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SEISMIC OBSERVATIONS AT FABRA OBSERVATORY IN 1983

by JAVIER PAVIA SEGURA
and M.ª TERESA SUSAGNA VIDAL

The Observatory has now the following seismographs:

— One short period "Teledyne Geotech" seismograph, vertical component, with ink recording.

— One short period "Hiller-Stuttgart" seismograph, vertical component, with photographic recording.

— Two long period "Mainka" seismographs, horizontal components, with mechanic recording.

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

We symbolize by ZT the Teledyne Geotech vertical component, by ZH the Hiller-Stuttgart 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.), by the Laboratoire de Détection et de Géophysique (LDG) or by P. Stahl (PS).

The average instrumental constants have been:

1.°) Electromagnetic seismograph (electronic and ink recording):

Type	*Component*	*Mass Kg.*	*Period (s) T o*	*Magnification*	*Damping*
Teledyne Geotech	Z(ZT)	5	1	64.000	0,7

2.°) Electromagnetic seismograph (photographic recording):

Type	*Component*	*Period (s)* *Tp*	*Tg*	*Maximun Amplification Vm*	*Damping*
Hiller-Stuttgart	Z(ZH)	1,61	1,3	7,326	Critical

3.°) Mechanical seismographs (recording on smoked paper):

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

SEISMIC OBSERVATIONS 1983

Date	Comp.	Phase	Time TU h	m	s	Δ km	Remarks
1 Jan	ZH	iP	05	44	25,0		Ep.: 16,9 S; 69,1 W; H = 05:31:56,1 h = 172 km; M = 5,7 (GS) Peru-Bolivia border region.
4	ZT	iPg	12	56	31,0		Ep.: Local.
		iSg	12	56	34,3		
4	ZT	ePg	14	07	32,0		Ep.: Local.
		eSg	14	07	36,0		
4	ZT	ePg	15	11	59,5		Ep.: Local.
		eSg	15	12	03,0		
5	ZH	iP	02	13	27,3		Ep.: 54,7 N; 162,8 E; H = 02:01:03,2 h = 33 km; M = 5,6 (GS) Near east coast of Kamchatka.
6	ZT	iPn	21	56	21,5		Ep.: 36,4 N; 2,1 W; H = 21:55:54,1
	ZT	eSn	21	57	24,0		M = 4,7 (IGN) Strait of Gibraltar.
7	ZT	iPg	15	13	33,0		Ep.: Local.
	ZT	iSg	15	13	34,5		
9	ZT	iPg	13	12	08,0		Ep.: Local.
	ZT	iSg	13	12	18,0		
10	ZT	iP	12	43	28,0		Ep.: 27,2 S; 63,3 W; H = 12:32:21,6 h = 558 km; M = 5,7 (GS) Santiago del Estero, Argentina.
13	ZT	iPg	14	11	10,0		Ep.: Local.
	ZT	iSg	14	11	12,0		
13	ZT	iSg	14	42	05,0		Ep.: Local.
13	ZT	iPg	14	45	12,5		Ep.: Local.
	ZT	iSg	14	45	14,0		
17	ZT	eP	12	44	51,0	1.590	Ep.: 38,0 N; 20,2 E; H = 12:41:29,7
	NM	eS	12	47	31,5		h = 14 km; M = 6,1 (GS) Greece.
24	ZT	iP	16	37	11,0		Ep.: 39,6 N; 13,6 W; H = 16:34:17,9
	ZT	iS	16	39	21,5		M = 6,2 (IGN) North Atlantic ocean.
24	ZT	e	20	39	36,0		Ep.: 43,1 N; 0,4 W; H = 20:38:48,9 h = 5 km; M = 3,7 (LDG) Pau, France.

SEISMIC OBSERVATIONS 1983

Date	Comp.	Phase	Time TU h	m	s	Δ km	Remarks
24 Jan	ZH	iP	23	21	38,3	9.180	Ep.: 12,9 N; 93,6 E; H = 23:09:21,4 h = 78 km; M = 6,1 (GS) Armadan islands region.
24	ZT	iPg	20	57	29,0		Ep.: Local.
	ZT	iSg	20	57	31,5		
26	ZT	iPg	13	22	46,3		Ep.: Local.
	ZT	iSg	13	22	49,0		
26	ZT	iP	16	22	01,0	18.770	Ep.: 30,4 S; 179,3 W; H = 16:02:21,3 h = 238 km; M = 6,0 (GS) Kermadec islands region.
	ZT	ePP	16	23	07,0		
27	ZT	iPg	12	35	18,0		Ep.: Local.
	ZT	iSg	12	35	22,0		
27	ZT	iSg	13	34	02,0		Ep.: Local.
28	ZT	eP	14	42	37,5		Ep.: 10,9 S; 165,9 E; H = 14:23:03,0 h = 64 km; M = 5,6 (GS) Santa Cruz islands.
29	ZT	iPg	11	21	05,5		Ep.: Local.
	ZT	iSg	11	21	09,0		
31	ZT	iSg	14	53	48,0		Ep.: Local.
31	ZT	iP	15	30	20,0		Ep.: 38,1 N; 20,3 E; H = 15:27:00,0 h = 28 km; M = 5,1 (GS) Greece.
3 Feb	ZT	ePg	14	11	59,0		Ep.: Local.
	ZT	iSg	14	12	02,0		
4	ZT	iPg	13	36	16,3		Ep.: Local.
	ZT	iSg	13	36	19,0		
4	ZT	iPg	15	55	49,0		Ep.: Local.
	ZT	iSg	15	55	50,5		
4	ZT	iPn	17	46	54,5		Ep.: 41,9 N; 0,5 W; H = 17:46:28,9 h = —; M = —; (IGN) Huesca.
	ZT	iSn	17	47	15,0		
8	ZT	iSg	14	24	11,0		Ep.: Local.
9	ZT	ePg	15	30	20,0		Ep.: Local.

