NEW ZEALAND

Department of Scientific and Industrial Research

Geophysics Division

APIA OBSERVATORY

FINAL SEISMOLOGICAL BULLETIN

STANDARD SEISMIC STATION (AFI)

AFIAMALU, WESTERN SAMOA

Latitude: 13° 54' 33.6"S Longitude: 171° 46' 38.1"W

Height above mean sea level: 705.6 metres, 2315 ft.

Geocentric direction cosines: a. - 0.961 070

b. - 0.138 883

c. - 0.238 862

Lithological Foundation: Basaltic Lava Flows

Instruments: World-wide standard seismograph system

Benioff short period seismometers

To = 1.0 sec. Tg = 0.75 sec.

Sprengnether long period seismometers

To = 15 sec. Tg = 100 sec.

Nominal Magnifications: S.P. 12500

L.P. 750

JANUARY 1969 *

No	Date	Phase		Time (G.M.T.)			Az	Tz	An	Tn	Ae	Te	△ (Deg.)	Remarks
1	1	eP	ZNE	00	24	45								
		S	ZNE		25	20								
2	1	iP	ZNE	04	40	13								u
		S	ZNE			35								
3	1	eS	ZNE	07	10	36							54.0	USCGS: 60.5S, 150.6E West of Macquarie Island h Normal H = 06 53 29.0
		eLq	NE		16	36								
		eLr	ZN		18	48								
4	1	eP	ZNE	09	27	19							9.8	USCGS: 16.2S, 178.4E Fiji Islands h about 33 km H = 09 25 00.5
		S	ZNE		29	16								
5	1	eP	ZNE	11	09	42								Samoa Islands region
		S	ZNE		10	00								
6	1	eP	ZNE	17	38	34							14.0	USCGS: 24.9S, 179.2E South of Fiji Islands h about 657 km H = 17 35 56.2 Mag. 4.4 (CGS)
		eS	ZNE		40	53								
7	1	eP	ZNE	21	11	23								
8	2	iP	Z	03	14	26.5							3.8	u USCGS: 16.4S, 174.7W Tonga Islands h about 250 km H = 03 13 26.6 Mag. 4.3 (CGS)
		S	ZNE		15	10								

No	Date	Phase	Time (G.M.T.)	Az Tz An Tn Ae Te	△ (Deg.)	Remarks
9	2	eP Z	10 32 05		35.6	USCGS: 24.5S, 176.2W South Island, New Zealand. Felt on South Island h about 134 km H = 10 25 22.8 Mag. 5.3 (CGS)
10	2	e(P) Z	15 51 36		18.6	USCGS: 12.9S, 169.1E Santa Cruz Islands region h about 635 km H = 15 47 55.4 Mag. 4.7 (CGS)
11	2	eP Z	17 23 10		7.5	USCGS: 18.1S, 178.3W Fiji Islands region h about 607 km H = 17 21 15.1 Mag. 4.1 (CGS)
12	2	iP ZNE S ZNE	17 32 42.3 33 02			une USCGS: 15.2S, 173.6W Tonga Islands h about 33 km H = 17 32 09.8 Mag. 4.7 (CGS)
13	3	eP Z eS ZNE	00 20 53 22 52		11.5	USCGS: 24.5S, 176.2W South of Fiji Islands h about 68 km H = 00 18 21.0 Mag. 4.7 (CGS)
14	3	eS ZN eL ZNE	13 47 36 55 16		65.0	USCGS: 51.2N, 179.4W Andreanof Islands, Aleutian Islands Felt on Adak h about 29 km H = 13 28 12.8 Mag. 5.6 (BRK), 5.8MB 5.2 MS (CGS)
15	3	eP Z eS ZNE	13 52 59 54 53		11.5	USCGS: 24.5S, 176.1W South of Fiji Islands h about 33 km H = 13 50 23.9 Mag. 4.7 (CGS)
16	4	eP ZNE eiS ZNE	02 58 50 59 45			
17	4	eP ZNE	22 18 35		15.5	USCGS: 26.4S, 178.4E South of Fiji Islands h about 599 km H = 22 15 23.2 Mag. 4.1 (CGS)
18	4	eP ZE	22 46 31		58.0	USCGS: 6.8S, 129.8E Banda Sea h about 107 km H = 22 36 47.9 Mag. 5.7 (CGS)

No	Date	Phase		Time (G.M.T.)			Az	Tz	An	Tn	Ae	Te	△ (Deg.)	Remarks
19	5	eP	ZNE	13	27	06								
		S	ZNE			53								
20	5	iP	ZNE	13	32	40							29.4	d USCGS: 8.0S, 158.9E Solomon Islands Slight damage on Santa Isabel Island also felt at Honiara h about 47 km H = 13 26 39.9 Mag. 7.5 (PAS), $6\frac{3}{4}$-7 (BRK), $6\frac{1}{2}$(PAL), 6.4MB 7.1MS (CGS)
		iS	ZNE		37	32								
		iL	ZE		40	00								
21	5	eP	Z	17	01	15							65.0	USCGS: 8.9S, 123.5E Flores Island region h about 27 km H = 16 50 42.8 Mag. 5.6 (CGS)
22	5	eP	ZNE	17	22	01								
		eS	ZNE		23	24								
23	6	eP	ZE	01	10	57							29.3	USCGS: 8.2S, 159 OE Solomon Islands h Normal H = 01 04 52.1 Mag. 4.8 (CGS)
24	6	eP	ZNE	04	58	10								
		S	ZNE			34								
25	6	eP	ZNE	06	22	53							3.3	USCGS: 16.4S, 173.9W Tonga Islands h about 33 km H = 06 22 05.8 Mag. 4.2 (CGS)
		S	ZNE		23	24								
26	6	eP	ZNE	12	31	53							12.4	USCGS: 22.5S, 179.2E South of Fiji Islands h about 586 km H = 12 29 12.5 Mag. 4.5 (CGS)
		eS	ZNE		33	59								
27	6	eP	ZNE	15	34	11	1.4	1.0					17.4	USCGS: 30.2S, 178.0W Kermadec Islands region h about 137 km H = 15 30 29.7 Mag. 5.2 (CGS)
		S	ZNE		37	04								
		eT	ZNE		47	11								
28	6	eP	ZNE	15	44	07	9.8	1.4					23.5	USCGS: 10.5S, 164.5E Santa Cruz Islands region h about 32 km H = 15 39 00.9 Mag. 7.1(PAS), $6\frac{3}{4}$-7 (BRK), 6.0(PAL), 6.2MB 6.8MS (CGS)
		iS	ZNE		48	24								
29	6	eP	Z	17	11	25							23.5	USCGS: 10.9S, 164.4E Santa Cruz Islands region h Normal H = 17 06 15.8 Mag. 5.0 (CGS)

