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Old seismologic reports

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SEISMIC OBSERVATIONS
AT FABRA OBSERVATORY IN 1987

by M^a TERESA SUSAGNA VIDAL

The Observatory has the following seismographs:

Station FBR (Coordinates 41°25,0'N, 2°07,5'E)

— One short period «Teledyne Geotech» seismograph, vertical and horizontal components, with ink recording (since 19 June).

— Two long period «Mainka» seismograph, horizontal components, with mechanic recording.

— One short period «Vicentini» seismograph, vertical component, with mechanic recording.

We symbolize by ZT Teledyne Geotech vertical component, by NM and EM the Mainka horizontal components and by ZV the Vicentini vertical component.

For the most outstanding earthquakes, we describe their epicentral characteristics, calculated by the Seismic Section of this Observatory (FBR), together with «Servei Geològic de Catalunya» (SGC) or provided by the United States Geological Survey (GS), by the «Centre Seismologique Europeo-Mediterranean» (CSEM), by the «Instituto Geográfico Nacional» (I.G.N.) or by the Laboratoire de Détection et de Géophysique (LDG) or by P. Sthal (PS).

Station FONT (Coordinates 41°45,7'N, 2°26,0'E)

— One short period «Teledyne Geotech» seismograph, vertical component, with ink recording (until 10 May).

The average instrumental constants have been:

1) Electromagnetic seismograph (electronic and ink recording):

Type	Component	Mass (kg)	Period(s) To	Magnification	Damping
Teledyne Geotech	Z (ZT)	5	1	3.600	0,7
	N-S (NT)	5	1	3.600	0,7
	E-W (ET)	5	1	3.600	0,7

2) Electromagnetic seismograph (photographic recording):

Type	Component	Period(s)		Magnification	Damping
		Tp	Tg		
Hiller-Stuttgart	Z (ZH)	1,61	1,3	7.236	Critical

3) Mechanical seismographs (recording on smoked paper):

Type	Component	Mass (kg)	Period(s) To	Damping E	Friction r/T o ²	Amplification V
Mainka	N-S (NM)	141	7,0	3,00	0,015	37,9
	E-W (EM)	144	6,2	3,91	0,013	58,9
Vicentini	Z (ZV)	56	0,9	—	—	125



SEISMIC OBSERVATIONS

1987

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
1 Jan	ZT	Pg	09	54	26,0	Ep.: See pag. 104	
	ZT	Sg	09	54	38,0		
3	ZT	P	22	23	57,0	16.700	Ep.: 15,0 S; 167,9 E; H = 22:04:04.78 h = 15 km; M = 6,0 (SG) Vanuatu Islands
4	ZT	P	10	33	27,0		Ep.: 49,8 N; 149,3 E; H = 10:21:45.8 h = 489 km; M = 5,1 (GS) Northwest of Kuril Islands
4	ZT	Pn	20	02	07,4	Ep.: See pag. 104	
	ZT	Sn	20	02	22,8		
5	ZT	P	12	24	35,0	9.500	Ep.: 52,4 N; 169,4 W; H = 12:11:55,7 h = 33 km; M = 6,1 (GS) Fox Islands, Aleutian Islands
5	ZT	P	21	11	24,5	16.700	Ep.: 14,9 S; 167,2 E; H = 20:51:47,6 h = 132 km; M = 5,5 (GS) Vanuatu Islands
5	ZT	P	23	02	30,5	6.300	Ep.: 41,9 N; 81,3 E; H = 22:52:46,5 h = 17 km; M = 5,9 (GS) Southern Xinjiang, China
6	ZT	P	00	21	53,5	1.200	Ep.: 36,9 N; 10,3 W; H = 00:19:19,7 h = 30 km; M = 4,0 (IGN) W Cabo San Vicente
8	ZT	Pn	04	06	59,0		Ep.: 43,0 N; 0,3 W; H = 04:06:18,2 h = - km; M = 2,8 (LDG) Pau, France
9	ZT	P	06	27	41,5	10.000	Ep.: 39,9 N; 141,7 E; H = 06:14:44,8 h = 68 Km; M = 6,4 (GS) Honshu, Japan
12	ZT	Pg	16	35	57,0		Ep.: Local
12	ZT	Pg	17	12	42,0		Ep.: Local
15	ZT	Pn	18	32	16,5	Ep.: Local	
	ZT	Sn	18	32	31,0		
18	ZT	Pg	03	35	17,4	Ep.: Local	
	ZT	Sg	03	35	22,0		
18	ZT	Pg	04	44	06,5	Ep.: Local	
	ZT	Sg	04	44	22,0		
19	ZT	Pg	10	22	12,2	Ep.: See pag. 104	
	ZT	Sn	10	22	46,0		



