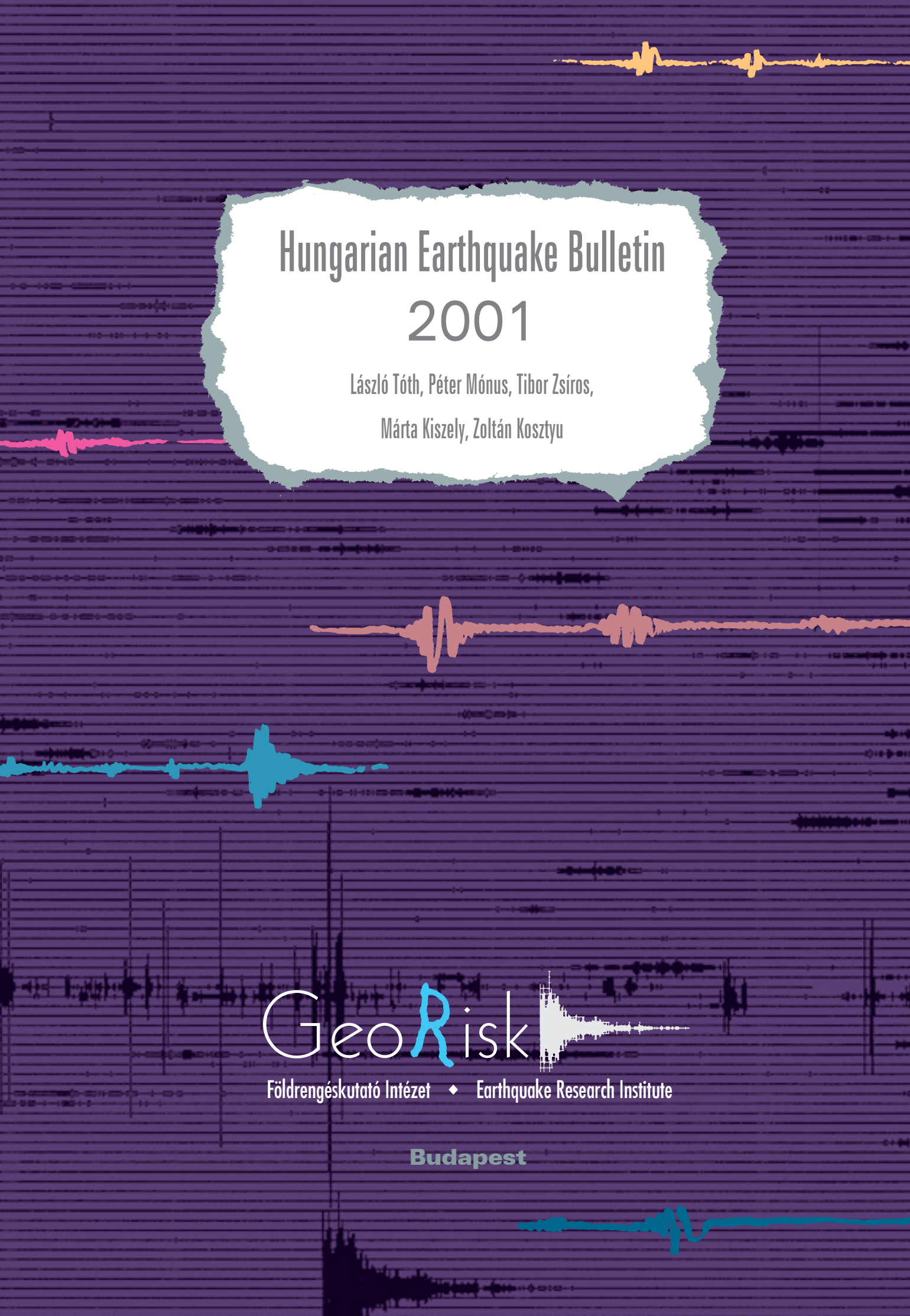




Hungarian Earthquake Bulletin 2001

László Tóth, Péter Mónus, Tibor Zsíros,
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GeoRisk

Földrengéskutató Intézet ♦ Earthquake Research Institute

Budapest

HUNGARIAN EARTHQUAKE BULLETIN

2001

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Felelős kiadó: *Dr. Tóth László*

Back cover page: History of Hungarian Seismological Station Network (1902-1994)
(See page 7 for details)

CONTENTS

ACKNOWLEDGEMENTS	4
INTRODUCTION.....	5
ON THE 100 YEARS ANNIVERSARY OF INSTRUMENTAL SEISMOLOGY IN HUNGARY	7
1. SUMMARY OF 2001 SEISMICITY.....	9
2. SEISMOGRAPH STATIONS IN HUNGARY	11
Paks micro-seismic monitoring network	16
Üveghuta micro-seismic monitoring network	18
Stations operated by GGKI.....	18
Strong motion stations	19
3. LIST OF ORIGINS / HYPOCENTER PARAMETERS	21
Method for hypocenter parameter determination	22
Crustal velocity model.....	22
List of events.....	23
Phase data	30
4. SIGNIFICANT EARTHQUAKES IN 2001	51
22 June 2001 - Órbottyán.....	53
28 June 2001 - Vilonya.....	57
1 July 2001 - Austria.....	61
REFERENCES	65
APPENDIX A: <i>European Macroseismic Scale (EMS)</i>	67
APPENDIX B: <i>Significant Earthquakes of the World, 2001</i>	69

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Public Agency for Radioactive Waste Management (PURAM)

Data interchange with a number of seismic stations from the neighboring countries contributed to the accuracy of event locations. Those are *Austria, Croatia, Czech Republic, Germany, Romania, Slovakia, Slovenia and Yugoslavia*.

INTRODUCTION

The Pannonian region occupies the territory between the Mediterranean area, what seismically is one of the most active regions in the world, and the East European Platform what can be treated as nearly aseismic. The Pannonian basin is bounded on the north to the east by the Carpathian mountain belt, on the south by the Dinarides mountain belt and on the west by the Eastern Alps. The area is tectonically rather complex and has been studied intensively for the last twenty years. Development of the Carpathian mountain belt and the Pannonian basin is attributed to collision between the Eurasian Plate and the African Plate between the Paleocene and Middle-Late Miocene. Different authors basically agree that the present-day deformation in the Pannonian basin system is controlled by the northward movement and counterclockwise rotation of the Adriatic micro plate relative to Europe.

The study of the current tectonics requires input data from the seismic activity of the area: if existing tectonic features are active in the present, or were active in the near past, this necessarily should be reflected in current seismicity. By definition, areas where earthquakes occur are areas of active tectonics. Earthquakes represent the sudden release of slowly accumulated strain energy and hence provide direct evidence of active tectonic processes. However, low and moderate seismicity at intraplate areas generally precludes reliable statistical correlation between epicenters and geological features.

Seismicity in the Pannonian basin is relatively low comparing to the peripherals and the distribution of earthquake epicenters shows a rather scattered pattern at the first glance. It is particularly difficult to decide whether the epicenters occur at isolated places or along elongated zones however, at several single places earthquakes occur repeatedly. For example, near to Eger (47.9N; 20.4E) at least sixteen earthquakes with more than fifty greater aftershocks occurred over a time interval of some 70 years. Komárom and Mór area (47.4-47.8N; 18.2E), Jászberény (47.5N; 20.0E), Kecskemét (46.9N; 19.7E) and Dunaharaszti (47.4; 19.0E) also produced significant activity over a certain but limited period of time. Moderate seismicity does not necessarily mean moderate size of earthquakes: reports of major earthquakes often refer to heavy building damage, liquefaction (e.g. 1763 Komárom earthquake, M 6.2; 1911 Kecskemét earthquake, M 5.6) and sometimes the possibility of fault rupture (e.g. 1834 Érmellék earthquake, M 6.2). These observations indicate that magnitude 6.0-6.5 earthquakes are possible but not frequent in the Pannonian basin. Several authors have shown the difficulty in constructing any meaningful geographical pattern of epicenter distribution when the statistical significance of the data is so low. Using only historical and early instrumental data, it really has been very problematic to find strong correlation between known tectonic structures and earthquakes. The recent high quality earthquake observations and locations may gradually change this situation.

The *Paks Micro-seismic Monitoring Network* has been operational since 1995. In 1999, a new set of stations (*Üveghuta Micro-seismic Monitoring Network*) has been installed with primary purpose of monitoring a potential nuclear waste disposal site. The typical detection threshold of the current local networks, supported by other existing stations, is around 1.5-2.0 ML, somewhat lower in the middle of the country and a little higher towards the border regions. This means that in most part of the country it is very unlikely that felt earthquakes go undetected.

In 2001, more than 550 seismic events were recorded by the monitoring networks and 110 of them happened in the monitored geographic window given below. The developing database of these well-located earthquakes can be used, in one hand, to resolve the tectonic framework in the Pannonian Basin and required on the other hand to refine our understanding of the level of seismic risk in Hungary.

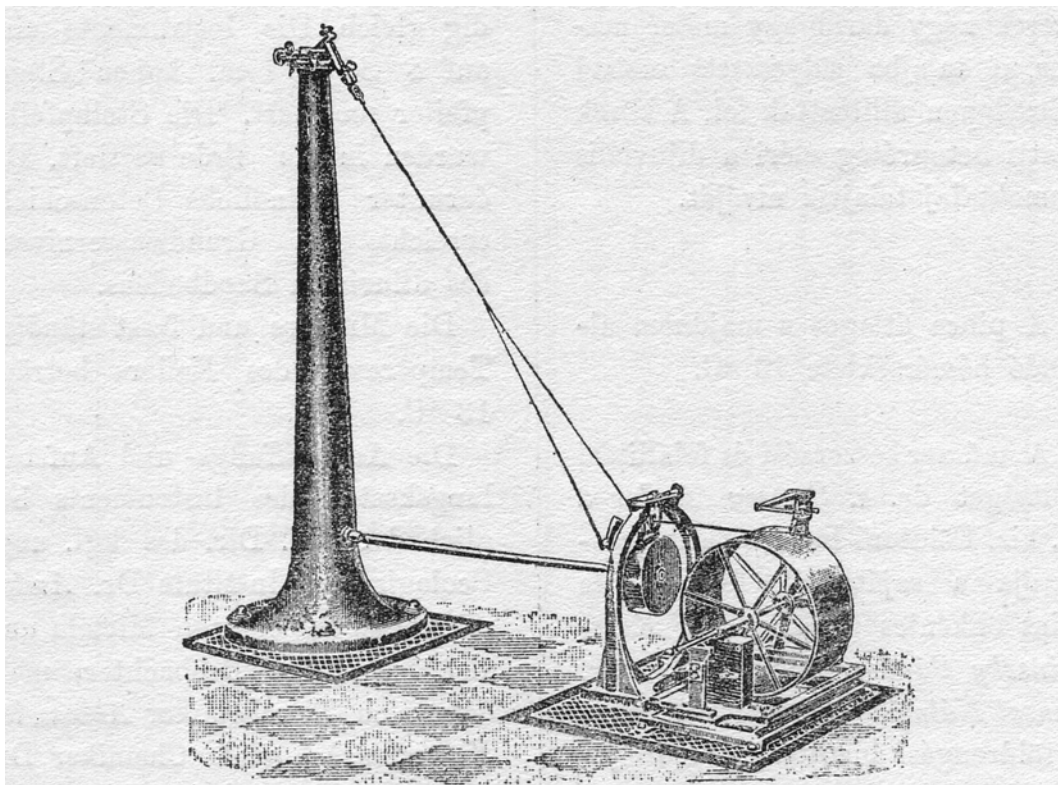
Further to the better understanding of the seismic hazard, the seismic monitoring project has been successful in accumulating seismic data to accuracy not before possible, giving a significant contribution to improve the understanding of the earthquake mechanisms within the whole Pannonian Basin.