No	Date	Phase		Time (G.M.T.)			Az	Tz	An	Tn	Ae	Te	△ (Deg.)	Remarks
30	6	eP	ZNE	17	38	47	1.2	1.0					23.5	USCGS: 10.7S, 164.4E
		S	ZN		43	00								Santa Cruz Islands
		iL	NE		44	00								region
		iL	Z			44								h Normal
														H = 17 33 40.5
														Mag. 5.4 (CGS)
31	6	eP	Z	20	54	01							17.4	USCGS: 30.2S, 178.2W
		eS	ZNE		56	54								Kermadec Islands region
		eT	ZNE	21	10	13								h about 189 km
														H = 20 50 24.6
														Mag. 4.5 (CGS)
32	7	eP	Z	01	46	49								
		eiS	ZNE		47	32								
33	7	eP	Z	04	44	56	0.7	1.0					20.1	USCGS: 16.0S, 167.5E
		ePP	ZNE		45	12								New Hebrides Islands
		eS	ZNE		48	42								Felt at Lamap
		eL	ZE		50	12								h about 45 km
														H = 04 40 21.4
														Mag. 4.7MB 5.3MS(CGS)
34	7	eP	ZNE	17	51	54	1.0	1.5					23.5	USCGS: 10.8S, 164.4E
		eS	ZNE		56	16								Santa Cruz Islands
		e(SSS)	E		57	12								region
		eL	Z		58	00								h about 29 km
														H = 17 46 45.8
														Mag. 5.3 (CGS)
35	8	eP	ZNE	12	10	27								
		S	ZNE			49								
36	8	iP	ZNE	12	17	00.2								u
		S	ZNE			19								Samoa Islands region
37	8	eP	ZNE	21	06	17								
		S	ZNE		07	03								
38	9	iP	ZNE	11	51	05							9.8	u?
		eS	ZNE		52	57								USCGS: 18.8S, 179.4E
														Fiji Islands
														h about 619 km
														H = 11 48 47.2
														Mag. 4.5 (CGS)
39	9	eP	ZNE	18	56	05							14.6	USCGS: 25.2S, 178.4E
		S	ZNE		58	31								South of Fiji Islands
														h about 550 km
														H = 18 53 03.5
														Mag. 5.0 (CGS)
40	10	iP	ZNE	09	46	34.5	9.0	0.9					3.6	u
		S	ZNE		47	28								USCGS: 15.0S, 175.4W
														Tonga Islands
														h about 106 km
														H = 09 45 12.5
														Mag. 4.2 (CGS)
41	10	eP	Z	10	39	54								
		iS	ZNE		40	35								
		eT	ZNE		42	28								

No	Date	Phase		Time (G.M.T.)	Az Tz An Tn Ae Te	△ (Deg.)	Remarks
42	11	eiP S eT	ZNE ZNE ZNE	04 29 48.5 32 24 43 09		15.4	USCGS: 28.4S, 177.0W Kermadec Islands h about 68 km H = 04 26 26.8 Mag. 6.6 (PAS), 5¾-6 (GOL), 5.4 (CGS)
43	11	eP S eT	ZNE ZNE ZNE	04 51 05 53 40 05 05 28		15.5	USCGS: 28.5S, 176.8W Kermadec Islands h about 68 km H = 04 47 42.7 Mag. 5.1 (CGS)
44	11	(P) (S) eT	ZNE ZNE ZNE	05 06 35 09 05 21 16		15.5	Confused by T waves of the previous shock. USCGS: 28.5S, 176.7W Kermadec Islands h about 76 km H = 05 02 55.9 Mag. 5.2 (CGS)
45	11	iP S	Z ZNE	06 29 25.2 30 57		7.8	d USCGS: 17.7S, 178.8W Fiji Islands region h about 529 km H = 06 27 29.0 Mag. 4.6 (CGS)
46	12	iP iS	ZNE ZNE	07 19 43.5 20 04			u Samoa Islands region
47	12	iP i(S)	ZNE ZNE	20 36 02.5 37 44			u
48	12	iP S	ZNE ZNE	22 46 55.2 47 14			u Samoa Islands region
49	13	eP iS	ZNE ZNE	07 58 03 59 03			
50	13	iP iS	ZNE ZNE	09 48 54.5 49 16			d
51	13	eP S T	ZNE ZNE ZNE	21 25 39 26 32 30 31		5.4	USCGS: 18.8S, 173.8W Tonga Islands h about 33 km H = 21 24 22.5 Mag. 4.8 (CGS)
52	14	eP e(S)	Z NE	11 27 58 29 36		7.5	USCGS: 20.2S, 175.8W Tonga Islands h about 16 km H = 11 26 08.4 Mag. 4.9 (CGS)
53	14	e(L)	ZE	12 47 12		23.5	USCGS: 10.9S, 164.4E Santa Cruz Islands region h about 16 km H = 12 35 37.2 Mag. 5.2 (CGS)

No	Date	Phase	Time (G.M.T.)	Az Tz An Tn Ae Te	△ (Deg.)	Remarks
54	14	e(P) ZNE	22 00 42			
55	14	PKP ZNE	23 32 00		152.0	USCGS: 36.2N, 29.2E Turkey Damage at Kas and Kalkan. Felt in Southwestern Anatolia h Normal H = 23 12 07.9 Mag. 6.3 (PAS), 6-6¼ (GOL), 5.5MB 6.0MS (CGS)
	15					No Readings
56	16	eP ZNE eS ZNE eT ZNE	06 45 20 46 11 49 45			
57	17	iP NE S NE T NE	04 45 06 34 47 23			
58	17	iP NE iS NE	10 25 29 26 03			
59	17	eiP NE S NE T NE	18 51 55 52 13 53 43			
60	18	e(P) Z	03 00 15			
61	18	eP ZNE eS ZNE	06 32 21 33 48			
62	18	eP ZNE eS ZNE	10 51 20 52 48			
63	18	eP ZNE eS ZNE e(T) ZNE	17 16 42 18 28 27 17			
64	18	eP ZNE eS ZNE	20 06 40 07 24			
65	19	eiP ZNE e ZNE iS ZNE i ZN e NE SSS NE iL ZE	07 13 04 14 00 22 00 26 12 28 00 30 28 31 37		72.0	USCGS: 45.0N, 143.2E Hokkaido, Japan region Felt in northern Hokkaido h about 204 km H = 07 02 04.4 Mag. 7(PAS), 6½-6¾(GOL), 6.4 (CGS)
66	19	eiP ZNE iS ZNE	12 18 03 57			
67	19	iP ZNE iS ZNE i(PcS)ZNE	18 55 23 59 04 19 02 56.1		20.5	u? USCGS: 14.9S, 167.2E New Hebrides Islands Felt at Lamap and Port Vila h about 112 km H = 18 50 52.1 Mag. 6¾(PAS), 6¼-6½(GOL), 6.2 (CGS)

No	Date	Phase		Time (G.M.T.)			Az	Tz	An	Tn	Ae	Te	△ (Deg.)	Remarks
68	20	eP	Z	01	06	11							15.7	USCGS: 28.7S, 176.8W Kermadec Islands h about 73 km H = 01 02 45.7 Mag. 4.6 (CGS)
		eS	NE		08	49								
		eT	ZNE		19	32								
69	20	eS	ZN	04	55	32							23.5	USCGS: 10.2S, 164.5E Santa Cruz Islands region h Normal H = 04 46 10.2 Mag. 5.0MB 5.1MS (CGS)
		eL	ZE		56	28								
70	20	eP	ZNE	06	20	21								
		iS	ZNE			52								
71	20	eP	ZNE	12	29	46							23.4	USCGS: 10.3S, 164.6E Santa Cruz Islands region h about 4 km H = 12 24 35.2 Mag. 5.6MB 5.8MS (CGS)
		S	ZNE		33	56								
		iL	ZE		35	00								
72	20	eP	ZNE	14	31	28							70.0	USCGS: 54.9N, 166.0E Komandorsky Islands region h about 23 km H = 14 20 11.5 Mag. 6.1 (CGS)
		eS	ZN		40	32								
		eSSS	E		49	04								
		eL	ZN		52	32								
73	21	eiP	ZNE	01	57	24	1.4	1.2					58.0	USCGS: 7.3S, 128.3E Banda Sea h about 91 km H = 01 47 29.6 Mag. 5.6 (CGS)
74	21	eiP	ZNE	04	09	40								
		iS	ZNE		10	51								
75	21	eL	ZNE	09	05	48								
76	21	e(S)	ZNE	10	52	24								
77	21	iP	Z	13	03	29.8								d
78	21	eP	ZNE	20	42	27							19.3	USCGS: 21.9S, 169.9E Loyalty Islands region h about 33 km H = 20 38 00.7 Mag. 4.9MB 5.2MS(CGS)
		eS	ZE		46	02								
		eS	N			28								
		eL	Z		47	28								
79	22	eL	ZNE	17	46	12							68.0	USCGS: 49.4N, 155.5E Kurile Islands h about 50 km H = 17 14 42.8 Mag. 5.4MB 4.7MS(CGS)
80	23	iP	ZNE	00	21	57.4								d
		iS	ZNE		22	52.6								
81	23	eP	Z	04	10	07								
		eS	ZNE		11	10								
		eT	ZNE		16	08								
82	23	e(P)	ZE	06	00	31								