SEISMIC OBSERVATIONS

1987

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
19 Jan	ZT	Pg	13	32	23,0		Ep.: Local
20	ZT	Pg	17	59	46,5		Ep.: Local
20	ZT	Pg	12	41	07,5		Ep.: Local
22	ZT	P	17	0,1	01,0		Ep.: 43,3 N; 3,52 W; H = 16:59:52,6 h = 10 km; M = 3,4 (IGN) Ogarrio, San Sebastian, Spain
22	ZT	Pn	17	23	52,0		Ep.: See pag. 104
	ZT	Pg	17	23	53,3		
	ZT	Sn	17	24	00,0		
24	ZT	P	08	18	56,0	6.200	Ep.: 41,5 N; 79,3 E; H = 08:09:21,3 h = 29 km; M = 5,9 (IGS) Xinjiang Border Region
24	ZT	Pg	09	55	09,5		Ep.: Local
25	ZT	Pg	15	32	39,0		Ep.: Local
25	ZT	P	19	06	01,7		Ep.: 43,23 N; 0,92 W; H = 19:05:18,4 h = 2 km; M = 2,6 (LDG) Pau, France
26	ZH	P	11	13	34,5		Ep.: 36,0 N; 1,3 E; H = 11:11:47,4 h = - km; M = 4,8 (IGN) Algeria
28	ZT	Pg	03	37	57,0		Ep.: See pag. 104
	ZT	Sg	03	38	04,3		
28	ZT	Pg	16	59	39,0		Ep.: Local
29	ZT	Pn	13	34	39,2		Ep.: 36,3 N; 12,7 E; H = 13:35:19,8 h = 30 km; M = 4,0 (GS) Mediterranean Sea
	ZT	Sn	13	34	51,0		
1 Feb	ZT	Pg	17	20	11,2		Ep.: See pag. 104
3	ZT	Pg	14	09	36,5		Ep.: Local
3	ZT	Pg	14	09	51,0		Ep.: Local
5	ZT	Pn	10	00	14,0		Ep.: 43,6 N; 4,6 E; H = 09:59:35,5 h = 12 km; M = 3,5 (GS) Near South Coast of France
5	ZT	Pg	11	37	14,2		Ep.: Local



SEISMIC OBSERVATIONS

1987

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
5 Feb	ZT	Pg	14	28	01,0		Ep.: Local
5	ZT	Pg	14	29	46,0		Ep.: Local
	ZT	Sg	14	29	49,0		
5	ZT	Pg	16	58	44,2		Ep.: Local
6	ZT	Pg	06	40	34,5		Ep.: Local
6	ZT	Pg	07	10	32,0		Ep.: Local
7	ZT	Pg	17	13	41,5		Ep.: See pag. 104
	ZH	Sg	17	14	05,4		
8	ZH	P	18	53	20,9		Ep.: Local
9	ZT	Pg	12	45	35,0		Ep.: Local
	ZT	Sg	12	45	37,5		
9	ZT	Pg	12	55	20,7		Ep.: Local
		Sg	12	55	23,0		
9	ZT	Pn	13	38	07,5		Ep.: Local
	ZT	Sn	13	38	26,0		
9	ZT	Pg	16	56	36,5		Ep.: Local
10	ZH	P	01	08	39,7	17.500	Ep.: 19,5 S; 177,5 W; H = 00:59:28,5 h = 395 km; M = 6,2 (GS) Fiji Islands Region
10	ZT	P	21	21	41,2	700	Ep.: 44,3 N; 10,3 E; H = 21:20:13,5 h = 32 km; M = 4,0 (GS) Northern Italy
11	ZH	P	08	17	01,2	16.800	Ep.: 15,8 S; 167,3 W; H = 07:56:12,9 h = 24 km; M = 5,9 (GS) Vanuatu Islands
11	ZT	Pg	13	13	07,2		Ep.: Local
11	ZT	Pg	17	04	41,0		Ep.: Local
13	ZT	Pg	10	31	40,5		Ep.: Local
13	ZT	Pg	10	35	52,0		Ep.: Local
14	ZT	Pg	10	40	30,0		Ep.: Local



SEISMIC OBSERVATIONS

1987

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
17 Feb	ZT	Pg	08	48	38,0		Ep.: Local
	ZT	Sg	08	48	42,0		
17	ZT	Pg	16	13	21,5		Ep.: Local
	ZT	Sg	16	13	34,2		
18	ZT	Pg	23	26	07,5		Ep.: Local
19	ZT	P	02	19	14,2		Ep.: 42,8 N; 4,9 W; H = 02:17:53,0 h = 5 km; M = 3,2 (IGN) Leon, Spain
19	ZT	Pg	09	40	51,0		Ep.: Local
19	ZT	Pg	09	49	24,0		Ep.: Local
19	ZT	Pg	10	33	37,0		Ep.: Local
19	ZT	Pg	12	40	16,0		Ep.: Local
19	ZT	Pg	14	42	49,0		Ep.: Local
20	ZT	Pg	02	02	15,5		Ep.: Local
20	ZT	Pg	19	34	40,0		Ep.: Local
21	ZT	Pg	01	47	32,0		Ep.: Local
21	ZT	Pg	06	50	43,5		Ep.: Local
21	ZT	Pg	08	38	11,5		Ep.: Local
21	ZT	Pg	14	44	08,0		Ep.: Local
22	ZT	Pg	22	23	25,5		Ep.: See pag. 104
	ZT	Sg	22	23	54,5		
23	ZT	Pg	11	48	01,0		Ep.: Local
23	ZT	Pg	11	51	40,5		Ep.: Local
23	ZT	Pg	12	23	28,5		Ep.: Local
23	ZT	P	16	09	23,0	16.700	Ep.: 15,8 S; 167,9 E; H = 15:49:54,6 h = 234 km; M = 5,9 (GS) Vanuatu Islands
25	ZT	Pg	08	57	48,0		Ep.: Local



