SEISMOLOGICAL BULLETIN OF SYOWA STATION, ANTARCTICA, 1992

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1. Introduction

The seismic observation system at Syowa Station is schematically illustrated in Fig. 1. There are two types of seismometers, one called SP (short-period) or HES with 1.0 s natural period of the pendulum and the other called LP (long-period) or PELS with 12.0 s natural period. The SP and LP have been operated since 1961 and 1967, respectively (Kaminuma *et al.*, 1968). A new vault for seismometers was built in March 1970 (Kaminuma and Chiba, 1973). The old type of LP seismometer (Press-Ewing) was replaced by a PELS at Syowa Station in 1982. The overall frequency response and the magnification of the short-period and long-period seismometers (Z, N-S and E-W components) are shown in Fig. 2. The coordinates of the seismographic vault are 69°00'31.7"S, 39°35'31.6"E. The elevation is 20 m above mean sea level.

A three-component Streckeisen Seismometer (STS) was installed in April 1989 at Syowa Station for broad-band digital seismographs, based on the recommendation from the Working Group of Solid Earth Geophysics of SCAR (Scientific Committee on Antarctic Research). The block diagram of the recording system is illustrated in Fig. 3. The STS system has two different outputs, Broad-Band (BRB) and Long-Period (LP). The digital recording system started BRB output in May 1990 (Nagasaka *et al.*, 1992), and LP output in February 1992. The amplitude and phase responses for BRB output of the STS seismometer are shown in Fig. 4. The BRB output has a flat frequency response for velocity from 0.1 s to 20 s in the 20-s mode and from 0.1 s to 360 s in the 360-s mode, respectively. The LP output has a flat response to acceleration for periods longer than 20 s.

All of these systems were maintained by the author throughout the wintering season of JARE-33 (February 1992 - January 1993). Observations by the STS system were mainly carried out in the 20-s mode for the vertical component, and in the 360-s mode for the horizontal components.

2. Data

Considering the delay time of 1-2 years between the publication of this report and the observing wintering period, which is inevitable since the resurply ship visits Syowa Station only once a year, the PDE (Preliminary Determination of Epicenters) reports by NEIC (National Earthquake Information Center) are referred to and only the seismograms of teleseismic events are edited.

The system clock has been connected to the recovered UTC from the NNSS (Navy Navigation Satellite System) since February 1987 (see Fig. 1). The accuracy of the read-out data can be estimated as 0.2 s. Testing measurement to receive UTC by GPS (Global Positioning System) satellites instead of NNSS was conducted during the wintering season of JARE-33 (see Fig. 3).

2.1. Read-out data

The onsets of the teleseismic events were detected on the SP monitoring seismograms and picked out from the pen-monitor records. The arrival times of P- and S- phases are listed in Table 1. Most phases were scaled on the vertical component, and only clear phases were on the horizontal components. The phase K denotes the PKP phase and X is the clear phase but its wave type cannot be identified. Symbols E and I in the phase column denote emergent and sharp onsets, respectively. The direction of the initial ground motion is denoted by + for upward and - for downward. Arrival time is represented in UTC.

The teleseismic events reported in the PDE are identified by serial numbers (#-xxx) in the table. The serial numbers correspond to the numbers in Table 2 which list the big events detected at Syowa Station and reported in the PDE. The events without serial numbers are teleseisms whose locations have not been determined by NEIC.

2.2. Teleseismic events

Figure 5 shows the location of 614 teleseismic events of which initial phases were detected at Syowa Station. The list of hypocenters of the teleseisms is shown in Table 2 with the same serial numbers as given in the remarks of Table 1. The seismograms of these events are available from the author.

The digital records of BRB outputs of STS seismographs for some large events are given in the Appendix. The digital records of these events can be distributed upon request. The three-component seismograms are shown and the scale of amplitude in the Appendix is arbitrary. The serial number of each output is in Table 2. The starting time of each seismogram is given at the top left of each panel.

3. Data Processing Staff

The seismic observations at Syowa Station are organized by the author, K. Kaminuma, and K. Shibuya of the National Institute of Polar Research. Information on the seismic observation at Syowa Station is available from them. Mr. I. Karakama of the National Institute of Polar Research has scaled and edited all events, and Ms. M. Minegishi has prepared this manuscript. The author expresses his thanks for their cooperation.

References

Kaminuma, K. and Chiba, H. (1973): Syowa Kiti no shin-jishinkeishitsu to jishin kenchiritsu (The new seismographic vault and the detection capability of Syowa Station, Antarctica). Nankyoku Shiryô (Antarct. Rec.), **46**, 67-82.

Kaminuma, K., Eto, T. and Yoshida, M. (1968): Syowa Kiti no jishin kansoku (Seismological observation at Syowa Station, Antarctica). Nankyoku Shiryô (Antarct. Rec.), **33**, 65-70.

Nagasaka, K., Kaminuma, K. and Shibuya, K. (1992): Seismological observations by a three-component broadband digital seismograph at Syowa Station, Antarctica. Recent Progress in Antarctic Earth Science, ed. by Y. Yoshida *et al.* Tokyo, Terra Sci. Publ., 595-601.

Streckeisen, G. and Messegeraete, A. G. (1987): Very-broad-band Feedback Seismometers STS-1V/VBB and STS-1H/VBB Manual. 34-35.
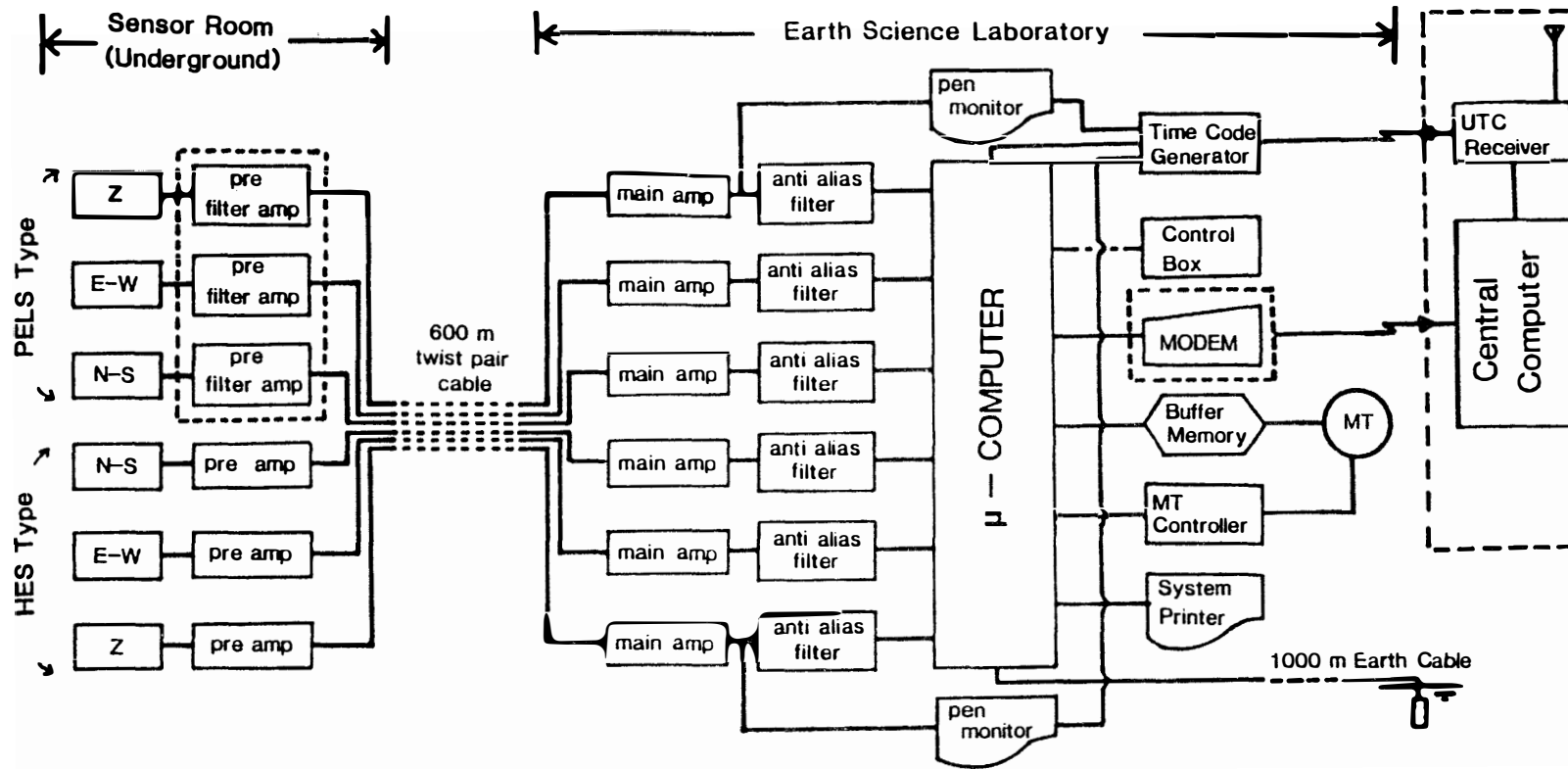
Fig. 1. The seismic observation system at Syowa Station.
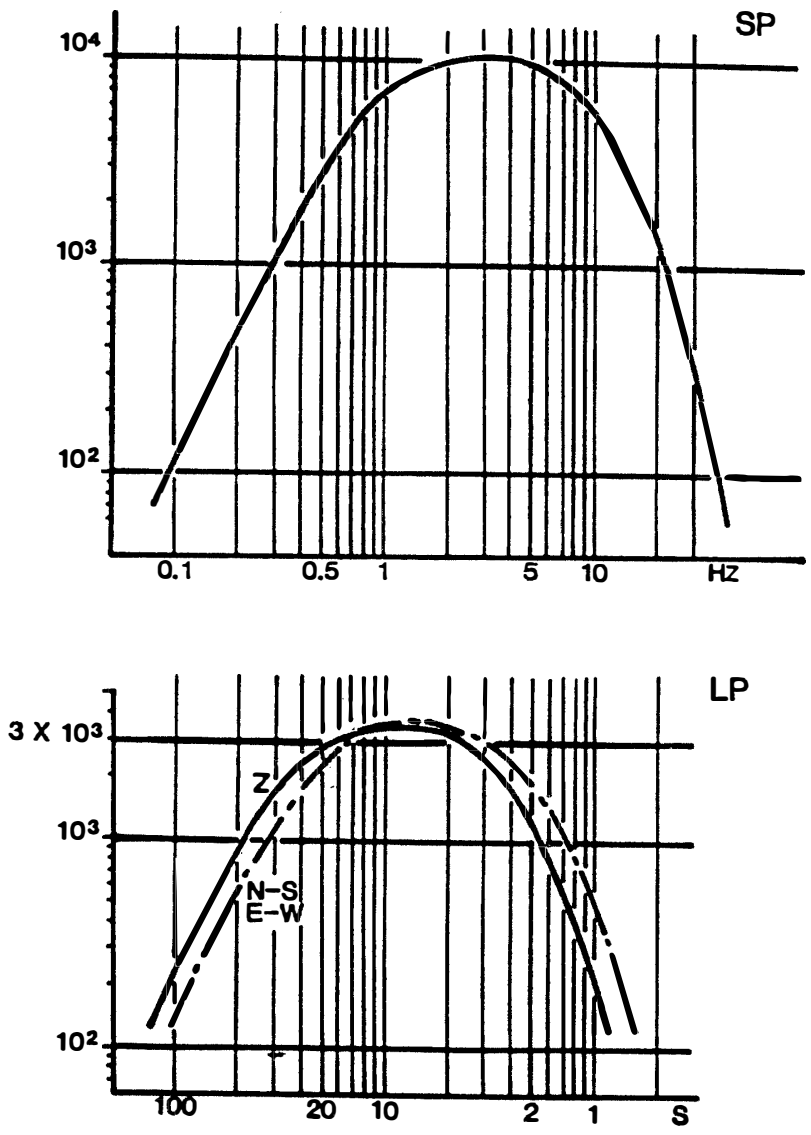
Fig. 2. Over-all frequency responses of the short-period and the long period seismographs.

BRB-Rcording

Analogue Monitor

hour, min.

pulse generator

GPS-Reciever

BCD

Time code generator

1pps

Personal Computer

STS U/D

Connector Box

BRB

Low-pass filter

Digitizer

RS-232

HDD-20MB   HDD-40MB

STS N/S

STS E/W

Sensor   Feedback Amp.

LP-Recording

Personal Computer

Controller

HDD-80MB

GP-IB

LP

Scanner   Digitizer

POS

Analogue-Monitor

Temperature
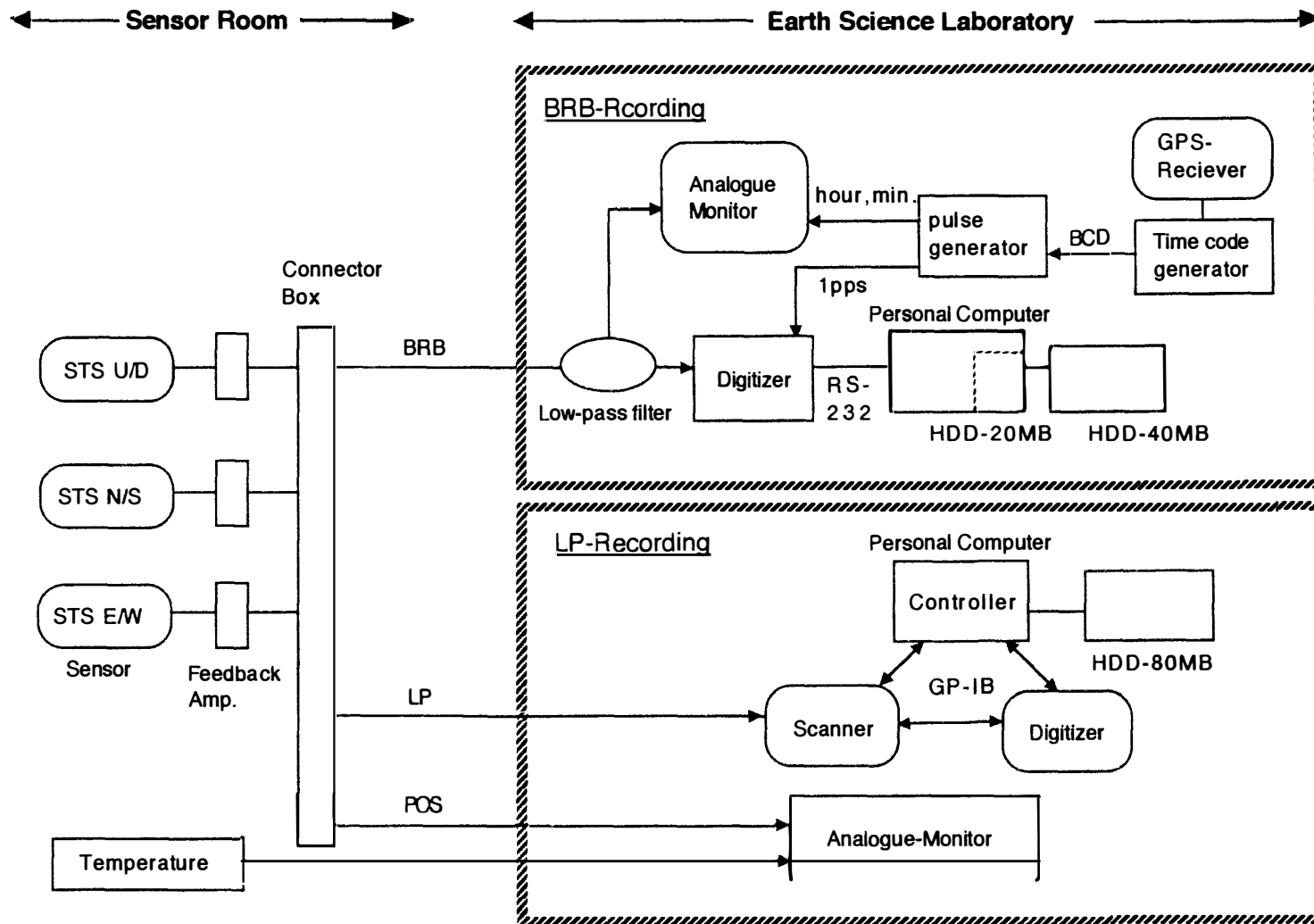
Fig. 3. Bl●ck diagrams of STS recording system at Syowa Station. Upper figure: BRB-recording
system; Lower figure: LP-recording system.

VELOCITY   RESPONSE   AT   BRB   OUTPUT

RESPONSE (V SEC/M)

1'000

100

10

20 SEC   360 SEC

0.1   1   10   100   1'000

PERIOD (SEC)

PHASE   RESPONSE   AT   BRB   OUTPUT

180°

20 SEC

360 SEC

90°

0°

- 90°

- 180°

0.1   1   10   100   1'000

PERIOD (SEC)

Fig. 4. Amplitude response (upper figure) and phase response (lower figure) of velocity output (BRB(Broad-Band)) of STS seismometer (after Streckeisen and Messegeraete, 1987).
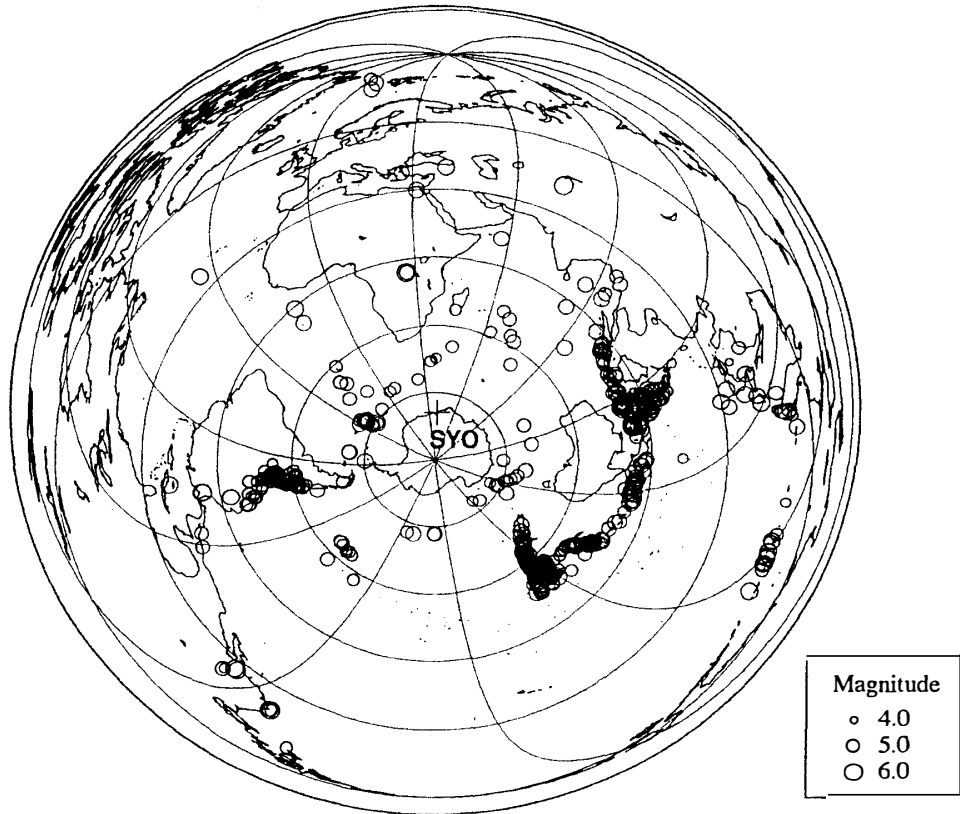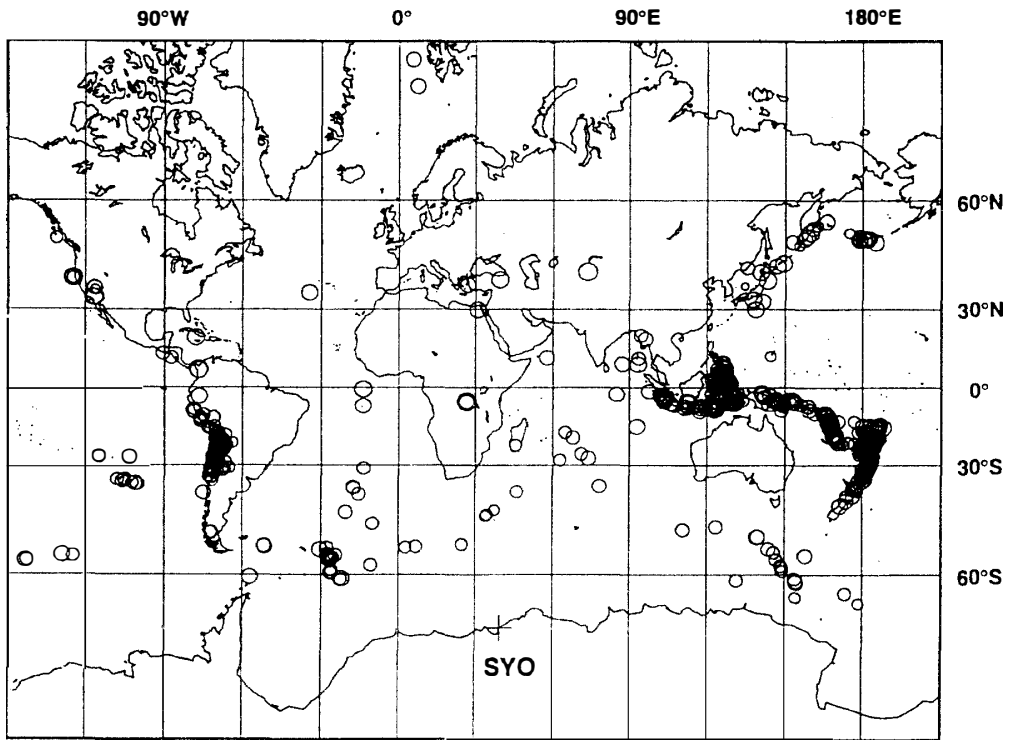
Fig. 5. Epicenters of the 614 events.

Table 1. Read-out data.

