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MONTHLY SEISMOLOGICAL BULLETIN

JANUARY, 1963.

Latitude: $35^{\circ} 19' 15''$ S. Longitude: $143^{\circ} 59' 55''$ E. Height: 700 M.

Instruments: Three-component Benioff variable reluctance seismographs.

$T_s = 1$ sec.

$T_g = 0.25$ secs. (Short-period VNE)

$T_g = 16$ secs. (Long-period vertical V_1)

$T_g = 70$ secs. (Long period horizontals N_1E_1)

Mount Stromlo quartz clocks provide accurate time marks and 50 c/s for drum drive.
Abbreviations: R = rarefaction; C = compression; Epicentre locations are those given by USCGS.

No.	Date	Phase	Component	Time	Remarks
1	1	eP i eL	V V E_1	12 23 24.5 51.5 30.8	6.8 S 155.9 E. h: 165 km. Solomon Is.
2	1	eP	V	14 50 37.0	C 3.4N. 122.9E. h: 590 km. Celebes Sea.
3	1	iP	VEV_1	16 34 18.0	R 20.0S. 175.4W. h: 130 km. Tonga Is.
4	1	eP i(pP) eS eL	V V E_1 V_1	19 45 12.0 18.5 52 45 20 00.9	40.2S. 81.3E. h: 33 km. Indian Ocean.
5	1	(i) i eSKS e oSS	V V E_1 N_1 N_1	23 53 10.0 57 37.0 24 04 38 11 46 12.2	56.6N. 157.7W. h: 50 km. Alaska Peninsula
6	2	iP	V	05 41 39.5	17.4S. 178.6W. h: 540 km. Fiji Is. region.
7	2	eP eS eL eL e i M	VNE E_1 E_1 N_1 E_1 N E_1	15 02 47.0 08 09 12.0 12.9 13 45 14 25.0 15.5	4.1S. 135.2E. h: 33 km. Near south coast of Western New Guinea.
8	2	iP eL	V E_1	16 06 22.0 25.9	C 52.9S. 118.2W. h: 33 km. South Pacific Ocean
9	2	eP	V	16 17 07.0	
10	2	eP i(pP) eL	V VN E_1	18 06 17.0 22.0 17 32	4.3S. 135.2E. h: 33 km. Near south coast of New Guinea.
11	2	eP	V	18 36 46.5	10.7S. 165.0E. h: 39 km. Santa Cruz Is.

No.	Date	Phase	Component	Time	Remarks
12	3	iP ipP	V V	03 15 51.5 16 03.0	C 29.7N 130.1E h:83km Ryukyu Is.
13	3	iP i eS eL	VN V N ₁ N ₁	09 45 50.0 4 03.0 50.3 .54.0	R 5.3S 151.5E h:74km New Britain
14	3	eP	V	14 02 36.5	6.3S 150.2E h:91km Solomon Is.
15	3	iP	V	19 13 49.0	5.9S 155.0E h:93km Solomon Is.
16	4	iPKP i	V VN	00 43 32.5 39.5	C 1.2N 27.7W h:83km 1,500 km south of Cape Verde Is.
17	4	eP	VN	05 53 14.0	29.7N 142.2E h:83km Bonin Is. region.
18	4	eP i eS eL	VN V N ₁ E ₁	12 22 43.0 23 23.0 27 47 29.4	4.7S 154.0E h:63km Solomon Is. region
19	5	eP i i ipP	V N V VN	00 23 14.0 14.5 20.5 24.0	R 3.2N 127.0E h:83km Malahera region.
20	5	iP	VNE	00 34 22.0	R
21	5	iP i iPeP	VN V V	03 41 34.0 42 13.0 43 19.5	R 3.4N 125.3E h:126km Sangihe Is.
L1	5	iP i iS	VN N VE	06 15 10.5 14.0 24.0	C Local
22	5	iP i iS	V N E ₁	13 10 06.5 09.5 14 30.5	R 17.3S 167.9E h:83km New Hebrides Is.
23	5	iP i(PeP) eS M	V V ₁ V ₁ N ₁ E ₁	13 23 25.0 23 09 23 50 33.6	C 10.0S 124.0E h:83 km Timor
24	5	i(P)	V	14 44 21.5	
25	5	iPKP	V	13 01 23.0	R 7.0S 72.1W h:544km Western Brazil.
26	6	eP	V	00 53 46.5	5.7S 147.3E h:141km Central New Guinea.
27	6	iP i(pP) iPeP iP	VN V V V	03 27 14.0 50.5 23 44.5 29 10.0	C 6.0N 125.3E h:143km Near Coast of Mindanao, P.I.
28	6	iP	V	04 46 29.0	
29	6	iP e(T)	VN V	15 30 50.5 51(17)	C 4.9S 153.3E h:131km Solomon Is. region.

No.	Date	Phase	Component	Time	Remarks
30	6	iP	VNE	19 53 49.5	R 3.9S 123.8E h: 83km near Flores.
L2	7	e iS	V VN	08 42(20.5) 49.5	Local
31	7	eP	V	06 30 46	6.4S 154.7E h:80 km Solomon Is. region.
32	7	iP i ePP iPP iPeS eS	VNV ₁ VNEV ₁ V V V N ₁	11 53 08.0 10.0 57 44.5 53 22.0 12 01 53.0 02 27	C 0.6N 123.7E h:42 km Halmahera region.
33	7	iP	VN	12 15 29.5	
34	7	eP i eS iS	V V N ₁ E ₁ E ₁	19 24 54.0 56.0 29 15 22	17.5S 167.7E h: 19km New Hebrides Is.
35	8	i	V	08 15 03.0	
L3	8	iP iS	VN VE	07 44 44.5 56.5	Local
L4	8	(eP) i i i(S)	V V V VNE	08 46 59.0 59.5 47 01.0 03.5	Local
36	8	eP iPeP	V V	15 57 32.0 52.0	31.2N 130.2E h:177 km near south coast of Kyushu.
37	9	iP	V	02 03 35.0	R 23.9S 177.4W h:71km Kermadec Is.
38	9	iP	V	03 22 30.5	C 13.6N 145.4E h:192km Mariana Is.
39	9	iP	VNE	08 00 54.5	R
L5	9	eP eS	V VN	09 12 40.5 53.0	Local
40	9	eP	V	11 48 43.6	20.0S 163.7E h:33km New Hebrides Is.
41	9	iP	VN	21 22 58.5	R 4.3S 123.5E h:174km Banda Sea.
42	9	iP	VNE	21 45 19.5	R 16.6S 174.8W h:270km Tonga Is region.
43	9	i	V	22 52 03.0	
L6	10	eP i i(S)	V V V	05 17 13.0 19.5 32.0	Local
L7	10	(e) i iS	V VN VN	12 10 43.0 47.0 13 05.5	Local
44	10	eP	V	13 03 22	13.1N 146.5E h:61 km Mariana Is.
45	10	iP iPeP	VE V	20 21 50.5 23 03.0	C 4.2S 104.6E h:211 km Sumatra.
46	11	iP	V	01 20 35.0	37.7N 101.6E h:33 km Tsinghai Province, China.

No.	Date	Phase	Component	Time	Remarks
47	✓ 11 ✗	eP	VV ₁	12 25 16.0	C 45.0S 75.7W h: 33 km Near coast of southern Chile.
48	11	eP ipP	VE V	17 11 15.0 53.5	R 29.4S 173.6W h: 225 km Kermadec Is.
49	11	e i	V V	21 09 13.5 20.5	
50	✓ 12	iPKP	V	03 59 31.0	4.3N 76.7W h: 102 km Northern Colombia.
51	12	eP	V	04 23 07.0	R 15.1N 120.5E h: 33 km Luzon, P.I.
52	12	eP	V	09 20 42.5	1.0N .29.3E h: 112 km Halmahera region.
53	12	e	V	11 45 25.5	
54	12	iP	V	11 53 23.0	
55	12	eP i	V VNE	2 30 22.5 23.0	R 7.1N 125.2E h: 34 km Mindanao, P.I.
56	13	eP	V	04 23 44.0	15.7S 174.3W h: 236 km Tonga Is.
57	13	iP	V	06 50 14.0	
58	13	iP	V	03 00 54.0	C 2.1N 125.4E h: 144 km Northern Celebes region.
59	13	eP	V	12 55 30.5	6.5S 149.3E h: 23 km New Britain.
60	13	iP	VNE	13 43 56.0	C 14.0S 171.2E h: 634 km New Hebrides Is. region.
L3	13	(eP) eS	V V	15 13(33.5) 45.4	Local
61	13	eP i eL eSS eT T max. T max	V V E ₁ E ₁ V V N	13 25 22.0 25.0 23 55.5 29 07 40 42 27 43 13	49.7S 163.7E h: 33 km Auckland Is. region.
62	13	e(T)	V	16 53 23	
63	14	eP i i(sP) i	V V V VN	00 53 03.0 15.0 16.5 23.0	17.2S 163.1E h: 33 km New Hebrides Is.
64	14	i	V	01 43 01.0	
L9	14	eP (eS) i(S)	V N V	06 32 35.0 33 00.0 01.0	Regional
65	14	eP e eL	V N ₁ V ₁	11 24 43.5 32 21 41.0	21.2S 169.3E h: 33 km Loyalty Is.

No.	Date	Phase	Component	Time	Remarks
59	13	eP	V	12 55 30.5	6.5S 149.3E h: 29 km New Britain.
60	13	iP	VME	13 48 56.0	C 14.0S 171.2E h: 334 km New Hebrides Is. region.
L8	13	(eP) eS	V V	15 18 (33.5) 45.4	Local
61	13	eP i eL eSS eT T max T max	V V E ₁ E ₁ V V N	16 25 22.0 25.0 23 55.5 29 07 40 42 27 43 18	49.7S 163.7E h: 33 km Auckland Is. region.
62	13	e(T)	V	16 53 23	
63	14	eP i i(sP) i	V V V VH	00 56 03.0 15.0 16.5 26.0	17.2S 163.1E h: 33 km New Hebrides Is.
64	14	i	V	01 43 01.0	
L9	14	eP (eS) i(S)	V N V	06 32 35.0 33 00.0 01.0	Regional
65	14	eP e eL	V N ₁ V ₁	11 24 46.5 32 21 41.0	21.2S 169.3E h: 33 km Loyalty Is.
66	15	i(P)	V	02 05 12.5	C
67	15	e i	V V	02 41 30.5 33.5	13.4N 145.3E h: 33 km Mariana Is.
68	15	iP isP	V V	09 53 33.5 54 03.5	R 10.6S 164.9E h: 33 km Solomon Is. region.
69	15	eP	V	13 19 36.0	24.9N 122.0E h: 47 km Near coast of Formosa.
70	15	e i i	V V V	17 45 11 25.0 43 28.0	Possibly 17.1S 179.6W h: 276 km Fiji Is.
71	15	i	V	13 05 31.5	
72	15	iP i ePP ePPP iPeP iScP	VE VE VE V V V	19 32 26.0 45.5 33 57.0 34 20.5 37 53.5	C 20.5S 177.9W h: 496 km Fiji Is.
L10	16	e eS i	V E V	02 47 59.5 43 39.0 40.5	Regional
73	16	iP	V	05 00 09.5	R 9.7N 98.9E h: 70 km Nicobar Is.
L11	16	eP eS	V VME	11 53 28.5 43.5	Local

No.	Date	Phase	Component	Time	Remarks
L12	16	iP	V	13 27 19.0	Local
		i	V	20.0	
		eS	VN	33.0	
74	16	eP	V	21 16 20.5	11.1S 111.6E h: 94 km
		i	V	29.5	South of Java.
		eL	E ₁	30.3	
75	16	iP	VN	22 43 41.0	R
76	17	eP	V	06 06 14	14.0N 120.6E h: 207 km
					Luzon, P.I.
L13	17	e	V	09 17 37.0	Local
		iS	VE	46.0	
		eS	N	47.0	
77	17	i	V	13 41 02.5	
78	17	iP	V	20 51 39.5	C 25.6N 125.2E h: 140 km
		iPeP	V	52 06.0	Ryukyu Is.
		ipP	V	12.5	
79	18	eP	V	03 22 29.5	C 33.1N 135.3E h: 425 km
					South of Honshu.
80	18	e	V	06 00 09	32.0S 117.1E h: 35 km
		i(Lg)	N	03 24.5	Western Australia.
L14	18	eP	V	06 05 36.5	Local
		i	VNE	37.0	
		i	N	44.5	
		iS	VNE	46.5	
L15	18	eP	V	06 10 54.5	Local
		iS	VNE	11 04.0	
L16	18	(eP)	V	06 13 03.0	Local
		e	V	03.5	
		e(S)	V	23.0	
81	18	e	V	07 17 04.5	
		i	VN	05.0	
L17	19	eP	VN	02 30 04.0	Local
		eS	VNE	22.0	
		i	V	22.5	
L18	19	e	V	17 00 33.0	Local
		i	V	39.5	
82	19	e	V	21 49 35	
83	20	iP	V	00 24 21.0	R 23.7S 130.0 E: 550 km
					Fiji Is. region.
84	20	iP	V	14 53 29.5	R
85	20	eP	V	19 03 34.5	10.1S 161.5E h: 97 km
					Solomon Is.
L19	20	(eP)	V	23 30 49.5	Local
		eP	V	50.0	
		iS	V	55.5	
86	20	iP	VN	23 40 54.5	
87	21	eP	V	07 13 14.5	60.5S 27.2W h: 33 km
					Sandwich Is. region.

No.	Date	Phase	Component	Time	Remarks
88	21	eP e e	V E ₁ V ₁	10 42 23.5 54 14 57.1	3.0S 136.2E h: 57 km Western New Guinea.
89	21	iP	VN	12 02 43.5	R 2.7S 150.1E h: 50 km New Ireland region.
90	21	iP	V	13 42 30.5	C 18.0S 175.4W h: 64 km Tonga Is.
22] No short period vertical component records.					
91	22	iP	N	04 09 35.5	
L20	22	eP iP eS eS	N NE E N	22 43 09.5 11.0 23.0 25.0	Local
L21	24	e i i(S)	V V VNE	04 45 (43.5) 46 12.5 19.0	Local
92	24	iP e i(scP)	VE N V	09 36 33.5 39.0 40 04.0	C 6.0S 112.6E h: 493 km Java Sea.
93	24	iP	VN	10 20 36.0	R 10.1S 160.3E h: 33 km Solomon Is.
94	24	iP isP	V V	12 16 25.5 40.0	15.2S 173.6W h: 33 km Tonga Is. region.
95	24	eP	V	19 04 32.5	
96	25	iP e ipP	VNE E VN	00 21 05.5 35.5 36.0	R 20.3S 169.6E h: 135 km Loyalty Is. region
97	25	eP i(pP) i i(sP)	V V V V	12 59 07.0 51.0 52.5 13 00 13.0	21.3N 143.3E h: 190 km Mariana Is. region.
98	25	eP	VN	14 38 17.0	04.6S 147.4E h: 33 km Off north coast of New Guinea.
99	25	eP	V	17 03 33.5	17.5S 176.2W h: 33 km Tonga Is region.
100	25	eP	V	20 23 30.0	19.0S 173.3W h: 120 km Tonga Is.
26] No short period vertical component records.					
101	27	e	V	01 17 13	25.6N 123.3E h: 61 km Ryukyu Is.
L 21	27	(e) e(S)	N E	03 03 (22) 04 23	Regional
102	27	e i	N N	13 52 13 53 15.0	5.2S 152.3E h: 72 km New Britain.
103	28	e	V	07 54 13.5	Possibly 167S 172.5W h: 154 km Tonga Is. region.

No.	Date	Phase	Component	Time	Remarks
104	28	eP	VH	10 07 33	52.4S 159.6E h: 33 km
		eT	V	23	Macquarie Is region.
		T Max	V	24 53	
105	28	iP	VE	10 44 29.5	R 19.0S 169.6E h: 220 km
		i	N	39.0	New Hebrides Is.
L23	28	iP	V	12 08 00.0	Regional
		eS	E	39.0	
106	28 X	iP	VNV ₁ N ₁	12 13 50.0	C 2.6S 149.9E h: 33 km
		eFP	N ₁	19 53.5	New Britain.
		eS	N ₁ E ₁	24 06	
		i	E ₁	12.5	
		ePcS	N ₁	25 21.0	
		eL	E ₁	26 03.5	
		eL	N ₁	23.0	
		M	E ₁	29.6	
		M	N ₁	32.0	
107	28 X	eP	V	13 14 31	54.7N 131.6W h: 33 km
		iS	E ₁	26 05	Alaska Peninsula.
108	28	e	V	13 34 45	
		i	V	47.0	
109	28	iP	V	13 56 15.5	R 19.7S 173.1W h: 537 km
					Fiji Is.
110	28	iP	V	16 13 09.0	31.2S 177.7W h: 33 km
		ipP	V	21.5	Kermadec Is.
		iPcP	V	16 24.5	
111	29	iP	V	01 37 17.0	C 21.3S 179.7W h: 120 km
					Fiji Is.
112	29 X	eP	V	09 33 37.0	49.7N 154.9E h: 126 km
					Kurile Is.
113	29	eP	V	17 01 28.5	15.2S 173.4W h: 33 km
		i	V	54.0	Tonga Is.
114	29	eP	VN	21 16 26.0	12.9N 143.2E h: 144 km
					Mariana Is.
115	30	iP	V	06 16 21.0	R 00.2N 123.4E h: 33 km
		i	V	43.0	Northern Celebes.
116	30 X	iP	V	10 22 59.0	R 55.6S 23.3W h: 33 km
		eSIS	N ₁	33 33	Sandwich Is region.
		iScS	E ₁	53	
		isS	E ₁	34 06	
		e	N ₁	35 11	
		e	V ₁	36 34	
		e	N ₁	40 05	
		eLq	E ₁	47.3	
		M	V ₁ N ₁	11 05.2	
117	30	iP	VN	20 16 23.5	R
L24	31	e	N	00 26 55.5	Local
		e	V	53.5	
		i	V	27 02.0	
L25	31	eP	VNE	00 59 03.5	Local
		eS	VH	16.5	
		i	V	17.5	

No.	Date	Phase	Component	Time	Remarks
118	31	iP	VE	05 17 26.0	R 27.9N 126.3E h: 33 km
		i	VE	29.0	Ryukyu Is.
		ePP	N	12 49.0	
		ePP	V	51.5	Mag. 6 1/4 [Camb]
		ePP	V	21 26.5	
		eS	N ₁	26 15	
		eL	V ₁	30.5	
		M	E ₁	42.8	
L2	31	iP	VE	16 13 52.0	C Local
		iC	VEE	14 11.0	
119	31	eP	V	16 27 42.0	21.53 173.1 W h: 373 km
		i	V	45.0	Fiji Is.

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MONTHLY SEISMOLOGICAL BULLETIN

February, 1963.

Latitude: $35^{\circ} 19' 15''$ S. Longitude: $143^{\circ} 59' 55''$ E. Height : 700M.

Instruments: Three-component Benioff variable reluctance seismographs.

$T_s = 1$ sec.

$T_g = 0.25$ secs. (Short periods VNE)

$T_g = 16$ sec. (Long period vertical V_1)

$T_g = 70$ sec. (Long period horizontals N_1E_1)

Mount Stromlo quartz clocks provide accurate time marks and 50c/s for drum drive.

Abbreviations: R ; rarefaction, C ; compression,

Epicentre locations are those given by USCGS. * Indicates epicentres believed accurate to $\frac{1}{2}^{\circ}$ in latitude and longitude and \pm 50 km. in depth.

No.	Date	Phase	Component	Time	Remarks.
1	1	eP	V	08 55 02	30.6 S 178.1 W h: 54 km Kermadec Is.
2	1	eP	VN	09 50 44.5	C 8.5 S 159.1 E h:144 km Solomon Is.
3	1	eP	V	10 23 37.0	C 3.0 S 131.0 E h:33 km.
		i	VN	37.9	
		i	V	44.4	Ceram region.
4	1	i(P)	V	14 22 49.7	
L1	1	eP	V	18 24 13.0	Local
		eS	E	42.5	
5	2	iP	V	07 57 53.7	C 9.2 S 120.2 E h:50 km.
		iPP	V	59 19.0	Sumba Strait
6	2	eP	VE	11 55 11.0	19.7 S 174.6 W h:77km.
		iPcP	V	57 40.3	Tonga Is.
7	2	iP	VN	21 25 45.7	
8	3	iP	VE	01 53 24.1	R 23.9 S 179.7 W h:500km. Fiji Is. region
9	4 ✓	eP	V	01 23 01.0	6.3 S 149.1 E h:36 km.
		e	N_1	34 13	New Britain region
10	4	iP	V	09 23 17.6	C 17.4 S 178.8 W h:552 km Fiji Is. region
L2	4	eP	V	14 46 16.5	Local
		eP	V	18.0	
		i	V	20.1	
		i	V	25.3	
		eS	VNE	26.0	
11	4	iP	VN	15 09 24.8	R 17.3 S 167.9 E h:33km New Hebrides Is.

No.	Date	Phase	Component	Time	Remarks.
12	5	iP ipP iPcP	VN V V	01 55 30.0 56 05.4 57 20.6	0.0, 123.8 E h = 164 km Celebes region
13	5	iP	V	05 13 27.4	19.2 N 147.1 E h = 38 km. Mariana Is. region
14	5	eP iScP	V V	19 35 06.5 41 56.7	31.9 S 179.0 W h = 68 km Kermadec Is.
15	5	e e (SSP) eL M	N ₁ N ₁ V ₁ V ₁ N ₁	21 06.9 10 57 23.8 28	38.4 S 73.2 W h = 41 km. Near coast of central Chile
16	6	iP iPcP	V V	02 02 50.2 05 01.6	R 7.9 S 119.9 E h = 306 km Flores Sea
17	6	iP iPcP iScP	VNE V V	02 37 26.5 39 30.4 42 19.1	C 6.8 S 123.5 E h = 637 km Flores Sea
18	6	iP	VNEV ₁	05 59 55.0	R 18.1 S 177.6 W h = 500 km Fiji Is. region.
19	6	eP i eL eL	N V N ₁ E ₁ V ₁	10 26 50 51.0 36 39.0	3.5 S 146.0 E h = 33 km Bismarck Sea
20	6	iP	VNE	12 51 29.2	R 22.2 S 171.3 E h = 101 km Loyalty Is. region
21	6	iP	VN	17 43 29.4	R 0.0, 124.1 E h = 110 km Molucca Sea
22	6	eP	V	20 59 39.5	56.7 S 28.8 W h = 33 km. Sandwich Is. region
23	7	iP i	VNE V	01 29 38.0 30 08.7	R 17.7 S 178.7 W h = 559 km Fiji Is. region
24	7	eP i(PP) ePPP iPcP	V V V V	02 13 54 15 20.0 46.0 16 07.5	8.2 S 119.4 E h = 51 km. Sumbawa
25	7	eP i	V V	03 34 56.0 35 18.3	R 59.6 S 147.9 E h = 33 km 1000 km south west of Macquarie Is.
26	7	i	V	05 36 48.4	
27	7	eP	V	15 06 19.0	1.0 N 99.1 E h = 33 km Near north west coast of Sumatra
28	7	eP e(PP) eL	V V V ₁	17 14 31.0 15 38.0 23	26.5 S 176.6 W h = 33 km Kermadec Is. region
29	8	eP	V	00 14 07.5	3.6 S 130.4 E h = 60 km Ceran
30	8	eP	V	02 34 57	26.9 S 176.7 W h = 190 km Kermadec Is. region
31	8	iP i	VN V	10 16 22.8 46.5	R
32	8	iP	VNE	18 23 23.5	C 12.9 S 170.2 E h = 628 km New Hebrides Is. region.