SEISMIC OBSERVATIONS

1987

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
25 Feb	ZT	Pg	13	12	57,5		Ep.: Local
25	ZT	P	20	07	16,0	7.200	Ep.: 38,1 N; 91,2 E; H = 19:56:35,5 h = 26 km; M = 5,7 (GS) Qinghai province, China
25	ZT	Pg	17	10	36,5		Ep.: Local
27	ZT	P	08	44	30,0	9.400	Ep.: 53,4 N; 167,3 W; H = 08:31:54,4 h = 10 km; M = 6,2 (GS) Fox Islands, Aleutian Islands
	ZH	P	08	44	10,0		
27	ZT	Pg	11	08	49,0		Ep.: Local
27	ZT	P	16	47	30,0		Ep.: Local
27	ZT	P	23	38	17,0	1.550	Ep.: 38,5 N; 20,3 E; H = 23:34:52,0 h = 5 km; M = 5,3 (GS) Greece
28	ZT	P	04	02	50,0		Ep.: 36,8 N; 0,45 E; H = 04:01:21,6 h = - km; M = 3,9 (IGN) Algeria
28	ZT	Pg	06	23	45,0		Ep.: See pag. 104
	ZT	Sg	06	24	07,0		
3 Mar	ZT	Pn	10	42	37,0		Ep.: 43,2 N; 0,6 W; H = 10:42:52,0 h = 6 km; M = 3,6 (LDG) Pau, France
	ZT	Sn	10	43	15,0		
	ZT	Sg	10	43	18,0		
3	ZT	Pg	12	25	52,5		Ep.: Local
4	ZT	Pg	12	02	18,2		Ep.: Local
4	ZT	Pg	12	09	18,0		Ep.: Local
5	ZT	P	09	30	22,0	10.500	Ep.: 24,4 S; 70,2 W; H = 09:17:05,2 h = 62 km; M = 6,5 (GS) Near Coast or Northern Chile
5	ZT	Pg	22	52	07,5		Ep.: See pag. 104
	ZT	Sg	22	52	14,5		
6	ZT	P	02	07	14,5	9.200	Ep.: 0,0 N; 77,6 W; H = 01:54:50,4 h = 146 km; M = 6,1 (GS) Colombia-Ecuador Border Region
	ZH	P	02	06	55,0		
6	ZT	P	04	21	49,5	9.200	Ep.: 0,1 N; 77,8 W; H = 04:16:41,9 h = 10 km; M = 6,5 (GS) Colombia-Ecuador Border Region



SEISMIC OBSERVATIONS

1987

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
7 Mar	ZT	P	06	31	08,0	16.800	Ep.: 16,0 S, 167,4 E; H = 06:11:17,0 h = 36 km; M = 5,6 (GS) Vanuatu Islands
8	ZT	Pg	01	41	05,0		Ep.: Local
	ZT	Sg	01	41	09,0		
8	ZT	P	01	59	55,0		Ep.: 42,7 N; 1,7 W; H = 01:59:07,5 h = 10 km; M = 2,8 (IGN) Navarra. Spain
	ZT	S	02	00	41,5		
8	ZT	Pg	05	11	44,0		Ep.: Local
	ZT	Sg	05	11	48,0		
8	ZT	Pg	05	13	19,0		Ep.: Local
	ZT	Sg	05	13	22,5		
8	ZT	Pg	18	42	52,5		Ep.: See pag. 104
	ZT	Sg	18	43	05,2		
8	ZT	Pg	20	47	03,0		Ep.: Local
11	ZT	Pg	17	43	43,0		Ep.: Local
	ZT	Sg	17	43	53,5		
12	ZT	Pg	15	19	57,0		Ep.: Local
13	ZT	Pg	00	31	40,5		Ep.: See pag. 104
	ZT	Sg	00	31	52,5		
18	ZT	P	03	49	31,0		Ep.: 32,0 N; 131,8 E; H = 03:36:30,3 h = 54 km; M = 6,4 (GS) Kyushu, Japan
20	ZT	Pg	17	47	49,0		Ep.: Local
21	ZT	Pg	06	38	26,0		Ep.: Local
21	ZT	Pg	06	38	46,5		Ep.: Local
22	ZT	Pg	06	43	10,0		Ep.: Local
22	ZT	Pg	06	47	41,0		Ep.: Local
23	ZT	Pg	00	48	57,8		Ep.: Local
	ZT	Sg	00	49	00,0		
23	ZT	Pg	17	06	43,5		Ep.: Local