No	Date	Phase	Time (G.M.T.)	Az Tz An Tn Ae Te	△ (Deg.)	Remarks
83	23	P ZNE S ZNE	13 53 00 35			
84	24	iP ZNE iS ZNE iScP Z iScS E isScS	02 35 28 37 21.5 43 11 46 50 51 04		11.0	d USCGS: 21.9S, 179.6W Fiji Islands region h about 595 km H = 02 33 03.5 Mag. 7.0 (PAS),5.9(CGS)
85	24	eP ZNE S ZNE T ZNE	03 56 20 57 05 04 00 07			
86	24	e(P) ZNE	05 05 07.5			
87	24	eP Z S ZNE	07 15 05 47			
88	25	eP ZNE eS ZE eSS Z eL N eL ZE	05 29 47 38 12 42 36 46 12 50 32	1.5 1.0	64.0	USCGS: 0.8N, 126.1E Molucca Passage h about 24 km H = 05 19 17.1 Mag. 6.2(PAS), 5.9MB 5.7MS (CGS)
89	25	iP ZNE S ZNE	06 18 50.5 19 37			d
90	25	eP Z eS ZNE e(T) ZNE	11 10 13 12 37 28 13		19.5	USCGS: 32.5S, 178.0W South of Kermadec Islands h about 14 km H = 11 05 50.6 Mag. 4.7 (CGS)
91	25	eP ZNE eS ZNE	22 00 03.5 01 28			
92	26	eL ZN	00 18 20		54.0	USCGS: 54.4S, 143.8E West of Macquarie Island h Normal H = 23 52 42.4
93	26	eP ZNE epP Z eS NE	05 04 17 37 09 24		26.4	USCGS: 10.2S, 161.5E Solomon Islands h about 75 km H = 04 58 45.8 Mag. 5.2 (CGS)
94	26	eL ZNE	15 38 36		73.0	USCGS: 55.8N, 162.9E Near east coast of Kamchatka h about 16 km H = 15 05 32.7 Mag. $5\frac{1}{2}$-$5\frac{3}{4}$(GOL), 5.5MB 5.5MS (CGS)
95	26	iP Z eiS ZNE eT ZNE	17 28 19.2 29 33 35 00		7.0	u USCGS: 20.1S, 174.8W Tonga Islands h about 33 km H = 17 26 40.0 Mag. 4.8 (CGS)

No	Date	Phase	Time (G.M.T.)	Az Tz An Tn Ae Te	△ (Deg.)	Remarks
96	27	eP ZNE eS ZNE eT ZNE	02 58 39 03 01 35 15 04	1.0 1.0	17.5	USCGS: 30.6S, 177.2W Kermadec Islands region h about 33 km H = 02 54 40.2 Mag. 5.0 (CGS)
97	27	P Z (S) ZNE eT ZNE	03 13 11 16 06 29 07		17.5	USCGS: 30.6S, 177.2W Kermadec Islands region h about 24 km H = 03 09 16.0 Mag. 5.0 (CGS)
98	27	iP ZNE iS ZNE	06 28 20.9 39			d Samoa Islands region
99	27	eiP ZNE e(T) ZNE	10 04 59 19 03		18.6	USCGS: 30.9S, 179.7W Kermadec Islands h about 300 km H = 10 01 05.7 Mag. 4.9 (CGS)
100	27	iP ZNE	10 07 49.2		5.6	d USCGS: 15.0S, 177.5W Fiji Islands region h about 420 km H = 10 06 27.6 Mag. 4.6 (CGS)
101	27	i(P) ZNE eS ZNE eSS ZNE e(SSS) NE eL ZNE	13 25 10 32 40 36 40 38 15 40 30		55.0	u? USCGS: 8.8N, 137.7E West Caroline Islands h about 5 km H = 13 15 24.4 Mag. 5.5MB 5.6MS(CGS)
102	27	eP ZNE	18 28 55		20.5	USCGS: 13.2S, 166.9E New Hebrides Islands h about 130 km H = 18 24 23.0 Mag. 5.1 (CGS)
103	27	eP Z	18 46 04.5	1.5 1.0	18.9	USCGS: 20.5S, 169.6E New Hebrides Islands h about 16 km H = 18 41 45.1 Mag. 4.6 (CGS)
104	28	iP ZNE iS ZNE	00 04 31.3 49			d Samoa Islands region
105	28	iP ZNE iS ZNE	00 27 57 28 14		1.8	d USCGS: 14.8S, 173.4W Samoa Islands region h about 13 km H = 00 27 31.2 Mag. $5\frac{1}{2}$-$5\frac{3}{4}$(GOL), 5.2MB 5.4MS (CGS)
106	28	e(P) ZNE S ZNE	01 53 12 54 09			

No	Date	Phase		Time (G.M.T.)	Az Tz An Tn Ae Te	△ (Deg.)	Remarks
107	28	iP	ZNE	03 33 59			d
		S	ZNE	34 18			Samoa Islands region
		T	ZNE	35 56			
108	28	eiP	ZNE	09 08 53			
109	28	iP	ZNE	11 32 06.5		11.1	u
		S	ZNE	34 02			USCGS: 21.9S, 179.7W
							Fiji Islands region
							h about 640 km
							H = 11 29 44.7
							Mag. 4.5 (CGS)
110	28	iP	ZNE	12 29 16.9			d
		S	ZNE	35			Samoa Islands region
111	28	eP	ZNE	14 06 14		5.9	USCGS: 19.1S, 174.6W
		S	ZNE	07 15			Tonga Islands
							h about 39 km
							H = 14 04 47.8
							Mag. 4.8 (CGS)
112	28	eiP	ZNE	16 35 47			Samoa Islands region
		iS	ZNE	36 04			
113	29	iP	ZNE	09 27 23			d
		iS	ZNE	47			
114	29	eP	Z	13 37 27		7.9	USCGS: 18.8S, 178.1W
		eS	ZNE	38 51			Fiji Islands region
							h about 455 km
							H = 13 35 38.3
							Mag. 4.3 (CGS)
115	29	iP	ZNE	17 45 19		3.4	un
		S	ZNE	53			USCGS: 17.2S, 171.6W
							Tonga Islands region
							Felt at Apia
							h about 33 km
							H = 17 44 31.1
							Mag. 6.0(PAS),6-6¼(BRK),
							6.0MB 6.5MS (CGS)
116	29	eP	ZNE	19 35 04		21.5	USCGS: 11.4S, 166.4E
							Santa Cruz Islands
							h about 153 km
							H = 19 30 26.5
							Mag. 5.0 (CGS)
117	30	eP	ZNE	10 40 03		64.0	USCGS: 4.8N, 127.4E
		iS	ZNE	48 36			Talaud Islands
		iSS	NE	52 52			Felt on Mindanao and
		iLq	N	56 12			the Visayan Islands
		iLr	ZE	11 00 04			h about 70 km
							H = 10 29 40.4
							Mag. 7.2(PAS),
							7-7¼(BRK), 5.9 (CGS)
118	30	eP?	Z	11 09 32			
		e(P)	Z	47			
119	30	eP	ZNE	15 01 59			
		iS	ZNE	02 22			

No	Date	Phase	Time (G.M.T.)	Az Tz An Tn Ae Te	△ (Deg.)	Remarks
120	30	eP ZNE	17 30 14.2		64.0	USCGS: 4.9N, 127.5E Talaud Islands h about 72 km H = 17 19 35.0 Mag. 5.3 (CGS)
121	30	iP ZNE	18 46 41.2		67.0	u USCGS: 4.0N, 123.0E Celebes Sea h about 521 km H = 18 36 37.3 Mag. 5.3 (CGS)
122	31	iP ZNE iS ZNE iSS ZN iSSS ZN L ZE	00 54 40.5 01 03 02 06 44 10 24 13 32		62.0	u USCGS: 4.2N, 128.1E North of Halmahera h about 33 km H = 00 44 13.3 Mag. 6.6(PAS), $6\frac{1}{4}$-$6\frac{1}{2}$ (BRK), 5.7MB 6.3MS(CGS)
123	31	eiP ZNE eS ZNE eSS ZE e(SSS)N eL ZNE	13 58 58 14 07 20 11 40 14 36 17 32		62.0	USCGS: 4.3N, 128.1E North of Halmahera h about 33 km H = 13 48 22.8 Mag. $5\frac{1}{2}$-$5\frac{3}{4}$ (BRK), 5.4MB 5.7MS (CGS)
124	31	iP ZNE iS ZNE	15 00 32 01 13		3.6	d USCGS: 15.5S, 175.0W Tonga Islands h about 262 km H = 14 59 34.3 Mag. 5.4 (CGS)
125	31	iP ZNE S ZNE eT ZNE	23 35 19.8 38 43 49 12		19.8	u USCGS: 32.1S, 179.6E South of Kermadec Islands h about 391 km H = 23 31 16.2 Mag. 5.2 (CGS)

NOTE:

(i) Trace amplitude (A) are expressed in millimetres and periods (T) in seconds.