Date	Phase	Arrival time			Remarks
		h	m	s	
JAN 3	-IPZ	02	17	42.0	# - 1
3	EPZ	03	47	23.3	# - 2
5	EPZ	03	55	13.6	# - 3
6	EPZ	14	41	00.9	# - 4
6	EPZ	21	38	50.0	# - 5
10	EPZ	07	15	41.2	# - 6
10	EXZ	20	21	35.3	
11	+IPZ	06	29	30.0	# - 7
11	EPZ	11	10	13.3	# - 8
11	-IPZ	12	49	07.1	
13	-IPZ	09	49	25.5	# - 9
	ISN	09	59	09.6	
13	+IPZ	12	11	13.4	# -10
	ESN	12	21	55.0	
13	EPZ	19	19	37.5	# -11
14	EPZ	16	09	24.2	# -12
15	EXZ	03	44	09.0	
16	EPZ	10	43	57.8	# -13
17	EXZ	00	35	08.3	
18	EPZ	15	52	49.5	# -14
18	+IPZ	18	46	14.0	# -15
18	EPZ	23	22	11.7	# -16
19	EPZ	18	10	36.3	# -17
21	-EPZ	08	09	22.7	# -18

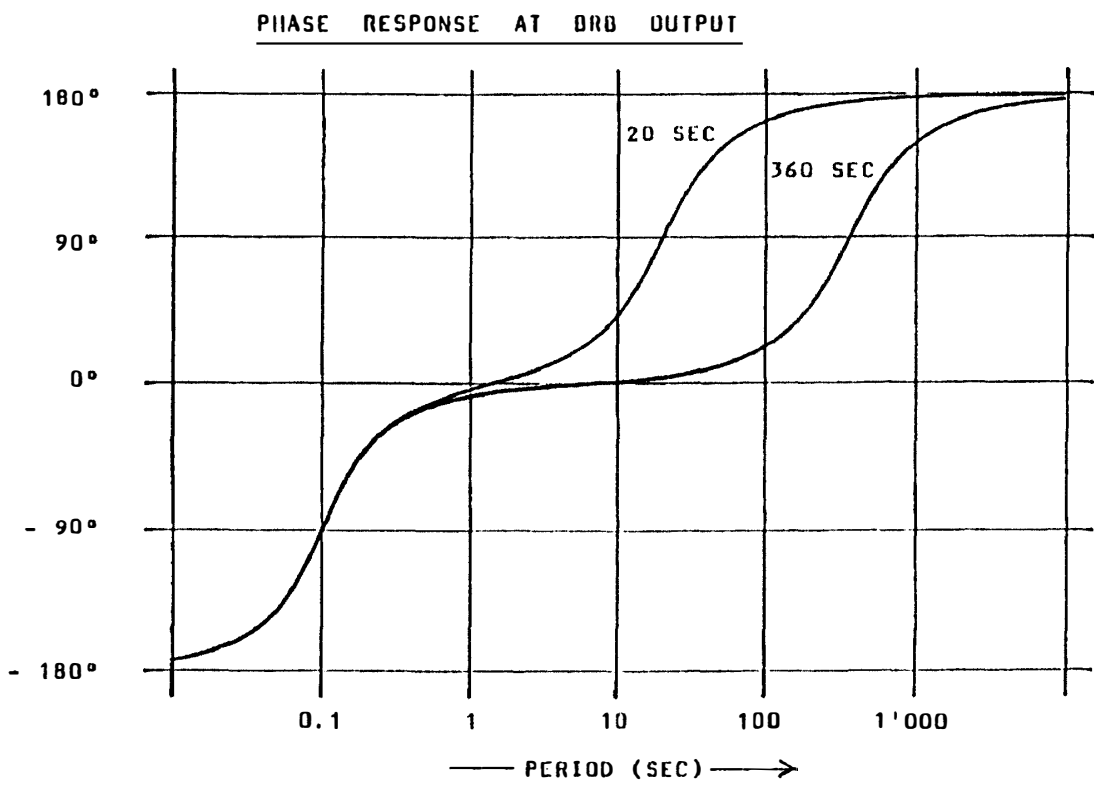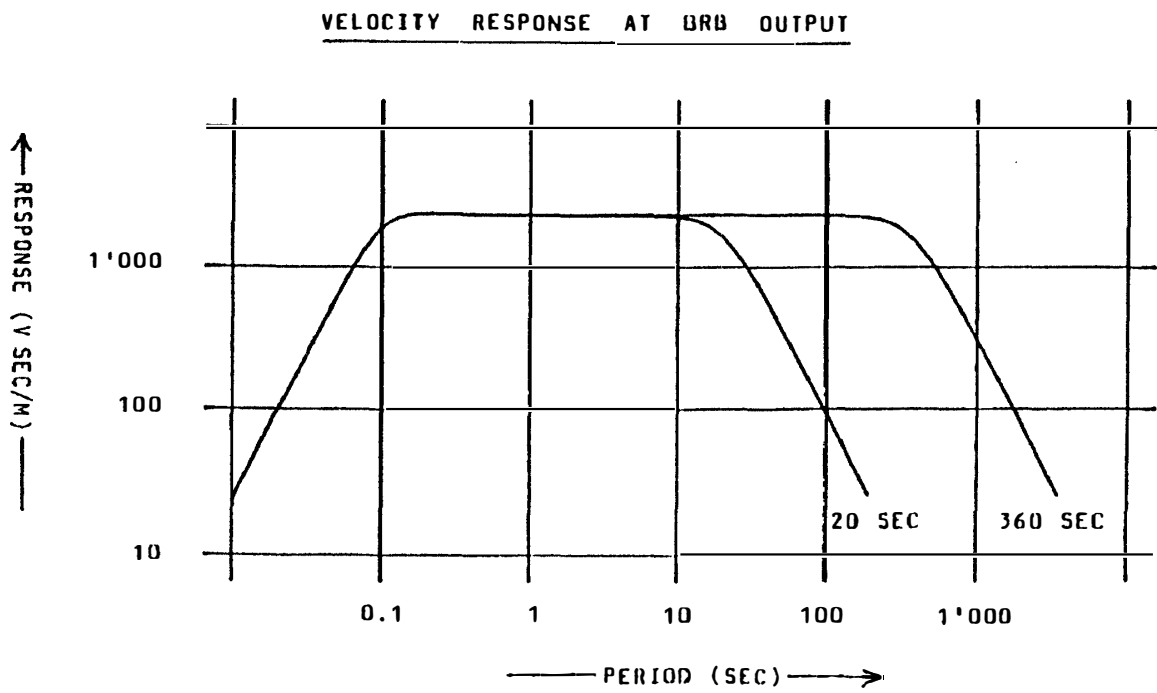| Date	Phase	Arrival time			Remarks
		h	m	s	
JAN 22	IPZ	06	37	24.3	# - 19
22	EPZ	07	35	06.5	# - 20
23	-EPZ	14	50	12.5	# - 21
24	EPZ	12	22	11.6	# - 22
25	EPZ	17	20	10.6	# - 23
25	EPZ	23	07	58.2	# - 24
27	EPZ	10	04	33.0	# - 25
28	EPZ	10	37	19.3	# - 26
28	EPZ	15	41	47.8	# - 27
28	EPZ	22	15	27.0	# - 28
30	EXZ	02	32	37.3	
30	EPZ	16	07	09.0	# - 29
30	EPZ	22	50	21.4	# - 30
FEB 1	EXZ	19	22	55.4	
2	EPZ	00	30	27.6	# - 31
2	EPZ	00	39	52.8	# - 32
3	EPZ	05	57	08.6	# - 33
3	EPZ	07	26	11.5	# - 34
4	EPZ	12	58	44.1	# - 35
4	-IPZ	13	16	30.8	# - 36
5	-IPZ	02	43	20.9	# - 37
5	EPZ	04	02	04.2	# - 38
5	EXZ	05	52	37.5	
5	EXZ	13	34	07.5	

Date	Phase	Arival time			Remarks
		h	m	s	
FEB 5	EPZ	20	38	42.6	# - 39
5	EXZ	23	56	22.7	
6	EPZ	01	24	18.0	# - 40
6	EPZ	04	06	18.5	# - 41
6	EXZ	04	46	51.5	
6	EPZ	09	15	47.5	# - 42
6	IPZ	17	02	31.9	# - 43
6	-IPZ	20	06	20.8	# - 44
6	EXZ	20	48	58.0	
7	EXZ	05	05	06.7	
7	-IPZ	06	05	42.0	# - 45
7	+IXZ	06	55	06.3	
7	EXZ	10	08	15.3	
7	EPZ	16	30	27.6	# - 46
7	+IPZ	19	37	38.5	# - 47
17	EPZ	04	46	01.4	# - 48
18	-IPZ	10	37	39.9	# - 49
20	-IPZ	15	57	10.3	# - 50
20	-IPZ	20	46	53.9	# - 51
21	EXZ	05	47	53.8	
21	-IPZ	17	26	18.3	# - 52
21	IXZ	18	43	48.7	
22	EPZ	23	52	13.3	# - 53
23	EPZ.	19	53	51.6	# - 54

Date	Phase	Arival time			Remarks
		h	m	s	
FEB 24	IXZ	06	44	47.9	
24	IPZ	11	34	36.3	# - 55
25	IPZ	17	57	55.6	# - 56
26	IPZ	03	57	40.0	# - 57
26	EPZ	11	39	31.6	# - 58
27	IPZ	20	18	24.2	# - 59
28	+IPZ	09	25	39.8	# - 60
MAR 2	-IPZ	09	16	43.2	# - 61
2	EXZ	12	49	17.3	
3	+IPZ	01	31	10.2	# - 62
5	+IXZ	14	58	48.3	
6	-IPZ	03	13	22.7	# - 63
7	EXZ	02	12	05.3	
7	EPZ	02	47	56.3	# - 64
7	+IPZ	20	10	43.9	# - 65
8	+IKZ	04	02	53.4	# - 66
8	IPZ	17	55	19.5	# - 67
8	+IPZ	18	50	39.4	# - 68
13	EXZ	16	20	33.7	
14	EPZ	22	26	34.8	# - 69
15	IPZ	02	10	22.3	# - 70
15	EPZ	19	29	43.5	# - 71
15	-IPZ	20	42	27.4	# - 72
16	EPZ	01	54	02.5	# - 73

Date	Phase	Arival time			Remarks
		h	m	s	
MAR 16	EPZ	01	59	43.0	# - 74
16	EPZ	02	07	09.7	# - 75
16	EPZ	02	15	18.8	# - 76
16	IPZ	04	56	13.5	# - 77
16	-IPZ	23	32	35.7	# - 78
17	-IPZ	05	27	05.8	# - 79
20	IPZ	18	51	20.0	# - 80
23	IPZ	14	11	28.3	# - 81
24	+IPZ	17	31	02.4	# - 82
24	EPZ	18	29	45.7	# - 83
24	IPZ	23	00	15.2	# - 84
25	IPZ	17	38	39.4	# - 85
26	-IPZ	13	38	55.2	# - 86
26	EKZ	14	34	07.5	# - 87
26	IKZ	16	49	39.3	# - 88
27	EXZ	20	46	42.1	
28	EPZ	00	38	20.5	# - 89
28	+IPZ	02	11	14.2	# - 90
28	IPZ	05	00	46.5	# - 91
29	-IPZ	12	31	14.3	# - 92
29	EPZ	13	24	15.6	# - 93
30	EPZ	07	13	18.8	# - 94
30	EPZ	13	54	10.7	# - 95
APR 1	EPZ	15	18	35.3	# - 96

Date	Phase	Arival time			Remarks
		h	m	s	
APR 1	EPZ	21	48	08.4	# - 97
2	EPZ	03	26	04.6	# - 98
2	EPZ	06	50	51.9	# - 99
2	-IPZ	10	20	12.0	# - 100
3	IPZ	03	33	00.4	# - 101
3	-IPZ	06	18	38.6	# - 102
4	-IPZ	01	23	08.1	# - 103
5	EPZ	11	59	35.6	# - 104
5	-IXZ	13	44	27.8	
6	IPZ	14	58	37.3	# - 105
7	+IPZ	03	49	42.6	# - 106
10	+IPZ	16	26	30.5	# - 107
14	-IPZ	12	24	30.3	# - 108
18	EPZ	09	28	35.2	# - 109
18	+IPZ	13	50	45.7	# - 110
19	+IPZ	17	43	54.9	# - 111
20	EPZ	02	48	57.8	# - 112
20	IPZ	13	55	21.7	# - 113
22	IPZ	05	33	25.4	# - 114
25	EKZ	18	25	51.5	# - 115
26	IPZ	01	37	25.4	# - 116
26	EXZ	08	01	32.4	
26	+IKZ	11	38	10.2	# - 117
26	-IPZ	17	29	30.1	# - 118

Date	Phase	Arival time h m s	Remarks
APR 28	EPZ	02 08 10.6	# - 119
28	EPZ	17 39 32.5	# - 120
29	EPZ	06 53 28.9	# - 121
29	-IPZ	09 15 39.1	# - 122
29	EPZ	09 38 50.8	# - 123
MAY 2	EPZ	15 46 04.8	# - 124
3	EPZ	03 51 28.4	# - 125
3	EPZ	05 52 41.6	# - 126
4	+IPZ	08 57 24.0	# - 127
	ISN	09 07 34.5	
5	EXZ	00 53 04.3	
5	-IXZ	04 37 14.0	
6	-IPZ	19 39 04.5	# - 128
6	+IPZ	23 31 24.0	# - 129
6	-IPZ	23 42 01.0	# - 130
7	EXZ	06 42 51.6	
9	EPZ	00 32 51.3	# - 131
9	+IPZ	08 55 01.3	# - 132
11	IXZ	10 26 49.6	
11	-IXZ	23 50 13.0	
12	-IXZ	00 09 48.4	
12	EPZ	15 00 11.2	# - 133
12	-IPZ	15 59 53.7	# - 134
12	+IPZ	18 18 50.1	# - 135

Date	Phase	Arival time h m s	Remarks
MAY 13	-IPZ	03 34 28.1	# - 136
13	+IPZ	18 39 06.2	# - 137
15	EPZ	05 47 49.7	# - 138
15	EXZ	06 12 47.2	
15	+IPZ	07 18 03.2	# - 139
16	EPZ	02 50 12.1	# - 140
16	+IPZ	04 14 38.2	# - 141
16	EXZ	13 52 17.5	
16	EPZ	18 08 18.8	# - 142
16	EPZ	21 10 35.2	# - 143
16	EXZ	21 47 08.3	
17	EXZ	01 18 02.7	
17	EPZ	10 02 41.8	# - 144
	ISN	10 13 20.6	
17	EPZ	10 28 54.5	# - 145
17	EPZ	15 49 43.4	# - 146
17	EPZ	19 58 09.2	# - 147
17	-IPZ	20 54 20.2	# - 148
17	EPZ	21 49 08.5	# - 149
18	-IPZ	03 13 07.4	# - 150
18	-IPZ	11 14 30.6	# - 151
19	EPZ	14 55 57.0	# - 152
20	EXZ	12 38 59.6	
21	+IXZ	05 18 42.4	

Date	Phase	Arival time h m s	Remarks
MAY 21	EPZ	14 22 02.1	# - 153
21	-IPZ	18 17 34.7	# - 154
21	EPZ	23 09 24.5	# - 155
22	EPZ	01 31 23.3	# - 156
22	EXZ	08 36 03.5	
22	EPZ	13 17 37.3	# - 157
22	IXZ	16 38 14.0	
22	IXZ	16 49 28.8	
22	EPZ	21 53 47.2	# - 158
23	EPZ	00 32 51.0	# - 159
25	EPZ	20 57 49.6	# - 160
26	-IPZ	01 35 10.3	# - 161
26	IPZ	02 23 05.3	# - 162
26	-IXZ	18 20 42.1	
27	-IPZ	05 26 45.6	# - 163
27	EPZ	17 43 49.2	# - 164
27	-IPZ	22 41 05.0	# - 165
28	+IPZ	09 38 58.7	# - 166
28	EXZ	21 44 13.8	
30	-IPZ	00 38 58.7	# - 167
30	EPZ	05 50 11.7	# - 168
30	+IPZ	20 09 08.0	# - 169
31	-IPZ	11 15 30.7	# - 170
JUN 1	EPZ	01 59 21.5	# - 171

Date	Phase	Arival time h m s	Remarks
JUN 1	-IPZ	06 17 22.5	# - 172
1	IXZ	18 47 58.6	
2	EPZ	20 13 33.4	# - 173
2	IPZ	21 15 22.9	# - 174
3	EKZ	06 30 47.7	# - 175
3	+IPZ	11 37 26.4	# - 176
4	-IPZ	23 24 55.3	# - 177
5	-IPZ	17 18 48.3	# - 178
5	EKZ	22 06 30.9	# - 179
6	EPZ	11 02 50.5	# - 180
6	EPZ	15 03 31.5	# - 181
6	EPZ	21 53 35.3	# - 182
6	EPZ	23 42 40.9	# - 183
7	EPZ	14 38 21.2	# - 184
9	IPZ	00 37 20.3	# - 185
9	EPZ	00 43 35.5	# - 186
9	EPZ	02 54 58.9	# - 187
9	EPZ	06 48 25.3	# - 188
9	EPZ	09 58 36.8	# - 189
9	EPZ	14 57 54.4	# - 190
10	-IPZ	02 26 38.6	# - 191
11	EPZ	02 16 29.0	# - 192
11	EPZ	21 30 37.1	# - 193
12	-IPZ	11 19 27.1	# - 194

Date	Phase	Arival time			Remarks	Date	Phase	Arival time			Remarks
		h	m	s				h	m	s	
JUN 12	-IPZ	12	01	43.5	# - 195	JUN 23	-IPZ	13	16	19.8	# - 212
14	EXZ	07	39	44.0		23	+IPZ	13	21	46.9	# - 213
14	IPZ	17	19	07.9	# - 196	23	EPZ	19	45	32.5	# - 214
15	EXZ	12	30	41.5		23	IPZ	21	58	31.8	# - 215
15	EPZ	14	24	40.5	# - 197	24	EPZ	00	53	23.2	# - 216
15	EPZ	20	51	46.0	# - 198	24	EPZ	09	13	28.7	# - 217
	ISN	21	02	16.2		25	EPZ	06	42	57.8	# - 218
16	-IPZ	13	07	47.7	# - 199	26	-IPZ	02	21	28.7	# - 219
16	-IPZ	21	52	05.5	# - 200		ISN	02	31	04.6	
17	+IPZ	08	46	33.4	# - 201	26	EPZ	02	47	52.4	# - 220
18	EXZ	04	16	39.4		26	+IPZ	03	30	23.7	# - 221
19	EPZ	08	27	13.8	# - 202		ESN	03	40	05.2	
19	+IXZ	09	23	12.2		26	EPZ	07	31	17.0	# - 222
20	-IPZ	13	52	47.9	# - 203	28	+IXZ	06	29	49.0	
	ESN	14	02	21.7		28	EKZ	12	17	07.2	# - 223
20	EPZ	17	13	46.5	# - 204	28	EKZ	15	25	00.3	# - 224
21	+IPZ	11	04	05.3	# - 205	28	EPZ	16	13	27.2	# - 225
21	-IPZ	17	54	14.5	# - 206	28	EPZ	16	24	45.9	# - 226
21	-EPZ	19	34	19.8	# - 207	28	EPZ	17	51	49.7	# - 227
22	+IPZ	04	06	16.0	# - 208	28	EKZ	23	47	00.4	
22	-IPZ	10	47	55.9	# - 209	29	EPZ	00	20	03.5	# - 228
22	EXZ	15	36	28.6		29	EPZ	03	05	21.3	# - 229
23	-IPZ	05	05	12.0	# - 210	29	EXZ	10	33	58.8	
23	EPZ	11	32	41.7	# - 211	29	EXZ	10	50	40.2	

Date	Phase	Arival time			Remarks
		h	m	s	
JUN 29	EPZ	13	57	21.5	# - 230
29	EXZ	16	22	00.5	
29	EXZ	21	44	27.8	
30	-IXZ	14	52	14.4	
JUL 1	EXZ	02	32	52.3	
1	-IPZ	17	13	04.1	# - 231
	ISN	17	23	08.8	
1	EPZ	17	43	26.9	# - 232
1	EXZ	19	42	27.7	
1	-IXZ	20	14	59.1	
1	-IPZ	20	52	19.4	
2	+IPZ	06	25	15.1	# - 233
	ESN	06	34	48.0	
4	+IXZ	03	45	27.1	
4	EPZ	06	59	43.1	# - 234
5	EPZ	06	12	37.9	# - 235
5	EXZ	21	37	58.8	
5	EXZ	23	33	56.5	
6	EPZ	19	16	50.6	# - 236
7	-IPZ	12	39	59.0	# - 237
7	EPZ	22	54	32.1	# - 238
10	EXZ	09	11	24.5	
10	EXZ	09	50	39.5	
11	EXZ	08	50	46.5	

Date	Phase	Arival time			Remarks
		h	m	s	
JUL 11	-IPZ	10	56	12.9	# - 239
11	-IPZ	13	04	58.9	# - 240
11	IPZ	21	14	37.1	# - 241
12	EPZ	01	28	56.5	# - 242
12	EXZ	11	28	02.0	
12	EPZ	17	49	21.3	# - 243
12	EPZ	23	52	56.4	# - 244
	ISN	00	02	27.3	
13	+IXZ	15	53	39.5	# - 245
13	-IPZ	18	24	49.0	
13	EXZ	18	41	39.1	
14	-IPZ	07	14	50.7	# - 246
	ESN	07	24	26.0	
14	+IXZ	10	14	18.8	
14	+IPZ	20	08	23.7	# - 247
15	EPZ	06	47	09.3	# - 248
15	-IPZ	18	16	11.1	# - 249
	ISN	18	25	56.0	
15	-IPZ	20	32	01.7	# - 250
17	EXZ	11	23	27.1	
17	EPZ	18	58	55.4	# - 251
17	EPZ	20	13	00.3	# - 252
18	EPZ	07	09	30.2	# - 253
18	-IPZ	08	56	11.5	

Date	Phase	Arival time h m s	Remarks
JUL 18	EXZ	10 09 20.5	
18	EXZ	14 16 04.3	
18	EXZ	15 44 15.8	
18	EXZ	21 54 22.3	
19	EPZ	02 53 06.0	# - 255
19	+EPZ	08 26 40.8	# - 256
19	EXZ	13 05 50.5	
20	+IXZ	02 32 19.0	
20	EXZ	08 06 33.5	
20	-IPZ	16 25 40.0	# - 257
20	EPZ	20 32 08.6	# - 258
21	EPZ	07 10 25.9	# - 259
22	EXZ	07 45 16.7	
23	EPZ	10 19 26.9	# - 260
23	EXZ	22 07 42.3	
23	IPZ	22 42 06.6	# - 261
24	EPZ	02 22 23.6	# - 262
24	EPZ	18 28 22.7	# - 263
25	EPZ	02 49 02.6	# - 264
27	EPZ	06 33 47.3	# - 265
27	EXZ	19 53 35.3	
28	EPZ	17 42 21.6	# - 266
	ISN	17 52 14.3	
29	+IPZ	00 43 15.3	# - 267