No.	Date.	Phase	Component.	Time	Remarks.
33	9	i(P)	V	02 20 05.6	
L3	9	eS i	V V	05 32 25.0 25.8	Gunning district.
34	9	iP	VN	05 56 19.6	C 7.3 S 130.3 E h = 220 km Tanimbar Is. region
35	9	iP	VN	08 41 49.7	C 15.0 S 167.4 E h = 127 km New Hebrides Is.
36	9	iP	VN	16 17 06.0	R 43.7 N 150.6 E h = 33 km Kurile Is. region
37	9	iP i	VN V	16 34 26.0 31.4	R
38	9	eP eL	VV ₁ E ₁ E ₁	16 59 55 17 04.4	35.9 S 177.9 E h = 172 km Off coast of North Is., N.Z.
39	9	iP	VE	17 13 11.1	R 24.0 S 179.1 E h = 550 km South of Fiji Is.
40	9	iP	V	23 07 47.8	21.7 S 176.9 W h = 66 km Tonga Is. region.
41	10	eP	V	07 44 05	R 17.3 S 177.4 W h = 343 km Fiji Is. region
42	10	iP iPcP isP	V V V	21 47 51.1 53.5 48 15.9	R 44.6 N 147.8 E h = 67 km Kurile Is. region
43	11	iP	V	04 41 21.9	C 29.8 S 179.1 E h = 523 km Kernadec Is. region
44	11	e	V	06 23 19	
45	11	iP	V	11 01 40.2	24.6 S 179.8 E h = 491 km Kernadec Is. region
46	11	eP	V	21 16 43.5	
47	12	e	V	00 36 55.0	17.7 N 122.3 E h = 33 km Near west coast of Luzon. P.I.
48	12	iP	VE	07 19 09.9	C 21.7 S 169.8 E h = 30 km Loyalty Is. region
49	12	e	V	13 46 09	
50	12	eP	V	17 49 46.5	6.7 S 147.1 E h = 120 km Near north coast of New Guinea.
51	12	eP iP i iP eS	V VNE V V EE ₁	23 13 24.0 24.5 32.6 15 00.7 18 06	R 17.8 S 178.6 W h = 533 km Fiji Is.
52	13	iP i	V V	00 19 46.5 48.0	R
53	13	iP	V	02 30 16.3	C
54	13	eP	V	03 13 41.5	
55	13	e	V	05 20 (50)	

No.	Date	Phase	Component	Time	Remarks.
56	13	iP	VV ₁	09 00 40.0	C 24.5 N 121.8 E h = 33 km Northern Formosa Mag. 6 3/4 (Canb.)
		i	VNE	43.1	
		iSP	NN ₁	53.0	
		i	N ₁	56.2	
		i	N	03 13.8	
		ePPP	V ₁	04 39.5	
		i	N ₁	45.7	
		iPcS	V ₁	05 21.9	
		e(S)	N ₁	09 03	
		eS	NE	16.0	
		i	NEE ₁	20.1	
		eScS	N	10 30.5	
		e	E	32	
eSSS	E ₁	16 23			
M	N ₁	24.7			
57	13	e	V	09 20 06	
58	13	eP	V	09 41 14.0	24.8 N 121.7 E h = 33 km Northern Formosa.
59	13	iP	V	18 19 40.5	9.9 S 160.8 E h = 29 km. Solomon Is.
		i	N	42.0	
		ipP	V	47.4	
		iPP	V	20 32.1	
		eS	N ₁	24 22.5	
		eiS	E ₁	24.0	
		i	N ₁	25.7	
eSS	N ₁	26.0			
M	V ₁	31.4			
60	14	eP	N	06 54 09.5	10.1 S 160.3 E h = 64 km. Solomon Is.
		i	V	10.9	
		e	N ₁	58 52	
		eL	V ₁	07 02.1	
61	14	iP	VNV ₁	07 11 07.5	C 7.2 S 128.2 E h = 197 km Banda Sea.
		ipP	VV ₁	15.9	
		e	EV ₁	46.0	
		i(P)	V ₁ N ₁	12 20.5	
		i	V ₁ N ₁	27.5	
		i(PPP)	V ₁ N ₁	37.0	
		eS	N ₁ E ₁	16 20.0	
		iPcS	V ₁	17 16.7	
eG	V ₁	18 17			
e	V ₁ N ₁	29			
62	14	ePKP	V	12 28 50.0	00.9 N 30.0 W h = 33 km Mid-Atlantic Ocean
		i	V	54.5	
		i	NE	57.9	
63	14	eP	V	12 48 39.5	17.7 S 168.0 E h = 33 km New Hebrides Is.
64	14	eP	V	14 43 42.5	17.9 S 167.6 E h = 40 km New Hebrides Is. region
		i	V	44 09.5	
65	14	eP	V	15 35 43.0	9.8 S 160.6 E h = 25 km Solomon Is.
66	14	iP	VN	21 51 21.0	C
		i	N	23.2	
		e	N ₁	53 17	
67	14	iP	VN	21 56 14.9	C 22.1 S 170.3 E h = 33 km New Hebrides Is. region

No.	Date	Phase	Component	Time	Remarks.
68	14	i(P)	V	22 00 33.8 R	
69	14	iP	V	22 04 31.7 C	22.0 S 170.1 E h = 47 km
		i	V	08 06.9	Loyalty Is. region
70	14	iP	VNV ₁	22 14 02.0 C	5.0 S 144.6 E h = 80 km
		i	VNN ₁	03.1	Eastern New Guinea
		i	V	08.2	
		i(sP)	E	35.7	
		eS	N ₁	19 07	
		iPcS	V ₁	20 41.1	
		i	V	21 11.0	
		eL	N ₁	22.9	
71	15	iP	V	00 12 13.0 C	22.2 S 170.3 E h = 33 km
		isP	V	24.9	New Hebrides Is. region
72	15	eP	V	00 54 28	33.2 S 179.2 W h = 42 km
		eL	V ₁	01 01.2	Kernadec Is.
73	15	iP	V	05 45 01.9 C	22.0 S 170.5 E h = 33 km
		i(Pp)	V	38.7	New Hebrides Is. region
		i	V	46 50.1	
74	15	eP	V	07 01 46.0	14.9 S 178.7 W h = 33 km
					Fiji Is. Region
75	15	iP	V	07 20 13.3 R	23.5 S 180.0 h = 523 km
					Fiji Is. region
76	15	iP	V	16 39 45.8 C	4.3 N 96.3 E h = 33 km.
		isP	V	40 00.1	Sumatra
77	15	iP	V	18 37 44.8	15.4 S 174.3 W h = 140 km
					Samoa Is. region
78	16	eP	V	05 52 39.5	5.7 N 126.5 E h = 133 km
		i	VNE	41.2	South of Mindenao, P.I.
79	16	iP	VNE	08 37 14.8 R	17.7 S 178.6 W h = 534 km
		iPcP	V	39 39.6	Fiji Is. region
		i(S)	V	42 05.3	
80	16	eP	V	08 40 51.5 R	9.7 N 122.5 E h = 28 km
					Negros, P.I.
81	16	iP	VNEV ₁ E ₁	10 53 14.0 R	7.0 S 117.3 E h = 561 km.
		iPcP	V	55 01.8	Flores Sea
		iScP	V	57 54.5	
		eS	EE ₁	58 42.0	
82	16	iP	VN	12 19 26.3 C	0.6 S 147.5 E h = 33 km
		ipP	V	37.8	Admiralty Is. region
83	16	iP	V	18 00 36.9 R	17.8 S 178.5 W h = 564 km
					Fiji Is. region.
84	16	eP	V	23 43 14.5	5.0 S 144.5 E h = 32 km.
		i(pP)	V	29.8	Northeast New Guinea
85	17	eP	V	02 42 18.5	24.1 N 122.5 E h = 33 km.
		ePcP	V	51.0	Ryukyu Is.
86	17	eP	V	04 17 53.5	
		i	VN	55.2	
		eL	V ₁	22.9	
87	17	eP	V	06 59 34	4.8 S 144.2 E h = 35 km
					Northeast New Guinea.
88	17	eP	VE	15 59 41.0	23.7 S 179.9 E h = 540 km.
					Fiji Is. region

No.	Date	Phase	Component	Time	Remarks.
89	17	eP	V	17 17 06.0	R 17.1 S 176.7 W h = 70 km Fiji Is. region
90	17	eP i	V VE	19 31 51.5 52.1	R 23.9 S 179.8 W h = 520 km Fiji Is. region
91	17	iP	VN	22 04 22.7	R
92	17	iP i	VE VN	22 19 25.7 27.9	C
93	18	iP	VN	03 38 24.0	C
94	18	iP	V	14 24 50.9	C
95	18	iP iPeP	VN V	15 48 04.2 49 56.9	C 1.5 N 125.8 E h = 41 km Celebes region
L4	18	eP i i eS	V V V NE	17 46 00.0 00.7 13.3 14.0	Local
96	19	i(P)	V	01 31 36.1	11.1 N 124.2 E h = 33 km Cebu, P.I.
97	19	eP	V	12 04 17	22.2 S 171.4 E h = 105 km Loyalty Is. region.
98	19	eP i i(pP) i	V V V V	15 34 40.5 35 14.0 49.4 36 41.0	6.2 S 128.1 E h = 370 km Banda Sea
99	19	i(P)	V	20 43 41.8	
100	20	iP	VNE	06 52 11.7	R 17.5 S 178.2 W h = 612 km Fiji Is. region
101	20	iP e •(S) eS e cSS	VE EE ₁ V ₁ E ₁ EE ₁ E ₁	08 49 02.5 40 53 05 11 16.5 49.5	C 22.3 S 170.5 E h = 33 km Loyalty Is. region
102	20	eP	V	12 20 58.0	17.7 S 168.1 E h = 33 km New Hebrides Is.
103	20	iP	VN	20 45 48.9	C
104	21	eP	V	02 44 24.0	33.4 N 139.2 E h = 168 km South of Honshu
L5	21	eP eS i	V V N	03 45 28.0 42.5 43.4	Local
105	21	e(P)	V	06 20 38	
106	21	e	V	06 52 25.0	
107	21	eP	V	13 10 19.5	17.9 N 146.5 E h = 88 km Mariana Is. region
108	21	eP	V	13 22 53.0	20.6 S 175.1 W h = 33 km Tonga Is. region
109	21	iP ipP cL	VE V V ₁	14 35 24.8 30.8 45 39	C 20.5 S 173.9 W h = 29 km Tonga Is. region

No.	Date	Phase	Component	Time	Remarks.
110	21	eP	V	15 22 10	0.9 N 126.8 E h = 101 km
		i	V	53 02.9	Molucca Sea
L6	21	(eP)	V	17 45 29.5	Local
		eS	V	39.0	
111	22	iP	VNEV ₁ E ₁	08 04 52.5	R 17.8 S 178.8 W h = 550 km
		e(PF)	V	06 23	Fiji Is. region
		iS	N	09 36.0	
112	22	iP	VN	10 14 06.8	C 1.0 S 125.8 E h = 285 km
					Molucca Sea
113	22	eP	VE	11 11 22.0	R 30.3 S 178.6 W h = 113 km
		i	V	12 23.1	Kernadec Is.
		i	V	36.1	
		ePcP	V	14 34.0	
L7	22	eP	V	15 54 08.5	Local
		eS	V	14.5	
114	22	iP	V	21 45 25.5	4.0 S 131.0 E h = 33 km
					Near north coast of Ceram
115	23	eP	V	06 44 52	36.0 S 102.5 W h = 33 km
					South Pacific Ocean
116	24	eP	V	06 42 06.5	19.7 S 177.5 W h = 541 km
					Fiji Is. region
117	24	iP	VN	07 22 05.8	R
118	24	e	V	17 41 30.0	31.7 S 176.5 W h = 33 km
					Kernadec Is. *
119	25	eP	V	02 46 21.5	7.6 S 112.3 E h = 33 km
		ipP	V	31.4	Near south coast of Java
120	25	iP	V	04 59 26.1	15.0 N 122.7 E h = 58 km
					Near east coast of Luzon, P.I.
121	25	e	V	05 21 02.5	
122	25	eP	V	09 20 31	10.4 N 121.3 E h = 46 km
		e(sP)	V	48.0	Near west coast of Panay, P.I.
123	25	iP	VNE	17 21 34.9	C 24.4 N 123.4 E h = 33 km
		iPcP	V	22 10.3	Near east coast of Formosa.
		e	V	50.5	
124	25	eP	V	23 38 16.5	
125	25	eP	V	23 55 04.0	15.5 N 121.3 E h = 30 km
					Central Luzon, P.I.
126	26	i	V	05 02 34.3	
127	26	iP	VNV ₁ N ₁	20 19 43.7	R 7.5 S 146.2 E h = 171 km
		i	V ₁ N ₁	49.5	Eastern New Guinea
		ipP	V ₁ N ₁	20 19.5	
		isP	N ₁	38.6	
		eS	E ₁	24 11.5	
		eS	VN ₁	13.0	
		i	E ₁	14.5	
		i	NN ₁	17.1	
		i	N ₁	30.7	
		isS	N ₁	25 23.5	
		iScP	N ₁	26 23.2	
		M	E ₁	32.4	

No.	Date	Phase	Component	Time	Remarks.
128	26	eP	V	20 52 06.0	
		i	V	53 25.1	
	26	i	V	21 37 39.1	
L8	26	eP	VN	22 22 12.5	Regional
		eS	E	37.0	
129	26	i(P)	V	22 38 03.0	
130	27	eP	V	04 36 00.5	C 6.0 S 149.4 E h = 52 km
		i	VN	06.2	New Britain region
		isP	V	22.3	
		iPP	N ₁	54.0	
		i(PPP)	E ₁	37 05.0	
		e	E ₁	14	
		eS	N ₁	40 47.0	
		iS	E ₁	56.2	
		M	V ₁ N ₁	47.8	
		M	E ₁	49.5	
		M	E ₁	51.3	
131	27	eP	V	05 29 57.0	R 6.3 S 149.2 E h = 59 km New Britain region
132	27	eP	V	07 41 45	16.2 S 173.3 W h = 33 km
		i	V	48.3	Tonga Is. region
133	27	iP	VN	20 34 42.8	C 4.6 S 152.9 E h = 100 km
		i	V	55.1	New Britain
		eL	E ₁	42.3	
		eL	V ₁	45.0	
134	27	iP	V	23 16 44.0	C 6.2 S 149.2 E h = 59 km New Britain region
135	28	eP	V	01 42 38.5	16.3 S 66.0 E h = 33 km Indian Ocean.

Seismograms read by Jennifer Clay.

J. C. Jaeger,
Professor of Geophysics.

*Copied
g. P. A.*

Department of Geophysics.
Australian National University.
CANBERRA A.C.T. AUSTRALIA.

MONTHLY SEISMOLOGICAL BULLETIN

March, 1963.

Latitude; $35^{\circ} 19' 15''$ S. Longitude: $143^{\circ} 59' 55''$ E. Height: 700M.

Instruments: Three-component Benioff variable reluctance seismographs.

$T_s = 1$ sec.

$T_g = 0.25$ secs. (Short periods VNE)

$T_g = 16$ sec. (Long period vertical V_1)

$T_g = 70$ sec. (Long period horizontals N_1E_1)

Mount Stromlo quartz clocks provide accurate time marks and 50 c/s for drum drive.

Abbreviations : R ; rarefaction, C ; compression,

Epicentre locations are those given by USCGS. * Indicates epicentres believed accurate to $\frac{1}{2}^{\circ}$ in latitude and longitude and ± 50 km. in depth.

No.	Date	Phase	Component	Time	Remarks.
1	1	iP e e e e	VNE E_1 V_1 E_1 V_1	04 45 32.1 50 59 52 08 17.0 34.5	C 18.2 S 177.9 W h = 568 km. Fiji Is. region.
2	1	ePKP	V	19 33 54	1.4 N 29.6 W h: 33 km. Atlantic Ocean
L1	1	iP iS iS	VNE NE V	22 13 46.2 50.8 51.0	R Local
3	1	iP	V	01 41 14.5	C 6.5 S 131.4 E h: 33 km. Banda Sea
4	2	iP	V	05 45 31.0	1.8 S 143.6 E h: 129 km. North of New Guinea.
5	2	eP	V	06 00 31.5	
6	2	eP	V	16 15 44.5	10.1 N 126.1 E h: 92 km. Mindanao, P.I.
7	2	iP	V	17 36 33.6	10.0 N 126.0 E h: 67 km. Mindanao, P.I.
8	2	eP	V	22 23 22.5	17.1 S 175.0 W h: 240 km. Tonga Is.
9	4	ePKP	V	08 01 09.0	82.9 N 7.7 W h: 33 km. North Polar region.
10	4	eP i ePP ePPP eS eS eL eL	V VN V_1 V_1 N_1 E_1 E_1 V_1	13 49 20.0 21.4 51 49 53 21 53 02 03.5 14 07 13.0	24.2 N 121.7 E h: 33 km. Formosa
11	4	iP i	V VN	14 56 29.8 30.8	C

No.	Date.	Phase	Component	Time	Remarks.
12	4	ePKP	V	15 29 35	35.2 N 25.4 E h: 42 km. Crete.
13	4	iP	X VNV ₁	15 59 33.0	D
14	4	eSSF	E ₁	16 19.9	4.5 S 81.6 W h: 33 km.
		e	E ₁ ✓	17 03.8	Off coast of northern Peru
15	4	eP	V	19 09 17.5	19.3 S 169.5 E h: 43 km.
		i	V	24.0	New Hebrides Is. region
		i(pP)	VE	30.5	
		i	V	10 13.7	
		eL	V	16.6	
16	4	i(P)	V	19 33 21.5	
17	5	eP	V	02 12 56.0	
18	5	iP	V	09 18 17.1	17.5 S 178.6 W h: 512 km. Fiji Is. region.
19	6	i(P)	V	05 53 28.0	C
L2	6	eP	V	09 01 12.5	Regional
		eS	VN	39.0	
20	6	eP	VN	19 55 40.5	9.8 S 155.2 E h: 60 km.
		i	V	47.4	Solomon Is. region
		ipP	V	54.1	
21	7	iP	V	01 57 24.5	C 3.9 S 131.1 E h: 33 km.
		i	N	25.4	Ceram
		ipP	VN	32.9	
		isP	V	38.7	
22	7	eP	V	03 46 25	15.1 S 168.2 E h: 33 km New Hebrides Is.
23	7	iP	V	05 34 12.8	K R 27.0 S 113.5 W h: 38 km.
		iPcP	V	17.0	Approximately 500 km.
		ipP	V	21.8	West of Easter Is.
		i	VV ₁	33.7	
		i	V	45.2	
		eS	N ₁ E ₁	44.3	
		i	E ₁	45 18.2	
		e	E ₁	49 47	
		eL	N ₁	55.7	
		eLR	V ₁ E ₁	59.2	
		M	V ₁	06 02.0	
24	7	eP	V	12 29 28	44.3 S 75.3 W h: 45 km.
		ipP	V	39.3	Near coast of southern Chile
		eLR	V ₁	58.0	
25	8	iP	V	02 49 47.8	19.2 S 169.7 E h: 33 km.
		i	VNE	49.9	Near Hebrides Is.
		ipP	VV ₁	53.1	
		i	V ₁	50 17.4	
		e	E ₁	22.0	
		eS	E ₁	54 12	
		esS	V ₁	21.0	
		eLR	E ₁	56.6	
26	8	i(P)	V	02 54 20.0	C
27	8	iP	V	03 30 09.7	R 19.2 S 169.6 E h: 49 km.
		i	V	11.9	New Hebrides Is.
		ipP	V	20.7	
		iPP	V	51.7	
		iPcP	V	33 46.5	
		eS	E ₁	34 37	

No.	Date	Phase	Component	Time	Remarks.
28	8	e	V	03 35 14.5	
		i	V	37 09.3	
29	8	eP	V	03 38 19.5	C 19.3 S 169.6 E h: 33 km.
		i	VNE	22.9	New Hebrides Is.
		e(S)	N ₁	42 40	
		e(sS)	E ₁	52	
	8	e	V	03 50 54.5	
30	8	e	V	03 54 09.5	
		e	V	55 08.0	
31	8	e	V	04 06 07	
		i	V	09.0	
32	8	eP	V	14 06 04.5	21.3 S 176.5 W h: 137 km Tonga Is. region.
33	8	ePKP	V	15 25 44.5	1.1 N 29.9 W h: 33 km
		i	V	46.4	Mid-Atlantic Ocean
34	8	iP	V	16 09 53.8	21.3 S 170.2 E h: 108 km. Loyalty Is. region
35	8	iP	V	18 32 31.5	
L3	9	e	V	01 14 (31)	Regional
		eS	VNE	15 00.5	
36	9	iP	V	05 35 38.3	R 8.9 N 126.3 E h: 87 km. Near coast of Mindanao, P.I.
37	9	eP	V	18 11 31.0	19.1 S 169.4 E h: 33 km.
		i	V	38.1	New Hebrides Is.
		i	V	12 22.9	
38	9	iP	V	16 30 11.1	3.2 S 147.0 E h: 33 km.
		ePPP	N	31 29.0	Bismarck Sea
		eL	E ₁	38.5	
39	9	iP	VN	17 04 52.8	R 6.7 N 123.9 E h: 33 km. Near south coast of Mindanao, P.I.
40	9	iP	V	19 02 15.0	3.2 S 147.1 E h: 33 km.
		eL	E ₁	10.0	New Britain region
41	9	eP	V	19 19 10.5	19.1 S 169.6 E h: 33 km. New Hebrides Is.
42	9	iP	VE	22 49 28.2	C 21.5 S 179.0 W h: 529 km. Fiji Is. region.
43	10	eP	V	01 24 56.5	15.2 S 167.2 E h: 142 km.
		i	VN	59.1	New Hebrides Is.
		e(PP)	V	25 35.5	
44	10	eP	V	01 31 53.0	R
45	10	eP	V	03 04 12.0	24.7 N 122.1 E h: 33 km.
		i	VN	13.0	Near east coast of Formosa
		i	V	33.8	
		i	V	05 28.9	
		i	V	54.2	
		e(PP)	V	06 34.0	
		e(S)	N ₁	13 09	
46	10	iP	V	09 44 17.8	R 16.0 S 168.4 E h: 283 km
		i	V	30.8	New Hebrides Is.
		e(PP)	V	45 08.0	

No.	Date.	Phase	Component	Time		Remarks.
47	10	i(P)	V	12 02	00.0	C 39.4 N 141.7 E h: 60 km. Near coast of Honchu
48	10	iP	VN	13 59	00.9	C 2.4 N 126.6 E h: 41 km. Celebes Sea
		e(PF)	V	14 00	40.5	
49	11	iP	V	03 33	05.5	17.1 S 178.8 W h: 540 km* Fiji Is.
50	11	iP	V	09 08	28.8	R 13.7 S 177.6W h: 402 km. Fiji Is. region.
		i	V		37.2	
		i	V	09	16.0	
51	11	iP	V	09 50	18.9	C 0.0 S 130.4 E h: 33 km. Halmahera region.
	12	No short period records.				
52	12	eP	V ₁	20 46	08.0	7.1 S 156.0 E h: 97 km. Solomon Is.
53	12	e	V ₁	22 53	49	
54	13	iP	VN	00 50	17.7	
55	13	iP	V	03 53	35.2	R 11.7 S 160.9 E h: 126 km. Solomon Is.
L4	13	eP	V	14 46	34.5	Local
		eS	VN		44.0	
56	14	eP	VN	02 00	46.0	25.6 S 137.6 E h: 33 km. Northern Territory.
		iPP	V		59.5	
		i	V	01	09.8	
		iS	V	03	20.8	
		iS	N		22.1	
		e	E		28.0	
		iLg	V	04	57.8	
		iLg	VV ₁	05	04.8	
57	14	i(P)	V	03 07	57.7	
58	14	iP	V	08 10	23.1	19.0 N 120.4 E h: 51 km. Off coast of northern Luzon, P.I.
		i	V		26.8	
59	14	(eP)	V	23 21	30	5.9 S 144.6 E h: 33 km. Eastern New Guinea
		i	V		31.6	
60	15	iP	VNE	00 10	30.1	R 5.0 S 129.6 E h: 295 km. Banda Sea
		i	V		35.5	
		isP	VN	12	08.7	
		iPcP	V		56.1	
		iScP	V	16	20.6	
61	15	eP	V	00 24	31.0	8.4 N 126.4 E h: 117 km. Mindanao. P.I.
		i	VNEV ₁		32.0	
		i	VNV ₁		43.5	
		i	V		55.8	
		i(pP)	V	25	00.7	
		i(sP)	NE		16.0	
		ePP	VV ₁	26	22	
		e(S)	N ₁	31	(26)	
		i	E ₁		49.0	
		eSS	E ₁		34.8	
62	15	iP	V	00 51	15.0	C
63	15	iP	V	03 40	07.6	24.9 S 180.0 h: 573 km. Fiji Is. region

No.	Date	Phase	Component	Time	Remarks.
64	15	iP	V	04 00 15.1	25.0 S 179.6 E h: 563 km Fiji Is region.
65	15	eP	V	11 03 59	17.5 N 119.3 E h: 33 km. Off west coast of Luzon P.I.
66	16	iP	V	03 47 34.5	26.1 N 92.3 E h: 48 km. Assam, India
L5	16	(e)	V	08 56 07.5	Local
		e(P)	V	08.0	
		eS	V	17.0	
67	16	iP	V	08 57 06.7	46.5 N 154.7 E h: 26 km. Kurile Is. region
		e	N	08.0	
		ipP	VN	14.1	
		isP	NN ₁	19.6	
		iPcP	V ₁ ¹	23.7	
		i	N ₁ ¹	27.9	
		i	V ₁ ¹	28.6	
		e	N ₁ ¹	09 00 08.5	
		e	V ₁ ¹	10.0	
		i	N	31.1	
		eS	N ₁ E ₁	07 20	
		iSKS	E ₁ ¹	27.5	
		eScS	V ₁ N ₁	46	
		e(PS)	N ₁ ¹	08 21	
		ePPS	N ₁ E ₁	30.5	
		eSS	N ₁ ¹	12 48.5	
		eL	E ₁ ¹	19.0	
		eL	V ₁ ¹	19 04	
68	16	e	V	09 15 41	
69	16	e	V	09 23 51.5	
L6	16	(e)	V	09 39 59	Regional
		e	V	40 51	
L7	16	eP	V	09 57 (15)	Local
		i	V	16.0	
		eS	VE	25.0	
70	16	iP	V	13 25 12.7	20.3 S 174.1 W h: 33 km. Tonga Is.
71	16	eP	V	21 46 59.5	20.7 S 174.6 W h: 33 km. Tonga Is.
72	17	eP	V	01 42 47.0	
L8	17	eP	V	05 26 35.5	Local
		eS	VNE	42.5	
L9	17	eP	VN	05 33 13.0	Local
		eS	VNE	20.0	
L10	17	e(S)	V	05 39 31.5	Local
L11	17	e(S)	V	06 24 28.0	Local
73	17	(eP)	V	13 11 47	
		i	V	48.9	
		i	V	12 17.8	
74	17	e	V	20 40 10.5	
75	18	i	V	09 50 14.6	
76	18	eP	V	11 46 58.0	7.6 S 120.2 E h: 33 km.
		ipP	V	47 07.8	Flores Sea

No.	Date.	Phase	Component	Time			Remarks.
77	18	iP i	VE V	13	22	11.0 34.8	R 15.7 S 178.4 W h: 561 km. Fiji Is. region.
78	19	e iPP	V V	05	51	55 28.1	22.8 S 170.5 E h: 67 km Loyalty Is. region
79	19	i(PP)	V	13	19	02.2	22.6 S 170.6 E h: 49 km Loyalty Is. region
80	19	eP i(PP)	V V	14	47	04 33.7	22.6 S 170.8 E h: 33 km Loyalty Is. region
81	19	iP	V	17	27	49.6	7.7 S 106.9 E h: 94 km. Near south coast of Java.
82	19	iP	V	18	18	56.9	2.1 S 127.3 E h: 33 km. Banda Sea
L12	20	iP iS	V VN	01	25	54.1 04.3	Local
83	20	iP i iPP ipP iPPP iPcP i	V VV ₁ V ₁ VEV ₁ V V	04	43	49.8 50.6 25.3 33.4 44.6 19.9 28.1	19.9 S 179.1 W h: 680 km Fiji Is. region
84	20	iP ePP i(PP) i i eS iScS	V V NV ₁ V N N V	04	51	24.2 06.0 07.7 34.2 36.8 52.3 36.4	19.6 S 179.3 W h: 680 km Fiji Is. region
85	20	iP	V	14	45	18.0	6.7 S 129.9 E h: 222 km. Banda Sea
86	20	iP i	V V	14	53	01.7 26.8	11.9 N 93.1 E h: 33 km Andaman Is. region
87	20	(eP) iP iPcP eS eL M	V V V E V ₁ V ₁	16	45	39.5 42.7 20.4 14 35.5	2.4 S 138.4 E h: 40 km Western New Guinea
88	20	iP	VN	21	40	48.3	C
89	21	e	V	00	48	33	
90	21	i(P) ipP iPcP	V V V	04	11	29.7 43.0 55.6	36.5N 140.9E h: 50 km. Near east coast of Honshu.
91	21	eP	V	09	03	55.5	
L13	21	eP iP eS eS i	V VN E N V	16	41	(02) 02.9 15.0 15.5 16.6	Local