SEISMIC OBSERVATIONS

1987

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
24 Mar	ZT	Pg	14	40	08,5		Ep.: Local
26	ZT	P	16	37	05,0	16.700	Ep.: 13,73 S; 167,2 E; H = 16:17:38,1 h = 191 km; M = 5,5 (GS) Vanuatu Islands
29	ZT	Pg	11	26	24,5		Ep.: See pag. 104
29	ZT	Pg	18	14	17,0		Ep.: Local
31	ZT	Pg	10	57	51,5		Ep.: Local
1 Apr	ZT	P	02	00	42,0	10.000	Ep.: 22,8 S; 66,2 W; H = 01:48:08,5 h = 249 km; M = 6,1 (GS) Argentina
1	ZT	Pn	03	07	10,7		Ep.: 43,4 N; 0,7 W; H = 03:7:24,0 h = 4 km; M = 3,2 (LDG) Pau, France
1	ZT	Pg	23	30	15,5		Ep.: Local
	ZT	Sg	23	30	17,5		
2	ZT	Pn	10	16	53,0		Ep.: Local
2	ZT	Pg	12	45	52,0		Ep.: Local
2	ZT	Pg	16	30	44,0		Ep.: Local
3	ZT	Pg	11	50	32,0		Ep.: Local
3	ZT	Pg	15	13	13,0		Ep.: Local
	ZT	Sg	15	13	16,5		
5	ZT	Pg	18	15	58,8		Ep.: Local
6	ZT	Pg	11	19	02,0		Ep.: See pag. 105
6	ZT	Pg	15	37	46,0		Ep.: Local
10	ZT	Pg	13	41	55,5		Ep.: Local
10	ZT	Pg	16	12	35,0		Ep.: Local
	ZT	Sg	16	12	38,0		
10	ZT	Pg	20	59	00,8		Ep.: Local
	ZT	Sg	20	59	04,6		



SEISMIC OBSERVATIONS

1987

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
11 Apr	ZT	Pg	10	21	34,0		Ep.: Local
11	ZT	Pg	10	21	42,0		Ep.: Local
11	ZT	Pg	14	27	26,5		Ep.: Local
12	ZT	Pg	05	51	24,5		Ep.: Local
13	ZT	Pn	20	38	55,5		Ep.: See pag. 105
16	ZT	Pg	06	04	06,0		Ep.: Local
16	ZT	Pg	17	30	00,0		Ep.: Local
	ZT	Sg	17	30	04,5		
17	ZT	Pg	06	00	30,5		Ep.: Local
18	ZH	P	02	13	51,0	8.300	Ep.: 61,4 N; 150,6 W; H = 02:01:38,8 h = 68 km; M = 5,7 (GS) Southern Alaska
18	ZT	Pg	09	01	13,0		Ep.: Local
18	ZT	P	23	49	33,0		Ep.: 43,4 N; 0,7 W; H = 23:48:45,5 h = 7 km; M = 2,9 (LDG) Pau, France
19	ZT	Pg	12	05	14,0		Ep.: See pag. 105
20	ZT	Pg	10	33	33,0		Ep.: See pag. 105
20	ZT	Pg	17	11	28,8		Ep.: Local
20	ZT	Pg	17	11	18,0		Ep.: Local
20	ZT	P	23	33	—		Ep.: See pag. 105
21	ZT	Pg	09	01	46,0		Ep.: Local
22	ZT	Pg	11	16	44,0		Ep.: See pag. 105
22	ZT	Pn	12	00	25,5		Ep.: See pag. 105
22	ZT	P	15	37	—		Ep.: See pag. 105
22	ZH	P	20	27	27,0	10.300	Ep.: 37,1 N; 141,6 E; H = 20:13:23,1 h = 30 km; M = 6,6 (GS) Near East Coast of Japan
22	ZT	Pg	21	35	36,5		Ep.: See pag. 105



