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Old seismologic reports

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SEISMIC OBSERVATIONS
AT FABRA OBSERVATORY IN 1988

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 (until 25 May).

— 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 Sismologique Europeo-Mediterranean» (CSEM), by the «Institut Geogràfic 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°26.1'E)

— One short period «Teledyne Geotech» seismograph, vertical component, with ink recording (since 25 May).

The average instrumental constants have been:

1) Electromagnetic seismograph (electronic and ink recording):

Type	Component	Mass (kg)	Period(s) To	Amplification (m/ms ⁻¹)	Damping
Teledyne Geotech	Z (ZT)	5	1	7.200	0,7
	N-S (NT)	5	1	7.200	0,7
	E-W (ET)	5	1	7.200	0,7

2) Mechanical seismographs (recording on smoked paper):

Type	Component	Mass (kg)	Period(s) To	Damping E	Friction $r/T \sigma^2$	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

1988

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
11 Jan	ZT	P	21	19		0.100	Ep.: 54,8 N; 161,6 E; H = 21:07:29,7 h = 43 km; M = 5,8 (GS) Near East coast of Kamchatka
15	ZT	P	08	59		17.650	Ep.: 20,8 S; 176,0 W; H = 08:40:23,9 h = 214 km; M = 6,2 (GS) Tonga Island
19	ZT	P	07	43		10.500	Ep.: 24,7 S; 70,6 W; H = 07:30:31,8 h = 33 km; M = 6,3 (GS) Near Coast of northern Chile
20	ZT	Pg	06	53	31,0		Ep.: Local
	ZT	Sg	06	53	37,5		
21	ZT	Pg	15	55	56,3		Ep.: Local
	ZT	Sg	15	56	00,0		
25	ZT	Pg	14	49	03,3		Ep.: Local
	ZT	Sg	14	49	07,5		
28	ZT	P	15	52		1.950	Ep.: 32,4 N; 21,15 E; H = 15:48:08,1 h = 10 km; M = 4,8 (GS) Near coast of Libya
1 Feb	ZT	Pg	22	18	18,3		Ep.: See pag. 102
	ZT	Sg	22	18	35,0		
5	ZT	P	14	14		10.500	Ep.: 24,7 S; 70,4 W; H = 14:01:02,7 h = 37 km; M = 6,2 (GS) Near coast of northern Chile
6	ZT	P	15	02		8.200	Ep.: 24,7 N; 91,6 E; H = 14:50:45,2 h = 33 km; M = 5,8 (GS) India-Bangladesh border region
6	ZT	P	18	16		9.500	Ep.: 17,7 S; 66,9 W; H = 18:03:54,7 h = 285 km; M = 6,0 (GS) Bolivia
13	ZT	P	01	48		625	Ep.: 36,1 N; 1,8 E; H = 01:47:39,0 h = — km; M = 3,3 (IGN) Algeria
13	ZT	Pg	02	00	36,0		Ep.: See pag. 102
	ET	Sg	02	00	46,5		
13	ZT	P	03	14		5.725	Ep.: 49,9 N; 78,9 E; H = 03:05:05,9 h = — km; M = 6,1 (GS) Eastern Kazakh SSR
20	ZT	P	01	44		13.400	Ep.: 7,1 S; 127,0 E; H = 01:25:58,1 h = 315 km; M = 5,8 (GS) Banda sea



