4.

SIGNIFICANT EARTHQUAKES IN 2000

(Earthquakes that was felt in Hungary)

2 March 2000	- Füzesgyarmat
1 May 2000	- Vámosszabadi
2 June 2000	- Nagykőrös
28 June 2000	- Vámosszabadi
11 July 2000	- Austria
7 October 2000	- Budapest

METHOD USED FOR ESTIMATION OF INTENSITY

The earthquake effects (macroseismic observations) are usually gathered on questionnaires. Based on these reports the intensity values were estimated by a computer algorithm (Zsíros et al, 1990 and Zsíros 1994).

The assigned intensities correspond to the *European Macroseismic Scale 1998 (EMS)* edited by Grünthal (1998). (APPENDIX A)

HYPOCENTER PARAMETERS

2 March 2000 - Füzesgyarmat

Date:	2000/03/02
Origin Time:	06:15:38.3 UTC
Latitude and Longitude:	47.011N 21.608E (S.D. 25.7 km)
Depth:	10.0 km (S.D. 27 km)
Magnitude:	2.7 ML
Maximum Intensity:	3.5

DISCUSSION

On March 2nd, an earthquake with a magnitude of 2.7 ML was felt at Füzesgyarmat area of about 150-200 km^2, with a maximum intensity of 3-4 EMS. The extremely large deviation of instrumental and macroseismic epicenter (some 20 km) is probably due to the sparse station coverage in the area.

Seismograms of the event is shown in Figure 4.1.

The intensity distribution of the event is shown in Table 4.1. and Figure 4.2.

2 March 2000 - Füzesgyarmat

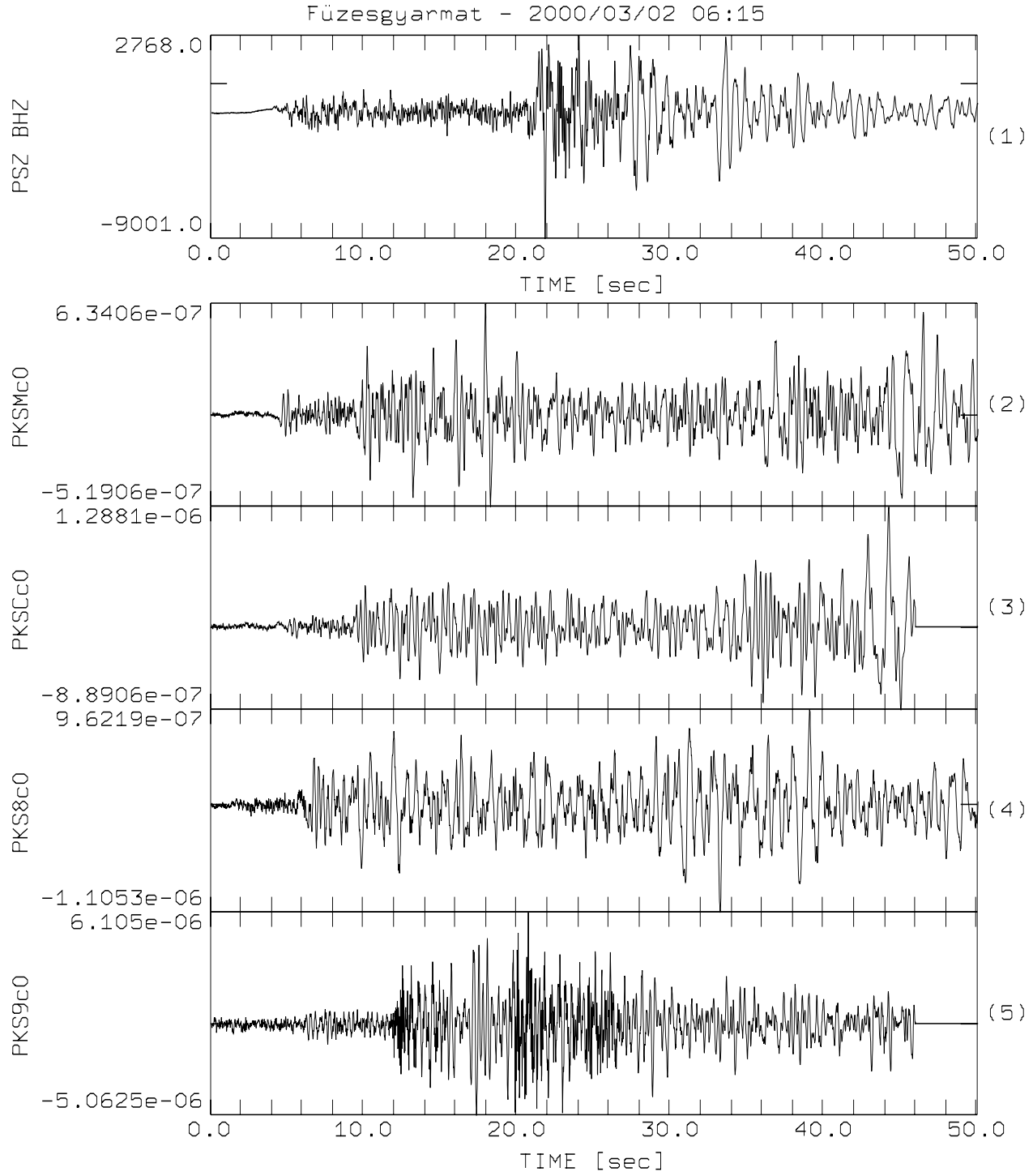

Figure 4.1.
Seismograms of the Füzesgyarmat earthquake 2nd March 2000, 6:15:38 UTC
(PSZ, PKSM, PKSC, PKS8 and PKS9 vertical components)
The vertical axis is ground velocity in m/s.

2 March 2000 - Füzesgyarmat

Table 4.1.
Intensity distribution of the Füzesgyarmat Earthquake 2nd March 2000 (6:15:38 UTC)

Location		Coordinates		I	R	N
		Latitude (N)	Longitude (E)	Intensity	Relative reliability	Number of reports
1	Biharnagybajom	47.207	21.229	3.5	30%	2
2	Bucsa	47.204	21.000	3.0	31%	2
3	Csökmő	47.028	21.284	1.0	0%	2
4	Darvas	47.105	21.335	1.0	0%	2
5	Dévaványa	47.030	20.952	1.0	0%	1
6	Ecsegfalva	47.147	20.916	1.0	0%	2
7	Füzesgyarmat	47.104	21.207	3.5	35%	4
8	Kertészsziget	47.150	21.051	1.0	0%	1
9	Kőrösladány	46.960	21.077	1.0	0%	2
10	Kőröstarcsa	46.878	21.020	1.0	0%	2
11	Nagyrábé	47.201	21.328	1.0	0%	2
12	Szeghalom	47.022	21.169	2.5	41%	2
13	Szerep	47.230	21.139	1.0	0%	3
14	Újirász	46.985	21.350	1.0	0%	1
15	Vésztő	46.916	21.253	1.0	0%	2
16	Zsáka	47.133	21.427	1.0	0%	1