SEISMIC OBSERVATIONS

1987

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
23 Apr	ZT	Pn	19	33	18,5		Ep.: See pag. 105
24	ZT	P	02	32	08,0	760	Ep.: 44,8 N; 10,9 E; H = 02:20:29,6 h: 32 km; M = 4,1 (GS) Northern Italy
25	ZH	P	13	31	13,4	8.400	Ep.: 16,1 N; 120,3 E; H = 13:12:52,4 h = 107 km; M = 6,3 (GS) Philippine Islands
25	ZT	Pg	22	18	45,5		Ep.: Local
	ZT	Sg	22	18	47,0		
27	ZT	Pg	19	29	35,2		Ep.: See pag. 105
	ZT	Sg	19	29	48,2		
28	ZT	Pg	00	28	16,0		Ep.: Local
	ZT	Sg	00	28	18,5		
28	ZT	Pg	16	10	38,5		Ep.: Local
29	ZT	Pg	09	13	02,0		Ep.: Local
2 May	ZT	P	20	45	34,5	750	Ep.: 44,8 N; 10,7 E; H = 20:43:53,0 h = 10 km; M = 4,8 (GS) Northern Italy
2	ZT	P	22	26	23,5		Ep.: 41,3 N; 5,7 E; H = 22:25:52,6 h = - km; M = 2,9 (GS) Mediterranean Sea
3	ZT	Pg	23	40	44,4		Ep.: See pag. 105
	ZT	Sg	23	40	47,8		
4	ZT	P	16	44	—		Ep.: See pag. 105
5	ZT	P	15	49	37,0	5.700	Ep.: 36,5 N; 70,7 E; H = 15:40:47,5 h = 202 km; M = 5,8 (GS) Hindu Kush Region
6	ZT	Pg	08	56	38,5		Ep.: Local
7	ZT	P	03	17	33,0	9.300	Ep.: 46,7 N; 139,2 E; H = 03:05:49,1 h = 430 km; M = 6,0 (GS) Near Coast of Eastern USSR
9	ZH	P	06	53	13,2	16.200	Ep.: 11,3 S; 165,7 E; H = 06:32:34,9 h = 46 km; M = 5,5 (GS) Santa Cruz Islands
10	ZT	Pg	14	08	30,0		Ep.: Local
	ZT	Pg	14	08	36,5		



SEISMIC OBSERVATIONS

1987

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
18 May	ZH	P	03	20	08,9	9.300	Ep.: 49,3 N; 147,7 E; H = 03:07:34,1 h = 542 km; M = 6,1 (GS) Sea of Okhotsk
25	ZH	P	11	38	18,5	2.500	Ep.: 63,8 N; 19,7 W; H = 11:31:54,3 h = 8 km; M = 5,8 (GS) Iceland
25	ZH	Pg	12	45	37,6		Ep.: Local
25	ZH	Sg	13	10	33,5		Ep.: See pag. 106
25	ZH	Sg	13	42	09,1		Ep.: Local
26	ZH	Sn	16	35	06,2	2.000	Ep.: 43,1 N; 0,4 W; H = 16:32:57,9 h = 7 km; M = 3,8 (LDG) Iceland
18 Jun	ZT	P	14	23	22	16.000	Ep.: 10,7 S; 162,3 W; H = 14:03:15,1 h = 73 km; M = 6,0 (GS) Salomon Islands
19	ZT	P	18	50	16,0	2.300	Ep.: 36,8 N; 28,2 E; H = 18:45:41,6 h = 80 km; M = 5,0 (GS) Dodecanese Islands
20	ZT	P	01	02	17,0	5.700	Ep.: 49,9 N; 78,7 E; H = 00:53:04,8 h = - km; M = 6,1 (GS) Eastern Kazakh SSR
20	ZT	Pg	06	07	30,0		Ep.: See pag. 107
	ZT	Sg	06	07	49,2		
21	ZT	P	05	58	37,4	9.200	Ep.: 54,2 N; 162,6 W; H = 05:46:10,0 h = 34 km; M = 6,2 (GS) Alaska Peninsula
25	ZT	P	02	54	34,0	2.400	Ep.: 47,3 N; 27,5 W; H = 02:49:39,7 h = 10 km; M = 5,5 (GS) North Atlantic Ridge
25	ZT	Pg	16	37	34,4		Ep.: Local
	ZT	Sg	16	37	38,0		
26	ZT	Pn	17	14	23,2		Ep.: 43,0 N; 0,5 W; H = 17:13:40,5 h = 2 km; M = 3,9 (LDG) Pau, France
28	ZT	P	00	54	46,5	2.200	Ep.: 32,8 N; 24,3 E; H = 00:50:17,8 h = 24 km; M = 5,2 (GS) Near Coast of Libia
28	ZT	P	02	14	00,0		Ep.: 44,2 N; 6,2 E; H = 02:12:53,0 h = 6 km; M = 3,8 (LDG) Pau, France