SEISMIC OBSERVATIONS 1983

Date	*Comp.*	*Phase*	*Time TU* *h*	*m*	*s*	*Δ km*	*Remarks*
11 Feb	ZT	ePg	14	42	51,5		Ep.: Local.
	ZT	iSg	14	42	55,0		
14	ZT	eP	03	32	25,0		Ep.: 54,9 N; 159,2 W; H = 03:20:04,4
	ZT	ipP	03	32	39,0		h = 47 km; M = 5,9 (GS) South of Alaska.
14	ZT	iPKP	08	22	25,0	9.140	Ep.: 55,0 N; 159,2 W; H = 08:10:03,6 h = 33 km; M = 6,0 (GS) South of Alaska.
14	ZT	iPg	13	32	02,5		Ep.: Local.
	ZT	iSg	13	32	04,3		
14	ZT	ePg	16	24	56,5		Ep.: Local.
	ZT	eSg	16	25	00,0		
18	ZT	iPg	17	33	03,5		Ep.: Local.
	ZT	eSg	17	33	07,0		
21	ZT	eP	00	16	28,0		Ep.: 37,9 N; 20,1 E; H = 00:13:07,6 h = 26 km; M = 5,0 (GS) Ionian Sea.
21	ZT	ePg	13	15	43,0		Ep.: Local.
	ZT	eSg	13	15	46,5		
22	ZT	iP	09	49	17,0		Ep.: 16,3 N; 95,0 W; H = 09:36:46,8 h = 37 km; M = 5,7 (GS) Oaxaca, Mexico.
22	ZT	iPg	12	33	10,0		Ep.: Local.
	ZT	iSg	12	33	12,0		
22	ZT	ePg	15	29	43,5		Ep.: Local.
	ZT	iSg	15	29	46,5		
23	ZT	iPg	18	07	07,0		Ep.: Local.
25	ZT	eP	22	25	45,0		Ep.: 5,4 S; 146,9 E; H = 22:03:56,3 h = 235 km; M = 5,9 (GS) East Papua New Guinea region.
25	ZT	iP	23	02	32,5		Ep.: 18,3 S; 69,4 W; H = 22:49:54,7
	ZT	ipP	23	03	09,5		h = 146 km; M = 5,9 (GS) Northern Chile.
26	ZT	eP	07	23	37,0	9.600	Ep.: 49,2 N; 155,6 E; H = 07:10:59,1 h = 56 km; M = 6,0 (GS) Kuril islands.

SEISMIC OBSERVATIONS 1983

Date	Comp.	Phase	Time TU h	m	s	Δ km	Remarks
1 Mar	ZT	iPg	13	12	36,5		Ep.: Local.
	ZT	iSg	13	12	39,5		
2	ZT	iPg	14	26	45,5		Ep.: Local.
	ZT	iSg	14	26	46,5		
4	ZT	e	02	41	12,0		Ep.: Local.
4	ZT	iPg	11	20	22,5		Ep.: Local.
	ZT	iSg	11	20	26,5		
4	ZT	ePg	14	54	50,5		Ep.: Local.
	ZT	iSg	14	54	53,5		
5	ZT	eP	14	29	54,0		Ep.: 32,5 N; 49,3 E; H = 14:22:35,6 h = 33 km; M = 5,4 (GS) Western Iran.
7	ZT	iPg	13	19	16,2		Ep.: Local.
	ZT	iSg	13	19	19,0		
7	ZT	ePg	17	42	54,0		Ep.: Local.
	ZT	iSg	17	42	56,0		
8	ZT	iPg	16	24	40,7		Ep.: Local.
	ZT	iSg	16	24	42,5		
8	ZT	ePg	16	58	38,0		Ep.: Local.
	ZT	iSg	16	58	41,0		
8	ZT	iP	17	17	00,0		Ep.: 11,0 N; 62,4 W; H = 17:06:36,5 h = 82 km; M = 5,9 (GS) Windward islands.
9	ZT	ePg	13	21	22,5		Ep.: Local.
	ZT	iSg	13	21	25,0		
9	ZT	ePg	15	30	58,0		Ep.: Local.
	ZT	eSg	15	31	07,5		
10	ZT	eP	00	40	42,5		Ep.: 43,8 N; 147,4 E; H = 00:27:48,3 h = 33 km; M = 6,2 (GS) Kuril islands.
	ZT	ipP	00	40	54,0		
10	ZT	eP	06	05	53,0		Ep.: 14,9 S; 167,3 E; H = 05:46:17,4 h = 135 km; M = 5,1 (GS) Vanuatu islands.
10	ZT	ePg	14	23	00,5		Ep.: Local.
	ZT	iSg	14	23	04,0		