2 March 2000 - Füzesgyarmat

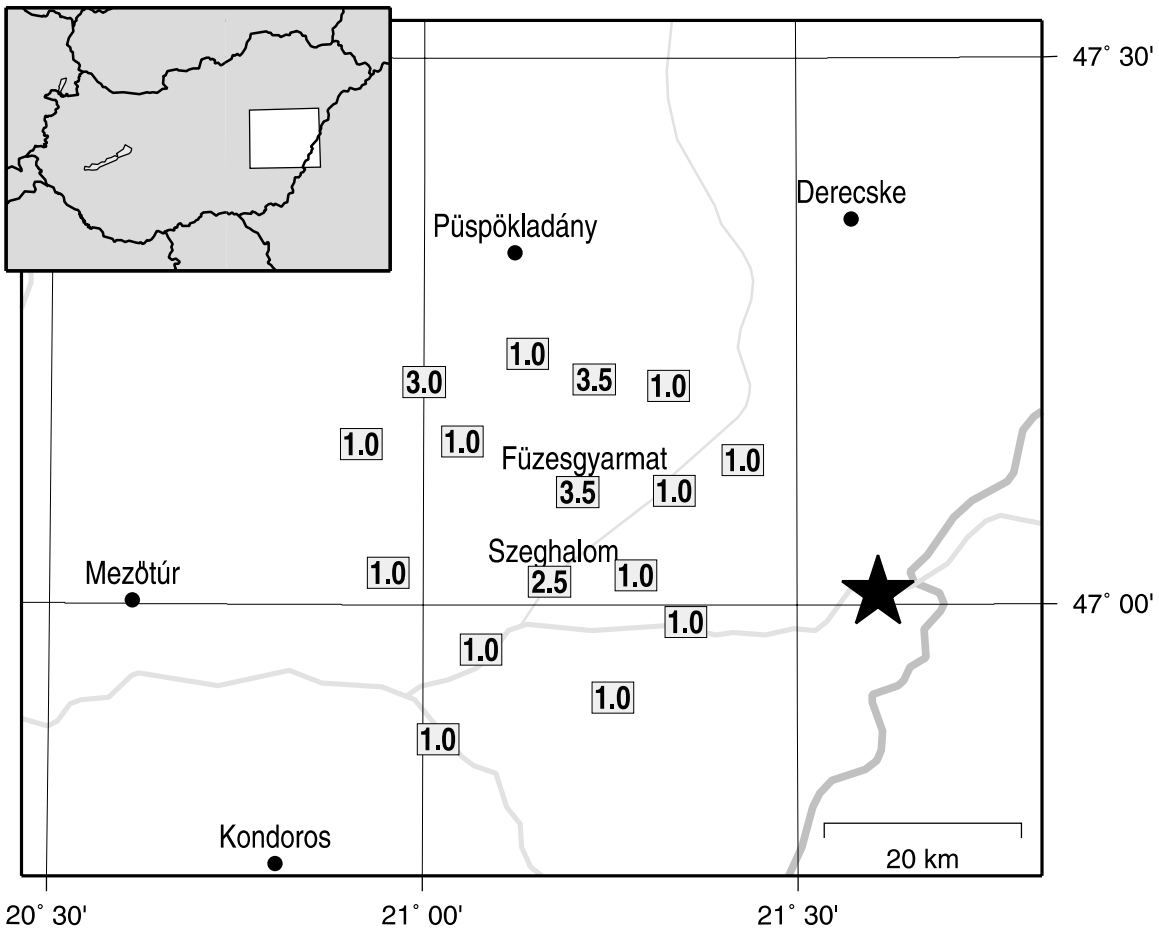

Figure 4.2.
Intensity distribution
of the Füzesgyarmat earthquake 2nd March 2000, 6:15:38 UTC
(star - instrumental epicentre)

HYPOCENTER PARAMETERS

1 May 2000 - Vámosszabadi

Date:	2000/05/01
Origin Time:	17:54:41.9 UTC
Latitude and Longitude:	47.759N 17.665E (S.D. 2.5 km)
Depth:	4.2 km (S.D. 2.2 km)
Magnitude:	2.6 ML
Maximum Intensity:	4

DISCUSSION

On May 1st, an earthquake with a magnitude of 2.6 ML occurred near to the Hungarian - Slovakian border. Maximum intensity of 4 was reported from Vámosszabadi. The event was felt in a small area of about 100 km^2

Seismograms of the event is shown in Figure 4.3.

The intensity distribution of the event is shown in Table 4.2. and Figure 4.4.

1 May 2000 - Vámosszabadi

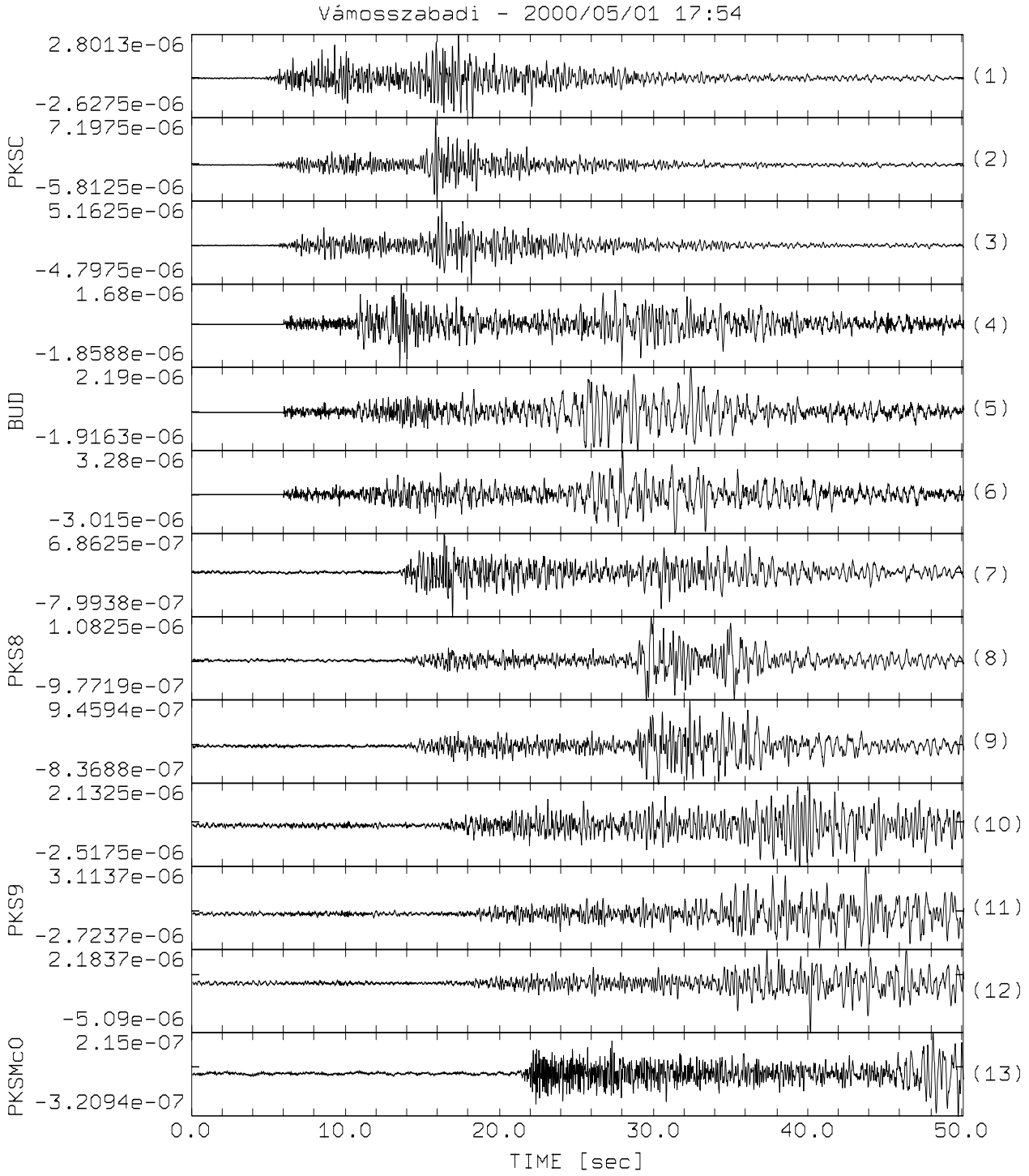

Figure 4.3.
Seismograms of the Vámosszabadi earthquake 1st May 2000, 17:54:42 UTC
(PKSC, BUD, PKS8, PKS9 three components, PKSM vertical component)
The vertical axis is ground velocity in m/s.