SEISMIC OBSERVATIONS

1988

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
20 Feb	ZT	Pg	13	12	16,2		Ep.: See pag. 103
	NT	Sg	13	12	30,2		
20	ZT	Pg	13	17	01,0		Ep.: See pag. 103
	ZT	Sg	13	17	14,2		
20	ZT	Pg	13	33	18,5		Ep.: See pag. 103
	ET	Sg	13	33	32,5		
20	ZT	Pg	15	50	52,3		Ep.: See pag. 103
	NT	Sg	15	51	06,5		
20	ZT	Pg	16	20	07,0		Ep.: See pag. 103
	ET	Sg	16	20	20,5		
20	ZT	Pg	16	39	04,7		Ep.: See pag. 103
	ET	Sg	16	39	19,5		
20	ZT	Pg	16	42	53,0		Ep.: See pag. 103
	ZT	Sg	16	43	07,0		
20	ZT	Pg	18	57	16,7		Ep.: See pag. 103
	ET	Sg	18	57	30,5		
20	ZT	Sg	19	02	28,0		Ep.: See pag. 103
20	ZT	Pg	19	14	33,7		Ep.: See pag. 104
	NT	Sg	19	14	47,0		
20	ZT	Pg	20	41	14,0		Ep.: See pag. 104
	ET	Sg	20	41	28,5		
20	ZT	Pg	21	01	13,8		Ep.: Local
20	ZT	Pg	21	04	15,3		Ep.: See pag. 104
	NT	Sg	21	04	30,2		
20	ZT	Pg	21	08	26,3		Ep.: See pag. 104
	ET	Sg	21	08	38,7		
22	ZT	P	19	26		10.150	Ep.: 20,8 S; 69,8 W; H = 19:13:17,7 h = 70 km; M = 5,9 (GS) Northern Chile
26	ZT	P	06	30		9.925	Ep.: 37,3 S; 48,0 E; H = 06:17:31,5 h = 10 km; M = 6,1 (GS) Atlantic - India rise



SEISMIC OBSERVATIONS

1988

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
29 Feb	ZT	P	05	44		9.200	Ep.: 55,1 N; 167,4 E; H = 05:31:41,4 h = 33 km; M = 6,1 (GS) Kormandorsky Islands region
6 Mar	ZT	P	22	47		8.600	Ep.: 56,9 N; 143,0 W; H = 22:35:38,1 h = 10 km; M = 6,8 (GS) Gulf of Alaska
10	ZT	P	06	27		7.000	Ep.: 10,4 N; 60,6 W; H = 06:17:23,3 h = 56 km; M = 6,2 (GS) Trinidad
14	ZT	Pg	01	39	14,2		Ep.: Local
	ZT	Sg	01	39	25,2		
16	ZT	Pg	21	19	17,0		Ep.: See pag. 105
	ZT	Sg	21	19	29,5		
17	ZT	Sg	17	37	56,5		Ep.: See pag. 105
18	ZT	Pg	16	57	07,3		Ep.: See pag. 105
	ZT	Sg	16	57	10,7		
19	ZT	P	20	28		6.300	Ep.: 30,0 N; 67,9 W; H = 20:19:15,9 h = — km; M = 5,4 (GS) Pakistan
21	ZT	P	23	41		6.200	Ep.: 77,6 N; 125,4 E; H = 23:31:21,6 h = 10 km; M = 6,0 (GS) Laptev Sea
9 Apr	ZT	P	04	24		16.300	Ep.: 10,9 S; 166,8 E; H = 04:04:23,1 h = 34 km; M = 5,5 (GS) Santa Cruz Islands
9	ZT	P	04	42		16.250	Ep.: 10,8 S; 166,7 E; H = 04:22:30,6 h = 33 km; M = 5,3 (GS) Santa Cruz Islands
15	ZT	Pg	11	04	17,0		Ep.: Local
	NT	Sg	11	04	18,5		
18	ZT	Pg	01	14	39,0		Ep.: See pag. 105
	ZT	Sg	01	14	44,2		
18	ZT	Pg	02	54	40,0		Ep.: See pag. 105
	ZT	Sg	02	54	57,5		
	ET	Pg	02	54	40,0		
	ET	Sg	02	54	57,5		



