fiji Islands region.	
	F	04	14								
	WTS: ePKP	02	40	12.0							
	HEE: ePKP	02	40	10.5							
	e	02	40	19.0							
26.	DBN: eL	12	34							15.6S 177.4W, H: 11 20 16.1 h 41 km. Mb 5.0 Ms 5.7 Fiji Islands region.	
	F	13	28								
	HEE: ePKP	11	39	49.0							
26.	WTS: e(Pg)	14	45	33						No determination of epicenter.	
26.	DBN: eP	15	22	50						51.1N 178.3E, H: 15 10 58.8 h 33 km. Mb 5.6 Ms 5.2 Rat Islands, Aleutian Islands.	
	eL	15	48								
	F	16	46								
	WTS: eP	15	22	49.0							
	HEE: eP	15	22	57.0							
	WIT: eP	15	22	45.5							
26.	WTS: eP	17	10	09.0						31.5N 51.2E, H: 17 02 51.2 h 48 km. Mb 4.7 Iran.	
	HEE: eP	17	10	11.5							
27.	WTS: iP	00	29	49.4	+					29.7N 50.7E, H: 00 22 22.3 h 34 km. Mb 4.8 Southern Iran.	
	HEE: eP	00	29	51.0							
	WIT: eP	00	29	51.5							
27.	DBN: eL	07	10							35.5N 27.6E, H: 06 59 27.3 h 52 km. Mb 4.9 Ms 4.8 Dodecanese Islands.	
	F	07	34								
	WTS: eP	07	04	24.0							
	e	07	04	32.0							
	HEE: eP	07	04	17.5							
	i	07	04	26.0	+						
27.	WTS: iP	11	48	03.3	+					23.6S 179.9W, H: 11 29 09.8 h 532 km. Mb 5.0 South of Fiji Islands.	
	epPKP	11	50	11.0							
	HEE: epPKP	11	50	14.5							
27.	DBN: eL	13	21							16.4S 177.5W, H: 12 06 19.2 h 33 km. Mb 5.1 Fiji Islands region.	
	F	13	43								
	WTS: ePKP	12	25	57.0							
	HEE: ePKP	12	25	57.0	-						

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Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
OCT. 1977											
27.	DBN: eL F	13 14	46 30								55.3S 129.0W, H: 12 31 11.8 h 33 km. Mb 5.1 Ms 5.4 South Pacific Cordillera.
27.	WTS: iPKP HEE: ePKP	18 18	12 12	55.0 58.0	+						20.9S 179.2W, H: 17 54 15.9 h 622 km. Mb 4.8 Fiji Islands region.
27.	DBN: eP eS eL F WTS: eP i HEE: eP WIT: eP	22 22 22 23 22 22 22 22	48 52 54.0 18 48 48 48 48	21 22 54.0 18 08.5 12.0 08.5 18.5	+						38.0N 27.9E, H: 22 43 32.5 h 24 km. Mb 4.7 Ms 4.7 Turkey.
28.	WTS: eP HEE: eP	00 00	45 45	50.0 49.0							38.0N 28.0E, H: 00 41 11.7 h 12 km. Mb 4.0 Turkey.
28.	WTS: eP	17	53	56.0	-						No determination of epicenter.
28.	WTS: iPKP HEE: ePKP e	23 23 23	33 33 33	29.9 33.0 45.0	- + +						23.7S 179.8W, H: 23 14 33.6 h 502 km. Mb 4.8 South of Fiji Islands.
29.	DBN: eL F WTS: iP ePcP HEE: iP ePcP WIT: eP ePcP	03 03 03 03 03 03 03 03	34 37 15 16 15 16 15 16								49.8N 78.2E, H: 03 06 57.7 h 0 km. Mb 5.5 Eastern Kazakh SSR.
29.	WTS: eP HEE: eP WIT: eP	03 03 03	15 15 15	11.0 19.0 09.0							50.1N 78.9E, H: 03 07 02.9 h 0 km. Mb 5.6 Eastern Kazakh SSR.
29.	WTS: ePKP i HEE: ePKP	10 10 10	34 34 34	19.5 22.0 15.5	- +						14.4S 167.3E, H: 10 15 12.1 h 184 km. Mb 5.1 New Hebrides Islands.
29.	WTS: eP	10	45	45.5							47.1N 153.2E, H: 10 33 56.7 h 59 km. Mb 4.5 Kuril Islands.

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Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
OCT. 1977											
29.	WTS: iPKP	17	35	38.5	-						20.7S 178.0W, H: 17 16 52.2 h 538 km. Mb 4.8 Fiji Islands region.
29.	HEE: ePKP	18	46	39.0							16.2S 177.9W, H: 18 27 03.1 h 33 km. Mb 4.8 Fiji Islands region.
	e	18	46	47.0							
29.	DBN: ePP	20	36	27							6.2S 146.6E, H: 20 15 45.1 h 106 km. Mb 5.9 East Papua New Guinea region.
	eL	21	16								
	F	21	46								
	WTS: epPKP	20	35	02.5							
	HEE: epPKP	20	35	04.5							
29.	DBN: eL	21	54								7.3N 78.3W, H: 21 13 28.4 h 38 km. Mb 4.8 Panama.
	F	22	07								
	WTS: eP	21	25	43.5							
	HEE: eP	21	25	41.0							
30.	WTS: iPKP	01	23	50.0	-						20.7S 178.4W, H: 01 05 06.2 h 567 km. Mb 5.1 Fiji Islands region.
	HEE: ePKP	01	23	53.0	-						
	WIT: iPKP	01	23	48.3	-						
30.	DBN: eL	02	50								10.2S 118.7E, H: 01 50 59.1 h 33 km. Mb 5.7 Ms 5.3 South of Sumbawa Island.
	F	03	29								
30.	WTS: ePKP	06	44	05.5							20.4S 178.6W, H: 06 25 30.0 h 600 km. Mb 5.6 Fiji Islands region.
	i	06	44	10.3	-						
	epPKP	06	46	30.0							
	HEE: ePKP	06	44	08.5							
	i	06	44	13.5	-						
	epPKP	06	46	32.0							
	WIT: ePKP	06	44	05.0							
	i	06	44	09.0	-						
30.	DBN: eL	13	59								14.9S 167.0E, H: 12 53 22.8 h 103 km. Mb 5.6 New Hebrides Islands.
	F	14	42								
	WTS: ePKP	13	12	43.0							
	eSKP	13	16	08.0	-						
	HEE: ePKP	13	12	39.0							
	eSKP	13	16	11.5	-						
30.	WTS: ePKP	16	45	46.0							27.2S 176.7W, H: 16 25 58.0 h 47 km. Mb 5.2 Kermadec Islands region.
	HEE: ePKP	16	45	52.0							