Table 4.2.
Intensity distribution of the Vámosszabadi Earthquake 1st May 2000 (17:54:42 UTC)

Location		Coordinates		I	R	N
		Latitude (N)	Longitude (E)	Intensity	Relative reliability	Number of reports
1	Abda	47.698	17.549	1.0	0%	2
2	Dunaszeg	47.770	17.546	1.0	0%	2
3	Győr	47.684	17.645	1.0	0%	1
4	Győrladamér	47.756	17.567	3.0	33%	2
5	Győrújfalu	47.723	17.610	3.5	37%	2
6	Kisbajcs	47.747	17.682	4.0	32%	3
7	Kunsziget	47.743	17.528	1.0	0%	2
8	Vámosszabadi	47.756	17.654	4.0	32%	2
9	Győrzámoly	47.742	17.584	4.0	21%	1
10	Vének	47.740	17.764	1.0	0%	1

1 May 2000 - Vámosszabadi

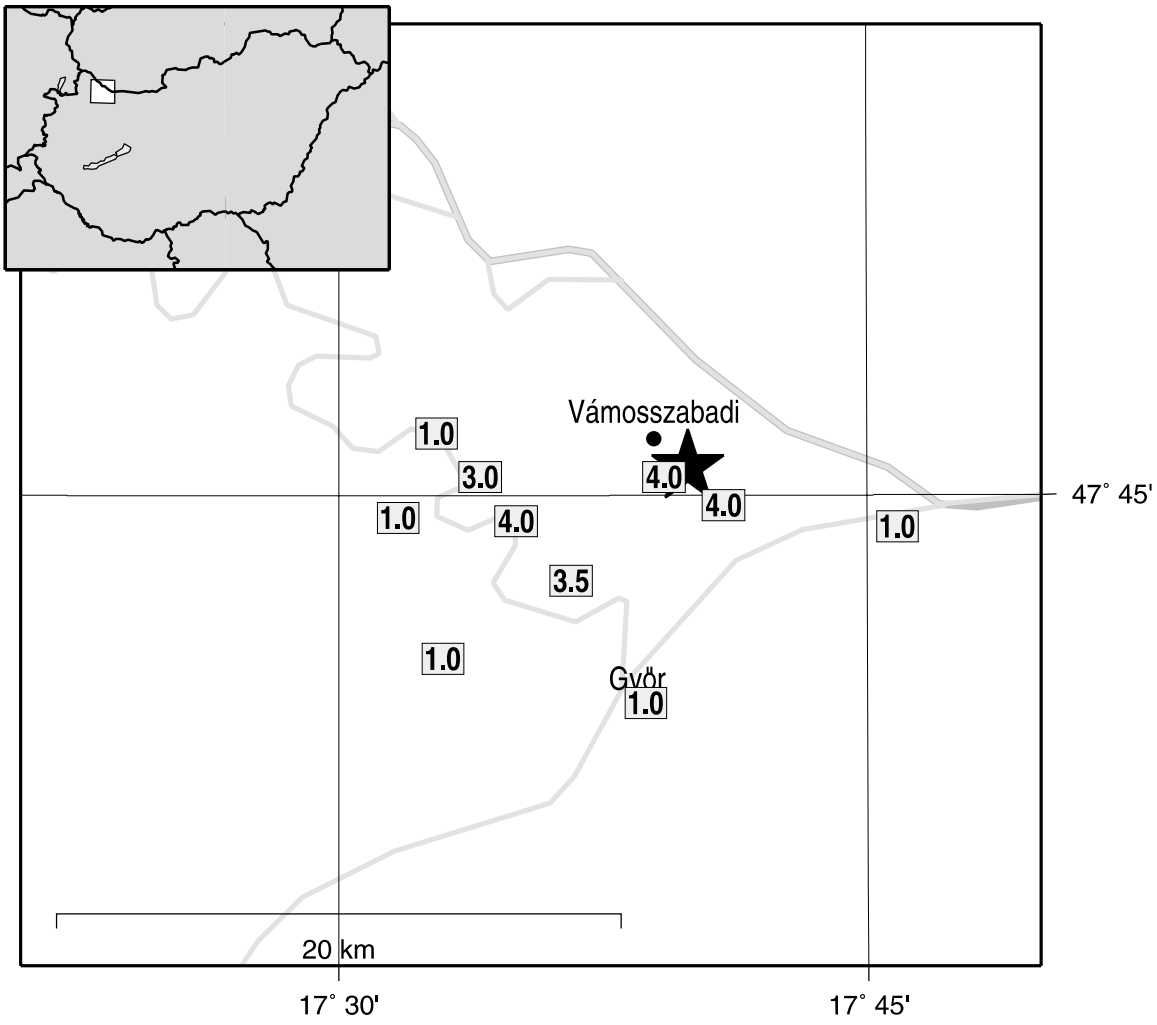

Figure 4.4.
Intensity distribution
of the Vámosszabadi earthquake 1st May 2000, 17:54:42 UTC
(star - instrumental epicentre)

HYPOCENTER PARAMETERS

2 June 2000 - Nagykőrös

Date:	2000/06/02
Origin Time:	15:17:30.2 UTC
Latitude and Longitude:	47.105N 19.769E (S.D. 5.4 km)
Depth:	16.9 km (S.D. 4.8 km)
Magnitude:	2.6 ML
Maximum Intensity:	3-4

DISCUSSION

The Nagykőrös earthquake of 2nd June with a magnitude of 2.6 ML was slightly felt at the epicenter area with a maximum intensity of 3-4 EMS.

Seismograms of the event is shown in Figure 4.5.

The intensity distribution of the event is shown in Table 4.3. and Figure 4.6.