SEISMIC OBSERVATIONS

1988

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
26 Apr	ZT	Pn	21	41	49,5		Ep.: 40,3 N ; 1,2 W; H = 21:40:59,3 h = 5 km; M = 3,0 (IGN) Teruel, Spain
4 May	ZT	Pn	01	06	19,0		Ep.: 40,3 N; 1,2 W; H = 00:57:06,8 h = — km; M = 6,1 (IGN) Teruel, Spain
16	ZT	P	23	27		16.600	Ep.: 13,9 S; 166,3 E; H = 23:07:36,6 h = 16 km; M = 6,0 (GS) Vanuatu Islands
17	ZT	P	14	45		16.500	Ep.: 11,4 S; 170,6 E; H = 14:25:53,0 h = 30; M = 5,7 (GS) Santa Cruz Islands region
18	ZT ZT	Pg Sg	01 01	26 27	56,3 06,5		Ep.: See pag. 105
18	ZT	P	05	21	04,0	1.600	Ep.: 38,4 N; 20,5 E; H = 05:17:42,5 h = 26 km; M = 5,4 (GS) Greece
26	ZT NT	Pg Sg	17 17	09 09	22,7 25,7		Ep.: Local
30	ZT	P	21	29		13.500	Ep.: 7,5 S; 128,3 E; H = 21:11:11,3 h = 86 km; M = 6,5 (GS) Banda sea
2 Jun	ZT	Pg	17	30	57,0		Ep.: Local
3	ZT	P	23	27		18.750	Ep.: 45,0 S; 167,6 E; H = 23:27:35,2 h = 83 km; M = 6,0 (GS) South Islands, New Zealand
12	ZT	P	13	59		16.160	Ep.: 10,7 S; 165,2 E; H = 13:39:37,4 h = 14 km; M = 5,7 (GS) Santa Cruz Islands region
17	ZT	P	13	11		16.160	Ep.: 10,7 S; 165,2 E; H = 12:52:03,8 h = 48 km; M = 5,6 (GS) Santa Cruz Islands region
19	ZT ZT	Pg Sg	04 04	05 06	53,5 12,0		Ep.: See pag. 106
19	ZT ZT	Pg Sg	23 23	35 35	41,0 46,5		Ep.: See pag. 106
21	ZT	P	06	34		4.800	Ep.: 24,8 N; 45,87 W; H = 06:26:16,6 h = 25 km; M = 5,9 (GS) North Atlantic ridge



SEISMIC OBSERVATIONS

1988

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
22 Jun	ZT	P	22	12		16.750	Ep.: 15,2 S; 168,2 E; H = 21:53:07,5 h = 26 km; M = 5,3 (GS) Vanuatu Islands
24	ZT ET	Pg Sg	18	17	38,2		Ep.: See pag.
24			18	17	52,8		
2 Jul	ZT	P	10	20		16.625	Ep.: 14,3 S; 167,2 E; H = 10:01:28,8 h = 143 km; M = 5,9 (GS) Vanuatu Islands
11	ZT ZT	Pn Sn	11	42	38,0		Ep.: 42,9 N; 1,8 W; H = 10:01:28,8 h = 16 km; M = 3,1 (IGN) Navarra, Spain
11			11	43	28,5		
12	ZT	P	10	07		7.950	Ep.: 9,8 N; 71,38 W; H = 09:55:54,0 h = 29 km; M = 5,5 (GS) Lake Maracaibo
12	ZT ZT	Pn Sn	21	45	00,6		Ep.: Regional
12			21	45	31,2		
13	ZT ZT	Pn Sn	12	48	04,7		Ep.: 42,9 N; 1,8 W; H = 12:47:12,7 h = 18 km; M = 3,2 (IGN) Navarra, Spain
13			12	48	55,4		
16	ZT NT	Pn Sn	22	44	05,0		Ep.: See pag.
16			22	44	35,2		
19	ZT	P	01	20		17.525	Ep.: 19,6 S; 175,0 W; H = 01:00:19,6 h = 137 km; M = 6,1 (GS) Tonga Islands
19	ZT	P	11	06		8.755	Ep.: 50,5 N ; 129,9 W; H = 10:54:41,7 h = 10 km; M = 5,4 (GS) Vancouver Island region
22	ZT	P	21	21	23,0	2.690	Ep.: 39,8 N; 29,59 W; H = 21:16:04,0 h = 10 km; M 0 5,0 (GS) Azores Islands
23	ZT	P	15	36		15.450	Ep.: 6,5 S; 158,7 E; H = 15:17:08,1 h = 17 km; M = 6,7 (GS) New Britain region
25	ZT	P	07	05		13.800	Ep.: 6,0 S, 133,6 E; H = 06:46:06,6 h = 28 km; M = 6,5 (GS) Aroe Island region
25	ZT	P	20	05	15,8	1.500	Ep.: 29,8 N ; 7,1 W; H = 20:03:07,4 h = 70 km; M = 4,3 (IGN) Golfo de Cadiz, Spain
27	ZT	P	22	14			Ep.: 13,1 S; 166,9 E; H = 21:55:09,6 h = 172 km; M = 5,9 (GS) Vanuatu Islands