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
OCT. 1977											
30.	DBN: eL F	23 00	53 11								27.4S 176.4W, H: 22 27 01.9 h 57 km. Mb 5.3 Ms 4.7 Kermadec Islands region.
31.	WTS: ePKP HEE: ePKP	13 13	27 27	03.0 04.0							20.7S 174.8W, H: 13 07 27.8 h 86 km. Mb 4.8 Tonga Islands.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
NOV. 1977	1. WTS: ePKP HEE: iPKP	08	45	13.0	-						22.8S 174.6W, H: 08 25 22.1 h 33 km. Mb 4.9 Ms 5.0 Tonga Islands region.
	1. WTS: eP(n)	18	34	25							No determination of epicenter.
	2. DBN: eL F HEE: ePKP	02 03 01	33 04 39								15.4S 173.3W, H: 01 19 27.9 h 30 km. Mb 5.3 Ms 4.8 Tonga Islands.
	2. DBN: eL F	12 12	00 30								49.7S 116.3W, H: 10 48 51.0 h 33 km. Mb 5.0 Ms 5.4 Easter Island Cordillera.
	2. WTS: iPg iSb HEE: iPg iSg i	14 14 14 14 14	42 43 42 42 42	58.1 12.8 49.0 53.5 59.3	+  +  -						BNS: 51.0N 6.5E, H: 14 42 39.5 h 10 km. Mloc. 3.3 Germany.
	2. WTS: iPKP HEE: ePKP WIT: iPKP	23 23 23	55 55 55	39.4 42.5 37.8	-  -						17.3S 179.2W, H: 23 37 03.3 h 555 km. Mb 5.1 Fiji Islands region.
	3. DBN: eP eS eL F WTS: eL HEE: eL WIT: eP e	02 02 02 03 02 02 02 02	26 29 30.7 18 31.0 30.7 26 27	48 52   45.0 19.5	+    -  -						42.1N 24.0E, H: 02 22 54.9 h 6 km. Mb 5.2 Ms 5.1 Bulgaria.
	4. DBN: eL F	03 03	11 15								No determination of epicenter.
	4. DBN: eL F	04 04	46 49								No determination of epicenter.
	4. DBN: eP eS eSS eSSS eL F WTS: eP HEE: eP	10 10 10 10 10 14 10 10	04 14 19 23 25.5 14 04 04	45 40 40 06 25.5 14 45.0 51.0		6    18	3.0    13.9			6.3	51.7N 176.0W, H: 09 52 55.7 h 33 km. Mb 5.7 Ms 6.7 Andreanof Islands, Aleutian Islands.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
NOV. 1977											
4.	DBN: eP eL F	18	19	21							51.4N 175.6W, H: 18 07 31.3 h 33 km. Mb 5.4 Ms 5.4 Andreanof Islands, Aleutian Islands.
5.	DBN: eL F	07	09								10.1S 161.0E, H: 06 02 57.6 h 70 km. Mb 5.6 Solomon Islands.
5.	DBN: eP eL F WTS: eP	14	55	53							51.5N 175.5W, H: 14 44 03.3 h 33 km. Mb 5.3 Ms 5.6 Andreanof Islands, Aleutian Islands.
5.	WTS: iPn i i e HEE: ePn e WIT: ePn	22	55	21.0	+						Probably Ruhrcaol district.
6.	WTS: iPg i iSn HEE: iPg iPn iSg iSn WIT: iPg i eSn eSb e	01	23	11.7	+						50.9N 6.7E, H: 01 22 51.4 h 27 km. BNS: Mloc. 3.5 Germany.
6.	HEE: iPg eSg	01	24	08.2	+						After shock BNS: Mloc. 3.1 Germany.
6.	WTS: eP HEE: eP	02	50	57.0							42.1N 24.1E, H: 02 48 44.9 h 23 km. Mb 4.8 Bulgaria.
6.	WTS: eP WIT: eP	07	46	16.0	-						51.3N 179.8W, H: 07 34 25.4 h 33 km. Mb 5.0. Andreanof Islands, Aleutian Islands.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
NOV. 1977	7. WTS: e	00	24	20.5						47.9N 9.0E, H: 00 23 09.5 h 33 km Germany.	
	ePg	00	24	32.5							
	e	00	24	36.0							
	eSg	00	25	29.0							
	HEE: iPn	00	24	05.4	-						
	ePg	00	24	19.5							
	e	00	24	36.0							
	eSg	00	25	04.5							
WIT: ePg	00	24	50.5								
7.	WTS: eP	08	31	28.5						46.4N 153.2E, H: 08 19 31.1 h 33 km. Mb 4.9 Ms 4.3 Kuril Islands.	
7.	HEE: ePKP	13	41	14.0						16.3S 174.7W, H: 13 21 36.7 h 33 km. Mb 4.8 Tonga Islands.	
7.	WTS: ePKP	23	16	15.5						7.2S 156.1E, H: 22 57 15.8 h 75 km. Mb 5.7 Solomon Islands.	
	epPKP	23	16	33.0							
	HEE: ePKP	23	16	19.0							
	DBN: eL	24	05								
	F	24	19								
8.	DBN: eL	04	35							12.2N 123.9E, H: 03 47 20.3 h 33 km. Mb 5.2 Ms 5.3 Luzon, Philippine Islands.	
	F	06	10								
8.	WTS: ePKP	11	57	36.0						18.7S 172.8W, H: 11 37 55.4 h 33 km. Mb 5.1 Tonga Islands region.	
	e	11	57	55.0							
	HEE: ePKP	11	57	40.0							
	WIT: ePKP	11	57	33.5							
8.	DBN: eL	15	37							47.4N 154.3E, H: 14 59 10.4 h 33 km. Mb 5.5 Ms 4.6 Kuril Islands.	
	F	16.2									
	WTS: iP	15	11	02.3	+						
	epP	15	11	12.0							
	HEE: eP	15	11	09.0							
8.	WTS: eP	21	49	03.5						34.8N 15.6E, H: 21 44 47.7 h 33 km. Mb 4.4 Mediterranean Sea.	
	HEE: eP	21	48	53.5	+						
9.	WTS: iS	14	19	23.7						63.2N 2.3E, H: 14 14 45.8 h 33 km. Mb 4.6 Norwegian Sea.	
	e	14	19	28.0							
	HEE: eS	14	19	44.5							
	e	14	20	15.0							

SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
NOV. 1977											
9.	WTS: iP HEE: iP WIT: eP	22	12	02.4	+						37.1N 116.1W, H: 22 00 00.1 h 0 km. Mb 5.7 Ms 4.0 Southern Nevada.
10.	WTS: iP KP	09	19	27.2	+						26.0S 179.9W, H: 09 00 21.7 h 476 km. Mb 5.1 South of Fiji Islands.
10.	DBN: eL F	10	13	10.5							9.5S 123.3E, H: 09 13 37.0 h 37 km. Mb 5.0 Ms 5.4 Timor.
12.	WTS: iP KP iPKP2 HEE: iP KP iPKP2	19	23	37.8 42.3 40.9 46.5	-						20.5S 177.8W, H: 19 04 48.0 h 507 km. Mb 5.0 Fiji Islands region.
13.	DBN: eL F	22	01	22 27							19.2N 121.2E, H: 21 12 46.3 h 33 km. Mb 5.2 Ms 5.2 Philippine Islands region.
16.	WTS: iP epP	19	48	11.7 26.5	-						41.9N 142.3E, H: 19 36 14.2 h 69 km. Mb 5.1 Hokkaido, Japan region.
17.	DBN: eL F WTS: eP HEE: eP epP WIT: eP	18	04	18 26							33.6N 139.9E, H: 17 20 32.6 h 112 km. Mb 5.5 South of Honshu, Japan.
18.	DBN: iP iPcP iS eSS eL F WTS: iP HEE: iP WIT: eP	05	30	27 11 48 52 47 08.0	+	5	2.2				32.7N 88.4E, H: 05 20 11.3 h 33 km. Mb 5.7 Ms 6.5 Tibet.
						19		75		6.9	
						22			50		
18.	DBN: eP iSKS eSP eL F	10	31	15 53 52 04 13.0	+						4.4S 102.0E, H: 10 17 41.0 h 33 km. Mb 5.5 Ms 5.9 Southern Sumatra.



SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
NOV. 1977	18. WTS: ePn	15	13	07.0							50.9N 9.8E, H: 15 12 33.2 h 33 km. Germany.
	e	15	13	23.5							
	eSn	15	13	34.0							
18. DBN: eL	17	58									32.6N 88.3E, H: 17 23 24.4 h 33 km. Mb 4.9 Tibet.
F	18	13									
18. DBN: eL	23	50									32.7N 88.4E, H: 23 12 49.5 h 33 km. Mb 4.7 Tibet.
F	23	57									
19. DBN: eL	01	43									56.0S 27.8W, H: 00 42 46.8 h 141 km. Mb 5.5 South Sandwich Islands region.
F	01	52									
19. WTS: ePKP	06	22	36.5								17.8S 178.7W, H: 06 04 04.2 h 612 km. Mb 4.7 Fiji Islands region.
HEE: ePKP	06	22	40.0	+							
WIT: ePKP	06	22	34.5								
21. DBN: eL	03	25									29.3N 113.0W, H: 02 50 03.4 h 33 km. Mb 5.2 Ms 5.6 Gulf of California.
F	04.5										
WTS: iP	03	02	34.0	+							
e	03	02	50.5								
HEE: eP	03	02	36.0								
WIT: eP	03	02	31.5								
21. WTS: iP	23	25	00.4	+							29.3S 179.0W, H: 23 05 12.4 h 330 km. Mb 4.8 Kermadec Islands region.
HEE: ePKP2	23	25	06.5								
ePP	23	28	54.0								
22. WTS: ePKP	08	59	08.0								19.1S 177.0W, H: 08 39 31.5 h 90 km. Mb 5.0 Fiji Islands region.
22. DBN: ePP	16	18	16								10.2S 161.1E, H: 15 56 44.1 h 92 km. Mb 5.9 Solomon Islands.
e	16	30	11								
eSSS	16	42.0									
eL	16	59									
F	in next shock										
WTS: ePKP	16	15	53.5								
HEE: ePKP	16	15	56.5								
22. DBN: eL	17	43									6.5S 129.4E, H: 16 46 40.7 h 33 km. Mb 5.6 Banda Sea.
F	18.3										

## SEISMOLOGICAL BULLETIN

Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
NOV. 1977											
22.	DBN: eL F	21 22	59 15								39.4N 123.3W, H: 21 15 52.5 h 5 km. Mb 5.2 Near coast of Northern California.
23.	DBN: eP e e ePP eSKS eSP ePPS eSS eL F WTS: eP e HEE: eP e WIT: ePP e	09 09 09 09 09 09 09 09 10.2 14.4 09 09 09 09 09	40 40 43 44 51 54 54 59  40 40 40 44 45	32 59 29 47 08 04 46 48  32.0 44.0 29.5 39.5 58.5 07.0	+	10	9.5				31.0S 67.8W, H: 09 26 24.7 h 13 km. Mb 6.3 Ms 7.4 San Juan Province, Argentina. 70 reported killed, nearly 300 injured.
						19	123		7.4		
23.	DBN: eL F	17 18.0	32								52.2N 171.5W, H: 16 55 20.4 h 53 km. Mb 5.5 Ms 5.5 Fox Islands, Aleutian Islands.
24.	DBN: eL F	02 03.8	49								31.5S 67.6W, H: 01 57 32.0 h 33 km. Mb 5.6 Ms 5.8 San Juan Province, Argentina.
24.	HEE: ePKP	17	19	25							21.9S 139.0W, H: 16 59 58.5 h 0 km. Mb 6.0 Ms 4.5 Tuamotu Archipelago region.
26.	WTS: iPKP HEE: ePKP WIT: iPKP	05 05 05	40 40 40	18.2 21.5 16.3	+						18.0S 178.1W, H: 05 21 40.8 h 564 km. Mb 5.5 Fiji Islands region.
26.	HEE: ePKP	09	34	12.0							15.3S 174.4W, H: 09 14 51.2 h 133 km. Mb 5.3 Tonga Islands.
26.	WTS: ePKP esPKP	11 52	52 28.0	16.0							ISC: 23.4S 175.2W, H: 11 32 24, h 62 km. Tonga region.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
NOV. 1977	26. DBN: eL	23	26							39.5N 117.9E, H: 22 46 52.2 h 33 km. Mb 5.1 Northeastern China.	
	F	23	43								
	WTS: eP	22	58	08.0							
	epP	22	58	15.5							
27.	DBN: eP	02	33	27						11.8N 125.5E, H: 02 19 52.3 h 33 km. Mb 5.5 Ms 5.7 Samar, Philippine Islands.	
	ePP	02	37	32							
	ePPP	02	39	56							
	eSP	02	46	30							
	eL	03.1				20		3.6	7.1		6.2
	F	04.2									
	HEE: eP	02	33	30.0							
	epP	02	33	37.0							
e	02	33	53.0								
27.	DBN: iP	08	48	03	+	7	5.5			46.4N 153.3E, H: 08 36 05.7 h 33 km. Mb 5.5 Ms 5.7 Kuril Islands.	
	ePP	08	52	56							
	eS	08	58	10							
	eSS	09	03	36							
	eL	09	11			20	6.6				6.0
	F	11.8									
	WTS: iP	08	48	01.6	-						
	HEE: eP	08	48	10.5	-						
WIT: eP	08	47	57.5								
27.	WTS: ePP	09	52	20.0						0.8S 120.6E, H: 09 33 47.1 h 65 km. Mb 5.5 Northern Sulawesi.	
	HEE: ePP	09	52	27.0							
	e		52	32.5							
27.	WTS: ePKP	10	39	19.0						21.0S 176.4W, H: 10 19 54.6 h 199 km. Mb 4.2 Fiji Islands region.	
	ePKP2	10	39	23.5							
	HEE: ePKP	10	39	23.5							
27.	WTS: iP	12	58	55.8	+					20.5S 178.4W, H: 12 40 15.0 h 558 km. Mb 5.6 Fiji Islands region.	
	ePKP2	12	58	59.0							
	e	13	01	15.5							
	HEE: ePKP	12	58	58.0							
	ePKP2	12	59	03.5							
	e	13	01	18.5							
	WIT: iP	12	58	57.1	-						
	i	12	58	58.4	+						
27.	WTS: iP	15	16	01.3	+					58.6N 155.4W, H: 15 05 06.8 h 116 km. Mb 4.9 Alaska Peninsula.	
	HEE: eP	15	16	07.0							
	epP	15	16	36.0							
	e	15	16	43.5							