The present Earthquake Bulletin is a united annual summary report of all earthquake-monitoring projects. The information in the Bulletin is based on all available earthquake related data provided by different organizations. The geographic region covered is bounded by latitudes 45.5-49.0N and longitudes 16.0-23.0E.

ON THE 100 YEARS ANNIVERSARY OF INSTRUMENTAL SEISMOLOGY IN HUNGARY

Systematic earthquake data collection in the Pannonian region started early in the nineteenth century when the great part of the area administratively belonged to Hungary and Austria. A detailed seismological report written by Kitaibel and Tomtsányi (1814) on the great Mór earthquake of January 14, 1810, M 5.4, is the first published paper which contains intensity distribution map with isoseismals.

Officially organised collection and evaluation of earthquake data started in 1881 when the *Seismological Committee* was founded within the *Hungarian Geological Society* following the model of the *Swiss Erdbeben-Kommission*.



A strassburgi horizontális inga. — *Das Strassburger Horizontal-Schwerpendel.*

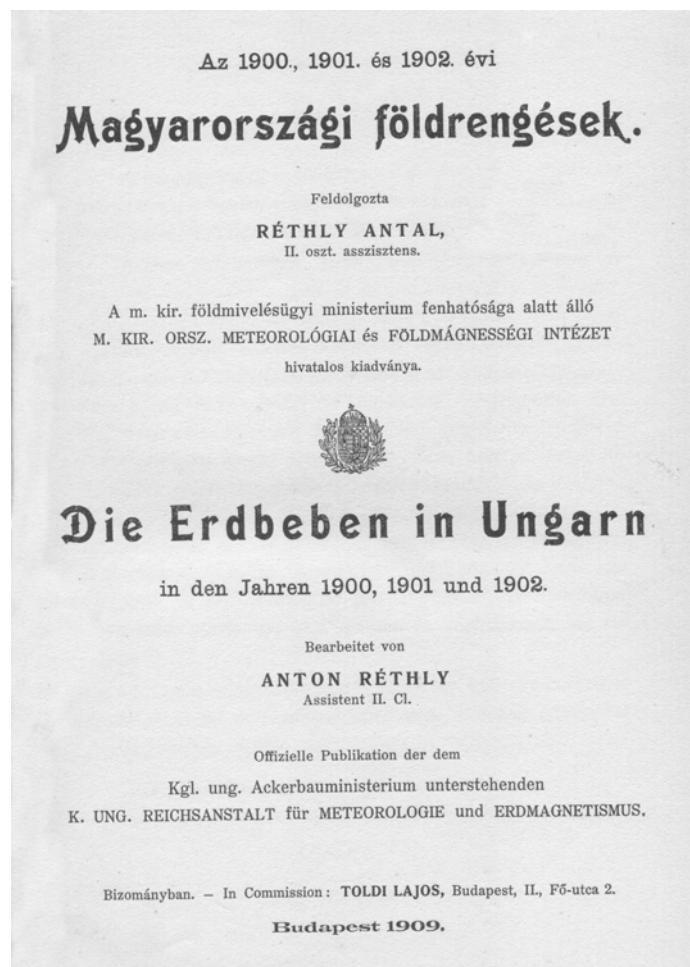
***The Strassburg type horizontal pendulum installed in Ógyalla in 1901.
Regular recordings started on January 1st 1902.***

In 1900 Radó Kövesligethy was sent by the *Seismological Committee* to study the Strasbourg Institute and other seismological stations in Europe. In his report Kövesligethy made a proposal for the organization of a seismological observatory network in Hungary and selected five localities for seismic stations.

The first seismograph stations were established in 1901, and regular observations started 100 years ago on January 1st, 1902.

By the end of 1914, ten seismological observatories had been set up in Hungary at the following locations: Budapest, Fiume (Rijeka), Kalocsa, Kecskemét, Kolozsvár (Cluj-Napoca), Ógyalla (Hurbanovo), Szeged, Temesvár (Timisoara), Ungvár (Uzhgorod), Zágráb (Zagreb). The First World War stopped this progress which had gotten off to a good start.

***The first
Hungarian Earthquake Bulletin
on instrumental data
published by Réthly (1909)
for the years of 1900, 1901 and 1902.***



Further details:

Bisztricsány, E. and D. Csomor, 1981. 75 years of seismological research in Hungary, Acta Geodaet., Geophys. et Montanist. Acad. Sci. Hung. Tomus 16 (2-4), pp. 423-434.

Pajdušák, P. 1997. Historical seismic instruments at the stations Hurbanovo (HRB) and Skalnaté Pleso (SPC) of Slovakia, Proceedings of the Workshop: Historical Seismic Instruments and Documents: a heritage of great scientific and cultural value, CONSEIL DE L'EUROPE Cahiers du Centre Européen de Géodynamique et de Séismologie, Volume 13, p. 49-60.

Réthly, A. 1909. Die Erdbeben in Ungarn in den Jahren 1900, 1901 und 1902, Budapest

1.

SUMMARY OF 2001 SEISMICITY

2001 was a relatively quiet year for Hungarian seismicity. There were 110 seismic events ($0.1 \leq ML \leq 3.8$) located within the area bounded by latitudes 45.5-49.0N and longitudes 16.0-23.0E. Three earthquakes were reported as felt. None of the earthquakes caused any damage. The highest magnitudes (ML) assigned to a shock was 3.8 in E-Austria, near to the Hungarian border.

The highest intensity reported during the year was 4-5 EMS, no earthquake damage was reported.

Reviewing the more notable events of the year in chronological order, a shock of magnitude 1.8 ML on the 22nd of June produced reports of intensity 3-4 EMS in Órbottyán and Vácrátót. This event turned to be a blast in the nearby quarry.

On June 28th, an earthquake near to Berhida – Peremarton with a magnitude of 3.0 ML was felt at a relatively large area (Várpalota – Veszprém – Siófok) with maximum intensity of 4 EMS.

The 3.8 ML earthquake in E-Austria on July 1st was felt with 4-5 EMS in W-Hungary in Sopron – Kőszeg area.

2.

SEISMOGRAPH STATIONS IN HUNGARY

In 2001, there have been some minor modifications with the Hungarian earthquake monitoring network compared to the previous year. The short period station ETYK has been closed up for logistical reasons. Facing with safety problems repeatedly, the PKSC station has been moved from Csákvár to the nearby Gánt and continued its operation with a new station code of PKSG from 22 September. Having serious difficulties with the telephone communication at station RHK1 at Bakonya, the modem controlled Mars-88MC acquisition system has been replaced by a locally recording Kinometrics K2 system.

The micro-seismic monitoring network established by the *Paks Nuclear Power Plant Ltd.* in 1995, has been operational throughout the year. In 1999, the network has been slightly reconfigured and extended (*Üveghuta network, RHKx stations*) to monitor micro-seismic activity at a potential nuclear waste disposal site vicinity. These stations were also available throughout the year.

In addition to the information from the 12 station *Paks* and *Üveghuta* micro-seismic monitoring network, data is contributed by three stations operated by the *Seismological Observatory, GGKI*. Of those, one belongs to the *Ministry of Foreign Affairs* and is operated in cooperation with the German GEOFON network.

Data interchange with stations from the neighboring countries and international data centers was also important.

The estimated detection capabilities of the present network with average noise conditions, supposing that at least four stations is needed for origin determination, is typically around 1.5-2.0 ML, somewhat lower in the middle of the country and a little higher towards the border regions. (See Fig. 2.4) This means that in most parts of the country it is very unlikely that felt events go undetected.

During the reporting period, we also had access to six strong motion accelerograph stations belonging to and operated by different organizations such as *Paks Nuclear Power Plant, GeoRisk, GGKI, Ministry of Environment* and *MOL RT*.

Seismograph Stations

Table 2.1.

Seismic stations, instrumentation and lithology

Code	Latitude (N)	Longitude (E)	Elevation (m)	Foundation	Type of station (1)	Sensor type (2)	Recording (3)	Org. (4)
BUD	47,4836	19,0239	196	dolomite	3C LP	Kirnos	A - C	GGKI
BUDA	47,4836	19,0239	196	dolomite	3C SP	LE-3D	D - E	GR
ETYK*	47.4404	18.7449	250	marl	3C SP	SS-1	D - E	GGKI
GYL	46,5981	21,1718	92	sand	3C SP	SS-1	D - E	GGKI
PENC	47,7905	19,2817	250	alluvium	3C SP	LE-3D	D - E	GGKI
PKS2	46,4920	19,2131	106	sand	3C SP	LE-3D	D - E	GR
PKS6	46,5998	19,5645	120	sand	3C SP	LE-3D	D - E	GR
PKS7	47,0473	19,1609	95	mud	3C SP	LE-3D	D - E	GR
PKS8	46,8787	18,6765	135	rhyolite tuff	3C SP	LE-3D	D - E	GR
PKS9	46,5870	18,2789	240	loess	3C SP	LE-3D	D - E	GR
PKSC**	47,3806	18,4371	200	dolomite	3C SP	LE-3D	D - E	GR
PKSG***	47,3918	18,3907	200	dolomite	3C SP	LE-3D	D - E	GR
PKSM	46,2119	18,6413	170	granite	3C SP	LE-3D	D - E	GR
PKSN	46,8972	19,8673	110	sand	3C SP	LE-3D	D - E	GR
PSZ	47,9184	19,8944	940	andesite	3C BB	STS-2	D - C	GGKI
RHK1	46,0948	18,0720	297	limestone	3C SP	SS-1	D - E	GGKI-GR
RHK2	46,1270	18,7799	147	loess	3C SP	LE-3D	D - E	GGKI-GR
RHK3	45,8885	18,2521	420	limestone	3C SP	LE-3D	D - E	GGKI-GR
SOP	47,6833	16,5583	260	gneiss	3C SP	SS-1	D - E	GGKI

- (1) 1C - one component vertical seismometer, 3C - three component seismometer
 SP - short period seismometer, BB - broad band seismometer, SM - strong motion accelerograph
- (2) STS-2 - Streckeisen broad band seismometer, LE-3D - Lennartz three directional 1Hz geophone,
 SS-1 - Kinematics 1Hz seismometer, Kirnos - 12 s long period seismometer
- (3) A - analogue, D - digital, C - continuous recording, E - event recording
- (4) GGKI - Geodetic and Geophysical Research Institute, GR - GeoRisk Ltd., PART - Paks Nuclear Power Plant Ltd.
- (*) ETYK off date 2001/01/31
- (**) PKSC off date 2001/09/22
- (***) PKSG on date 2001/09/22