SEISMIC OBSERVATIONS

1988

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
27 Jul	ZT	P	23	03		16.500	Ep.: 13,1 S; 166,9 E; H = 22:44:34,9 h = 177 km; M = 5,8 (GS) Vanuatu Islands
28	ZT	Pg	06	20	31,3		Ep.: See pag. 106
	NT	Sg	06	20	44,8		
29	ZT	Pn	02	06	15,8	1.330	Ep.: 45,0 N; 13,45 W; H = 02:03:24,5 h = 10 km; M = 4,6 (GS) North Atlantic Ocean
	NT	Sn	02	08	20,8		
30	ZT	Pg	06	01	38,8		Ep.: See pag. 106
	NT	Sg	06	01	52,5		
30	ZT	P	21	20		9.860	Ep.: 44,7 N; 149,8 E; H = 21:07:21,1 h = 61 km; M = 6,3 (GS) Kuril Island
31	ZT	P	13	10		17.600	Ep.: 22,2 S; 171,1 E; H = 12:50:07,7 h = 61 km; M = 6,3 (GS) Loyalty Island region
31	ZT	P	15	35		9.525	Ep.: 31,9 S; 57,4 E; H = 15:22:48,7 h = 10 km; M = 5,8 (GS) Atlantic-Indian rise
2 Aug	ZT	Sn	12	23	15,0		Ep.: 43,0 N; 0,2 W; H = 12:22:01,0 h = 3 km; M = 3,2 (LDG) Luz, France
3	ZT	P	05	52		5.775	Ep.: 36,48 N; 70,9 E; H = 05:43:14,8 h = 201 km; M = 5,5 (GS) Hindu Kush region
4	ZT	Pg	03	50	35,8		Ep.: Local
	ET	Sg	03	50	40,0		
5	NT	Pg	01	39	39,2		Ep.: Local
	NT	Sg	01	40	02,0		
6	ZT	P	00	48		8.300	Ep.: 25,15 N; 95,1 E; H = 00:36:24,6 h = 91 km; M = 6,8 (GS) India Border region
6	ZT	P	06	46		15.050	Ep.: 7,1 S; 151,1 E; H = 06:26:55,6 h = 25 km; M = 5,9 (GS) New Britain region
6	ZT	P	09	12		5.800	Ep.: 36,4 N; 71,0 E; H = 09:03:21,9 h = 195 km; M = 6,1 (GS) Afghanistan-USSR Border region
7	ZT	Pg	02	17	35,0		Ep.: See pag. 106
	ZT	Sg	02	17	37,0		