Date	Phase	Arival time h m s	Remarks
JUL 29	EPZ	02 04 24.2	# - 268
29	+IPZ	08 31 59.0	# - 269
30	EPZ	13 23 53.2	# - 270
30	+IPZ	23 11 33.9	# - 271
31	EPZ	13 14 46.6	# - 272
31	EPZ	14 16 27.3	# - 273
31	EPZ	14 22 06.7	# - 274
AUG 1	-IPZ	06 18 35.1	# - 275
1	-IPZ	06 22 24.5	# - 276
1	-IXZ	10 53 22.2	
1	EXZ	15 53 58.7	
1	EPZ	17 26 30.0	# - 277
1	EPZ	18 30 37.7	# - 278
2	EPZ	06 03 03.6	# - 279
2	+IPZ	12 14 42.1	# - 280
	ISN	12 24 06.6	
2	EXZ	12 43 48.5	
4	-IPZ	02 48 29.0	# - 281
4	-IPZ	07 10 44.7	# - 282
	ISN	07 20 42.3	
4	-IPZ	21 21 35.8	# - 283
4	EXZ	22 36 13.1	
4	EPZ	23 57 48.4	# - 284
5	EPZ	05 05 38.0	# - 285

Date	Phase	Arrival time			Remarks
		h	m	s	
AUG 5	+IPZ	19	44	49.5	# - 286
7	-IPZ	10	13	40.7	# - 287
7	+IXZ	11	29	59.9	
7	EXZ	18	39	24.7	
7	EXZ	21	15	18.0	
8	+IPZ	01	19	10.5	# - 288
8	EPZ	03	03	49.1	# - 289
8	EXZ	20	51	57.2	
9	EPZ	16	40	25.1	# - 290
9	-IPZ	20	02	49.4	# - 291
10	EPZ	03	12	59.9	# - 292
11	EPZ	00	14	16.7	# - 293
11	EPZ	02	08	38.0	# - 294
11	EKZ	04	23	36.4	# - 295
11	-IXZ	09	55	37.7	
11	-IPZ	13	56	31.3	# - 296
11	EXZ	15	33	53.3	
11	EPZ	16	03	23.8	# - 297
12	+IPZ	17	42	23.0	# - 298
	ESN	17	52	34.2	
13	EPZ	01	31	50.4	# - 299
13	EPZ	20	56	01.2	# - 300
	ESN	21	06	27.2	
14	EPZ	16	32	59.9	# - 301

Date	Phase	Arrival time			Remarks
		h	m	s	
AUG 14	-IPZ	20	19	30.7	# - 302
16	+IPZ	10	36	09.2	# - 303
	ISN	10	46	41.7	
16	+IPZ	15	00	32.2	# - 304
17	EPZ	14	03	53.4	# - 305
17	-IPZ	21	21	09.3	# - 306
17	-IPZ	22	02	46.4	# - 307
17	EPZ	22	56	49.4	# - 308
18	IPZ	05	14	54.3	# - 309
18	EPZ	06	28	33.1	# - 310
18	+IPZ	20	12	46.7	# - 311
	ESN	20	22	25.0	
19	EXZ	01	17	33.3	
19	EXZ	02	23	12.8	
19	EXZ	03	30	41.3	
19	-IPZ	13	13	38.3	# - 312
20	-IPZ	13	48	26.4	# - 313
21	EPZ	00	37	43.2	# - 314
21	-IPZ	00	46	10.5	# - 315
21	EPZ	10	04	10.3	# - 316 ,
21	-IPZ	22	21	08.9	
22	EPZ	07	47	48.0	# - 317
24	EXZ	07	18	24.0	
24	EPZ	15	33	46.8	# - 318

Date	Phase	Arival time			Remarks
		h	m	s	
AUG 24	+IPZ	19	46	41.5	# - 319
25	EPZ	08	36	52.6	# - 320
25	EPZ	12	44	06.5	# - 321
26	EPZ	17	09	36.6	# - 322
27	EPZ	07	01	34.2	# - 323
28	EPZ	05	01	25.7	# - 324
28	-IPZ	08	52	08.4	# - 325
28	EPZ	17	26	38.5	# - 326
	ISN	17	36	15.3	
28	EPZ	18	30	37.2	# - 327
29	EXZ	13	30	39.8	
29	EXZ	19	37	29.0	
30	EPZ	17	43	48.6	# - 328
30	-IPZ	20	21	02.4	# - 329
	ISN	20	30	36.7	
SEP 2	EXZ	00	35	19.5	
2	+IPZ	06	00	58.8	# - 330
	ISN	06	10	01.3	
2	EXZ	10	45	54.4	
2	EPZ	22	50	05.8	# - 331
2	+IPZ	23	12	36.7	# - 332
3	EXZ	04	31	31.9	
3	EXZ	18	18	34.6	
4	+IPZ	14	10	11.9	# - 333

Date	Phase	Arival time			Remarks
		h	m	s	
SEP 5	IPZ	05	27	46.5	
5	EPZ	20	19	43.4	# - 334
5	EXZ	23	57	59.3	
8	-IPZ	00	57	30.8	# - 335
8	EPZ	11	44	41.7	# - 336
9	-IXZ	13	28	33.4	
9	EPZ	14	46	06.6	# - 337
9	-IPZ	16	10	44.5	# - 338
9	-IPZ	20	56	18.4	# - 339
	ISN	21	05	49.6	
10	EPZ	10	55	54.2	# - 340
10	EXZ	15	14	15.6	
10	+EPZ	20	23	39.2	# - 341
10	EPZ	22	22	22.4	# - 342
10	EPZ	23	33	04.7	# - 343
11	-IPZ	04	07	57.3	# - 344
11	EXZ	04	36	50.5	
11	EPZ	22	38	01.0	# - 345
12	EPZ	13	42	51.0	# - 346
12	EXZ	15	20	36.4	
12	EXZ	16	18	52.2	
12	-IPZ	19	52	18.0	# - 347
14	EPZ	00	17	59.6	# - 348
14	EPZ	17	27	33.0	# - 349

Date	Phase	Arival time			Remarks	Date	Phase	Arival time			Remarks
		h	m	s				h	m	s	
SEP 15	-IPZ	02	39	40.9	# - 350	SEP 24	EPZ	00	57	41.9	# - 369
	ISN	02	49	22.5		24	EXZ	01	00	53.0	
15	EPZ	04	30	52.3	# - 351	24	EXZ	08	08	43.4	
15	EXZ	06	14	10.8		24	EPZ	12	21	15.7	# - 370
15	+IPZ	21	16	35.9	# - 352	24	EPZ	13	33	13.4	# - 371
	ISN	21	27	09.0		24	+IPZ	18	25	03.6	# - 372
16	+IPZ	04	35	55.7	# - 353	25	EPZ	09	09	22.2	# - 373
16	EPZ	19	24	34.5	# - 354	25	-IPZ	12	22	04.9	# - 374
18	EPZ	06	12	47.5	# - 355	25	EPZ	20	13	18.1	# - 375
18	EPZ	07	45	27.9	# - 356		ESN	20	18	37.0	
19	EPZ	22	47	10.2	# - 357	26	EPZ	07	46	44.5	# - 376
20	-IPZ	00	24	16.9	# - 358	26	IPZ	22	29	01.2	# - 377
20	EXZ	02	12	10.0		27	EXZ	00	32	21.5	
20	EPZ	13	39	56.4	# - 359	27	EPZ	03	44	32.2	# - 378
21	EPZ	10	30	02.3	# - 360	27	EPZ	09	13	19.2	# - 379
22	+IPZ	14	27	29.0	# - 361	27	EPZ	10	17	44.5	# - 380
23	-IPZ	00	14	30.1	# - 362	27	EPZ	10	22	16.8	# - 381
23	EPZ	08	18	21.9	# - 363	27	EXZ	14	32	31.6	
23	EPZ	08	23	45.2	# - 364	27	IXZ	18	08	08.9	
23	EPZ	12	01	50.8	# - 365	27	EPZ	18	39	47.4	# - 382 .
23	-IXZ	13	57	04.9		27	EXZ	22	40	40.0	
23	EPZ	15	02	58.5	# - 366	28	-IPZ	10	37	30.9	# - 383
23	-IPZ	17	01	02.6	# - 367	28	+IPZ	11	53	12.5	# - 384
23	EPZ	17	16	21.6	# - 368	28	EXZ	18	53	01.9	

Date	Phase	Arrival time			Remarks	Date	Phase	Arrival time			Remarks
		h	m	s				h	m	s	
SEP 29	EXZ	04	53	31.2		OCT 8	EKZ	16	54	58.6	# - 396
29	IPZ	07	00	25.2	# - 385	8	-IPZ	17	46	54.5	# - 397
30	EXZ	03	47	47.9		9	EKZ	12	36	57.6	# - 398
30	EPZ	04	54	48.6	# - 386	10	-IPZ	01	11	48.1	# - 399
30	EXZ	05	53	48.0		10	EKZ	04	20	47.8	# - 400
30	-IXZ	07	08	02.8		10	+IPZ	06	03	55.0	# - 401
30	EXZ	07	44	36.4		10	EPZ	10	02	56.8	# - 402
30	EXZ	10	02	40.5		10	-IPZ	23	56	42.3	# - 403
30	EKZ	10	19	04.5		11	+IPZ	19	36	46.8	# - 404
30	EXZ	11	30	20.3		11	-IXZ	23	39	34.5	
30	EXZ	23	48	29.8		12	EPZ	06	59	12.7	# - 405
OCT 1	EPZ	03	28	55.2	# - 387	12	EPZ	13	23	35.3	# - 406
1	EKZ	05	22	24.6	# - 388	12	-IPZ	17	15	55.9	# - 407
1	-IPZ	08	29	09.3	# - 389	14	EPZ	01	42	11.6	# - 408
1	EPZ	18	23	31.0	# - 390	14	IPZ	15	43	01.0	# - 409
2	EPZ	06	42	57.6	# - 391	15	EPZ	14	52	58.6	# - 410
2	EPZ	11	02	34.8	# - 392	15	+IPZ	20	33	07.6	# - 411
2	EPZ	19	42	32.5	# - 393	15	EPZ	22	49	58.5	# - 412
4	EXZ	08	16	14.3		16	EPZ	00	14	20.5	# - 413
5	EXZ	19	18	53.5		16	-IPZ	04	07	21.0	# - 414
6	+EPZ	10	41	31.2	# - 394	16	-IXZ	05	23	04.1	
6	EPZ	14	56	41.9	# - 395	16	EPZ	06	05	50.4	# - 415
6	EXZ	15	34	58.5		16	+IPZ	16	27	44.8	# - 416
6	EXZ	17	39	20.5		16	+IPZ	18	45	47.0	# - 417

Date	Phase	Arival time			Remarks
		h	m	s	
OCT 16	EPZ	21	37	13.6	# - 418
16	EPZ	22	16	32.4	# - 419
17	EPZ	02	18	33.3	# - 420
17	-IPZ	03	04	26.4	# - 421
17	EPZ	06	00	31.6	# - 422
17	EPZ	07	42	12.5	# - 423
17	EXZ	08	50	55.4	
17	EPZ	11	53	36.4	# - 424
17	EPZ	18	22	55.8	# - 425
18	EPZ	01	09	50.9	# - 426
18	EPZ	12	56	09.7	# - 427
18	EPZ	13	02	42.5	# - 428
18	+IPZ	13	21	14.9	# - 429
	IXN	13	31	22.6	
18	EXZ	15	26	17.5	
18	EPZ	16	07	46.5	# - 430
18	EPZ	17	54	31.2	# - 431
18	EPZ	18	23	41.2	# - 432
19	EPZ	12	16	03.4	# - 433
20	EXZ	04	59	57.5	# - 434
20	EPZ	07	11	27.0	# - 435
20	-EPZ	16	00	17.9	# - 436
21	+EPZ	12	24	07.0	# - 437
22	EPZ	02	05	24.5	# - 438

Date	Phase	Arival time			Remarks
		h	m	s	
OCT 22	EPZ	09	16	19.2	# - 439
	EXN	09	26	13.9	
22	EPZ	09	43	52.5	# - 440
22	EXZ	11	52	00.6	
22	-IPZ	18	37	56.3	# - 441
22	EXZ	20	12	11.3	
22	EPZ	23	20	25.5	# - 442
22	EXZ	23	26	00.0	
22	EXZ	23	29	09.8	
22	EPZ	23	30	53.2	# - 443
22	EPZ	23	56	49.0	# - 444
23	EXZ	00	08	11.4	
23	EPZ	01	09	46.4	# - 445
23	EXZ	01	52	38.4	
23	EPZ	02	09	17.2	# - 446
23	EPZ	04	39	48.5	# - 447
23	EPZ	08	42	22.1	# - 448
23	EPZ	13	17	52.4	# - 449
23	EPZ	15	42	24.3	# - 450
23	EPZ	19	29	52.5	# - 451
23	-IPZ	20	43	29.4	# - 452
23	-IPZ	21	36	36.3	# - 453
	ESN	21	46	30.1	
24	+EPZ	01	11	47.9	# - 454
	ESN	01	21	40.2	

Date	Phase	Arival time			Remarks
		h	m	s	
OCT 24	EXZ	04	22	28.3	
24	EPZ	04	38	29.0	# - 455
24	+IPZ	08	34	58.5	# - 456
24	EPZ	11	59	13.7	# - 457
24	IPZ	13	51	06.3	# - 458
24	EPZ	13	58	47.3	# - 459
24	+IPZ	19	12	46.8	# - 460
	ESN	19	23	28.0	
24	EPZ	23	12	28.5	# - 461
25	-IPZ	00	41	15.4	# - 462
	ESN	00	51	05.7	
25	EPZ	04	54	09.9	# - 463
25	EPZ	07	34	32.4	# - 464
25	EPZ	15	11	45.4	# - 465
25	EPZ	17	55	19.5	# - 466
26	EPZ	14	59	04.8	# - 467
26	EPZ	22	55	46.5	# - 468
27	+IPZ	17	50	21.0	# - 469
28	EPZ	07	15	36.9	# - 470
28	EPZ	10	14	55.5	# - 471
28	EPZ	13	43	07.5	# - 472
28	EXZ	22	06	49.2	
29	EPZ	01	37	28.5	
29	EPZ	02	51	44.0	# - 473

Date	Phase	Arival time			Remarks
		h	m	s	
OCT 29	EPZ	05	00	48.4	# - 474
	ESN	05	10	50.1	
29	EPZ	07	43	16.1	# - 475
29	-IPZ	14	50	24.3	# - 476
29	EPZ	15	39	43.6	# - 477
29	-IPZ	17	00	54.5	# - 478
29	EPZ	19	43	13.2	# - 479
30	-IXZ	03	07	54.4	
30	+IPZ	15	08	00.0	# - 480
30	EPZ	17	05	25.4	# - 481
31	EPZ	05	28	20.2	# - 482
31	EPZ	11	43	15.7	# - 483
31	EPZ	14	47	35.2	# - 484
31	EPZ	14	59	34.9	# - 485
NOV 1	EPZ	01	25	43.6	# - 486
1	+IPZ	07	37	38.9	# - 487
1	EXZ	07	47	27.1	
1	-IXZ	07	57	41.7	
1	+IPZ	09	47	42.3	# - 488
1	+IPZ	10	09	42.2	# - 489
	ISN	10	14	51.8	
2	EPZ	20	48	24.1	# - 490
3	EXZ	10	54	09.5	
3	+IPZ	15	53	06.5	# - 491

Date	Phase	Arival time			Remarks
		h	m	s	
NOV 4	EPZ	02	07	16.6	# - 492
4	EXZ	05	04	23.6	
4	EPZ	14	54	08.6	# - 493
4	EPZ	18	26	09.2	# - 494
4	EPZ	21	43	31.2	# - 495
5	EPZ	20	06	36.7	# - 496
6	+IPZ	21	04	27.5	# - 497
8	EPZ	03	56	26.9	# - 498
8	+IPZ	10	34	32.0	# - 499
8	+IPZ	10	53	03.4	# - 500
8	EPZ	11	24	17.8	# - 501
8	EPZ	18	34	21.6	# - 502
8	-IPZ	19	40	39.4	# - 503
9	EPZ	01	39	57.5	# - 504
9	EXZ	05	53	28.2	
10	EPZ	08	19	54.5	# - 505
10	EXZ	10	18	07.2	
10	+IPZ	10	43	02.5	# - 506
10	EPZ	15	57	34.4	# - 507
10	+IXZ	21	28	39.0	
11	EPZ	00	31	55.0	# - 508
11	EPZ	00	44	34.2	# - 509
11	+EPZ	01	39	54.9	# - 510
11	EXZ	21	46	02.0	

Date	Phase	Arival time			Remarks
		h	m	s	
NOV 12	EPZ	01	29	43.9	# - 511
12	EPZ	15	08	29.0	# - 512
12	+IPZ	22	40	53.8	# - 513
	IXN	22	50	38.8	
14	EPZ	06	03	16.2	# - 514
14	EPZ	08	30	44.2	# - 515
15	EXZ	07	10	52.6	
15	+IXZ	09	33	52.6	
17	+IPZ	04	35	14.9	# - 516
17	+IPZ	06	59	13.2	# - 517
	IXN	07	09	27.2	
17	EXZ	19	41	46.2	
18	EPZ	04	17	31.6	# - 518
18	EPZ	16	14	24.5	# - 519
18	EPZ	16	49	28.4	# - 520
18	EPZ	21	37	49.5	# - 521
19	EPZ	03	34	06.2	# - 522
	ESN	03	43	32.3	
20	-IPZ	01	56	34.9	# - 523
	EXN	02	05	49.7	
20	EPZ	03	54	58.9	# - 524
20	EPZ	04	54	12.4	# - 525
21	-IPZ	03	15	45.7	# - 526
21	EPZ	03	56	40.3	# - 527

Date	Phase	Arival time			Remarks
		h	m	s	
NOV 21	EPZ	18	39	57.3	# - 528
21	EPZ	22	45	46.6	# - 529
21	EPZ	23	18	04.6	# - 530
22	EPZ	00	34	04.9	# - 531
22	EPZ	02	22	05.5	# - 532
22	EXZ	02	26	24.4	
22	-IPZ	11	56	13.5	# - 533
22	EPZ	14	50	58.6	# - 534
22	EPZ	17	48	12.9	# - 535
22	-IPZ	21	22	13.9	# - 536
24	EXZ	01	13	33.7	
24	EXZ	01	29	09.7	
24	EPZ	05	25	09.6	# - 537
24	+IPZ	23	55	29.7	# - 538
25	ISN	00	05	54.2	
25	EPZ	06	14	12.2	# - 539
25	EPZ	10	16	39.7	# - 540
25	+IPZ	10	29	37.9	# - 541
25	EPZ	13	01	47.2	# - 542
25	EPZ	18	00	53.4	# - 543
25	EPZ	18	11	05.5	# - 544
26	EPZ	01	28	21.2	# - 545
26	EXZ	03	44	23.5	
26	+IPZ	20	01	07.4	# - 546

Date	Phase	Arival time			Remarks
		h	m	s	
NOV 27	EXZ	02	14	28.2	
27	EPZ	14	04	05.5	# - 547
27	EPZ	21	01	43.2	# - 548
28	-IPZ	03	24	34.4	# - 549
	IXN	03	34	31.5	
28	EXZ	03	52	45.0	
28	EXZ	11	13	16.6	
28	EPZ	15	35	02.0	# - 550
28	-IPZ	17	32	25.6	# - 551
28	EPZ	17	58	46.5	# - 552
29	EPZ	04	32	12.9	# - 553
DEC 1	EPZ	00	35	46.7	# - 554
1	EPZ	18	56	07.2	# - 555
3	EPZ	06	35	03.3	# - 556
3	-IPZ	11	35	56.0	# - 557
4	-IXZ	00	43	44.8	
4	+IPZ	08	31	17.1	# - 558
4	EPZ	20	51	39.0	# - 559
5	-IPZ	00	09	46.9	# - 560
7	EXZ	02	30	59.5	
7	-IPZ	04	17	58.8	# - 561
	ESN	04	27	12.4	
8	EPZ	02	37	14.3	# - 562
8	EXZ	05	42	27.4	

Date	Phase	Arrival time			Remarks
		h	m	s	
DEC 8	EPZ	07	21	18.4	# - 563
	ISN	07	31	47.3	
8	-IPZ	16	06	13.0	# - 564
9	EPZ	06	37	14.3	# - 565
9	EPZ	16	34	25.4	# - 566
10	EPZ	14	06	04.5	# - 567
11	EPZ	02	35	30.6	# - 568
11	EPZ	22	18	49.4	# - 569
12	+IPZ	05	41	31.8	# - 570
12	+IXZ	05	55	53.5	
12	+IXZ	06	04	01.7	
12	+IXZ	06	09	20.7	
12	+IXZ	06	12	54.0	
12	EXZ	06	41	25.0	
12	+IPZ	06	50	35.9	# - 571
12	+IXZ	07	03	20.5	
12	EXZ	07	04	54.0	
12	EPZ	07	44	39.3	# - 572
12	EXZ	07	46	16.3	
12	EXZ	07	51	04.0	
12	+IXZ	08	10	31.0	
12	EXZ	08	23	15.8	
12	EXZ	10	42	27.2	
12	+IPZ	12	42	09.8	# - 573

Date	Phase	Arrival time			Remarks
		h	m	s	
DEC 12	+IPZ	15	06	28.8	# - 574
12	+IPZ	19	31	23.3	# - 575
12	EXZ	21	32	41.7	
12	+IPZ	21	55	16.0	# - 576
12	+IPZ	22	35	56.6	# - 577
12	EPZ	22	53	42.1	# - 578
12	EPZ	23	48	43.8	# - 579
13	EPZ	16	05	54.6	# - 580
14	-IXZ	03	11	52.7	
14	-IPZ	07	52	57.4	# - 581
	IXN	08	02	27.2	
14	+IXZ	19	24	11.3	
	IXN	19	33	23.8	
14	-IPZ	23	33	03.0	# - 582
15	EPZ	00	52	35.4	# - 583
15	IPZ	01	04	27.0	# - 584
15	EPZ	04	02	18.8	# - 585
15	EPZ	10	53	14.4	# - 586
16	EPZ	05	19	55.3	# - 587
16	EPZ	17	34	59.1	# - 588
17	+IPZ	19	09	04.0	# - 589
18	EPZ	03	27	02.2	# - 590
	ISN	03	37	51.4	
18	EXZ	04	23	45.7	

Date	Phase	Arival time			Remarks
		h	m	s	
DEC 18	EPZ	15	10	19.0	# - 591
19	EPZ	06	57	04.7	# - 592
19	EPZ	10	56	21.2	# - 593
19	EXZ	12	33	55.5	
19	EPZ	22	09	58.2	# - 594
20	+IPZ	16	50	10.4	# - 595
20	EPZ	21	05	11.5	# - 596
20	EXZ	21	31	26.2	
21	EXZ	14	06	54.2	
22	+IPZ	05	06	42.5	# - 597
	ISN	05	16	54.5	
23	-IPZ	02	31	52.7	# - 598
	ISN	02	41	37.9	
23	+IPZ	03	13	07.1	# - 599
	ISN	03	23	19.3	
23	EPZ	05	59	10.5	# - 600
24	EPZ	00	16	30.9	# - 601
24	EPZ	00	35	36.8	# - 602
24	+IPZ	00	47	26.0	# - 603
25	EPZ	18	07	40.7	# - 604
26	EPZ	06	15	12.6	# - 605
26	+IPZ	16	29	58.3	# - 606
26	+IPZ	19	26	10.1	# - 607
26	+IXZ	19	39	50.3	

Date	Phase	Arival time			Remarks
		h	m	s	
DEC 26	+IXZ	19	49	53.4	
26	EXZ	20	04	39.5	
27	EPZ	22	00	05.4	# - 608
	ISN	22	09	09.6	
28	+IPZ	04	36	43.7	# - 609
29	-IPZ	21	29	29.7	# - 610
30	EPZ	04	39	20.7	# - 611
30	EPZ	06	38	32.8	# - 612
31	EPZ	04	11	43.4	# - 613
31	-IPZ	20	28	53.7	# - 614
	ESN	20	38	32.2	
31	EXZ	20	40	57.8	
31	EXZ	21	49	34.1	

Table 2. List of 614 earthquakes.