SEISMIC OBSERVATIONS 1983

Date	Comp.	Phase	Time TU h	m	s	Δ km	Remarks
11 Mar	ZT	iPg	10	21	30,0		Ep.: Local.
	ZT	iSg	10	21	31,5		
11	ZT	iPg	10	36	26,0		Ep.: Local.
	ZT	iSg	10	36	30,5		
11	ZT	iPg	13	27	50,0		Ep.: Local.
	ZT	iSg	13	27	55,0		
11	ZT	ePg	14	03	43,5		Ep.: Local.
	ZT	iSg	14	03	47,7		
12	ZT	ePKP	01	55	24,0	13.210	Ep.: 4,0 S; 127,9 E; H = 01:36:35,8 h = 17 km; M = 6,0 (GS) Banda sea.
12	ZT	iPKP	09	09	42,0		Ep.: 18,1 S; 168,1 E; H = 08:49:46,3 h = 36 km; M = 5,5 (GS) Vanuatu islands.
15	ZT	iPg	15	08	10,7		Ep.: See pag. 104.
	ZT	iSg	15	08	35,0		
16	ZT	iPg	10	43	10,5		Ep.: See pag. 104.
	ZT	eSg	10	43	20,5		
16	ZT	iPg	11	11	58,5		Ep.: Local.
	ZT	iSg	11	12	00,0		
17	ZT	iPg	11	37	54,5		Ep.: Local.
	ZT	iSg	11	37	58,5		
17	ZT	iPg	14	49	57,3		Ep.: Local.
	ZT	iSg	14	50	00,0		
18	ZT	iPKP	09	24	49,5	15.050	Ep.: 4,9 S; 153,6 E; H = 09:05:50,0 h = 89 km; M = 6,5 (GS) New Ireland region.
18	ZT	iPg	12	25	03,0		Ep.: Local.
19	ZT	iP	21	46	04,0		Ep.: 35,1 N; 25,3 E; H = 21:41:42,8 h = 65 km; M = 5,7 (GS) Crete.
20	ZT	iP	02	09	25,5		Ep.: 10,5 S; 74,9 W; H = 01:56:37,0 h = 10 km; M = 5,4 (GS) Peru.
20	ZT	iPm	07	00	39,7		Ep.: 36,6 N; 2,2 W; H = 06:59:13,8 h = — ; M = 4,4 (IGN) Strait of Gibraltar.
	ZT	eSn	07	01	46,0		

SEISMIC OBSERVATIONS 1983

Date	Comp.	Phase	Time TU h	m	s	Δ km	Remarks
20 Mar	ZT	eP	14	05	01,0		Ep.: 4,7 S; 153,2 E; H = 13:45:49,0
	ZT	ePP	14	08	28,0		h = 80 km; M = 5,9 (GS) New Ireland region.
21	ZT	iPKP	08	04	10,0	17.780	Ep.: 21,5 S; 175,5 W; H = 07:44:17,7
							h = 68 km; M = 6,3 (GS) Tonga islands.
21	ZT	iPg	10	22	15,5		Ep.: Local.
21	ZT	iPg	15	10	10,5		Ep.: Local.
21	ZT	iPg	16	53	19,0		Ep.: Local.
	ZT	eSg	16	53	22,0		
23	ZT	iPg	12	39	35,0		Ep.: Local.
	ZT	iSg	12	39	38,0		
23	ZT	iP	23	54	28,0		Ep.: 38,3 N; 20,3 E; H = 23:51:06,5
	EM	eP	23	54	29,0		h = 19 km; M = 5,8 (GS) Greece.
24	ZT	iP	04	20	53,0		Ep.: 38,2 N; 20,3 E; H = 04:17:31,6
							h = 25 km; M = 5,3 (GS) Greece.
24	ZT	ePg	12	27	18,0		Ep.: Local.
	ZT	eSg	12	27	21,0		
24	ZT	iPg	13	59	44,5		Ep.: Local.
	ZT	iSg	13	59	48,5		
25	ZT	ePg	06	53	06,0		Ep.: Local.
	ZT	eSg	06	53	11,0		
25	ZT	ePg	08	57	15,5		Ep.: Local.
	ZT	eSg	08	57	21,5		
28	ZT	iPg	14	47	39,0		Ep.: Local.
28	ZT	iPg	15	23	42,5		Ep.: Local.
	ZT	iSg	15	23	47,5		
30	ZT	iPg	14	03	06,0		Ep.: Local.
	ZT	iSg	14	03	08,0		
30	ZT	ePn	18	12	04,5		Ep.: 42,4 N; 0,2 E; H = 18:11:18,1
	ZT	eSn	18	12	41,0		h = — ; M = 3,2 (IGN) Huesca.

SEISMIC OBSERVATIONS 1983

Date	Comp.	Phase	Time TU h	m	s	Δ km	Remarks
31 Mar	ZT	iPg	10	19	12,0		Ep.: Local.
	ZT	iSg	10	19	14,0		
31	ZT	iPg	11	09	37,5		Ep.: Local.
	ZT	iSg	11	09	41,5		
1 Apr	ZT	iPg	07	59	57,0		Ep.: Local.
	ZT	iSg	08	00	07,0		
3	ZT	eP	03	02	12,0	8.960	Ep.: 8,7 N; 83,1 W; H = 02:50:01,1
	ZH	eP	03	01	58,4		h = 37 km; M = 6,5 (GS) Costa Rica.
4	ZT	iP	03	04	19,0	9.790	Ep.: 5,7 N; 94,7 E; H = 02:51:34,3
	ZT	ipP	03	04	38,5		h = 79 km; M = 6,6 (GS) Northern Sumatera.
	ZH	iP	03	04	16,7		
	EM	eS	03	14	35,7		
4	ZH	eP	19	16	50,0		Ep.: 52,9 N; 159,9 E; H = 19:04:20,6 h = 38 km; M = 6,0 (GS) Off east coast of Kamchatka.
5	ZT	iPKP	00	18	38,0	16.740	Ep.: 15,0 S; 167,3 E; H = 23:58:59,0
	ZH	ePKP	00	18	34,0		h = 123 km; M = 6,2 (GS) Vanuatu islands.
5	ZT	iSg	12	23	43,0		Ep.: Local.
6	ZT	iPg	12	46	34,5		Ep.: Local.
	ZT	iSg	12	46	36,5		
6	ZT	iPg	13	18	25,5		Ep.: Local.
	ZT	iSg	13	18	27,5		
7	ZT	iPg	12	52	51,5		Ep.: Local.
	ZT	iSg	12	52	54,5		
8	ZT	eP	02	38	10,5		Ep.: 11,4 N; 57,5 E; H = 02:28:25,5
	ZH	eP	02	38	11,5		h = 10 km; M = 5,9 (GS) Arabian Sea.
8	ZT	ePg	12	08	56,5		Ep.: Local.
	ZT	eSg	12	08	58,5		
11	ZT	eP	08	28	43,0		Ep.: 10,4 N; 62,8 W; H = 08:18:10,1
	ZH	eP	08	28	44,7		h = 40 km; M = 6,0 (GS) Near coast of Venezuela.