SEISMIC OBSERVATIONS

1987

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
3 Jul	ZT	P	10	24	08,5	700	Ep.: 43,3 N; 14,1 E; H = 10:21:59,0 h = - km; M = 4,8 (LDG) Central Italy
3	ZT	P	18	16	08,0	7.800	Ep.: 6,8 N; 72,2 E; H = 18:03:59,7 h = 26 km; M = 5,3 (GS) Chagos Archipelago Region
6	ZT	P	03	09	29,5	16.600	Ep.: 14,1 S; 167,8 E; H = 02:49:42,7 h = 48 km; M = 5,9 (GS) Vanuatu Islands
6	ZT	P	03	24	47,0	16.600	Ep.: 14,0 S; 167,8 E; H = 03:05:00,3 h = 46 km; M = 5,7 (GS) Vanuatu Islands
6	ZT	Pn	04	33	04,0		Ep.: 41,1 N; 1,1 W; H = 04:32:25,4 h = - km; M = 3,5 (IGN) Zaragoza, Spain
	ZT	Pg	04	33	09,6		
	ZT	Sn	04	33	37,8		
6	ZT	P	23	34	17,5	9.200	Ep.: 53,4 N; 158,3 E; H = 23:22:06,1 h = 149 km; M = 5,3 (GS) Near East coast of Kanchatka
8	ZT	P	23	08	35,5	9.700	Ep.: 46,4 N; 149,6 E; H = 22:56:02,7 h = 152 km; M = 5,4 (GS) Kuril Islands
9	ZT	P	22	38	29,0	16.400	Ep.: 12,1 S; 166,6 E; H = 22:18:57,2 h = 121 km; M = 5,6 (GS) Santa Cruz Island
10	ZT	P	19	02	17,5	9.100	Ep.: 55,1 N; 165,5 E; H = 18:49:53,9 h = 33 km; M = 6,1 (GS) Kornandorsky Island Region
11	ZT	P	01	48	50,0	800	Ep.: 44,7 N; 11,3 E; H = 01:46:50,6 h = 20 km; M = 4,1 (GS) Noethern Italy
11	ZT	P	06	23	39,5	4.500	Ep.: 82,2 N; 17,5 W; H = 06:15:51,0 h = 10 km; M = 5,5 (GS) North Coast of Greenland
14	ZT	P	23	57	36,0	9.300	Ep.: 49,6 N; 147,8 E; H = 23:46:03,53 h = 576 km; M = 5,7 (GS) Sea of Okhotsk
15	ZT	P	07	28	45,0	9.300	Ep.: 17,5 N; 97,1 W; H = 07:16:13,5 h = 67 km; M = 5,9 (GS) Oaxaca, Mexico
24	ZT	P	05	37	21,0	8.900	Ep.: 56,2 N; 153,6 W; H = 05:25:10,5 h = 33 km; M = 5,5 (GS) Kodiak Island Region
24	ZT	P	08	11	12,2	600	Ep.: 36,2 N; 3,4 E; H = 08:09:52,4 h = 10 km; M = 4,5 (GS) Algeria



SEISMIC OBSERVATIONS

1987

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
24 Jul	ZT	Pg	08	28	16,2		Ep.: Local
24	ZT	Sg	10	45	42,0		Ep.: Local
24	ZT	Pg	11	25	17,6		Ep.: Local
24	ZT	Pg	11	27	35,0		Ep.: Local
26	ZT	Pg	14	43	05,2		Ep.: See pag. 107
	ZT	Sg	14	43	19,6		
26	ZT	Pg	15	30	09,4		Ep.: See pag. 107
	ZT	Sg	15	30	23,4		
28	ZT	Pg	15	27	07,0		Ep.: Local
29	ZT	Pn	21	44	28,4		Ep.: 43,1 N; 0,7 W; H = 21:43:38,9
	ZT	Sn	21	45	01,8		h = 16 km; M = 3,1 (LDG) Pau, France
31	ZT	P	02	25	42,0	750	Ep.: 36,4 N; 7,8 E; H = 02:24:03,4 h = 10 km; M = 3,7 (GS) Algeria
1 Aug	ZT	Pg	00	09	33,5	8.600	Ep.: 40,4 N; 124,4 W; H = 23:56:58,0 h = 16 km; M = 5,6 (GS) Near Coast of Northern Calif.
2	ZT	P	01	07	20,0	5.700	Ep.: 49,9 N; 78,9 E; H = 00:58:06,8 h = - km; M = 5,9 (GS) Easter Kazaki SSR
2	ZT	P	02	07	39,5	4.400	Ep.: 73,3 N; 54,6 E; H = 01:59:59,8 h = - km; M = 5,8 (GS) Novaya Zemlya
3	ZT	Pg	04	07	10,7		Ep.: See pag. 107
	ZT	Sg	04	07	29,0		
7	ZT	Sg	23	08	17,8		Ep.: Local
8	ZT	P	16	01	48,5	10.000	Ep.: 19,0 S; 69,9 W; H = 15:48:56,7 h = 70 km; M = 6,4 (GS) Northern Chile
9	ZT	P	21	25	38,0	7.200	Ep.: 29,5 N; 83,7 E; H = 21:15:00 h = 48 km; M = 5,6 (GS) Nepal
10	ZT	P	11	01	02,0	10.100	Ep.: 29,8 S; 63,8 E; H = 10:52:19,9 h = 165 km; M = 5,6 (GS) Pakistan