SEISMIC OBSERVATIONS

1988

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
8 Aug	ZT	P	20	04		2.500	Ep.: 63,6 N; 2,4 E; H = 19:59:31,8 h = 10 km; M = 5,7 (GS) Norwegian sea
9	ZT	Pn	16	57		12,8	Ep.: Local
	ZT	Pg	16	57		14,0	
10	ZT	P	04	57		15.900	Ep.: 10,3 S; 160,8 E; H = 04:38:26,1 h = 34 km; M = 6,1 (GS) Salomon Island
10	ZT	P	05	16		15.900	Ep.: 10,0 S; 160,7 E; H = 04:56:40,2 h = 33 km; M = 5,9 (GS) Salomon Island
10	ZT	P	06	58		15.900	Ep.: 10,2 S; 160,8 E; H = 06:38:42,8 h = 40 km; M = 5,8 (GS) Salomon Island
10	ZT	P	11	08		5.800	Ep.: 37,0 N; 71,6 E; H = 10:59:05,4 h = 126 km; M = 4,9 (GS) Afghanistan-USSR Border region
10	ZT	P	13	30		16.670	Ep.: 14,8 S; 167,3 E; H = 13:11:19,4 h = 125 km; M = 6,2 (GS) Vanuatu Islands
11	ZT	P	03	10		2.520	Ep.: 49,2 N; 28,4 W; H = 03:05:40,5 h = 10 km; M = 5,4 (GS) North Atlantic ridge
11	ZT	P	13	41		9.270	Ep.: 18,1 S; 65,4 E; H = 13:29:20,6 h = 10 km; M = 5,5 (GS) Mascarene Island region
11	ZT	P	16	07		4.550	Ep.: 29,9 N; 51,5 E; H = 16:00:07,5 h = 32 km; M = 5,3 (GS) Southern Iran
11	ZT	P	16	12		4.560	Ep.: 29,9 N; 51,65 E; H = 16:00:07,5 h = 33 km; M = 5,7 (GS) Southern Iran
12	ZT	P	19	07		5.900	Ep.: 39,6 N; 74,5 E; H = 18:58:47,7 h = 33 km; M = 5,7 (GS) Southern Xinjiang, China
13	ZT	Pg	12	14		58,2	Ep.: See pag. 106
	ZT	Sg	12	15		06,5	
14	ZT	P	11	08		9.000	Ep.: 54,6 N; 152,6 E; H = 10:56:57,5 h = 645 km; M = 5,4 (GS) Sea of Okhotsk
14	ZT	P	20	15		8.775	Ep.: 39,1 N; 110,8 W; H = 20:03:03,9 h = 10 km; M = 5,5 (GS) Utah



SEISMIC OBSERVATIONS

1988

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
17 Aug	ZT	P	02	17		11.800	Ep.: 7,7 S; 107,1 E; H = 01:59:07,7 h = 27 km; M = 5,8 (GS) Java
20	ZT	P	23	20		7.600	Ep.: 26,7 N; 86,6 E; H = 23:09:09,5 h = 57 km; M = 6,4 (GS) Nepal-India Border region
23	ZT	Pg	16	21	40,0		Ep.: See pag. 106
	ZT	Sg	16	21	55,2		
27	ZT	Pg	02	51	12,4		Ep.: See pag. 106
	NT	Sg	02	51	15,0		
29	ZT	Pg	09	35	40,0		Ep.: See pag. 107
	ZT	Sg	09	35	47,0		
2 Sep	ZT	Pg	21	55	30,0		Ep.: Local
	NT	Sg	21	55	32,7		
2	ZT	Pn	22	00	58,9		Ep.: 43,2 N; 1,3 W; H = 22:00:09,3 h = 4 km; M = 2,8 (LDG) Pau, France
4	ZT	Pg	03	38	10,6		Ep.: Local
	NT	Sg	03	38	14,0		
5	ZT	P	06	23		7.250	Ep.: 18,4 N; 70,3 W; H = 06:13:17,4 h = 28 km; M = 5,5 (GS) Dominican Republic region
5	ZT	P	20	08		2.250	Ep.: 34,48 N; 26,5 E; H = 20:03:25,4 h = 11 km; M = 5,0 (GS) Crete
9	ZT	Pg	15	49	11,0		Ep.: See pag. 107
	NT	Sg	15	49	17,0		
9	ZT	P	21	21		5.800	Ep.: 36,4 N; 71,3 E; H = 21:12:36,1 h = 99 km; M = 5,4 (GS) Afghanistan-USSR border region
9	ZT	Pg	22	10	15,5		Ep.: Local
	NT	Sg	22	10	33,4		
10	ZT	Pg	17	33	45,6		Ep.: See pag. 107
	NT	Sg	17	33	53,2		
13	NT	Pg	19	01	14,0		Ep.: 43,1 N; 0,4 W; H = 19:00:31,8 h = 10 km; M = 3,1 (LDG) Pau, France
	NT	Sg	19	01	48,0		