Seismograph Stations

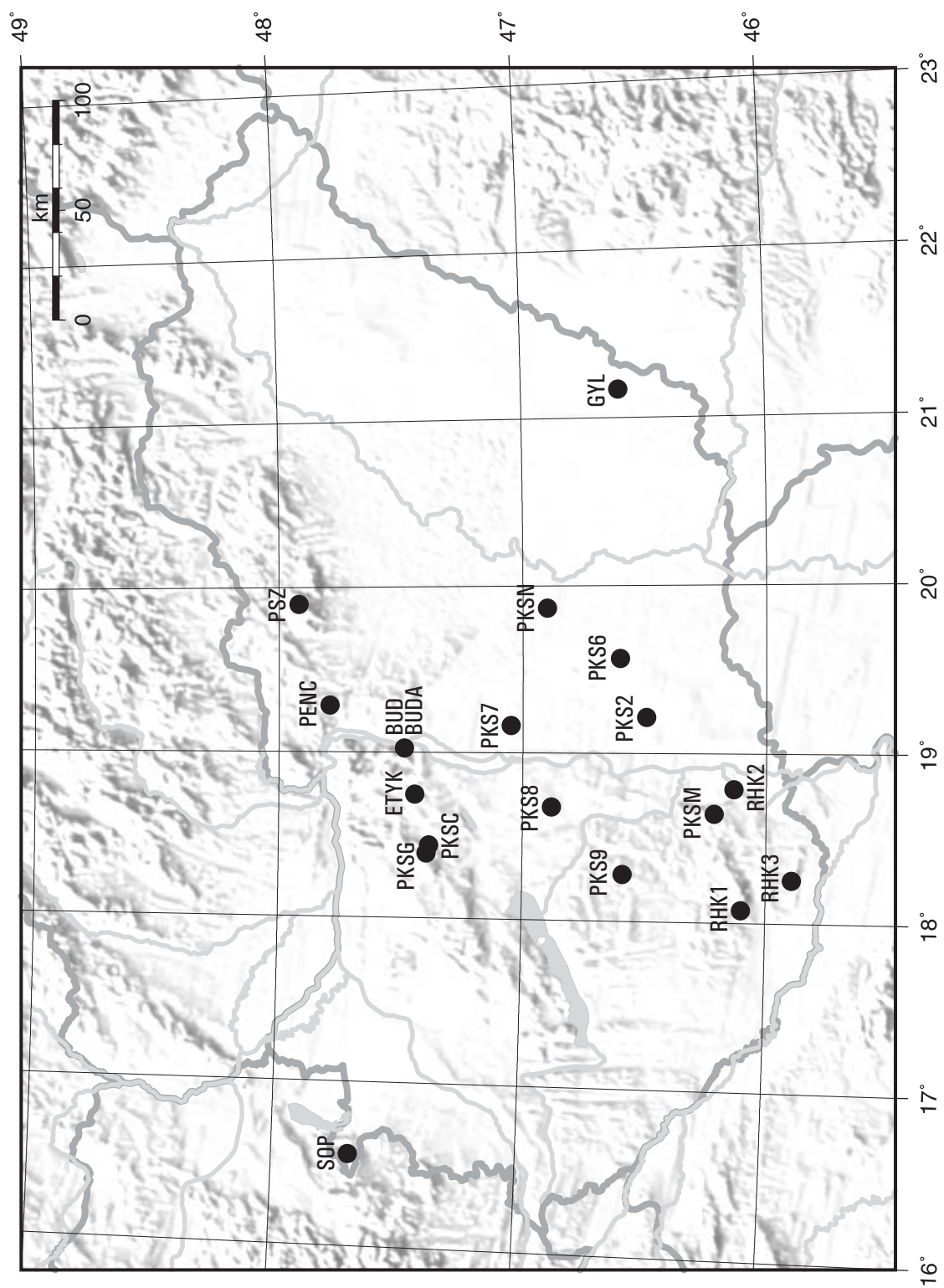


Figure 2.1.
Seismograph stations in Hungary in 2001
(See Table 2.1. for details)

Seismograph Stations

Table 2.2.

Strong motion accelerograph stations

Code	Latitude (N)	Longitude (E)	Elevation (m)	Foundation	Type of station (1)	Sensor type (2)	Recording (3)	Org. (4)
ALGY	46.3332	20.2092	90	loose sand	3C SM	AC-23	D - E	MO-GR
BOD	47.322	18.241	250	limestone	3C SM	AC-23	D - E	GR
BPGY	47.4836	19.0239	196	dolomite	3C SM	AC-23	D - E	GGKI
PAKB	46.5743	18.8587	100	sand	3C SM	AC-23	D - E	PART
PAKK	46.5743	18.8449	100	loose sand	3C SM	AC-23	D - E	GGKI
TLK*	47.5500	18.8300	220	limestone	3C SM	AC-23	D - E	GGKI

(1) 3C - three component seismometer
SM - strong motion accelerograph

(2) AC-23 - triaxial accelerometer package (full scale 0.5g)

(3) D - digital, E - event recording

(4) GGKI - Geodetic and Geophysical Research Institute, GR - GeoRisk Ltd., MO – MOL Hungarian Oil Company Ltd.
PART - Paks Nuclear Power Plant Ltd.

(*) TLK off date 2001/09/30

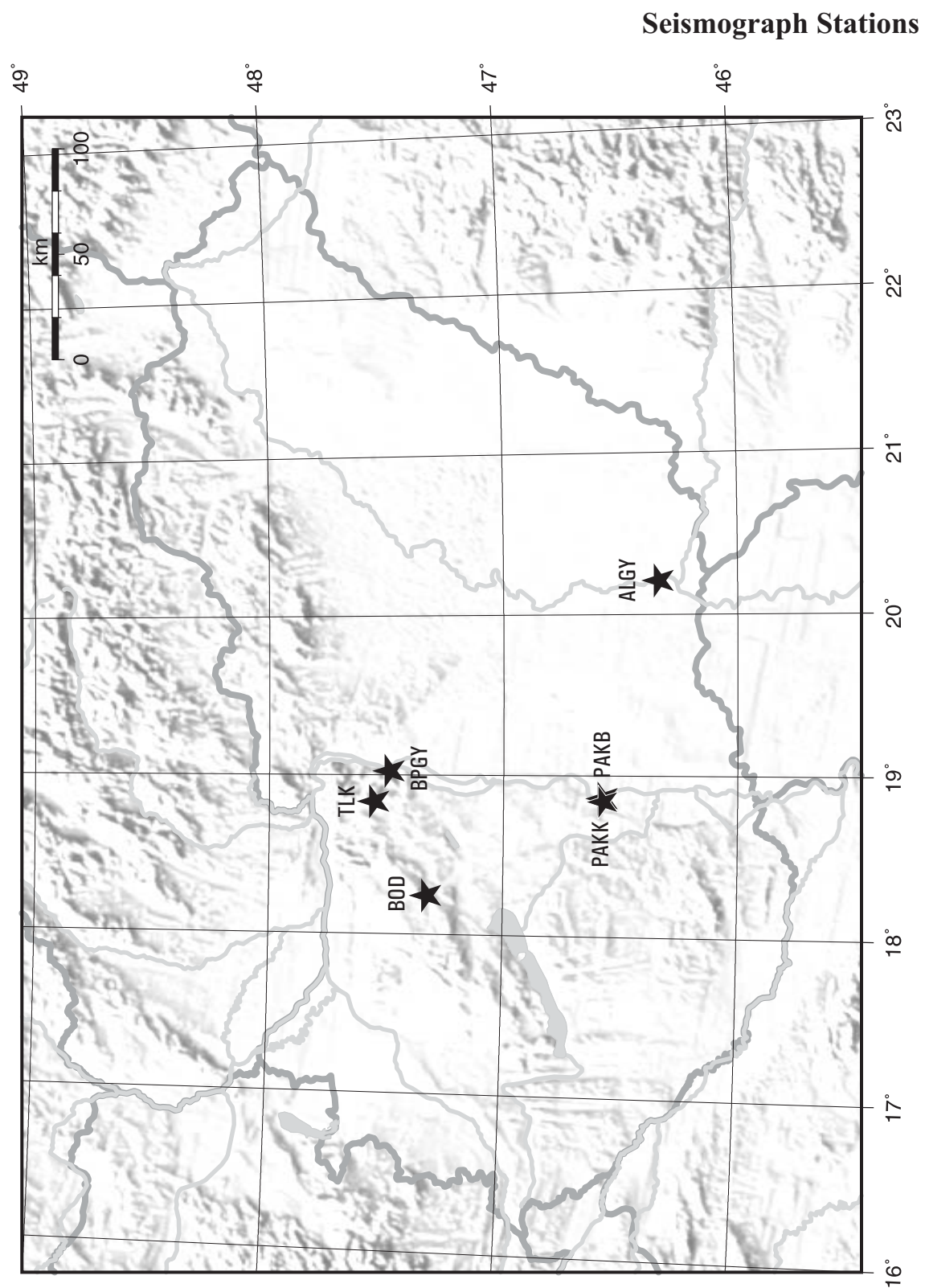


Figure 2.2.
Strong motion accelerograph stations in Hungary in 2001
(See Table 2.2. for details)

Seismograph Stations

PAKS MICRO-SEISMIC MONITORING NETWORK

The system comprises of a network of eight seismometer stations, located within a radius of about 100 km from the Power Plant at Paks (situated in the center of Hungary) and one additional station in Budapest where the data center is set up and collected data analyzed (Tóth and Mónus, 1997).

The field stations each consist of a three component short period seismometer located in a pit, with a digital recorder and time signal receiver housed nearby in a heat insulated steel container building.

The seismometers used are the LE-3D three directional compact size high sensitivity 1 Hz geophones. The digital acquisition system is the MARS-88 recorder that uses 20 bit AD converters sampling the data 62.5 times per second. The recorder also performs signal detection by its internal STA/LTA algorithm. The stations store event and continuous monitor channel data on rewritable magneto-optical disks, which are collected and transferred to the data center on a weekly basis. Most of the stations are powered by solar panels, and absolute time is provided by DCF-77 time code receivers.

At the data center a SUN workstation with sufficient on-line disk capacity serves as a powerful tool for the routine data processing and analysis. Lennartz M88 database software is used for the data management and XPITSA for advanced seismogram analysis. All recorded data are archived on CDs. Both waveform and bulletin data are available over the INTERNET for authorized remote users.

The *PAKS micro-seismic monitoring network* is currently operated and its data processed and analyzed by *GeoRisk Ltd.*

Extensive noise survey has been carried out at those station sites where magneto-optical disks storage allowed to store large amount of data. Noise segments of 3 minutes has been recorded with 11 hours shifts. Figure 2.3. shows the vertical components of the very long term averaged (near to one year) noise power spectra. There is a clear separation of the rocky sites (PKSm, PKSc and PKS8) from those of having loose sediments (PKSn, PKS2, PKS6, PKS7, PKS9).