Data No.	Date	h m s	Latitude (degree)	Longitude (degree)	Region	Depth (km)	Magnitude (Mb)	Epicentral distance (degree)
1	JAN 3	02 05 15.0	7.545 S	130.109 E	Tanimbar Islands Reg., Indonesia	27	5.0	83.251
2	3	03 39 20.5	48.965 S	123.462 E	South of Australia	10	5.4	43.383
3	5	03 43 19.0	18.477 S	69.253 W	Northern Chile	128	4.9	79.350
4	6	14 28 14.7	0.683 N	123.336 E	Minahassa Peninsula, Sulawaesi	58	5.3	88.448
5	6	21 26 01.2	6.261 S	146.417 E	Eastern New Gunia., P.N.G.	116	5.3	90.190
6	10	07 03 02.5	13.352 S	76.463 W	Near Coast of Peru	52	5.0	86.478
7	11	06 16 55.9	9.311 N	86.964 E	Bay of Bengal	22	5.7	84.865
8	11	10 58 15.5	18.560 S	177.500 W	Fiji Islands Region	500	5.1	88.700
9	13	09 37 43.7	20.930 S	178.717 W	Fiji Islands Region	575	5.7	86.147
10	13	11 58 23.1	1.342 N	127.373 E	Halmahera, Indonesia	113	6.0	90.507
11	13	19 07 44.1	17.922 S	179.448 W	Fiji Islands Region	583	5.1	88.910
12	14	16 03 05.8	56.106 S	26.451 W	South Sandwich Islands Region	33	5.1	31.167
13	16	10 32 27.5	33.080 S	178.550 W	South of Kermadec Islands	82	5.0	74.382
14	18	15 42 13.6	35.170 S	71.594 W	Central Chile	33	5.0	64.553
15	18	18 35 00.0	24.042 S	66.851 W	Salta Province,Argentina	187	4.8	73.376
16	18	23 10 02.9	3.963 N	123.035 E	Celebes Sea	541	5.4	91.385
17	19	18 04 21.8	55.906 S	24.277 W	South Sandwich Islands Region	33	5.3	30.540
18	21	07 57 20.7	9.339 S	122.794 E	Savu Sea	27	5.1	78.961

19	22	06 24 49.6	14.107 S	167.287 E	Vanuatu Islands	198	5.3	89.312
20	22	07 23 45.6	34.515 S	179.760 W	South of Kermadec Islands	81	5.2	72.756
21	23	14 46 15.3	53.436 S	24.861 E	South of Africa	10	5.0	17.007
22	24	12 09 24.3	9.403 S	148.796 E	Eastern New Guinea Reg., P.N.G.	35	5.5	88.060
23	25	17 11 12.5	50.421 S	72.158 W	Chile - Argentina Border Region	33	5.1	50.729
24	25	22 56 10.8	31.728 S	177.006 W	Kermadec Islands Region	33	4.9	75.992
25	27	09 52 58.8	21.481 S	68.032 W	Chile - Bolivia Border Region	145	5.0	76.147
26	28	10 25 49.5	6.940 S	125.937 E	Banda Sea	494	5.1	82.313
27	28	15 29 05.6	21.358 S	174.268 W	Tonga Islands	37	5.3	86.608
28	28	22 06 54.8	26.088 S	71.382 E	Mid - Indian Ridge	10	5.1	46.950
29	30	15 54 05.3	1.900 N	128.580 E	Halmahera, Indonesia	29	5.3	91.458
30	30	22 42 17.0	58.214 S	148.528 E	West of Macquarie Island	10	5.1	43.129
31	FEB 2	00 22 05.9	51.654 S	139.406 E	South of Australia	10	5.7	46.253
32	2	00 31 30.9	51.547 S	139.704 E	South of Australia	10	5.6	46.438
33	3	05 44 48.8	21.195 S	176.284 W	Fiji Islands Region	219	4.9	86.381
34	3	07 13 44.6	6.187 S	131.466 E	Tanimbar Islands Reg., Indonesia	95	5.2	84.997
35	4	12 47 14.8	23.458 S	179.954 W	South of Fiji Islands	567	4.6	83.436
36	4	13 04 45.5	19.729 S	178.120 W	Fiji Islands Region	600	5.4	87.437
37	5	02 32 04.6	23.223 S	66.613 W	Jujuy Province, Argentina	201	4.7	74.059
38	5	03 49 41.2	22.810 S	172.620 E	Loyalty Islands Region	33	4.8	82.370
39	5	20 31 09.9	64.250 S	154.260 E	Balleny Islands Region	10	4.8	39.298
40	6	01 12 38.5	5.720 S	103.156 E	Southern Sumatera, Indonesia	37	5.9	75.477

41	6	03 54 37.6	5.684 S	103.162 E	Southern Sumatera, Indonesia	33	5.3	75.513
42	6	09 04 00.8	31.323 S	176.954 W	Kermadec Islands Region	36	4.8	76.396
43	6	16 50 59.2	22.144 S	179.453 W	South of Fiji Islands	608	5.1	84.815
44	6	19 54 44.0	21.438 S	68.450 W	Chile - Bolivia Border Region	132	4.8	76.325
45	7	05 59 45.2	59.047 S	25.919 W	South Sandwich Islands Region	33	5.2	28.747
46	7	16 18 14.6	25.981 S	176.854 W	South of Fiji Islands	62	5.2	81.613
47	7	19 26 48.5	37.435 S	177.463 E	Off E.Coast of N. Islands, N. Z.	206	4.7	69.374
48	17	04 37 31.4	55.979 S	158.123 E	Macquarie Islands Region	33	5.5	47.537
49	18	10 27 09.0	40.000 S	174.108 E	Cook Strait, New Zealand	151	5.2	66.202
50	20	15 44 42.3	15.382 S	177.108 W	Fiji Islands Region	379	5.3	91.868
51	20	20 35 24.3	33.631 S	179.533 W	South of Kermadec Islands	48	5.5	73.658
52	21	17 13 19.7	2.075 N	128.408 E	Halmahera, Indonesia	80	5.5	91.559
53	22	23 40 46.9	32.400 S	179.490 W	South of Kermadec Island	135	5.4	74.860
54	23	19 42 21.7	25.810 S	179.727 W	South of Fiji Islands	435	5.1	81.203
55	24	11 21 43.1	16.066 S	174.076 W	Tonga Islands	135	4.8	91.805
56	25	17 46 32.6	27.135 S	71.498 W	Near Coast of Northern Chile	35	5.2	71.995
57	26	03 45 19.7	11.803 N	57.764 E	Arabian Sea	10	5.8	81.696
58	26	11 28 05.3	35.492 S	104.880 W	Sothem Pacific Ocean	10	4.7	72.462
59	27	20 05 23.8	6.191 S	147.576 E	Eastern New Guinea	39	5.9	90.650
60	28	09 14 09.1	24.369 S	69.924 W	Northern Chile	58	5.7	74.072
61	MAR 2	09 05 56.4	40.337 S	176.363 E	North Island, New Zealand	28	5.3	66.351
62	3	01 18 31.2	14.384 S	167.179 E	Vanuatu Islands	148	5.9	89.019

63	6	03 01 39.9	31.991 S	178.117 W	Kermadec Islands Region	33	5.3	75.525
64	7	02 36 44.9	24.088 S	66.796 W	Salta Province, Argentina	225	4.2	73.315
65	7	19 59 06.6	32.568 S	178.705 W	South of Kermadec Islands	33	4.7	74.851
66	8	03 43 04.4	40.228 N	124.290 W	Near Coast of Northern California	13	5.3	149.859
67	8	17 47 20.1	58.608 S	148.911 E	West of Macquarie Island	10	5.3	42.886
68	8	18 45 22.7	58.055 S	10.559 W	Southwest Atlantic Ocean	10	5.1	23.987
69	14	22 15 04.5	24.363 S	179.905 W	South of Fiji Islands	498	4.8	82.569
70	15	01 58 10.9	7.321 S	128.513 E	Banda Sea	131	5.1	82.886
71	15	19 21 54.5	39.600 S	15.320 W	Tristan da Cunha Region	10	5.3	41.144
72	15	20 31 02.8	24.020 S	178.890 E	South of Fiji Islands	566	4.7	82.645
73	16	01 41 40.5	23.851 S	177.428 W	South of Fiji Islands	33	5.1	82.489
74	16	01 47 16.9	23.910 S	177.410 W	South of Fiji Islands	25	5.0	83.518
75	16	01 54 43.4	23.960 S	177.320 W	South of Fiji Islands	21	5.3	83.487
76	16	02 02 54.3	23.970 S	177.370 W	South of Fiji Islands	33	5.0	83.468
77	16	04 43 48.7	29.966 S	177.312 W	South of Fiji Islands	33	5.3	83.483
78	16	23 21 33.3	35.406 S	178.528 E	Off E. Coast of N. Island, N.Z.	181	5.4	71.552
79	17	05 13 55.9	6.539 N	125.780 E	Mindanao, Philippine Islands	102	5.2	94.755
80	20	18 45 09.6	56.427 S	27.121 W	South Sandwich Islands Region	105	5.8	31.156
81	23	14 05 09.6	55.949 S	27.615 W	South Sandwich Islands Region	80	5.3	31.703
82	24	17 19 30.4	7.751 S	117.464 E	Bali Sea	280	5.5	78.527
83	24	18 20 12.8	55.506 S	124.357 W	Southern East Pacific Rise	10	5.1	55.153
84	24	22 47 06.6	3.613 N	127.008 E	Talaud Islands, Indonesia	53	5.6	92.482

85		25	17 27 36.8	37.703 S	176.973 E	North Island, New Zealand	33	5.5	69.015
86		26	13 27 39.5	7.099 S	124.195 E	Banda Sea	611	5.0	81.539
87		26	14 14 11.9	51.222 N	179.723 W	Andreanof Islands, Aleutian Is.	33	5.9	154.321
88		26	16 30 00.0	37.272 N	116.360 W	Southern Nevada	0	5.5	145.542
89		28	00 25 40.0	12.708 S	166.963 E	Santa Cruz Islands	203	4.9	90.556
90		28	01 59 33.0	32.108 S	178.793 W	South of Kermadec islands	33	5.4	75.280
91		28	04 48 21.8	22.007 S	176.256 W	South of Fiji Islands	142	5.2	85.596
92		29	12 19 27.0	20.526 S	178.050 W	Fiji Islands Region	542	5.2	86.677
93		29	13 11 17.3	16.969 S	173.542 W	Tonga Islands	65	5.3	91.025
94		30	07 02 51.9	43.151 S	171.386 E	South Island, New Zealand	12	5.7	62.595
95		30	13 42 17.1	8.345 S	114.734 E	Bali Region, Indonesia	17	5.2	77.008
96	APR	1	15 06 44.9	31.326 S	176.919 W	Kermadec Islands Region	10	4.9	76.399
97		1	21 36 24.9	31.950 S	177.660 W	Kermadec Islands Region	33	4.8	75.652
98		2	03 17 55.6	37.562 S	17.164 W	Southern Mid-Atlantic Ridge	10	5.4	43.610
99		2	06 42 42.0	37.298 S	17.351 W	Southern Mid-Atlantic Ridge	10	5.4	43.912
100		2	10 08 44.2	24.993 S	179.951 E	South of Fiji Islands	498	5.1	81.928
101		3	03 19 51.4	5.696 S	151.164 E	New Britain Region	27	5.8	92.320
102		3	06 07 38.8	28.929 S	69.612 W	Chile-Argentina	110	5.5	69.729
103		4	01 11 12.3	17.949 S	178.365 W	Fiji Islands Region	574	5.6	89.113
104		5	11 46 35.0	11.938 S	166.324 E	Santa Cruz Islands	49	5.6	91.111
105		6	14 46 43.2	1.851 S	97.741 E	Southwest of Sumatera, Indonesia	32	5.7	77.368
106		7	03 37 02.9	4.172 S	131.005 E	Banda Sea	53	5.9	86.700

107	10	16 14 59.0	4.351 S	104.528 E	Southern Sumatera, Indonesia	227	5.4	77.216
108	14	12 12 39.8	19.450 S	69.133 W	Northern Chile	113	5.0	78.403
109	18	09 16 52.8	5.454 S	103.001 E	Southern Sumatera, Indonesia	29	5.7	75.675
110	18	13 37 56.3	1.678 N	127.373 E	Halmahera, Indonesia	131	5.3	90.819
111	19	17 32 14.5	20.343 S	178.741 W	Fiji Islands Region	605	4.9	86.712
112	20	02 36 36.7	22.218 S	170.508 E	Loyalty Islands Region	24	5.6	82.413
113	20	13 42 56.2	7.533 S	130.165 E	Tanimbar Islands Region Indonesia	31	5.1	83.283
114	22	05 20 38.5	5.307 S	146.430 E	Eastern New Guinea Region, P.N.G.	161	5.1	91.085
115	25	18 06 04.2	40.368 N	124.316 W	Near Coast of Northern Calif.	15	6.3	150.000
116	26	01 25 14.8	2.369 N	123.054 E	Celebes Sea	447	5.5	89.912
117	26	11 18 25.7	40.378 N	124.575 W	Near Coast of Northern Calif.	22	6.5	150.050
118	26	17 19 58.7	56.460 S	142.150 W	Pacific-Antarctic Ridge	10	5.1	54.757
119	28	01 55 47.2	5.602 N	124.054 E	Mindanao, Philippine Islands	477	5.5	93.270
120	28	17 26 53.2	5.631 S	133.788 E	Aru Islands Rigion, Indonesia	33	5.2	86.344
121	29	06 41 39.0	29.930 S	177.200 W	Kermadec Islands, New Zealand	77	4.9	77.704
122	29	09 04 32.7	27.610 S	69.313 W	Northern Chile	103	4.8	70.859
123	29	09 25 43.4	10.703 S	166.029 E	Santa Cruz Islands	33	5.4	92.204
124	MAY 2	15 33 37.0	19.910 S	168.492 E	Vanuatu Islands	32	4.9	84.099
125	3	03 40 40.5	32.370 S	71.590 W	Near Coast of Central Chile	69	5.2	67.150
126	3	05 40 06.3	12.529 S	75.916 W	Central Peru	100	5.1	87.079
127	4	08 45 01.7	6.762 S	130.229 E	Banda Sea	86	5.9	84.020
128	6	19 28 20.4	22.074 S	63.663 W	Salta Province, Argentina	532	4.5	74.139

129	6	23 26 14.9	45.658 S	34.874 E	Prince Edward Islands Rigion	10	5.0	23.530
130	6	23 29 47.2	17.165 S	72.015 W	Near Coast of Peru	52	4.9	81.478
131	9	00 20 56.1	18.347 S	69.401 W	Northern Chile	124	5.4	79.520
132	9	08 43 47.7	24.267 S	66.923 W	Salta Province, Argentina	177	4.5	73.191
133	12	14 47 44.5	23.741 S	175.931 W	Tonga Islands Region	48	5.3	83.971
134	12	15 46 56.0	9.525 S	78.748 W	Near Coast of Northern Peru	63	5.7	90.800
135	12	18 05 42.6	16.524 S	172.367 W	Samoa Islands Region	15	6.4	91.676
136	13	03 22 48.6	21.129 S	68.373 W	Chile-Bolivia Border	127	4.9	76.588
137	13	18 26 38.3	23.863 S	175.944 W	Tonga Islands Region	33	5.5	83.850
138	15	05 36 08.6	32.896 S	177.879 W	South of Kermadec Islands	33	5.1	74.691
139	15	07 05 05.3	6.075 S	147.572 E	Eastern New Guinea Region	58	6.2	90.757
140	16	02 38 31.4	32.663 S	178.469 W	South of Kermadec Islands	33	5.2	74.804
141	16	04 08 14.4	56.042 S	27.643 W	South Sandwich Islands Region	33	5.4	31.640
142	16	17 57 16.3	38.458 S	177.852 E	North Island New Zealand	45	5.4	68.466
143	16	20 57 59.5	13.672 S	76.108 W	Near Coast of Peru	57	5.6	86.065
144	17	09 49 19.1	7.239 N	126.645 E	Mindanao, Philippine Islands	33	6.2	95.714
145	17	10 15 31.3	7.191 N	126.762 E	Mindanao, Philippine Islands	33	6.4	95.711
146	17	15 36 21.1	6.946 N	126.882 E	Mindanao, Philippine Islands	42	5.1	95.527
147	17	19 47 31.2	32.942 S	70.153 W	Chile-Argentina Border Region	107	4.5	66.174
148	17	20 42 43.0	21.870 S	68.763 W	Chile-Bolivia Border Region	105	5.3	76.025
149	17	21 36 00.0	6.463 S	153.237 E	New Britan Region P.N.G.	32	5.7	92.285
150	18	03 02 21.5	33.594 S	72.018 W	Off Coast of Central Chile	30	5.6	66.144

151	18	11 02 42.6	20.449 S	177.699 W	Fiji Islands Region	538	5.2	86.824
152	19	14 42 50.7	9.463 S	159.316 E	Solomon Islands	33	5.5	91.392
153	21	14 09 03.3	6.175 S	147.236 E	Eastern New Guinea Region, P.N.G.	48	5.7	90.550
154	21	18 05 52.5	8.748 S	117.604 E	Sumba Region, Indonesia	143	5.7	77.652
155	21	23 01 31.4	59.332 S	149.158 E	West of Macquarie Island	33	5.0	42.321
156	22	01 20 39.9	33.669 S	71.942 W	Near Coast of Central Chile	44	5.3	66.051
157	22	13 06 07.9	35.340 S	105.890 W	South East Pacific Rise	10	5.1	72.790
158	22	21 40 37.2	3.506 S	144.221 E	Near N Coast Of New Gunia, P.N.G.	33	5.7	92.003
159	23	00 20 00.4	4.544 S	141.905 E	New Guinea, Papua New Guinea	99	5.4	90.229
160	25	20 51 09.7	54.601 S	30.261 W	South Sandwich Islands Region	33	5.8	33.703
161	26	01 23 38.0	21.084 S	67.318 W	Chile-Bolivia Region	159	4.9	76.282
162	26	02 11 15.1	18.286 S	177.944 W	Fiji Islands Region	628	4.9	88.874
163	27	05 13 38.8	11.122 S	165.239 E	Santa Cruz Islands	19	6.3	91.580
164	27	17 31 00.3	1.138 S	127.190 E	Halmahera, Indonesia	34	5.1	88.142
165	27	22 30 35.2	41.616 S	173.727 E	South Island, New Zealand	85	5.8	64.571
166	28	09 27 07.5	30.650 S	178.162 W	Kermadec Island, New Zealand	27	5.8	76.819
167	30	00 26 34.3	18.117 S	178.446 W	Fiji Islands Region	626	4.8	88.933
168	30	05 37 44.4	23.981 S	175.333 W	Tonga Islands Region	33	5.2	83.851
169	30	19 57 33.6	20.730 S	178.920 W	Fiji Islands Region	667	4.5	86.299
170	31	11 03 14.2	22.200 S	172.010 E	Loyalty Islands Region	64	4.8	82.806
171 JUN	1	01 47 15.7	17.319 S	70.491 W	Near Coast of Peru	81	4.8	80.840
172	1	06 04 14.0	10.975 S	165.183 E	Santa Cruz Islands	12	5.5	91.704

173	2	20 00 52.4	3.303 S	130.718 E	Seram, Indonesia	33	5.0	87.402
174	2	21 05 00.8	16.138 S	92.844 E	South Indian Ocean	14	5.9	62.367
175	3	06 10 54.3	51.130 N	178.743 E	Rat Islands, Aleutian Islands	22	5.9	153.734
176	3	11 25 48.1	31.995 S	178.602 W	Kermadec Islands Region	59	5.4	75.427
177	4	23 11 44.8	4.805 S	153.255 E	New Ireland Region P.N.G.	74	5.2	93.846
178	5	17 07 11.9	21.470 S	68.399 W	Chile-Bolivia Border Region	131	4.9	76.278
179	5	21 46 41.9	40.273 N	124.552 W	Near Coast of Northern Calif.	21	5.0	149.943
180	6	10 50 11.0	0.172 S	123.093 E	Minahassa Peninsula, Sulawesi	78	5.1	87.568
181	6	14 51 39.1	21.026 S	70.291 W	Near Coast of Northern Chile	37	5.0	77.310
182	6	21 40 40.8	1.068 N	124.040 E	Minahassa Peninsula, Sulawesi	18	5.9	89.058
183	6	23 29 32.3	3.672 N	126.954 E	Talaud Islands, Indonesia	44	5.5	92.517
184	7	14 26 00.2	24.224 S	176.226 W	South of Fiji Islands	67	5.5	83.444
185	9	00 24 54.5	23.007 S	176.365 W	South of Fiji Islands	79	5.7	84.602
186	9	00 31 56.3	8.474 S	111.100 E	Jawa, Indonesia	64	5.9	75.612
187	9	02 46 58.3	65.346 S	178.521 E	Balleny Islands Region	10	4.8	42.818
188	9	06 41 05.7	49.804 S	110.567 E	Southeast Indian Ridge	10	5.3	38.149
189	9	09 45 58.4	13.160 S	167.158 E	Vanuatu Islands	200	4.8	90.180
190	9	14 45 02.5	1.119 N	124.172 E	Minahassa Peninsula, Sulawasi	42	5.6	89.152
191	10	02 13 45.4	1.084 N	124.089 E	Minahassa Peninsula, Sulawesi	31	5.9	89.090
192	11	02 03 35.6	1.077 N	124.115 E	Minahassa Peninsula, Sulawesi	28	5.8	89.093
193	11	21 22 33.8	63.560 S	173.308 E	Balleny Islands Region	10	5.1	43.676
194	12	11 06 30.2	2.617 N	125.687 E	Talaud Islands, Indonesia	79	5.8	91.085