2 June 2000 - Nagykőrös

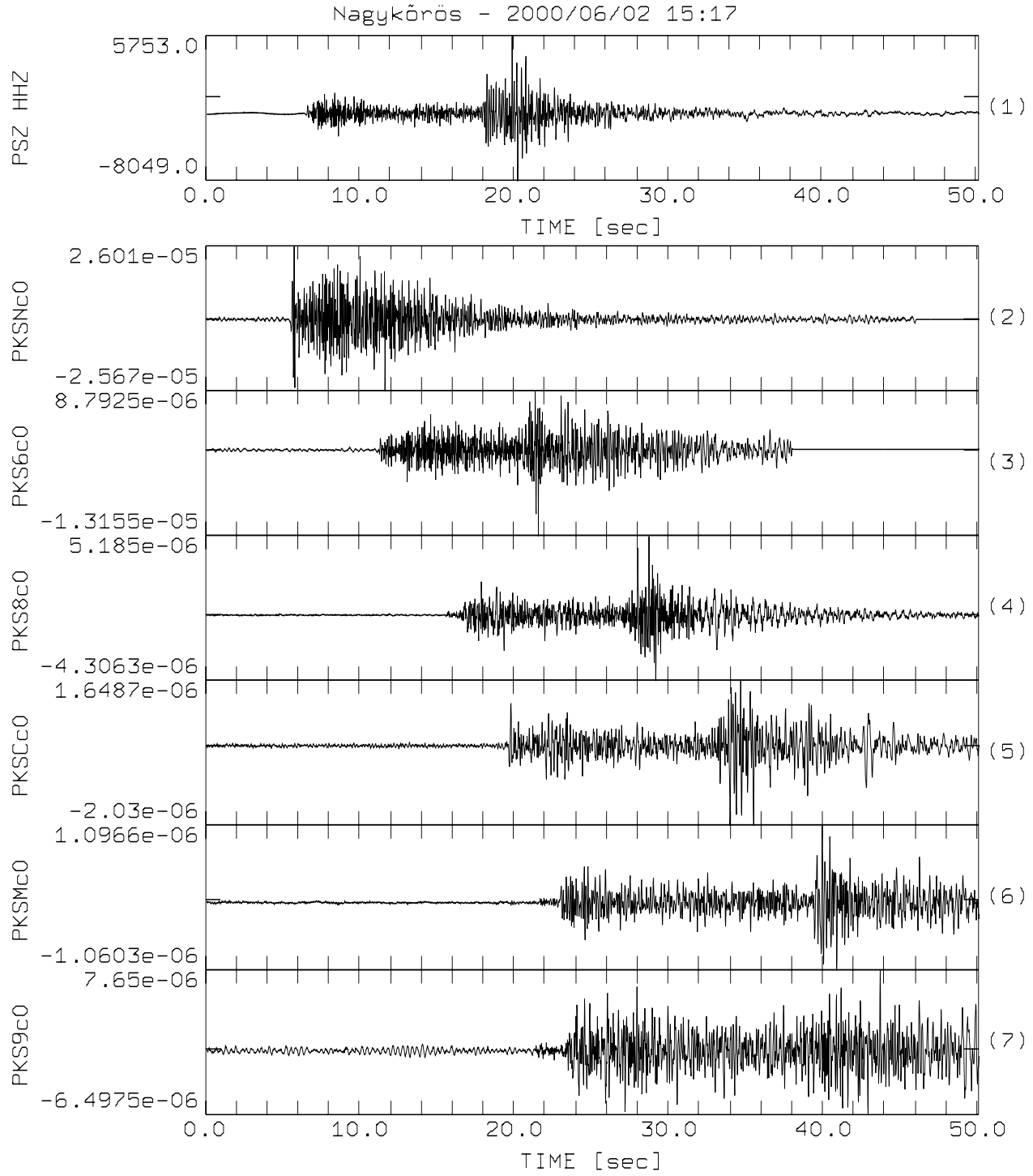

Figure 4.5.
Seismograms of the Nagykőrös earthquake 2nd June 2000, 15:17:30 UTC
(PSZ, PKSN, PKS6, PKS8, PKSC, PKSM and PKS9 vertical components)
The vertical axis is ground velocity in m/s.

Table 4.3.
Intensity distribution of the Nagykőrös Earthquake 2nd June 2000 (15:17:30 UTC)

Location		Coordinates		I	R	N
		Latitude (N)	Longitude (E)	Intensity	Relative reliability	Number of reports
1	Csemő	47.118	19.688	1.0	0%	2
2	Kocsér	47.000	19.915	1.0	0%	2
3	Nagykőrös	47.033	19.779	3.5	40%	2
4	Törtel	47.120	19.929	1.0	0%	1

2 June 2000 - Nagykőrös

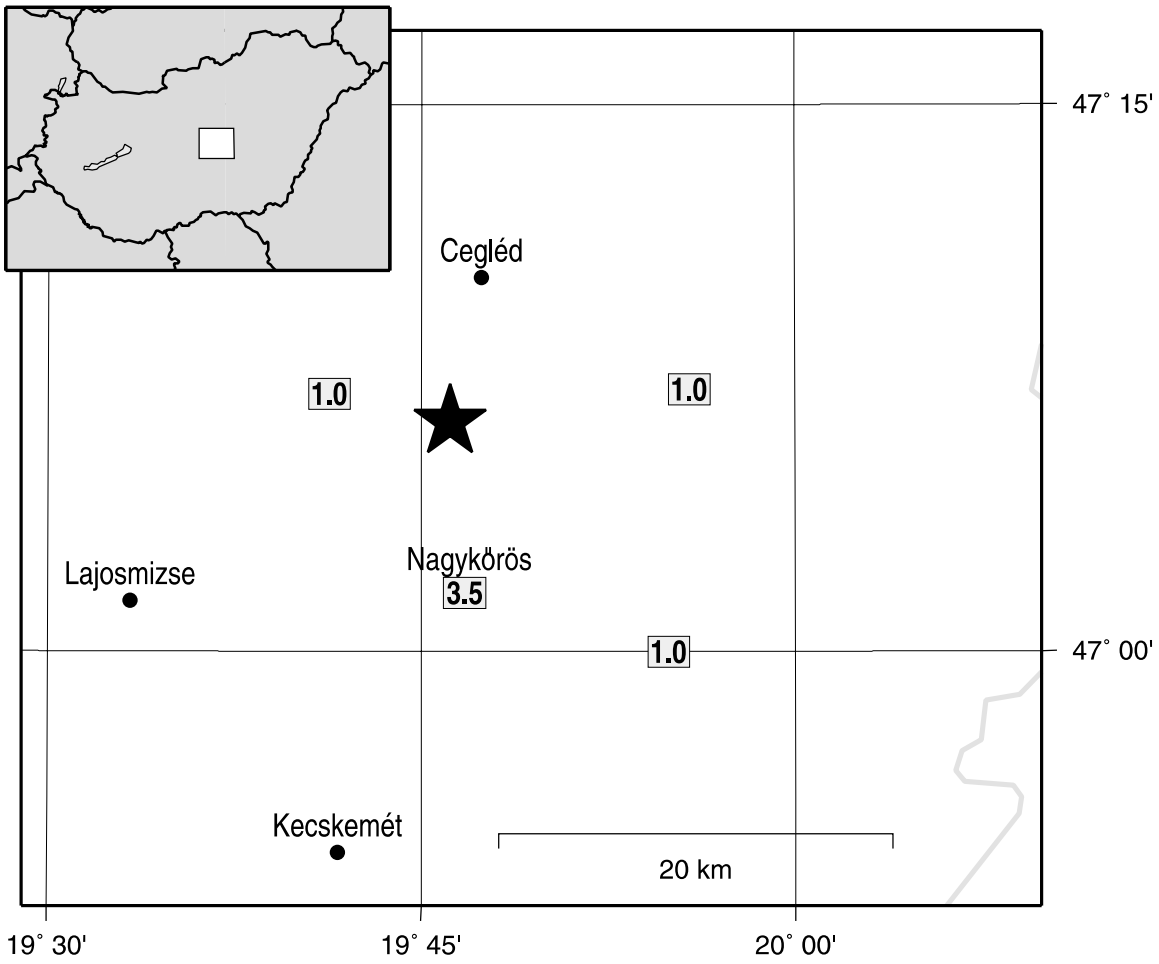

Figure 4.6.
Intensity distribution
of the Nagykőrös earthquake 2nd June 2000, 15:17:30 UTC
(star - instrumental epicentre)

HYPOCENTER PARAMETERS

28 June 2000 - Vámosszabadi

Date:	2000/06/28
Origin Time:	19:19:16.1 UTC
Latitude and Longitude:	47.799N 17.689E (S.D. 3.3 km)
Depth:	8.2 km (S.D. 2.5 km)
Magnitude:	2.6 ML
Maximum Intensity:	4

DISCUSSION

The Vámosszabadi earthquake of 1st May was followed by a similar size event (probable aftershock) on 28th June. The earthquake was slightly felt with intensity 4 EMS at the epicenter area.