SEISMIC OBSERVATIONS 1983

Date	Comp.	Phase	Time TU h	m	s	Δ km	Remarks
11 Apr	ZT	iPg	16	33	37,0		Ep.: Local.
	ZT	iSg	16	33	39,0		
12	ZT	iP	12	20	22,5	9.540	Ep.: 4,8 S; 78,1 W; H = 12:07:54,5
	ZT	iPP	12	23	26,5		h = 104 km; M = 6,5 (GS) Peru-Ecuador
	EM	eS	12	30	45,8		border region.
12	ZT	iPg	16	58	25,0		Ep.: Local.
	ZT	iSg	16	58	27,5		
14	ZT	iPg	13	09	39,0		Ep.: Local.
	ZT	iSg	13	09	41,5		
	ZH	iSg	13	09	41,4		
15	ZT	iP	10	20	42,5		Ep.: 6,0 S; 75,7 W; H = 10:08:20,5
							h = 118 km; M = 5,6 (GS) Northern Peru.
15	ZT	iP	15	04	02,5		Ep.: 53,4 N; 160,3 E; H = 14:51:59,1
							h = 65 km; M = 5,8 (GS) Near east coast of Kamchatka.
15	ZT	iPg	16	17	48,0		Ep.: Local.
	ZT	iSg	16	17	50,0		
18	ZT	iP	11	07	42,0	5.570	Ep.: 27,8 N; 62,0 E; H = 10:58:51,2
	ZH	iP	11	07	42,2		h = 64 km; M = 6,5 (GS) Southern Iran.
18	ZT	iPg	12	49	55,5		Ep.: Local.
18	ZT	iPg	15	34	56,0		Ep.: Local.
19	ZT	ePg	10	44	44,0		Ep.: Local.
19	ZT	iPg	16	15	57,0		Ep.: Local.
20	ZT	ePn	19	15	12,0		Ep.: 43,5 N; 5,3 W; H = 19:13:50,6
		eSn	19	16	11,0		h = —; M = 4,0 (IGN) Oviedo.
25	ZT	iPg	11	52	11,0		Ep.: Local.
25	ZT	ePg	12	06	06,0		Ep.: Local.
25	ZT	iPg	16	04	55,5		Ep.: Local.
	ZT	eSg	16	04	57,5		

SEISMIC OBSERVATIONS 1983

Date	Comp.	Phase	Time TU h	m	s	Δ km	Remarks
26 Apr	ZT	ePg	09	02	27,0		Ep.: Local.
	ZT	eSg	09	02	37,0		
26	ZT	iP	11	35	30,5		Ep.: 16,0 S; 168,4 E; H = 11:15:37,4
	ZH	iP	11	35	30,9		h = 33 km; M = 5,5 (GS) Vanuatu islands.
26	ZT	ePg	12	58	19,5		Ep.: Local.
	ZT	eSg	12	58	22,0		
27	ZT	ePg	10	34	49,5		Ep.: Local.
	ZT	iSg	10	34	55,5		
27	ZT	ePg	11	15	29,0		Ep.: Local.
	ZT	iSg	11	15	31,5		
28	ZT	iPg	11	14	14,0		Ep.: Local.
29	ZT	iPg	12	04	43,0		Ep.: Local.
30	ZT	iP	14	16	49,0	10.010	Ep.: 41,5 N; 143,8 E; H = 14:03:49,2
	ZH	iP	14	16	48,7		h = 30 km; M = 6,5 (GS) Hokkaido, Japan
	ZH	ePP	14	20	19,7		region.
1 May	ZT	ePn	09	42	25,0		Ep.: 43,0 N; 2,0 W; H = 09:41:41,2
	ZT	iSn	09	43	15,5		h = — ; M = 3,2 (IGN) Navarra.
1	ZT	eP	18	23	33,0		Ep.: 46,3 N; 153,5 E; H = 18:10:40,3
							h = 24 km; M = 6,1 (GS) Kuril islands.
2	ZT	eP	23	55	22,0	9.580	Ep.: 36,2 N; 120,3 W; H = 23:42:37,7
	ZH	eP	23	55	22,0		h = 10 km; M = 6,2 (GS) Central California.
3	ZT	iPg	13	16	06,0		Ep.: Local.
4	ZT	iPg	14	00	06,5		Ep.: Local.
	ZT	iSg	14	00	09,0		
5	ZT	iPg	10	07	56,5		Ep.: Local.
	ZT	iSg	10	08	00,0		
5	ZT	iPg	10	59	17,0		Ep.: Local.