SEISMIC OBSERVATIONS

1987

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
12 Aug	ZT	P	00	26	02,5	16.200	Ep.: 12,2 S; 166,6 E; H = 00:06:29,2 h = 144 km; M = 5,4 (GS) Santa Cruz Islands
12	ZT	P	03	20	00,0	6.600	Ep.: 14,1 N; 59,2 W; H = 03:09:59,5 h = 52 km; M = 5,7 (GS) Windward Islands
12	ZT	P	06	31	39,5	9.900	Ep.: 31,6 S; 58,4 E; H = 06:18:40,7 h = 10 km; M = 5,6 (GS) Atlantic-Indian Rise
12	ZT	Pg	13	02	25,8		Ep.: Local
	ZT	Sg	13	02	37,7		
13	ZT	P	07	24	39,0	1.200	Ep.: 37,9 N; 15,0 E; H = 07:22:09,2 h = 41 km; M = 4,8 (GS) Sicily
13	ZT	P	15	36	02,0	10.000	Ep.: 17,9 S; 70,9 W; H = 15:23:06,9 h = 37 km; M = 6,1 (GS) Near Coast of Peru
13	ZT	P	20	52	30,0	16.200	Ep.: 11,3 S; 165,4 E; H = 20:32:47,9 h = 23 km; M = 5,4 (GS) Santa Cruz Islands
13	ZT	P	22	06	43,5	16.700	Ep.: 14,8 S; 167,9 E; H = 21:46:53,2 h = 33 km; M = 5,6 (GS) Vanuatu Islands
13	ZT	P	06	18	48,0	16.200	Ep.: 12,6 S; 166,6 E; H = 05:59:04,2 h = 29 km; M = 5,6 (GS) Santa Cruz Islands
15	ZT	P	18	18	04,0	10.700	Ep.: 28,1 S; 70,8 W; H = 18:04:23,1 h = 37 km; M = 6,0 (GS) Central Chile
23	ZT	Pn	13	25	11,0		Ep.: See pag. 108
	ZT	Sn	13	25	40,0		
24	ZT	Pg	18	43	16,9		Ep.: See pag. 108
	ZT	Sg	18	43	25,9		
29	ZT	Pg	14	29	18,5		Ep.: See pag. 108
1 Sep	ZT	P	04	38	45,5	10.000	Ep.: 23,1 S; 66,5 W; H = 04:26:07,4 h = 199 km; M = 6,0 (GS) Argentina
2	ZT	S	20	19	20,5		Ep.: Local
5	ZT	Pg	18	23	12,2		Ep.: See pag. 108
	ZT	Sg	18	23	26,5		



SEISMIC OBSERVATIONS

1987

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
7 Sep	ZT	P	12	17	15,0	18.400	Ep.: 31,1 S; 177,9 W; H = 11:57:09,4 h = 33 km; M = 5,8 (GS) Kermadec Islands Region
16	ZT	Pn	22	01	43,2		Ep.: 37,3 N; 3,9 E; H = 22:00:40,4
	ZT	Sn	22	02	28,0		h = - km; M = 4,5 (LDG) Argel
20	ZT	P	11	45	36,5	2.000	Ep.: 34,9 N; 25,6 W; H = 11:41:08,1 h = - km; M = 4,5 (GS) Crete
20	ZT	Pg	14	58	46,4		Ep.: See pag. 108
	ZT	Sg	14	58	53,5		
20	ZT	Pn	23	10	31,5		Ep.: 42,1 N; 2,4 W; H = 23:09:38,5 h = - km; M = 3,5 (IGN) Burgos, Spain
22	ZT	P	07	28	20,0	9.400	Ep.: 0,8 S; 84,4 E; H = 07:17:23,8 h = 10 km; M = 5,5 (GS) South Indian Ocean
28	ZT	P	12	07		17.100	Ep.: 18,4 S; 168,1 E; H = 11:47:08,6 h = 31 km; M = 5,7 (GS) Vanuatu Islands
3 Oct	ZT	P	03	47	46,7	9.800	Ep.: 17,9 S; 69,2 W; H = 03:35:10,6 h = 149 km; M = 5,8 (GS) Peru-Bolivia Border Region
3	ZT	P	10	35	14,0		Ep.: 5,4 S; 131,0 E; H = 10:16:26,6 h = 74 km; M = 6,4 (GS) Banda Sea
3	ZT	P	11	09	11,0	5.900	Ep.: 36,4 N; 71,4 E; H = 11:00:05,2 h = 95 km; M = 5,9 (GS) Afghanistan-USSR Border Region
4	ZT	P	18	46	37,0	9.000	Ep.: 55,5 N; 161,6 E; H = 18:34:22,6 h = 54 km; M = 6,0 (GS) Near Coast of Kamchatka
5	ZT	Pn	04	46	28,0		Ep.: See pag. 108
	ZT	Sn	04	46	46,5		
6	ZT	P	04	39	02,0	17.300	Ep.: 17,9 S; 172,2 W; H = 04:19:06,0 h = 16 km; M = 6,7 (GS) Tonga Island Region
6	ZT	P	20	24	04,0	9.300	Ep.: 52,9 N; 159,9 E; H = 20:11:35,1 h = 34 km; M = 6,3 (GS) EastCoast of Kamchatka
12	ZT	P	14	46	25,0	15.300	Ep.: 7,2 S; 154,3 E; H = 13:57:04,7 h = 34 km; M = 6,3 (GS) Salomon Island