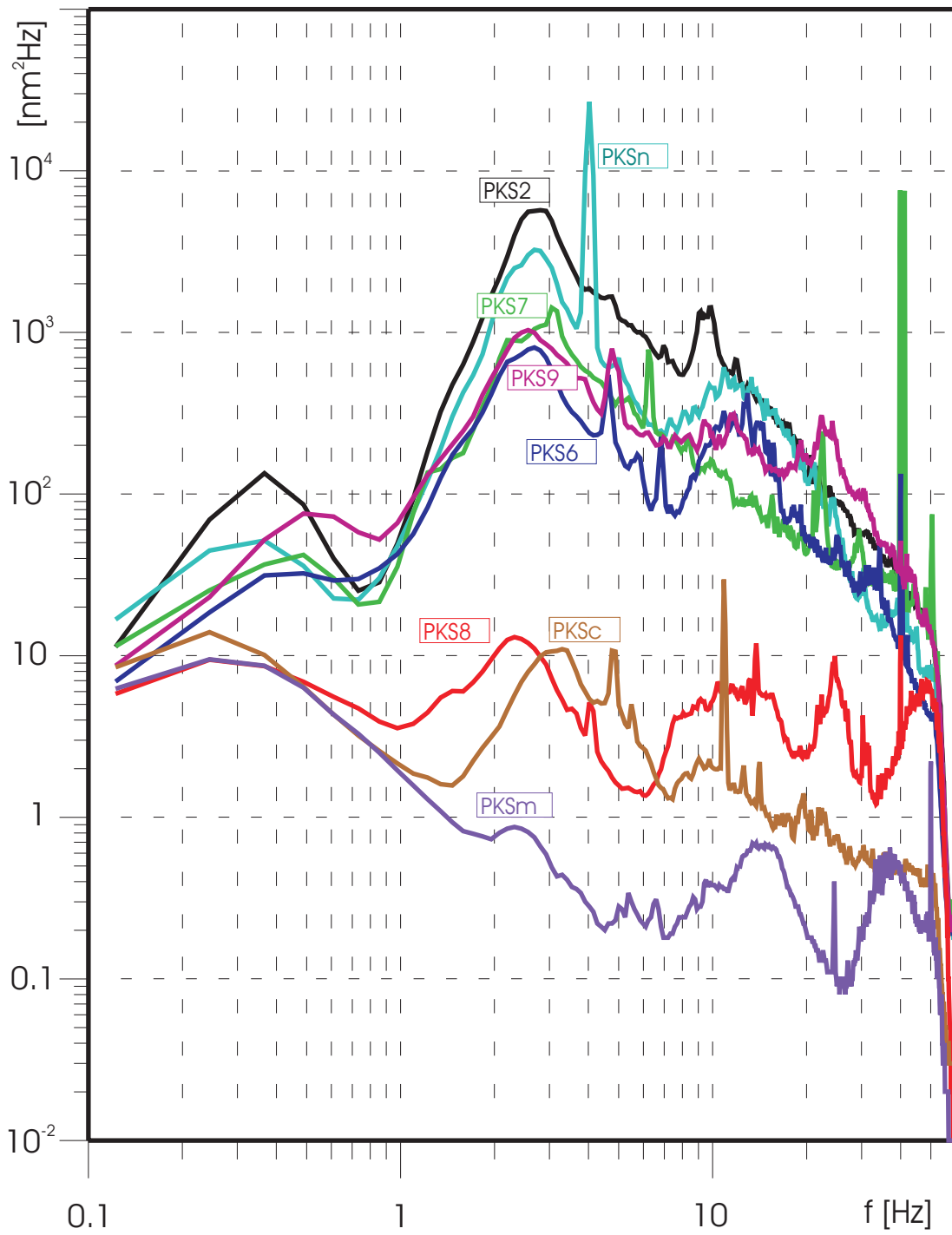


Figure 2.3.
Average noise power spectra for selected stations
(See text for details)

Seismograph Stations

ÜVEGHUTA MICRO-SEISMIC MONITORING NETWORK

Two relocated stations from the PAKS network and one additionally installed station forms the *Üveghuta micro-seismic monitoring network*.

The system comprises of a network of three seismometer stations, located in the potential nuclear waste disposal vicinity at Üveghuta (situated in southern part of Hungary).

The field stations hardware are just like the PAKS stations, each consist of a three component short period seismometer, with a digital recorder and time signal receiver housed in a nearby building.

The stations are accessible over commercial telephone lines. Event data are collected and transferred to the Budapest data center on a daily basis and analyzed jointly with the Paks network data. Having serious difficulties with the telephone communication at station RHK1 at Bakonya, the modem controlled Mars-88MC acquisition system has been replaced by a locally recording Kinometrics K2 system.

The network is currently operated and its data processed and analyzed by *GGKI* and *GeoRisk Ltd.*

STATIONS OPERATED BY GGKI

During 2001 *GGKI* operated three digital and one analogue seismological stations.

Station *Piszkés (PSZ)* has been installed as an ‘Open Station’ under a cooperation between the Ministries for Foreign Affairs of Hungary and of Germany with the primary goal of nuclear test ban monitoring (Tóth, 1992). The station is equipped with a triaxial Streckeisen STS-2 broad-band seismometer and data acquisition system with a 24 bit high resolution digitizer. Three component continuous data streams are transmitted near real time to the GEOFON Data Centre at Potsdam, Germany and recorded in circular buffers on magnetic disks and archived on CDs. Continuous data is available on-line for more than a month. All data can be accessed and retrieved via internet

GYL and SOP are three component short period stations installed in 1994. Kinometrics SSR-1 16bit digitizers and event recorders sample and record the output of three component SS-1 Ranger seismometers. Data of recorded events are collected via commercial telephone links.

A long period analogue recording seismograph has been operated at the *Seismological Observatory* in Budapest mostly for demonstration purposes.

Seismograph Stations

STRONG MOTION STATIONS

Although the six strong motion accelerograph stations belong to three different organizations, they are all equipped with the same instrumentation: AC-23 triaxial accelerometer package (full scale 0.5g) and an SM-2 digital event recorder (manufactured by SIG^{SA}, Switzerland).

During 2001, we had access to all of these stations.

Seismograph Stations

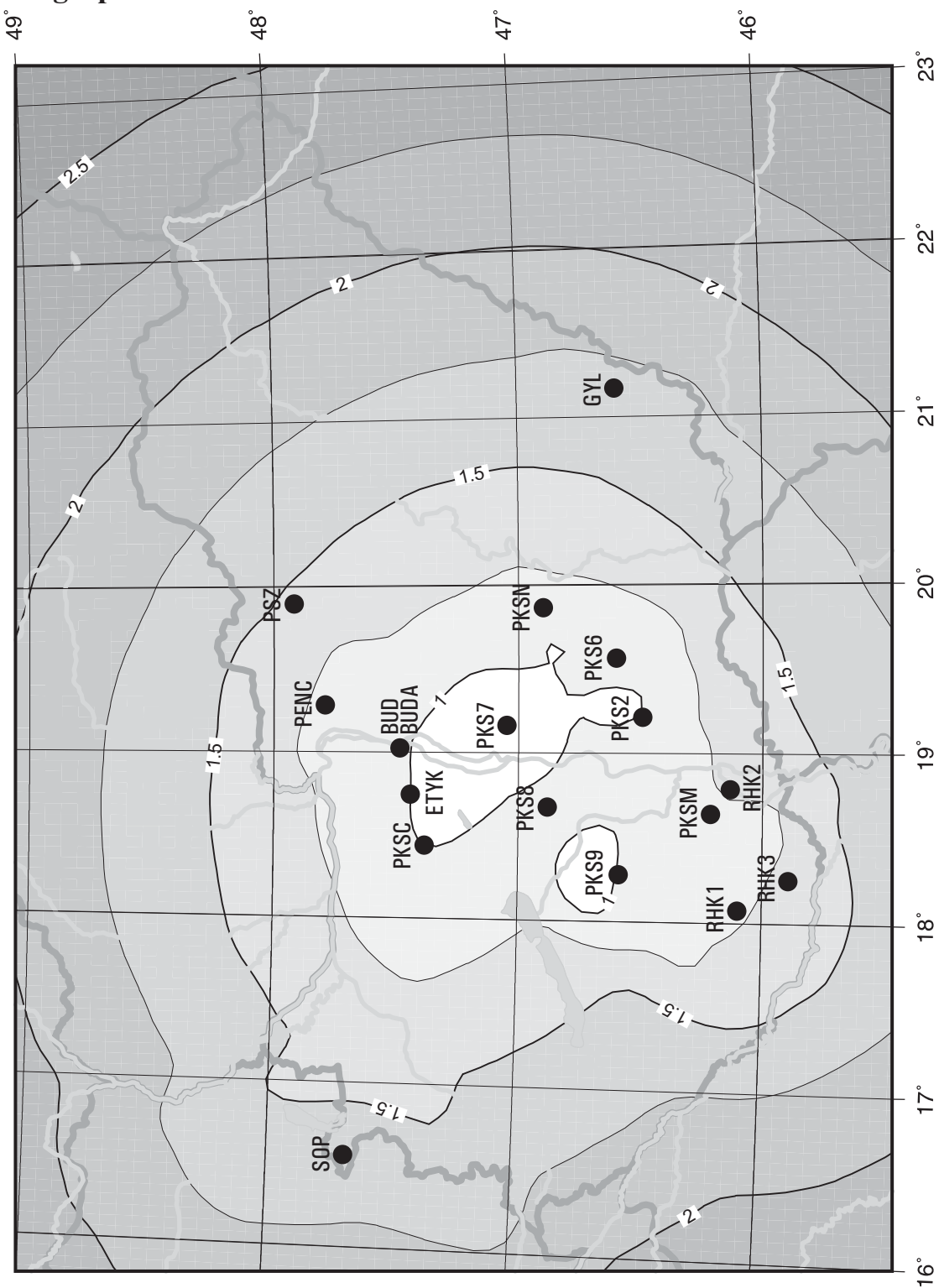


Figure 2.4.
Detection capability at average noise conditions
Contour values are Richter local magnitudes (ML)

3.

LIST OF ORIGINS / HYPOCENTER PARAMETERS

Hypocenter Parameters

METHOD FOR HYPOCENTER PARAMETER DETERMINATION

HYPO71PC (Lee and Lahr, 1975) was used for the routine calculation of hypocenter parameters. The original program has been modified and a routine for Richter local magnitude calculation implemented. For the magnitude calculations, the method published by Bakun and Joyner (1984) has been used.

The hypocenter parameters have been calculated using phase readings of seismological stations from Hungary and from the neighboring countries. However, a distance weighting has been applied, phase data from stations with epicenter distance greater than 450 km have been weighted out. In some cases, when enough P readings were available, S phase readings were not used in the calculations.

During 2001, *USGS National Earthquake Information Center* reported 7 low magnitude events on the monitored area what were not identified by our network. For the sake of completeness, these events are also listed by an indication “*Reported by NEIC*”.

CRUSTAL VELOCITY MODEL

The three-layer crustal velocity model used in the hypocenter calculations has been derived from crustal phase travel times of several hundreds of local earthquakes (Mónus, 1995).