SEISMIC OBSERVATIONS 1983

Date	Comp.	Phase	Time TU h	m	s	Δ km	Remarks
5 May	ZT	iPg	13	51	10,0		Ep.: Local.
	ZT	iSg	13	51	13,0		
	ZH	iPg	13	51	10,0		
	ZH	iSg	13	51	13,0		
8	ZT	iPg	01	27	34,5		Ep.: See pag. 104.
	ZT	eSg	01	27	46,0		
10	ZT	iPg	14	50	06,0		Ep.: Local.
	ZT	iSg	14	50	07,5		
12	ZT	iP	11	00	32,0		Ep.: 17,6 N; 46,5 W; H = 10:51:49,7 h = 10 km; M = 5,7 (GS) North Atlantic ridge.
12	ZT	ePg	16	58	24,0		Ep.: Local.
13	ZT	ePg	16	15	11,5		Ep.: Local.
	ZT	iSg	16	15	14,0		
16	ZH	ePg	13	30	50,2		Ep.: Local.
17	ZT	ePg	10	05	35,0		Ep.: Local.
	ZT	eSg	10	05	39,0		
17	ZT	ePg	11	22	40,0		Ep.: Local.
	ZT	eSg	11	22	42,5		
17	ZT	eP	20	53	02,0		Ep.: 15,0 S; 168,0 E; H = 20:33:23,9 h = 37 km; M = 5,4 (GS) Vanuatu islands.
18	ZT	iPg	14	52	42,0		Ep.: Local.
	ZT	iSg	14	52	43,5		
19	ZT	iPg	14	29	39,5		Ep.: Local.
	ZT	iSg	14	29	42,0		
20	ZT	iPg	11	39	05,5		Ep.: Local.
	ZT	iSg	11	39	08,2		
20	ZT	iPg	12	45	05,5		Ep.: Local.
	ZT	eSg	12	45	08,0		
20	ZT	iPg	13	49	58,0		Ep.: Local.
25	ZT	ePg	14	03	22,5		Ep.: Local.

SEISMIC OBSERVATIONS 1983

Date	Comp.	Phase	Time TU h	m	s	△ km	Remarks
26 May	ZT	eP	03	12	56,0	9.920	Ep.: 40,5 N; 139,1 E; H = 02:59:59,6
	ZT	ePP	03	15	58,0		h = 24 km; M = 6,8 (GS) Near west coast of Honshu, Japan.
27	ZT	iPg	13	49	24,0		Ep.: Local.
28	ZT	iP	11	43	10,4		Ep.: 32,6 N; 48,6 E; H = 11:35:51,9 h = 18 km; M = 5,6 (GS) Western Iran.
30	ZT	ePn	05	37	57,0		Ep.: 43,6 N; 1,8 W; H = 05:36:27,0 h = —; M = 3,3 (IGN) Guipuzcoa.
30	ZT	iPg	09	41	33,0		Ep.: Local.
	ZT	iSg	09	41	35,0		
31	ZT	ePg	12	12	21,0		Ep.: Local.
	ZT	eSg	12	12	24,7		
1 Jun	ZH	e	02	12	27,6	17.270	Ep.: 17,0 S; 174,6 W; H = 01:59:54,6 h = 180 km; M = 6,2 (GS) Tonga islands.
2	ZT	iP	20	24	20,0		Ep.: 9,5 S; 71,2 W; H = 20:12:50,7
	ZT	iPP	20	26	28,0		h = 599 km; M = 5,9 (GS) Peru-Brazil border region.
4	ZT	ePg	10	23	00,5		Ep.: Local.
	ZT	eSg	10	23	03,0		
6	ZT	ePn	01	30	31,5		Ep.: 43,1 N; 0,5 W; H = 01:29:48,3
	ZT	eSn	01	31	07,5		h = —; M = 4,1 (LDG) Pau, France.
6	ZT	iPg	17	13	06,0		Ep.: Local.
	ZT	iSg	17	13	09,0		
7	ZT	iPg	13	00	35,5		Ep.: Local.
	ZT	eSg	13	00	38,0		
7	ZT	iPg	16	43	20,0		Ep.: Local.
	ZT	eSg	16	43	24,0		
	ZH	iPg	16	43	20,0		
8	ZT	iPg	17	52	56,5		Ep.: Local.
	ZT	eSg	17	53	01,0		

SEISMIC OBSERVATIONS 1983

Date	Comp.	Phase	Time TU h	m	s	Δ km	Remarks
9 Jun	ZH	iP	13	16	57,3	9.930	Ep.: 40,3 N; 139,0 E; H = 13:04:00,5
	ZH	i	13	17	06,3		h = 28 km; M = 6,3 (GS) Near west coast of Honshu, Japan.
9	ZT	iPg	14	32	30,0		Ep.: Local.
	ZT	eSg	14	32	33,0		
	ZH	iPg	14	32	30,0		
9	ZT	iPg	16	08	55,5		Ep.: Local.
9	ZT	eP	18	58	48,0	9.680	Ep.: 51,4 N; 174,1 W; H = 18:46:00,9
							h = 21 km; M = 6,2 (GS) Andreanof islands, Aleutian islands.
12	ZH	iP	02	45	54,5		Ep.: 49,9 N; 79,0 E; H = 02:36:43,5
							h = 0 km; M = 6,1 (GS) Eastern Kazakh SSR.
17	ZT	iPg	10	23	28,0		Ep.: Local.
20	ZT	iPg	15	00	43,5		Ep.: Local.
	ZT	eSg	15	00	47,5		
21	ZH	iP	06	38	22,0	9.840	Ep.: 41,3 N; 139,1 E; H = 06:25:27,3
	ZH	ePP	06	41	53,0		h = 10 km; M = 6,7 (GS) Hokkaido, Japan region.
	ZV	eS	06	49	00,0		
22	ZT	iPg	15	56	35,0		Ep.: Local.
23	ZH	e	12	25	08,8		Ep.: 51,7 S; 139,6 E; H = 12:05:19,0
							h = 10 km; M = 5,5 (GS) South of Australia.
24	ZH	e	07	34	05,6		Ep.: 21,7 N; 103,3 E; H = 07:18:22,1
							h = 18 km; M = 6,1 (GS) Southeast Asia.
24	ZH	e	09	20	04,3	10.470	Ep.: 24,2 N; 122,4 E; H = 09:06:45,8
							h = 44 km; M = 6,1 (GS) Taiwan region.
3 Jul	ZH	eP	03	02	—	10.810	Ep.: 20,2 N; 122,4 E; H = 02:49:27,9
	ZH	e	03	05	—		h = 22 km; M = 6,1 (GS) Philippine islands region.
5	ZH	e	11	31	—		Ep.: 22,6 S; 171,0 E; H = 11:11:39,8
							h = 33 km; M = 6,1 (GS) Loyalty islands.
5	ZH	eP	12	05	49,0		Ep.: 40,3 N; 27,2 E; H = 12:01:27,3
	EM	eP	12	05	50,0		h = 10 km; M = 5,7 (GS) Turkey.