195	12	11 50 19.6	23.887 S	68.193 W	Northern Chile	119	5.2	73.960
196	14	17 06 59.7	26.538 S	177.743 W	South of Fiji Islands	47	5.3	80.897
197	15	14 16 50.0	60.774 S	154.040 E	West of Macquarie Island	33	5.2	42.273
198	15	20 39 11.3	0.073 S	123.030 E	Minahassa Peninsula, Sulawesi	128	5.9	87.637
199	16	12 56 21.1	22.639 S	68.044 W	Northern Chile	142	5.0	75.073
200	16	21 40 36.0	23.425 S	179.728 E	South of Fiji Islands	603	4.7	83.401
201	17	08 39 15.4	60.373 S	57.074 W	South Shetland Islands	10	5.8	37.815
202	19	08 15 26.2	8.917 S	118.927 E	Sumbawa Region, Indonesia	118	5.2	77.967
203	20	13 41 17.7	19.166 S	66.709 W	Southern Bolivia	249	5.1	77.865
204	20	17 02 16.0	33.771 S	178.898 W	South of Kermadec Islands	33	4.6	73.646
205	21	10 52 42.4	26.503 S	70.659 W	Near Coast of Northern Chile	39	5.7	72.319
206	21	17 43 08.8	37.689 S	176.861 E	North Island, New Zealand	10	6.1	69.006
207	21	19 23 03.9	24.027 S	66.809 W	Salta Province, Argentina	167	4.8	73.376
208	22	04 00 41.0	60.728 S	21.969 W	Southwestern Atlantic Ocean	12	6.0	26.145
209	22	10 36 42.1	24.124 S	66.736 W	Salta Province, Argentina	180	4.7	73.262
210	23	04 52 36.3	3.595 S	129.088 E	Seram, Indonesia	75	5.6	86.546
211	23	11 21 21.5	36.104 S	101.220 W	Southern Pacific Ocean	10	5.6	71.182
212	23	13 03 22.6	17.981 S	174.726 W	Tonga Islands	18	5.4	89.814
213	23	13 08 48.3	18.015 S	174.822 W	Tonga Islands	16	5.3	89.762
214	23	19 32 38.6	1.409 N	123.282 E	Minahassa Peninsula Sulawesi	10	4.5	89.103
215	23	21 47 26.7	26.560 S	178.400 E	South of Fiji Islands	650	4.6	80.082
216	24	00 41 05.1	23.610 S	175.467 W	Tonga Islands Region	43	5.5	84.187

217		24	09 00 18.1	15.424 S	173.395 W	Tonga Islands	31	5.2	92.560
218		25	06 30 51.0	28.314 S	176.716 W	Kermadec Islands Region	20	6.1	79.369
219		26	02 09 56.1	22.281 S	179.572 W	South of Fiji Islands	598	5.4	84.657
220		26	02 36 13.4	8.790 S	112.593 E	Jawa, Indonesia	64	5.2	75.841
221		26	03 18 52.2	33.719 S	178.862 W	South of Kermadec Islands	33	5.6	73.703
222		26	07 19 51.0	34.102 S	179.093 W	South of Kermadec Islands	70	4.7	73.287
223		28	11 57 34.1	34.201 N	116.436 W	Southern California	1	6.2	142.587
224		28	15 05 30.7	34.203 N	116.827 W	Southern California	5	6.3	142.667
225		28	16 08 05.0	44.425 S	37.782 E	Prince Edward Islands Region	10	4.7	24.666
226		28	16 19 24.3	44.441 S	37.691 E	Prince Edward Islands Region	10	4.8	24.652
227		28	17 40 19.7	23.694 S	179.857 W	South of Fiji Islands	547	4.8	83.228
228		29	00 07 05.2	10.666 S	161.440 E	Solomon Islands	59	5.5	90.899
229		29	02 54 03.3	24.930 S	68.187 W	Chile-Argentina Border Región	113	5.0	72.988
230		29	13 49 21.0	28.336 S	62.907 E	Southwest Indian Ridge	10	5.0	42.989
231	JUL	1	17 00 51.3	7.184 S	129.389 E	Banda Sea	138	5.6	83.327
232		1	17 31 53.9	33.310 S	179.240 W	South of Kermadec Islands	33	4.8	74.027
233		2	06 13 36.7	32.903 S	178.592 W	South of Kermadec Islands	10	5.5	74.548
234		4	06 48 00.0	20.762 S	68.711 W	Chile-Bolovia Border Region	103	5.0	77.041
235		5	06 00 51.3	7.671 S	111.268 E	Jawa, Indonesia	33	5.1	76.418
236		6	19 05 52.4	38.125 S	177.364 E	North Island, New Zealand	74	4.8	68.684
237		7	12 27 23.1	0.089 S	123.814 E	Minahassa Peninsula, Sulawesi	136	5.3	87.903
238		7	22 47 13.3	44.978 S	20.387 W	Southern Mid-Atlantic Ridge	10	5.4	38.188

239	11	10 44 19.7	22.483 S	178.413 W	South of Fiji Islands	377	6.2	84.702
240	11	12 53 13.3	4.369 S	102.839 E	Southern Sumatera, Indonesia	57	5.3	76.639
241	11	21 03 16.5	25.084 S	179.494 E	South of Fiji Islands	573	4.6	81.744
242	12	01 16 56.9	28.971 S	175.984 W	Kermadec Islands Region	79	4.8	78.867
243	12	17 37 04.7	7.104 S	129.272 E	Banda Sea	109	4.9	83.360
244	12	23 40 59.8	3.090 N	122.055 E	Celebes Sea	616	5.5	90.208
245	13	18 11 33.7	3.919 S	76.602 W	Northern Peru	97	6.1	95.395
246	14	07 03 09.5	4.725 S	125.455 E	Banda Sea	465	5.5	84.192
247	14	19 56 53.3	25.026 S	179.603 W	South of Fiji Islands	497	4.9	81.989
248	15	06 34 16.5	1.330 N	123.190 E	Minahssa Peninsula, Sulawesi	44	5.1	88.998
249	15	18 04 19.4	8.774 S	121.442 E	Flores Region, Indonesia	130	5.7	78.999
250	15	20 20 16.2	21.602 S	69.796 W	Northern Chile	78	4.9	76.611
251	17	18 46 00.4	10.380 S	78.550 W	Near Coast of Peru	45	5.5	89.932
252	17	20 01 25.8	34.660 S	105.210 W	Southern East Pacific Rise	10	5.0	73.332
253	18	06 57 11.2	16.090 S	177.456 W	Fiji Islands Region	431	5.3	91.108
254	18	07 57 47.9	6.490 S	147.850 E	Eastern New Guinea Region, P.N.G.	40	5.5	90.464
255	19	02 40 13.2	6.683 S	147.533 E	Eastern New Guinea Region, P.N.G.	77	5.4	90.176
256	19	08 21 05.5	60.799 S	22.201 W	South Sandwich Islands Region	33	4.9	26.177
257	20	16 13 07.1	3.600 N	124.353 E	Celebes Sea	305	4.8	91.519
258	20	20 20 57.8	31.497 S	179.758 W	Kermadec Islands Region	338	4.8	84.635
259	21	06 57 51.9	22.869 S	175.043 W	Tonga Islands Region	33	5.4	84.989
260	23	10 11 10.9	54.511 S	143.744 E	West of Macquarie Island	10	5.3	45.043

261	23	22 30 17.2	19.494 S	69.113 W	Northern Chile	135	4.6	78.355
262	24	02 09 23.7	7.036 S	149.932 E	New Britain Region, P.N.G.	43	5.6	90.655
263	24	18 15 21.9	11.894 S	166.229 E	Santa Cruz Islands	58	5.3	91.126
264	25	02 37 32.5	24.840 S	70.087 W	Near Coast of Northern Chile	52	5.2	73.686
265	27	06 25 43.5	56.841 S	146.896 E	West of Macquarie Island	33	5.1	43.890
266	28	17 30 17.6	4.435 S	127.496 E	Banda Sea	297	5.5	85.195
267	29	00 31 50.2	23.930 S	179.690 E	South of Fiji Islands	595	4.6	82.903
268	29	01 54 47.8	55.349 S	128.438 W	Pacific-Antarctic Ridge	10	5.7	55.558
269	29	08 20 33.9	24.998 S	179.797 E	South of Fiji Islands	532	4.9	81.891
270	30	13 14 51.6	50.357 S	72.095 W	S. Chile-Argentina Border Region	10	5.4	50.769
271	30	23 00 41.7	31.481 S	67.386 W	San Juan Province, Argentina	5	5.5	66.653
272	31	13 03 55.9	31.767 S	67.557 W	San Juan Province, Argentina	5	5.2	66.443
273	31	14 02 54.3	10.133 N	126.232 E	Philippine Islands Region	48	5.3	98.248
274	31	14 11 21.2	40.645 S	176.210 E	North Island, New Zealand	38	5.1	66.023
275	AUG 1	06 06 45.3	18.280 S	178.281 W	Fiji Islands Region	632	5.1	88.810
276	1	06 10 34.6	18.184 S	178.100 W	Fiji Islands Region	645	4.8	88.941
277	1	17 14 54.1	21.331 S	68.016 W	Chile-Bolivia Border Region	140	4.9	76.282
278	1	18 19 03.0	21.344 S	179.189 W	Fiji Islands Region	634	5.3	85.647
279	2	05 50 11.6	0.883 S	127.582 E	Halmahera, Indonesia	19	5.8	88.519
280	2	12 03 20.3	7.126 S	121.748 E	Flores Sea	486	6.2	80.636
281	4	02 36 30.5	20.644 S	70.967 W	Near Coast of Northern Chile	22	4.8	77.885
282	4	06 58 32.5	21.738 S	177.214 W	Fiji Islands Region	253	5.7	85.669

283	4	21 08 41.7	12.127 S	166.589 E	Santa Cruz Islands	91	6.1	91.006
284	4	23 45 31.8	26.696 S	106.363 W	Easter Island Region	10	5.3	81.305
285	5	04 53 04.9	5.324 S	131.057 E	Banda Sea	65	5.1	85.650
286	5	19 33 00.7	3.086 S	101.795 E	Southern Sumatera, Indonesia	76	5.4	77.502
287	7	10 02 11.4	34.854 S	178.487 W	South of Kermadec Islands	14	5.2	72.673
288	8	01 08 05.7	31.566 S	179.997 W	Kermadec Islands Region	392	5.5	75.568
289	8	02 50 16.6	10.063 N	126.158 E	Philippine Islands Region	52	5.2	98.157
290	9	16 28 03.2	21.828 S	170.108 E	Loyalty Islands Region	19	5.2	82.684
291	9	19 49 44.1	4.005 N	126.360 E	Talaud Islands, Indonesia	73	6.1	92.613
292	10	03 04 35.7	27.701 S	73.953 E	Mid-Indian Ridge	10	5.6	46.027
293	11	00 01 30.2	0.123 S	125.186 E	Southern Molucca Sea	59	5.5	88.363
294	11	01 55 45.1	0.115 S	127.175 E	Halmahera, Indonesia	38	5.0	89.085
295	11	04 03 45.8	80.213 N	1.048 W	North of Svalbard	18	5.1	150.815
296	11	13 44 05.7	0.453 N	123.792 E	Minahassa Peninsula, Sulawesi	244	4.9	88.398
297	11	15 52 12.5	24.072 S	66.692 W	Salta Province, Argentina	209	4.4	73.296
298	12	17 30 02.6	6.626 S	130.597 E	Banda Sea	117	5.5	84.278
299	13	01 20 01.7	19.530 S	177.804 W	Fiji Islands Region	562	4.9	87.695
300	13	20 43 00.2	6.103 S	148.875 E	New Britain Region, P.N.G.	45	5.8	91.172
301	14	16 20 10.4	17.411 S	174.327 W	Tonga Islands	113	5.2	90.446
302	14	20 08 59.7	30.823 S	65.292 W	Cordoba Province, Argentina	194	5.0	66.584
303	16	10 23 28.4	5.3680 S	146.669 E	Eastern New Guinea Region, P.N.G.	215	6.0	91.110
304	16	14 49 08.0	3.084 S	84.945 E	South Indian Ocean	33	5.7	72.456

305	17	13 52 39.8	24.199 S	66.964 W	Salta Province, Argentina	189	4.6	73.268
306	17	21 09 24.9	20.240 S	68.783 W	Chile-Bolivia Border Region	110	5.2	77.551
307	17	21 51 14.6	23.426 S	179.650 W	South of Fiji Islands	529	4.9	83.531
308	17	22 45 00.2	20.929 S	178.006 W	Fiji Islands Region	497	5.2	86.295
309	18	05 03 12.8	21.012 S	68.631 W	Chile-Bolivia Border Region	114	5.0	76.781
310	18	06 15 58.0	22.280 S	174.789 W	Tonga Islands Region	44	5.2	85.611
311	18	20 01 03.6	28.644 S	178.324 W	Kermadec Islands Region	201	5.6	78.737
312	19	13 02 04.9	24.628 S	70.494 W	Near Coast of Northern Chile	39	5.3	74.014
313	20	13 37 11.5	26.177 S	69.088 W	Northern Chile	105	5.4	72.120
314	21	00 25 49.7	19.920 S	178.260 W	Fiji Islands Region	490	4.5	87.222
315	21	00 34 35.0	22.962 S	69.278 W	Northern Chile	74	5.0	75.175
316	21	09 54 51.3	18.321 S	65.097 E	Mauritius-Reunion Region	10	5.1	53.166
317	22	07 35 41.5	15.543 S	70.717 W	Southern Peru	172	4.8	82.573
318	24	15 21 21.1	20.588 S	169.779 E	Vanuatu Islands	33	5.3	83.787
319	24	19 40 34.9	56.622 S	26.552 W	South Sandwich Islands Region	107	5.9	30.804
320	25	08 24 12.9	20.942 S	174.947 W	Tonga Islands	66	5.5	86.886
321	25	12 32 53.8	22.725 S	66.166 W	Jujuy Province, Argentina	254	4.7	74.373
322	26	16 56 42.8	12.495 S	166.014 E	Santa Cruz Islands	73	4.7	90.494
323	27	06 50 17.5	33.670 S	179.980 W	South of Kermadec Islands	160	4.8	73.532
324	28	04 49 44.2	6.922 S	126.906 E	Banda Sea	395	4.8	82.678
325	28	08 40 44.0	23.841 S	179.078 E	South of Fiji Islands	582	4.8	82.859
326	28	17 15 05.5	22.314 S	179.526 W	South of Fiji Islands	598	5.5	84.635

327	28	18 18 46.4	0.965 S	13.562 W	North of Ascension Island	16	6.3	76.584
328	30	17 32 10.0	29.518 S	178.821 W	Kermadec Islands, New Zealand	157	4.3	77.789
329	30	20 09 05.7	17.918 S	178.710 W	Fiji Islands Region	565	5.8	89.071
330 SEP	2	05 50 01.9	6.046 S	112.138 E	Jawa, Indonesia	625	5.9	78.234
331	2	22 37 28.8	12.434 S	70.996 W	Central Peru	28	5.1	85.573
332	2	23 00 54.4	20.744 S	178.395 W	Fiji Islands Region	581	4.9	86.394
333	4	13 57 28.3	13.232 S	167.021 E	Vanuatu Islands	150	5.4	90.073
334	5	20 06 41.8	3.922 S	142.563 E	Near N Coast of New Guinea, P.N.G.	43	5.6	91.038
335	8	00 46 17.4	24.510 S	66.940 W	Salta Province, Argentina	168	4.9	72.971
336	8	11 31 46.2	16.839 S	173.312 W	Tonga Islands	95	5.5	91.195
337	9	14 34 19.7	31.327 S	177.299 W	Kermadec Islands Region	33	5.1	76.327
338	9	15 58 13.6	2.779 N	124.429 E	Celebes Sea	295	5.0	90.784
339	9	20 44 50.2	23.509 S	178.877 E	South of Fiji Islands	554	5.3	83.137
340	10	10 43 20.3	22.562 S	174.974 W	Tonga Islands Region	38	5.6	85.302
341	10	20 10 57.0	17.221 S	167.817 E	Vanuatu Islands	20	5.5	86.486
342	10	22 09 47.6	22.601 S	175.098 W	Tonga Islands Region	38	5.5	85.240
343	10	23 20 29.3	22.431 S	174.870 W	Tonga Islands Region	33	5.5	85.449
344	11	03 57 26.5	6.087 S	26.651 E	Zaire	11	6.7	63.447
345	11	22 24 52.2	4.153 N	126.464 E	Talaud Islands, Indonesia	46	5.4	92.788
346	12	13 36 36.6	38.756 S	46.383 E	Southwest Indian Ridge	10	5.2	30.562
347	12	19 40 51.7	25.101 S	179.742 E	South of Fiji Islands	496	4.8	81.780
348	14	00 06 07.1	28.196 S	177.076 W	Kermadec Islands Region	150	4.7	79.415

349	14	17 15 00.3	22.733 S	175.071 W	Tonga Islands Region	50	5.0	85.117
350	15	02 28 00.4	21.042 S	178.763 W	Fiji Islands Region	581	5.3	86.029
351	15	04 19 35.0	36.278 S	100.224 W	Southern Pacific Ocean	10	5.1	70.817
352	15	21 03 59.9	14.053 S	167.269 E	Vanuatu Islands	184	6.3	89.359
353	16	04 23 16.1	11.645 N	93.590 E	Adaman Islands, India	149	5.3	88.912
354	16	19 13 03.3	24.468 S	70.709 W	Near Coast of Northern Chile	42	4.8	74.232
355	18	06 00 56.3	20.409 S	177.872 W	Fiji Islands Region	495	4.9	86.827
356	18	07 34 15.3	22.810 S	66.178 W	Jujuy Province, Argentina	254	4.5	74.298
357	19	22 34 34.6	22.886 S	174.747 W	Tonga Islands Region	33	5.2	85.028
358	20	00 12 17.5	17.545 S	178.766 W	Fiji Islands Region	543	5.2	89.421
359	20	13 28 19.9	34.810 S	107.820 W	Southern East Pacific Rise	10	4.9	73.637
360	21	10 18 49.3	7.816 S	13.585 W	Ascension Island Region	10	5.8	70.095
361	22	14 15 08.7	7.254 S	128.529 E	Banda Sea	49	5.2	82.954
362	23	00 03 16.3	25.299 S	178.283 E	South of Fiji Islands	612	5.1	81.277
363	23	08 05.28.1	1.310 N	123.527 E	Minahassa Peninsula, Sulawesi	23	5.0	89.099
364	23	08 10 53.1	1.139 N	123.390 E	Minahassa Peninsula, Sulawesi	32	5.0	88.891
365	23	11 51 12.3	32.135 S	69.538 W	Mendoza Province, Argentina	115	4.7	66.730
366	23	14 52 27.6	6.163 S	26.718 E	Zaire	11	5.6	63.366
367	23	16 49 43.6	23.902 S	179.528 E	South of Fiji Islands	644	5.0	82.896
368	23	17 03 52.9	22.608 S	175.048 W	Tonga Islands Region	73	5.1	85.243
369	24	00 51 46.7	59.478 S	25.971 W	South Sandwich Islands Region	21	5.3	28.499
370	24	12 08 21.8	1.355 N	123.497 E	Minahassa Peninsula, Sulawesi	24	5.1	89.130

371	24	13 22 19.5	31.044 S	67.811 W	San Juan Province, Argentina	10	4.9	67.193
372	24	18 17 10.9	61.220 S	154.359 E	Balleny Islands Region	10	5.5	41.957
373	25	08 57 40.5	5.388 S	102.556 E	Southern Sumatera,Indonesia	29	5.3	75.590
374	25	12 10 30.7	22.220 S	68.586 W	Northern Chile	112	4.6	75.641
375	25	20 06 45.9	54.401 S	27.643 W	South Sandwich Islands Region	42	5.6	32.934
376	26	07 39 21.4	36.978 S	78.298 E	Mid-Indian Ridge	10	5.3	38.436
377	26	22 15 57.5	1.289 N	129.118 E	Halmahera, Indonesia	28	5.9	91.085
378	27	03 31 29.2	1.278 N	129.262 E	Halmahera, Indonesia	33	4.9	91.127
379	27	09 02 24.0	31.556 S	71.589 W	Near Coast of Central Chile	47	5.1	67.906
380	27	10 04 40.1	1.269 N	129.245 E	Halmahera, Indonesia	28	5.4	91.112
381	27	10 09 14.4	1.268 N	129.314 E	Halmahera, Indonesia	31	5.6	91.136
382	27	18 28 14.6	33.754 S	178.686 W	South of Kermadec Islands	33	4.9	73.703
383	28	10 26 07.7	21.489 S	66.567 W	Southern Bolivia	223	4.7	75.656
384	28	11 40 53.3	19.203 S	169.043 E	Vanuatu Islands	142	5.2	84.919
385	29	06 49 44.0	38.170 S	175.560 E	North Island, New Zealand	169	4.6	68.270
386	30	04 42 24.9	26.487 S	114.518 W	Easter Island Region	10	4.9	82.839
387	OCT 1	03 21 04.3	53.591 S	51.661 W	South Atlantic Ocean	10	5.3	41.797
388	1	05 02 34.1	51.123 N	177.997 W	Andreanof Islands, Aleutian Is.	15	5.9	154.799
389	1	08 18 51.7	39.035 S	74.911 W	Off Coast of Central Chile	28	5.6	61.954
390	1	18 15 40.8	53.655 S	51.684 W	South Atlantic Ocean	10	5.3	41.750
391	2	06 30 34.5	26.497 S	114.435 W	Easter Island Region	20	5.0	82.818
392	2	10 50 46.1	30.820 S	177.557 W	Kermadec Islands, New Zealand	33	5.1	76.771

393	2	19 29 55.1	0.304 N	122.618 E	Minahassa Peninsula, Sulawesi	107	5.2	87.840
394	6	10 28 22.9	5.425 S	151.175 E	New Britain Region, P.N.G.	50	5.8	92.577
395	6	14 45 28.5	24.194 S	66.971 W	Salta Province, Argentina	209	-	73.274
396	8	16 34 53.2	51.147 N	177.872 W	Andreanof Islands, Aleutian Is.	21	5.6	154.861
397	8	17 35 41.2	24.353 S	67.108 W	Chile-Argentina Border Region	179	4.8	73.172
398	9	12 16 54.6	51.552 N	176.867 W	Andreanof Islands, Aleutian Is.	33	5.3	155.533
399	10	01 00 20.1	26.013 S	70.730 W	Near Coast of Northern Chile	34	5.2	72.798
400	10	04 00 58.2	54.454 N	162.715 W	Near East Coast of Kamchatka	25	4.8	150.825
401	10	05 52 27.2	25.923 S	70.844 W	Near Coast of Northern Chile	32	5.2	72.918
402	10	09 50 11.6	20.656 S	173.138 W	Tonga Islands	37	5.2	87.501
403	10	23 45 12.5	23.251 S	179.202 E	South of Fiji Islands	560	4.9	83.457
404	11	19 24 26.2	19.247 S	168.948 E	Vanuatu Islands	129	6.4	84.852
405	12	06 46 55.6	19.462 S	176.786 W	Fiji Islands Region	300	4.9	87.968
406	12	13 09 55.5	29.778 N	31.144 E	Egypt	22	5.9	98.742
407	12	17 04 32.4	21.583 S	66.723 W	Southern Bolivia	217	4.4	75.620
408	14	01 36 18.7	29.581 S	25.979 W	South Sandwich Islands Region	33	5.0	28.376
409	14	15 31 34.4	25.183 S	179.786 E	South of Fiji Islands	491	4.9	81.709
410	15	14 40 23.3	19.157 S	169.614 E	Vanuatu Islands	20	5.3	85.113
411	15	20 28 19.8	53.851 S	6.900 E	Bouvet Island Region	10	5.2	21.297
412	15	22 37 05.9	14.537 S	166.711 E	Vanuatu Islands	25	6.2	88.743
413	16	00 01 35.9	19.723 S	174.445 W	Tonga Islands	70	5.1	88.169
414	16	03 55 48.8	23.967 S	179.834 W	South of Fiji Islands	506	5.2	82.968