No.	Date	Phase	Component	Time	Remarks
92	22	eP	V	23 40 41.0	52.7S 137.4E h: 33 km. 1500 km. south-west of Tasmania.
		i	V	42.9	
		i(S)	V	44 13.2	
		eL _R	V	45.2	
93	23	eP	V	01 15 52.5	25.3S 179.2E h: 560 km. Fiji Is. region.
94	23	iP	V	03 57 55.1	C 4.9S. 145.7E h: 51 km. Near north coast of New Guinea.
95	23	eP	VN	14 34 49.5	6.5S. 147.9E. h: 33 km. Near north-east coast of New Guinea.
96	23	iP	V	21 18 50.4	10.0S. 113.8E. h: 139 km. Near south-east coast of Java.
97	23	eP	V	23 39 53.0	
		i	VN	53.2	
98	24	iP	VN	02 14 16.3	C 9.7S. 120.4E. h: 33 km. Sumba Is. region.
		i	EV ₁ N ₁ E ₁	17.1	
		i	V ₁	15 23.8	
		ePP	N ₁	44	
		iS	N ₁	19 55.8	
		iS	E ₁	56.8	
		esS	N ₁	20 12	
		esS	N ₁	14	
		iPcS	V	27.7	
		eL	N ₁	21.5	
		e	V ₁	22.4	
		M	E ₁	31.9	
		M	N ₁	33.0	
L14	24	iP	VN	04 57 23.2	Local
		iP	VN	23.3	
		i	V	30.2	
		iS	VNE	30.5	
99	24	eP	V	05 37 21.5	
L15	24	iP	V	06 00 02.0	Local
		iS	VE	07.9	
L16	24	iS	VE	06 00 23.0	Local
100	24	eP	V	09 38 21	3.2S 146.8E h: 33 km. Bismarck Sea.
		i	V	40 05.1	
		eS	N	43 26	
		eL	E ₁	46	
		eL	E ₁	49.6	
101	24	iP	V	09 52 06.2	C 9.0N 125.6E h: 51 km. Mindanao, P.I.
		ipP	VN	17.1	
L17	24	eP	V	12 21 25.5	Local
		iP	N	25.9	
		i	N	32.3	
		iS	VE	32.5	
L18	24	eP	V	12 27 10.0	Local
		eS	VN	16.0	
L19	24	eP	V	12 59 52.5	Local
		eS	V	59.0	
L20	24	eP	V	20 46 57.0	Local
		iS	V	47 04.4	

No.	Date	Phase	Component	Time	Remarks
102	24	iP ipP iPP	V V V	21 43 25.5 43.3 52 02.6	C 51.0N 170.1W h: 57 km. Andreanof Is., Aleutian Is.
103	24	e i	V V	22 05 42 47.6	
104	25	e	V	04 05 19	14.0N 121.9E h: 33 km. Southern Luzon, P.I.
105	25	eP	V	03 13 40.5	10.3N 119.7E. h: 36 km. Near west coast of Luzon, P.
106	25	iP iPP	VN V	13 00 02.0 01 22.1	C 10.0S 120.4E. h: 33 km. Near south coast of Sumbawa.
107	25	eP i(pP) i i i eS eL e(SSS) eL M	VN V VV ₁ E ₁ VV ₁ E ₁ E ₁ N ₁ V ₁ V ₁	20 21 40.5 53.0 59.0 22 02.0 23 23.2 25 (47) 26.0 26 39.5 27.0 29.1	50.3S 149.9E h: 39 km. Macquarie Is. region.
108	25	eP i ipP	V VN VE	22 56 25.5 26.1 36.7	R 0.7N 96.5E h: 30 km. Off south west coast of Sumatra.
109	26	iP	VN	02 49 50.4	R
110	26	iP	V	03 56 53.7	R 4.2S 152.6E h: 120 km. New Ireland region.
111	26	iP i i iPcP e(S) i e i eL	VE N N V N ₁ N ₁ N ₁ N ₁ V ₁	09 54 13.7 16.7 19.7 57.20.4 59.0 10 00 02.0 53 57.8 02.2	C 29.7S 177.0W h: 45 km. Kernadec Is.
112	26	iP	V	10 26 37.9	
113	26	iP	V	11 51 53.5	C 30.1S 177.4W h: 50 km. Kernadec Is. region
114	26	iP	V	12 57 33.0	29.9S 177.6W. h: 60 km. Kernadec Is.
115	26	iP i ePP ePPP ePcP eS eSSS eScP	V VE E ₁ V ₁ N ₁ E ₁ N ₁ V ₁	13 30 55.2 56.6 31 50 32 02.5 34 09 35.7 37 34 40.5	R 29.0S 177.9W. H: 42 km. Kernadec Is.
116	26	iP	V	14 39 31.1	R 13.0S 168.0E h: 32 km. New Hebrides Is.
117	26	e	V	15 37 10.0	
118	26	e	V	19 01 47	
119	26	iP	V	19 59 41.0	C 44.4N. 146.7E h: 110 km. Kurile Is.

No.	Date	Phase	Component	Time	Remarks
120	26	iP	V	21 46 02.6	36.0N. 135.7E h: 33 km. Near east coast of Honshu
		i	VV ₁	06.7	
		i	NN ₁	07.0	
		iPPF	V	50 30.5	
		eL	E ₁	22 07.0	
		eL	V ₁	11.0	
121	26	iP	V	23 58 26.3	R 7.0S 129.0E. h: 235 km. Banda Sea.
L21	27	e(P)	V	00 35 33.0	Local
		iS	VN	57.7	
122	27	e	V	06 51 57.0	Local
L22	27	e	V	09 36 56.5	
		iS	V	37 22.6	
123	27	iP	V	21 45 33.4	
124	28	ePKP	VV ₁	00 35 37.5	C 66.3N 19.6W h: 15 km. Iceland
		e	V ₁	39 54	
		ePcPPKP	V ₁	43 50	
		e	N ₁	51.7	
		eSSP	N ₁	59 05	
		eL	E ₁	01 16.9	
		eG	E ₁	18.6	
125	28	iP	VN	01 36 34.0	R 16.0S 131.9E h: 33 km. Northern Territory, Australia.
L23	28	(eP)	V	02 31 (45)	Regional
		i	V	46.0	
		i(S)	VN	32 10.8	
126	28	e	V	06 56 49	
127	28	iP	V	11 18 23.9	C 30.2S 177.8 W h: 33 km. Kernadec Is.
		i	E	24.6	
		ipP	V	34.2	
		e	E ₁	26.0	
128	28	iP	VN	15 20 54.7	R 10.2N 126.2E h: 60 km. Near north coast of Mindanao, P.I.
L24	28	iP	VN	16 30 34.6	R Local
		iS	VNE	39.4	
129	28	iP	V	17 20 42.0	C
130	28	eP	VE	23 35 10.5	C 29.6S 177.5W h: 54 km. Kernadec Is.
		i	V	11.0	
		iPP	N	36 01.0	
		iPcP	V	38 21.2	
		eL	V ₁ E ₁	43.1	
131	29	eP	V	01 46 15	28.2S 177.9W. h: 33 km. Kernadec Is.
132	29	iP	V	06 11 02.3	C 10.3S 160.7E h: 32 km. Solomon Is.
		ipP	V	13.1	
		i	V	55.6	
		i	V	12 23.7	
L 25	29	e	V	18 29 (38.5)	Local
		iP	VN	39.2	
		eS	VN	49.5	

No	Date	Phase	Component	Time	Remarks
133	29	iP e	V V	18 37 53.1 38 41	C
134	29	iP iPcP	VE V	21 22 34.6 25 47.1	C 30.2S. 177.7W. h: 60 km. Kernadec Is.
L26	29	iP eS eS	V E N	21 58 41.6 22 00 (20) 22.0	Regional
135	29	iP ipP i	V V V	23 36 01.1 09.7 23.1	C 18.0S 168.5E h: 35 km. New Hebrides Is.
136	30	iP i i ipP ipP i isP i iS i eSS eScP iScP eScS	VN VNE V E V V V V N ₁ N ₁ N ₁ V ₁ V EE ₁	01 58 30.5 32.7 56.9 59 03.1 03.7 03.6 18.9 02 01 29.3 02 35.9 03 16.6 39.5 05 33.1 34.4 09 20.5	C 19.1S 169.1E h: 160 km. New Hebrides Is.
137	30	eP	V	11 43 29.0	30.1S 176.9W h: 33 km Kernadec Is. region.
138	30	eP	V	12 44 58.5	
139	30	iP iPcP ipP i	V V V V	17 04 00.6 12.8 14.7 03 09.0	R 44.2N 148.0E h: 33 km. Kurile Is.
	31	e i	V V	00 14 41 43.7	
	31	e	V	00 22 06.0	
L27	31	e e	V E	00 28 14.5 31 23.5	Regional
L28	31	iP i iS	VNE N VNE	02 27 47.6 51.1 52.3	Local
L29	31	iP eS iS	VNE V N	02 31 55.5 32 00.0 00.3	R Local
140	31	iP e eS eL e i M	VE N E N ₁ E ₁ N ₁ E ₁ V ₁ E ₁	05 36 43.6 48.0 41.4 42 47 43 24.5 30.0 47.3	C 29.9S 177.7W h: 48 km. Kernadec Is.
141	31	eP i ePP eS e M	V V V N ₁ V ₁ V ₁	07 13 33.5 38.8 14 25.0 18 19 41.5 27.6	6.1S 149.0E h: 60 km. New Britain

No.	Date	Phase	Component	Time	Remarks
142	31	eP	V	08 18 44.0	29.7S 176.9W h: 60 km. Kernadec Is.
143	31	iP iPcP	VE V	09 13 12.7 16 25.1	C 30.1S 177.7W h: 48 km. Kernadec Is.
144	31	eP	V	09 58 31.0	
145	31	eP	V	11 16 25.5	
146	31	iP	V	17 10 41.3	R
147	31	iP ipP e	V V V	17 39 02.2 11.8 46 01.0	R 0.8N 96.6E h: 33 km. Nicobar Is. region.
148	31	iP i i ipP iPcP eS i eL	V N N V V N ₁ V E ₁	19 28 44.9 46.3 48.6 56.0 31 52.5 33 35 34 17.6 36.3	C 30.0S 178.0W h: 50 km. Kernadec Is.

Seismograms read by Jennifer Clay.

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Professor of Geophysics.

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 Australian National University.
 CANBERRA A.C.T. AUSTRALIA

MONTHLY SEISMOLOGICAL BULLETIN

April, 1963

Comedi 8/3

Latitude: $35^{\circ} 19' 15''$ S. Longitude: $143^{\circ} 59' 55''$ E. Height : 700 M.

Instruments : Three-component Benioff variable reluctance seismographs.

$T_s = 1$ sec.

$T_g = 0.25$ secs (Short periods VNE)

$T_g = 16$ sec. (Long period vertical V_1)

$T_g = 70$ sec. (Long period horizontals $N_1 E_1$)

Mount Stromlo quartz clocks provide accurate time marks and 50 c/s for drum drive.

Abbreviations: R ; rarefaction, C ; compression,

Epicentre locations are those given by USCGS. * Indicates epicentres believed accurate to $\frac{1}{2}^{\circ}$ in latitude and longitude and ± 50 km. in depth.

No.	Date	Phase	Component	Time	Remarks.
1	1	iP	VN	02 25 53.7	C 6.0 S 149.0 E h: 64 km New Britain
2	1	eP	V	03 57 17	13.0 S 167.1 E h: 213 km Santa Cruz Is. region
3	1	i(P)	V	07 08 30.4	
4	1	iP	V	08 36 39.0	29.2 S 176.6 W h: 38 km Kermadec Is. region
5	1	eP	V	11 23 00	28.8 S 178.0 W h: 33 km Kermadec Is. region
6	1	e	V	22 24 24	
7	2	eP	V	03 38 58 $\frac{1}{2}$	31.0 S 177.6 W h: 33 km Kermadec Is. region
8	2	iP	V	04 49 31.0	29.7 S 177.1 W h: 51 km
		e	V	42 $\frac{1}{2}$	Kermadec Is.
		i	V	53.5	
		eL	N_1	56.0	
		eL	V_1	57.2	
9	2	eP	V	* 05 26 40	31.1 S 177.5 W h: 33 km Kermadec Is. region
10	2	iP	V	11 31 22.2	R 30.1 S 177.1 W h: 48 km
		e	V	31	Kermadec Is. region
11	2	iP	VN	11 44 38.8	R 5.8 S 105.0 E h: 91 km Sumatra
12	\checkmark 2 \times	iP	V	16 32 00.8	C 53.2 N 171.7 W h: 142 km Andreanof Is. Aleutian Is.,
L1	2	e	V	19 10 20	Regional. Two movements?
		e	V	53 $\frac{1}{2}$	
		e(S)	N	11 22 $\frac{1}{2}$	
13	3	iP	VN	01 40 41.6	R 9.2 S 123.9 E h: 33 km
		i	V	47 57.7	Sawu Sea
14	3	iP	V	11 27 47.8	C 29.6 S 177.2 W h: 48 km
		eL	E_1	36.5	Kermadec Is. region

No.	Date	Phase	Component	Time	Remarks.
15	3	eP	V	11 52 41	3.2 S 112.7 E h: 163 km Java
16	3	iP	V	12 08 11.0	R 19.1 N 121.4 E h: 71 km Babuyan Is., P.I.
17	3	eP oS e eL eL	V N ₁ E ₁ E ₁ V ₁	14 57 46 15 05 45 52½ 12.9 14.9	55.4 S 128.2 W h: 33 km South Pacific Ocean
18	3	iP	VNE	16 19 18.2	R
19	3	iP	VE	18 59 34.5	R 25.2 S 179.5 W h: 409 km Fiji Is. region
20	3	c (P)	V	19 09 25½	14.4 N 146.7 E h: 33 km Mariana Is.
21	4	i eP	V V	14 29 53.7 22 06 56	C 30.3 S 177.8 W h: 36 km Kermadec Is. region
22	4	iP	V	23 33 42.9	R 30.2 S 177.8 W h: 33 km Kermadec Is. region
23	5	iP	V	02 32 03.3	30.2 S 177.7 W h: 33 km Kermadec Is. region
24	5	iP	V	06 59 28.0	R 1.6 S 99.4 E h: 33 km Off west coast of Sumatra
25	6	iP	VNEV ₁	02 43 18.8	C 1.7 N 124.9 E h: 38 km Celebes Region
26	6	iP ipP	VNV ₁ V	02 57 53.5 58 07.7	R 5.1 S 145.5 E h: 57 km New Guinea
27	6	eP	V	05 40 08.5	30.3 S 177.0 W h: 33 km Kermadec Is region
28	6	iP	VNEV ₁ E ₁	07 09 04.1	R 17.5 S 178.9 W h: 526 km Fiji Is. region
29	6	eP	V	15 15 36.0	30.2 S 177.9 W h: 33 km Kermadec Is. region
30	6	e	V	18 07 56.5	32.1 S 178.1 E h: 197 km Kermadec Is. region.
31	6	e eL	V N ₁	21 41 (19) 51.4	6.0 S 149.9 E h: 49 km New Britain
32	6	iP i	VN V	23 42 59.4 43 17.7	R 7.2 S 132.6 E h: 33 km Taninbar Is. region
33	7	iP ipP iPcP	VE V V	04 03 43.2 04 11.4 06 34.8	R 24.5 S 177.0 W h: 114 km Tonga Is. region
34	7	e	V	07 49 35	
35	7	e	V	15 03 (35)	
36	7	eP ipP	N VN	15 18 11 21.1	27.0 N 129.2 E h: 33 km Ryukyu Is. region
37	7	iP	VN	20 10 27.5	R
38	7	iP i i ipP i	V VNEV ₁ N ₁ E ₁ VEE ₁ V N	22 45 07.1 08.1 17.9 22.7 24.3	C 4.9 S 103.2 E h: 72 km Near southwest coast of Sumatra

No.	Date	Phase	Component	Time			Remarks.	
38	✓ 7	isP	N	22	45	34.7		
		i	V ₁		47	32.6		
		iPcS	V		50	12.3		
		eS	N ₁		52	26		
		eS	EV ₁ E ₁			26½		
		isS	E ₁			54.0		
		iScS	E ₁		54	51.5		
		eL	N ₁			58.4		
		M	V ₁ E ₁	23	08.4			
39	8	iP	VN	06	31	36.2	C	5.5 S 130.1 E h: 33 km Banda Sea
40	8	eP	V	08	02	02		13.3 S 168.5 E h: 33 km New Hebrides Is. region
41	8	iP	VN	11	59	26.6	R	4.2 S 152.2 E h: 153 km New Britain region
42	8	eP	V	20	56	36½		10.4 S 161.4 E h: 33 km Solomon Is.
43	8	i(P)	V	22	42	53.1		24.7 S 179.8 E h: 424 km South of Fiji Is.
44	9	e	V	01	10	17		
45	✓ 9 ✗	iP	VNEV ₁ E ₁	02	08	22.2	R	17.7 S 178.7 W h: 538 km Fiji Is. region
		ipP	V		09	54.9		
		iPcP	V		10	46.2		
		iScP	V		13	40.0		
46	9	iP	VN	04	37	44.2	C	17.8 S 168.0 E h: 35 km New Hebrides Is. region
		i	V		38	48.9		
47	9	i(P)	V	04	50	06.1	R	
48	9	eP	V	18	51	00½	R	10.5 N 122.6 E h: 55 km Panay, P.I.
49	9	eP	V	23	03	37½		11.6 S 166.1 E h: 64 km Santa Cruz Is. region
50	10	iP	V	03	42	26.9		
51	✓ 10 ✗	eP	VN	07	57	13	C	9.2 S 125.0 E h: 33 km Timor
		i	V			14.1		
		eS	N ₁	08	02	36½		
		i	E ₁			37.6		
		e	N ₁ E ₁		09.4			
		M	V ₁		13.9			
52	10	eP	V	11	46	23		3.6 N 148.1 E h: 108 km Caroline Is. region.
53	10	iP	V	23	29	19.7	R	10.0 S 160.6 E h: 90 km Solomon Is. region
		e(pP)	V			46		
54	11	eP	V	03	06	29½		1.8 N 128.0 E h: 33 km Halmahera region
55	11	(eP)	V	09	40	42		9.9 S 116.2 E h: 33 km South of Sumbawa
		i	V			51.7		
56	11	eP	V	16	57	55		60.2 S 13.7 W h: 33 km Sandwich Is. region
		isP	V		58	09.4		
57	✓ 12 ✗	1P	V	00	54	43.9	C	31.9 N 78.8 E h: 33 km Northern India
58	✓ 12 ✗	eP	V	08	46	46½		39.0 S 176.7 E h: 106 km North Is., N.Z.
		i(pP)	VV ₁ E ₁		47	06.0		
		eS	N ₁		50.6			
		eL	E ₁	✓ 51	16			

No.	Date	Phase	Component	Time	Remarks.
59	12	eP	V	08 53 09	
60	12	eP	V	20 55 33	16.7 S 173.7 W h: 33 km Tonga Is. region
61	✓ 13 X	iP	V	02 34 56.3	C
62	✓ 13	eP	V	03 27 13	19.2 S 175.8 W h: 222 km Tonga Is.
63	13	(eP)	V	03 44 15½	
		iP	VN	16.0	R
64	✓ 13 X	eP	VN	14 38 05½	3.4 S 135.4 E h: 31 km
		isP	VNV ₁	21.1	Near north coast of New
		iPPP	N	39 34.4	Guinea.
		e	V ₁	45 26½	
		e	V ₁	47½	
		M	E ₁	50.4	
65	14	iP	V	05 38 24.0	C 31.4 S 177.8 W h: 33 km
		i	V	44.3	Kernadec Is.
		iPPP	V	39 30.7	
		i	V	40 20.2	
		ePcP	V	41 37	
66	14	iP	V	09 47 40.0	
	14	e	V	15 08 15½	
67	15	i	V	03 09 24.8	
68	15	iP	V	15 03 16.9	R 4.0 S 129.0 E h: 143 km Ceram region
69	15	eP	V	20 26 50½	0.9 S 128.0 E h: 33 km Halmahera region
70	✓ 15 X	eP	V	23 46 35	18.3 S 173.7 W h: 33 km
		i	VE	35.3	Tonga Is. region
71	✓ 16 X	iP	VNV ₁	01 36 47.9	R 0.8 S 128.0 E h: 33 km
		i	V	51.5	Halmahera region
		i	VNE	52.9	
		ipP	V ₁	53.2	
		i(PP)	N ₁	38 26.3	
		iS	N ₁	42 56.3	
		eSS	E ₁	45 38	
		eSSS	E	46 13	
		eScS	E	50	
72	✓ 16 X	eP	V	01 44 24	1.2 S 128.4 E h: 33 km
		i	VN	24.8	Halmahera region
		ipP	V	38.4	
		isP	V	42.3	
		iScP	V	50 20.2	
73	✓ 16 X	eP	V	02 00 53½	
74	16	iP	VN	02 02 40.8	R 0.7 S 128.0 E h: 32 km Halmahera region
75	16	eP	V	02 13 20	1.3 S 126.9 E h: 33 km
		i	V	22.1	Halmahera region
		i	V	26.1	
76	16	e(P)	V	02 17 46½	
		i	V	53.4	
77	16	e(P)	V	02 24 03	
		i	V	09.1	
78	16	eP	V	02 27 52½	

No.	Date	Phase	Component	Time	Remarks.
79	16	iP	V	02 30 43.5	
80	16	eP	V	02 45 10	
7 81	16	eP	V	02 53 27	0.3 S 127.8 E h: 33 km Halmahera region Nos. 72 - 81 are confused by previous movements
82	16	iP i	VN V	03 39 44.0 R 41 24.8	1.1 S 127.9 E h: 33 km Halmahera region
83	16	eP i e i	V VN V V	03 54 04 03.0 57 27 58 36.1	0.9 S 127.8 E h: 33 km Halmahera region
84	16	e	V	04 05 03	
85	16	iP	V	04 11 39.3 C	0.3 S 127.6 E h: 33 km Halmahera region
86	16	iP e	V V	04 17 44.6 C 19 24.5	0.8 S 128.9 E h: 33 km Halmahera region
87	16	iP	V	05 26 05.1 R	
88	16	iP	V	05 27 48.4	
89	16	iP	V	05 37 57.9 C	13.4 S 177.7 W h: 557 km Fiji Is. region
90	16	iP	V	05 43 45.6 R	
91	16	iP	VN	06 35 13.3 R	1.6 S 127.8 E h: 53 km Halmahera region
92	16	iP	VN	07 43 26.6 C	1.1 S 129.5 E h: 33 km Halmahera region
93	16	eP i	V V	07 53 (04) 09.6	0.0 127.6 E h: 33 km Halmahera region
94	16	eP ePP	V V	09 17 57 19 30	0.9 S 128.5 E h: 33 km Halmahera region
95	16	iP i i i (PPP) iPcP eS e	VNEV ₁ VNEV ₁ VV ₁ N ₁ E ₁ V V NN ₁ E ₁	12 11 12.3 C 13.9 16.2 13 11.7 20.7 17 14 20	1.0 S 127.6 E h: 33 km Halmahera region
96	16	eP	V	15 11 54.5	
97	16	e	V	19 03 (57)	
98	16	iP i	VN VN	20 03 10.5 C 14.4	1.3 S 128.9 E h: 33 km Halmahera region
99	16	eP	VN	21 13 35.5	
100	17	iP	V	00 03 32.8	
101	17	iP i ePP i eS eSSS	V V V V N ₁ E ₁ N ₁	01 17 41.3 C 44.4 19 26.5 21 09.2 23 46 27.1	0.6 S 128.1 E h: 39 km Halmahera region
102	17	iP	V	02 17 37.5	19.6 S 173.6 E h: 33 km Fiji Is.,

No.	Date	Phase	Component	Time	Remarks.
102	✓ 17	i	VE ₁	02 17 30.7	
		iPP	V ₁ E ₁	13 34.0	
		eS	N ₁ E ₁	22 36	
		i	E ₁	40.0	
		e	E ₁	27 43.0	
		M	N ₁	28.9	
		M	V ₁ E ₁	34.0	
103	17	i(P)	V	04 10 38.9	1.0 S 128.3 E h: 33 km
		i	V	43.9	Halmahera region
104	17	iP	VN	08 30 43.9	15.7 S 174.1 W h: 124 km
		i	V	31 30.9	Samoa Is. region
105	17	iP	V	10 27 37.3	C 1.1 S 128.0 E h: 33 km
					Halmahera region
106	17	e	V	12 20 45½	18.4 S 173.8 W h: 33 km
					Tonga Is. region
107	17	e	V	17 09 56	3.5 S 135.4 E h: 39 km
					Western New Guinea
108	17	eP	V	18 37 26	54.9 S 28.2 W h: 26 km
					Sandwich Is.,
109	18	e	V	01 14 02	
110	✓ 18	iP	VE	01 57 46.2	20.3 S 177.7 W h: 530 km
					Fiji Is. region
111	18	e	V	02 13 00	
112	18	(eP)	V	02 44 41½	0.7 S 128.4 E h: 116 km
		i	V	46.0	Halmahera region
113	18	iP	V	02 56 34.0	C
114	18	iP	V	06 49 21.0	
115	18	e	V	11 29 29	
116	18	i(P)	V	16 52 55.1	
L2	18	eP	V	17 54 27	Local
		i	V	27.7	
		eS	VN	46.0	
117	18	iP	VN	22 08 31.6	C 1.3 S 128.8 E h: 33 km
		i	VN	36.1	Halmahera region
		ipP	VN	37.3	
		i	VN	47.6	
		iPcP	V	10 51.0	
118	18	iP	V	22 17 16.6	C 1.7 S 128.1 E h: 63 km
		i	VN	21.3	Halmahera region
119	19	iP	VN	03 54 26.7	C 9.8 S 120.5 E h: 33 km
		ePP	V	55 48½	Sumba
		eL	E ₁	04 05	
120	19	eP	V	07 03 29½	17.7 S 167.3 E h: 33 km
					New Hebrides Is region
121	✓ 19	eP	V	07 43 00	35.3 N 96.9 E h: 33 km
		i	V	00.7	Tsinghai Province, China
		i	V	03.0	
		eSKS	N ₁	53 20	
		eS	V ₁	30	
		isSKS	E ₁	40.3	
		e	E ₁	59 27	
		e	N ₁ E ₁	03 03.5	
		eSS	V ₁	04 09	