(ii) The small letters in the Remarks column indicate the direction of initial movement. u indicates an upwards ground movement, d a downwards one. n,s,e, and w towards north, south, east and west respectively.

(iii) *Readings to be incorporated in the New Zealand Seismological Report for 1969.

P.D. Muller
OBSERVER-IN-CHARGE

c23

NEW ZEALAND

Department of Scientific and Industrial Research

Geophysics Division

APIA OBSERVATORY

FINAL SEISMOLOGICAL BULLETIN

STANDARD SEISMIC STATION (AFI)

AFIAMALU, WESTERN SAMOA

Latitude: 13° 54' 33.6"S Longitude: 171° 46' 38.1"W

Height above mean sea level: 705.6 metres, 2315 ft.

Geocentric direction cosines: a. - 0.961 070

b. - 0.138 883

c. - 0.238 862

Lithological Foundation: Basaltic Lava Flows

Instruments: World-wide standard seismograph system

Benioff short period seismometers

To = 1.0 sec. Tg = 0.75 sec.

Sprengnether long period seismometers

To = 15 sec. Tg = 100 sec.

Nominal Magnifications: S.P. 12500

L.P. 750

FEBRUARY 1969 *

No.	Date	Phase		Time (G.M.T.)			Az	Tz	An	Tn	Ae	Te	△ (Deg.)	Remarks
1	1	eiP	ZNE	00	58	01								Samoa Islands region
		S	ZNE			21								
2	1	eP	ZNE	04	21	02							10.6	USCGS: 21.7S, 179.3W
		iS	NE		22	55								Fiji Islands region
														h about 616 km
														H = 04 18 45.0
														Mag. 4.3 (CGS)
3	1	iP	ZNE	09	45	43.5								u
		iS	ZNE		46	14								
4	1	eP	ZNE	09	53	22								
		S	ZNE			53								
		eT	ZNE		56	05								
5	1	eiP	Z	13	22	57.1	1.0	0.9						
6	1	iP	Z	16	23	31								u
		i(S)	ZNE		24	39								
7	1	eS	NE	16	38	08							61.0	USCGS: 4.0N, 128.1E
		eL	N		45	32								North of Halmahera
		L	ZE		48	36								h Normal
														H = 16 19 13.3
														Mag. 5.2MB 5.5MS(CGS)
8	1	eP	ZNE	22	17	14.9								
		e(S)	ZNE		19	20								

No.	Date	Phase	Time (G.M.T.)	Az Tz An Tn Ae Te	△ (Deg.)	Remarks
9	2	eS ZNE e(SSS)N L ZNE	01 57 32 02 04 56 07 28		61.0	USCGS: 3.9N, 128.2E North of Halmahera h Normal H = 01 38 44.2 Mag. 6(PAS), 5.4 MB 5.8 MS (CGS)
10	2	eS ZE eL ZE	05 40 40 51 32		61.0	USCGS: 3.9N, 128.3E North of Halmahera h Normal H = 05 21 26.2 Mag. 5.5MB 5.2MS(CGS)
11	2	iP ZNE iS ZNE	08 16 52 56			d Samoa Islands
12	2	eS ZE eL ZE	16 40 28 50 24		61.0	USCGS: 3.8N, 128.4E North of Halmahera h Normal H = 16 21 15.4 Mag. 5.3 (CGS)
13	3	iP NE iS NE	07 54 32.1 57 04		15.4	ne USCGS: 25.8S, 178.1E South of Fiji Islands h about 629 km H = 07 51 25.4 Mag. 5.3 (CGS)
14	3	eP NE eS NE	08 16 52 19 21		15.2	USCGS: 25.6S, 178.1E South of Fiji Islands h about 610 km H = 08 13 44.2 Mag. 4.9 (CGS)
15	3	eiP NE S NE	08 21 22 23 52		15.3	USCGS: 25.7S, 178.3E South of Fiji Islands h about 654 km H = 08 18 14.7 Mag. 5.3 (CGS)
16	3	eP NE eS NE	13 40 47 42 54		12.4	USCGS: 23.5S, 179.8W South of Fiji Islands h about 507 km H = 13 38 05.9 Mag. 4.6 (CGS)
17	3	e(P) NE eS ZNE e(SSS)N eL ZE	19 12 05 20 24 27 44 30 52		61.0	USCGS: 4.4N, 128.1E North of Halmahera h Normal H = 19 01 29.4 Mag. 5.2MB 5.5MS(CGS)
18	3	eiP Z iS ZNE iSS ZN iSSS E i ZN iL ZE	21 52 07 22 00 40 04 39 07 24 08 00 10 52		64.0	USCGS: 4.9N, 127.4E Talaud Islands h about 33 km H = 21 41 41.9 Mag. $6\frac{3}{4}$-7(PAS), $6\frac{3}{4}$(BRK), 6.1 MB 6.4 MS (CGS)

No.	Date	Phase	Time (G.M.T.)	Az Tz An Tn Ae Te	△ (Deg.)	Remarks
19	4	eP NE eS ZNE i(SS) NE iSS NE i(SSS)N eL ZE	01 49 28 58 24 02 01 39 03 00 06 56 11 12		67.0	USCGS: 0.6S, 121.7E Northern Celebes h about 33 km H = 01 38 26.2 Mag. 6.0(PAS), 4.8MB 6.1 MS (CGS)
20	4	eP NE iS NE	03 14 04 29			
21	4	eiP NE eS ZNE eSS ZE e(L) ZE eL ZNE	04 23 17 34 12 40 08 46 56 51 12		89.0	USCGS: 8.2S, 80.2W Off coast of Northern Peru. Felt in Trugillo Chidayo area h about 16 km H = 04 10 13.3 Mag. 6.5(PAS), 5¾(BRK), 6.0 MB 5.9 MS (CGS)
22	4	eiP NE eiS NE	11 30 48 32 28		9.1	USCGS: 19.8S, 178.9W Fiji Islands region h about 623 km H = 11 28 44.5 Mag. 5.0 (CGS)
23	5	eS E eL ZE	10 55 36 11 05 28		61.0	USCGS: 3.8N, 128.6E North of Halmahera h about 35 km H = 10 36 24.6 Mag. 5.2 (CGS)
24	6	iP Z S ZNE	10 05 22.9 48			d
25	6	eP ZNE eiS ZNE eT ZNE	16 11 32 13 27 21 39		11.5	USCGS: 24.7S, 175.2W South of Tonga Islands h about 33 km H = 16 09 01.7 Mag. 4.8 (CGS)
26	7	eP ZNE eS ZNE eT ZNE	03 45 11 47 06 56 04		11.7	USCGS: 25.1S, 175.2W South of Tonga Islands h about 33 km H = 03 42 43.4 Mag. 4.9 (CGS)
27	7	iP ZNE iS ZNE	09 24 08 22			u Samoa Islands region
28	7	eP ZNE e(S) ZNE e(T) ZNE	13 04 30 06 20 15 05			
29	8	iP ZNE iS ZNE	01 56 03.7 23			u Samoa Islands region
30	8	eP Z eS NE e(T) ZNE	10 04 54 07 26 18 13		14.7	USCGS: 27.9S, 176.5W Kermadec Islands h about 118 km H = 10 01 45.4 Mag. 4.3 (CGS)
31	9	eP ZNE S ZNE eT ZNE	11 53 53 54 27 57 04			