SEISMIC OBSERVATIONS

1988

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
14 Sep	ZT	P	04	09		5.725	Ep.: 49,8 N; 78,8 E; H = 03:59:57,4 h = — km; M = 4,5 (GS) Eastern Kazakh, SSR
15	ZT ET	Pg Sg	04	35	38,0		Ep.: See pag. 107
16	ZT ET	Pg Sg	01	51	29,0		Ep.: See pag. 107
16	ZT ET	Pg Sg	04	08	25,5	800	Ep.: See pag. 107
23	NT ET	Pg Sg	09	58	48,0		Ep.: See pag. 107
25	ZT	P	21	01		5.800	Ep.: 37,1 N; 71,8 E; H = 20:52:14,7 h = 11 km; M = 5,5 (GS) Afghanistan-USSR border region
25	ZT	P	21	36		5.775	Ep.: 36,3 N; 71,3 E; H = 07:17:00,2 h = 212 km; M = 5,6 (GS) Hindu Kush region
26	ZT	P	08	36		10.450	Ep.: 35,5 N; 141,1 E; H = 08:23:19,8 h = 29 km; M = 5,9 (GS) Near East coast of Honshu, Japan
28	ZT	Pg	15	33	48,0		Ep.: Local
5 Oct	ZT	P	01	19		16.670	Ep.: 14,8 S; 167,3 E; H = 01:00:06,9 h = 14 km; M = 5,4 (GS) Vanuatu Islands
7	ZT NT	Pn Sg	03	49	02,1		
7	ZT ZT	Pg Sg	19	13	38,3		Ep.: See pag. 107
8	ZT	P	05	06		17.400	Ep.: 18,7 S; 172,4 W; H = 04:46:24,5 h = 35 km; M = 6,6 (GS) Tonga Islands region
10	ZT	Sg	00	33	00,8		Ep.: Local
10	ZT NT	Pg Sg	05	38	53,2		Ep.: Local
10	ZT ZT	Pn Sn	00	54	05,3		Ep.: See pag. 107



SEISMIC OBSERVATIONS

1988

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
10 Oct	ZT	P	06	51		16.500	Ep.: 13,7 S; 166,3 E; H = 06:31:28,0 h = 37 km; M = 5,3 (GS) Vanuatu Islands
10	ZT	Pg	08	39	27,6		Ep.: Local
	NT	Sg	08	39	30,8		
10	ZT	P	18	40		18.550	Ep.: 28,6 S; 177,5 W; H = 18:20:25,0 h = 28 km; M = 6,5 (GS) Kermadec islands region
11	ZT	Pg	12	27	04,0		Ep.: Local
	NT	Sg	12	27	06,0		
11	ZT	Pg	16	38	06,7		Ep.: Local
	ET	Pg	16	38	23,8		
13	ZT	P	14	12		9.250	Ep.: 37,1 N; 116,0 W; H = 14:00:00 h = — km; M = 5,9 (GS) Southern Nevada
17	ET	Pg	05	07	56,7		Ep.: See pag. 107
	ET	Sg	05	08	04,3		
19	NT	Pn	02	11	41,7		Ep.: See pag. 107
	NT	Sn	02	12	00,3		
20	ZT	Pg	01	21	11,3		Ep.: See pag. 108
	ZT	Sg	01	21	31,7		
21	ZT	P	09	11		16.750	Ep.: 15,3 S; 168,2 E; H = 08:51:41,0 h = 27 km; M = 5,3 (GS) Vanuatu Islands
21	ZT	Pg	11	17	38,7		Ep.: Local
	NT	Sg	11	17	56,7		
21	ZT	Pg	11	38	12,7		Ep.: Local
	NT	Sg	11	38	14,7		
23	ZT	P	23	01		2.500	Ep.: 38,2 N; 26,7 W; H = 22:56:54,6 h = 10 km; M = 4,8 (GS) Azores Islands
24	ZT	Pn	17	34	45,1		Ep.: See pag. 108
	ZT	Sn	17	35	08,7		
26	ZT	P	02	24		5.800	Ep.: 36,5 N; 70,8 E; H = 02:15:12,6 h = 220 km; M = 5,1 (GS) Hindu Kush region