No.	Date	Phase	Component	Time	Remarks.
122	19	e	V	09 32 (53)	
123	19	i	V	10 13 52.3	
124	19	e	V	10 32 26 $\frac{1}{2}$	
125	✓ 19 ✗	iP	VN	16 30 26.1	C 53.8 S 26.0 W h: 99 km Sandwich Is. region
126	19	eP	V	16 36 16	1.3 S 123.3 E h: 33 km Halmahera region
		i	VN	17.0	
		i	V	19.7	
		ipP	VN	21.6	
		iPP	V	37 50.1	
	19	e	V	13 41 (26)	
	19	e	V	19 04 19	
127	19	i(P)	VN	20 49 02.5	R 1.4 S 123.9 E h: 33 km Halmahera region
128	19	eP	V	22 50 11.5	R 29.9 S 177.7 W h: 41 km Kernadec Is.,
129	19	e	V	23 41 50	
130	20	iP	V	01 15 21.9	C 1.2 S 123.9 E h: 23 km Halmahera region
		i	N	27.1	
		ePP	V	16 54 $\frac{1}{2}$	
L3	20	eP	V	19 44 20	Local
		eS	V	33	
131	✓ 21 ✗	eP	V	04 43 (56 $\frac{1}{2}$)	24.1 N 122.1 E h: 33 km Near east coast of Formosa
		i	V	57.5	
		i	V	49 00.8	
		ipP	V	06.1	
132	✓ 21 ✗	e	V	09 27 39	26.3 N 123.5 E h: 23 km Ryukyu Is. region
133	✓ 21 ✗	iP	V	10 44 54.8	R 3.2 S 146.9 E h: 33 km Bismarck Sea
		eL	E ₁	54.4	
		eL	V ₁	57.6	
134	21	eP	V	21 25 29	0.9 S 123.1 E h: 33 km Halmahera region
135	21	iP	VN	23 24 13.7	C 1.5 S 123.7 E h: 33 km Halmahera region
		ipP	VN	19.1	
136	22	iP	V	01 54 30.2	7.0 S 129.2 E h: 135 km Banda Sea
137	✓ 22 ✗	iP	VN	07 31 25.2	C 29.9 S 177.6 W h: 33 km Kernadec Is. region
138	22	iP	VN	08 36 31.8	R 5.1 S 154.1 E h: 132 km Solomon Is. region
139	22	e	V	11 54 40	
		i	V	56 54.9	
L4	22	e	V	12 07 02 $\frac{1}{2}$	Regional
		i	V	26.0	
140	22	eP	V	15 13 43	19.8 S 175.4 W h: 53 km Tonga Is. region
141	23	eP	V	07 32 14	R 60.7 S 24.7 W h: 33 km Sandwich is. region
142	✓ 23 ✗	eP	V	10 06 53	25.7 N 99.5 E h: 33 km Yunnan Province, China

No.	Date	Phase	Component	Time			Remarks.
143	23	i(P)	V	11	46	17.6	12.2 N 125.7 E h: 30 km Samar, P.I.
L5	23	eP	V	13	43	14	Local
		eS	V			28	
144	23	iP	VNE	15	38	47.6	R 17.8 S 178.7 W h: 533 km Fiji Is. region
L6	23	eP	VN	17	21	49½	Local
		i	V			49.8	
		i(S)	V	22		04.8	
		eS	NE			05½	
145	23	eP	V	18	58	24½	C 5.1 S 146.1 E h: 134 km Near north east coast of New Guinea
146	23	iP	V	19	55	17.7	R 23.8 S 179.9 E h: 540 km South of Fiji Is.
147	24	eP	V	04	01	57½	17.2 S 174.5 W h: 190 km Tonga Is. region
148	24	iP	V	05	59	16.0	C 1.1 S 127.2 E h: 33 km Halmahera region
		e	V			40	
149	24	iP	V	06	23	41.7	C
150	✓ 24 X	iP	V	13	42	45.1	C 27.0 N 128.3 E h: 33 km Ryukyu Is. region
		ipP	V			57.0	
151	24	iP	V	20	54	10.2	R 30.1 S 177.3 W h: 33 km Kernadec Is. region
152	✓ 24 X	eP	V	21	48	25½	20.8 S 179.1 W h: 603 km Fiji Is. region
		iScP	V			53 45.9	
	25	i	V	04	46	05.6	
153	✓ 25 X	iP	VNE	08	20	35.4	C 4.7 N 122.4 E h: 610 km Celebes Sea
		iPcP	V	21		56.4	
		iScP	V	24		52.1	
		eS	N	26		43	
154	✓ 25 X	eP	V	11	22	27	4.3 N 62.4 E h: 33 km Maldiva Is. region
155	25	eP	V	11	30	10	31.7 N 140.5 E h: 53 km South of Honshu
156	✓ 25 X	iP	VN	16	43	20	R 1.3 S 128.7 E h: 33 km Halmahera region
		ePP	E			44 47	
		i(PcP)	V			45 19.9	
157	✓ 25 X	eP	V	17	56	18	21.6 S 178.0 W h: 380 km Fiji Is. region
		i	V			18.6	
158	26	eP	V	08	25	22	18.0 S 173.8 W h: 18 km Tonga Is. region
159	26	eT	V	12		36.0	
160	✓ 26 X	eP	V	23	55	46½	24.1 N 122.5 E h: 33 km Off east coast of Formosa
161	27	iP	V	08	40	55.0	C 15.9 S 173.9 W h: 100 km Tonga Is.
162	✓ 27 X	iP	V	08	50	27.7	R 0.6 S 128.4 E h: 33 km* Halmahera region
		ePP	N			52 01	
		iPPP	N			22.2	
		iPcP	N			32.2	
		eL	N ₁	09		01.4	

No.	Date	Phase	Component	Time		Remarks.
163	27	iP	V	11	13 04.2	C
164	28	e	V	01	53 23	1.1 S 123.5 E h: 33 km Halmahera region
165	28	i(P)	V	07	03 37.5	
		i	V		04 13.5	
L7	28	e(P)	V	12	10 13	Local
		i(S)	V		19.1	
166	28	eP	V	14	22 06 $\frac{1}{2}$	C 17.6 S 173.5 W h: 505 km Fiji Is.
167	28	eP	V	17	35 53.0	0.6 S 123.5 E h: 33 km Halmahera
168	28	iP	V	18	19 15.3	9.3 S 160.3 E h: 30 km Solomon Is.
169	✓ 29 X	eP	V	14	57 54 $\frac{1}{2}$	63.9 S 159.5 E h: 33 km
		i	V	15	01 00.0	Balleny Is. region
		eS	N ₁		02 53	
		e(SS)	N ₁		04 32	
170	✓ 29 X	eP	V	21	57 16	51.4 N 173.6 E h: 60 km
		eSKS	N ₁	22	07 43	Andreanof Is. Aleutian Is.
		eS	N ₁		08 07	
		e	N ₁		13 33	
		eSS	N ₁		14 15	
171	✓ 30 X	iP	V	01	05 44.3	C 0.7 S 129.0 E h: 33 km
		i	V		50.1	
		eS	N ₁		11 44	
		i	V ₁		51.0	
172	30	eP	V	10	32 02 $\frac{1}{2}$	10.6 N 94.4 E h: 33 km* Andaman Is. region
173	30	e	V	12	00 57 $\frac{1}{2}$	

Seismograms read by Jennifer Clay.

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CANBERRA A.C.T. AUSTRALIA.

MONTHLY SEISMOLOGICAL BULLETIN.

May, 1963.

*Comedi
g.B.*

Latitude: $35^{\circ} 19' 15''$ S. Longitude: $143^{\circ} 59' 55''$ E. Height: 700M.

Instruments: Three-component Benioff variable reluctance seismographs.

$T_s = 1$ sec.

$T_g = 0.25$ secs. (Short periods VNE)

$T_g = 16$ sec. (Long period vertical V_1)

$T_g = 70$ sec. (Long period horizontals N_1E_1)

Mount Stromlo quartz clocks provide accurate time marks and 50c/s for drum drive.

Abbreviations: R ; rarefaction, C ; compression,

Epicentre locations are those given by USCGS. * Indicates epicentres believed accurate to $\frac{1}{2}^{\circ}$ in latitude and longitude and ± 50 km. in depth.

No.	Date	Phase	Component	Time	Remarks.
1	$\checkmark 1 \times$	iP	V	10 08 22.9	R 19.0 S 169.0 E h: 140 km
		i	V	25.3	New Hebrides Is.
		i	N	38.7	
		ipP	N_1	55.4	
		isP	V_1	09 09.0	
		i	V	11.2	
		iS	N_1	12 29.0	
		i	V_1	44.5	
		esS	E_1	13 17	
L1	2	eP	VN	06 50 47 $\frac{1}{2}$	Local
		iS	V	54.5	
		iS	NE	54.8	
2	2	eP	V	09 25 30	24.6 S 178.4 W h: 33 km*
					Fiji Is. region
3	$\checkmark 3$	iP	V	08 43 45.6	R
4	$\checkmark 3 \times$	iP	V	11 02 10.1	15.0 S 173.3 W h: 33 km
					Tonga Is.
5	4	eP	V	18 23 36 $\frac{1}{2}$	54.4 S 144.0 E h: 33 km
					South of Australia
6	4	eP	V	19 14 33 $\frac{1}{2}$	56.1 S 27.1 W h: 33 km
					Sandwich Is.
7	4	e	V	22 19 57	
8	5	eP	V	03 56 14	19.8 S 177.0 W h: 33 km*
					Fiji Is. region.
9	$\checkmark 5$	e	V	08 06 32	
10	$\checkmark 5 \times$	eP	V	17 13 59 $\frac{1}{2}$	17.5 S 173.7 W h: 33 km
					Tonga Is. region
11	$\checkmark 6$	eP	V	06 00 04	
12	$\checkmark 6 \times$	iP	V	08 46 20.3	C 9.1 S 112.5 E h: 84 km
					Near south coast of Java
13	6	iP	V	09 21 04.8	9.9 S 160.6 E h: 76 km
					Solomon Is.
L2	6	e	V	12 14 35	Local
		eS	V	41 $\frac{1}{2}$	
14	7	e	V	05 10 07	18.8 N 145.5 E h: 93 km
					Mariana Is. region

No.	Date	Phase	Component	Time	Remarks.
15	7	e	V	09 30 17	
16	8	i(P) i	V V	10 31 17.4 32 00.9	
17	✓ 8	iP isP i i	VN V V V	10 33 29.5 48.3 34 33.7 36 13.3	R 36.6 N 141.0 E h: 53 km Honshu
18	✓ 8	iP i i	VNE VN V	15 32 18.8 31.7 34 17.6	C 5.3 N 125.7 E h: 70 km Off coast of Mindanao, P.I.
19	8	eP	V	19 22 30½	R 17.2 S 175.0 W h: 199 km Tonga Is. region
20	8	eP	V	19 59 11	3.6 S 103.0 E h: 137 km Near south west coast of Sumatra
21	8	eP	V	21 37 53	32.1 N 141.5 E h: 39 km South of Honshu
22	9	e	V	06 24 (05)	
23	9	iP	V	11 34 21.1	31.7 N 142.3 E h: 33 km South of Honshu
24	✓ 10	iP ipP i	VNE V V	04 33 44.1 55.6 36 00.7	R 20.0 S 168.1 E h: 33 km Loyalty Is.
25	10	e	V	03 10 57	
26	10	eP	V	10 35 22	21.5 S 173.5 W h: 175 km Fiji Is. region
27	10	e	V	15 40 35	
28	✓ 10	ePKP ePP e eL	V V V V ₁	22 41 33 43 20½ 51 30 23 23	2.2 S 77.6 W h: 33 km Ecuador
29	11	eP	V	01 23 52½	
30	11	e	V	03 41 31	
31	✓ 11	eP epP	V V	04 50 49½ 52 09	15.4 S 177.1 W h: 400 km Fiji Is. region
32	11	e	V	07 04 13	
33	11	eP	V	07 55 41½	17.9 S 173.5 W h: 590 km Fiji Is. region
34	✓ 11	eP	V	18 00 13	24.2 N 122.5 E h: 33 km Off east coast of Formosa
35	11	eP	V	19 56 30	34.9 S 103.2 W h: 33 km Easter Is. region
36	11	iP	V	22 50 53.6	
37	12	eP	V	04 51 45	17.3 S 167.6 E h: 53 km New hebrides Is.
38	12	iP	V	09 16 03.9	R
39	✓ 12	iP iPcP eS eL T wave	VNV ₁ N ₁ V N ₁ V ₁ V	09 43 03.8 51 49.2 52.4 54.4 10 07	C 57.5 S 159.4 E h: 44 km Macquarie Is. region

No.	Date	Phase	Component	Time	Remarks.
40	12	eP	V	19 29 01	3.4 S 146.9 E h : 33 km Bismarck Sea
41	13	iP	V	01 52 54.4	R
L3	13	eP iS iS	VN V N	03 01 16 $\frac{1}{2}$ 21.1 21.8	Local
L4	13	iP eS	VN VNE	06 13 51.7 14 07 $\frac{1}{2}$	Local
42	13	iP	V	07 15 52.7	25.7 S 179.6 E h: 453 km Fiji Is. region
43	13	e	V	10 21 41	
44	13	iP opP iPP i	VNE V V V	14 12 47.3 13 22 33.8 14 16.8	R 19.5 S 169.3 E h: 163 km New Hebrides Is.
45	13	iP	V	17 41 23.2	5.5 S 154.6 E h: 336 km Solomon Is. region
L5	13	iP iS iS	VN VE N	17 57 06.3 11.0 11.4	R Local
46	13	eP	V	22 54 05	6.0 S 150.1 E h: 94 km New Britain region
47	14	iP ipP isS	VNE V V	15 15 07.9 16 24.8 20 33.1	R 5.6 S 127.8 E h: 405 km Banda Sea
48	14	iP	V	18 02 03.0	R 30.2 S 177.7 W h: 33 km Kernadec Is.
49	14	iP i	V V	23 21 02.3 29.4	C 4.1 S 152.8 E h: 58 km New Britain
50	15	eP e eS	N N ₁ N ₁	02 59 03 03 03 46 04 09	3.4 S 146.8 E h: 33 km Bismarck Sea
L6	15	e eS	V V	15 10 31 $\frac{1}{2}$ 30 $\frac{1}{2}$	Local
51	15	iP	V	15 42 44.3	R 24.1 N 122.8 E h: 33 km Off east coast of Formosa
L7	15	iP eS iS	VNE VNE VNE	18 22 43.4 49 $\frac{1}{2}$ 49.9	Local
52	15	e	V	18 43 34	
L8	15	eS	V	18 57 03	Local
L9	15	eS	V	19 57 53 $\frac{1}{2}$	Local
L10	15	eS	V	21 39 37 $\frac{1}{2}$	
53	16	eP	V	01 33 11	22.6 S 171.6 E h: 79 km New Hebrides region
54	16	iP	VN	06 20 33.7	C
55	16	iP	V	09 07 17.0	R 30.0 S 177.2 W h : 63 km Kernadec Is.
56	16	iP	V	14 01 31.2	C

No.	Date	Phase	Component	Time	Remarks.
57	16	eP	V	15 59 39	0.8 S 128.5 E h: 50 km Halmahera region
		i	V	42.5	
		ipP	V	53.5	
		isP	V	16 00 01.2	
		ePP	V	01 16.0	
		(i)	E ₁	08 20.3	
		e	V ₁	28	
58	16	iP	V	16 25 26.1	R 1.0 S 128.8 E h: 33 km Halmahera region
		i	N	26.4	
		i	V	31.8	
		e	V	26 02½	
59	16	iP	V	17 27 22.5	
60	16	iP	VE	19 26 05.2	R 17.6 S 178.7 W h: 510 km Fiji Is. region
61	17	i(sP)	V	04 19 06.1	45.3 N 150.8 E h: 33 km Kurile Is. region
62	17	iP	V	06 19 02.4	15.7 N 120.1 E h: 30 km Near west coast of Luzon, P.I.
		eS	E	26 54½	
63	17	iP	V	07 33 24.9	C 31.0 S 179.8 W h: 358 km Kermadec Is. region
64	17	iP	V	10 48 41.3	
L11	17	iP	VN	15 17 08.5	R Local
		iP	VNE	09.1	
		iS	VE	14.8	
65	17	eP	V	17 23 29	
		i	VN	42.4	
		i	V	25 23.6	
66	17	iP	V	21 38 18.6	0.8 S 128.8 E h: 231 km Halmahera region
67	17	eP	V	22 46 21½	24.4 S 177.2 W h: 70 km Tonga Is. region
		i(sP)	V	52.2	
No Minute marks from 23 39 on 17 th May to 04 33 on 21 st May					
68	21	iP	V	17 36 00.3	C 11.1 S 163.3 E h: 33 km C Solomon Is. region
		i	VN	03.1	
		eS	N ₁	40 40	
		eL	V ₁	43.9	
69	22	eP	V	02 33 36	11.3 S 163.2 E h: 60 km Solomon Is. region
		i	V	34 15.6	
		i	V	35 29.7	
70	22	iP	VN	02 40 03.3	R
71	22	iP	VN	12 22 22.7	
72	22	eP	V	14 09 11	48.6 N 154.7 E h: 22 km Kurile Is. region
		i	V	12.8	
		i	VN	13.6	
		isP	V	21.8	
		eS	N ₁	19 23	
		eL	N ₁	37.9	
		eL	N ₁	37.9	
J*2	22	iP	VN	14 56 31.1	R Local
		iS	VE	35.3	
		iS	N	35.7	
73	22	eP	V	15 50 55	4.3 N 127.9 E h: 58 km Molucca Passage
		i	VN	55.3	
		ipP	V	51 11.5	
		i	V	52 39.2	
		i	V	52 39.2	

No.	Date	Phase	Component	Time	Remarks.
73Cont.	22	i	V	50.6	
		eS	V	57 27½	
74	22 ✓	iP	VV ₁	22 00 42.5	C 8.2 S 115.7 E h: 33 km
		i	NE ₁	42.7	Java Sea
		iPP	V	02 20.9	
		eScP	V	06 32	
		eS	E	40½	
		eS	N ₁	54	
		eSS	VN ₁	09 40	
75	23 ✓	iP	VN	00 59 34.7	1.6 N 123.4 E h: 33 km Molucca Passage
76	23 ✓	iP	V	03 40 11.1	15.0 S 176.7 W h: 279 km
		i	V	12.1	Fiji Is. region
		M	V ₁	53.2	Confused by drilling near vault
77	23	iP	V	05 33 02.7	7.9 S 115.3 E h: 33 km Java Sea
78	23	eP	V	07 06 23½	18.4 N 145.2 E h: 473 km Mariana Is. region
79	23 ✓	iPKP	V	03 03 35.4	19.2 N 64.6 W h: 55 km Leeward Is. region
80	23	iP	V	14 25 12.7	
81	23 ✓	iP	V	15 20 25.7	C 6.0 N 126.1 E h: 33 km
		i	V	26.2	Near east coast of Mindanao
		i	VN	28.1	P.I.
		i	E	33.7	
		i	N	36.9	
		ipP	V	44.6	
		ePP	V ₁	22 14	
		i	V	15.5	
L13	24	eP	VN	14 55 29	Local
		eS	VE	46½	
		i	N	47.5	
82	24	iP	V	20 57 50.6	22.3 S 179.6 W h: 566 km
83	24 ✓	iP	V	21 24 14.7	Fiji Is. region
84	25	eP	VN	10 18 41½	24.5 S 179.7 E h: 649 km
		ipP	V	19 03.7	Fiji Is. region
85	25 ✓	iP	V	16 20 49.6	4.5 S 129.2 E h: 95 km*
		eS	E ₁	31 34	Banda Sea
		eL	E ₁	44.4	56.3 S 25.0 W h: 29 km
86	25	eP	V	16 56 03	Sandwich Is. region
87	25 ✓	i	V	20 19 47.3	20.7 N 120.9 E h: 33 km
88	25	iP	V	22 23 43.7	South of Formosa
L14	25	eP	V	22 33 35	37.1 S 179.5 E h: 33 km
		eS	V	41	Near north east coast of North Is., N.Z.
89	26	eP	V	00 06 53½	Local
90	26	eP	V	00 43 50½	19.7 S 174.3 W h: 33 km Tonga Is.
					6.9 S 155.6 E h: 37 km Solomon Is.

No.	Date	Phase	Component	Time	Remarks.
91	26	eP i	V VN	02 57 39 43.4	1.5 S 127.3 E h: 33 km * Halmahera region
92	26	iP	VN	06 49 31.0	R
93	26	eP	VN	23 41 04½	7.2 S 123.3 E h: 293 km Banda Sea
94	✓ 27 ✗	eP	V	04 11 46½	55.3 N 160.1 E h: 54 km Near east coast of Kamchatka
95	27	iP ipP	VN V	16 27 35.1 45.2	C 0.6 S 130.1 E h: 33 km Halmahera region
96	27	iP	V	18 52 25.7	R 1.3 S 139.0 E h: 33 km* Near north coast of West Irian
97	28	iP	V	07 06 49.5	18.6 S 177.3 W h: 602 km Fiji Is.
98	✓ 29 ✗	iP	VN	01 33 09.9	R 13.1 S 173.0 W h: 472 km Fiji Is. region
99	29	e	V	05 53 01	
100	29	iP i	V V	08 33 42.7 50.3	17.7 S 173.3 W h: 512 km Fiji Is.
101	✓ 29 ✗	iP eS eScP	VNE N V	11 05 10.1 09 52 ✓ 10 20½	KR 13.0 S 173.0 W h: 550 km Fiji Is.
102	29	iP	V	13 23 25.7	23.9 S 179.2 W h: 60 km Fiji Is. region
L15	29	iP eS	VN VNE	16 41 05.3 12	Local
L16	29	eP eS	V V	16 55 09 15	Local
103	29	e	V	22 45 12½	
30	No short period records.				
104	✓ 30 ✗	eP eS eL	V N N	07 00 30 04 11 05.0	54.2 S 143.7 E h: 33 km South of Australia
105	✓ 31 ✗	iP i eL eL	V V N V	06 11 00.8 24.3 20.2 23.3	R 15.1 S 173.3 W h: 33 km Tonga Is. region
106	31	iP	V	14 13 50.4	30.6 S 173.1 W h: 60 km Kermadec Is.

Seismograms read by
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*Comed
J.B.*

MONTHLY SEISMOLOGICAL BULLETIN

June 1963.

Latitude: 35° 19' 15"S. Longitude: 143° 59' 55"E. Height: 700M.

Instruments: Three-component Benioff variable reluctance seismographs.

$T_s = 1$ sec.

$T_g = 0.25$ secs. (Short periods VNE)

$T_g = 16$ sec. (Long period vertical V_1)

$T_g = 70$ sec. (long period horizontals N_1E_1)

Mount Stromlo quartz clocks provide accurate time marks and 50 c/s for drum drive.

Abbreviations: R ; rarefaction, C ; compression,

Epicentre locations are those given by USCGS. * Indicates epicentres believed accurate to $\frac{1}{2}^\circ$ in latitude and longitude and ± 50 km. in depth.

No.	Date	Phase	Component	Time	Remarks.
1	1	iP	V	00 06 15.6	15.1 S 173.4 W h:33 km
		ipP	V	26.8	Samoa Is. region
		eLQ	N_1	15.4	
		eLR	E_1	17.5	
2	1	iP	VN	19 43 50.0 R	0.1 N 123.1 E h:145 km
		i	V	45 33.8	Celebes region
3	1	eP	V	21 13 12 $\frac{1}{2}$	22.2 S 169.6 E h: 35 km
					Loyalty Is. region
4	1	iP	V	21 21 18.5	15.2 S 173.5 W h: 33 km
		epP	V	29 $\frac{1}{2}$	Samoa Is. region
		e	N	37 $\frac{1}{2}$	
		eL	N_1	30 32	
5	1	iP	V	22 59 56.7	
6	2	eP	V	10 06 05	6.1 S 154.4 E h: 49 km
		eS	N_1	10 51	Solomon Is. region
		eL	N_1	12.5	
7	2	eP	V	21 12 43.0	32.8 S 179.0 W h: 56 km
		e	E_1	20.6	Kermadec Is. region
8	2	iP	V	21 17 00.0	58.5 S 15.6 W h: 50 km
		eS	N_1	27 27	Sandwich Is. region
		eL	E_1	39.2	
9	3	eP	V	07 47 04 $\frac{1}{2}$	34.2 N 138.7 E h: 43 km
		isP	V	21.6	Honshu
10	3	ePKP	V	11 51 03	5.3 N 72.9 W h: 21 km
		i	V	54 23.1	Colombia
11	3	e	V	14 57 08	
12	3	iP	V	13 54 43.0 R	29.5 S 177.3 W h: 49 km
					Kermadec Is. region
13	4	eP	V	03 21 42 $\frac{1}{2}$ C	6.9 S 124.8 E h: 403 km*
					Banda Sea
14	4	eP	VE	12 00 02	30.5 S 177.3 W h: 33 km
		eL	V_1	08.1	Kermadec Is.
15	4	(eP)	V	13 11 52 $\frac{1}{2}$	30.4 S 177.6 W h: 33 km
		i	V	54.5	Kermadec Is.