No.	Date	Phase	Time (G.M.T.)	Az Tz An Tn Ae Te	△ (Deg.)	Remarks
32	10	e(P) ZN e(P) E	20 24 07.6 12			
33	10	iP ZNE iS ZNE	23 00 45 02 52	7.0 1.0	12.7	u? USCGS: 22.7S, 178.6E South of Fiji Islands h about 673 km H = 22 58 05.8 Mag. 6.9(PAS), 6.7(BRK), 6.0 (CGS)
34	10	iP ZNE iS ZNE	23 05 43 07 52		12.8	USCGS: 23.1S, 178.8E South of Fiji Islands h about 670 km H = 23 02 57.5 Mag. 5.8 (CGS)
35	11	iP ZNE iS ZNE	10 57 21.6 58 52		7.6	d USCGS: 19.3S, 177.6W Fiji Islands region h about 424 km H = 10 55 15.4 Mag. 4.4 (CGS)
36	11	eiP ZNE eS ZNE	16 06 49 08 18		7.8	USCGS: 17.9S, 178.7W Fiji Islands region h about 621 km H = 16 05 02.1 Mag. 4.0 (CGS)
37	11	eiP ZNE PP ZE eS ZNE i ZNE i(ScS) ZNE iSS ZNE iSSS NE eL ZNE eL Z	22 25 44 27 23 33 32 35 00 36 00 38 00 39 52 42 20 45 00		62.0	USCGS: 6.7S, 126.8E Banda Sea h about 450 km H = 22 16 13.5 Mag. 7(PAS), 6.7(BRK), 6.0 (CGS)
38	11	e(P) Z	22 55 11			
39	12	iP Z iS ZNE	18 43 03 45 00.6		11.5	u USCGS: 22.7S, 179.4W South of Fiji Islands h about 470 km H = 18 40 38.3 Mag. 4.6 (CGS)
40	13	eP ZNE eS ZNE eT ZNE	10 06 50 09 41 20 43		17.3	USCGS: 30.1S, 178.0W Kermadec Islands region h about 23 km H = 10 02 57.9 Mag. 4.9 (CGS)
41	13	eP ZNE S ZNE T ZNE	13 29 57 30 24 32 12			
42	14	eiP ZNE S ZNE T ZNE	03 04 37 05 06 06 49		2.6	USCGS: 16.1S, 173.0W Tonga Islands h Normal H = 03 04 04.1 Mag. 5.3 (CGS)
43	15	eiP ZNE S ZNE	03 50 23 52			

No.	Date	Phase		Time (G.M.T.)			Az	Tz	An	Tn	Ae	Te	△ (Deg.)	Remarks
44	15	eP	ZNE	06	22	27.8							7.9	USCGS: 17.8S, 178.9W Fiji Islands region h about 610 km H = 06 20 38.0 Mag. 4.6 (CGS)
45	15	eP	ZNE	06	52	16							7.8	USCGS: 20.5S, 176.0W Fiji Islands region h about 160 km H = 06 50 34.1 Mag. 4.6 (CGS)
		iS	ZNE		53	30								
46	15	P	ZNE	07	01	31								
		S	ZNE		02	41								
47	15	iP	ZNE	08	46	14							11.9	d
		eS	ZNE		48	23								USCGS: 24.1S, 180.0 South of Fiji Islands h about 550 km H = 08 43 34.4 Mag. 5.0 (CGS)
48	15	eP	ZNE	09	03	51								
		S	ZNE		04	20								
		T	ZNE		06	33								
49	15	eP	ZNE	09	30	03								
		S	ZNE			33								
		T	ZNE		32	40								
50	15	iP	ZNE	13	53	38							20.5	d
		eS	ZNE		57	48								USCGS: 13.6S, 167.2E New Hebrides Islands h about 205 km H = 13 49 13.6 Mag. 5.3 (CGS)
51	15	eP	ZNE	17	15	21								
		S	ZNE			47								
		T	ZNE		17	23								
52	15	eP	ZNE	18	35	16								
		S	ZNE			58								
		T	ZNE		38	05								
53	16	eiP	ZNE	04	17	27							3.5	USCGS: 16.7S, 173.7W
		S	ZNE		18	02								**Tonga Islands region**
		T	ZNE		19	52								h Normal H = 04 16 41.9 Mag. 4.1 (CGS)
54	16	iP	ZNE	09	01	37								u
		iS	ZNE			58								Samoa Islands region
55	16	eP	ZNE	11	03	47								
		eS	ZNE		05	15								
56	16	iP	ZNE	23	43	16.5								u
		S	ZNE			38								
57	17	eP	ZNE	00	53	24							61.0	USCGS: 3.8N, 128.4E
		L	ZNE	01	13	02								North of Halmahera h about 14 km H = 00 42 59.2 Mag. $6\frac{1}{2}$ (PAS), 5.6 MB 6.5 MS (CGS)
58	17	iP	ZNE	23	12	23.6								Samoa Islands region
		iS	ZNE			41								

No.	Date	Phase		Time (G.M.T.)			Az	Tz	An	Tn	Ae	Te	△ (Deg.)	Remarks
59	18	iP	ZNE	05	17	25							11.3	u
		iS	ZNE		19	19								USCGS: 24.0S, 176.7W
														South of Fiji Islands
														h about 99 km
														H = 05 14 55.9
														Mag. 5.4 (CGS)
60	18	iP	ZNE	20	45	07.5	4.5	1.1					7.6	d
		iS	ZNE		46	36								USCGS: 17.9S, 178.6W
														Fiji Islands region
														h about 569 km
														H = 20 43 13.6
														Mag. 5.2 (CGS)
61	18	eP	ZNE	20	51	29								
		iS	ZNE		52	16								
62	19	iP	ZNE	03	24	10							10.0	d
		iS	ZNE		25	41								USCGS: 22.6S, 176.5W
														South of Fiji Islands
														h about 162 km
														H = 03 21 59.3
														Mag. 4.8 (CGS)
63	19	eP	ZNE	05	36	46								
		iS	ZNE		37	18								
		eT	ZNE		39	46								
64	19	eP	ZNE	12	39	23								
		S	ZNE			53								
65	20	eP	ZNE	03	00	42							6.6	USCGS: 20.1S, 173.9W
		S	ZNE		01	51								Tonga Islands
		S	ZNE		02	04								h about 33 km
		eT	ZNE		06	47								H = 02 59 14.0
														Mag. 5.3 (CGS)
66	20	e(P)	ZNE	04	40	10								
67	20	eP	ZNE	10	05	56							61.0	USCGS: 3.5N, 128.2E
		eS	ZNE		14	18								North of Halmahera
		eSS	ZNE		18	20								h about 33 km
		eSSS	ZNE		21	09								H = 09 55 33.8
		iL	N		24	02								Mag. $6\frac{1}{2}$(PAS), 5.7MB
		L	ZE			15								6.4 MS (CGS)
68	20	iP	ZNE	10	36	09								u
		eS	ZNE		37	34								
69	20	eP	ZNE	10	40	36							61.0	USCGS: 3.5N, 128.4E
		S	ZNE		49	04								North of Halmahera
		e(SSS)	NE		56	12								h about 77 km
		L	ZNE	11	00	48								H = 10 30 22.1
														Mag. 6.0 (CGS)
70	20	P	ZNE	13	04	02							8.4	USCGS: 19.9S, 177.7W
		iS	ZNE		05	35								Fiji Islands region
														h about 579 km
														H = 13 02 04.1
														Mag. 5.0 (CGS)
71	20	eP	ZNE	15	24	13								
		S	ZNE		25	03								
72	20	eP	ZNE	17	08	39							61.0	USCGS: 3.7N, 128.2E
		eS	ZNE		17	24								North of Halmahera
		eSSS	NE		24	16								h about 48 km
		eL	ZNE		26	56								H = 16 58 13.8
														Mag. 5.3 MB 5.8 MS (CGS)