415	16	05 54 30.0	35.526 S	179.855 W	East of North Island, New Zealand	31	5.3	71.757
416	16	16 15 19.7	20.430 S	169.255 E	Vanuatu Islands	40	5.3	83.802
417	16	18 33 16.1	0.252 N	122.432 E	Minafassa Peninsula, Sulawesi	157	5.4	87.725
418	16	21 24 20.0	1.329 N	123.559 E	Minafassa Peninsula, Sulawesi	33	4.8	89.128
419	16	22 03 40.2	1.354 N	123.405 E	Minafassa Peninsula, Sulawesi	33	4.5	89.096
420	17	02 06 01.9	19.354 S	169.694 E	Vanuatu Islands	57	5.3	84.945
421	17	02 51 50.9	19.226 S	169.553 E	Vanuatu Islands	12	5.8	85.031
422	17	05 47 58.1	19.239 S	169.473 E	Vanuatu Islands	33	5.2	84.998
423	17	07 29 51.3	19.171 S	168.853 E	Vanuatu Islands	125	5.2	84.895
424	17	11 41 03.3	19.161 S	169.484 E	Vanuatu Islands	33	5.3	85.075
425	17	18 10 23.8	19.334 S	169.636 E	Vanuatu Islands	36	5.3	84.949
426	18	00 58 05.8	10.022 S	117.093 E	South of Sumbawa, Indonesia	27	5.5	76.289
427	18	12 43 09.1	9.268 S	78.722 W	Near Coast of Northern Peru	48	5.0	91.034
428	18	12 54 26.1	55.231 S	145.889 E	West of Macquarie Island	10	5.1	45.021
429	18	13 08 54.7	6.279 S	130.214 E	Banda Sea	119	5.8	84.462
430	18	15 55 03.4	16.560 S	167.424 E	Vanuatu Islands	34	4.6	87.010
431	18	17 42 51.4	6.740 S	105.602 E	Sunda Strait	37	5.8	75.341
432	18	18 10 36.6	14.071 S	176.714 E	Fiji Islands Region	34	5.0	91.766
433	19	12 03 30.1	19.385 S	169.593 E	Vanuatu Islands	21	5.7	84.889
434	20	04 40 01.7	55.520 N	166.303 E	Komandorsky Islands Region	27	5.7	152.953
435	20	06 57 58.2	8.958 N	126.316 E	Mindanao, Philippine Islands	41	5.1	97.189
436	20	15 47 56.2	24.453 S	176.054 W	South of Fiji Islands	64	5.8	83.254

437	21	12 11 13.8	6.870 S	144.174 E	New Guinea, Papua New Guinea	19	5.9	88.852
438	22	01 53 30.2	18.129 S	178.522 W	Fiji Islands Region	582	4.9	88.906
439	22	09 04 23.4	30.227 S	177.205 W	Kermadec Islands, New Zealand	26	6.0	77.414
440	22	09 31 47.1	28.860 S	176.260 W	Kermadec Islands Region	10	5.1	78.923
441	22	18 25 56.4	4.222 S	126.155 E	Banda Sea	316	5.4	84.910
442	22	23 08 27.1	30.125 S	177.000 W	Kermadec Islands, New Zealand	16	5.7	77.553
443	22	23 19 00.9	30.350 S	177.310 W	Kermadec Islands, New Zealand	33	5.1	77.275
444	22	23 44 54.2	29.914 S	177.223 W	Kermadec Islands, New Zealand	32	5.0	77.716
445	23	00 57 46.5	30.112 S	177.171 W	Kermadec Islands, New Zealand	10	5.4	77.533
446	23	01 57 17.9	30.055 S	177.139 W	Kermadec Islands, New Zealand	10	4.9	77.594
447	23	04 27 51.9	29.574 S	176.829 W	Kermadec Islands Region	33	4.9	78.121
448	23	08 30 22.0	30.041 S	176.803 W	Kermadec Islands Region	10	4.9	77.672
449	23	13 04 40.7	5.352 S	152.616 E	New Britain Region, P.N.G.	31	5.8	93.123
450	23	15 29 12.6	5.282 S	152.639 E	New Britain Region. P.N.G.	33	5.6	93.196
451	23	19 16 42.8	5.327 S	152.661 E	New Britain Region, P.N.G.	30	5.5	93.161
452	23	20 31 56.4	21.933 S	68.276 W	Chile-Bolivia Border Region	134	4.7	75.807
453	23	21 24 36.1	9.469 S	122.560 E	Savu Sea	33	6.0	78.757
454	24	00 59 47.7	29.996 S	177.074 W	Kermadec Islands, New Zealand	10	5.3	77.664
455	24	04 26 29.8	30.032 S	177.037 W	Kermadec Islands, New Zealand	10	4.9	77.636
456	24	08 23 01.1	29.536 S	177.279 W	Kermadec Islands, New Zealand	19	5.8	78.073
457	24	11 47 14.4	29.944 S	177.113 W	Kermadec Islands, New Zealand	10	5.1	77.707
458	24	13 39 10.5	29.972 S	177.277 W	Kermadec Islands, New Zealand	43	5.3	77.649

459	24	13 46 48.3	29.796 S	177.066 W	Kermadec Islands, New Zealand	10	5.0	77.860
460	24	18 59 57.2	5.759 S	145.449 E	Eastern New Guinea Region, P.N.G.	110	5.6	90.327
461	24	23 00 28.7	30.090 S	177.215 W	Kermadec Islands, New Zealand	10	5.5	77.546
462	25	00 29 18.3	29.900 S	177.352 W	Kermadec Islands, New Zealand	26	5.7	77.704
463	25	04 42 08.2	29.838 S	176.806 W	Kermadec Islands Region	10	4.9	77.869
464	25	07 22 35.0	29.280 S	176.950 W	Kermadec Islands Region	33	4.7	78.384
465	25	15 00 07.1	5.910 S	103.712 E	Souther Sumatera, Indonesia	56	5.2	75.484
466	25	17 43 20.9	29.060 S	176.930 W	Kermadec Islands Region	33	4.5	78.602
467	26	14 47 11.1	17.910 S	179.750 E	Fiji Islands	629	4.9	88.747
468	26	22 44 13.7	21.469 S	67.872 W	Chile-Bolivia Border Region	146	5.0	76.106
469	26	17 38 07.0	16.596 S	73.105 W	Near Coast of Peru	94	4.6	82.362
470	28	07 02 09.3	19.004 N	96.277 E	Myanmar	34	5.6	96.971
471	28	10 02 57.4	29.296 S	176.831 W	Kermadec Islands Region	33	4.9	78.391
472	28	13 31 05.7	29.347 S	177.314 W	Kermadec Islands, New Zealand	10	4.9	78.250
473	29	02 40 08.8	22.379 S	68.533 W	Northern Chile	118	4.8	75.475
474	29	04 48 50.4	17.560 S	179.089 W	Fiji Islands Region	561	5.1	89.338
475	29	07 29 57.6	6.834 N	124.006 E	Mindanao, Philippine Islands	33	5.8	94.395
476	29	14 39 17.4	29.225 S	71.222 W	Near Coast of Central Chile	46	5.5	69.961
477	29	15 27 48.1	29.618 S	178.134 W	Kermadec Islands, New Zealand	33	5.0	77.827
478	29	16 49 06.3	20.508 S	177.785 W	Fiji Islands Region	534	5.1	86.749
479	29	19 31 55.7	35.813 S	179.672 W	East of North Island, New Zealand	54	5.1	71.515
480	30	14 56 16.9	31.810 S	178.076 W	Kermadec Islands Region	52	5.3	75.709

481	30	16 53 52.5	7.878 S	107.050 E	Jawa, Indonesia	65	5.1	74.770
482	31	05 14 59.5	6.869 N	126.941 E	Mindanao, Philippine Islands	48	4.9	95.477
483	31	11 31 39.4	21.172 S	178.901 W	Fiji Islands Region	637	5.0	85.874
484	31	14 34 22.4	2.321 S	141.262 E	Near N Coast of New Gunia, P.N.G.	6	5.9	92.071
485	31	14 46 27.0	2.298 S	141.256 E	Near N Coast of New Gunia, P.N.G.	29	5.8	92.090
486 NOV	1	01 12 56.6	14.875 S	166.700 E	Vanuatu Islands	59	5.2	88.418
487	1	07 24 39.3	5.582 S	154.344 E	Solomon Islands	142	5.2	93.473
488	1	09 36 42.5	28.907 S	69.544 W	Chile-Argentina Border Region	110	5.6	69.727
489	1	10 03 16.3	55.633 S	27.629 W	South Sandwich Islands Region	25	5.4	31.955
490	2	20 36 22.1	30.096 S	176.479 W	Kermadec Islands Region	10	5.1	77.679
491	3	15 41 28.4	23.981 S	70.221 W	Near Coast of Northern Chile	31	5.2	74.530
492	4	01 59 26.9	61.542 S	154.573 E	Balleny Islands Region	10	5.6	41.725
493	4	14 49 08.8	54.147 S	2.792 E	Bovet Island Region	10	5.0	22.378
494	4	18 13 13.4	14.238 S	167.641 E	Vanuatu Islands	14	6.1	89.285
495	4	21 32 33.9	31.565 S	71.565 W	Near coast of Centran Chile	19	5.8	67.891
496	5	19 53 22.9	5.263 S	152.575 E	New Britain Region, P.N.G.	20	5.9	93.193
497	6	20 51 37.8	11.456 S	75.140 W	Central Peru	14	5.3	87.839
498	8	03 43 20.4	15.727 S	179.703 W	Fiji Islands Region	10	5.7	90.981
499	8	10 22 52.9	23.626 S	70.380 W	Near Coast of Northern Chile	33	5.4	74.912
500	8	10 41 23.3	23.590 S	70.369 W	Near Coast of Northern Chile	28	5.2	74.942
501	8	11 12 37.4	23.675 S	70.283 W	Near Coast of Northern Chile	29	4.8	74.835
502	8	18 22 52.7	23.431 S	68.049 W	Northern Chile	103	4.9	73.338

503	8	19 28 50.0	8.861 S	119.282 E	Flores Region, Indonesia	115	5.4	78.146
504	9	01 27 13.8	21.051 S	174.140 W	Tonga Islands	33	5.1	86.931
505	10	08 13 32.6	55.866 S	26.979 W	South Sandwich Islands Region	33	5.4	31.542
506	10	10 30 53.5	7.204 S	129.178 E	Banda Sea	171	5.4	83.233
507	10	15 46 50.9	31.784 S	70.182 W	Chile-Argentina Border Region	117	4.2	67.257
508	11	00 18 49.3	2.925 S	141.560 E	Near N Coast of New Guinea, P.N.G.	34	5.6	91.614
509	11	00 31 25.9	7.325 S	156.216 E	Solomon Islands	26	5.3	92.437
510	11	01 27 36.0	17.057 S	168.556 E	Vanuatu Islands	234	5.3	86.841
511	12	01 16 52.2	14.329 S	167.682 E	Vanuatu Islands	42	5.2	89.209
512	12	15 00 38.7	53.767 S	51.727 W	South Atlantic Ocean	10	5.7	41.669
513	12	22 28 57.5	22.401 S	178.104 W	South of Fiji Islands	360	5.9	84.845
514	14	05 54 48.2	22.991 S	45.847 E	Madagascar	23	5.1	46.228
515	14	08 19 27.4	26.445 S	179.290 E	South of Fiji Islands	545	4.9	80.383
516	17	04 24 16.4	30.588 S	71.172 W	Near Coast of Central Chile	54	5.7	68.677
517	17	06 46 39.9	5.822 S	130.616 E	Banda Sea	33	5.9	85.030
518	18	04 04 31.8	16.052 S	173.819 W	Tonga Islands	86	5.3	91.867
519	18	16 02 08.2	6.957 S	129.958 E	Banda Sea	123	5.1	83.742
520	18	16 36 45.1	16.771 S	167.103 E	Vanuatu Islands	22	5.2	86.722
521	18	21 26 13.0	7.268 S	106.193 E	Jawa, Indonesia	48	5.3	75.048
522	19	03 22 39.9	23.814 S	179.067 E	South of Fiji Islands	575	5.0	82.883
523	20	01 45 22.6	23.126 S	66.282 W	Jujuy Province, Argentina	253	5.1	74.039
524	20	03 46 14.9	31.082 S	13.548 W	Southern Mid-Atlantic Ridge	10	5.1	48.291

525	20	04 42 48.7	25.090 S	179.920 E	South of Fiji Islands	564	5.0	81.828
526	21	03 04 08.0	8.643 S	110.423 E	Jawa, Indonesia	48	5.3	75.219
527	21	03 43 32.5	16.022 S	173.009 W	Tonga Islands	26	5.2	92.048
528	21	18 27 32.7	16.325 S	175.932 W	Tonga Islands	380	5.0	91.190
529	21	22 39 32.9	56.665 S	26.405 W	South Sandwich Islands Region	20	5.9	30.718
530	21	23 11 50.6	56.316 S	25.581 W	South Sandwich Islands Region	33	5.4	30.695
531	22	00 27 51.3	56.422 S	25.733 W	South Sandwich Islands Region	33	5.4	30.667
532	22	02 15 51.4	56.346 S	25.785 W	South Sandwich Islands Region	33	5.2	30.745
533	22	11 42 46.4	20.365 N	94.340 E	Myanmar	68	5.3	97.416
534	22	14 44 46.4	56.499 S	25.484 W	South Sandwich Islands Regio	33	4.6	30.519
535	22	17 35 20.3	19.578 S	173.772 W	Tonga Islands	21	5.5	88.437
536	22	21 11 07.1	29.266 S	71.232 W	Near Coast of Central Chile	44	5.1	69.926
537	24	05 14 21.8	33.486 S	72.979 W	Off Coast of Central Chile	32	5.1	66.537
538	24	23 43 03.2	0.085 S	122.828 E	Minahassa Peninsula, Sulawesi	200	5.5	87.554
539	25	06 02 25.3	4.069 S	102.160 E	Southern Sumatera, Indonesia	58	5.9	76.698
540	25	10 03 31.9	2.497 N	128.548 E	Halmahera, Indonesia	30	5.4	92.000
541	25	10 16 30.3	2.537 N	128.541 E	Halmahera, Indonesia	24	5.8	92.035
542	25	12 55 28.2	56.177 S	26.778 W	South Sandwich Islands Region	33	4.9	31.228
543	25	17 47 59.4	13.491 S	166.497 E	Vanuatu Islands	33	5.4	89.681
544	25	17 58 14.4	13.538 S	166.344 E	Vanuatu Islands	60	5.6	89.593
545	26	01 16 32.9	20.093 S	69.502 W	Northern Chile	116	4.4	77.924
546	26	19 49 22.9	18.365 S	178.564 E	Fiji Islands	656	5.2	88.045

547	27	13 50 55.8	2.582 N	128.756 E	Halmahera, Indonesia	22	5.5	92.154
548	27	20 49 05.6	13.327 S	76.536 W	Near Coast of Peru	63	4.8	86.524
549	28	03 13 33.3	31.330 S	71.992 W	Near Cost of Central Chile	12	5.8	68.241
550	28	15 22 41.5	22.730 S	176.727 W	South of Fiji Islands	134	5.0	84.801
551	28	17 20 44.9	23.819 S	70.762 W	Near Coast of Northern Chile	25	5.0	74.854
552	28	17 45 40.0	2.615 N	128.770 E	Halmahera, Indonesia	35	5.6	92.190
553	29	04 18 48.9	8.237 N	126.531 E	Mindanao, Philippine Islands	65	5.2	96.598
554 DEC 1		00 23 22.8	20.864 S	169.234 E	Vanuatu Islands	32	5.8	83.381
555	1	18 43 43.5	22.288 S	174.307 E	Loyalty Islands Region	21	5.2	83.278
556	3	06 28 37.7	48.137 S	9.878 W	Southern Mid-Atlantic Ridge	10	5.3	31.762
557	3	11 23 38.4	6.062 S	130.406 E	Banda Sea	162	5.2	84.732
558	4	08 19 18.1	19.654 S	177.923 W	Fiji Islands Region	446	5.0	87.550
559	4	20 38 43.3	1.051 N	126.027 E	Northern Molucca Sea	55	5.3	89.754
560	5	23 58 07.4	21.420 S	68.468 W	Chile-Bolivia Border Region	118	5.0	76.348
561	7	04 06 47.3	23.896 S	66.688 W	Jujuy Province, Argentina	210	5.1	73.458
562	8	02 24 26.1	15.483 S	168.012 E	Vanuatu Islands	34	5.7	88.198
563	8	07 08 39.9	9.291 N	93.479 E	Nicobar Islands, India	66	6.0	86.642
564	8	15 54 05.5	26.846 S	175.959 W	South of Tonga Islands	86	5.2	80.942
565	9	06 27 43.3	56.559 S	142.556 W	Pacific- Antarctic Ridge	10	5.7	54.655
566	9	16 22 32.9	18.035 S	178.086 W	Fiji Islands Region	611	4.9	89.088
567	10	13 54 37.7	24.402 S	178.955 E	South of Fiji Islands	529	5.2	82.289
568	11	02 22 51.8	17.523 S	167.961 E	Vanuatu Islands	33	5.4	86.237

569	11	22 12 56.0	59.572 S	26.101 W	South Sandwich Islands Region	33	5.5	28.425
570	12	05 29 26.3	8.480 S	121.896 E	Flores Region, Indonesia	28	6.5	79.435
571	12	06 38 29.4	8.517 S	121.928 E	Flores Region, Indonesia	21	6.1	79.412
572	12	07 32 33.2	8.447 S	122.066 E	Flores Region, Indonesia	26	5.0	79.526
573	12	12 30 02.0	8.373 S	122.405 E	Flores Region, Indonesia	20	5.2	79.716
574	12	14 54 23.1	8.374 S	122.198 E	Flores Region, Indonesia	33	5.2	79.641
575	12	19 19 18.3	8.531 S	122.145 E	Flores Region, Indonesia	33	5.1	79.477
576	12	21 43 10.0	8.483 S	121.964 E	Flores Region, Indonesia	23	5.4	79.456
577	12	22 23 48.1	8.318 S	122.550 E	Flores Region, Indonesia	21	5.4	79.819
578	12	22 41 34.4	8.152 S	122.714 E	Flores Region, Indonesia	33	5.0	80.032
579	12	23 36 36.1	8.235 S	122.681 E	Flores Region, Indonesia	33	5.0	79.943
580	13	15 53 49.2	8.470 S	122.550 E	Flores Region, Indonesia	33	—	79.679
581	14	07 41 00.3	14.029 S	170.753 E	Vanuatu Islands Region	622	5.5	90.319
582	14	23 21 32.5	23.510 S	68.736 W	Northern Chile	101	4.7	74.488
583	15	00 40 15.8	16.658 S	73.414 W	Near Coast of Peru	53	4.8	82.403
584	15	00 52 20.4	8.409 S	122.455 E	Flores Region, Indonesia	33	4.8	79.701
585	15	03 50 25.8	30.413 S	177.152 W	Kermadec Islands, New Zealand	33	5.1	77.244
586	15	10 41 06.0	8.203 S	122.594 E	Flores Region, Indonesia	23	5.2	79.942
587	16	05 07 58.4	7.866 S	116.463 E	Bali Sea	36	5.0	78.064
588	16	17 22 52.6	8.500 S	121.945 E	Flores Region, Indonesia	17	5.0	79.434
589	17	18 56 57.3	8.270 S	121.630 E	Flores Region, Indonesia	23	5.6	79.534
590	18	03 14 04.2	6.487 S	147.144 E	Eastern New Guinea	29	6.0	90.227

591	18	14 58 09.5	8.085 S	123.069 E	Flores Region, Indonesia	29	4.9	80.222
592	19	06 44 01.5	11.429 S	166.290 E	Santa Cruz Islands	44	5.7	91.586
593	19	10 44 14.0	8.300 S	122.629 E	Flores Region, Indonesia	33	4.9	79.864
594	19	21 57 21.5	0.023 N	123.620 E	Minahassa Peninsula, Sulawesi	127	5.5	87.938
595	20	16 38 46.3	25.684 S	179.561 E	South of Fiji Islands	499	5.4	81.177
596	20	20 52 47.2	6.582 S	130.393 E	Banda Sea	78	6.6	84.246
597	22	04 54 16.6	6.648 S	130.550 E	Banda Sea	67	5.9	84.241
598	23	02 20 06.3	19.766 S	68.808 W	Chile-Bolivia Border Region	106	5.4	78.001
599	23	03 00 44.9	6.541 S	130.417 E	Banda Sea	102	6.1	84.292
600	23	05 46 39.8	6.691 S	130.396 E	Banda Sea	23	4.9	84.146
601	24	00 03 33.3	2.549 S	126.581 E	Northern Molucca Sea	97	5.6	91.342
602	24	00 22 53.1	2.955 S	130.296 E	Seram, Indonesia	60	5.2	87.573
603	24	00 34 13.8	15.293 S	173.128 W	Tonga Islands	23	5.9	92.738
604	25	17 55 41.5	8.731 S	121.908 E	Flores Region, Indonesia	80	4.6	79.206
605	26	06 02 02.6	5.594 S	152.834 E	New Britain Region, P.N.G.	38	5.6	92.968
606	26	16 17 50.2	8.343 S	122.267 E	Flores Region, Indonesia	24	5.1	79.695
607	26	19 14 25.7	32.457 S	178.282 W	South of Kermadec Islands	10	5.5	75.041
608	27	21 49 04.4	6.087 S	113.050 E	Jawa, Indonesia	601	5.9	78.514
609	28	04 24 35.9	8.264 S	122.424 E	Flores Region, Indonesia	27	5.4	79.824
610	29	21 17 31.8	9.295 S	123.987 E	Timor Region, Indonesia	95	5.5	79.431
611	30	04 30 13.1	20.243 S	68.074 E	Mid-Indian Ridge	17	5.3	51.876
612	30	06 25 26.6	7.986 S	159.041 E	Solomon Islands	50	5.6	92.702

| 613 | 31 | 04 01 02.8 | 31.514 S | 67.989 W | San Juan Province, Argentina | 118 | 5.2 | 66.815 |
| 614 | 31 | 20 17 08.6 | 32.015 S | 178.025 W | South of Kermadec Islands | 16 | 5.8 | 75.519 |