SEISMIC OBSERVATIONS 1983

Date	Comp.	Phase	Time TU h	m	s	Δ km	Remarks
5 Jul	ZT	iPg	16	12	39,0		Ep.: Local.
5	ZT	iPg	18	57	58,0		Ep.: Local.
12	ZH	eP	11	42	40,4		Ep.: 27,6 N; 56,4 E; H = 11:34:17,5 h = 25 km; M = 5,9 (GS) Southern Iran.
12	ZH	iP	15	21	41,2	8.290	Ep.: 61,0 N; 147,3 W; H = 15:10:03,4 h = 37 km; M = 6,1 (GS) Southern Alaska.
14	ZT	ePg	14	14	06,5		Ep.: Local.
	ZT	eSg	14	14	09,5		
18	ZT	iPg	11	27	58,0		Ep.: Local.
	ZT	eSg	11	28	00,0		
20	ZT	iPg	19	08	32,0		Ep.: See pag. 104.
	ZT	iSg	19	08	45,0		
22	ZH	eP	02	52	38,4	9.580	Ep.: 36,2 N; 120,4 W; H = 02:39:53,7 h = 9 km; M = 6,0 (GS) Central California.
24	ZH	e	23	19	36,0		Ep.: 53,9 N; 158,4 E; H = 23:07:30,9 h = 180 km; M = 6,1 (GS) Near east coast of Kamchatka.
26	ZT	iPg	20	08	09,0		Ep.: See pag. 105.
	ZT	iSg	20	08	29,0		
28	ZT	iPg	11	13	59,5		Ep.: Local.
29	ZH	e	18	14	22,7		Ep.: 10,5 N; 57,0 E; H = 18:03:59,8 h = 10 km; M = 5,7 (GS) Carlsberg ridge.
2 Aug	ZT	iPg	20	20	45,0		Ep.: Local.
	ZT	iSg	20	20	49,5		
2	ZT	iPg	11	28	58,0		Ep.: Local.
4	ZH	iPg	12	28	58,4		Ep.: Local.
5	ZH	ePKP	05	45	36,4		Ep.: 17,3 S; 167,9 E; H = 05:25:43,4 h = 33 km; M = 5,3 (GS) Vanuatu islands.

SEISMIC OBSERVATIONS 1983

Date	Comp.	Phase	Time TU h	m	s	Δ km	Remarks
5 Aug	ZH	iP	06	33	15,4		Ep.: 3,6 S; 62,1 W; H = 06:21:42,7 h = 23 km; M = 5,6 (GS) Western Brazil.
5	ZH	eP	07	22	47,4		Ep.: 17,2 S; 167,8 E; H = 07:02:38,8 h = 15 km; M = 5,3 (GS) Vanuatu islands.
5	ZH	iSg	13	13	04,4		Ep.: Local.
6	ZH	eP	02	39	09,4		Ep.: 16,1 N; 93,9 W; H = 02:26:49,3 h = 87 km; M = 5,7 (GS) Chiapas, Mexico.
6	ZH	eP	15	48	—	1.910	Ep.: 40,1 N; 24,8 E; H = 15:43:51,2 h = 2 km; M = 6,2 (GS) Aegean sea.
	NH	eP	15	48	54,4		
	NH	eS	15	51	12,4		
	EM	eP	15	48	—		
9	ZH	eSg	14	49	20,2		Ep.: Local.
17	ZH	iP	11	08	06,0	9.010	Ep.: 55,9 N; 161,3 E; H = 10:55:54,1 h = 63 km; M = 6,6 (GS) Near east coast of Kamchatka.
18	ZH	iP	16	17	40,6		Ep.: 73,4 N; 54,9 E; H = 16:09:58,6 h = 0 km; M = 5,9 (GS) Novaya Zemlya.
19	ZH	iPg	10	48	39,1		Ep.: Local.
20	ZH	eP	14	18	50,6		Ep.: 30,1 N; 42,6 W; H = 14:11:32,2 h = 10 km; M = 5,3 (GS) North Atlantic ridge.
22	ZT	iPg	10	21	32,0		Ep.: Local.
25	ZT	iPg	12	58	54,0		Ep.: Local.
25	ZH	eP	20	36	25,0	10.200	Ep.: 33,5 N; 131,5 E; H = 20:23:33,3 h = 126 km; M = 6,1 (GS) Kyushu, Japan.
29	ZT	iPg	10	09	52,0		Ep.: Local.
30	ZH	ePKP	09	10	08,2	17.200	Ep.: 16,7 S; 172,1 W; H = 08:50:17,1 h = 39 km; M = 6,0 (GS) Samoa islands region.
30	ZH	iP	10	51	08,2		Ep.: 25,1 N; 94,7 E; H = 10:39:27,3 h = 63 km; M = 5,6 (GS) Burma-India border region.
	ZH	ipP	10	51	24,2		