No	Date	Phase		Time (G.M.T.)			Az	Tz	An	Tn	Ae	Te	△ (Deg.)	Remarks
73	20	eP	Z	18	01	05							14.6	USCGS: 25.0S, 178.2E
		eS	NE		03	33								South of Fiji Islands
														h about 616 km
														H = 17 58 08.6
														Mag. 4.8 (CGS)
74	20	eP	Z	20	02	51.6								
		eS	NE		04	24								
75	21	iP	ZNE	06	23	23.8								u
		iS	ZNE			44								Samoa Islands region
76	21	iP	ZNE	20	47	00.2							2.6	d
		S	ZNE			26								USCGS: 16.1S, 173.0W
														Tonga Islands
														h about 38 km
														H = 20 46 27.1
														Mag. 5.4 (CGS)
77	22	eiP	ZNE	12	17	08							9.9	USCGS: 22.4S, 177.1W
		iS	ZNE		18	49								South of Fiji Islands
														h about 239 km
														H = 12 14 57.9
														Mag. 4.4 (CGS)
78	22	eiP	ZNE	18	13	36							12.1	USCGS: 24.8S, 177.0W
		iS	ZNE		15	32								South of Fiji Islands
		eT	ZNE		21	53								h about 138 km
														H = 18 11 01.2
														Mag. 5.0 (CGS)
79	22	eP	ZNE	22	16	39								
		iS	ZNE		17	09								
80	22	eP	ZNE	23	52	25								
		S	ZNE			55								
		T	ZNE		55	31								
81	23	iP	ZN	00	48	08							71.0	u
		iS	ZN		57	20								USCGS: 3.1S, 118.9E
		iL	ZN	01	07	00								Celebes
		iL	Z		10	52								64 killed, 97 injured and 1287 structures damaged at Madjene and Environs. Ground cracks 50 meters long noted at Paletoang and 1.5 meters at Parasanga and Palili. Local Tsunami generated wave with 4 meter height.
														h about 13 km
														H = 00 36 56.6
														Mag. 6.1MB 6.9MS (CGS)
82	23	eiP	ZNE	01	09	20							4.5	USCGS: 18.2S, 172.8W
		S	ZNE		10	08								Tonga Islands region
		eT	ZNE		12	55								h Normal
														H = 01 08 14.5
														Mag. 4.4 (CGS)
83	23	iP	ZNE	10	30	38.3								d
		eiS	ZNE		31	30								
84	23	eP	ZNE	17	26	04								
		S	ZNE			38								
		eT	ZNE		29	06								
85	24	e	ZNE	00	18	22								
86	24	P	ZNE	06	01	50								
		S	ZNE		02	07								
		eT	ZNE		03	17								

No.	Date	Phase		Time (G.M.T.)			Az	Tz	An	Tn	Ae	Te	△ (Deg.)	Remarks
87	25	eiP	ZNE	03	55	51							20.0	USCGS: 32.4S, 180.0 South of Kermadec Islands h about 325 km H = 03 51 45.6 Mag. 5.1 (CGS)
		S	ZNE		59	15								
		eT	ZNE	04	09	32								
88	25	eP	ZNE	10	38	13							12.7	USCGS: 25.8S, 176.3W South of Fiji Islands h about 55 km H = 10 35 26.3 Mag. 5.0 (CGS)
		eS	ZNE		40	14								
		eT	ZNE		50	34								
89	25	eP	ZNE	13	38	30							20.2	USCGS: 15.0S, 167.4E New Hebrides Islands h about 125 km H = 13 33 58.3 Mag. 5.0 (CGS)
90	25	iP	ZNE	14	46	58.2							20.2	u USCGS: 15.0S, 167.4E New Hebrides Islands h about 132 km H = 14 42 30.4 Mag. 5.0 (CGS)
		ipP	ZE		47	30								
		iS	ZNE		50	46								
		i(sS)	ZE		51	20								
91	26	eP	Z	04	21	07								
		e(S)	ZNE		23	32								
92	26	iP	ZNE	17	44	39								d
93	27	eP	ZNE	13	18	03								
		iS	ZNE			30								
		T	ZNE		20	10								
94	27	eP	ZNE	19	38	13							5.6	USCGS: 18.4S, 175.3W Tonga Islands h about 145 km H = 19 36 55.4 Mag. 4.5 (CGS)
		iS	ZNE		39	10								
95	27	eP	ZNE	21	13	42								
		eS	ZNE		14	34								
96	28	iPKP	ZNE	03	00	22.3							153.0	u USCGS: 36.0N, 10.6W North Atlantic Ocean 13 killed(11 Morocco, 2 Portugal),80 injured (65 Portugal, 5 Spain, 10 Morocco), a number of heart-attacks attributed to quake. Damage in Portugal, Morocco and Spain. Felt throughout Portugal, Morocco, Spain and Canary Islands. Also felt in France and by ships on high seas. Tsunami of 1.20M at Casablanca, less than 1m. at Canaries and Gulf of Cadiz. Max. intensity VII. h about 22 km H = 02 40 32.5 Mag. 8(PAS), 7.9(BRK), 8.2(GOL), 7¼ (PAL), 7.3 MB 8.0 MS (CGS)

No.	Date	Phase	Time (G.M.T.)	Az Tz An Tn Ae Te	△ (Deg.)	Remarks
97	28	ePKP ZNE	04 45 26		153.0	USCGS: 36.2N, 10.5W North Atlantic Ocean Felt at Rabat, Casablanca, and Averroes, Morocco and at Lisbon, Portugal h Normal H = 04 25 36.9 Mag. 5.7 (CGS)
98	28	eP ZNE e(L) E	16 53 24 58 36	1.0 1.0	19.8	USCGS: 16.8S, 167.9E New Hebrides Islands Felt at Port Vila and Lamap h about 48 km H = 16 48 53.2 Mag. 4.9 (CGS)
99	28	eP Z eS ZNE	18 38 37 40 22			
100	28	eP ZNE eS ZNE	22 56 53 58 20			

NOTE:

(i) Trace amplitude (A) are expressed in millimetres and periods (T) in seconds.

(ii) The small letters in the Remarks column indicate the direction of initial movement. u indicates an upwards ground movement, d a downwards one. n,s,e, and w towards north, south, east and west respectively.

(iii) *Readings to be incorporated in the New Zealand Seismological Report for 1969.

P.D. Muller
OBSERVER-IN-CHARGE

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Department of Scientific and Industrial Research

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APIA OBSERVATORY

FINAL SEISMOLOGICAL BULLETIN

STANDARD SEISMIC STATION (AFI)

AFIAMALU, WESTERN SAMOA

April 1969

No	Date	Phase	Time (G.M.T.)	Az Tz An Tn Ae Te	△ (Deg.)	Remarks
1	1	iP ZNE eS ZNE	00 05 15 07 31		13.8	u USCGS: 25.2S, 179.7E South of Fiji Islands h about 550 km H = 00 02 26.5 Mag. 4.2 (CGS) No timing between 010120 and 040205
2	4	eS Z e E eL ZN	09 05 12 11 40 13 24		65.0	USCGS: 51.2N, 173.7E Near Islands Aleutian Islands h Normal H = 08 45 18.7 Mag. 4.3 (BRK), 5.6 MB 5.3 MS (CGS)
3	4	eL ZE	13 38 20		87.0	USCGS: 1.2N, 85.2W Off coast of Ecuador h Normal H = 12 58 24.1 Mag. 5.3 (CGS)
4	4	eP ZNE	14 55 05			
5	4	e(P) Z eS ZNE eL ZNE	16 27 36 37 36 48 32		72.0	USCGS: 24.4N, 109.8W Gulf of California Minor damage at La Paz, Mexico h about 31 km H = 16 16 17.2 Mag. 5-5½ (BRK), 5.6 (CGS)
6	4	eP ZNE S ZNE	21 27 47 29 17			
7	4	eL ZN	23 28 32		69.0	USCGS: 54.5N, 169.4E Komandorsky Islands region h about 27 km H = 22 57 16.8 Mag. 5.4 (CGS,
8	5	iP ZNE iS ZNE	01 40 50.2 41 10			u Samoa Islands region
9	5	ePKP Z	02 38 20	2.5 1.7	148.0	USCGS: 12.2N, 41.2E Ethiopia Felt h about 17 km H = 02 18 29.9 Mag. 6-6¼(PAS), 6.2MB 6.1 MS (CGS)