No.	Date	Phase	Component				Remarks.
16	4	iP	VN	14	50	43.0	R 4.8 S 129.9 E h: 188 km Banda Sea
17	4	iP i iPcP	VN VN V	19	31	11.0 34.3 12.7	R 18.9 N 146.2 E h: 110km Mariana Is.
18	4	iP i eS e i	VNV ₁ V ₁ N ₁ EE ₁ N ₁	21	12	12.7 18.7 13 16 16.9	C 1.2 S 127.3 E h: 31 km Halmahera region
	4	e	V	23	30	53½	
19	5	eP	V	05	12	57½	30.7 S 177.6 W h: 70 km Kermadec Is. region
20	5	eP	V	08	56	14½	19.7 S 177.8 W h: 528km Fiji Is. region
21	5	iP isP iPP i iPPP eS eL	V V N V N N ₁ N ₁	10	17	41.4 55.2 23.8 25.3 35.8 22 08 25.4	14.9 S 166.8 E h: 37 km New Hebrides Is.
22	5	iP ipP eL	VN V N ₁	11	26	29.7 34.8 35	R 3.6 S 149.6 E h: 33 km Bismark Sea
23	5	i(P)	V	13	11	44.6	
24	5	iP	V	22	48	52.3	R 2.9 S 119.7 E h: 63 km Celebes
25	5	iP eL	V N ₁ E ₁	23	02	15.0 15	R 3.0 S 119.5 E h: 75 km Celebes
26	6	iP ipP iPcP eS eS	VN VN V N ₁ E ₁	05	29	08.7 19.6 51.0 37 27 28½	R 19.9 N 120.2 E h: 33 km Off north coast of Luzon P.I.
27	6	iP	V	06	17	36.7	20.1 N 120.4 E h: 33 km Off north coast of Luzon, P.I.
28	6	iP	V	08	31	57.6	C 6.7 N 94.7 E h: 33 km Nicobar Is. region
29	6	iP i	V V	11	31	04.6 14.8	C 30.5 S 177.7 W h: 110 km Kermadec Is. Region
30	6	eP	V	12	13	51½	37.8 S 77.9E h: 33 km 1,500 km. North coast of Kerguelen Is.
	6	no minute marks between 15 00 and 24 00 G.M.T.					
31	7	iP	V	03	28	23.9	C
	7	e	V	08	12	56	
32	7	i	V	08	57	54.0	R
L1	7	eP i iS	V V VNE	14	05	55 55.7 06 05.5	Local. Dalton area.

No.	Date	Phase	Component	Time	Remarks.
33	7	eP i	V V	16 00 00 $\frac{1}{2}$ 21.9	19.0 N 121.3 E h: 33 km Off north coast of Luzon, P.I.
		i	V	28.9	
34	7	e	V	16 22 29	
35	7	i(P)	V	18 37 32.5	
36	7	eP	V	22 39 20	15.2 S 173.1 W h: 33 km Samoa Is. region
37	7	(eP) i i(P) e(S) e(S) e	V V V N ₁ E ₁ N ₁	22 44 55 56.8 46 36.4 51.1 51 18 54.4	15.3 S 173.2 W h: 33 km Samoa Is. region
38	7	eP	V	22 50 10	
39	8	eP	V	01 09 20 $\frac{1}{2}$	15.1 S 173.0 W h: 33 km Samoa Is. region
40	8	iP i	V V	02 05 31.7 C 58.9	23.2 S 171.3 E h: 47 km Loyalty Is. region
41	8	iP	VN	05 39 58.8 C	5.5 S 147.0 E h: 170 km Near north coast of New Guinea.
L2	8	eP i eS i	VN V VE N	19 01 38 40.1 43 $\frac{1}{2}$ 53.7	Local
42	8	eP	V	19 59 01	16.1 S 176.9 W h: 542 km* Fiji Is. region
43	8	eP	V	23 05 57	14.5 S 174.0 W h: 33 km Samoa Is. region
L3	9	eP is	VN VE	01 13 58 $\frac{1}{2}$ 14 03.0	Local
44	9	eP ipP	V V	04 03 17 27.8	17.5 S 168.0 E h: 33 km New Hebrides Is.
45	9	iP	V	09 10 44.9 C	6.3 N 126.1 E h: 106 km Near coast of Mindanao, P.I.
46	9	ePKP	V	20 57 (55)	10.7 N 41.9 W h: 33 km Mid-Atlantic Ocean
	10	e	V	03 23 (33)	
47	10	iP isP iPP e e(S) esS e e i iPeP	VN V V ₁ N ₁ N ₁ E ₁ V ₁ V ₁ NN ₁ N ₁ V ₁	04 21 (10.2)C 22.8 32.5 22 15 $\frac{1}{2}$ 24 59 25 05 12 13 22.0 27.6	55.4 S 146.4 E h: 33 km 300 km West of Macquarie Is.
48	10	eP ipP eS	VN VN N	05 13 47 $\frac{1}{2}$ R 51.7 22 47.5	55.2 S 146.3 E h: 33 km 300 km west of Macquarie Is.
49	10	iP i	VN V	06 43 37.7 C 47 22.1	55.3 S 146.1 E h: 13 km 300 km west of Macquarie Is.

PTG

No.	Date	Phase	Component	Time	Remarks.
49	✓ 10	iS e e e(SSS)	E ₁ E ₁ E V	25.7 32 40 58½	
50	10	eP	V	07 10 05½	
51	10	e i	V V	08 43 10 21.9	
52	✓ 10 + ✓	eP	V	10 59 38½	50.9 N 160.2 E h: 33 km Off coast of Kamchatka
53	10	iP iPP i	VN V V	12 25 56.2 R 27 05.9 11.0	4.6 S 152.0 E h: 174km New Britain
54	10	eP	V	18 48 07	5.1 S 151.7 E h: 112 km New Britain
55	✓ 11	eP isP iPPP	VN N VN	00 04 55 R 05 18.9 06 09.9	4.5 S 152.8 E h: 69 km New Britain
56	11	iP	V	17 18 34.7	23.1 S 179.8 W h: 550 km Fiji Is.
57	11	iP e(S) e	V E E	17 18 58.8 23 06½ 20	23.2 S 179.7 W h: 550km Fiji Is.
58	11	iP i	VE V	18 51 33.7 C 52.8	
59	12	eP isP	V V	04 15 17 16 02.2	15.8 S 174.2 W h: 150 km Samoa Is. region
L4	12	eP (eS)	VN V	07 12 30½ 14 16½	Regional
60	12	iP	V	08 13 07.8	
61	12	eP	V	15 24 52	55.8 S 27.8 W h: 33 km Sandwich Is. region
62	13	iP	VN	10 41 21.8 R	6.1 S 130.1 E h: 150 km Banda Sea
L5	13	eS eS	V E	15 12 00½ 01½	Local
63	13	iP	VN	15 24 32.3 C	
64	13	iP	V	15 43 48.6	
65	✓ 13 + ✓	eP isP iPcP i iS	V VN V V V	17 32 58½ 33 19.5 35 50.9 37 22.6 56.7	4.6 S 153.2 E h: 54km New Britain
66	14	iP	VN	13 14 15.8 R	
67	14	iP	VN	16 36 40.6 R	17.9 S 178.5 W h: 587km Fiji Is. region
L6	14	iP _N iP ₁ iS ₁ iS _N i i	VN VN N V N EE ₁	19 24 49.0 58.4 25 33.7 35.0 35.7 36.6	Gippsland, Victoria Mag. 4 3/4
68	15	iP	V	01 55 03.2 R	

No.	Date	Phase	Component	Time	Remarks.
69	15	i	V	06 18 03.2	
70	15	eP	V	12 03 01	
71	✓ 15	eP eL	V E ₁	15 43 09 R 16 10.9	36.3 S 93.9 W h: 33 km Off coast of central Chile
72	16	iP	V	13 55 11.4 C	4.5 S 153.0 E h: 72 km New Ireland
73	16	iP	VN	13 59 21.2 C	
74	16	e	V	15 15 27	
L7	16	e i e(S)	V V N	18 44 (57½) 45 30.9 38½	Victoria Mag. 3½
75	17	iP	VN	02 10 54.5 R	17.7 S 178.5 W h: 515 km Fiji Is. region
76	✓ 17	eP e eS eL	VN N ₁ N ₁ E ₁ N ₁ E ₁	13 37 52 R 42 55½ 43 36 45.6	65.3 S 179.5 W h: 33 km Scott Is. region
77	✓ 17	iP iPP	VE V	20 15 31.9 R 16 48.7	20.4 S 174.4 W h: 33 km Tonga Is.
78	✓ 17	iP i ipP isP	VNEV ₁ E ₁ VV ₁ VNV ₁ N	23 11 19.5 C 28.3 36.3 42.2	4.1 S 102.2 E h: 73 km Near south coast of Sumatra
79	18	ePKP	V	13 23 59½	18.3 N 71.0 W h: 33 km Dominican Republic
80	18	iP	VNE	13 29 30.6 R	
81	18	eP	V	23 23 46½	12.6 N 124.2 E h: 16 km Southern Luzon, P.I.
82	19	iP	V	04 34 21.1	
83	✓ 19	iP ipP eS iScS e	VN VN N ₁ E ₁ N ₁	09 17 13.7 R 24.5 23 47 27 04.0 06½	4.7 N 126.5 E h: 33 km Talaud Is. region
84	✓ 19	iP ipP isP i	VN V V V	10 59 34.7 49.5 57.1 11 01 06.0	25.0 N 92.1 E h: 51 km Assam, India
85	19	iP i	V V	12 04 39.5 R 07 34.6	9.3 S 153.3 E h: 33 km Solomon Is.
86	19	iP	V	13 35 05.2 R	
87	✓ 19	iP esP iPcP iScP	VN N V V	13 23 11.0 R 29 35 30 54.9 34 14.5	3.5 S 153.4 E h: 279 km New Ireland region
88	20	eP	V	05 43 05½	
89	20	e(P)	V	16 24 06	
90	✓ 20	eP i eS eL	VEV ₁ E E ₁ N ₁	22 52 26½ 27.1 57 20 59 23	27.9 S 176.6 W h: 41 km Kernadec Is.

No.	Date	Phase	Component	Time	Remarks.
91	21	(eP) i	V V	00 14 23 24.2	
92	21	eP	V	14 37 50	2.7 N 128.6 E h: 219 km Halmahera region
93	21	eP ipP	V V	15 30 42½ 53.6	25.2 N 92.2 E h: 56 km Eastern India
94	21	eP eL	V E ₁	17 43 47½ C 58.3	27.9 S 176.2 W h: 33 km Kernadec Is. region
95	21	iP	V	19 54 22.3 R	
L8	21	eP iS	VN VN	21 26 50 54.2	Local
96	21	eP i ipP i eL	E V V V E ₁	21 47 56½ 56.9 48 08.5 36.3 55.8	29.7 S 177.4 W h: 43 km Kernadec Is. region
97	22	iP	V	04 43 21.6	6.1 S 154.4 E h: 64 km Solomon Is. region
98	22	iP iPcP iPcS	V V V	16 19 32.2 R 21 04.5 24 00.3	6.0 S 113.1 E h: 595 km Java Sea
99	22	eP	V	18 49 48½	
100	22	iP ipP isP	V V V	21 33 56.2 C 34 03.9 07.2	30.1 S 177.2 W h: 33 km Kernadec Is. region
101	22	iP	V	22 06 47.4	
102	23	eiP eSSS eL	V N ₁ E ₁	03 55 26½ 04 02 08 02.9	29.6 S 177.9 W h: 55 km Kernadec Is. region
103	23	iP	V	03 59 07.3 R	6.0 S 146.6 E h: 61 km New Guinea
104	23	eP	V	10 59 26	9.0 S 113.1 E h: 157 km Off south coast of Java
105	23	eP	V	13 35 43	12.3 N 140.7 E h: 42 km Mariana Is. region
24 th - 23 th inclusive Vault out of operation Willmore operated on University site.					
106	27	eP	Z	11 54 47½	3.3 S 111.2 E h: 180 km Near coast of Java
107	27	eP	Z	12 27 16	30.1 S 177.7 W h: 44 km Kernadec Is. region
108	28	eP	Z	13 57 55	1.3 N 97.4 E h: 50 km Near coast of Sumatra
L9	29	eP iP iS eS	V V V NE	05 30 17 17.8 24.3 24½	Gunning district Mag. 2 1/4
109	29	eP	V	08 37 25½	8.7 S 119.8 E h: 75 km Flores Sea
110	29	iP	V	09 25 10.6	

N.	Date	Phase	Component	Time	Remarks.
111	29	(eP)	V	12 52 18	11.6 N 142.7 E h: 30 km
		i(P)	VN	18.7	Mariana Is. region
		ipP	V	22.0	
		iPcP	V	53 50.6	
112	29	iP	V	13 12 54.2 C	11.7 N 142.8 E h: 33 km
		iPcP	V	14 26.4	Mariana Is.
113	29	iP	V	23 07 31.6 R	16.8 S 172.9 W h: 33 km*
					Tonga Is. region
114	30	eP	VE	02 09 40 $\frac{1}{2}$	21.9 S 170.8 E h: 73 km
					Loyalty Is. region
115	30	eP	V	04 27 47 $\frac{1}{2}$	11.7 N 142.6 E h: 33 km
					Mariana Is. region
	30	i	V	04 52 39.7	
116	30	iP	VN	06 54 45.3 C	2.5 S 102.4 E h: 160 km
		i	VE	48.9	Sumatra
		iPcP	V	55 49.5	
		iScP	V	59 30.0	
L10	30	eP	V	08 13 13 $\frac{1}{2}$	Local
		iS	V	22.6	
		c	E	23 $\frac{1}{2}$	
117	30	iP	V	23 16 08.5	

Seismograms read by
Jennifer Wanless.

J. C. Jaeger.
Professor of Geophysics.

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Department of Geophysics,
Australian National University.
CANBERRA A.C.T. AUSTRALIA.

MONTHLY SEISMOLOGICAL BULLETIN

July 1963

Latitude : $35^{\circ} 19' 15''$ S. Longitude : $143^{\circ} 59' 55''$ E. Height : 700 M.

Instruments: Three-component Benioff variable reluctance seismographs.

$T_g = 1$ sec.

$T_g = 0.25$ secs. (Short periods VNE)

$T_g = 16$ sec. (Long period vertical V_1)

$T_g = 70$ sec. (Long period horizontal N_1E_1)

Mount Stromlo quartz clocks provide accurate time marks and 50 c/s for drum drive.

Abbreviations: R ; rarefaction, C ; compression,

Epicentre locations are those given by USCGS. * Indicates epicentres believed accurate to ± 0 in latitude and longitude and ± 50 km. in depth.

No.	Date	Phase	Component	Time	Remarks.
1	1	iP	V	02 51 30.0	C
2	1	eP	V	04 09 01 $\frac{1}{2}$	17.4 S 167.6 E h : 33km
		i	V	05.0	New Hebrides Is.
3	1	eP	V	06 36 30	25.7 S 179.1 E h:583 km*
					Fiji Is. region
4	1	eP	V	17 53 18 $\frac{1}{2}$	20.8 S 169.2 E h:33 km*
					Loyalty Is.
5	1	eP	V	20 28 39 $\frac{1}{4}$	4.7 S 103.7 E h: 91 km
					Off south coast of Sumatra
L1	2	eP	V	02 01 24 $\frac{1}{2}$	Local
		iP	VN	24.7	
		iS	V	29.1	
		iS	NE	29.3	
		iS	N	29.6	
6	2	i	V	03 15 19.0	
7	2	eP	V	09 54 47	7.8 S 109.0 E h:117 km
					Java
	3	Nil			
8	4	iP	V	06 08 50.4	C
9	4	eP	VE	11 04 08 A	C
		ipP	E	41.0	26.3 S 177.7 W h:158 km
		i	E	53.1	Tonga Is. region
		iPP	N_1	05 16.3	
		i	N_1	54.7	
		eS	N_1	08 43	
		i	N_1	10 08.8	
		iScP	V	32.9	
		eScS	N	14 27	
10	4	iP	VNE	21 53 38.9	C
					0.5 N 120.6 E h:59 km
					Celebes
11	5	iP	VN	20 35 20.7	R
					30.3 S 141.9 E h:68 km
					Near north coast of
					New Guinea
12	6	iP	V	05 14 37.0	R

No.	Date	Phase	Component	Time	Remarks.
13	6	iP	VE	05 26 56.6	R 31.3 S 179.0 W h: 33 km* Kermadec Is. region
14	6	i	V	06 06 34.1	
15	6	eP	V	17 58 26 $\frac{1}{2}$	11.6 N 142.7 E h: 26 km Mariana Is. region
16	7	eP	V	01 14 28	18.0 S 168.0 E h: 33 km New Hebrides Is. region
17	7	eP i	VN V	10 26 29 $\frac{1}{2}$ 27 09.1	17.9 N 145.6 E h: 137 km Mariana Is. region
18	7	e(P) e(S)	V V	10 51 14 $\frac{1}{2}$ 53 (41)	
19	7	iP	V	11 00 35.7	6.2 N 124.5 E h: 33 km Mindanao, P.I.
20	7	iP	V	22 09 25.1	C
21	8	iP	V	01 26 13.6	
22	8	eP eS eS i	V N V V	05 39 45 42 13 14 $\frac{1}{2}$ 20.1	
23	9	iP i	V V	03 21 10.3 23.3	C
24	9	iP	VE	06 24 49.9	C 0.3 N 121.5 E h: 142 km Celebes
25	10	eP	V	04 35 25	29.7 S 177.2 W h: 33 km Kermadec Is. region
26	10	e i e eS	V V N ₁ N ₁	05 35 19 47.2 44 04 45 30	46.3 N 152.9 E h: 33 km Kurile Is. region
27	10	iP	V	16 54 36.5	R 30.2 S 177.8 W h: 25 km Kermadec Is. region
28	10	iP ipP isP iPeP i	VN V V V V	20 01 30.1 02 09.2 29.1 35.1 49.0	R 19.2 N 145.2 E h: 171 km Mariana Is. region
	10	e	V	23 30 43	
	11	i	V	21 09 26.2	
29	11	iP	V	22 22 13.6	R 17.7 S 179.1 W h: 533 km* Fiji Is.
30	12	iP	NE	03 01 00.4	17.9 S 173.5 W h: 550 km Fiji Is.
31	12	eP	NE	09 15 01	
32	13	iP	V	14 17 06.9	24.3 N 122.3 E h: 33 km Ryukyu Is.
33	13	e	V	20 23 49	
	13	e(T)	V	22 56 (29)	
34	14	eP i e	V VE N ₁	00 03 20 $\frac{1}{2}$ 21.1 14 04	R 30.5 S 177.2 W h: 33 km Kermadec Is. region

No.	Date	Phase	Component	Time	Remarks.
35	✓ 14 X	iP i	V V	04 05 08.3 ✓ 17.0	30.5 S 177.3 W h: 50 km Kernadec Is. region
36	✓ 14 X	iPKP i i	V V V	06 01 18.2 ✓ 17.7 ✓ 20.5	10.4 N 62.6 W h: 24 km Off coast of northern Venezuela
37	✓ 14 X	eP	V	14 34 18½	30.2 S 177.4 W h: 42 km Kernadec Is.
38	✓ 14 X	iP eT	V VN	17 11 08.4 ✓ 29	39.4 S 174.9 E h: 189 km North Is. N.Z.
39	14	iP	V	19 23 58.8	15.8 S 168.0 W h: 186 km New Hebrides Is.

Operation of seismographs suspended during
extension of vault 15 th July - 2 nd August inclusive.

Seismograms read by
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MONTHLY SEISMOLOGICAL BULLETIN

AUGUST 1968

Latitude: 35° 19' 15"S. Longitude: 143° 59' 55" E. Height: 700M.

Instruments: Three-component Benioff variable reluctance seismographs.

$T_s = 1$ sec.

$T_g = 0.25$ secs. (Short periods VNE)

$T_g = 16$ sec. (Long period vertical V_1)

$T_g = 70$ sec. (Long period horizontals $N_1 E_1$)

Mount Stromlo quartz clocks provide accurate time marks and 50 c/s for drum drive.

Abbreviations: R ; rarefaction, C; compression,

Epicentre locations are those given by USCGS. * Indicates epicentres believed accurate to $\frac{1}{2}^\circ$ in latitude and longitude and ± 50 km. in depth.

No.	Date	Phase	Component	Time	Remarks.
	1 - 2	No recording			
1	✓ 3 ✗	iP	V	03 53 28.3	R 7.6 S 156.8 E h: 402 km
		i	V	54 14.8	Solomon Is.
		i(pP)	V	31.8	
		i(PP)	V	40.3	
2	3	eP	V	06 33 52½	6.7 S 147.5 E h: 83 km Near east coast of New Guinea
3	✓ 3 ✗	ePKP	V	10 41 24	7.7 N 35.8 W h: 33 km
		i	VN	28.8	Mid-Atlantic Ocean
		i	N	38.6	
4	3	iPKP	V	10 54 18.1	R 7.8 N 35.9 W h: 33 km
		i	V	28.0	Mid-Atlantic Ocean
		i	V	33.0	
5	3	i(P)	V	12 04 14.0	C
		i	V	58.2	
6	3	ePKP	V	20 27 03	1.4 N 23.2 W h: 33 km Mid-Atlantic Ocean
7	✓ 3 ✗	iP	V	20 31 54.3	C 30.7 S 173.3 W h: 37 km Kermadec Is.
8	4	eP	V	07 16 21	9.4 S 114.2 E h: 117 km
		e	V	24	South of Java
9	4	eP	V	09 18 35½	22.6 S 173.4 E h: 72 km Loyalty Is. region
10	4	eP	V	10 00 30½	7.7 S 129.5 E h: 195 km Tanimbar Is. region
L1	4	eP	V	10 16 11½	Local
		eS	V	19½	
	5	Record very faint			
L2	6	eP	VN	14 22 51	Local
		e(S)	V	23 13	
11	7	iP	V	04 31 42.7	R 21.8 S 173.5 E h: 106 km
		i	V	52.0	Loyalty Is. region
		i(sP)	V	32 28.7	
12	7	e	V	07 18 18½	

*Conrad
J.P.*

No.	Date	Phase	Component	Time	Remarks.
13	7	iP	V	07 30 21.1	C
14	7	ePKP	V	07 37 25	7.5 N 37.2 W h: 33 km Atlantic Ocean
15	7	eP	V	11 20 51½	20.0 S 173.3 W h: 600 km Fiji Is.
16	7	eP	V	11 22 33	20.1 S 173.4 W h: 600 km
		i	V	46.4	Fiji Is.
		iPcP	V	24 53.0	
17	7	e	V	11 53 39	
18	7	iP	V	14 02 51.2	13.2 S 177.9 W h: 503 km Fiji Is. Region *
13	7	iP	VN	15 24 25.3	R Regional
		eS	V	50	
		iS	VNE	50.6	
19	7	iP	VE	15 44 53.1	R 21.2 S 177.3 W h: 352 km Fiji Is.
20	7	eP	V	17 23 14	53.1 S 27.0 W h: 33 km Sandwich Is.
21	8	iP	V	02 27 56.9	54.2 N 163.1 E h: 33 km
		eSKS	N ₁	30 20	Fox Is. Aleutian Is.
		eL	N ₁ E ₁	59	
22	8	eP	V	11 22 14½	5.3 S 151.0 E h: 43 km
		eS	N ₁	27 00	New Britain
		esS	N ₁	22½	
		eL	E ₁	28.3	
		e	E ₁	29 03½	
23	8	eP	V	11 52 04	27.3 N 129.2 E h: 92 km Ryukyu Is.
24	8	eP	V	14 02 22½	13.3 N 145.3 E h: 423 km Mariana Is. region
25	8	iP	V	22 10 29.9	
26	9	i	V	04 10 34.7	
27	9	iPKP	V	06 25 03.7	44.5 N 11.9 E h: 33 km Northern Italy.
28	9	iP	V	07 29 26.7	
29	9	iP	VN	10 15 17.2	21.6 S 171.1 E h: 153 km
		i	V	20.0	Loyalty Is. region
		ipP	V	50.3	
30	9	iP	VN	14 21 53.5	R 1.2 N 125.6 E h: 33 km Molucca Passage
31	9	eP	V	14 43 57½	15.3 S 175.7 W h: 33 km
		eS	N ₁	49 45	Fiji Is. region
		i	E ₁	50.0	
32	9	iP	VN	15 19 14.0	C 3.0 S 152.3 E h: 143km New Ireland
33	9	eP	V	16 45 37	15.5 S 167.7 E h: 127km New Hebrides Is.
34	10	iP	V	03 16 57.9	
35	10	iP	V	13 27 50.0	C 24.7 N 142.7 E h: 33 km Volcano Is. region
36	10	eP	V	17 53 05½	3.2 S 141.9 E h: 33km* Near north coast of New Guinea.

No.	Date	Phase	Component	Time		Remarks.
37	10	iP ipP	VN V	18 17	00.3 00.0	C 54.4 S 132.0 W h: 33 km South Pacific Ocean
L4	10	iP iS	VN N	22 43	48.1 50.1	Local
38	11	iP i iPP ePPP e(S) e ei ei M e(T) (T) max	V V V V E ₁ N ₁ E ₁ E ₁ E ₁ V ₁ V	01 39 40 44 45 43.6 02 08	47.6 49.4 27.0 39 10 22 24 18 08 47	C 60.5 S 154.9 E h: 33 km Balleny Is. region
39	11	iP	V	05 24	00.3	C 17.4 S 179.0 W h: 509 km Fiji Is.
L5	11	iP eS	VN VN	08 00	28.0 30	C Local
40	11	iP	VN	08 11	40.2	R
41	11	i(P)	V	10 16	54.3	R
42	11	eP	V	21 22	41 $\frac{1}{2}$	7.7 S 100.8 E h: 169 km* Near east coast of Java
43	12	eP	V	09 03	54 $\frac{1}{2}$	11.6 S 136.8 E h: 53 km Santa Cruz Is.
44	12	iP	VNE	10 16	48.1	R 5.7 S 131.1 E h: 92 km Banda Sea
45	12	eP i	VN V	17 40	41.1 40.8	5.9 S 146.5 E h: 110 km Near east coast of New Guinea
	13	i	N	01 00	40.5	
46	13	e	N	04 50	10 $\frac{1}{2}$	
47	13	eP i i i eS	VN VN N N NE	05 00 01 05	15 $\frac{1}{2}$ 15.9 20.0 00.6 15	C 7.2 S 124.5 E h: 542 km Banda Sea
48	13	eP	V	06 59	11	19.1 S 173.9 W h: 23 km Tonga Is.
49	✓ 13 ✗	e(P) iP e eL eL	VE V N N ₁ E ₁	21 59 22	39 $\frac{1}{2}$ 41.1 42.5 03.0 10.6	19.3 S 173.7 W h: 33 km Tonga Is.
50	13	eP	NE	23 23	59	
51	14	eP eL	V E ₁	02 53 03	20 04.0	21.4 S 175.2 W h: 33 km Fiji Is. region
52	✓ 14 ✗	iP eS eL	VN E ₁ E ₁	03 30 43 45.4	41.7 37	R 4.9 S 152.3 E h: 62 km New Britain
53	14	eP	V	07 22	40 $\frac{1}{2}$	
54	14	eP	V	08 33	01	9.3 S 150.3 E h: 33 km Solomon Is.