Seismograms of the event is shown in Figure 4.7.

The intensity distribution of the event is shown in Table 4.4. and Figure 4.8.

28 June 2000 - Vámosszabadi

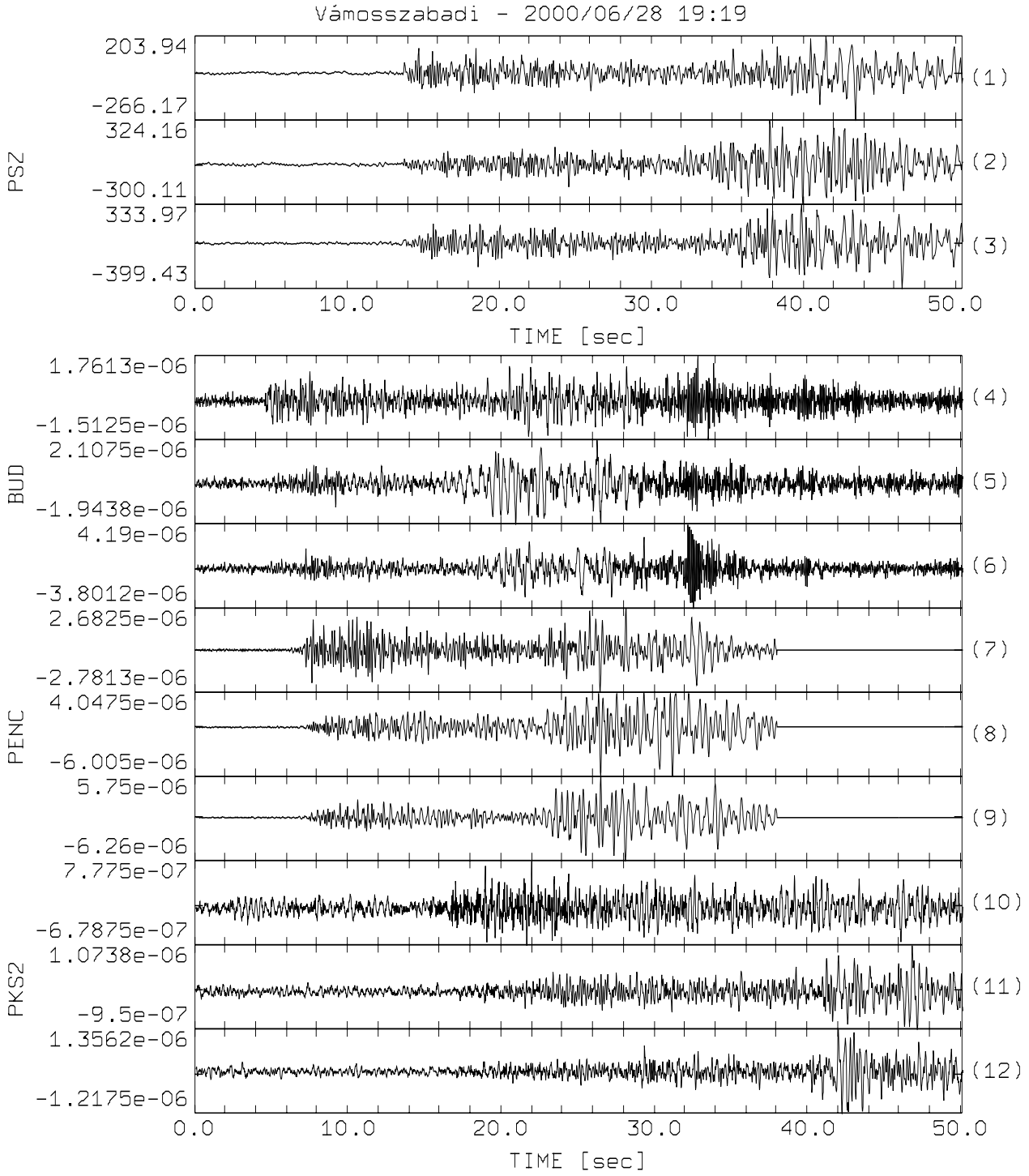

Figure 4.7.
Seismograms of the Vámosszabadi earthquake 28th june 2000, 19:19:16 UTC
(PSZ, BUD, PENC and PKS2 three components)
The vertical axis is ground velocity in m/s.

Table 4.4.
Intensity distribution of the Vámosszabadi Earthquake 28th June 2000 (19:19:16 UTC)

Location		Coordinates		I	R	N
		Latitude (N)	Longitude (E)	Intensity	Relative reliability	Number of reports
1	Abda	47.698	17.549	1.0	0%	1
2	Dunaszeg	47.770	17.546	1.0	0%	2
3	Győr	47.684	17.645	2.5	43%	3
4	Győrladamér	47.756	17.567	1.0	0%	1
5	Győrszentiván	47.699	17.750	1.0	0%	1
6	Győrzámoly	47.742	17.584	1.0	0%	2
7	Kisbajcs	47.747	17.682	4.0	33%	2
8	Kunsziget	47.743	17.528	1.0	0%	2
9	Nagybajcs	47.769	17.691	4.0	47%	1
10	Vámosszabadi	47.756	17.654	3.0	36%	2
11	Vének	47.740	17.764	3.5	35%	1