<i>Velocity (v_P)</i> <i>[km/s]</i>	<i>Depth</i> <i>[km]</i>	<i>Thickness</i> <i>[km]</i>	v_P/v_S
5.60	0.0	20.0	1.78
6.57	20.0	11.0	
8.02	31.0	∞	

Hypocenter Parameters

LIST OF EVENTS

Day	Origin time UTC hr mn sec	Geographic coordinates Lat Long	Depth (km)	ML	I _{MAX} (EMS)	Locality/Region
JANUARY, 2001						
15	13:37:22.1	47.118N 18.154E	10	2.6	-	Berhida
18	10:53:16.0	47.424N 18.504E	4	1.8	-	Vértesszőlő (expl.)
FEBRUARY, 2001						
05	10:38:14.9	47.468N 18.399E	5	1.7	-	Vértesszőlő (expl.)
10	4:26:21.4	46.148N 16.768E	10	1.9	-	Croatia
12	10:22:42.2	47.477N 18.401E	10	1.7	-	Vértesszőlő (expl.)
14	10:32:35.3	47.410N 18.566E	10	1.1	-	Vértesszőlő
16	11:27:10.7	47.623N 18.735E	10	0.8	-	Márialom
17	22:21:13.7	47.802N 19.306E	18	1.1	-	Csővár
20	11:03:38.3	47.670N 16.041E	10	3.1	4.0	Austria
MARCH, 2001						
05	10:40:11.8	47.509N 18.483E	4	1.4	-	Vértesszőlő (expl.)
09	16:01:59.5	46.175N 16.074E	10	2.3	-	Croatia
11	19:06:55.3	47.883N 16.397E	10	2.5	-	Austria
12	10:01:33.9	47.456N 18.760E	8	0.8	-	Etyek (expl.)
13	12:14:25.9	47.477N 18.590E	0	1.6	-	Vértesszőlő (expl.)
17	5:30:02.8	45.790N 18.115E	13	2.7	-	Tésenfa
22	2:12:06.0	45.833N 18.142E	11	1.8	-	Drávaszerdahely
27	9:06:03.5	47.353N 18.454E	10	1.3	-	Vértesszőlő (expl.)
28	13:05:31.0	46.187N 16.133E	10	2.2	-	Croatia
29	22:42:12.6	47.802N 18.048E	9	2.9	-	Komárom
APRIL, 2001						
09	11:20:52.8	47.789N 19.274E	12	1.2	-	Penc
18	14:24:43.6	47.534N 16.405E	2	1.2	-	Austria
23	10:55:11.0	47.710N 18.504E	10	1.1	-	Lábatlan
26	9:58:56.7	47.403N 18.511E	10	0.8	-	Vértesszőlő (expl.)
MAY, 2001						
04	3:34:16.0	47.714N 18.899E	11	1.0	-	Pilisszentkereszt
06	9:16:02.4	45.826N 18.083E	8	2.2	-	Drávaszőlő

Hypocenter Parameters

08	11:09:21.5	45.999N	18.374E	1	0.8	-	Birján (expl.)
09	9:46:01.8	47.426N	18.498E	7	1.8	-	Vértessz. (expl.)
15	10:05:18.7	45.569N	17.723E	16	1.3	-	Croatia
16	7:37:38.6	45.846N	18.421E	10	0.3	-	Villányi sz. (exp.)
16	10:52:22.1	45.502N	18.058E	5	1.1	-	Croatia
24	10:19:53.1	47.446N	18.467E	7	1.7	-	Vértessz. (expl.)
24	11:39:32.8	45.567N	17.861E	14	1.4	-	Croatia
25	15:15:49.7	45.836N	18.139E	10	1.7	-	Drávaszerdahely
26	4:30:42.5	47.771N	18.069E	10	1.9	-	Komárom
26	7:26:48.5	45.513N	17.992E	1	1.2	-	Croatia
26	17:36:42.9	45.811N	18.103E	10	0.8	-	Kékes
28	9:01:11.4	45.543N	17.288E	10	1.3	-	Croatia
29	11:29:05.6	45.858N	18.415E	6	0.9	-	Villányi sz. (exp.)

JUNE, 2001

02	23:59:41.9	46.794N	19.301E	10	0.5	-	Soltszentimre
05	12:05:48.0	47.462N	18.516E	10	1.6	-	Vértessz. (expl.)
07	3:27:06.8	47.863N	16.309E	1	1.6	-	Austria
07	20:28:59.5	46.972N	19.272E	0	1.1	-	Kunadacs
08	9:58:56.3	45.852N	18.131E	13	1.2	-	Rádfalva
08	11:02:29.6	46.076N	18.348E	10	0.6	-	Romonya (expl.)
11	11:51:10.1	47.466N	18.446E	6	1.8	-	Vértessz. (expl.)
11	12:04:41.6	45.854N	18.133E	12	0.6	-	Rádfalva
13	13:51:00.8	47.585N	16.350E	1		-	Austria
15	13:43:30.8	46.207N	16.008E	1	2.7	-	Croatia
16	7:35:50.3	46.085N	16.775E	10	3.0	-	Croatia
16	9:04:35.3	46.053N	16.791E	6	3.1	-	Croatia
19	4:56:35.6	45.858N	18.133E	13	0.5	-	Rádfalva
20	15:44:48.0	45.749N	21.323E	10	3.1	-	Romania
22	9:03:48.9	46.047N	18.103E	1	0.4	-	Bicsérd (expl.)
22	13:26:40.7	47.780N	19.227E	7	1.8	4.5	Őrbottyán (expl.)
27	0:17:08.1	47.704N	16.219E	5	2.6	5.0	Austria
27	0:25:10.9	47.716N	16.166E	7	1.4	3.0	Austria
28	7:08:34.1	47.107N	18.119E	10	3.0	4.0	Vilonya

JULY, 2001

01	1:48:59.1	47.726N	16.194E	6	3.8	4.5	Austria
02	11:28:05.2	45.539N	17.725E	15	1.1	-	Croatia
10	9:58:14.5	47.455N	18.500E	10	1.7	-	Vértessz. (expl.)
15	23:39:38.1	45.737N	18.375E	0	1.1	-	Croatia
17	10:08:15.6	47.443N	18.509E	4	1.4	-	Vértessz. (expl.)
19	1:33:40.4	46.535N	18.331E	10	0.8	-	Gyulaj

Hypocenter Parameters

25	8:53:25.9	45.512N	17.878E	10	1.2	-	Croatia
26	9:48:39.0	47.463N	18.506E	10	1.3	-	Vértessz. (expl.)
26	12:31:55.5	45.570N	17.396E	12	1.7	-	Croatia
26	13:22:23.2	45.757N	17.257E	11	1.3	-	Croatia

AUGUST, 2001

02	21:50:47.5	45.592N	20.989E	10	3.0	-	Romania
03	8:30:04.6	45.506N	17.803E	3	1.8	-	Croatia
06	12:04:55.8	45.574N	17.964E	10	1.5	-	Croatia
06	18:48:23.0	45.513N	17.199E	10	2.3	-	Croatia
08	18:46:30.6	47.041N	18.119E	10	1.7	-	Balatonkenese
09	1:10:41.8	45.831N	17.889E	10	1.1	-	Kemse
09	9:53:55.2	47.444N	18.352E	10	1.5	-	Oroszlány (expl.)
13	23:42:48.4	45.554N	18.449E	10	0.9	-	Croatia
14	10:32:27.5	46.190N	18.285E	15	1.0	-	Zobákpuszta (exp.)
14	19:18:03.7	47.787N	17.618E	8	2.0	3.0	Vámosszabadi
22	9:16:36.8	46.169N	18.292E	13	1.0	-	Zobákpuszta (exp.)
23	11:23:08.2	47.365N	19.691E	14	2.0	-	Tápióbicske
26	0:50:03.1	47.397N	18.379E	8	1.9	-	Gánt
26	10:44:16.9	46.718N	20.484E	8	1.9	-	Eperjes
28	10:04:28.5	47.423N	18.363E	10	1.1	-	Vértessz. (expl.)
29	5:25:01.2	45.565N	16.430E	5	2.1	-	Croatia
30	9:57:33.0	45.538N	17.755E	15	1.5	-	Croatia

SEPTEMBER, 2001

04	10:44:07.0	47.724N	18.527E	10	0.8	-	Lábatlan (expl.)
05	9:58:13.4	47.492N	18.489E	10	1.4	-	Vértessz. (expl.)
12	10:19:38.8	47.451N	18.501E	10	1.3	-	Vértessz. (expl.)
16	12:54:35.6	45.624N	18.361E	6	1.3	-	Croatia
19	7:30:57.4	45.772N	21.049E	10	2.6	-	Romania
27	10:34:51.0	45.543N	17.723E	14	1.4	-	Croatia
27	10:56:30.9	46.039N	18.347E	3	1.4	-	Magyarsarlós
28	10:43:00.7	47.472N	18.437E	10	1.6	-	Vértessz. (expl.)
28	19:25:13.8	45.564N	16.437E	0	1.8	-	Croatia
30	15:55:48.7	45.538N	18.048E	1	1.8	-	Croatia

OCTOBER, 2001

17	11:02:47.6	45.557N	17.725E	15	1.5	-	Croatia
20	11:11:46.1	45.834N	17.403E	10	2.5	-	Croatia
20	11:31:51.1	46.171N	18.295E	10	0.9	-	Zobákpuszta (exp.)
25	9:24:14.8	45.535N	17.727E	14	1.2	-	Croatia
25	14:16:43.6	45.547N	17.922E	3	1.8	-	Croatia

Hypocenter Parameters

NOVEMBER, 2001

05	12:32:30.5	47.732N	18.272E	9	1.4	-	Almásfüzitő (exp.)
07	10:59:03.7	47.464N	18.285E	10	1.8	-	Oroszlány (expl.)
11	3:35:58.8	46.001N	16.787E	10	1.4	-	Croatia
15	10:35:05.8	45.543N	17.696E	14	1.2	-	Croatia
21	10:42:59.5	47.717N	18.537E	9	1.2	-	Bajót
21	17:10:20.3	48.060N	16.631E	7	2.5	5.0	Austria
26	18:04:15.0	45.540N	16.470E	7	1.7	-	Croatia
29	12:03:00.5	45.679N	18.014E	10	1.2	-	Croatia
30	12:05:15.0	46.088N	18.253E	6	0.1	-	Pécs

DECEMBER, 2001

04	9:31:19.0	46.197N	16.035E	10	2.1	-	Croatia
27	0:32:42.4	45.691N	17.956E	10	1.1	-	Croatia