SEISMIC OBSERVATIONS

1987

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
13 Oct	ZT	Pg	17	10	53,2		Ep.: See pag. 109
	ZT	Sg	17	10	56,5		
16	ZT	P	21	10	40,0	14.900	Ep.: 6,2 S; 149,1 E; H = 20:48:01,6 h = 48 km; M = 5,9 (GS) New Britain Region
20	ZT	Pn	20	18	59,0		Ep.: 42,6 N; 1,0 E; H = 20:18:33,2 h = 9 km; M = 2,9 (LDG) Foix, France
	ZT	Sn	20	19	17,5		
23	ZT	Sn	20	58	39,0		Ep.: See pag. 109
24	ZT	P	14	56	37,0	16.300	Ep.: 10,9 S; 166,1 E; H = 14:37:16,4 h = 171 km; M = 5,5 (GS) Santa Cruz Islands
25	ZT	P	16	54	50,0		Ep.: 5,4 N; 36,7 E; H = 16:46:13,3 h = 12 km; M = 5,6 (GS) Ethiopia
25	ZT	P	17	13	04,5	13.800	Ep.: 2,32 S; 138,4 E; H = 16:54:05,6 h = 33 km; M = 6,2 (GS)
5 Nov	ZT	Pn	22	44	40,3		Ep.: 43,0 N; 0,9 W; H = 22:43:58,0 h = 2 km; M = 53,9 (LDG) Luz, France
	ZT	Sn	22	45	16,0		
6	ZT	Sg	05	45	14,2		Ep.: 43,0 N; 1,8 W; H = 05:43:31,6 h = - km; M = 3,2 (LDG) Pau, France
6	ZT	P	12	27	19,5		Ep.: See pag. 109
6	ZT	Sg	12	33	02,5		Ep.: Local
6	ZT	P	18	59	30,0	9.800	Ep.: 22,8 S; 63,6 W; H = 18:47:35,0 h = 538 km; M = 5,8 (GS) Argentina
7	ZT	Pn	01	33	00,8		Ep.: 43,1 N; 0,7 W; H = 01:31:16,9 h = 3 km; M = 3,3 (LDG) Pau, France
7	ZT	Pn	11	08	58,4		Ep.: 43,4 N; 3,6 W; H = 11:07:51,0 h = - km; M = 3,2 (IGN) Bilbao, Spain
	ZT	Sn	11	09	50,0		
9	ZT	Sg	12	03	52,8		Ep.: Local
11	ZT	Pg	02	05	49,0		Ep.: See pag. 109
	ZT	Sg	02	06	06,0		



SEISMIC OBSERVATIONS

1987

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
11 Nov	ZT	Pg	05	46	08,0		Ep.: See pag. 109
	ZT	Sg	05	47	18,7		
11	ZT	Pn	07	16	06,5		Ep.: 43,0 N; 0,2 W; H = 07:15:23,0 h = 7 km; M = 4,1 (LDG) Pau, France
	ZT	Sn	07	16	36,0		
17	ZT	P	03	52	16,5	9.000	Ep.: 12,53 N; 87,0 W; H = 03:40:08,9 h = 76 km; M = 5,8 (GS) Nicaragua
17	ZT	P	08	58	39,0	8.400	Ep.: 58,6 N; 143,2 W; H = 08:46:53,3 h = 10 km; M = 6,6 (GS) Gulf of Alaska
19	ZT	Sg	16	41	28,5		Ep.: See pag. 109
30	ZT	P	19	35	04,8	8.400	Ep.: 58,6 N; 142,7 W; H = 19:23:19,5 h = 10 km; M = 6,7 (GS) Gulf of Alaska
7 Dec	ZT	P	12	45	57,0	16.500	Ep.: 13,6 S; 167,3 W; H = 12:26:11,7 h = 48 km; M = 5,7 (GS) Vanuatu Islands
7	ZT	P	13	34	22,0	16.500	Ep.: 13,6 S; 167,5 E; H = 13:14:34,9 h = 33 km; M = 5,8 (GS) Vanuatu Islands
7	ZT	P	19	40	12,0	16.500	Ep.: 13,5 S; 167,3 E; H = 19:20:24,9 h = 33 km; M = 5,3 (GS) Vanuatu Islands
9	ZT	P	15	42	23,2		Ep.: 35,5 N; 3,78 W; H = 15:40:34,2 h = 30 km; M = 4,6 (GS) Strait of Gibraltar
12	ZT	P	05	05	14,7		Ep.: 29,7 N; 140,2 E; H = 04:51:50,5 h = 164 km; M = 6,3 (GS) Japan
15	ZT	Pg	07	36	20,8		Ep.: 43,5 N; 0,6 W; H = 07:35:27,6 h = 13 km; M = 3,9 (LDG) Pau, France
	ZT	Sg	07	36	56,0		
28	ZT	P	13	44	04,5	16.600	Ep.: 14,3 S; 167,3 E; H = 13:24:39,3 h = 231 km; M = 4,9 (GS) Vanuatu Islands