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
NOV. 1977	27. DBN: eL	18	27								41.5S 90.6W, H: 17 28 04.2 h 33 km. Mb 5.3 Ms 4.8 Southern Pacific Ocean.
	F	18	47								
	27. WTS: ePKP	19	08	14.5							17.3S 178.7W, H: 18 49 33.9 h 495 km. Mb 4.5 Fiji Islands region.
	HEE: ePKP	19	08	19.0							
	28. DBN: eP	03	04	05		8	2.0				36.1N 27.8E, H: 02 59 10.8 h 85 km. Mb 5.6 Dodecanese Islands.
	ePP	03	04	27							
	eS	03	08	09							
	eL	03	09.5								
	F	03	32								
	WTS: iP	03	03	56.6	+						
	e	03	04	03.5							
	HEE: iP	03	03	55.1	+						
	WIT: eP	03	04	02.5							
	e	03	04	04.5							
	28. DBN: eL	05	13								15.3N 91.4W, H: 04 36 52.5 h 225 km. Mb 5.1 Mexico-Guatamala border region.
	F	05	45								
	WTS: iP	04	48	54.3	+						
	ePP	04	52	06.0							
	HEE: iP	04	48	52.9	+						
	28. DBN: eL	05	55								30.6N 41.9W, H: 05 35 22.7 h 33 km. Mb 4.8 North Atlantic Ridge.
	F	05	58								
	28. DBN: eL	06	33								30.8S 67.9W, H: 05 39 22.0 h 10 km. Mb 5.4 Ms 4.9 San Juan Province, Argentina.
	F	in next shock									
	28. DBN: ePP	06	49	55							31.4S 67.4W, H: 06 31 29.3 h 16 km. Mb 5.7 Ms 5.8 San Juan Province, Argentina.
	eL	07	20								
	F	09.2									
	29. DBN: eL	00	05								31.7S 67.6W, H: 23 08 00.5 h 33 km. Mb 4.8 San Juan Province, Argentina.
	F	00	09								
	29. WTS: iP	00	09	39.4	-						43.8N 148.1E, H: 23 57 38.7 h 38 km. Mb 4.9 Kuril Islands region.
	e	00	09	57.0							
	e	00	10	08.5							

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
NOV. 1977	30. DBN: eL	04	34.9							50.0N 78.9E, H: 04 06 57.5 h 0 km. Mb 5.9 Ms 3.5 Eastern Kazakh SSR.	
	F	04	37								
	WTS: iP	04	15	06.2	+						
	iPcP	04	16	53.3							
	HEE: iP	04	15	14.3	+						
	WIT: iP	04	15	03.9	+						
	ePP	04	16	43.0							
30. DBN: ePKP	10	34	25						20.6S 178.4W, H: 10 15 43.4 h 550 km. Mb 5.5 Fiji Islands region.		
e	10	34	35								
ePP	10	37	35								
WTS: iP	10	34	25.3	+							
iPKHKP	10	34	29.2								
ePKP2	10	34	34.5								
epPKP	10	36	40.0								
HEE: iP	10	34	27.6	+							
iPKHKP	10	34	32.2								
ePKP2	10	34	40.0								
epPKP	10	36	43.0								
WIT: iP	10	34	25.3	+							
30. DBN: eL	13	00								12.5N 141.5E, H: 12 08 04.9 h 32 km. Mb 5.4 Ms 4.9 South of Mariana Islands.	
F	13	23									
30. WTS: iP	22	07	56.8	+					17.7S 179.0W, H: 21 49 18.0 h 539 km. Mb 5.2 Fiji Islands region.		
HEE: ePKP	22	08	01.5								
WIT: ePKP	22	07	55.0								

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
DEC. 1977											
	1. DBN: eL F	16	21								3.8S 149.5E, H: 15 15 20.0 h 33 km. Mb 5.4 Bismarck Sea.
	1. WTS: iP epP HEE: eP e	21	19	25.8	+						27.7N 56.6E, H: 21 11 17.9 h 33 km. Mb 5.1 Southern Iran.
	2. DBN: eL F	00	43								40.5S 78.7E, H: 23 43 09.9 h 33 km. Mb 5.0 Mid-Indian Rise.
	2. DBN: ePP ePPP eL F WTS: ePKP epPKP ePKKP e HEE: ePKP epPKP	04	34	17							5.0S 145.0E, H: 04 13 53.8 h 66 km. Mb 5.7 East Papua New Guinea region.
	2. DBN: eL F WTS: iP HEE: iP ePcP WIT: iP	13	33								52.9N 159.7E, H: 12 57 10.7 h 15 km. Mb 5.8 Ms 5.1 Off east coast of Kamchatka.
	2. DBN: eL F	18	48								No determination of epicenter.
	3. WTS: eP ePP	05	43	07.5							40.2N 19.9E, H: 05 39 29.5 h 27 km. Mb 5.1 Albania.
	3. WTS: iP e HEE: eP	12	36	31.1	-						9.3N 84.7W, H: 12 24 06.7 h 59 km. Mb 4.8 Costa Rica.
	3. WTS: iP HEE: eP	12	46	23.7	+						19.1N 69.6W, H: 12 35 38.2 h 81 km. Mb 5.0 Dominican Republic region.
	3. DBN: eL F WTS: iP HEE: eP e WIT: eP	14	30								3.5N 95.9E, H: 13 41 20.9 h 41 km. Mb 5.8 Ms 5.9 Off west coast of northern Sumatra.