28 June 2000 - Vámosszabadi

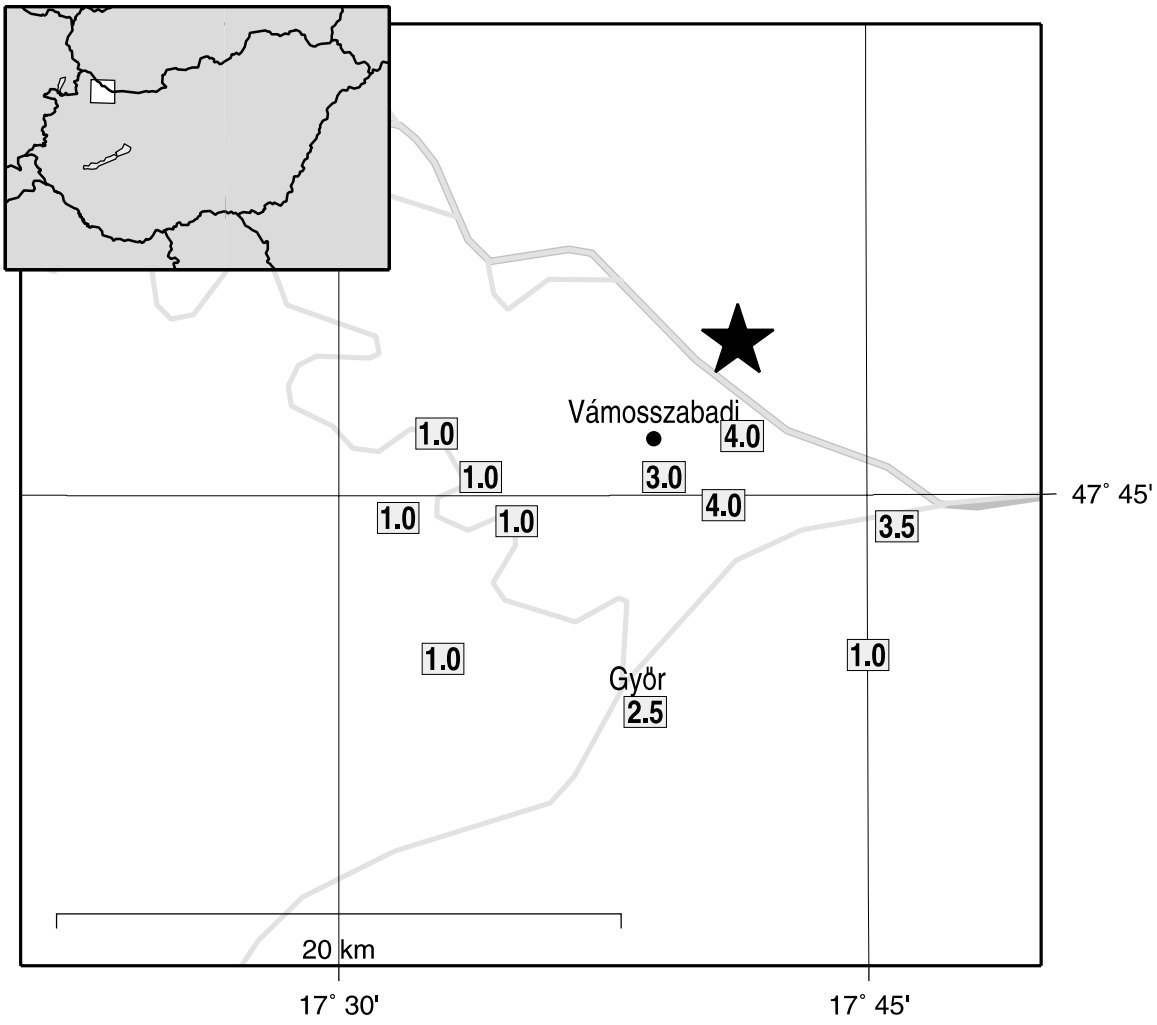

Figure 4.8.
Intensity distribution
of the Vámosszabadi earthquake 28th June 2000, 19:19:16 UTC
(star - instrumental epicentre)

HYPOCENTER PARAMETERS

11 July 2000 - Austria

Date:	2000/07/11
Origin Time:	02:49:48.4 UTC
Latitude and Longitude:	47.917N 16.475E (S.D. 1.1 km)
Depth:	1.0 km (S.D. 1.4 km)
Magnitude:	4.4 ML
Maximum Intensity:	6 (4-5 in Hungary)

DISCUSSION

The earthquake of 11th July in E Austria was widely felt in Sopron-Kőszeg-Hédervár area (2500 km^2) in NW Hungary. Maximum intensity of 4-5 EMS was reported from the border region.

Seismograms of the event is shown in Figure 4.9.

The intensity distribution of the event is shown in Table 4.5. and Figure 4.10.

11 July 2000 - Austria

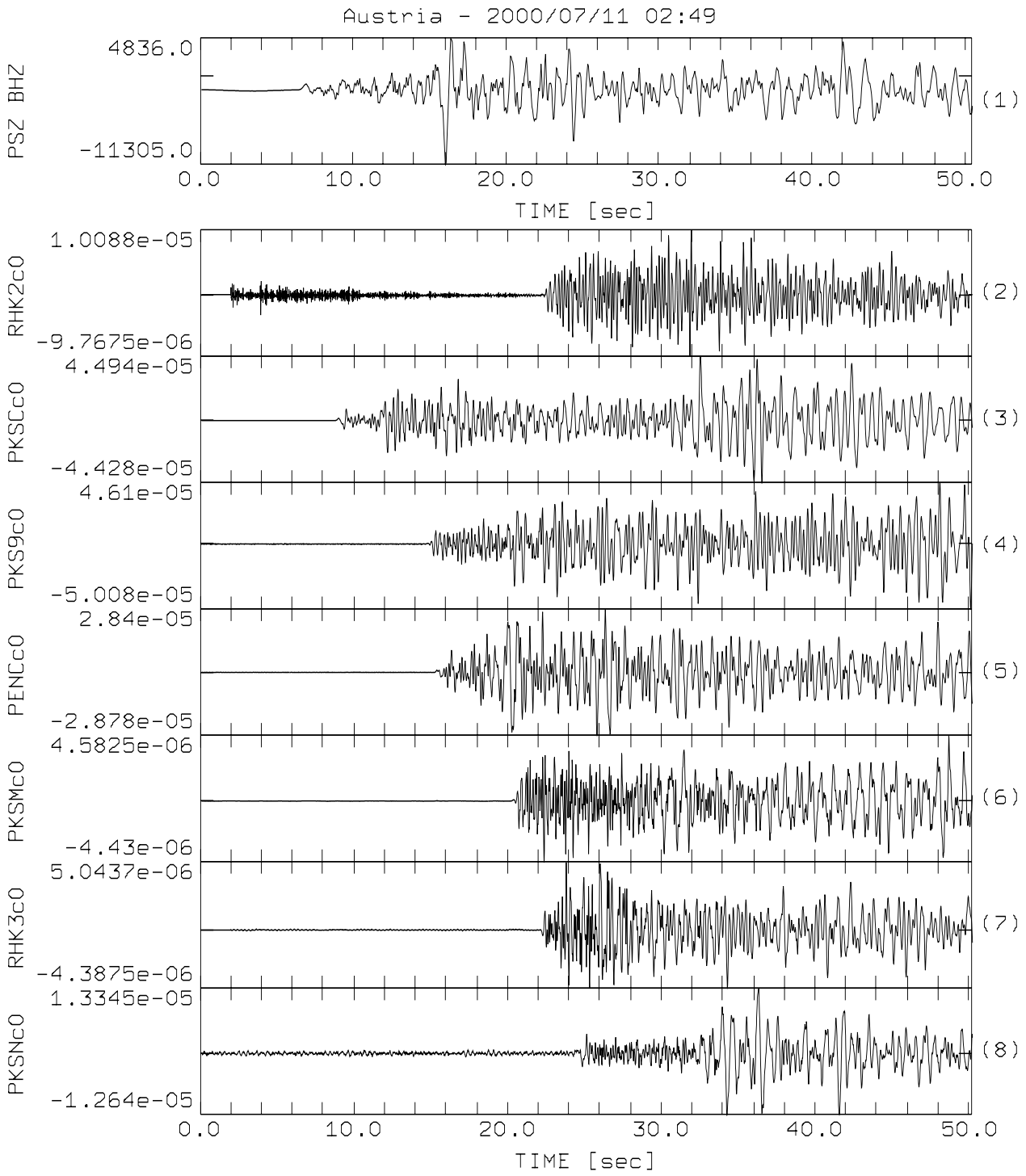

Figure 4.9.
Seismograms of the Austria earthquake 11th July 2000, 2:49:48 UTC
(PSZ, RHK2, PKSC, PKS9, PENC, PKSM, RHK3 and PKSN vertical components)
The vertical axis is ground velocity in m/s.