No.	Date	Phase	Component	Time	Remarks,
55	14	eP	V	03 50 25	
56	14	eP	V	13 23 (22)	
		i	V	26.1	
		eT	VN	43 05	
		Tmax	V	45 07	
57	14	iP	V	15 59 52.1 R	
58	14	iP	V	16 28 53.8 C	24.1 N 122.4 E h: 23 km
		iPP	V	31 20.9	Off coast of Formosa
59	14 X	iP	V	18 50 39.1 C	3.4 S 135.4 E h: 33 km
					West Irian
60	14	iP	V	21 54 32.1	17.5 S 170.3 W h: 437 km
					Fiji Is. region
61	15 X	iP	VN	02 27 02.1 R	27.9 N 139.6 E h: 476 km
					Bonin Is.
62	15 X	eP	V	06 28 00.1	37.9 N 141.6 E h: 59 km
		iPcP	VN	10.1	Near east coast of Honshu
		eiS	E ₁	32 22.1	
		eS	N ₁	24	
		eSP	E ₁	53	
		eSPP	E	33 10.1	
		e	N ₁	31	
		e	N ₁	36 33	
		eLQ	E ₁	42.1	
63	15	iP	VNE	08 09 27.0 R	
		i	V	10 14.1	
64	15	iP	V	10 25 10.5 R	15.3 S 175.3 W h: 237 km
					Tonga Is. region
65	15 X	e	V	17 40 12	18.3 S 69.3 W h: 543 km
		iPKP	V	42 54.3	Peru-Bolivia Border
		i	V	43 03.7	
		i	N	11.0	
		i	V	12.3	
		ePKS	N ₁	46 37	
		eiSKS	N ₁	49 13	
		i	NE	15.5	
		i	N	25.0	
		e	N ₁	50 39	
		eSP	N ₁	53 21	
		i	VN	27.1	
		e	N ₁	54 40.1	
		i	N ₁	57 10.4	
		i	V	22.0	
		eSS	N ₁	18 00.2	
		e	N ₁	00 41	
		e	N ₁	04 21.1	
66	15	eP	V	22 35 22.0	21.0 S 170.2 W h: 597 km
					Fiji Is.
67	16	eP	V	02 45 13	3.1 S 129.3 E h: 94 km
		i	VN	27.4	Ceram Sea
68	16	iP	VN	03 06 43.3 R	6.3 S 129.0 E h: 263 km
		i	V	53.4	Banda Sea
		ipP	V	07 43.1	
L6	16	eP	VN	11 50 14	Local
		eS	N	22.1	

No.	Date	Phase	Component	Time		Remarks.
69	16	eP	VH	20 57	49 R	2.1 N 126.1 E h: 36 km Molucca Passage
70	✓ 16 X	eP eS	V N ₁	23 24	35½ 28.8	48.9 S 122.8 E h: 33 km South of Australia
71	17	iP	V	05 40	38.3	20.0 S 174.0 W h: 33 km Tonga Is.
72	✓ 17 X	(eP) iP isP h eS e esS e eSSS	V V V V N ₁ E ₁ E ₁ E ₁ E ₁	11 23	37 38.1 53.3 26 35.1 32 20 30 58 33 41 40.0	30.6 N 130.9 E h: 33 km Ryukyu Is. region
73	✓ 18 X	eP	V	07 20	56	35.9 N 139.2 E h: 153 km Central Honshu
	18	i	V	17 15	19.0	
74	18	iP	V	18 44	39.3 C	
75	✓ 18 X	iP iPcP	V V	18 53	16.0 C 21.4	50.3 N 176.9 W h: 33 km Andreanof Is. Aleutian Is.
76	18	iP	VHE	19 53	37.5 C	13.0 S 173.3 W h: 544 km Fiji Is.
77	18	eP	V	20 25	03½	22.5 S 175.2 W h: 33 km Tonga Is.
78	✓ 18 X	iP ePcP e ePcS eL H	V V E ₁ V ₁ E ₁ E ₁	20 33	20.0 R 44½ 33 42 40 27½ 41.0 44.6	32.1 S 173.1 W h: 33 km Kermadec Is. region
79	19	eP isP iPcP eL	V V V E ₁	04 29	40 30 00.1 33 04.7 37.3	32.0 S 177.9 W h: 33 km Kermadec Is. region
80	19	iP	VH	10 08	50.9	59.3 S 25.9 W h: 33 km Sandwich Is. region
81	19	eP	V	14 53	30	
82	19	iP	VH	16 59	10.4 R	17.0 S 168.3 E h: 231 km New Hebrides Is.
83	19	eP	V	19 16	27	6.1 S 130.7 E h: 33 km Banda Sea
L7	19	eP iS	V V	20 59	33½ 41.7	Local
84	20	eP	V	06 46	02½	5.5 S 145.3 E h: 90 km Near coast of north east New Guinea.
85	20	eP	V	09 26	33	27.3 S 173.5 W h: 37 km Kermadec Is.
86	20	iP	V	15 55	04.9 C	
87	✓ 20 X	(eP) e	V V	15 59	58 16 00 06½	41.2 N 142.7 E h: 50 km Off east coast of Honshu

No.	Date	Phase	Component	Time			Remarks.
88	20	iP i	V N	19 49	40.7 51.7	C	30.2 S 177.8 W h:48 km Kermadec Is.
89	21	eP	V	02 47	24		5.5 S 147.7 E h:134 km New Britain region
90	21	ePIP e	V V	03 58 59	48 02½		14.3 N 72.5 W h:38 km Caribbean Sea
L8	21	e iS	V V	17 34	(27) 34.8		Local
91	21	iP	V	23 05	53.1		21.3 S 176.0 W h:140km Tonga Is.
92	22	eP ipP	V V	05 09	07 13.8		1.2 S 123.5 E h:33 km Melanhera region
93	22	ePcP	V	17 14	20		7.2 S 120.4 E h:393 km Flores Sea
94	22	iP iS esS eL i e M	VV ₁ N ₁ NEV ₁ N ₁ N ₁ V ₁ V ₁	19 50 20 02 03 04 04 07.0 10.8	07.0 47.0 02½ 04.4 42.0	R	9.4 S 158.0 E h: 33km Solomon Is.
95	23	eP eT	VN V	04 18	00 33		
96	23	eP	V	15 31	54	C	4.9 N 128.1 E h:268 km* Talaud Is. region
97	23	e e	V V	21 34 46	50 57		4.4 S 134.9 E h:95 km* Irian
98	23	eP	V	23 32	40½		28.6 N 142.5 E h:45 km Bonin Is.
99	24	iP	V	02 24	34.4	C	54.3 S 5.2 E h:23 km Bouvet Is. region
100	24	iP	VE	03 28	50.5	R	30.7 S 170.2 W h:42 km Kermadec Is.
101	24	i(P)	V	07 30	39.1		
L9	24	eP es	V V	10 14	04 25½		Local
102	24	eP	V	12 55	48½		37.3 S 170.2 W h: 36 km Off east coast North Is., N.E.
103	25	iP epP or PP ePPP eS eScP ePcS esS eSS i i iScS i	VNEV ₁ N ₁ V ₁ V ₁ V ₁ N ₁ V ₁ N ₁ N ₁ V ₁ N ₁ V ₁ E ₁ E N ₁ E	12 24 25 25 23 29 30 31 31 32 33 33	09.2 44 20 52½ 25 20 50 57 13.8 51.0 29.9 30.5	R	17.5 S 173.8 W h:565 km Fiji Is. region
104	25	iP	VE	13 31	52.7	R	17.9 S 173.3 W h:610km Fiji Is. region

No.	Date	Phase	Component	Time	Remarks.
105	25	iP	V	13 40 44.1	C 17.4 S 170.7 W h:540 km Fiji Is. region
106	26	iP	V	02 33 13.1	23.3 S 170.3 E h:546 km Fiji Is. region
107	26	eP	V	04 55 30 $\frac{1}{2}$	17.7 S 170.3 W h:575 km Fiji Is.
108	26	iP i	V V	05 51 25.9 43.9	C 6.3 S 105.6 E h:33 km Java
109	26	eP i	V VII	11 57 24 $\frac{1}{2}$ 24.3	
110	26	iP iScP	V V	23 39 09.3 45 11.3	R 7.7 S 127.3 E h:151 km Banda Sea
111	27	iP ipP	V V	01 26 34.3 44.7	
112	27	eL	V ₁ N ₁	04 05.1	
113	27	iP	VII	07 12 49.4	C 5.5 S 149.3 E h:132 km New Britain region
114	27	iP	V	17 29 12.4	R
115	27	epP	V	13 14 15	16.0 S 161.3 E h: 92 km Solomon Is.
116	27	eP	V	19 21 16 $\frac{1}{2}$	
117	27	eP	V	20 49 53	10.3 N 146.4 E h:78 km Mariana Is.
118	28	i(P)	V	06 20 27.1	
119	28	eL	N ₁ E ₁	13 00.2	61.9 S 164.5 E h:33 km Balleny Is. region
120	28	i(P)	V	16 01 20.5	23.3 N 141.0 E h:96 km Bonin Is. region
121	28	eP	V	19 01 40	
122	29	iP i(PcP) i	VII V V	01 30 14.5 31 50.3 32 16.6	2.0 N 123.4 E h: 43 km Northern Celebes
123	✓ 29 X	iP ePP	V V	09 07 39.3 11 56	C 39.6 N 74.2 E h: 31km Sinkiang Province, China
L10	29	iP iP e(S) iS iS	V N VE N N	12 02 20.3 20.6 33 $\frac{1}{2}$ 34.0 34.6	Local
124	✓ 29 X	ePKP e ePS ePS eSS eL _R eL _R	V V V ₁ N ₁ N ₁ N ₁ V ₁	15 49 20 50 47 $\frac{1}{2}$ 13 00.0 00 10 06.7 24.3 24 57	7.1 S 81.6 W h: 23 km Off coast of Peru
125	30	i(P)	V	00 24 54.4	8.7S 100.3 E h:33 km Off south coast of Java
126	30	iP i i i	VII V VII V	10 33 43.5 35 01.9 02.2 47.1	C

No.	Date	Phase	Component	Time		Remarks
127	31	iP	VII	21	31	44.2 C 21.5 S 179.2 W h: 543 km
		i	V		32	29.2 Fiji Is.
		i	V			33.3
128	31	iP	V	22	10	40.5

Seismograms read by
Jennifer Wanless.

J.C. Jaeger.
Professor of Geophysics.

Copied Nov. 1966

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OCT - DEC
1963

MONTHLY SEISMOLOGICAL BULLETIN
OCTOBER, 1963.

Latitude : $35^{\circ} 19' 15''$ S.

Longitude: $143^{\circ} 59' 55''$ E.

Height : 700 M.

Instruments: Three-component Benioff variable reluctance seismographs.

$T_s = 1$ sec

$T_g = 0.25$ secs. (Short periods VNE)

$T_g = 16$ secs. (Long period vertical V_1)

$T_g = 70$ secs. (Long period horizontals N_1E_1)

Mount. Stromlo quartz clocks provide accurate time marks and 50 c/s for drum drive.
Abbreviations: R - rarefaction ; C - compression; Epicentre locations are those given by USCGS. * Indicates epicentres believed accurate to $\frac{1}{2}$ in latitude and longitude and ± 50 km. in depth.

No.	Date	Phase	Component	Time	Remarks
1	1	iP	VN	X 02 25 59.2	C
2	1	e	V	X 03 15 03 $\frac{1}{2}$	14.5 S 167.5 E h: 170 km New Hebrides Is.
3	1	eP	VN	X 05 09 22 $\frac{1}{2}$	18.5 N 145.2 E h: 225 km Mariana Is. region
4	2	eP	VN	X 03 37 29	C 5.4 S 152.0 E h: 65 km New Britain
5	2	iP	VE	X 05 54 00.2	R 20.8 S 174.1 W h: 33 km
		eS	E_1	59 36	Tonga Is.
		eL	N_1	X 06 02.3	
		eL	V_1	05.0	
6	2	iP	V	X 09 24 27.9	23.5 S 179.7 E h: 626 km* Fiji Is. region
7	3	iP	V	X 14 01 08.7	15.3 S 173.4 W h: 36 km Tonga Is.
8	3	eP	V	X 16 00 58 $\frac{1}{2}$	58.5 S 25.1 W h; 54 km Sandwich Is.
9	8	eP	V	X 18 08 34 $\frac{1}{2}$	58.6 S 25.5 W h: 33 km
		i	V	51.5	Sandwich Is.
10	3	eP	V	X 23 35 41	R 32.2 N 131.6 E h: 33 km
		i	V	47.4	Kyushu
		iPcP	V	36 04.2	
		eS	N_1	44 43 $\frac{1}{2}$	
		iScS	E_1	45 44.0	
		eSS	N_1	49 24	
		eSSS	E_1	52 17	
11	3	e	V	X 23 45 50 $\frac{1}{2}$	
12	4	eP	V	X 02 54 27	20.7 S 174.0 W h: 33 km
		i	V	23.1	Tonga Is.
		eL	N_1E_1	X 03 05.4	
13	4	eP	V	X 03 45 48	
14	4	iP	V	X 03 57 09.8	58.4 S 25.0 W h: 33 km Sandwich Is.
15	4	eP	V	X 10 18 49 $\frac{1}{2}$	

No.	Date	Phase	Component	Time	Remarks.
16	X 5	eP	V	00 22 14½	
17	✓ 5	iP	V	02 02 52.2	C 16.0 S 173.2 W h: 79 km Tonga Is.
18	✓ 5	eP	V	05 22 55½	15.9 S 173.2 W h: 33 km Tonga Is.
19	X 5	iP	V	06 48 48.3	2.7 N 127.4 E h: 175 km Molucca Sea
	X 6	i	V	05 23 12.1	
20	X 6	e(P)	V	21 36 40	
21	✓ 7	iP	VEV ₁ E ₁	13 19 44.1	R 23.6 S 179.9 E h: 550 km
		i	N	44.9	Fiji Is. region
		ipP	VEV ₁ E ₁	21 14.7	
		iPPP	V	27.2	
		i	VV ₁	34.3	
		i	E ₁	45.5	
		iS	NN ₁ E ₁	23 59.0	
		iS	VE ₁	59.9	
		iScP	V	25 26.0	
		eScS	NE	29 21	
		iScS	EE ₁	22.2	
22	X 7	iP	VN	21 45 34.9	1.0 S 147.5 E h: 68 km Admiralty Is. region
23	✓ 7	eP	V	23 47 03½	42.7 N 110.5 E h: 33 km Outer Mongolia - Inner Mongo border.
24	✓ 8	iP	V	00 24 27.1	C 15.1 S 173.2 W h: 33 km
		eL _Q	N ₁	34.0	Samoa Is. region
		eL _R	E ₁	36.0	
25	X 8	eP	V	01 11 43.9	3.1 S 123.8 E h: 33 km Ceram
	X 8	i	V	01 33 48.7	
26	X 8	iP	V	02 08 49.0	C 21.2 S 177.9 W h: 300 km Fiji Is. region
27	X 8	eP	V	03 03 23½	23.6 N 95.1 E h: 24 km Assam, India
28	X 8	eP	V	06 35 20½	11.3 N 125.9 E h: 39 km
		i	V	21.9	Samoa region, P.I.
		ipP	V	32.7	
29	X 8	iP	V	20 37 20.0	2.6 N 123.4 E h: 166 km Halmahera
30	X 8	eP	V	23 07 50½	19.4 S 175.8 W h: 132 km Tonga Is. region
31	X 9	iP	V	05 20 33.2	R 13.6 S 173.7 W h: 33 km Tonga Is.
32	X 9	e	V	10 21 47	
33	X 9	eP	V	10 43 49	20.3 S 174.4 W h: 33 km Tonga Is.
34	X 9	iP	VNE	13 01 42.8	R
35	X 9	eP	V	14 46 09½	27.7 N 133.5 E h: 553 km South of Honshu
	X 9	i	V	16 00 33.7	

No.	Date	Phase	Component	Time	Remarks
36	✓ 9	e	V	23 47 30	8.4 S 126.1 E h: 229 km* Timor
37	✓ 10	iP	V	00 56 38.1	C 5.8 S 145.6 E h: 102 km New Britain region
38	✓ 10	iP	VN	10 58 02.8	R
39	✓ 10	eP	V	12 11 38	20.2 S 175.2 W h: 25 km Tonga Is.
40	✓ 11	iP	VE	00 06 40.7	R 24.1 S 179.6 W h: 437 km Fiji Is. region
41	✓ 11	iP	V	09 15 17.9	18.5 S 179.9 W h: 247 km* Fiji Is.
42	✓ 11	i	V	12 19 33.0	
43	✓ 11	iP	VN	16 39 56.5	R 18.5 S 177.7 W h: 533 km Fiji Is.
44	✓ 11	iP	V	18 45 57.9	R
45	✓ 12	i	V	00 43 54.8	18.6 S 179.8 E h: 347 km* Fiji Is.
46	✓ 12	i	V	08 40 56.5	
47	✓ 12	iP iPcP ipP e i ePPP e iS e	VN V V ₁ V ₁ V ₁ V N ₁ E ₁ E ₁	11 39 04.9 12.6 19.3 41 07½ 55.4 43 58½ 48.6 49 06.0 12 00 12	C 44.8 N 149.0 E h: 40 km Kurile Is.
48	✓ 12	iP	V	19 00 56.3	44.7 N 149.4 E h: 50 km Kurile Is.
49	✓ 13	eP iPcP ipP i e eiS ei eiSPP ei	V VNV ₁ V ₁ V ₁ V N ₁ V ₁ N ₁ V ₁	05 30 00½ 07.7 18.0 49.6 31 26½ 40 09½ 12½ 41 03 42 26	44.8 N 149.5 E h: 60 km Kurile
50	✓ 13	eP ipP	V V	05 48 51 49 06.8	
51	✓ 13	iP	V	05 53 14.4	
52	✓ 13	eP	V	06 17 38½	45.9 N 151.9 E h: 55 km Kurile Is.
53	✓ 13	eP ipP	V V	06 21 08 23.8	45.3 N 151.3 E h: 60 km Kurile Is.
54	✓ 13	eP i(pP)	V V	07 00 37 51.6	45.5 N 151.8 E h: 55 km Kurile Is.
55	✓ 13	eP ipP	V V	07 15 32½ 47.0	45.5 N 150.6 E h: 50 km Kurile Is.
56	✓ 13	iP	V	07 31 17.8	C 45.0 N 151.5 E h: 40 km Kurile Is.
57	✓ 13	eP	V	07 47 59	46.5 N 151.8 E h: 45 km Kurile Is.

No.	Date	Phase	Component	Time	Remarks.
58	X 13	i(sP)	V	10 59 39.2	45.4 N 151.8 E h: 40 km Kurile Is.
59	✓ 13	e(P)	V	12 54 20½	44.4 N 149.4 E h: 55 km Kurile Is.
60	✓ 13	iP	V	13 10 28.7	45.0 N 150.1 E h: 50 km Kurile Is.
		ipP	V	42.7	
61	✓ 13	iP	V	16 12 03.8	C 45.6 N 150.5 E h: 35 km Kurile Is.
		eS	E ₁	22 08½	
		eScS	E ₁	34	
		eL	E ₁	33.4	
62	✓ 13	eP	V	19 39 50	45.7 N 151.7 E h: 45 km Kurile Is.
63	✓ 13	iP	V	22 07 06.2	44.7 N 152.1 E h: 50 km Kurile Is.
64	X 14	eP	V	00 04 23	44.5 N 150.1 E h: 50 km Kurile Is.
		eL	E ₁	32.2	
65	X 14	iP	V	02 13 14.6	25.2 N 95.3 E h: 33 km* Assam, India-Burma border
66	✓ 14	eP	V	04 18 08½	44.9 N 150.2 E h: 50 km Kurile Is.
		ipP	V	22.9	
67	✓ 14	e	V	04 23 26	44.7 N 150.6 E h: 45 km Kurile Is.
68	✓ 14	iP	V	04 25 11.0	44.9 N 150.7 E h: 40 km Kurile Is.
69	✓ 14	eP	V	05 36 19	44.5 N 151.0 E h: 55 km Kurile Is.
		ipP	V	35.7	
70	✓ 14	eP	V	07 04 53	18.3 S 169.3 E h: 250 km New Hebrides Is.
		ipP	V	05 32.7	
71	✓ 14	eP	V	08 06 39	44.8 N 151.2 E h: 44 km Kurile Is.
72	✓ 14	i(P)	V	09 27 07.8	19.0 S 169.0 E h: 160 km New Hebrides Is. region
73	✓ 14	i(P)	V	13 05 10.4	
74	✓ 14	iP	VN	13 33 49.5	R 44.8 N 151.0 E h: 60 km Kurile Is.
		eS	N ₁	43 53	
		e(L)	E ₁	51.9	
75	✓ 14	eP	V	14 54 47½	2.3 S 126.7 E h: 33 km Ceram Sea
		i	V	48.4	
76	✓ 14	iP	V	15 39 08.1	R 1.6 N 127.6 E h: 231 km* Timor region
77	X 14	i	V	18 41 21.0	4.2 S 103.4 E h: 33 km* Sumatra
78	X 15	eP	V	04 23 17	2.6 N 93.9 E h: 137 km* Sumatra
		i	V	20.1	
79	X 15	eP	V	07 13 58½	20.5 S 173.9 W h: 33 km Tonga Is.
		eL	E ₁	31	
80	✓ 15	i	V	09 44 30.3	45.2 N 150.2 E h: 40 km Kurile Is.
81	✓ 15	eP	V	10 59 16½	44.6 N 149.0 E h: 50 km Kurile Is.
82	X 15	iP	VN	12 45 20.1	C

No.	Date	Phase	Component	Time			Remarks.
L1	✓ 15	(eP)	V	18	42	53 $\frac{1}{2}$	Local
		iP	V			54.0	
		iS	VE	43		05.1	
		iS	NE			05.3	
83	✗ 15	eP	V	20	53	40.0	45.4 N 151.1 E h: 50 km Kurile
84	✗ 15	e	V	21	46	59 $\frac{1}{2}$	
85	✓ 15	eP	V	21	52	05	3.0 S 129.9 E h: 27 km Ceram
		i	V			06.3	
		ipP	VNE			12.3	
		eiS	E ₁	57		52	
		eL	E ₁	✓ 22	00	20	
86	✓ 16	eP	V	05	27	45	44.8 N 150.4 E h: 33 km Kurile Is.
		i(sP)	V		28	00.7	
		e	V		29	19	
87	✓ 16	iP	V	07	13	23.3	22.2 S 179.5 W h: 539 km Fiji Is. region
88	✓ 16	iP	V	10	43	03.4	45.2 N 150.4 E h: 45 km Kurile Is.
		ipP	V			17.3	
89	✓ 16	iP	VN	12	55	05.7	C 1.3 S 127.9 E h: 33 km Malahera region
		ipP	V		56	37.3	
90	✓ 16	eP	V	14	02	50	15.1 S 173.6 W h: 33 km Tonga Is. region
91	✓ 16	eL	E ₁	16		31.9	38.6 N 73.4 E h: 33 km Tadzhik SSR
92	✓ 16	iP	VN	20	47	47.2	K R 3.3 N 137.9 E h: 23 km Palau Is. region
		ipP	V			54.1	
93	✓ 16	e	V	21	43	14	44.4 N 150.9 E h: 30 km Kurile Is.
94	✗ 16	ePKP	V	22	40	55	17.7 N 62.0 W h: 67 km Leeward Is. region
95	✓ 17	iP	V	02	10	32.1	C
96	✗ 17	iP	VN	03	14	25.1	C 11.3 N 140.6 E h: 70 km Mariana Is. region
97	✓ 17	iP	VN	11	40	55.3	C 17.3 S 163.0 E h: 33 km New Hebrides Is.
98	✗ 17	iP	VN	14	22	51.2	C 9.3 N 126.5 E h: 33 km Near east coast of Mindanao P.I.
		i	V		23	54.3	
99	✗ 17	iP	V	19	12	00.7	6.6 N 126.3 E h: 33 km Off east coast of Mindanao
L2	✓ 17	(eP)	V	23	34	16	Local
		eP	V			16$\frac{1}{2}$	
		eS	VE			34	
100	✗ 17	eP	V	23	36	40.3	44.6 N 149.0 E h: 45 km Kurile Is.
		ipP	V			55.8	
		eS	N ₁ E ₁	43		38	
✓ 101	18	eP	V	02	52	54	13.0 S 173.7 W h: 650 km* Fiji Is.
✗ 102	18	e(P)	V	03	47	23	10.5 S 161.6 E h: 33 km Solomon Is.