Hypocenter Parameters

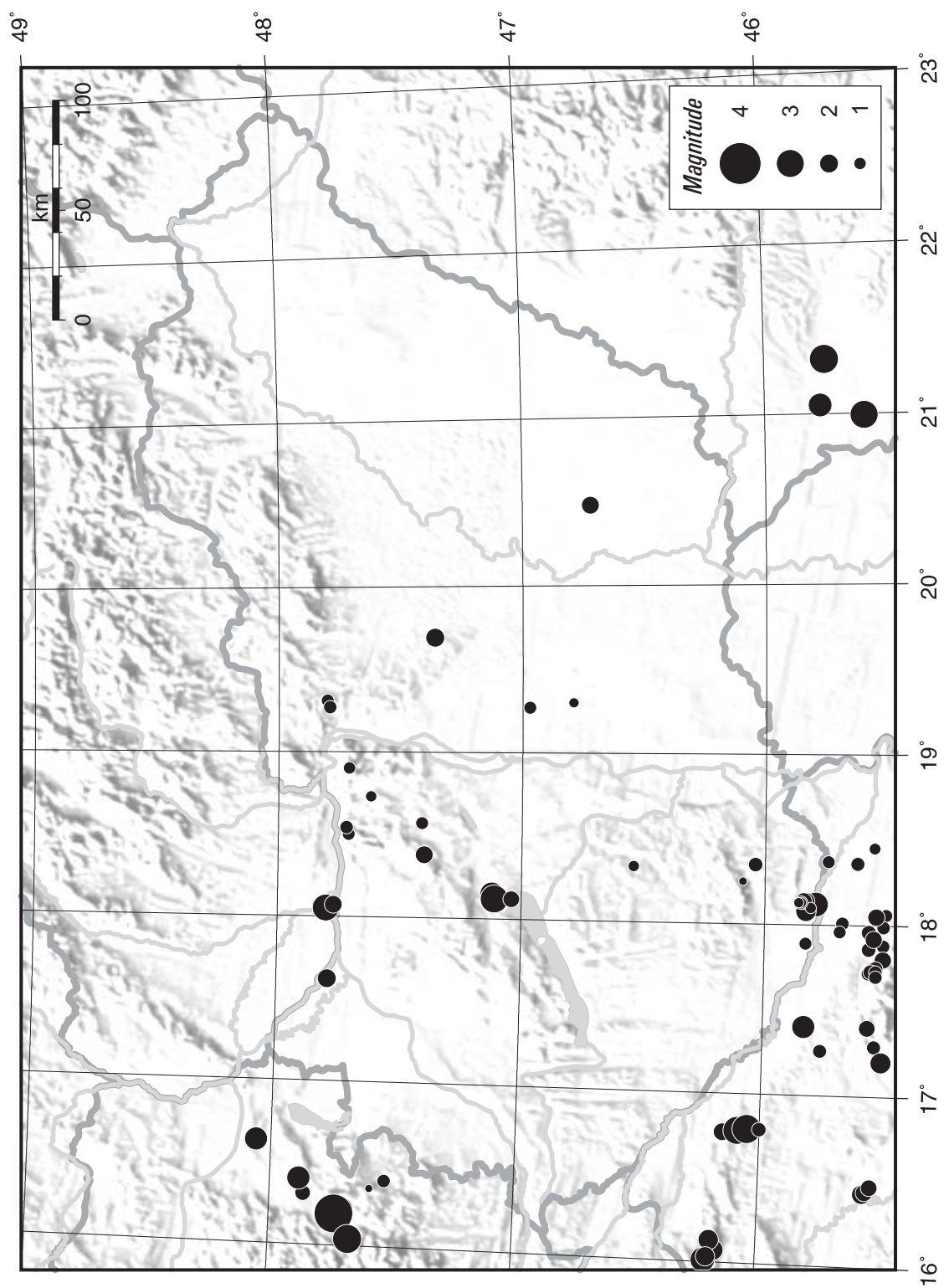


Figure 3.1.
Epicenters of 2001 earthquakes

Hypocenter Parameters

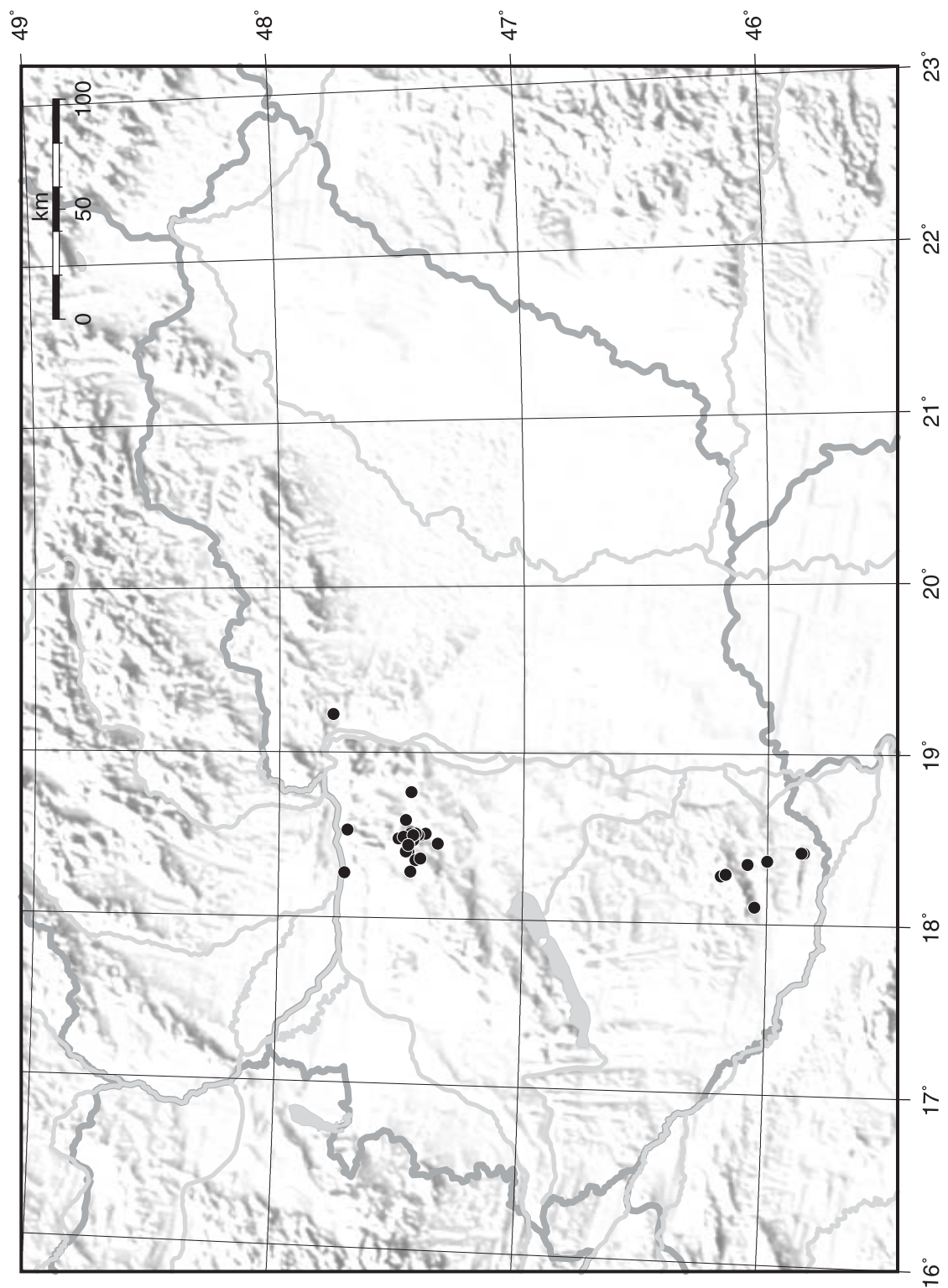


Figure 3.2.
Epicenters of 2001 explosions

Hypocenter Parameters

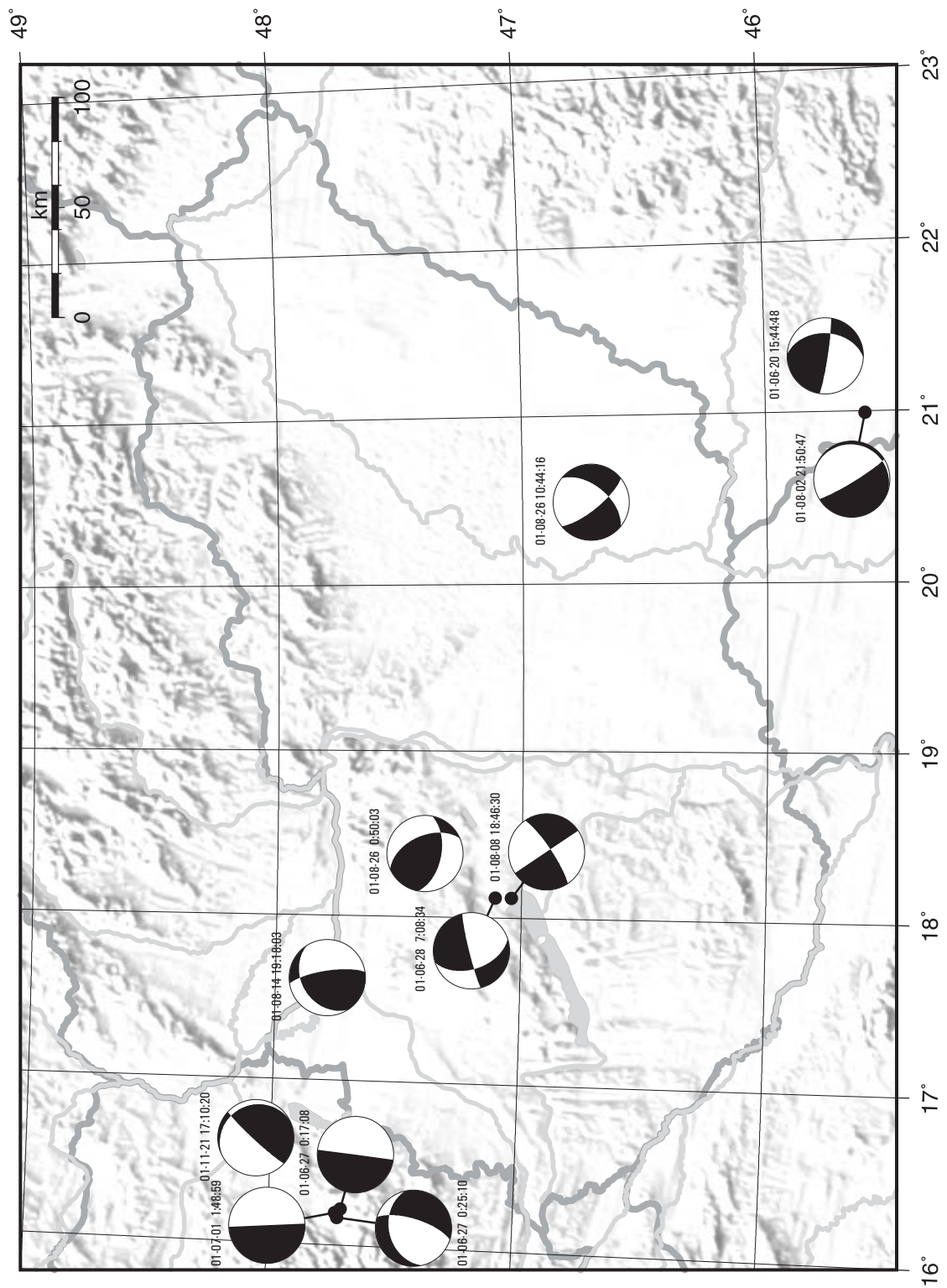


Figure 3.3.
Fault plane solutions of 2001 earthquakes

Hypocenter Parameters

PHASE DATA

Key to phase data encoding

time:	Time of occurrence of event in hours, mins and secs (UTC).
ML:	Richter local magnitude of the earthquake.
lat:	Latitude of the event in degrees.
lon:	Longitude of the event in degrees.
h:	Depth of the hypocenter in km.
erh:	Standard error of the epicenter in km. ($erh = \sqrt{SDX^2 + SDY^2}$, where SDX and SDY are the standard errors in latitude and longitude respectively, of the epicenter.) If $erh = ---$, this means that erh could not be computed because of insufficient data.
erz:	Standard error of the focal depth in km. If $erz = ---$, this means that erz could not be computed either because focal depth is fixed in the solution or because of insufficient data.
nr:	Number of station readings used in locating the earthquake. P and S arrivals for the same stations are regarded as 2 readings.
gap:	Largest azimuthal separation in degrees between stations.
rms:	Root mean square error of time residuals in seconds. ($rms = \sqrt{\sum R_i^2 / nr}$, where R_i is the time residual of the i^{th} station.
Locality:	A geographical indication of the epicenter area, usually the nearest settlement.
Comments:	Additional comments about the event, eg. maximum EMS intensity
sta:	Station name. (For details see Chapter 2.)
dist:	Distance from earthquake epicenter to station in km.
azm:	Azimuthal angle between epicenter to station measured from North in degrees.
phase:	Phase identifier; the first letter characterizes onset e = emergent i = impulsive, the second and third indicate the phase eg. Pn, Pg, Sn and Sg, the forth indicates the polarity C=compression/up D=dilatation/down.
hr mn sec:	Arrival time of the phase from input data.
res:	Residual of the phase in secs. ($res = T_{obs} - T_{cal}$, where T_{obs} is the observed and T_{cal} is the calculated travel time respectively.

Fault plane solutions were attempted for each event where any information for the stress field could be drawn. Stereographic projections of the lower focal hemisphere are shown, P and T are the main compression and tension axes respectively. Strike, dip and slip values of the nodal planes are also indicated. Calculations were carried out by computer program FPFIT (Reasenbergs and Oppenheimer, 1985)

Hypocenter Parameters

1.

2001-01-15 time: 13:37:22.08 UTC ML= 2.6
lat: 47.118N lon: 18.154E h= 10.0 km
erh= 4.7km erz= 7.3km
nr= 10 gap=192 rms=0.42
Locality: Berhida
Comments:

sta	dist	azm	phase	hr mn sec	res
PKSC	36.2	36	iPgD	13:37:28.50	-0.29
			eSg	37:34.10	0.08
ETVK	57.3	51	iPgC	13:37:32.30	-0.16
			iSg	37:41.00	0.44
SRO	78.2	9	ePg	13:37:36.20	0.04
			Sg	37:47.00	-0.14
RHK2	120.0	156	ePnC	13:37:42.50	-0.30
			eSn	37:55.50	-3.47
RHK3	136.6	177	iPnC	13:37:45.40	0.53
			eSn	37:59.70	-2.94

2.

2001-01-18 time: 10:53:16.05 UTC ML= 1.8
lat: 47.424N lon: 18.504E h= 3.6 km
erh= ---km erz= ---km
nr= 4 gap=301 rms=0.56
Locality: Vértess mt.
Comments: explosion

sta	dist	azm	phase	hr mn sec	res
PKSC	7.0	227	iPgC	10:53:17.00	-0.45
			iSg	53:18.40	-0.14
PKS8	62.0	168	eSg	10:53:35.30	-0.48
PKS9	94.6	190	iPgC	10:53:33.80	0.85

3.

2001-02-05 time: 10:38:14.89 UTC ML= 1.7
lat: 47.468N lon: 18.399E h= 4.7 km
erh=29.3km erz=10.5km
nr= 7 gap=337 rms=1.37
Locality: Vértess mt.
Comments: explosion

sta	dist	azm	phase	hr mn sec	res
PKSC	10.1	163	iPgC	10:38:16.40	-0.48
			iSg	38:17.20	-1.23
PKS8	68.8	162	iPgC	10:38:28.80	1.60
PKS9	98.3	185	ePgC	10:38:32.90	0.43