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
DEC. 1977	3. WTS: ePKP	18	19	19.5							22.0S 174.9W, H: 17 59 31.3 h 33 km. Mb 5.3 Tonga Islands region.
	HEE: ePKP	18	19	23.5							
4.	DBN: ePKP2	06	10	45							23.9S 176.1W, H: 05 50 35.6 h 56 km. Mb 5.6 Ms 6.2 South of Fiji Islands.
	eL	07	05								
	F	08	09								
	WTS: ePKP	06	10	20.0							
	e	06	10	26.0							
	e	06	10	48.0							
	HEE: ePKP	06	10	29.0							
	WIT: ePKP	06	10	24.5							
4.	WTS: iP	11	49	50.5	+						48.2N 146.6E, H: 11 39 02.8 h 479 km. Mb 5.1 Sea of Okhotsk.
	e	11	49	52.0							
	WIT: eP	11	49	48.5							
4.	WTS: iP	14	42	33.6	-						18.3S 176.4W, H: 14 23 24.0 h 272 km. Mb 5.2 Fiji Islands region.
	HEE: ePKP	14	42	37.5	-						
	WIT: iP	14	42	31.9	-						
5.	DBN: eL	15	30								23.9S 175.9W, H: 14 13 52.0 h 33 km. Mb 5.5 Ms 5.9 South of Fiji Islands.
	F	in next shock									
	WTS: PKP	14	33	45.0							
	e	14	34	39.5							
	HEE: PKP	14	33	47.0							
WIT: ePKP2	14	33	50.0								
5.	DBN: eL	16	38								31.0S 67.7S, H: 15 43 27.9 h 32 km. Mb 5.4 Ms 5.6 San Juan Province, Argentina.
	F	17	19								
6.	DBN: eL	09	35								31.1S 67.7W, H: 08 41 39.3 h 35 km. Mb 5.6 Ms 5.1 San Juan Province, Argentina.
	F	09	51								
6.	DBN: eL	11	17								41.4N 69.7E, H: 10 52 53.5 h 33 km. Mb 5.2 Kirgiz SSR.
	F	11	26								
	WTS: eP	11	00	53.0							
	ePP	11	02	36.0							
6.	DBN: eL	14	38								24.8S 175.8W, H: 13 07 23.7 h 33 km. Mb 4.9 Ms 4.7 South of Tonga Islands.
	F	14	51								
6.	DBN: eL	17	58								31.2S 67.7W, H: 17 05 06.4 h 19 km. Mb 5.9 Ms 5.9 San Juan Province, Argentina.
	F	in next shock									

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Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
DEC. 1977											
6.	DBN: eL F	18	49								11.2S 118.3E, H: 17 52 35.2 h 33 km. Mb 5.7 Ms 5.6 South of Sumbawa Island.
7.	DBN: eL F	05	43								19.9 S 11.9W, H: 05 06 05.5 h 33 km. Mb 5.0 Ms 5.2 South Atlantic Ridge.
7.	WTS: ePKP HEE: ePKP WIT: ePKP	06	19	38.0							24.1S 175.6W, H: 05 59 44.3 h 33 km. Mb 5.2 Ms 4.7 South of Tonga Islands.
8.	DBN:e(PKP2) ePP eL F WTS: ePKP HEE: ePKP WIT:e(PKP2)	06	35	34							24.2S 175.6W, H: 06 15 16.2 h 33 km. Mb 5.5 Ms 6.1 South of Tonga Islands.
		06	38	52							
		07	36								
		08	50								
		06	35	11.3	+						
		06	35	14.0							
		06	35	21.5							
8.	WTS: iPKP HEE: iPKP	12	33	24.1							17.8S 173.7W, H: 12 14 00.5 h 151 km Mb 5.1 Tonga Islands.
		12	33	28.1							
9.	WTS: ePKP2 e HEE: ePKP2 e	05	21	40.0							23.5S 176.0W, H: 05 01 38.1 h 33 km. Mb 5.1 Ms 4.6 South of Fiji Islands.
		05	21	44.5							
		05	21	42.0							
		05	21	48.0							
9.	DBN: eP eL F WTS: eP HEE: eP WIT: eP	15	58	13							38.3N 27.2E, H: 15 53 36.7 h 19 km. Ms 4.6 Turkey.
		16	04.5								
		16	12								
		15	58	08.0							
		15	58	07.0							
		15	58	15.0							
9.	WTS: iPKP HEE: ePKP2	21	50	28.3	-						24.1S 175.7W, H: 21 30 34.6 h 33 km. Mb 5.1 South of Tonga Islands.
		21	50	42.0							
10.	WTS: iPKP HEE: ePKP WIT: ePKP	00	49	08.3	+						21.5S 179.5W, H: 00 30 27.8 h 619 km Mb 4.9 Fiji Islands region.
		00	49	12.0							
		00	49	07.0							
10.	DBN: eL F WTS: eP HEE: eP WIT: eP	06	10								27.7N 56.6E, H: 05 46 22.9 h 47 km. Mb 5.1 Ms 5.0 Southern Iran. 3 reported killed and 15 injured.
		06	33								
		05	54	29.5							
		05	54	32.0							
		05	54	32.0							



SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
DEC. 1977											
10.	DBN: eL F	08	02								31.2S 67.6W, H: 07 11 56.0 h 39 km. Mb 5.6 Ms 4.8 San Juan Province, Argentina.
10.	WTS: iP	20	16	46.4	-						ISC: 46.9N 152.5E, H: 20 05 07.3, h 144 km, Mb 4.3. Kurile Islands.
10.	WTS: iP i e HEE: eP WIT: eP	23	23	15.2 16.1 18.5 23.0 12.0	-						47.6N 152.8E, H: 23 11 37.1 h 128 km. Mb 5.2 Kuril Islands.
11.	WTS: iP HEE: iP ePcP	16	33	46.1 42.5 57.5	+ + -						9.5N 69.6W, H: 16 22 08.6 h 18 km. Mb 5.6 Ms 5.0 Venezuela.
12.	DBN: eL F WTS: iP HEE: eP WIT: eP	03	31								23.1N 121.4E, H: 02 44 03.4 h 26 km. Ms 5.1 Taiwan.
12.	WTS: e ePKP HEE: ePKP WIT: ePKP	06	06	40.0 44.0 47.0 43.0							22.4S 170.6E, H: 05 47 03.2 h 33 km. Mb 5.3 Loyalta Islands region.
12.	WTS: iP HEE: ePKP WIT: iP	08	57	16.4 20.5 14.7	- - -						17.8S 175.1W, H: 08 38 00.2 h 202 km. Mb 5.3 Tonga Islands.
12.	DBN: eL F	21	22								57.5S 148.1W, H: 20 03 45.1 h 33 km. Mb 5.0 South Pacific Cordillera.
13.	DBN: iP iS eScS eSS eL F WTS: eP i HEE: eP WIT: eP	01	24	11 12 00 04 38.8 04.8 17.0 18.3 12.5 18.5	+ - - - - - + - + +	6 18 19	5.4 11.0				17.4N 54.8W, H: 01 14 18.6 h 33 km. Mb 5.7 Ms 6.4 North Atlantic Ocean.
								40	28	6.0 6.6	

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
DEC. 1977	13. WTS: iPKP	03	26	27.4	+					17.8S 178.8W, H: 03 07 47.7 h 534 km. Mb 5.3 Fiji Islands region.	
	e	03	26	47.0							
	HEE: iPKP	03	26	31.3							
	epPKP	03	28	35.0							
	WIT: iPKP	03	26	25.6	+						
	13. WTS: eP	05	18	42.5						43.1N 146.9E, H: 05 06 46.4 h 89 km. Mb 4.6 Kuril Islands.	
	13. WTS: ePKP	06	47	17.0						18.3S 173.5W, H: 06 27 40.0 h 38 km. Mb 5.2 Tonga Islands.	
	epPKP	06	47	31.5							
	e	06	47	34.0							
	HEE: ePKP	06	47	20.0							
	epPKP	06	47	35.5							
	e	06	47	38.0							
	WIT: iPKP	06	47	14.6	-						
	e	06	47	29.5							
	13. DBN: eL	09	45							8.1N 137.0E, H: 08 47 25.7 h 44 km. Mb 5.2 Ms 4.9 West Caroline Islands.	
	F	10.1									
	14. WTS: eP	03	13	41.5						33.8S 58.0E, H: 03 00 14.6 h 33 km. Mb 5.6 Ms 4.7 South Indian Ocean.	
	HEE: eP	03	13	40.5							
	WIT: eP	03	13	44.5							
	14. DBN: eL	05	54							27.5S 178.4W, H: 04 41 23.1 h 45 km. Mb 5.1 Ms 5.3 Kermadec Islands region.	
	F	06.6									
	14. WTS: eP	09	07	54.5						42.3N 147.6E, H: 08 55 44.5 h 20 km. Mb 5.1 Off coast of Hokkaido, Japan.	
	14. WTS: iP	15	42	02.3	+					37.1N 116.1W, H: 15 30 00.2 h 0 km. Mb 5.7 Southern Nevada.	
	e	15	42	24.0							
	HEE: iP	15	42	05.2	+						
	e	15	42	25.0							
	WIT: iP	15	41	59.4	+						

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Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
DEC. 1977	14. WTS: iPKP	19	11	06.4	-						21.1S 179.1W, H: 18 52 34.9 h 659 km. Mb 5.6 Fiji Islands region.
	i	19	11	11.4	-						
	iPKP2	19	11	17.9							
	HEE: iPKP	19	11	08.5	-						
	e	19	11	14.5							
	ePKP2	19	11	23.0							
	e	19	11	52.0							
	WIT: ePKP	19	11	05.5							
	i	19	11	10.0	-						
iPKP2	19	11	15.2	+							
15. WTS: eP	08	10	50.0							34.9N 23.1E, H: 08 06 10.8 h 47 km. Mb 4.3 Crete.	
15. WTS: ePKP2	08	55	51.5							21.7S 173.8W, H: 08 35 57.4 h 33 km. Mb 4.9 Tonga Islands.	
HEE: ePKP	08	55	49.0								
15. WTS: ePKP	16	10	53.0							23.4S 175.3W, H: 15 51 00.9 h 33 km. Mb 4.9 Tonga Islands region.	
15. DBN: eL	23	54								4.8S 34.9E, H: 23 20 53.6 h 33 km. Mb 4.8 Ms 5.6 Tanzania.	
F	00	17									
WTS: eP	23	31	09.0								
e	23	31	13.0								
HEE: eP	23	31	05.0								
e	23	31	08.5								
WIT: e	23	31	18.5	-							
16. WTS: iP	07	23	42.7	+						43.2N 146.8E, H: 07 11 41.6 h 38 km. Mb 5.4 Ms 4.6 Kuril Islands.	
ipP	07	23	53.3								
HEE: eP	07	23	49.0								
WIT: eP	07	23	39.5								
epP	07	23	50.5								
16. DBN: eP	07	42	10		5	2.9				38.4N 27.2E, H: 07 37 30.1 h 34 km. Mb 5.3 Ms 4.2 Turkey.	
eS	07	45	54								
eL	07	48.0									
F	08	19									
WTS: iP	07	41	59.0								
epP	07	42	07.0								
HEE: eP	07	41	58.0								
WIT: eP	07	42	05.5	-							
16. WTS: eP	09	20	35.0								51.6N 159.5E, H: 09 08 59.7 h 33 km. Mb 4.7 Ms 4.3 Off east coast of Kamchatka.
epP	09	20	44.5								
ePcP	09	20	49.5								
WIT: eP	09	20	31.5								

SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
DEC. 1977	16. DBN: eL	15	51							36.7N 141.0E, H: 15 10 28.0 h 46 km. Mb 5.6 Ms 5.4 Near east coast of Honshu, Japan.	
	F	16	16								
	WTS: iP	15	22	50.0	+						
	HEE: iP	15	22	56.2	+						
	WIT: iP	15	22	47.4	+						
	epP	15	23	00.5							
16.	WTS: e	20	29	28.5						48.5N 7.4E, H: 20 28 06.3 h 35 km. France.	
	eSg	20	29	59.0							
	HEE: eSg	20	29	26.0							
17.	WTS: ePg	02	35	52.0						MOX: Near Bleicherode.	
	eSn	02	36	09.5							
17.	DBN: eL	12	12							52.2N 170.1W, H: 11 32 24.4 h 44 km. Mb 5.0 Ms 5.1 Fox Islands, Aleutian Islands.	
	F	12.8									
	WTS: eP	11	44	08.5							
17.	WTS: ePKP	16	21	37.0						21.0S 178.8W, H: 16 03 00.3 h 602 km. Mb 5.1 Fiji Islands region.	
	i	16	21	42.0							
	ePKP2	16	21	47.5							
	HEE: ePKP	16	21	45.0							
	ePKP2	16	21	52.5							
	WIT: ePKP	16	21	40.0							
17.	WTS: ePKP	16	27	33.5						23.7S 175.8W, H: 16 07 50.0 h 115 km. Mb 5.1 Tonga Islands region.	
	ePKP2	16	27	42.0							
	e	16	27	48.5							
	HEE: ePKP	16	27	36.0							
	ePKP	16	27	47.5							
	WIT: ePKP	16	27	32.0							
17.	DBN: eL	18	05							52.2N 170.0W, H: 17 27 27.5 h 40 km. Mb 5.3 Ms 5.5 Fox Islands, Aleutian Islands.	
	F	19.0									
	WTS: eP	17	39	13.0							
	ePcP	17	39	28.0							
	HEE: eP	17	39	19.0							
	WIT: eP	17	39	09.0							
17.	WTS: iP	23	36	26.7	-					10.8N 65.4W, H: 23 25 11.9 h 30 km. Mb 4.7 Near coast of Venezuela.	
	epP	23	36	36.0							
	HEE: eP	23	36	23.0							
	epP	23	36	32.0							
18.	DBN: eL	00	24							13.1N 50.9E, H: 23 57 54.9 h 33 km. Mb 5.0 Ms 4.8 Eastern Gulf of Aden.	
	F	00	45								
	HEE: eP	00	07	06.5							
18.	WTS: iP	07	08	39.2	+					55.3N 160.6E, H: 06 57 33.3 h 118 km. Mb 5.1 Kamchatka.	
	HEE: eP	07	08	46.0							
	WIT: eP	07	08	35.0	+						

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Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
DEC. 1977	18. DBN: eP	16	56	09		7	2.8				39.9N 77.3E, H: 16 47 17.1 h 33 km. Mb 5.3 Ms 5.8 Southern Sinkiang Province, China.
	ePP	16	58	05							
	eS	17	03	24							
	eSS	17	06	56							
	eL	17	10								
	F	18.4									
	WTS: eP	16	56	01.0							
	HEE: eP	16	56	06.5							
19.	DBN: eP	23	42	31		6	4.3				31.0N 56.5E, H: 23 34 34.2 h 31 km. Mb 5.4 Ms 5.8 Iran. 584 reported killed and 1000 injured.
	iPP	23	44	19							
	iS	23	49	02							
	eSS	23	52	26							
	eL	23	54								
	F	01.4									
	WTS: iP	23	42	23.7	+						
	HEE: eP	23	42	26.0	+						
20.	WTS: iP	09	02	09.7	-						48.6N 153.0E, H: 08 50 38.2 h 140 km. Mb 5.8 Kuril Islands.
	i	09	02	10.4	+						
	HEE: eP	09	02	16.5	-						
	WIT: iP	09	02	06.2	-						
20.	WTS: eP	20	07	40.0							38.6N 15.6E, H: 20 04 16.3 h 193 km. Mb 4.7 Sicily.
	HEE: eP	20	07	30.5							
	i	20	07	32.6	+						
21.	DBN: iP	01	13	51	-	8	8.1				25.5N 143.1E, H: 01 00 32.8 h 33 km. Mb 6.2 Ms 6.8 Volcano Islands region.
	e	01	15	39							
	ePP	01	17	40							
	iSKS	01	24	27							
	eS	01	24	57							
	iSP	01	26	19							
	eSS	01	31	20							
	eL	01	44			20	21.0			6.6	
	F	04.6									
	WTS: eP	01	13	48.5							
	iPP	01	17	33.8							
	ePKKP	01	30	53.0							
	HEE: eP	01	13	54.5							
	ePKKP	01	30	50.0							
WIT: eP	01	13	46.0	-							
ePP	01	17	40								
21.	WTS: epP	05	07	14.5							30.8 132.3E, H: 04 54 31.3 h 33 km. Mb 5.2 Southeast of Shikoku, Japan.
	HEE: eP	05	07	10.0							
	epP	05	07	20.0							
	WIT: e	05	07	11.0							

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Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
DEC. 1977	21. WTS: iPKP	05	27	26.9	+						18.2S 178.6W, H: 05 08 54.4 h 606 km. Mb 4.9 Fiji Islands region.
	HEE: ePKP	05	27	30.5	+						
	WIT: ePKP	05	27	24.5							
21.	WTS: iP	16	51	01.6	+						52.9N 159.8E, H: 16 39 33.0 h 33 km. Mb 5.5 Ms 5.0 Off east coast of Kamchatka.
	HEE: eP	16	51	08.5							
	WIT: eP	16	50	57.5	+						
21.	WTS: eP	20	51	38.0							ISC: 53.0N 160.0E, H: 20 40 10.3, h 33 km, Mb 4.7. Off east coast of Kamchatka.
22.	DBN: eL	05	26								29.6N 127.8E, H: 04 45 14.7 h 33 km. Mb 5.5 Ms 5.3 East China Sea.
	F	06.4									
	WTS: iP	04	57	42.4	-						
	e	04	57	48.0							
	HEE: eP	04	57	48.0	-						
	e	04	57	54.0							
	e	04	58	35.0							
	WIT: eP	04	57	40.5							
e	04	57	46.0								
22.	DBN: eL	14	17								34.4S 55.3E, H: 13 29 49.4 h 33 km. Mb 5.7 Ms 5.1 Atlantic-Indian Rise.
	F	14.7									
22.	DBN: eL	23	02								39.1N 143.2E, H: 22 17 59.9 h 23 km. Mb 5.3 Ms 4.8 Off east coast of Honshu, Japan.
	F	23	22								
	WTS: eP	22	30	17.5	+						
	HEE: eP	22	30	24.0	+						
WIT: eP	22	30	15.0	-							
23.	DBN: eP	11	20	20							72.0N 0.5W, H: 11 15 44.0 h 10 km. Mb 4.8 Ms 4.7 Jan Mayen Island region.
	eL	11	25								
	F	11	38								
	WTS: eP	11	20	23.0							
	e(pP)	11	20	27.5							
HEE: eP	11	20	32.5	-							
23.	WTS: ePKP	18	25	44.5							ISC: 22.7S 175.9W, H: 18 06 13, h 186 km. Tonga region.
23.	DBN: eP	21	14	28		6	6.1				39.1N 143.2E, H: 21 02 07.5 h 19 km. Mb 5.6 Ms 5.9 Off east coast of Honshu, Japan.
	iPP	21	17	35							
	iS	21	24	46							
	eSP	21	25	36							
	eL	21	41			20	17.0			6.4	
	F	22.9									
	WTS: eP	21	14	26.0							
	HEE: eP	21	14	32.5							
	WIT: eP	21	14	23.0							