No	Date	Phase	Time (G.M.T.)	Az Tz An Tn Ae Te	△ (Deg.)	Remarks
10	5	eP ZNE	03 55 01		65.0	USCGS: 3.4N, 125.4E Talaud Islands h about 150 km H = 03 44 36.7 Mag. 5.4 (CGS)
11	5	eS ZNE eLq E eLr ZN	07 10 40 16 40 18 20		54.0	USCGS: 54.7S, 143.8E West of Macquarie Islands h Normal H = 06 53 39.2 Mag. 5.2 (CGS)
12	5	e(P) Z	17 16 45			
13	5	eP Z eS ZNE eSS ZNE eSSS N eL N eL ZE	23 39 09 49 52 55 36 59 08 00 02 12 06 12		86.0	USCGS: 1.2N, 85.2W Off coast of Ecuador h about 31 km H = 23 26 11.5 Mag. 5.8MB 6.2MS (CGS)
14	6	iP ZNE iS ZNE	01 06 07.6 42			u
15	6	iPKP ZNE	04 09 28		150.0	u USCGS: 38.5N, 26.4E Aegean Sea Major damage in Karaburun Area, Turkey. Felt on Chios, Greece. h about 14 km H = 03 49 33.5 Mag. 5.5MB 5.5MS (CGS)
16	6	iP ZNE S ZNE	16 05 18 36			d Samoa Islands region
17	6	ePKP ZE	17 11 32		148.0	USCGS: 12.0N, 41.1E Ethiopia Felt h about 20 km H = 16 51 45.5 Mag. 5.2MB 5.4MS (CGS)
18	6	iP ZNE iS ZNE	20 09 34.3 10 12			u
19	6	eiP ZNE eiS ZNE	23 22 00 23 43		9.6	USCGS: 20.9S, 178.5W Fiji Islands region h about 505 km H = 23 19 46.2 Mag. 4.8 (CGS)
20	7	eP ZNE e(S) NE	03 53 58 55 54			
21	7	eP ZNE	05 13 02		10.4	USCGS: 16.2S, 177.8E Fiji Islands region h about 62 km H = 05 10 40.3 Mag. 5.0 (CGS)
22	7	eP ZNE eS ZNE	08 35 37 37 15			
23	7	e(P) Z	15 44 20			
24	8	eiP ZNE iS ZNE	00 19 35.2 20 10			

No	Date	Phase	Time (G.M.T.)	Az Tz An Tn Ae Te	△ (Deg.)	Remarks
25	8	ePKP Z	02 33 46		148.0	USCGS: 11.9N, 41.4E Ethiopia h about 34 km H = 02 13 58.7 Mag. 4.8 (CGS)
26	8	ePKP ZNE	10 51 53		154.0	USCGS: 27.5N, 33.7E United Arab Republic h about 15 km H = 10 31 52.2 Mag. 5.2 (CGS)
27	8	e(P) ZNE eS ZNE	20 56 26 57 38			
28	9	i(P) Z	12 08 35			u
29	9	iP ZNE	13 08 15		68.0	u USCGS: 36.8N, 139.6E Honshu, Japan Felt in Tokyo area h about 116 km H = 12 57 24.8 Mag. 5.5 (CGS)
30	9	e(P) ZNE eS ZNE	15 04 10 06 18		10.5	USCGS: 21.5S, 179.2W Fiji Islands region h about 651 km H = 15 02 19.7 Mag. 4.3 (CGS)
31	9	ei(P) ZNE	23 58 24			
32	10	eiP ZNE eS ZNE	13 00 48 02 07			
33	10	eP Z	15 04 59			
34	10	iP ZNE S ZNE	19 32 15.0 33 00			u
35	11	eP ZNE eS ZNE	07 32 38 34 33			
36	11	eP ZNE eS ZNE eT ZNE	09 48 10 50 49 10 02 45		16.4	USCGS: 29.5S, 176.8W Kermadec Islands h about 44 km H = 09 44 35.6 Mag. 4.8 (CGS)
37	11	eP ZNE S ZNE	13 59 00 14 00 07			
38	11	iP ZNE S ZNE	15 36 14.2 35			u Samoa Islands region
39	11	eP Z eS NE e(T) ZNE	19 30 38 33 15 46 33		16.5	USCGS: 29.5S, 176.8W Kermadec Islands h about 43 km H = 19 26 48.2 Mag. 4.7 (CGS)
40	12	eP ZNE iS ZNE	04 03 12 53			
41	12	e(P) ZNE e(S) ZNE	15 01 26 03 29			
42	13	eiP ZNE eS ZNE	07 16 15 17 49		7.9	USCGS: 17.3S, 179.3W Fiji Islands region h about 616 km H = 07 14 26.4 Mag. 4.3 (CGS)

No	Date	Phase		Time (G.M.T.)			Az	Tz	An	Tn	Ae	Te	△ (Deg.)	Remarks
43	13	eP	ZNE	07	35	57							9.8	USCGS: 20.9S, 178.8W Fiji Islands region h about 579 km H = 07 33 49.4 Mag. 4.3 (CGS)
		eS	ZNE		38	41								
44	13	eP	ZNE	13	07	47							4.2	USCGS: 17.7S, 173.1W Tonga Islands h Normal H = 13 06 50.8 Mag. 4.7 (CGS)
		S	ZNE		08	30								
		T	ZNE		12	01								
45	13	iP	ZNE	23	42	54.7							62.0	u USCGS: 6.1S, 129.9E Banda Sea h about 152 km H = 23 33 15.4 Mag. 6(PAS), 5.9(CGS)
		iPcP	Z		43	41								
		S	E		50	57								
		SS	ZN		55	00								
		SSS	N		57	52								
		SSS	E		58	08								
		eL	ZE	00	00	20								
46	14	iP	ZNE	07	12	19.5							84.0	u USCGS: 5.2S, 104.3E Southern Sumatra h about 102 km H = 07 00 01.7 Mag. 5.7 (CGS)
47	14	iP	ZNE	20	39	51								u Samoa Islands region
		iS	ZNE		40	11								
48	15	eS	N	17	51	00							67.0	USCGS: 39.8N, 143.4E Off east coast of Honshu, Japan h about 20 km H = 17 30 55.8 Mag. 5.3 (CGS)
		eL	ZN	18	01	28								
49	15	eiP	ZNE	22	25	51							75.0	USCGS: 5.9S, 113.2E Java Sea h about 575 km H = 22 15 09.6 Mag. 5.6 (CGS)
50	16	eP	ZE	01	29	24							38.3	USCGS: 3.5S, 151.0E New Ireland region Felt at Kevieng Lessul and Rabaul New Britain h about 39 km H = 01 22 47.5 Mag. 6¼(PAS), 6-6¼(BRK), 5.7 MB 6.5 MS (CGS)
		PP	ZNE		31	32								
		S	ZNE		35	56								
		SS	NE		38	52								
		iL	ZE		40	30								
		Coda lasting 30 minutes												
51	16	eP	ZNE	12	24	10	7.5	1.0					21.4	USCGS: 13.5S, 166.3E New Hebrides Islands h about 137 km H = 12 20 08.8 Mag. 5.6 (CGS)
		e	ZNE			48								
		eS	ZNE		27	56								
52	16	eP	ZNE	15	22	57								
		S	ZNE		24	10								
		eT	ZNE		29	54								
53	16	ePKP	Z	23	15	35							153.0	USCGS: 35.3N, 27.9E Dodecanese Islands h about 25 km H = 22 55 37.2 Mag. 5.2 (CGS)