			eSg	38:48.90	2.72
PKSM	140.8	172	ePnC	10:38:37.60	-1.28
			eSn	38:54.60	-2.99

4.

2001-02-10 time: 4:26:21.37 UTC ML= 1.9
lat: 46.148N lon: 16.768E h= 10.0 km
erh= 8.8km erz= 5.5km
nr= 14 gap=151 rms=1.02
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn sec	res
DOBS	100.4	270	ePg	4:26:39.10	-0.28
			iSg	26:53.00	-0.43
CESS	102.8	259	ePg	4:26:40.30	0.48
			iSg	26:53.70	-0.51
PKS9	126.1	67	ePnC	4:26:44.80	1.95
			eSn	27:01.40	1.80

VBV	137.5	239	ePn	4:26:45.70	1.43
			iSn	27:01.50	-0.63
BISS	137.9	294	ePn	4:26:45.20	0.88
PKSM	144.8	87	iPnD	4:26:44.70	-0.48
			Sn	27:04.60	0.85
PKS8	167.5	61	iPnD	4:26:47.50	-0.51
			iSn	27:06.50	-2.28
PKSC	187.2	43	ePn	4:26:51.40	0.94
PKS6	220.9	77	Sn	4:27:30.10	9.45

5.

2001-02-12 time: 10:22:42.21 UTC ML= 1.7
lat: 47.477N lon: 18.401E h= 10.0 km
erh=43.0km erz= 6.7km
nr= 6 gap=337 rms=1.10
Locality: Vértess mt.
Comments: explosion

sta	dist	azm	phase	hr mn sec	res
PKSC	11.1	166	iPgC	10:22:44.70	-0.17
			iSg	22:45.90	-1.04
PKS8	69.7	163	ePg	10:22:57.20	2.42
PKS9	99.4	185	ePg	10:23:01.20	1.16
PKSM	141.8	173	iPnC	10:23:05.30	-0.35
			eSn	23:22.30	-1.63

6.

2001-02-14 time: 10:32:35.28 UTC ML= 1.1
lat: 47.410N lon: 18.566E h= 10.0 km
erh= 5.1km erz= 3.3km
nr= 6 gap=280 rms=0.22
Locality: Vértessboglár
Comments:

sta	dist	azm	phase	hr mn sec	res
PKSC	10.3	251	iPgC	10:32:37.60	-0.23
			Sg	32:40.00	0.17
PKS8	59.7	172	ePg	10:32:46.10	0.02
PKS9	94.1	193	iPgC	10:32:52.40	0.23
			eSg	33:04.90	-0.44
PKSM	133.3	178	ePnC	10:32:57.70	0.05
			eSn	33:12.30	-2.81

7.

2001-02-16 time: 11:27:10.69 UTC ML= 0.8
lat: 47.623N lon: 18.735E h= 10.0 km
erh= 9.8km erz= 3.6km
nr= 5 gap=266 rms=0.37
Locality: Máriahalom
Comments:

sta	dist	azm	phase	hr mn sec	res
BUD	26.7	126	ePg	11:27:16.00	0.21
PKSC	35.1	220	iPgD	11:27:17.10	-0.11
			Sg	27:22.10	-0.19
PKS8	82.9	183	ePg	11:27:26.50	0.90
PKSM	157.1	183	iPnC	11:27:35.70	-0.33

8.

2001-02-17 time: 22:21:13.70 UTC ML= 1.1
lat: 47.802N lon: 19.306E h= 18.0 km
erh= ---km erz= ---km
nr= 2 gap=198 rms=0.00
Locality: Csővár
Comments:

Hypocenter Parameters

sta	dist	azm	phase	hr mn sec	res
PENC	2.2	235	iPgU	22:21:16.94	0.00
			iSg	21:19.44	-0.02

9.

2001-02-20 time: 11:03:38.34 UTC ML=3.1
lat: 47.670N lon: 16.041E h= 10.0 km
erh=10.1km erz= km
Locality: Austria
Comments: Felt (IV) at Ternitz
Reported by NEIC

10.

2001-03-05 time: 10:40:11.75 UTC ML= 1.4
lat: 47.509N lon: 18.483E h= 4.0 km
erh=10.7km erz= 6.4km
nr= 7 gap=335 rms=0.55
Locality: Vértes mt.
Comments: explosion

sta	dist	azm	phase	hr mn sec	res
PKSC	14.6	193	iPgC	10:40:14.30	-0.16
			iSg	40:15.60	-0.97
PKS8	71.6	168	ePg	10:40:24.90	0.35
			eSg	40:34.50	-0.04
PKS9	103.6	189	iPgC	10:40:30.80	0.53
			eSg	40:46.10	1.39
PKSM	144.7	175	iPnC	10:40:36.20	-0.11

11.

2001-03-09 time: 16:01:59.52 UTC ML=2.3
lat: 46.175N lon: 16.074E h= 10.0 km
erh=15.4km erz= km
Locality: Northwestern Balkan Peninsula
Comments:
Reported by NEIC

12.

2001-03-11 time: 19:06:55.31 UTC ML=2.5
lat: 47.883N lon: 16.397E h= 10.0 km
erh=12.4km erz= km
Locality: Austria
Comments:
Reported by NEIC

13.

2001-03-12 time: 10:01:33.94 UTC ML= 0.8
lat: 47.456N lon: 18.760E h= 7.8 km
erh= 6.2km erz= 3.4km
nr= 5 gap=293 rms=0.29
Locality: Etyek
Comments: explosion

sta	dist	azm	phase	hr mn sec	res
PKSC	25.7	251	iPgD	10:01:38.50	-0.25
			Sg	01:42.60	0.10
PKS8	64.5	186	ePg	10:01:46.20	0.66
			Sg	01:54.50	-0.09
PKSM	138.6	184	Sn	10:02:15.40	-0.04

14.

2001-03-13 time: 12:14:25.89 UTC ML= 1.6
lat: 47.477N lon: 18.590E h= 0.0 km
erh= 5.3km erz= 5.1km
nr= 6 gap=311 rms=0.84
Locality: Vértes mt.
Comments: explosion

sta	dist	azm	phase	hr mn sec	res
PKSC	15.7	227	iPgC	12:14:28.80	0.10
			eSg	14:30.00	-0.88
PKS9	101.7	193	iPgC	12:14:45.30	1.24
			eSg	14:57.60	-0.62
PKSM	140.7	178	iPnC	12:14:50.00	-0.47
			eSn	15:05.70	-3.94

15.