APPENDIX

APR. 25   18h24m00.0s   Near Coast of Northern California   #-115

20000

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0

S
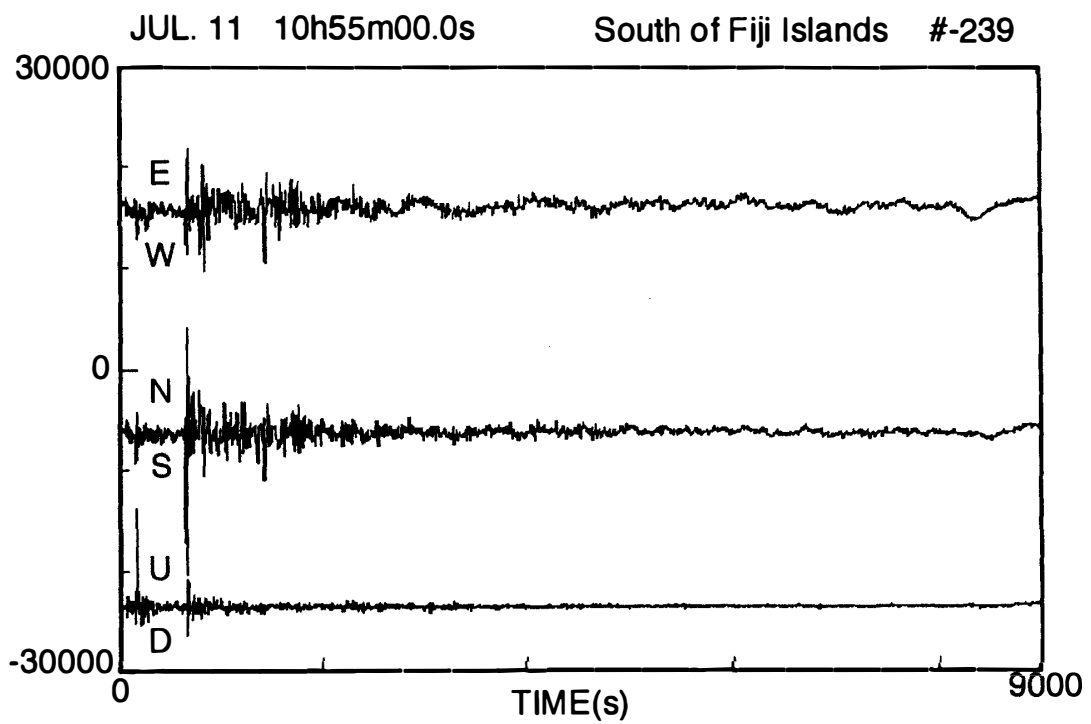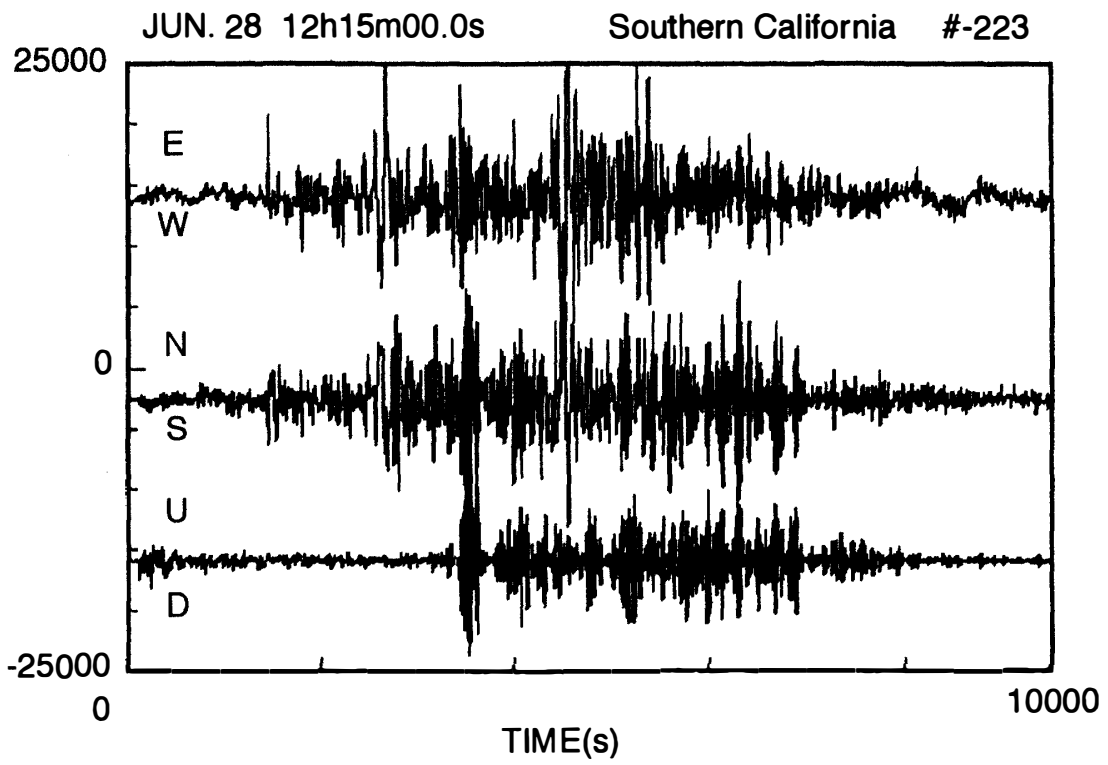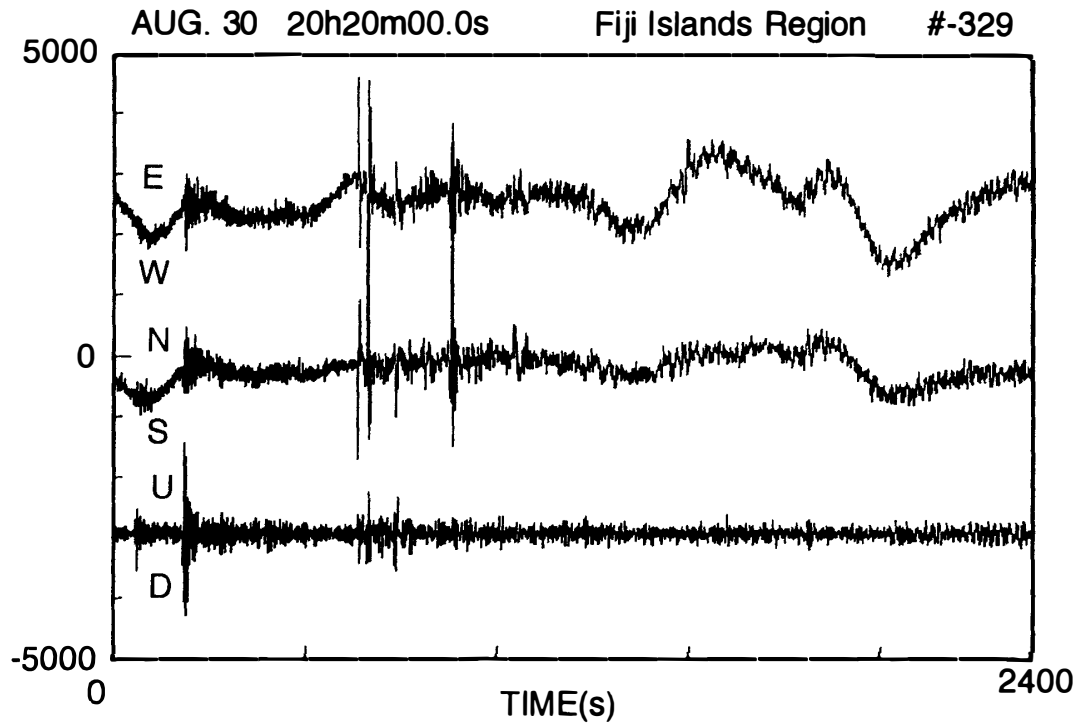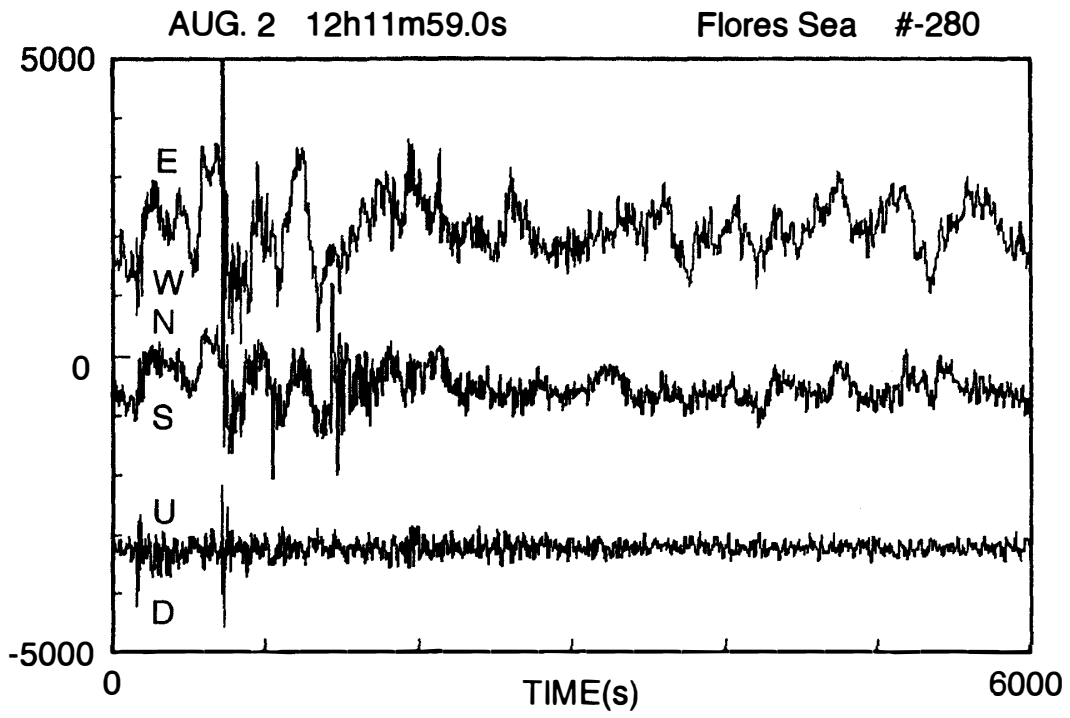
U

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-20000

0   TIME(s)   12000
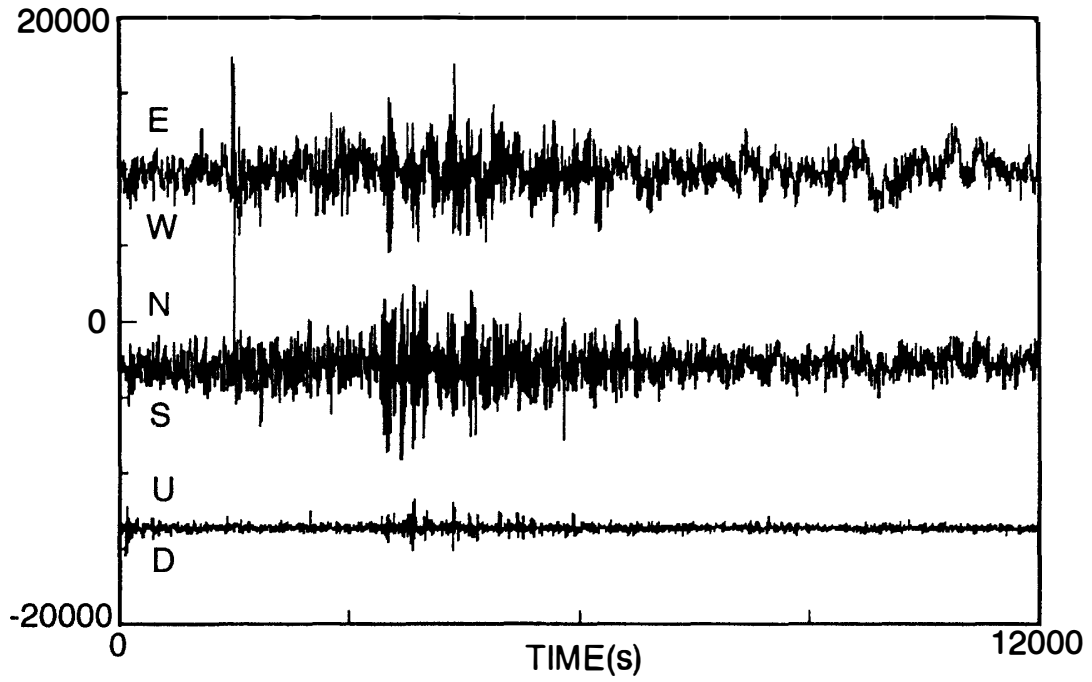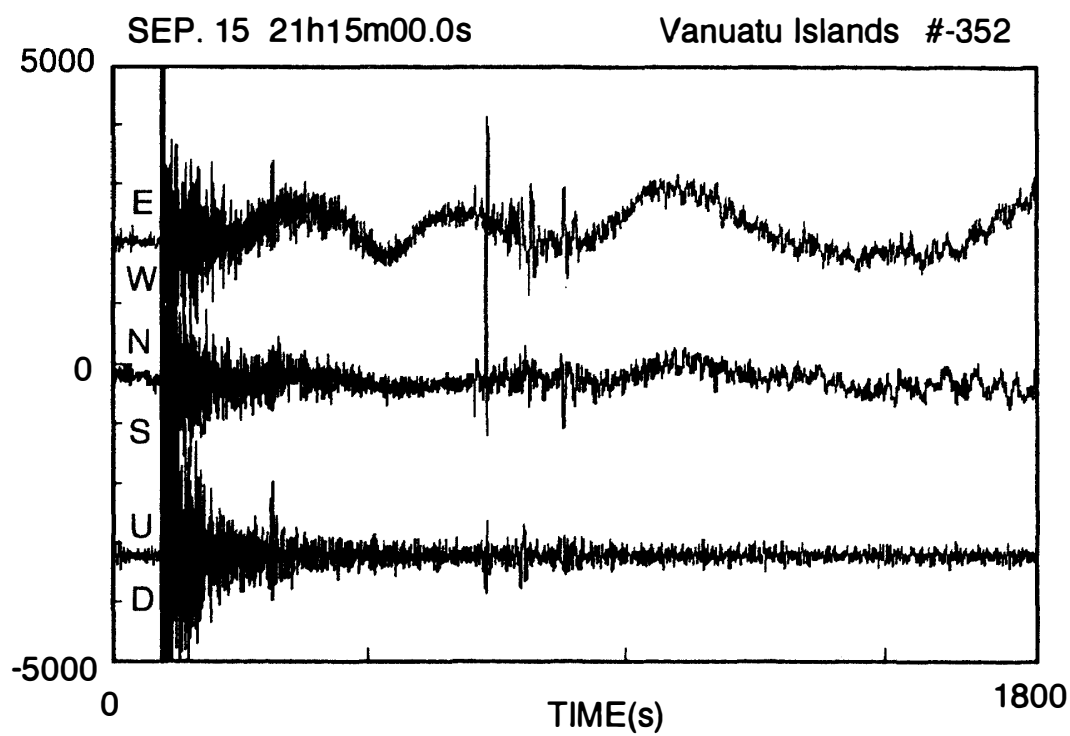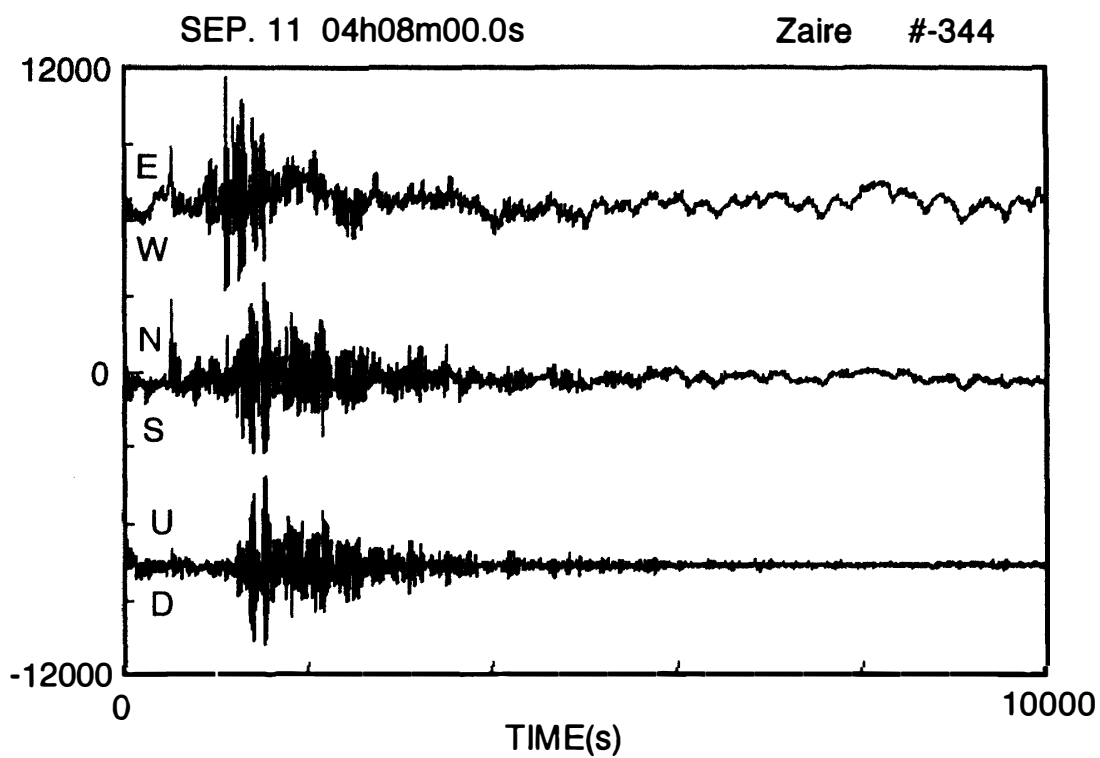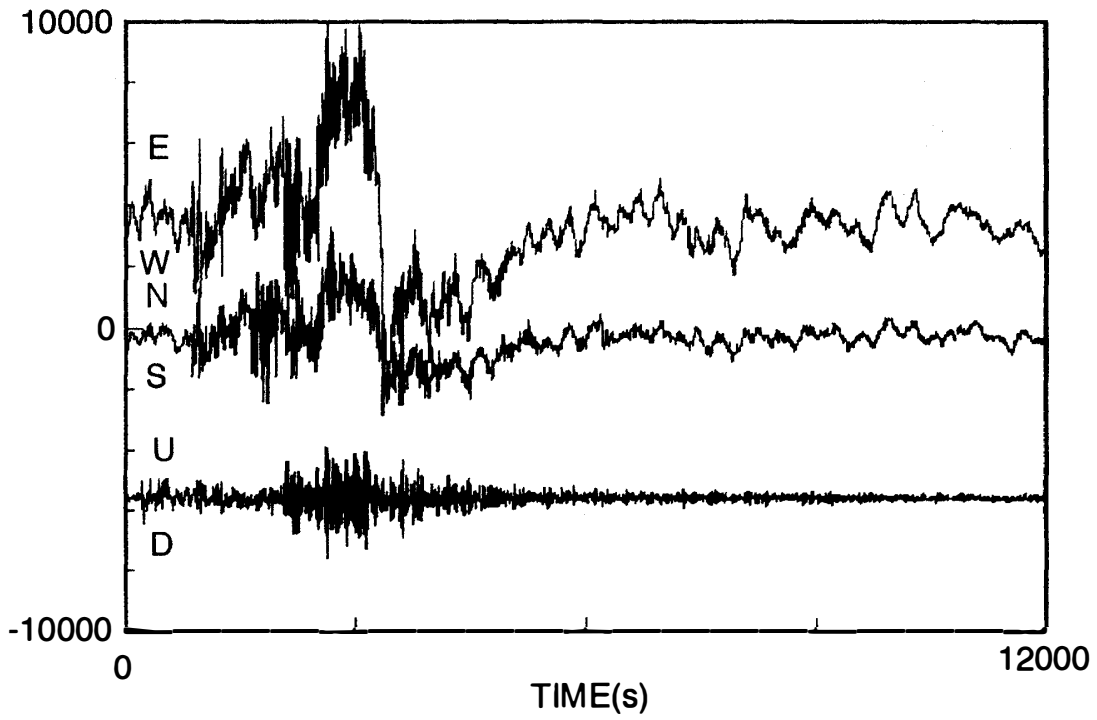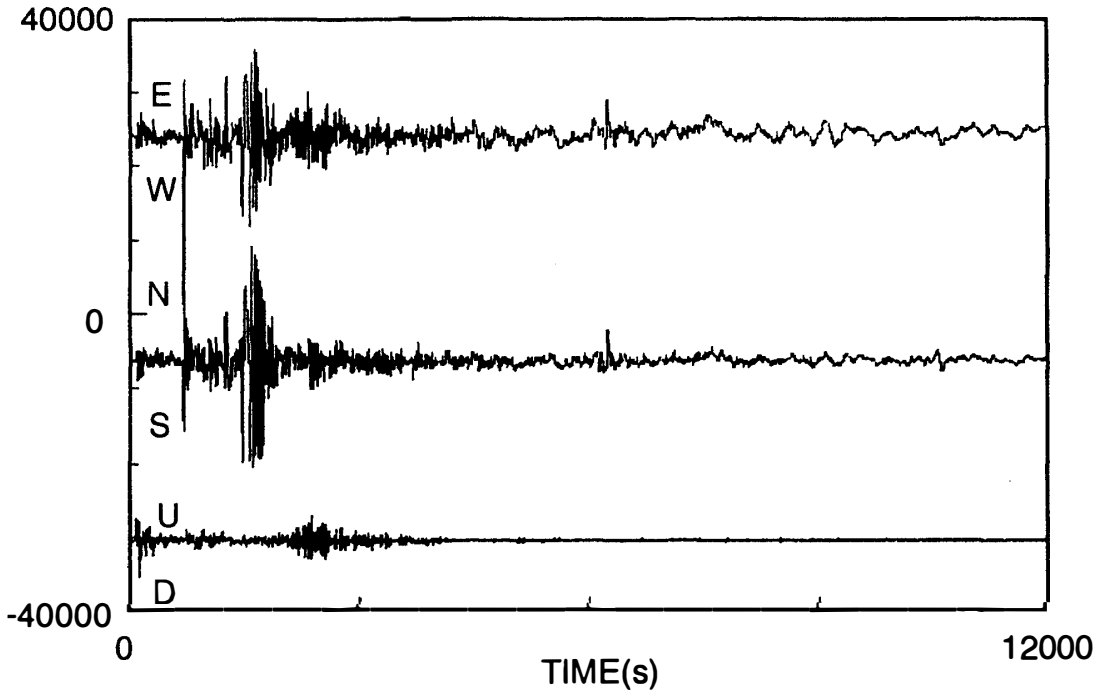
MAY. 12   18h17m00.0s   Samoa Island Region   #-135