SEISMIC OBSERVATIONS

1988

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
28 Oct	ZT	Pg	13	20	20,0		Ep.: Local
29	ZT	P	06	10	04,0		Ep.: 38,1 N; 0,65 W; H = 06:09:12,1 h = — km; M = 3,5 (IGN) Guardamar, Spain
29	ZT	P	09	21		7.450	Ep.: 27,8 N; 85,6 E; H = 09:10:52,5 h = 18 km; M = 5,4 (GS) Nepal
29	ZT	Pg	17	53	28,0		Ep.: See pag. 108
	ZT	Sg	17	53	29,7		
30	ZT	Pn	02	42	29,0		Ep.: See pag. 108
	ET	Sn	02	42	48,0		
30	ZT	Pg	03	14	25,8		Ep.: See pag. 108
30	ZT	Pg	08	20	58,0		Ep.: Local
30	ZT	P	20	39	25,7		Ep.: Local
31	ZT	Pg	00	35	54,3		Ep.: Local
	ET	Sg	00	35	54,5		
31	ZT	Pg	01	39	30,5		Ep.: See pag. 108
	ET	Sg	01	39	34,0		
31	ZT	P	03	31	09,7		Ep.: Local
31	ZT	P	06	53	10,0		Ep.: Local
31	ZT	P	10	14	18,3		Ep.: 36,4 N; 2,58 E; H = 10:13:00,7 h = — km; M = 5,2 (IGN) Argelia
	ZT	S	10	15	15,3		
1 Nov	ZT	Pg	17	43	30,0		Ep.: Local
2	ZT	Pg	09	41	36,8		Ep.: Local
3	ZT	Pg	12	22	13,9		Ep.: Local
	ET	Sg	12	22	15,7		
3	ZT	P	14	59		9.215	Ep.: 13,8 N; 90,4 W; H 0 14:47:10,7 h = 69; M = 5,6 (GS) Near coast of Guatemala
4	ZT	Pg	07	25	27,9		Ep.: See pag. 108



SEISMIC OBSERVATIONS

1988

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
6 Nov	ZT	Pg	03	02	31,1		Ep.: Local
6	ZT	P	13	15		8.900	Ep.: 22,8 N; 99,6 E; H = 13:03:19,3 h = 18; M = 6,1 (GS) China
7	ZT	Pg	00	45	48,3		Ep.: Local
7	ZT	Pg	12	24	00,3		Ep.: Local
8	ZT	Pg	04	16	33,9		Ep.: Local
11	ZT	Pg	13	29	25,6		Ep.: Local
	ZT	Sg	13	29	26,0		
14	ZT	Pg	04	31	00,3		Ep.: See pag. 108
14	ZT	Pg	08	27	49,0		Ep.: Local
	ET	Sg	08	27	52,5		
14	ZT	Pn	12	01	28,7		Ep.: 36,9 N; 2,8 E; H = 12:00:17,9 h = — km; M = 3,8 (IGN) Argelia
14	ZT	Sg	13	46	34,6		Ep.: Local
16	ZT	Pg	03	19	53,6		Ep.: Local
	ET	Sg	03	19	57,2		
16	ET	Pg	08	20	22,1		Ep.: Local
	ET	Sg	08	20	25,7		
17	ZT	P	07	14		11.575	Ep.: 12,4 N; 124,5 E; H = 06:55:46,0 h = 19 km; M = 6,0 (GS) Philippine Islands
23	ET	Pg	15	00	58,3		Ep.: Local
24	ZT	Pn	17	54	24,7		Ep.: See pag.
	ET	Sn	17	54	56,0		
24	ZT	Sg	18	11	34,7		Ep.: See pag. 108
25	ZT	Sg	13	52		5.600	Ep.: 48,1 N; 71,2 W; H = 23:46:04,5 h = 29 km; M = 5,9 (GS) Southern Quebec
29	ET	Pg	10	21	07,9		Ep.: Local
	ET	Sg	10	21	12,7		