No	Date	Phase	Time (G.M.T.)	Az Tz An Tn Ae Te	△ (Deg.)	Remarks
54	16	ePKP Z	23 41 01		153.0	USCGS: 35.3N, 27.8E Dodecanese Islands h about 45 km H = 23 21 04.9 Mag. 5.2 (CGS)
55	17	eL ZN	05 27 16		67.0	USCGS: 39.5N, 143.4E Off east coast of Honshu, Japan h about 33 km H = 04 56 15.9 Mag. 5.0MB 5.1MS (CGS) SP Motor stalled between 171241 and 180122
56	18	eiP ZNE eS ZNE	05 44 07 45 39			
57	18	eP ZNE	12 41 37	0.5 1.0	55.5	USCGS: 4.5S, 132.7E West New Guinea region h Normal H = 12 32 03.4 Mag. 5.5 (CGS)
58	19	iP Z S ZNE	06 09 56.4 11 28		7.7	u USCGS: 17.7S, 178.7W Fiji Islands region h about 605 km H = 06 08 02.6 Mag. 4.7 (CGS)
59	19	eiP ZNE	08 57 41		84.0	USCGS: 6.2S, 103.9E Southwest of Sumatra h about 40 km H = 08 45 16.0 Mag. 5.7 (CGS)
60	19	iP ZNE S ZNE T ZNE	13 59 21.5 55 14 02 28			u
61	20	eiP ZNE S ZNE	20 28 17 30 32		13.2	USCGS: 24.5S, 179.9W South of Fiji Islands h about 374 km H = 20 25 18.2 Mag. 4.5 (CGS)
62	21	iP ZNE iS ZNE	00 22 39.0 56			u Samoa Islands region
63	21	eP ZNE eS E eL ZNE	02 31 36 43 12 57 16		85.0	USCGS: 14.1N, 91.0W Guatemala Felt at San Salvador, El Salvador h about 82 km H = 02 19 07.1 Mag. 6(PAS), 6¼(BRK), 5.5 (CGS)
64	21	eP ZNE e(S) ZNE	02 47 26 48 27			
65	21	eiP ZNE iS ZNE	04 21 41 22 50			
66	21	iP ZNE S ZNE	06 58 45.6 59 07			u

No	Date	Phase		Time (G.M.T.)	Az	Tz	An	Tn	Ae	Te	△ (Deg.)	Remarks
67	21	eP	ZNE	07 30 41							71.0	USCGS: 32.2N, 131.9E
		eP	Z	50								Kyushu, Japan
		S	ZNE	39 57								4 injured and slight
		L	ZNE	52 00								damage at Miyasaki
												h about 41 km
												H = 07 19 27.5
												Mag. $6\frac{1}{4}$(PAS), $5\frac{3}{4}$(GOL),
												6.1 MB 6.3 MS (CGS)
68	21	eP	ZNE	13 10 50								
		eS	ZNE	12 12								
69	22	eS	ZNE	04 55 32							55.0	USCGS: 26.7S, 114.2W
		eL	ZNE	05 01 00								Easter Island region
												h Normal
												H = 04 38 03.0
												Mag. 5.3MB 5.7MS (CGS)
70	22	iP	ZNE	05 19 20.3								d
		iS	ZNE	20 12								
71	22	eP	Z	06 41 40							55.0	USCGS: 26.8S, 114.1W
		iS	ZNE	49 24								Easter Island region
		SSS	N	54 40								h Normal
		L	ZNE	57 00								H = 06 31 57.5
												Mag. $6\frac{1}{4}$(PAS), 5.6 MB
												6.2 MS (CGS)
72	22	iP	ZNE	07 38 35							2.6	une
		S	ZNE	39 04								USCGS: 15.4S, 174.1W
												Tonga Islands
												h about 164 km
												H = 07 37 51.2
												Mag. 5.0 (CGS)
73	22	eL	ZNE	08 41 30							67.0	USCGS: 39.8N, 143.0E
												Off east coast of Honshu,
												Japan
												h about 36 km
												H = 08 11 21.6
												Mag. 5.5 (CGS)
74	22	eP	ZNE	13 12 27								Samoa Islands region
		S	ZNE	47								
75	22	eP	ZNE	14 12 05								
		S	ZNE	58								
76	23	eiP	ZNE	08 54 07								Samoa Islands region
		S	ZNE	27								
77	23	iP	ZNE	14 20 47								d
		S	ZNE	21 14								
78	24	iP	ZNE	06 27 46							8.9	u
		iS	ZNE	29 23								USCGS: 20.4S, 178.3W
												Fiji Islands region
												h about 540 km
												H = 06 25 42.0
												Mag. 4.6 (CGS)
79	24	eiP	ZNE	07 28 16.4							8.9	USCGS: 21.2S, 177.0W
		iS	ZNE	29 42								Fiji Islands region
												h about 250 km
												H = 07 26 20.4
												Mag. 4.9 (CGS)
80	25	eP	ZNE	01 34 52.8							11.1	USCGS: 22.2S, 179.5W
		eS	ZNE	36 52								South of Fiji Islands
												h about 542 km
												H = 01 32 22.9
												Mag. 4.6 (CGS)

No	Date	Phase	Time (G.M.T.)	Az Tz An Tn Ae Te	△ (Deg.)	Remarks
81	25	eP ZNE eS ZNE	01 46 31 48 28			
82	25	eS ZE e(SS) Z eL ZE	03 59 40 04 04 44 16 08		93.0	USCGS: 7.5N, 82.1W South of Panama h about 25 km H = 03 34 17.7 Mag. 5.4MB 5.4MS (CGS)
83	25	eiP ZNE S ZNE	13 19 54.5 22 12		13.5	USCGS: 24.9S, 179.8E South of Fiji Islands h about 459 km H = 13 16 58.9 Mag. 4.7 (CGS)
84	25	eiP ZNE eiS ZNE	23 09 59 12 19			
85	26	eP ZNE eS ZNE	02 25 30 27 07			
86	26	eP Z e ZNE e ZNE eS E eS ZNE eSS ZNE e(SSS) Z eL ZNE	06 15 56 22 24 24 08 26 28 28 09 32 16 35 24 40 08		92.0	USCGS: 30.6S, 71.5W Near coast of Central Chile h Normal H = 06 02 49.0 Mag. 6.0-6.2 (BRK), 5.9 MB 6.3 MS (CGS)
87	26	eiP ZNE e(S) ZNE	20 40 42 43 55			
88	27	eiP ZNE iS ZNE	06 47 43 49 18			
89	27	eP ZNE e(S) ZNE	11 48 20 50 24			
90	28	eL ZE	01 09 08		50.0	USCGS: 13.3N, 145.1E Mariana Islands h about 51 km H = 00 46 25.6 Mag. 5.3 (CGS)
91	28	eiP ZNE iS ZNE	07 27 42 29 21		10.4	USCGS: 22.4S, 177.7W South of Fiji Islands h about 296 km H = 07 25 29.7 Mag. $6\frac{1}{4}$(BRK), 5.9(CGS)
92	28	eiP ZNE eL ZE	19 45 03 52 32	2.0 1.0	29.5	USCGS: 7.9S, 158.8E Solomon Islands Felt at Honiara h about 77 km H = 19 39 05.5 Mag. $5\frac{3}{4}$(BRK), 5.7(CGS)
93	28	eL ZNE	23 52 52		73.0	USCGS: 33.4N, 116.4W Southern California h about 20 km 33° 21'N, 116° 21'W Hypocenter by Pasadena Rockslide and minor damage at Borrego Springs. Felt throughout Southern California, in Southern Nevada, western Arizona and northern Baja California, Mex. H = 23 20 42.9 Mag. 5.9(PAS), 6.1(BRK), 5.7MB 5.2MS (CGS)

No	Date	Phase	Time (G.M.T.)	Az Tz An Tn Ae Te	△ (Deg.)	Remarks
						Seismograph inoperative between 290541 and 300136
94	30	eP ZNE eS ZNE	12 12 30 14 16			

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P.D. Muller
OBSERVER-IN-CHARGE