SEISMIC OBSERVATIONS 1983

Date	Comp.	Phase	Time TU h	m	s	Δ km	Remarks
5 Sep	ZT	Pg	09	25	43,0		Ep.: Local.
5	ZT	Pg	15	53	24,7		Ep.: Local.
	ZT	Sg	15	53	26,0		
	ZH	Pg	15	53	25,0		
5	ZT	Pg	15	53	37,0		Ep.: Local.
7	ZH	Pg	12	34	45,6		Ep.: Local.
	ZH	Sg	12	34	52,6		
7	ZH	P	19	33	42,6	8.300	Ep.: 61,0 N; 147,5 W; H = 19:22:05,1 h = 45 km; M = 6,2 (GS) Southern Alaska.
9	ZT	iPg	16	39	56,5		Ep.: Local.
9	ZH	P	18	04	11,2		Ep.: 35,4 N; 27,2 E; H = 17:59:41,6 h = 10 km; M = 5,1 (GS) Dodecanese islands.
9	ZT	iPg	21	02	40,5		Ep.: Local.
	ZT	Sg	21	02	53,0		
12	ZH	P	15	50	55,1	5.820	Ep.: 36,5 N; 71,1 E; H = 15:42:08,5 h = 209 km; M = 6,1 (GS) Afghanistan-USSR border region.
14	ZH	Pg	11	37	49,8		Ep.: Local.
	ZH	Sg	11	37	54,8		
15	ZH	P	10	51	11,3		Ep.: 16,1 N; 93,1 W; H = 10:39:02,3 h = 115 km; M = 5,6 (GS) Chiapas, Mexico.
16	ZT	iPg	11	05	48,5		Ep.: Local.
	ZT	Sg	11	05	50,5		
19	ZT	iPg	13	43	35,5		Ep.: Local.
	ZT	Sg	13	43	36,7		
21	ZH	Pg	15	37	26,5		Ep.: Local.
22	ZH	Pg	11	26	03,0		Ep.: Local.
22	ZT	Pg	12	25	58,0		Ep.: Local.
	ZT	Sg	12	26	01,0		

SEISMIC OBSERVATIONS 1983

Date	Comp.	Phase	Time TU h	m	s	Δ km	Remarks
23 Sep	ZH	P	23	56	43,5		Ep.: 8,4 N; 83,4 W; H = 23:44:30,2 h = 42 km; M = 5,6 (GS) Costa Rica.
24	ZH	P	20	49	22,0		Ep.: 7,0 S; 12,8 W; H = 20:40:23,3 h = 10 km; M = 5,4 (GS) Ascension island.
28	ZH	P	00	03	55,0		Ep.: 36,7 N; 26,9 E; H = 23:59:38,4 h = 159 km; M = 5,5 (GS) Dodecanese islands.
3 Oct	ZH	iSg	10	44	13,6		Ep.: Local.
3	ZH	ePg	13	58	14,6		Ep.: Local.
4	ZT	iPg	12	21	14,0		Ep.: Local.
4	ZT	iPg	14	54	34,0		Ep.: Local.
4	ZT	iPg	16	59	37,0		Ep.: Local.
4	ZH	eP	19	05	38,0	10.610	Ep.: 26,5 S; 70,6 W; H = 18:52:13,3 h = 15 km; M = 6,4 (GS) Near coast of Northern Chile.
5	ZT	iPg	13	42	54,0		Ep.: Local.
6	ZH	ePg	12	52	28,6		Ep.: Local.
7	ZH	eSg	13	40	18,9		Ep.: Local.
8	ZH	iP	07	56	56,2		Ep.: 44,2 N; 130,7 E; H = 07:45:26,6 h = 558 km; M = 5,7 (GS) USSR-NE China border region.
	ZH	iPP	07	58	58,2		
	ZH	iPPP	08	00	18,2		
9	ZH	e	11	39	02,5		Ep.: 26,1 S; 70,5 W; H = 11:25:40,5 h = 16 km; M = 5,9 (GS) Near coast of Northern Chile.
10	ZT	iPg	16	21	25,0		Ep.: Local.
11	ZT	iPg	10	15	23,0		Ep.: Local.
11	ZT	ePg	15	13	00,0		Ep.: Local.
11	ZH	eP	22	48	36,1		Ep.: 27,2 N; 44,5 W; H = 22:41:10,9 h = 10 km; M = 5,5 (GS) North Atlantic ridge.