Table 4.5.
Intensity distribution of the Austria Earthquake 11th July 2000 (2:49:48 UTC)

Location		Coordinates		I	R	N
		Latitude (N)	Longitude (E)	Intensity	Relative reliability	Number of reports
1	Ágfalva	47.689	16.522	4.0	34%	2
2	Bezenye	47.959	17.223	3.5	45%	2
3	Bősárkány	47.688	17.256	3.0	50%	2
4	Csapod	47.518	16.931	3.0	34%	1
5	Csorna	47.615	17.255	3.5	40%	1
6	Fertőrákos	47.722	16.655	3.5	36%	1
7	Fertőszentmiklós	47.587	16.885	4.0	38%	2
8	Győrladamér	47.756	17.567	1.0	0%	1
9	Győrújfalu	47.723	17.610	1.0	0%	1
10	Halászi	47.889	17.330	2.5	50%	2
11	Hegyeshalom	47.910	17.166	1.0	0%	2
12	Jánossomorja	47.782	17.138	3.5	40%	2
13	Kapuvár	47.593	17.036	4.5	34%	2
14	Kőszeg	47.390	16.548	3.5	35%	5
15	Mihályi	47.515	17.101	3.5	35%	4
16	Mosonmagyaróvár	47.866	17.272	4.0	40%	2
17	Nagycenk	47.607	16.697	3.5	43%	1
18	Rajka	47.995	17.205	3.0	44%	1
19	Sopron	47.682	16.593	4.0	34%	3
20	Sopronhorpács	47.481	16.744	3.5	35%	2
21	Sopronkövesd	47.547	16.746	1.0	0%	1

11 July 2000 - Austria

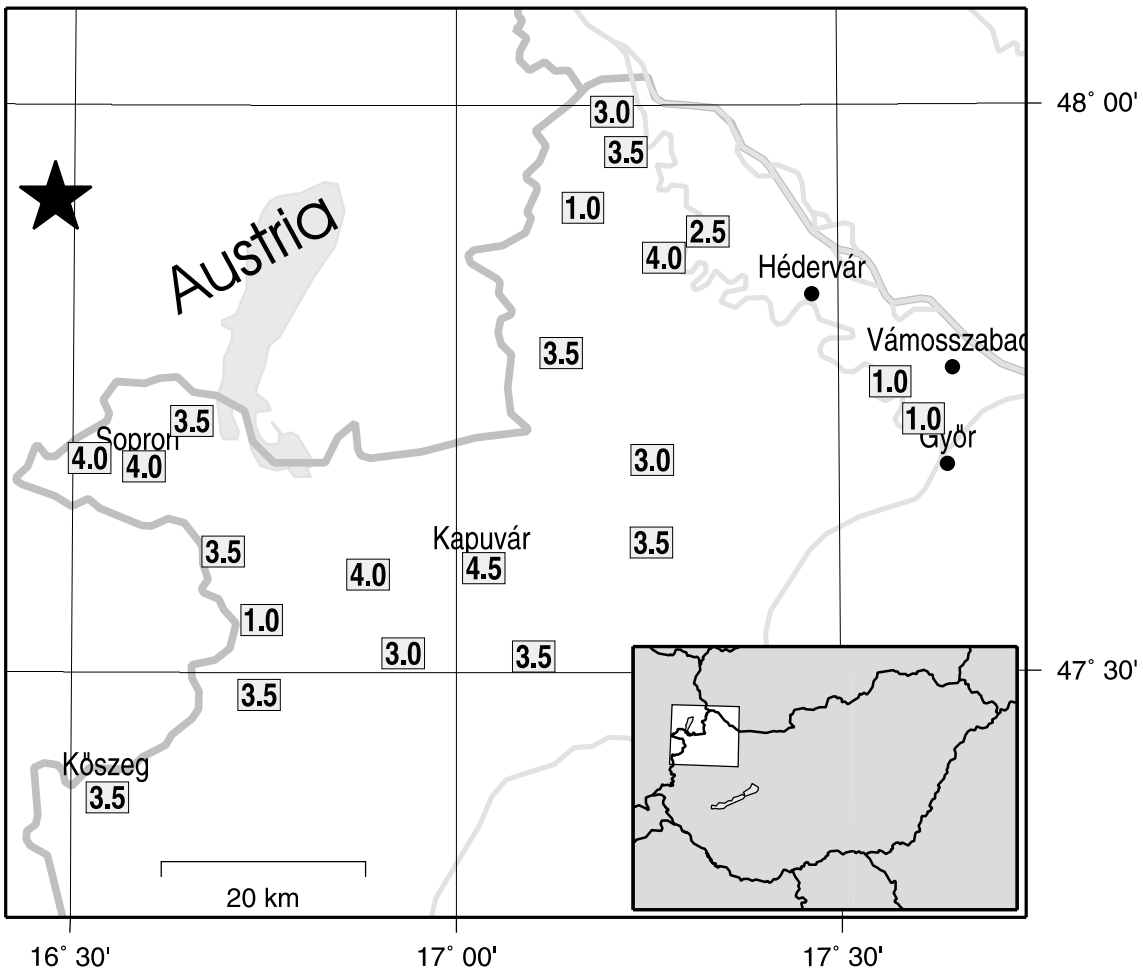

Figure 4.10.
Intensity distribution
of the Austria earthquake 11th July 2000, 2:49:48 UTC
(star - instrumental epicentre)

HYPOCENTER PARAMETERS

7 October 2000 - Budapest

Date:	2000/10/07
Origin Time:	00:42:11.8 UTC
Latitude and Longitude:	47.390N 19.135E (S.D. 6.1 km)
Depth:	12.6 km (S.D. 5.0 km)
Magnitude:	2.1 ML
Maximum Intensity:	4

DISCUSSION

On early morning 7th October a smaller size earthquake was felt in the XVI-th and XVII-th district in Budapest but no damage was reported. The instrumental epicenter has been located somewhat South (Csepel) from the felt area.

Seismograms of the event is shown in Figure 4.11.

The intensity distribution of the event is shown in Table 4.6. and Figure 4.12.