SEISMIC OBSERVATIONS

1988

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
29 Nov	ZT	Pn	21	17	39,1		Ep.: 42,2 N; 2,2 W; H = 23:46:04,5 h = 10 km; M = 3,1 (IGN) Burgos, Spain
2 Dec	ZT	Pn	10	27	12,7		Ep.: 43,2 N; 0,7 W; H = 10:26:29,0 h = 10 km; M = 2,9 (LDG) Pau, France
	ZT	Sg	10	27	52,3		
2	ZT	P	22	19	14,1		Ep.: 42,2 N; 2,2 W; H = 22:18:16,8 h = 20 km; M = 3,6 (IGN) Burgos, Spain
	ET	P	22	19	14,3		
4	ZT	P	05	27		4.425	Ep.: 73,4 N; 54,9 E; H = 05:19:53,0 h = — km; M = 5,9 (GS) Novaya Zemlya
5	ZT	Pn	02	05	45,7		Ep.: See pag. 108
	ZT	Sn	02	06	02,7		
5	ZT	Pg	03	08	25,9		Ep.: Local
5	ZT	Pg	13	31	08,1		Ep.: Local
5	ZT	P	16	25		17.000	Ep.: 15,2 S; 173,5 W; H = 16:05:32,7 h = 40 km; M = 6,0 (GS) Tonga Islands
7	ZT	P	07	47		3.450	Ep.: 40,9 N; 44,1 E; H = 07:41:24,2 h = 5 km; M = 6,2 (GS) Turkey - USSR border region
9	ZT	Pn	06	17	54,3		Ep.: 35,9 N; 2,8 E; H = 06:40:43,4 h = 10 km; M = 4,0 (GS) Algeria
12	ZT	Sg	05	40	49,2		Ep.: See pag. 108
12	ZT	P	06	42	32,9		Ep.: 36,7 N; 4,1 W; H = 22:18:16,8 h = 40; M = 4,3 (IGN) S. Fuengirola, Spain
12	ZT	Pg	09	29	37,3		Ep.: See pag. 108
12	ZT	Pg	17	17	34,1		Ep.: Local
17	ZT	Pg	02	39	37,1		Ep.: See pag. 108
	ET	Sg	02	39	50,8		
17	ZT	P	04	27		6.000	Ep.: 49,8 N; 78,9 W; H = 04:18:06,9 h = — km; M = 5,9 (GS) Eastern Kazakh SSR



SEISMIC OBSERVATIONS

1988

Date	Comp.	Phase	Time TU			Δ Km	Remarks
			h	m	s		
18 Dec	ZT	Pg	05	24	15,7		Ep.: See pag. 109
	ET	Sg	05	24	30,0		
19	ZT	Pg	05	05	30,4		Ep.: Local
	ET	Sg	05	05	34,3		
21	ZT	Pg	00	35	19,0		Ep.: Local
	ET	Sg	00	35	25,7		
21	ZT	Pg	18	44	12,0		Ep.: Local
22	ZT	Pg	15	52	30,0		Ep.: See pag. 109
	ET	Sg	15	52	42,3		
25	ZT	P	18	29			Ep.: 44,9 N; 9,0 E; H = 18:27:35,8 h = 23 km; M = 4,2 (GS) Northern Italy
26	ZT	Pn	01	30	36,3		Ep.: 36,2 N; 2,7 E; H = 01:29:13,0 h = 10 km; M = 3,6 (GS) Algeria
27	ZT	Pg	20	21	37,8		Ep.: 42,9 N; 1,3 W; H = 20:20:49,5 h = — km; M = 3,3 (LDG) Luz, France
	ZT	Sg	20	22	26,7		
28	ZT	Pn	06	21	01,8		Ep.: 39,4 N; 0,2 W; H = 06:21:15,1 h = 20 km; M = 3,3 (IGN) Valencia, Spain
28	ZT	Pn	06	57	57,3		Ep.: 39,4 N; 0,3 W; H = 06:57:10,5 h = 20 km; M = 3,2 (IGN) Valencia, Spain
28	ZT	Pg	10	44	41,2		Ep.: Local
30	ZT	P	05	08	42,7		Ep.: Local
30	ZT	Pg	12	11	13,1		Ep.: Local
	ZT	Sg	12	11	14,7		