SEISMIC OBSERVATIONS 1983

Date	Comp.	Phase	Time TU h	m	s	Δ km	Remarks
14 Oct	ZT	ePg	12	14	03,0		Ep.: Local.
17	ZH	eP	19	39	44,0	1.730	Ep.: 37,6 N; 17,5 W; H = 19:36:21,4
	NM	eS	19	42	47,0		h = 10 km; M = 6,0 (GS) North Atlantic ocean.
	EM	eP	19	39	58,0		
21	ZH	eP	20	39	26,0		Ep.: 40,1 N; 29,4 E; H = 20:34:49,1 h = 14 km; M = 5,1 (GS) Turkey.
22	ZH	eP	04	40	00,0	11.620	Ep.: 60,7 S; 25,4 W; H = 04:21:35,0 h = 24 km; M = 6,5 (GS) South Sandwich islands region.
26	ZH	iPg	12	55	09,0		Ep.: Local.
26	ZH	ePg	17	10	21,0		Ep.: Local.
31	ZT	iPg	13	26	34,0		Ep.: Local.
5 Nov	ZT	iPg	21	01	44,0		Ep.: See pag. 105.
	ZT	iSg	21	01	48,3		
8	ZH	P	00	54	39,6		Ep.: 50,7 N; 5,3 E; H = 00:49:22,1 h = 10 km; M = 5,0 (GS) Belgium.
9	ZT	P	02	01	06,5		Ep.: 42,7 N; 10,5 W; H = 01:58:50,4 h = —; M = 4,6 (IGN) Atlántico.
9	ZT	Pn	16	31	39,0		Ep.: 44,7 N; 10,3 E; H = 16:29:51,6 h = 37 km; M = 5,1 (GS) Northern Italy.
10	ZT	iPg	13	38	24,4		Ep.: Local.
16	ZT	iPg	15	39	31,0		Ep.: Local.
16	ZH	eP	16	32	29,0	12.860	Ep.: 19,4 N; 155,4 W; H = 16:13:00,0 h = 12 km; M = 6,4 (GS) Hawaii.
17	ZT	iPg	13	19	53,0		Ep.: Local.
20	ZH	eP	00	57	40,5		Ep.: 43,7 N; 148,4 E; H = 00:44:43,5 h = 29 km; M = 5,9 (GS) Kuril islands region.
20	SH	iP	20	21	11,5		Ep.: 7,4 S; 130,6 E; H = 20:32:20,5 h = 59 km; M = 6,0 (GS) Tanimbar islands region.

SEISMIC OBSERVATIONS 1983

Date	Comp.	Phase	Time TU h	m	s	Δ km	Remarks
22 Nov	ZH	P	14	33	28,1	9.300	Ep.: 0,5 N; 79,9 W; H = 14:21:03,0 h = 55 km; M = 6,3 (GS) Near coast of Ecuador.
24	SH	eP	05	49	08,5		Ep.: 7,5 S; 128,2 E; H = 05:30:34,2 h = 179 km; M = 6,4 (GS) Banda sea.
24	ZT	ePg	14	56	48,0		Ep.: Local.
	ZT	eSg	14	56	52,0		
25	ZT	iPg	12	07	50,5		Ep.: Local.
	ZT	eSg	12	07	52,0		
25	ZH	iP	23	08	43,1		Ep.: 3,8 S; 76,3 W; H = 22:56:25,8 h = 115 km; M = 5,5 (GS) Northern Peru.
29	ZT	iPg	10	58	17,5		Ep.: Local.
	ZT	eSg	10	58	20,0		
30	ZT	eP	00	00	05,0		Ep.: 19,5 S; 177,8 W; H = 23:41:07,3 h = 525 km; M = 5,7 (GS) Fiji islands region.
30	ZT	eSg	12	30	25,0		Ep.: Local.
30	ZT	eP	17	58	11,0	8.870	Ep.: 6,8 S; 72,1 E; H = 17:46:00,6 h = 10 km; M = 6,6 (GS) Chagos archipelago region.
	NM	P	17	58	—		
	EM	P	17	58	—		
1 Dec	ZT	e	05	57	40,0		Ep.: 6,6 S; 71,4 E; H = 05:45:34,4 h = 10 km; M = 5,8 (GS) Chagos archipelago region.
1	ZT	iPg	11	13	39,0		Ep.: Local.
	ZT	iSg	11	13	43,0		
1	ZT	iPg	12	10	22,7		Ep.: Local.
	ZT	iSg	12	10	25,2		
2	ZT	iPg	13	12	52,0		Ep.: Local.
	ZT	iSg	13	12	54,0		
3	ZT	eP	17	55	22,0	8.790	Ep.: 6,5 S; 71,4 E; H = 17:43:14,8 h = 10 km; M = 6,3 (GS) Chagos archipelago region.

SEISMIC OBSERVATIONS 1983

Date	*Comp.*	*Phase*	*Time TU* *h*	*m*	*s*	*△ km*	*Remarks*
5	ZT	eP	12	08	25,5		Ep.: 14,5 S; 167,3 E; H = 11:48:57,1 h = 207 km; M = 5,0 (GS) Vanuatu islands.
7	ZT	ePn	21	53	24,5		Ep.: 36,8 N; 3,1 E; H = 21:52:14,9
	ZT	eSn	21	54	16,0		h = —; M = 3,8 (IGN) Argelia.
8	ZT	iPg	05	54	39,0		Ep.: See pag. 105.
	ZT	iSg	05	54	55,0		
10	ZT	iPn	11	29	36,0		Ep.: See pag. 105.
	ZT	iSn	11	30	02,0		
12	ZT	iP	09	44	44,0		Ep.: 7,6 S; 127,3 E; H = 09:26:07,0 h = 137 km; M = 6,1 (GS) Banda sea.
13	ZT	iPg	11	11	51,5		Ep.: Local.
19	ZT	iPg	16	22	42,0		Ep.: Local.
	ZT	iSg	16	22	44,5		
21	ZT	iP	12	17	12,0	10.230	Ep.: 28,2 S; 63,2 W; H = 12:05:06,3 h = 602 km; M = 6,2 (GS) Santiago del Estero.
21	ZT	P	12	27	11,5		Ep.: 28,0 S; 63,0 W; H = 12:15:06,9 h = 609 km; M = 5,9 (GS) Santiago del Estero.
22	ZT	eP	04	18	01,0	3.610	Ep.: 11,9 N; 13,5 W; H = 04:11:29,2 h = 11 km; M = 6,4 (GS) Northwest Africa.
31	ZT	iP	00	01	30,0	5.800	Ep.: 36,4 N; 70,7 E; H = 23:52:39,9 h = 215 km; M = 6,6 (GS) Hindu Kush region.