7 October 2000 - Budapest

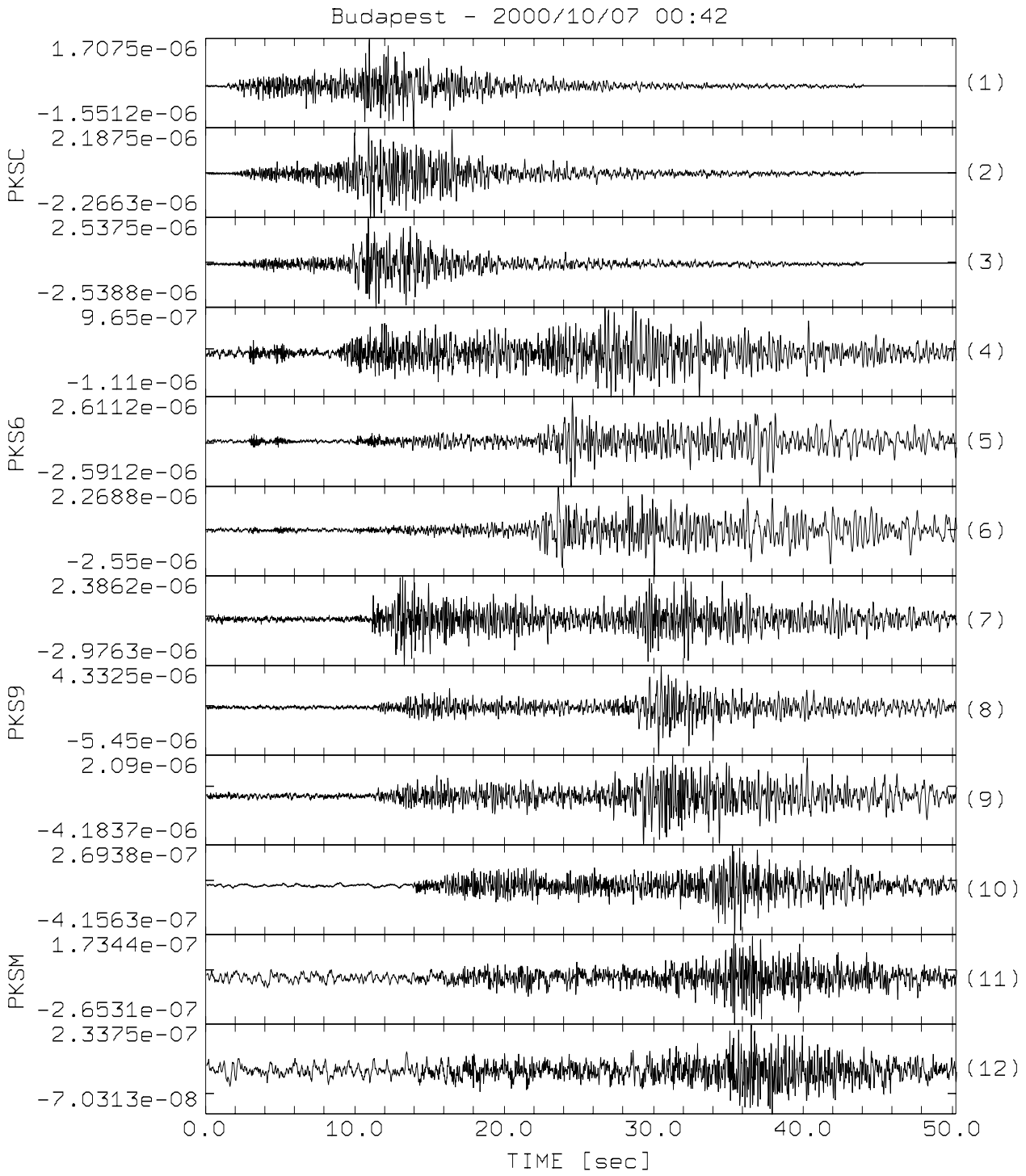

Figure 4.11.
Seismograms of the Budapest earthquake 7th October 2000, 0:42:12 UTC
(PKSC, PKS6, PKS9, and PKSM three components)
The vertical axis is ground velocity in m/s.

Table 4.6.
Intensity distribution of the Budapest Earthquake 7th October 2000 (0:42:12 UTC)

Location		Coordinates		I	R	N
		Latitude (N)	Longitude (E)	Intensity	Relative reliability	Number of reports
1	Budapest X. ker.	47.486	19.160	4.0	55%	1
2	Budapest XVI. ker.	47.509	19.205	4.0	40%	2
3	Budapest XVII. ker.	47.486	19.299	3.5	35%	3
4	Budapest XIX. ker.	47.456	19.138	1.0	0%	1

7 October 2000 - Budapest

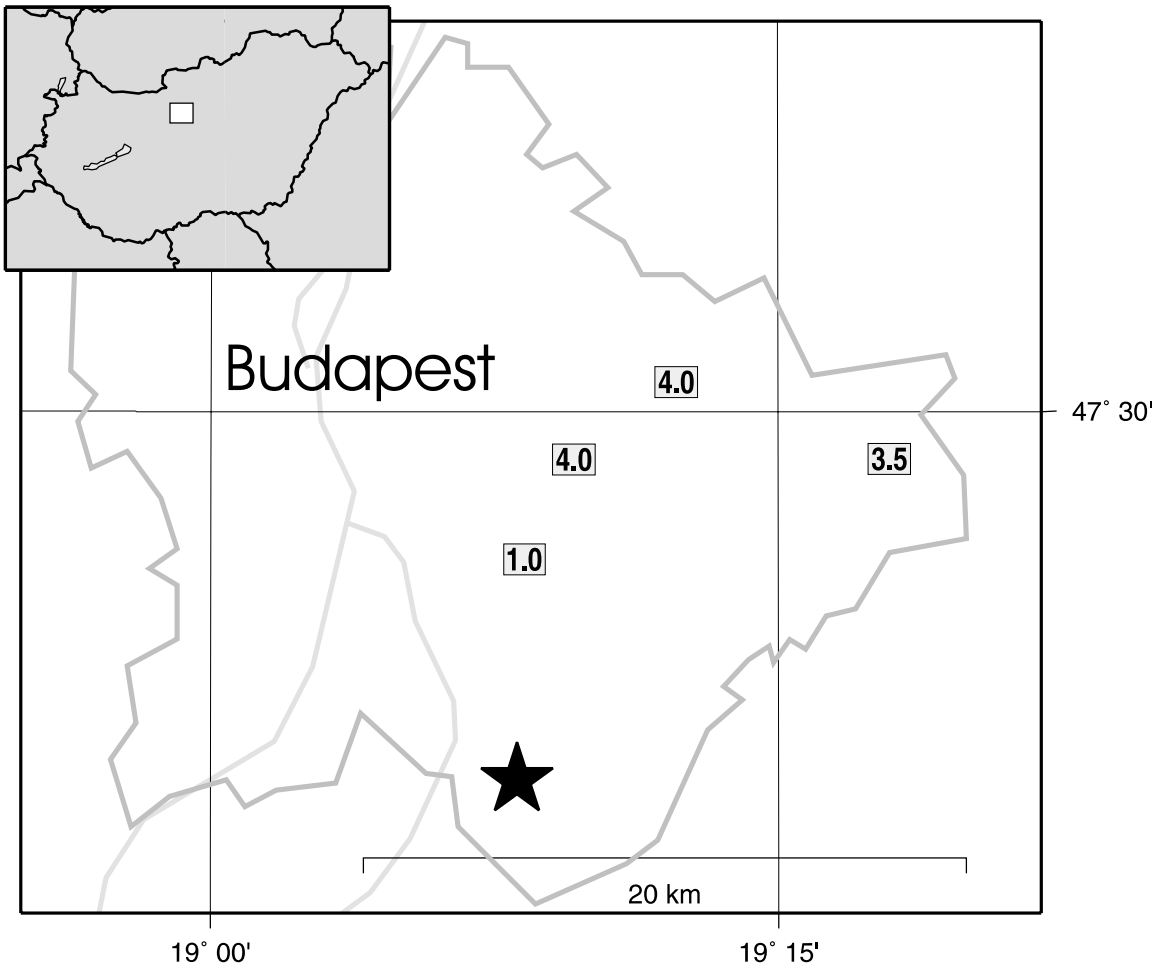

Figure 4.12.
Intensity distribution
of the Budapest earthquake 7th October 2000, 0:42:12 UTC
(star - instrumental epicentre)