15000

E

W

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-15000

0   TIME(s)   7000

MAY. 15 07h16m00.0s Eastern New Guinea Region #-139

MAY. 17 10h00m00.0s Mindanao, Philippine Islands #-144,145

MAY. 27   05h25m00.0s   Santa Cruz Islands   #-163

40000

E
W

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-40000

0   TIME(s)   10000

JUN. 21   17h53m47.0s   North Island, New Zealand   #-206

10000

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W

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-10000

0   TIME(s)   7200

JUN. 28 12h15m00.0s   Southern California   #-223

TIME(s)

JUL. 11 10h55m00.0s   South of Fiji Islands   #-239

TIME(s)

AUG. 2   12h11m59.0s   Flores Sea   #-280

AUG. 30   20h20m00.0s   Fiji Islands Region   #-329

SEP. 11 04h08m00.0s   Zaire   #-344

12000

E
W

0   N
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0   10000
TIME(s)

SEP. 15 21h15m00.0s   Vanuatu Islands #-352
5000

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0   N
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-5000
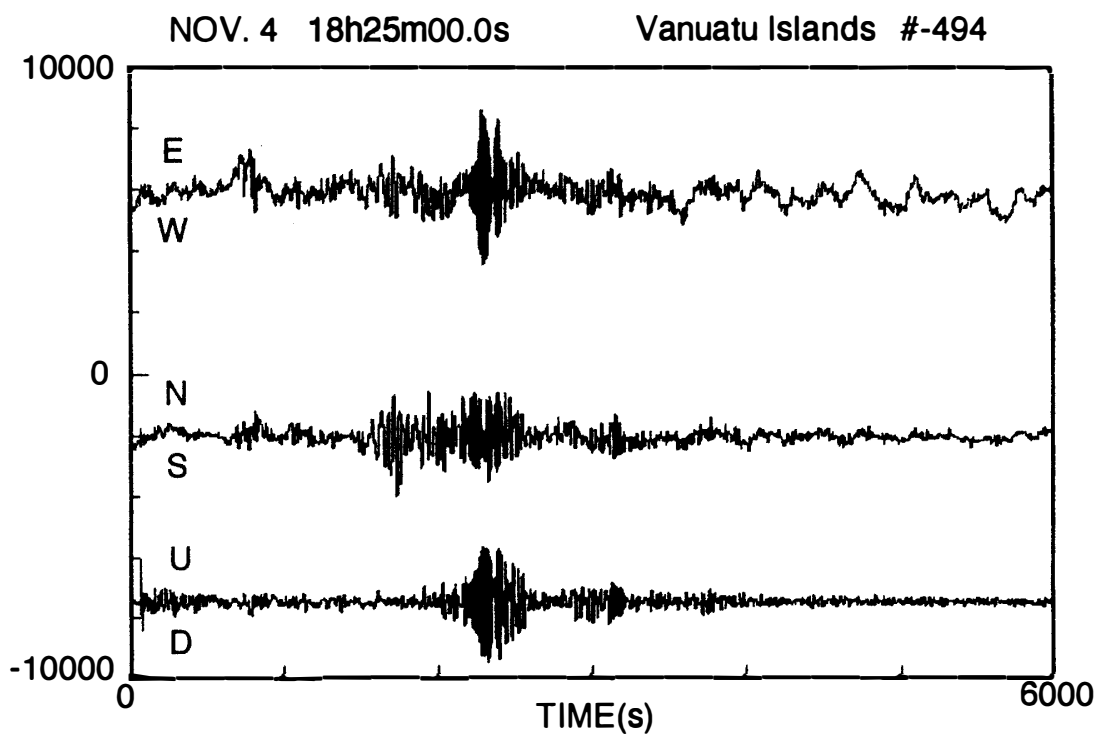0   1800
TIME(s)

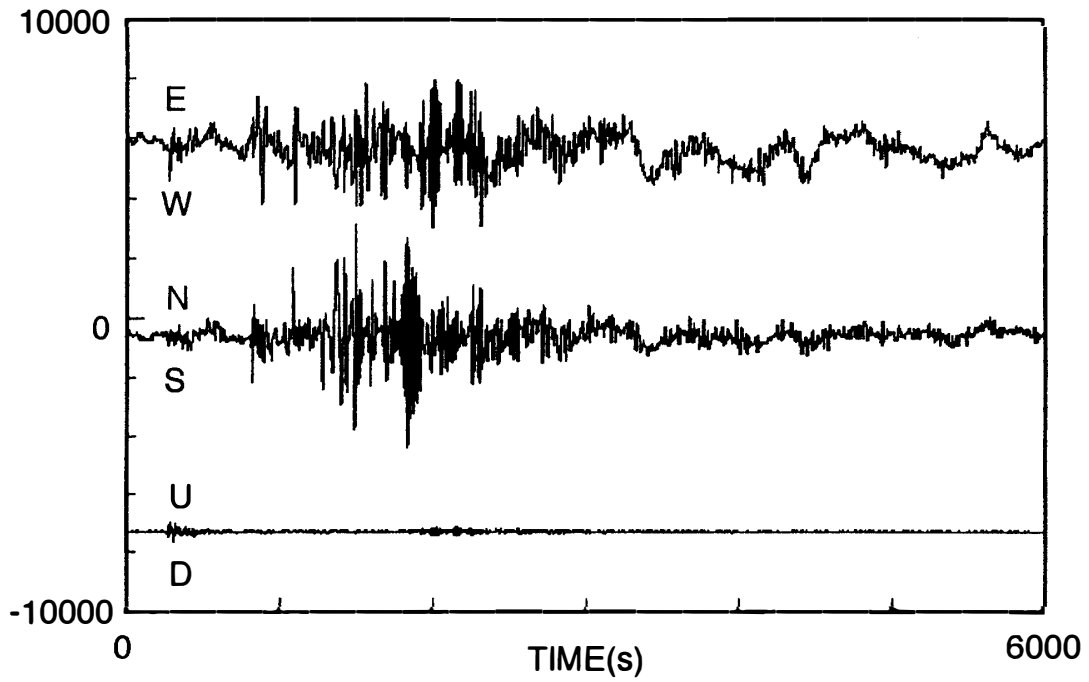SEP. 26 22h25m00.0s   Halmahera, Indonesia   #-377

OCT. 11   19h34m59.0s   Vanuatu Islands #-404

OCT. 12 13h23m00.0s   Egypt   #-406

OCT. 19 12h14m00.0s   Vanuatu Islands #-433

OCT. 22 09h15m00.0s   Kermadec Islands, New Zealand   #-439

OCT. 22   23h17m00.0s   Kermadec Islands, New Zealand   #-442

NOV. 4 18h25m00.0s Vanuatu Islands #-494

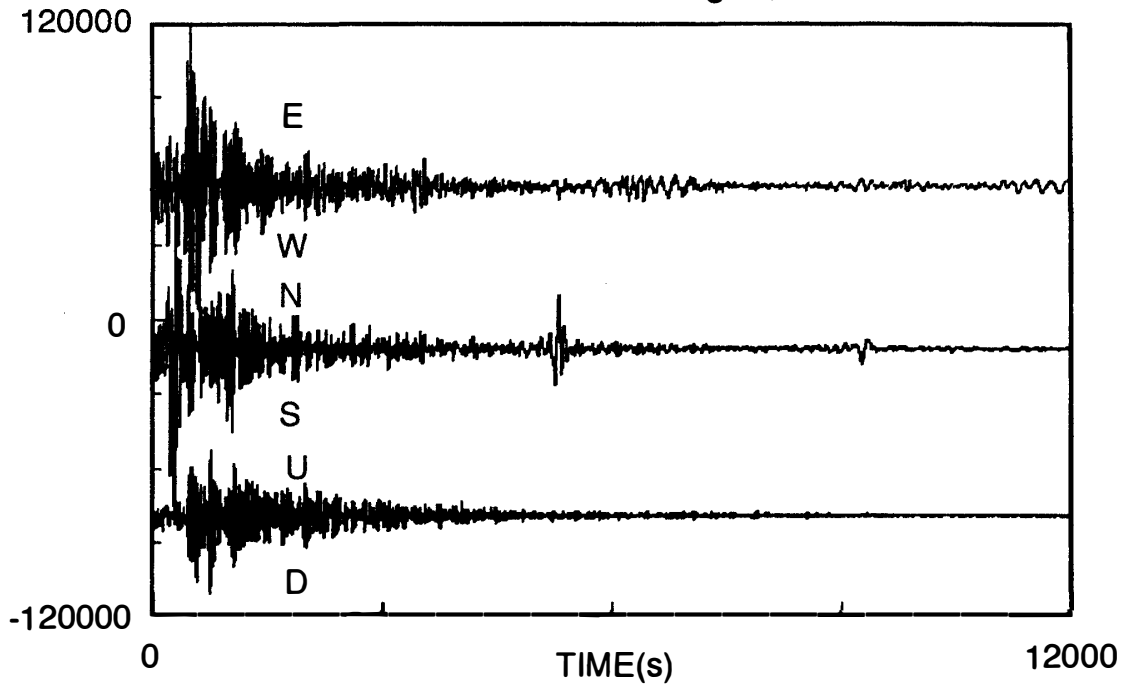NOV. 8 03h49m59.0s Fiji Islands Region #-498
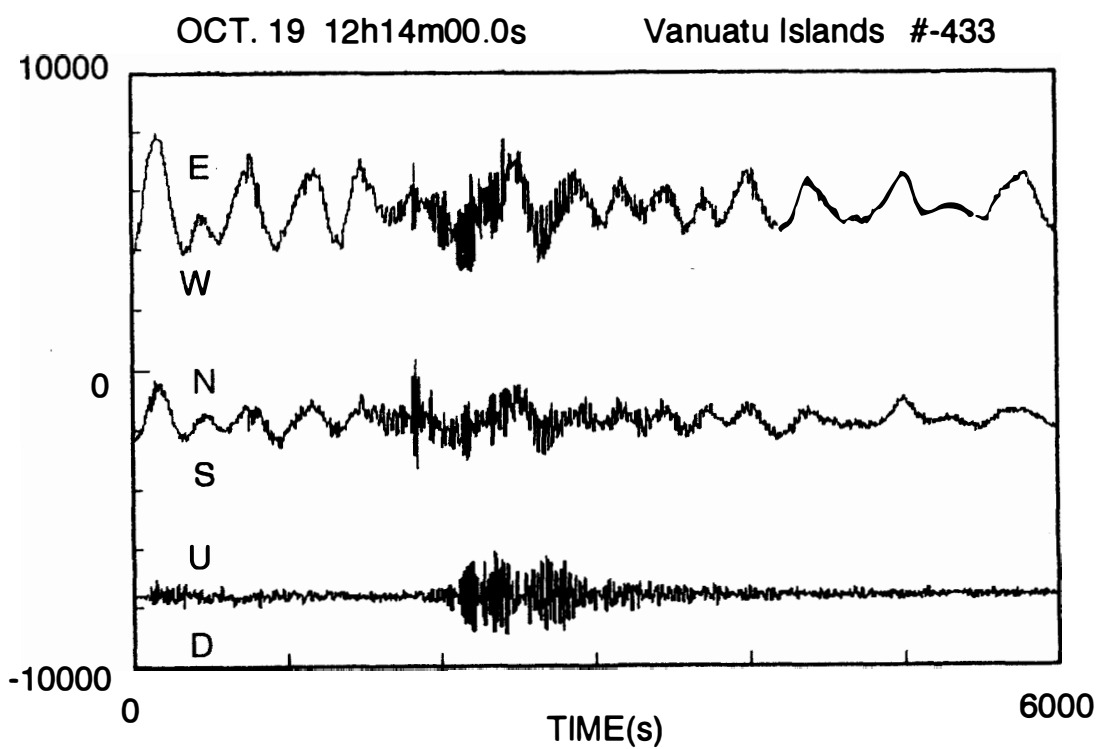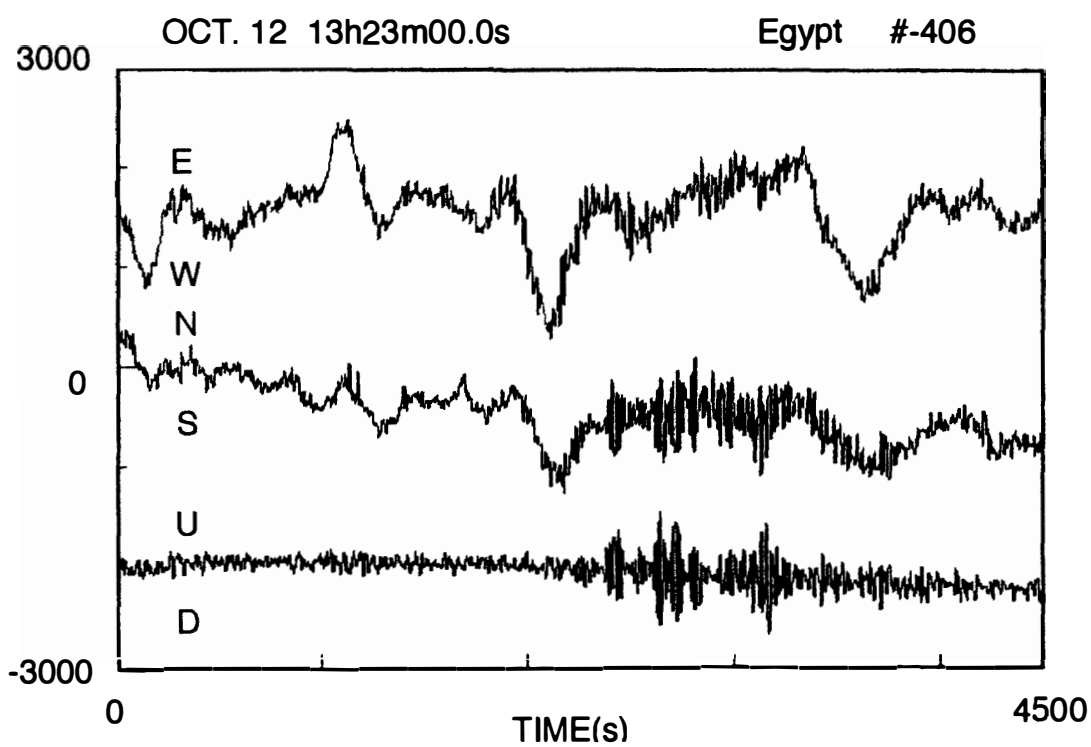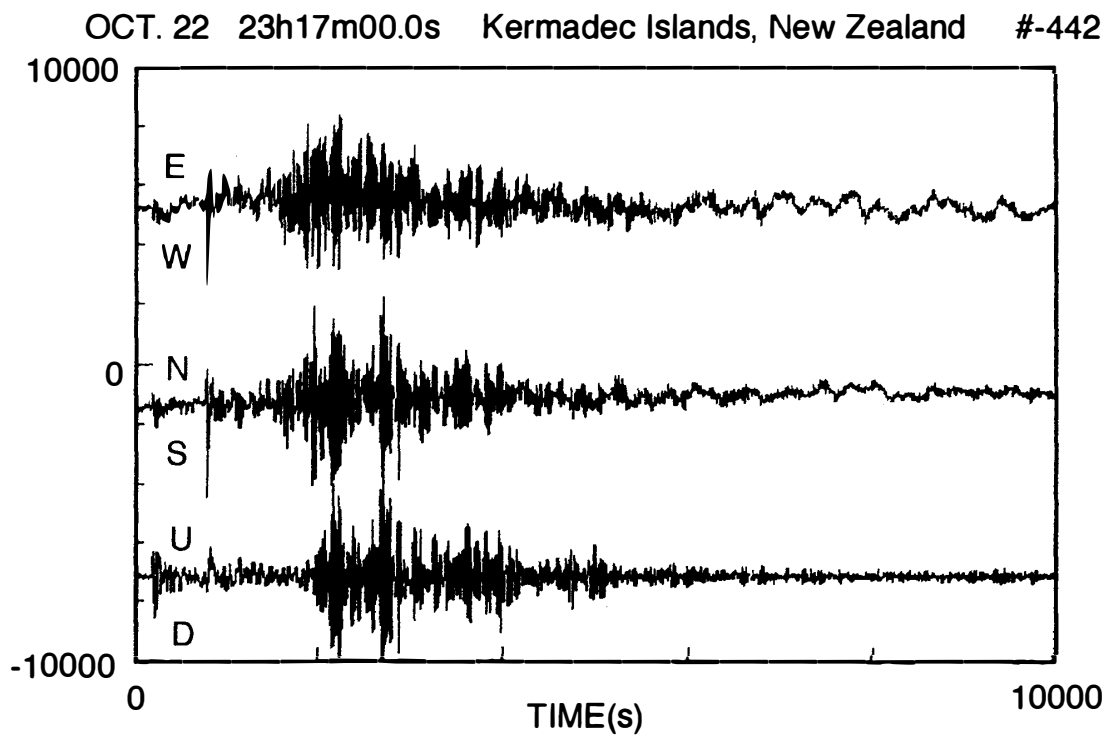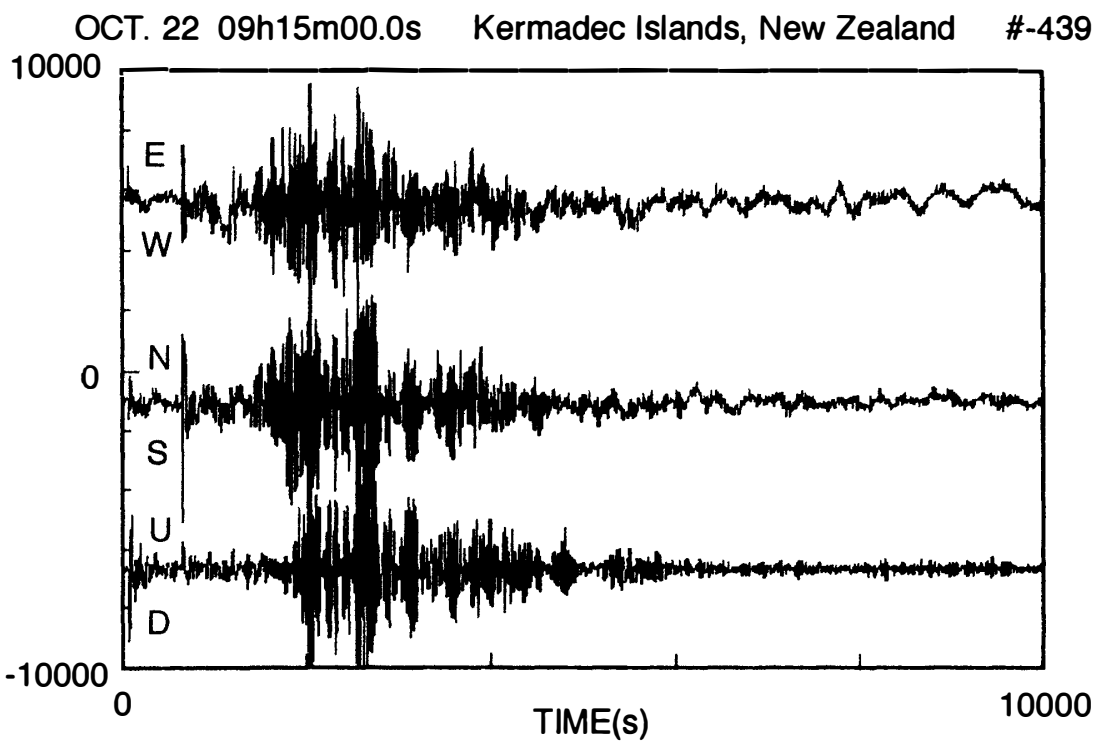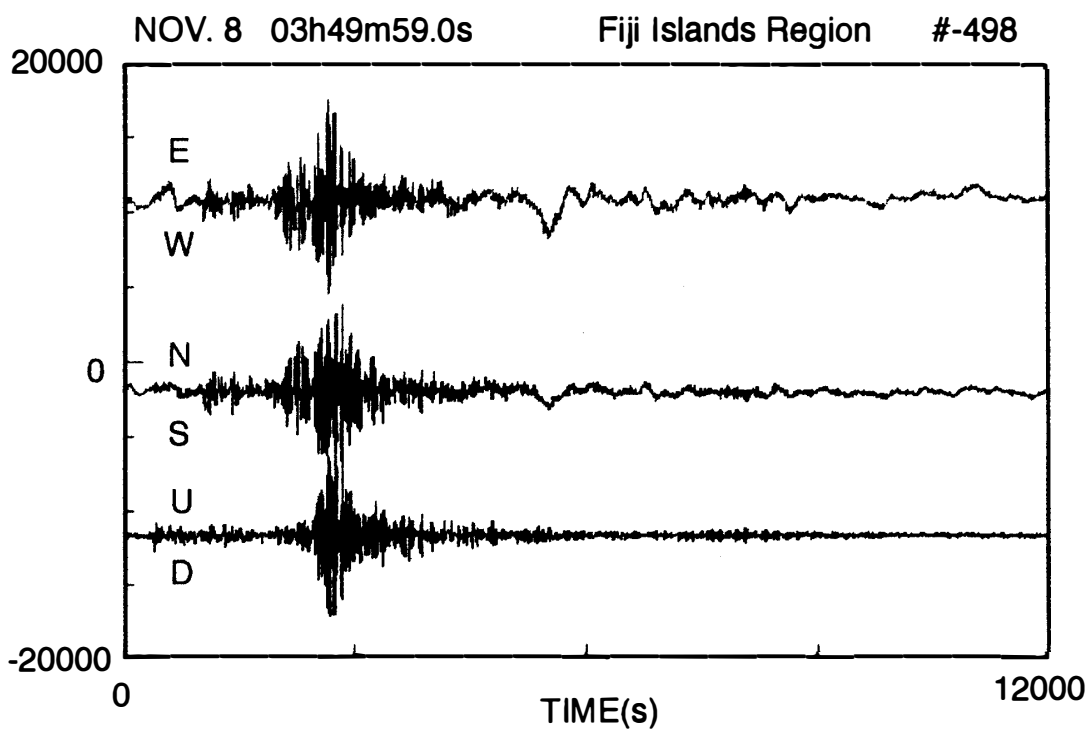
NOV. 28   03h19m59.0s   Near Coast of Central Chile   #-549

DEC. 12   05h59m00.0s   Flores Region, Indonesia   #-570

DEC. 18   03h24m59.0s   Eastern New Guinea Region, P.N.G.   #-590