No.	Date	Phase	Component	Time	Remarks
103	✓ 18	eP	V	13 04 18	
103	✓ 18	iP	V	13 36 26.3	Local
		iP	V	27.7	
		i(S)	V	39.5	
		eS	E	41	
104	✓ 18	eP	V	17 21 14	
105	✓ 18	eP	V	18 07 11½	45.6 N 150.6 E h: 40 km Kurile Is.
106	✓ 18	eP	V	21 45 59	5.3 S 103.5 E h: 33 km Sumatra
107	✓ 18	i	V	22 17 22.6	
108	19	× eP	V	09 11 09	9.9 N 126.1 E h: 36 km
		ipP	V	25.1	Near east coast of Leyte P.I.
109	19	× i	V	13 10 17.9	
110	✓ 20	eP	V ₁	01 05 19	44.7 N 150.7 E h: 25 km
		ipP	V ₁	25.1	Kurile Is.
		i	V	27.9	
		iPcP	V	33.4	
		i	V	09 04.2	
		i(S)	E ₁	15 18.1	
		isS	N ₁	36.7	
		ePS	N ₁	16 24	
		e	N ₁	20 16	
111	✓ 20	eP	V	03 05 50	20.3 S 173.6 W h: 600 km Fiji Is. region
112	✓ 20	eP	V	03 42 28½	
		i	V	37.7	
113	✓ 20	iP	V	06 22 26½	R 43.9 N 150.7 E h: 50 km Kurile Is.
114	✓ 20	eP	VN	03 29 15½	Regional
		eS	N	31 (10)	
		eS	E	(14)	
114	✓ 20	iP	V	09 22 49.4	A C 44.4 N 150.0 E h: 40 km
		ipP	V	23 00.7	Kurile Is.
115	✓ 20	iP	V	11 11 57.2	16.1 S 104.3 E h: 33 km* Indian Ocean
116	✓ 20	eP	V	12 04 (23)	44.7 N 150.2 E h: 45 km
		ipP	V	39.1	Kurile Is.
		eS	E ₁	✓ 14 23	
117	✓ 20	iPKP	V	13 19 44.9	C 24.1 N 5.1 E h: 0 km Southern Algeria
118	✓ 20	eP	V	13 33 24	45.1 N 150.5 E h: 45 km Kurile Is.
119	✓ 20	e	V	17 53 29	44.2 N 149.6 E h: 45 km
		i	V	✓ 41.3	Kurile Is.
120	✓ 20	iP	V	18 11 02.7	C 44.2 N 149.6 E h: 45 km Kurile Is.
121	✓ 21	eP	V	02 36 (40½)	22.9 S 172.1 E h: 54 km
		i	VE	51.0	Loyalty Is.
		ipP	V	37 04.2	
122	✓ 21	iP	VN	13 15 53.8	R 3.3 S 150.2 E h: 43 km Bismarck Sea

No.	Date	Phase	Component	Time	Remarks.
123	X 21	iP	V	13 32 30.5	26.0 S 179.9 E h: 397 km Fiji Is. region
124	Y 21	iP	V	15 30 32.5	R 45.5 N 149.7 E h: 55 km Kurile Is.
125	✓ 21	iP	V	17 32 49.4	44.1 N 150.3 E h: 65 km Kurile Is.
126	✓ 21	iP ipP	V V	23 30 43.4 57.7	C 44.0 N 150.3 E h: 50 km Kurile Is.
127	✓ 21	iP ipP	V V	23 41 23.7 39.0	44.0 N 150.1 E h: 55 km Kurile Is.
128	X 22	eP	VN	01 10 50	C 13.7 N 121.6 E h: 15 km Luzon, P.I.
129	✓ 22	e(P)	V	03 29 30	45.0 N 150.2 E h: 45 km Kurile Is.
130	X 22	eP	V	07 09 58½	3.0 S 130.0 E h: 54 km Ceram
131	Y 22	iP	VN	15 41 15.1	R 11.6 S 166.3 E h: 80 km Santa Cruz Is.
	Y 22	i	V	16 05 29.6	
132	Y 22	i(P)	V	17 53 26.2	
133	X 23	iP	V	00 13 23.7	C 45.7 N 151.6 E h: 20 km Kurile Is.
134	X 23	eP i	V V	03 01 56½ 02 48.3	12.0 S 166.5 E h: 107 km Santa Cruz Is.
135	✓ 23	eP	V	09 53 55	C 41.2 N 144.2 E h: 50 km East of Honshu
136	Y 23	eP i	V V	10 22 31½ 32.4	6.9 S 148.4 E h: 29 km Near north east coast of New Guinea
137	Y 23	eP	V	14 54 36	12.2 N 125.7 E h: 99 km Off east coast of Samar P.I.
138	Y 23	iP	V	20 20 02.7	25.9 S 173.3 W h: 343 km* Kermadec Is. region
139	X 23	eP	V	20 35 57	19.4 N 155.5 W h: 5 km Hawaii Is. Hawaii
140	✓ 24	eP ipP	V V	01 13 35 45.7	44.5 N 150.3 E h: 45 km Kurile Is.
141	Y 24	iP	V	02 41 22.1	R
142	X 24	eP	V	07 07 29	19.2 N 121.3 E h: 72 km Babuyan Is. P.I.
143	✓ 24	iP ipP eS eS eSP eL eL	VNEV ₁ E ₁ V N ₁ E ₁ N ₁ V N ₁ V ₁	07 35 32.2 43.8 42 55.0 56.0 43 03 50 55.2	A C 4.9 S 102.9 E h: 50 km Off south coast of Sumatra
144	X 24	eP ipP	V V	19 30 02½ 11.6	23.3 N 123.5 E h: 33 km Ryukyu Is.

No.	Date	Phase	Component	Time	Remarks.
145	✓ 24	eP	V	20 30 15	44.4 N 149.7 E h: 40 km Kurile Is.
146	✓ 25	eL	E ₁	01 42 34	62.3 S 156.9 E h: 33 km* Balleny Is.
147	✓ 25	eP eL	V E ₁	20 07 40 21.2	12.3 N 144.5 E h: 29 km Mariana Is. region
148	✗ 25	eP	V	23 02 27	36.9 N 95.2 E h: 33 km* Tsinghai Province, China
149	✓ 26	eP	V	04 07 47½	44.5 N 150.1 E h: 55 km Kurile Is.
150	✓ 26	eP i	V V	06 11 51 58.2	44.5 N 149.8 E h: 60 km Kurile Is.
151	✓ 26	eP	V	11 36 53	44.7 N 149.7 E h: 55 km Kurile Is.
152	✗ 26	iP i e	VE N V	12 41 00.8 01.2 37½	C 15.3 S 174.0 W h: 115 km Tonga Is,
L5	✓ 26	eP iP i iS	VN V V VN	18 00 53 53.7 54.6 01 00.3	Local
153	✓ 26	iP	VN	19 02 07.3	7.3 S 129.7 E h: 125 km Banda Sea
154	26 ✓	iP e	VN E ₁	22 47 34.3 56.4	R 5.2 S 152.0 E h: 73 km New Britain
155	✓ 27	iP i	VNEV ₁ V	03 51 30.5 52 09.2	R 17.9 S 170.5 W h: 536 km Fiji Is. region
156	✗ 27	eL	N ₁	10 55.0	22.3 S 175.2 W h: 35 km* Tonga Is.
157	✓ 27	eP i eL	V V V	18 31 03 30.6 41.2	24.3 S 176.1 W h: 33 km Tonga Is. region
158	✗ 27	e	V	19 43 48	16.0 S 173.5 W h; 33 km Tonga Is.
159	✓ 27	eP	V	20 17 45	44.5 N 150.1 E h: 50 km Kurile Is.
160	✗ 27	eP eT Tmax	V V V	23 14 49 30 32 41	
161	✗ 28	iP i i iPcP	V V V V	00 45 03.6 19.7 46 02.8 18.7	R 1.9 N 124.3 E h: 232 km* Northern Celebes
162	✓ 28	eP eL eL	V N ₁ V ₁	03 01 39½ 03.9 11.1	24.3 S 173.0 W h: 33 km Tonga Is. region
L6	✗ 28	eP eP i iS	V VN V VNE	03 24 15½ 18.0 22.7 56.3	Regional

No.	Date	Phase	Component	Time	Remarks
L7	✓ 23	eP	VN	03 32 30	Regional
		iP	VN	34.8	
		iS	VE	33 09.0	
163	✗ 23	eP	V	11 23 (31)	57.1 S 147.1 E h: 33 km*
		i	V	33.6	South of Australia
		eT	V	47 55	
164	✓ 23	iP	VV ₁	12 16 09.3	C 52.8 N 159.8 E h: 33 km
		ipP	V	22.0	Off east coast of Kamchatka
165	✓ 23	iP	VNE	20 04 31.0	R 24.5 S 179.9 E h: 532 km
		ePP	V	05 50.3	Fiji Is. region
		e	V	53	
		i(pP)	V	06 04.8	
166	✗ 23	eP	V	20 49 (05)	44.8 N 149.6 E h: 45 km
		ipP	V	18.0	Kurile Is.
167	✗ 29	eP	V	11 02 10.3	18.0 S 173.3 W h: 494 km
					Fiji Is. region
168	✗ 29	eP	V	16 12 26	
169	✗ 29	eL	N ₁	17 13.1	26.5 S 177.5 W h: 65 km
					Kermadec Is. region
170	✓ 29	eP	V	20 23 21.3	26.2 S 177.8 W h: 49 km
		eL	N ₁	39.5	Kermadec Is. region
171	✗ 30	iP	V	06 56 23.0	R
L8	✗ 30	iP	VN	17 10 16.2	Local
		i	N	17.7	
		iS	VNE	25.6	
172	✓ 31	eP	V	03 24 26.3	C 21.8 S 175.0 W h: 33 km
		ipP	V	36.2	Tonga Is.
		isP	V	40.3	
		i	V	25 24.1	
		eS	E ₁	29 49	
		i	E ₁	56.0	
		eL	N ₁	32.6	
173	✗ 31	iP	V	04 31 03.0	R 23.9 S 179.3 W h: 464 km
					Fiji Is. region
174	✓ 31	iP	VE	03 57 32.6	R 17.9 S 173.3 W h: 637 km*
		i	V	59 56.1	Fiji Is. region
175	✓ 31	eP	V	10 00 22	19.3 S 177.4 W h: 555 km*
					Fiji Is. region
176	✓ 31	iP	V	10 53 11.0	R 10.5 S 162.0 E h: 33 km
		i	V	21.6	Solomon Is. region
177	✗ 31	eP	V	13 43 25.3	22.0 S 169.9 E h: 33 km*
					Loyalty Is.
L9	✓ 31	eP	V	14 45 27.3	Local
		i	V	23.3	
		iS	VNE	41.4	

Seismograms read by Jennifer Wanless

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CANBERRA, A.C.T. AUSTRALIA

MONTHLY SEISMOLOGICAL BULLETIN
NOVEMBER, 1968.

Latitude: $35^{\circ} 19' 15''$ S. Longitude: $148^{\circ} 59' 55''$ E. Height : 700M.

Instruments: Three-component Benioff variable reluctance seismographs.

$T_s = 1$ sec

$T_g = 0.25$ secs. (Short periods VNE)

$T_g = 16$ secs. (Long period vertical V_1)

$T_g = 70$ secs. (Long period horizontals N_1E_1)

Mount Stromlo quartz clocks provide accurate time marks and 50 c/s for drum drive.

Abbreviations: R - rarefaction ; C - compression ; Epicentre locations are those given by USCGS. * Indicates epicentres believed accurate to \pm in latitude and longitude and \pm 50 km. in depth.

No.	Date	Phase	Component	Time	Remarks.
1	✓ 1	iP	V	21 05 53.3	C 22.5 S 176.8 W h: 71 km Tonga Is.
		ipP	V	06 04.2	
		i	V	22.6	
		i	V	29.2	
		i	V	47.4	
		iPeP	V	08 39.1	
		e	V	12 10 $\frac{1}{2}$	
2	✓ 1	iP	V	22 53 28.9	R 44.9 N 148.9 E h: 60 km Kurile Is.
3	✓ 2	i(P)	V	21 06 40.3	C
4	✓ 2	eP	V	22 23 10	1.9 S 138.9 E h: 33 km Near north coast of western New Guinea
		i	V	13.7	
		eL	V_1	39.7	
		i	E_1	40 10.8	
		i	E_1	50.5	
5	✓ 2	e	V_1	23 06 15	23.9N 122.6 E h: 33 km* Off east coast of Taiwan
		e	N_1E_1	10.4	
		eL	E_1	15.2	
		eL	V_1	17.6	
6	✓ 3	eP	V	02 24 57 $\frac{1}{2}$	C 02 23 48.0
7	✓ 3	iP	V	02 23 48.0	
8	✓ 3	ePKP	V	03 29 06 $\frac{1}{2}$	3.5 S 77.8 W h: 33 km Peru-Ecuador border
		ipPKP	V	17.0	
		ePP	V_1	30 36	
		iPKKP	V_1	39 07.8	
		PS	E_1	40.7	
		SS	E_1	47.6	
		eL	E_1	04 08.3	
9	✓ 3	eP	V	12 02 (50 $\frac{1}{2}$)	43.4 S 145.8 E h: 33 km Tasmanian region
		e(S)	N	04 39	
		i	V	53.4	
		i	V	05 16.8	
10	✓ 3	eP	V	14 37 32	14.0 S 165.9 E h: 50 km New Hebrides Is.
11	✓ 4	eP	VEV_1E_1	01 19 54	C 15.1 S 167.3 E h: 154 km New Hebrides Is.
		i	V	56.4	
		ipP	V	20 25.1	
		eiPP	$V_1N_1E_1$	42	
		(s)	N_1	24 24	
					Obscured by No. 12

No.	Date	Phase	Component	Time	Remarks.
12	✓ 4	iP i ipP PP eS eS	VV ₁ E ₁ N ₁ N ₁ E ₁ V ₁ N ₁	01 28 43.5 54.2 24 03 (52) 28 53 29 07	C 6.8 S 129.6 E h: 80 km Bansa Sea
13	X 4	iP i e(S3)	V V V	02 20 39.3 51.7 27 53	C 6.9 S 129.5 E h: 76 km Banda Sea
14	+ 4	iP iScP	V V	02 43 09.8 49 19.0	R 7.0 S 129.5 E h: 129 km Banda Sea
15	+ 4	iP i	V V	03 37 07.2 38 16.0	
16	+ 4	eP i i e	V V V V	03 49 48 50 40.4 57.7 53.9	6.9 S 129.8 E h: 100 km Banda Sea
17	+ 4	e	V	04 36 46	
18	+ 4	eP	V	05 07 00	7.0 S 129.5 E h: 115 km Banda Sea
19	+ 4	iP i e	VN V V	05 29 33.2 30 30.5 36 34	C 6.8 S 129.8 E h: 80 km Banda Sea
20	+ 4	eP	V	07 26 53½	
21	+ 4	iP i i	V V V	00 57 15.7 53 23.6 59 54.2	
22	+ 4	iP ipP i e	V V V V	15 20 04.0 36.9 23 07.2 27 03	R 7.0 S 129.4 E h: 132 km Banda Sea
23	+ 4	eP	V	19 58 35½	6.9 S 129.5 E h: 104 km Banda Sea
24	+ 4	iP i i iPP e e	V V V N V N ₁	22 23 36.7 43.4 24 43.2 55.7 30 37 39 11	C 6.8 S 129.8 E h: 122 km Banda Sea
25	+ 4	i(P)	V	22 50 41.6	
26	+ 5	iP	V	05 22 57.1	C 7.3 S 129.2 E h: 141 km Banda Sea
27	+ 5	eP isP	V V	06 12 53 13 23.9	6.9 S 129.4 E h: 94 km* Banda Sea
28	+ 5	eP	V	08 23 13½	24.8 S 179.7 E h: 606 km* Fiji Is.
29	+ 5	iP i(sP)	VN N	08 50 04.3 35.5	C 7.2 S 129.0 E h: 112 km Banda Sea
30	+ 5	eP	V	09 39 42	27.6 S 176.2 W h: 92 km* Kermadec Is. region
31	+ 5	e(P)	V	13 53 59	
32	X 6	iP ePP	VNE V	00 00 51.1 02 31½	C 1.7 N 126.4 E h: 23 km Molucca Passage

No.	Date	Phase	Components	Time	Remarks.
33	X 6	iP	V	01 25 53.1	C 7.3 S 129.3 E h: 158 km
		iPP	V	27 08.1	Banda Sea
34	✓ 6	eP	VN	02 20 00	2.6 S 138.4 E h: 33 km
		ipP	VN	06.9	Western New Guinea
		i(sP)	V	12.6	
		e(S)	N ₁	25 32	
		ei	E ₁	35½	
		ei	V ₁	38½	
		iScP	V	26 11.4	
		eL	V ₁	23.9	
		ei	E ₁	32 09	
35	X 6	eP	V	03 02 40	2.5 S 138.6 E h: 32 km
					Western New Guinea
36	✓ 6	eP	V	03 06 56	2.2 S 138.7 E h: 43 km
		i	VN	07 04.6	Western New Guinea
		e	N ₁ E ₁	15 27	
37	✓ 6	iP	V	06 33 57.6	C 30.8 S 179.9 E h: 411 km
					Kernadec Is. region
38	✓ 6	eP	V	07 42 09	2.5 S 138.6 E h: 38 km
		eL	E ₁	55.8	Western New Guinea
39	✓ 6	iP	VN	09 07 44.9	R 7.1 S 129.2 E h: 90 km
		isP	VN	08 15.5	Banda Sea
		i	VN	53.8	
40	X 6	eP	V	10 59 42	3.0 S 138.7 E h: 16 km
					Western New Guinea
41	X 6	iP	V	22 20 32.5	
42	X 7	iP	V	00 01 23.2	7.0 S 129.7 E h: 229 km
		ipP	V	53.1	Banda Sea
43	X 7	eP	V	13 00 07	24.2 S 176.4 W h: 33 km
					Tonga Is. region
44	✓ 7	eP	V	16 32 26½	11.3 S 166.1 E h: 39 km
					Santa Cruz Is.
45	X 7	iP	V	16 35 44.5	R
46	✓ 8	iP	VN	16 21 12.0	R 2.7 N 123.4 E h: 21.6 km
		i(pP)	V	22 03.1	Molucca Passage
47	X 8	eP	V	05 46 05½	C 5.6 S 105.5 E h: 33 km
					Sumatra
48	X 9	eP	V	13 57 16½	7.1 S 129.4 E h: 30 km*
		isP	V	45.3	Banda Sea
		i	V	53 24.2	
49	✓ 9	iPKP	V	21 33 19.1	R 9.0 S 71.5 W h: 600 km
		i	NV ₁	25.2	Western Brazil
		ei	V ₁	36	
		iPP	V ₁	35 05.2	
		e	E ₁	33 30	
		PPP	V ₁	59	
		esPP	E ₁	33 13	
		e	E ₁	19	
		eSKS	E ₁	39 29	
		iSKS	MT ₁	31.2	
		i	EE ₁	32.1	
		i(SKKS)	NBE ₁	41 02.3	
		i	N	13.0	
		i(PKP)	V	43 20.5	
		iPKP	V	24.1	

No.	Date	Phase	Component	Time	Remarks.
49	X 9	Contin. iPKKP	V	21 43 24.1	
		e sSKS	E ₁	30	
		e	V ₁	42	
		eSP	V ₁ E ₁	53	
		ei (SKSP)	E ₁	44 09	
		eSPP	N ₁	45 23	
		i	V ₁	31.5	
		i	N ₁	43.9	
		eSS	N ₁ E ₁	50 55	
		eL	E ₁	22 05.8	
L1	X 9	eP	VN	22 21 43	Local
		iS	VN	57.8	
50	✓ 10	ePKP	V	01 18 27	9.2 S 71.5 W h: 600 km
		i	V	27.8	Western Brazil
		iPKP	V	29.3	
		ePP	V ₁	20 15	
		i	V ₁	34.0	
		ipPKP	V	48.4	
		i	V	21 08.9	
		SKS	E ₁	24.7	
		e (SKKS)	N ₁	26 08	
		i (PKKP)	V ₁	23 31.5	
		eSP	V ₁	29 08	
		eSS	E ₁	36.0	
51	X 10	eP	V	04 33 16½	6.9 S 129.3 E h: 181 km
					Banda Sea
L2	✓ 10	eP	V	07 00 32½	Local
		eS	V	43	
52	✓ 10	eP	V	08 05 43	
53	✓ 10	eP	V	17 29 48½	44.4 N 149.0 E h: 40 km
		i	VN	49.3	Kurile Is.
		i (PcP)	V	53.5	
		isP	V	30 09.3	
		eS	N ₁ E ₁	39 52	
		e (L)	E ₁	50.7	
54	X 10	iP	V	19 25 34.1	26.2 S 178.3 E h: 607 km
					South of Fiji Is.
55	✓ 11	iP	V	00 21 32.7	7.0 S 129.5 E h: 132 km
		ipP	V	22 04.4	Banda Sea
		e (L)	E ₁	23.4	
56	✓ 11	iP	VN	11 36 02.7	C 16.9 S 174.4 W h: 135 km
		ipP	V	44.0	Tonga Is.
		isP	V	37 06.2	
		iPcP	V	38 19.6	
		S	E ₁	41.6	
57	X 11	e	V	16 33 24	
58	✓ 11	iPKP	V	20 11 59.2	9.1 S 71.4 W h: 585 km
					Western Brazil
L3	X 11	iP	VN	23 52 27.1	Local
		i	N	27.7	
		iS	VNE	33.4	
		iL	V	37.1	
59	X 12	e	V	00 33 37	

No.	Date	Phase	Component	Time	Remarks.
60	12	eP	V ₁	07 43 29	
		eS	N ₁	43 14	
		eL	E ₁	49.4	
		eL	V ₁	51.1	
61	12	iP	V	11 16 28.9	R
62	12	iP	V	17 47 42.3	R
		i	V	49.1	30.4 S 177.8 W h: 60 km Kermadec Is.
63	12	eP	V	21 00 32.5	7.1 S 129.5 E h: 181 km Banda Sea
64	12	eP	V	21 54 56	27.7 S 176.3 W h: 38 km* Kermadec Is.
65	13	iP	V	05 24 58.1	R
					7.8 N 125.9 E h: 38 km* Midanao, P.I.
66	13	eP	V	08 45 41	4.9 S 132.3 E h: 38km* Banda Sea
67	13	iP	VE	11 23 50.4	R
		ePcP	V	26 41	23.8 S 179.9 W h: 520 km Fiji Is. region
68	13	eP	V	17 25 29	22.9 S 175.3 W h: 38 km Tonga Is.
69	14	eP	V	00 25 58½	30.1 S 177.4 W h: 42 km Kermadec Is.
70	14	iP	V	04 08 28.8	22.6 N 142.9 E h: 177 km Mariana Is. region
		iPcP	V	09 14.4	
71	14	iP	V	04 32 05.0	R
		i	V	10.2	
		i	V	13.7	
72	14	eP	V	04 41 06	17.5 S 167.7 E h: 38 km New Hebrides Is.
		i(pP)	V	12.8	
		i(sP)	E	17.8	
		eS	N ₁ E ₁	45 31	
		eL	V ₁	46.5	
		e	V ₁	48.1	
73	14	iP	V	07 43 22.7	
74	14	eP	V	14 06 36½	17.4 S 167.6 E h: 38 km New Hebrides Is.
		ipP	V	42.8	
75	14	iP	V	14 10 53.5	17.5 S 167.7 E h: 38 km New Hebrides Is.
		iPP	V	11 26.3	
		iPPP	V	34.0	
76	14	iP	V	20 16 15.1	C
		i	V	40.4	19.0 s 168.8 E h: 38 km New Hebrides Is.
77	14	eP	V	23 43 10½	17.4 S 167.8 E h: 38 km New Hebrides Is.
78	15	iP	V	01 19 02.8	C
					3.3 S 129.1 E h: 54 km Ceram
L4	15	e	VN	01 56 26	Regional movement?
		e	VN	57 00	
79	15	i(P)	V	20 51 21.2	
80	15	iP	VV ₁	21 18 37.5	R
		e	VV ₁	20 12	44.3 N 149.0 E h: 50 km Kurile Is.
		eS	E ₁	23 36	
		eSKS	N ₁	43	
		e	N ₁	29 24	
		SS	N ₁	33.6	
		eL	V ₁	39.2	

No.	Date	Phase	Component	Time	Remarks.
81	X 15	eP	V	23 52 52	
82	✓ 16	i(pP)	V	02 42 25.9	44.3 N 149.0 E h: 50 km Kurile Is.
83	X 16	e	V	04 37 16	
		i	V	27.6	
84	✓ 16	eP	V	06 59 07	41.3 S 37.5 W h: 11 km
		ipP	V	13.4	Off coast of Chile
85	X 16	iP	V	21 57 36.4	
86	✓ 16	eP	V	22 50 07	22.3 S 175.0 W h: 33 km
		i	V	09.1	Tonga Is.
		e(PF)	E ₁	51 25	
		eL	N ₁	53.2	
		eL	V ₁	59.6	
87	X 16	eP	V	23 46 39	22.1 S 175.e W h: 33 km Tonga Is.
88	✓ 17	eP	V	00 55 39	22.2 S 175.0 W h: 33 km*
		epP	V	46½	Tonga Is.
89	Y 17	ePKP	V	01 07 53½	7.6 N 37.4 W h: 33 km
		i	V	56.8	Northern Atlantic Ocean
		i	V	58.3	
		eSS	E ₁	31 18	
		e	E ₁	49.7	
		eLQ	E ₁	50.9	
90	X 17	iP	V	05 56 12.8	C
91	Y 17	iP	VN	07 59 02.8	C 6.3 N 126.2 E h: 33 km
		eScP	V	03 04 28	Mindanao, P.I.
92	+ 17	iP	V	10 36 02.8	
93	+ 17	iP	VNE	13 19 51.6	R 17.4 S 178.5 W h: 509 km
		ePcP	V	22 03½	Fiji Is. region
94	X 18	eP	V	01 03 20½	3.6 S 143.4 E h: 33 km Near coast of northeast New Guinea
95	Y 18	eP	E	06 09 25½	22.4 S 170.5 E h: 33 km Loyalty Is.
96	Y 18	eP	V	13 19 06	35.5 S 179.9 W h: 50 km Kermadec Is. region
97	X 18	iP	V	13 53 57.5	15.9 S 173.3 W h: 33 km Tonga Is.
98	✓ 18	iP	VE	19 52 21.1	C
99	+ 18	iP	V	21 16 49.8	R 13.4 S 166.6 E h: 51 km
		ipP	V	17 02.2	Santa Cruz Is.
100	X 18	iP	V	22 10 55.9	R
101	Y 19	iP	VN	04 48 51.1	C 39.7 N 129.5 E h: 537 km Off east coast of Korea
102	X 19	iP	VNE	10 50 55.9	R 22.5 S 171.3 E h: 36 km
		ipP	V	51 03.7	Loyalty Is. region
		e	E	52 13½	
103	✓ 19	eP	V	11 12 59	44.4 N 149.2 E h: 33 km
		epP	V	13 03½	Kurile Is.
104	Y 19	eP	V	12 00 11	
105	Y 19	e	V	12 25 13	

No.	Date	Phase	Component	Time	Remarks
106	✓ 19	iP e	V V	12 37 02.3 31	30.2 S 60.3 E h: 33 km Indian Ocean
107	X 19	eP	V	17 51 29½	53.1 N 159.6 E h: 40 km Off east coast of Kamchatka
108	✓ 19	iP ipP eL	V V N ₁	18 26 15.2 25.3 ✓ 45.7	5.0 S 102.2 E h: 37 km Off south coast of Sumatra
109	✓ 20	iP epP	VNV ₁ V	04 13 11.2 52	R 5.5 S 143.2 E h: 201 km New Britain
110	✓ 20	eP	V	09 01 45	17.5 S 172.3 W h: 33 km* Tonga Is.
111	X 20	eP	V	09 31 42½	
112	✓ 20	eP eL eL	V E ₁ V ₁	12 06 38½ 16.5 ✓ 17 18	22.2 S 175.2 W h: 33 km Tonga Is.
113	X 20	iP i isP	V VN V	13 57 49.2 49.5 58 03.3	C 6.4 N 126.2 E h: 33 km Mindanao, P.I.
114	✓ 21	iP	V	06 00 49.0	R 17.9 S 173.6 W h: 595 km Fiji Is.
115	✓ 21	iP	V	06 43 47.3	R 3.9 S 117.3 E h: 33 km Sumbawa
116	✓ 21	eP	V	09 13 59	18.0 s 173.4 w h: 563 km* Fiji Is.
117	X 21	eP	V	20 23 57½	11.1 S 166.3 E h: 149 km Santa Cruz Is.
118	✓ 21	iP	V	21 14 07.8	50.3 N 156.4 E h: 30 km Southern Kamchatka
119	✓ 22	iP i i(pP) i ePcP iPPP	V V V V V V	00 26 43.3 57.3 27 45.6 52.5 23 03 29 43.4	C 5.9 S 107.9 E h: 323 km Near north coast of Java
120	✓ 22	iP	V	14 57 58.5	C 44.4 N 149.0 E h: 33 km Kurile Is.
121	X 22	(eP) e	V V	16 27 00 05	10.4 N 94.0 E h: 33 km Andaman Is. region
122	X 22	eP	V	17 11 06	17.9 S 172.3 W h: 33 km Tonga Is. region
123	✓ 23	e	V	05 03 27	
124	✓ 23	eP ipP i	V V V	05 04 17½ 42.1 05 21.6	15.0 S 167.3 E h: 116 km New Hebrides Is.
125	✓ 24	eP	V	02 01 25	
126	✓ 24	iP	VN	04 05 43.6	R 2.9 S 123.3 E h: 42 km* Ceram Sea
127	X 24	eP	V	05 15 22½	22.1 S 175.6 W h: 33 km Tonga Is.
128	X 24	eP	V	05 20 02	21.9 S 175.3 W h: 33 km Tonga Is.