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Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
DEC. 1977											
23.	WTS: eP	21	21	39.0							39.1N 143.1E, H: 21 09 21.7 h 23 km. Mb 5.4
	HEE: eP	21	21	45.0							Off east coast of Honshu, Japan.
	WIT: eP	21	21	36.0							
23.	WTS: eP	21	26	42.0	-						39.1N 143.0E, H: 21 14 26.7 h 41 km. Mb 5.4 Ms 6.0
	ipP	21	26	54.0	+						Off east coast of Honshu, Japan.
	HEE: eP	21	26	48.5							
	WIT: eP	21	26	39.0							
23.	WTS: eP	22	22	53.5							39.0N 143.4E, H: 22 10 36.4 h 32 km. Mb 5.1 Off east coast of Honshu, Japan.
25.	WTS: iPKP	04	45	03.2	-						22.0S 170.9E, H: 04 25 27.7 h 76 km. Mb 5.0
	HEE: iPKP	04	45	07.1	-						Loyalty Islands region.
	WIT: ePKP	04	45	02.0							
25.	DBN: eL	16	43								38.9N 70.8E, H: 16 18 54.7 h 33 km. Mb 5.3 Ms 4.7
	F	16	59								Afghanistan-USSR border region.
	WTS: eP	16	27	11.0							
	i	16	27	13.0							
	ePP	16	29	02.0							
	HEE: eP	16	27	19.0							
	ePP	16	29	11.0							
25.	WTS: eP	18	32	40.5							39.1N 143.4E, H: 18 20 21.6 h 18 km. Mb 5.0 Off east coast of Honshu, Japan.
25.	DBN: eL	23	18								24.2N 121.7E, H: 22 33 48.1 h 40 km. Mb 5.2 Ms 4.7
	F	23	40								Taiwan.
	HEE: eP	22	46	26.5							
	epP	22	46	39.0							
26.	DBN: eL	02	20								24.6S 175.9W, H: 00 57 07.4 h 33 km. Mb 4.6 Ms 5.0
	F	02	41								South of Tonga Islands.
	WTS: ePKP	01	17	02.5							
	ePKP2	01	17	11.0							
	HEE: ePKP	01	17	07.0							
	ePKP2	01	17	18.0							
26.	WTS: eP	04	11	04.0							49.9N 78.1E, H: 04 02 57.7 h 0 km. Mb 4.9 Eastern Kazakh SSR.

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Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
DEC. 1977											
26.	DBN: eL F	07	40								2.5N 126.8E, H: 06 44 52.4 h 36 km. Mb 5.5 Ms 4.1 Molucca Passage.
26.	WTS: eP HEE: eP	07	40	13.0							18.3N 97.1W, H: 07 27 47.6 h 67 km. Mb 4.7 Central Mexico.
26.	DBN: eL F	10	37								14.7N 123.6E, H: 09 39 26.1 h 33 km. Mb 5.3 Ms 4.3 Luzon, Philippine Islands.
27.	WTS: iPKP HEE: iPKP WIT: iPKP	11	56	59.5	+						18.0S 178.6W, H: 11 38 21.3 h 555 km. Mb 5.3 Fiji Islands region.
28.	DBN: iP iPP iS iSS eL F WTS: iP ePP HEE: eP ePP WIT: eP i	02	53	51	-						16.7N 40.3E, H: 02 45 36.7 h 33 km. Mb 5.9 Ms 6.6 Red Sea.
						19	17.0			6.0	
28.	WTS: ePKP	11	39	05.0							23.8S 175.4W, H: 11 19 14.0 h 50 km. Mb 4.8 Tonga Islands region.
28.	DBN: eP eL F WTS: iP HEE: eP WIT: eP	20	36	40		18	3.9			4.7	64.6N 17.3W, H: 20 32 40.8 h 10 km. Mb 5.0 Ms 5.2 Iceland.
29.	WTS: pPKP HEE: pPKP	10	39	44.5	+						18.0S 173.9W, H: 10 19 42.1 h 98 km. Mb 5.2 Tonga Islands.
29.	DBN: eL F	12	48								8.5N 126.0E, H: 11 55 35.9 h 53 km. Mb 5.3 Ms 5.1 Mindanao, Philippine Islands.



SEISMOLOGICAL BULLETIN



Date	Phase	G.M. Time			First motion	Period s	Amplitude $\mu$			Magnitude	Remarks Data without indication are from USGS; d.b.m. means disturbed by microseisms
		h	m	s			Z	NS	EW		
DEC. 1977	29. DBN: eL	17	03.0								38.4N 22.3E, H: 16 52 56.7 h 18 km. Mb 4.7 Greece.
	F	17.9									
	29. DBN: ePg	19	58	16							Local shock.
	e	19	58	25							
	F	19	59								
	30. WTS: iPg	17	30	10.9							Probably Rhurcoal district.
	i	17	30	24.0							
	HEE: iPg	17	30	25.7	-						
	eSg	17	30	38.5							
	WIT: ePg	17	30	27.0							
	30. DBN: iP	17	38	18	+						40.0N 15.4E, H: 17 35 08.9 h 283 km. Mb 5.6 Southern Italy.
	iS	17	40	46							
	F	17	56								
	WTS: iP	17	38	09.9	+						
e	17	38	12.3	-							
eS	17	40	42.0								
HEE: iP	17	38	04.3	-							
i	17	38	15.4								
iS	17	40	29.5								
WIT: eP	17	38	21.0								
i	17	38	33.2								
31. DBN: eL	08	32								15.3S 71.7W, H: 07 53 18.0 h 158 km. Mb 5.9 Southern Peru.	
F	09	04									
WTS: iP	08	06	24.6	-							
HEE: iP	08	06	20.7	-							