No.	Date	Phase	Component	Time	Remarks.
129	✓ 24	iP	VN	11 16 02.3	R 28.2 N 140.1 E h: 260 km South of Honshu
130	✗ 24	e	V	15 37 34	6.1 S 147.6 E h: 75 km Near coast of North- East New Guinea.
131	✓ 24	eP	V	23 11 09½	56.1 S 27.5 W h: 33 km Sandwich Is.
132	✗ 25	iP	V	00 57 58.3	R 16.3 S 174.6 W h: 196 km Fiji Is. region
133	✓ 25	eP	V	10 14 29	44.3 N 149.5 E h: 55 km Kurile Is.
134	✗ 26	eP	V	03 04 46½	26.9 S 176.5 W h: 46 km Kernadec Is. region
135	✓ 26	iP ipP isP iScP e	VNEV ₁ N ₁ E ₁ V V V E ₁	06 53 38.6 59 06.3 16.6 07 04 48.8 05.4	R 6.8 S 129.6 E h: 111 km Banda Sea
136	✓ 26	iP iPcP	V V	08 53 46.7 56 25.8	7.1 S 129.2 E h: 117 km Banda Sea
137	✓ 26	eP i	V V	13 36 04 20.1	
135	✓ 26	iP iS	VN VN	13 11 10.1 11.7	R Local. Felt
136	✓ 26	iP eS	VN VN	13 33 52.3 54.4	R Local
138	✗ 26	eP	V	20 06 44	9.5 S 155.5 E h: 33 km Solomon Is. region
139	✓ 26	eP i ipP e i e(S) eL	V V V V ₁ N ₁ E ₁ E ₁ N ₁ E ₁ N ₁	22 56 16 19.9 24.0 57 04 59 10.5 23 01 21 03.0	16.6 S 175.2 E h: 33 km Fiji Is. region
	✗ 26	e	V	23 51 03	
	27 - 30 Nov.	No N _s records. Drum under repair			
140	✓ 27	iP	V	13 19 55.0	C 7.5 S 127.7 E h: 33 km* Banda Sea
141	✓ 27	iP i	V V	14 07 02.0 06.3	3.1 N 126.6 E h: 33 km Molucca Passage
	✗ 28	No short period records			
142	29	eP	V	14 59 25½	23.7 N 143.2 E h: 33 km Bonin Is. region
143	✓ 29	eP	V	19 01 25	R 17.3 S 173.4 W h: 520 km Fiji Is.
144	✗ 30	e	V	03 32 11	
145	✓ 30	iP ipP iFP	VV ₁ V V	09 55 42.5 56.0 57 10.1	R 1.6 N 128.4 E h: 61 km Halmahera region
146	✗ 30	iP	V	21 51 07.7	6.6 N 94.2 E h: 33 km Nicobar Is.

No.	Date	Phase	Component	Time	Remarks.
L7	8 30	iP	V	23 35 21.3	Local
		iP	V	22.1	
		eS	VE	30	
		iS	V	30.7	

Seismograms read by
Jennifer Wanless.

J.C. Jaeger.
Professor of Geophysics.

Department of Geophysics
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 CANBERRA A.C.T. AUSTRALIA

MONTHLY SEISMOLOGICAL BULLETIN

DECEMBER, 1963.

Latitude: $35^{\circ} 19' 15''$ S. Longitude: $148^{\circ} 59' 55''$ E. Height: 700 M.

Instruments: Three-component Benioff variable reluctance seismographs.

$T_s = 1$ sec.

$T_g = 0.25$ secs. (Short periods VNE)

$T_g = 16$ sec. (Long period vertical V_1)

$T_g = 70$ sec. (Long period horizontals N_1E_1)

Mount Stromlo quartz clocks provide accurate time marks and 50 c/s for drum drive.

Abbreviations: R; rarefaction, C; compression,

Epicentre locations are those given by USCGS. * Indicates epicentres believed accurate to $\frac{1}{2}^{\circ}$ in latitude and longitude and ± 50 km. in depth.

No.	Date	Phase	Component	Time	Remarks.
	1 - 2	No N_s records			
1	X 1	iP	V	07 53 15.2	R 3.9 S 146.3 E h: 33 km Bismarck Sea
2	X 1	eP	V	09 45 50	7.4 N 93.5 E h: 27 km* Nicoban Is.
3	X 1	eP	V	11 58 32	4.6 S 154.8 E h: 479 km
		e	V	59 00 $\frac{1}{2}$	Solomon Is. region
4	✓ 1	eP	V	16 25 55	28.9 N 130.0 E h: 31 km* Ryukyu Is.
5	X 1	e	V	16 50 19	11.6 S 167.0 E h: 33 km Santa Cruz Is.
6	X 2	i	V	14 12 07.3	
7	X 2	iP	V	17 37 41.8	C 24.8 S 179.7 E h: 550 km Fiji Is. region
	X 3	No records between 02 05 and 04 36			
L1	X 3	iP	V	05 01 59.2	South Australia
		eS	N	03 39 $\frac{1}{2}$	
8	✓ 3	iP	V	05 15 58.1	
9	✓ 3	iP	VN	07 19 30.7	C 6.2 S 147.6 E h: 97 km
		epP	V	55	North-east New Guinea
		e(PP)	V	20 22 $\frac{1}{2}$	
10	✓ e	iP	V	14 39 32.2	R 18.5 S 177.8 W h: 615 km* Fiji Is. region
11	✓ 3	eP	V	19 49 35 $\frac{1}{2}$	
12	X 3	eP	V	21 21 03	12.2 S 166.0 E h: 32 km
		ipP	V	10	Santa Cruz Is.
		isP	V	14.5	
		i	V	46.9	
		i	V	23 43.7	
		iPcP	V	24 18.1	
		i	V	25 23.5	
		eS	N_1E_1	25.8	
13	✓ 3	eP	V	21 35 55	12.0 S 166.0 E h: 40 km
		i	V	36 00.8	Santa Cruz Is.
		i	V	06.1	

No.	Date	Phase	Component	Time	Remarks.
13	X 3	iPP eiScP	V E ₁	21 42 40 47.8	
	X 4	No V _s records until 06 15			
14	X 4	iP	V	09 40 45.9	C 17.9 S 178.4 W h: 574 km Fiji Is. region
15	✓ 4	eP eS eL	V E ₁ E ₁	16 12 03 22.6 37.7	35.5 S 102.8 W h: 33 km Easter Is. region
16	X 5	e(P)	V	11 03 58½	
17	✓ 6	iP	V	01 02 51.9	R 18.0 S 176.9 W h: 33 km* Fiji Is. region
18	✓ 6	(e) i(pP) iPP e i eL	V VN V V V N	02 02 44 51.3 03 36.8 04 08 06 24.8 12.3	5.8 S 150.3 E h: 61 km New Britain
19	X 6	e	V	17 17 08½	
20	✓ 7	iP i(pP) iPP eS	VNE V V E	04 13 24.3 14 51.0 58.8 17 51	C 22.1 S 179.4 W h: 546 km Fiji Is. region
21	✓ 7	eP i(PP)	V V	04 51 51 52 39.6	18.8 S 169.2 E h: 227 km New Hebrides Is.
L2	✓ 7	eS	V	10 23 17	Local
22	✓ 7	iP	V	10 38 15.5	C 20.8 S 174.0 E h: 33 km Fiji Is. region
23	✓ 7	i(P) i	V V	15 26 25.8 27 15.8	12.3 N 143.9 E h: 33 km Mariana Is. region
24	✓ 7	eP	V	17 42 59	29.3 S 178.5 W h: 209 km Kermadec Is.
25	✓ 8	iP	V	09 44 45.5	C
26	X 9	e eT Tmax	V V V	09 21 (23) 36 38 24	
27	✓ 9	iP i ipP iPP eS	VV ₁ V V V E ₁	10 59 30.7 33.7 11 00 46.9 01 01.5 04 14½	R 21.1 S 178.0 W h: 435 km Fiji Is. region
28	X 9	eP i	V V	11 30 53 31 05.6	7.6 N 126.8 E h: 139 km Near east coast of Mindanao, P
29	✓ 9	iP	V	21 15 38.0	11.4 S 166.4 E h: 167 km Santa Cruz Is.
30	✓ 10	(eP) iP e ipP i iPP i iS iScP i	V VNEV ₁ N ₁ E ₁ E ₁ VV ₁ VN ₁ VN ₁ V N ₁ E ₁ V V	03 37 41 41.4 38 44½ 48.3 39 05.8 11.7 19.0 42 43.9 43 13.9 17.0	C 6.2 S 128.1 E h: 366 km Banda Sea

No.	Date	Phase	Component	Time			Remarks.
30	✓ 10	Contin. eSS esS ei(L) ei	E E ₁ E ₁ N ₁	03	44	31 50 28½ 30½	
31	✓ 10	iP iPcP i(pP) isP	VN V V V	06	43	27.7 29.9 0.6 10.1	R 58.1 S 26.4 W h: 110 km Sandwich Is.
32	X 10	iP	VN	08	20	53.2	R
33	✓ 10	eP i	V V	13	16	45½ 48.1	7.2 N 125.1 E h: 33 km Near east coast of Mindanao P.
34	✓ 10	eP	V	14	48	02	7.1 S 155.5 E h: 88 km Solomon Is.
35	X 10	ePKP	V	20	22	58	17.1 N 60.4 W h: 33 km Leeward Is. region
	11	No V _s record from 00 00 until 03 15					
36	✓ 11	eP	NE	00	55	14	15.1 S 173.6 W h: 33 km Tonga Is. region
37	✓ 11	iP	NE N ₁ E ₁	02	37	16.7	17.8 S 173.6 W h: 537 km Fiji Is.
38	Y 11	iP ipP iPP i	VNE V ₁ N ₁ E ₁ V ₁ V V ₁ N ₁	04	01	22.7 54.2 02 49.7 52.6	C 7.2 S 125.5 E h: 145 km Banda Sea
39	Y 11	e(P)	V	07	58	02½	
40	Y 11	eP i	V V	10	10	40 43.0	8.0 N 126.1 E h: 33 km * Near east coast of Mindanao P.
41	Y 11	eP	V	11	17	42½	24.2 S 179.3 E h: 540 km Fiji Is.
42	✓ 11	iP	V	17	21	12.9	51.2 N 179.3 W h: 32 km Andreanof Is., Aleutian Is.
43	X 11	iP	V	22	46	49.9	
L3	Y 12	eP eS	VN N	01	12	46½ 02½	Local
44	Y 12	eP	VN	04	19	15	8.3 S 128.5 E h: 179 km Timor region
45	✓ 12	eP	V	09	53	15½	22.8 S 173.9 W h: 33 km* Fiji Is. region
46	Y 12	iP	V	15	13	11.8	R 4.5 N 97.2 E h: 33 km* Northern Sumatra
47	Y 12	e	V	17	44	29	
48	Y 12	eP	V	22	33	40	19.8 S 174.1 N h: 33 km Tonga Is.
49	✓ 12	eP e	V V	23	36 37	46 10	43.3 N 150.5 E h: 90 km Kurile Is.
50	X 13	eP	V	02	57	44	25.9 N 126.1 E h: 109 km* Ryukyu Is.
51	X 14	iP	VNE	01	51	11.8	R 17.9 S 173.3 W h: 550 km Fiji Is. region
52	X 14	eP	V	04	41	29	

No.	Date	Phase	Component	Time	Remarks.
53	X 14	eP	V	07 41 57	2.8 S 140.8 E h: 33 km Near north coast of New Guinea
54	X 15	iP	V	05 43 07.9	18.1 S 178.0 W h: 650 km Fiji Is.
55	Y 15	eP	V	15 14 24½	4.7 S 102.9 E h: 72 km Near coast of Sumatra
56	Y 15	eP eL ei	V N ₁ E ₁	17 39 27 50.4 51.02	9.4 S 124.1 E h: 33 km Timor region
57	✓ 15	iP i i i i eiPcP i ipP isP e(PFP) i iScP ePcS eS eSP ei e i iScS e(sS)	VNEV ₁ VN V VV ₁ NE ₁ V ₁ N ₁ VV ₁ N ₁ E ₁ V ₁ V ₁ VV ₁ E ₁ V ₁ N ₁ V ₁ E ₁ V ₁ N ₁ N ₁ E ₁ N ₁	19 42 33.5 35.3 48.4 43 13.2 14.6 46½ 48.9 44 29.1 45 44.3 46 07 10.1 40.6 47 46 48 48 57 49 03 53 50 05.0 51 15.7 52 22	R 4.8 S 108.0 E h: 650 km Java Sea
58	Y 16	iP i eFP eS e eiSS e	VNEV ₁ E ₁ V ₁ E ₁ V ₁ V ₁ N ₁ E ₁ V ₁ E ₁ V ₁	00 15.1 19.5 02 13 07 20 10 14 50½ 11.0	R 6.4 S 105.4 E h: 64 km Sunda Strait
59	X 16	iP	V	02 15 26.8	6.3 S 105.5 E h: 33 km Near west coast of Sumatra
60	Y 16	iP	V	04 25 28.1	6.3 S 105.5 E h: 63 km Near west coast of Sumatra
61	Y 16	eP	V	05 26 22	17.1 N 147.0 E h: 48 km Mariana Is. region
62	X 16	iP eS eL	VNV ₁ N ₁ N ₁ V ₁	14 22 49.3 26 54 28.4	C 49.1 S 127.1 E h: 33 km 2000 km south of Australia
63	X 16	iP	V	15 25 58.8	C 15.2 S 173.7 W h: 33 km Samoa Is.
64	X 16	eP	V	16 15 17½	6.5 S 105.3 E h: 46 km Sunda St.
65	X 17	eP	V	04 22 18	22.2 N 144.4 E h: 101 km Volcano Is. region
66	X 17	eP i(pP) i eL	V V V E ₁	10 25 06 11.8 47.9 34.7	6.5 S 146.8 E h: 33 km Eastern New Guinea

No	Date	Phase	Component	Time	Remarks
67	✓ 18	iP	VEV ₁ E ₁ 00	36 21.7	C 24.8 S 176.6 W h: 46 km
		i	NE	24.1	Tonga Is.
		i	N	26.7	
		ipP	VN	34.5	
		ePP	V	37 29	
		ePPP	V	44½	
		eiS	N ₁	41 21	
		ei	N ₁	26	
		e	E ₁	42 02	
		e	V ₁	38	
		eL	N ₁	43 24	
		eL	V ₁ E ₁	45.0	
68	✗ 18	eP	V	01 08 03	
69	✓ 18	eP	V	03 02 44	45.5 N 151.3 E h: 33 km Kurile Is.
70	✓ 18	iP	V	06 44 35.7	C 18.7 S 179.1 W h: 300 km* Fiji Is.
71	✗ 18	eP	V	12 27 40	29.9 S 177.2 W h: 130 km Kermadec Is.
72	✗ 18	e	V	19 52 04½	
73	✓ 19	eP	VN	15 42 21	
	✗ 19	eL	V ₁ E ₁	18 01.0	9.7 S 79.1 W h: 56 km Near coast of central Peru
74	✗ 19	eP	VN	19 30 10	
75	✓ 20	iP	VN	00 29 41.1	C 3.6 S 160.4 E h: 69 km
		esS	N ₁	34 48	Solomon Is.
		esS	E ₁	49	
		eL	V ₁	38.8	
	✗ 20	i	VN	01 18 24.1	
76	✗ 20	eP	V	04 26 48	6.9 S 129.5 E h: 53 km
		ei	V	27 54	Banda Sea
77	✗ 20	iP	V	04 59 59.7	C 14.8 S 173.4 W h: 33 km Samoa Is. region
L4	✗ 20	eP	V	06 34 24	Local
		eS	N	40½	
78	✗ 20	eP	V	07 36 07½	
79	✓ 20	eP	VN	09 03 49	R 7.0 S 129.3 E h: 103 km
		i	VV ₁	04 19.7	Banda Sea
		i	V ₁	05 50.7	
		eL	E ₁	10.6	
80	✗ 20	eP	V	16 01 36½	12.8 S 66.0 E h: 33 km Indian Ocean
81	✓ 20	eP	V	16 35 56½	12.7 S 66.3 E h: 33 km Indian Ocean
82	✓ 20	eP	V	16 58 05	12.6 S 66.4 E h: 33 km Indian Ocean
83	✗ 20	eP	F	21 18 45	20.3 S 174.8 W h: 33 km Tonga Is.
84	✗ 21	eP	V	04 19 07½	18.0 S 178.3 W h: 595 km Fiji Is.
85	✗ 21	eP	V	06 58 38	
		eL	E ₁	07 08.9	

No	Date	Phase	Component	Time	Remarks
86	✓ 21	iP	V	08 41 04.5	C 7.1 S 129.2 E h: 143 km Banda Sea
87	✓ 21	iP e ePPF eS	VEV ₁ E ₁ VE V NN ₁	12 40 59.6 41 25 42 37 ✓ 46 16	R 21.2 S 175.8 W h: 90 km Tonga Is.
88	✓ 21	iP ipP ePcP L	V V V E ₁	13 19 01.2 15.1 54½ ✓ 37	C 16.1 N 119.7 E h: 49 km Near west coast of Luzon, P.I.
89	✗ 21	iP	V	22 10 13.2	23.4 S 178.8 W h: 112 km* Tonga Is. region
90	✗ 22	e	V	10 43 (51)	
91	✗ 22	iP	VN	12 03 20.7	C 6.1 S 146.9 E h: 102 km North-east New Guinea
92	✗ 22	eP	V	13 40 12	34.9 S 173.0 E h: 82 km North Is., N.Z.
93	✓ 22	iPKP iSKP	V V	23 32 53.2 ✓ 36 03.5	6.9 N 73.0 W h: 153 km Colombia
94	✗ 23	eP	V	13 58 43	5.3 S 144.9 E h: 65 km North-east New Guinea
95	✗ 23	e	V	23 15 31½	
96	✗ 24	eP	V	09 13 58	5.0 S 155.1 E h: 197 km Solomon Is.
97	✓ 24	iP ipP eS	VNEV ₁ V E ₁	11 23 56.1 24 07.9 ✓ 28 33	C 13.1 S 166.7 E h: 61 km Santa Cruz Is. region
98	✓ 24	eP	V	13 07 07	36.2 N 139.7 E h: 70 km Honshu
99	✓ 24	eP	V	18 42 57½	6.9 S 147.4 E h: 49 km* Eastern New Guinea
100	✓ 24	eP	V	19 07 06½	6.6 S 146.8 E h: 53 km North-east New Guinea
101	✗ 24	eP i iS eS e eLq eL _R eT _R Tmax Tmax	VN VNE V E V ₁ E ₁ V ₁ V ₁ N V	21 10 17½ 18.9 13 46.0 48½ 52 55 15.1 24.8 28 11 31	53.0 S 159.5 E h: 33 km Macquarie Is. region
102	✓ 25	iP	VN	03 05 25.8	C 7.0 S 129.8 E h: 212 km* Banda Sea
103	✓ 25	eP	V	05 26 20	17.7 S 178.6 W h: 523 km Fiji Is. region
L5	✓ 25	(e) i(S)	V N	08 49 31½ 50 06.9	Victoria
104	✓ 25	eP	V	09 27 40	19.0 S 173.2 W h: 33 km Tonga Is.

No	Date	Phase	Component	Time	Remarks
105	25	e	V	12 50 52½	
106	X 25	iP	V	20 25 23.7	18.9 S 173.4 W h: 33 km Tonga Is.
L6	X 26	eP	VN	01 21 46	Local
		i	V	49.4	
		(eS)	V	57½	
		eS	VNE	58	
107	X 26	eP	V	01 40 05	5.1 S 102.3 E h: 40 km*
		i	V	10.9	Near south coast of Sumatra
		ipP	V	11.7	
108	Y 26	eP	V	05 41 54	5.1 S 129.3 E h: 175 km*
					Banda Sea
109	X 26	eP	V	16 31 43½	1.4 N 126.7 E h: 65 km
		i	V	43.9	Molucca Sea
110	X 27	eP	V	05 28 53½	15.1 S 175.2 W h: 33 km*
		i	V	58.7	Tonga Is.
111	✓ 27	eP	V	05 41 57	6.4 S 105.2 E h: 33 km
					Sunda Strait
112	Y 27	eP	V	06 55 03½	
L7	Y 27	e	V	07 44 58	Victoria
113	X 27	eP	V	10 10 02½	5.8 S 105.5 E h: 52 km
					Flores Sea
114	X 28	eP	V	04 41 00½	20.2 S 177.9 W h: 507 km
					Fiji Is. region
115	✓ 28	iP	VNV ₁	05 51 28.1	C 5.1 S 15.3 E h: 70 km
		i(pP)	V	50.2	New Ireland region
		eS	E ₁	56 25	
		eLq	E ₁	58.6	
		eL	N ₁	59.3	
		eL	V ₁	06 01.2	
116	X 28	(eP)	V	07 26 06	
		iP	V	06.4	
117	✓ 28	iP	VEV ₁ E ₁	09 09 32.1	C 32.7 S 178.9 W h: 33 km
		ipP	N ₁	41.4	Kermadec Is.
		e	N	52½	
		ei	V ₁	10 07	
		ei	E ₁	13.5	
		iPcP	VV ₁	12 52.2	
		eS	E ₁	14 01	
		eS	N ₁	02	
		e(L)	N ₁	57	
		eSSS	N ₁	15 27	
		iScP	V ₁	16 21.7	
		i	EV ₁	23.2	
		eL	E ₁	16.8	
		eScS	NN ₁	20 11	
		ei	EE ₁	14	
118	✓ 28	eP	V	18 10 56	60.4 S 51.8 W h: 49 km
		iPcP	V	58.0	South Shetland Is. region
		L	V ₁	41	
L8	X 29	eP	V	01 46 25½	Local
		eP	V	27	
		eS	V	34½	
		eS	E	35	

No	Date	Phase	Component	Time	Remarks
119	29	iP	VE	03 06 00.8	R 30.9 S 177.8 W h: 33 km Kernadec Is.
120	29	esP	V	08 42 26	20.6 S 169.8 E h: 65 km New Hebrides Is.
121	29	eP	V	11 58 37½	6.1 S 148.9 E h: 86 km New Britain region
122	29	iP	V	13 29 49.3	
123	29	iP	V	15 06 09.3	R 20.7 S 178.4 W h: 534 km Fiji Is, region
124	30	iP	V	01 05 16.3	3.4 S 128.8 E h: 62 km
		i	V	20.3	Banda Sea
125	30	iP	VN	01 24 58.0	R 21.6 N 144.5 E h: 120 km
		i	V	59.2	Mariana Is. region
		ePcP	V	25 57½	
126	30	iP	V	06 29 38.8	C 29.3 S 176.3 W h: 34 km Kernadec Is.
127	30	eP	V	10 25 17	19.8 S 169.9 E h: 33 km Loyalty Is.
129	30	iP	V	10 53 45.9	Local
		iS	VN	49.8	
128	30	iP	V	13 41 35.9	C 45.5 N 150.6 E h: 40 km
		iPcP	V	44.2	Kurile Is.
129	30	iP	V	15 12 57.1	R 9.4 N 126.0 E h: 102 km
		i	V	13 08.7	Near east coast of Mindanao P.I.
		ipP	V	23.1	
		i	V	29.9	
		i	V	44.8	
		i	V	51.0	
		iPcP	V	14 17.3	
		iPP	V	50.3	
		i	V	15 17.1	
		eS	E	19 56½	
130	30	iP	VE	22 16 50.2	C 6.9 N 94.7 E h: 64 km Nicobar Is.
131	30	iP	V	23 56 50.8	
132	31	iP	V	00 35 59.0	R
133	31	eP	V	01 37 40	21.5 S 176.9 W h: 390 km* Tonga Is.
134	31	iP	V	10 27 42.5	R 19.1 S 173.1 W h: 609 km Fiji Is.
135	31	iP	VV ₁ N ₁	17 50 23.3	C 56.5 S 26.0 W h: 30 km
		ipP	V	36.0	Sandwich Is.
		isP	V	39.8	
		i	V	53 08.2	
		ePP	V ₁ N ₁	51	
		e	V	57 09	
		e	V	59 11	
		eSKS	N ₁	18 00 52	
		eS	E ₁	01 07	
		eL	V ₁	14.3	
136	31	eP	V	19 05 16	7.1 S 129.3 E h: 100 km* Banda Sea

No	Date	Phase	Component	Time	Remarks
137	✓ 31	eP	V	19 24 00 $\frac{1}{2}$	17.4 S 174.2 W h: 80 km Tonga Is.
		e	N ₁	33 10	
		e	VN ₁	✓ 18	
138	✗ 31	e	V	22 09 05 $\frac{1}{2}$	

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