2001-03-17 time: 5:30:02.75 UTC ML= 2.7
lat: 45.790N lon: 18.115E h= 13.4 km
erh= 7.7km erz= 5.2km
nr= 13 gap=239 rms=0.60
Locality: Tésenfa
Comments:

sta	dist	azm	phase	hr mn sec	res
PKSM	62.1	41	iPgD	5:30:14.20	0.10
			iSg	30:22.00	-0.96
PKS9	89.5	8	iP*C	5:30:19.40	0.54
			iS*	30:32.00	0.58
PKSC	178.6	8	iPnC	5:30:30.50	0.17
			eSn	30:51.70	-0.15
PKSN	182.6	48	eSn	5:30:59.10	6.35
ARSA	256.8	309	iPnC	5:30:40.30	0.21
			iSn	31:08.50	-0.71
OBKA	286.9	286	iPnC	5:30:43.50	-0.34
			iSn	31:14.70	-1.19
MOA	372.5	308	iPnC	5:30:55.60	1.09
			iSn	31:35.30	0.42
KHC	505.0	317	ePn	5:31:12.50	1.46
			eSn	32:02.50	-1.80

16.

2001-03-22 time: 2:12:06.02 UTC ML= 1.8
lat: 45.833N lon: 18.142E h= 10.8 km
erh= 2.1km erz= 1.3km
nr= 7 gap=315 rms=0.16
Locality: Drávaszerdahely
Comments:

sta	dist	azm	phase	hr mn sec	res
PKSM	57.1	43	iPgD	2:12:16.50	0.10
			iSg	12:24.30	-0.20
PKS9	84.4	7	iPgC	2:12:21.30	0.08
			eSg	12:33.10	0.03
PKS6	139.0	52	iPn	2:12:29.10	0.10
			eSn	12:49.70	2.77
PKSC	173.5	7	ePn	2:12:32.90	-0.40
			eSn	12:54.70	0.11

17.

2001-03-27 time: 9:06:03.49 UTC ML= 1.3
lat: 47.353N lon: 18.454E h= 10.0 km
erh= ---km erz= ---km
nr= 4 gap=197 rms=0.51
Locality: Vértes mt.
Comments: explosion

Hypocenter Parameters

sta	dist	azm	phase	hr mn sec	res
PKSC	3.3	337	iPgC	9:06:05.20	-0.17
			eSg	06:06.70	-0.14
PKSM	127.7	174	ePn	9:06:26.10	0.94
			eSn	06:41.30	-0.77

18.

2001-03-28 time: 13:05:30.99 UTC ML=2.2
lat: 46.187N lon: 16.133E h= 10.0 km
erh=16.3km erz= km
Locality: Northwestern Balkan Peninsula
Comments:
Reported by NEIC

19.

2001-03-29 time: 22:42:12.60 UTC ML= 2.9
lat: 47.802N lon: 18.048E h= 8.8 km
erh= 2.8km erz= 2.1km
nr= 19 gap= 85 rms=0.62
Locality: Komárom
Comments:

sta	dist	azm	phase	hr mn sec	res
SRO	19.9	86	iPg	22:42:16.90	0.41
			eSg	42:19.90	0.38
PKSC	55.3	148	iPgD	22:42:22.80	0.21
			iSg	42:29.20	-1.19
BUD	81.5	116	iPgD	22:42:26.90	-0.33
			eSg	42:36.60	-2.04
ZST	83.0	302	iPg	22:42:27.70	0.19
			eSg	42:38.50	-0.64
PKS9	136.2	173	iPnC	22:42:35.60	0.10
			eSn	42:53.80	0.44
VKA	138.9	292	iPnC	22:42:36.20	0.38
			iSn	42:53.00	-0.94
PKS6	176.3	139	eSn	22:43:04.60	2.35
PKSM	182.5	166	iPnC	22:42:40.80	-0.47
			eSn	43:03.60	-0.03
ARSA	199.8	252	iPnC	22:42:43.60	0.18
			iSn	43:11.70	4.24
OKC	226.4	2	ePn	22:42:49.90	3.15
			eSn	43:12.50	-0.88
PTJ	264.8	217	ePn	22:43:00.40	8.87
MOA	283.2	271	iPnC	22:42:56.10	2.28
PRU	353.8	313	ePn	22:43:02.60	-0.03
			Sn	43:39.00	-2.65
KHC	362.1	294	iPn	22:43:04.90	1.25
			eSn	43:44.80	1.32

20.

2001-04-09 time: 11:20:52.80 UTC ML= 1.2
lat: 47.789N lon: 19.274E h= 12.0 km
erh= ---km erz= ---km
nr= 2 gap= rms=0.00
Locality: Penc
Comments:

sta	dist	azm	phase	hr mn sec	res
PENC	0.6	71	iPg-	11:20:54.93	-0.02
			iSg	20:56.35	-0.27

21.

2001-04-18 time: 14:24:43.58 UTC ML= 1.2
lat: 47.534N lon: 16.405E h= 2.0 km
erh=19.9km erz= 9.5km
nr= 10 gap=209 rms=1.28
Locality: Austria
Comments:

sta	dist	azm	phase	hr mn sec	res
SOP	20.2	35	iPgC	14:24:47.50	0.30
			eSg	24:50.50	0.47
ARSA	73.7	245	iPgC	14:24:56.50	-0.24
			iSg	25:06.50	-0.50
ZST	90.2	35	eSg	14:25:11.10	-1.16
MOA	164.3	282	iPnC	14:25:10.70	-0.14
			iSn	25:30.70	-1.41
KBA	236.9	258	iPnC	14:25:24.60	4.71
			iSn	25:53.90	5.68
KHC	274.7	310	eSn	14:26:00.00	3.40
PRU	305.4	333	ePn	14:25:35.30	6.87
			eSn	26:12.80	9.39
DPC	313.2	359	eSn	14:26:12.90	7.75

22.

2001-04-23 time: 10:55:10.96 UTC ML= 1.1
lat: 47.710N lon: 18.504E h= 10.0 km
erh= ---km erz= ---km
nr= 3 gap=349 rms=0.01
Locality: Lábátlan
Comments:

sta	dist	azm	phase	hr mn sec	res
PKSC	36.9	188	iPgD	10:55:17.80	0.01
			eSg	55:23.10	-0.01
PKSM	166.8	176	iPnD	10:55:37.50	-0.02

23.

2001-04-26 time: 9:58:56.74 UTC ML= 0.8
lat: 47.403N lon: 18.511E h= 10.0 km
erh= ---km erz= ---km
nr= 3 gap=289 rms=0.83
Locality: Vértes mt.
Comments: explosion

sta	dist	azm	phase	hr mn sec	res
PKSC	6.1	246	iPgC	9:58:58.60	-0.23
PKSM	132.8	176	iPnC	9:59:19.60	0.55
			eSn	59:32.00	-4.45

24.

2001-05-04 time: 3:34:16.00 UTC ML= 1.0
lat: 47.714N lon: 18.899E h= 10.9 km
erh= 5.5km erz= 1.9km
nr= 6 gap=324 rms=0.21
Locality: Pilisszentkereszt
Comments:

sta	dist	azm	phase	hr mn sec	res
PKSC	50.8	223	iPgD	3:34:25.40	0.13
			iSg	34:32.30	-0.21
PKS8	94.4	190	ePgC	3:34:33.20	0.24
PKS9	133.8	201	ePn	3:34:38.20	-0.13
			eSn	34:56.00	0.26
PKSM	168.2	187	ePnC	3:34:42.30	-0.31

Hypocenter Parameters

25.

2001-05-06 time: 9:16:02.41 UTC ML= 2.2
lat: 45.826N lon: 18.083E h= 7.7 km
erh= 3.0km erz= 1.4km
nr= 10 gap=259 rms=0.34
Locality: Drávapiski
Comments:

sta	dist	azm	phase	hr mn sec	res
PKSM	60.9	45	iPgD	9:16:13.50	0.13
			iSg	16:21.40	-0.51
PKS9	85.9	10	ePgC	9:16:18.20	0.38
			eSg	16:29.90	0.07
PKS2	114.4	50	ePn	9:16:22.70	-0.03
			iSn	16:38.80	0.21
PKSC	174.9	9	ePn	9:16:29.90	-0.38
			eSn	16:52.90	0.89
ARSA	252.3	309	iPnC	9:16:39.80	-0.12
			iSn	17:07.80	-1.38
MOA	368.0	308	iPnC	9:16:55.00	0.65
			iSn	17:35.60	0.74

26.

2001-05-08 time: 11:09:21.55 UTC ML= 0.8
lat: 45.999N lon: 18.374E h= 1.0 km
erh= 0.5km erz=13.2km
nr= 5 gap=255 rms=0.20
Locality: Birjān
Comments: explosion

sta	dist	azm	phase	hr mn sec	res
RHK1	25.7	296	ePgC	11:09:26.30	0.17
			iSg	09:29.40	-0.31
PKSM	31.4	41	iPgC	11:09:27.30	0.13
			iSg	09:31.40	-0.15
PKS9	65.8	354	eSg	11:09:42.70	0.23

27.

2001-05-09 time: 9:46:01.84 UTC ML= 1.8
lat: 47.426N lon: 18.498E h= 7.4 km
erh=27.8km erz=11.5km
nr= 6 gap=313 rms=0.75
Locality: Vértess mt.
Comments: explosion

sta	dist	azm	phase	hr mn sec	res
PKSC	6.8	222	iPgC	9:46:03.50	-0.14
			iSg	46:04.30	-0.74
PKS9	94.8	190	iPgD	9:46:19.90	1.09
			eSg	46:31.10	-0.95
PKSM	135.4	175	iPnC	9:46:24.80	-0.01
			eSn	46:39.80	-2.92

28.

2001-05-15 time: 10:05:18.70 UTC ML= 1.3
lat: 45.569N lon: 17.723E h= 15.5 km
erh= 1.9km erz= 0.7km
nr= 6 gap=336 rms=0.08
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn sec	res
RHK3	54.6	49	ePg	10:05:28.70	-0.14
			iSg	05:36.80	0.05
RHK1	64.8	25	iPgC	10:05:30.60	0.00
			eSg	05:39.90	0.01
PKSM	100.9	45	iPnC	10:05:36.40	0.08
			eSn	05:49.90	-0.17

29.

2001-05-16 time: 7:37:38.61 UTC ML= 0.3
lat: 45.846N lon: 18.421E h= 10.0 km
erh= 3.5km erz= 3.2km
nr= 5 gap=269 rms=0.68
Locality: Villányi mt.
Comments: explosion

sta	dist	azm	phase	hr mn sec	res
RHK3	13.9	291	ePgC	7:37:41.60	-0.07
			iSg	37:43.70	-0.36
PKSM	44.1	23	iPgC	7:37:46.20	-0.49
			iSg	37:52.60	-0.39
PKS9	83.1	352	iPgC	7:37:54.80	1.24

30.

2001-05-16 time: 10:52:22.06 UTC ML= 1.1
lat: 45.502N lon: 18.058E h= 5.1 km
erh=11.0km erz= 6.2km
nr= 5 gap=338 rms=0.25
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn sec	res
RHK3	45.9	19	iPgD	10:52:30.50	0.19
			iSg	52:36.40	-0.34
PKSM	91.0	30	iPgC	10:52:38.10	-0.23
			iSg	52:51.30	0.28
PKS9	121.8	8	ePnC	10:52:43.80	0.17

31.

2001-05-24 time: 10:19:53.10 UTC ML= 1.7
lat: 47.446N lon: 18.467E h= 6.7 km
erh= 218km erz=43.8km
nr= 6 gap=337 rms=0.42
Locality: Vértess mt.
Comments: explosion

sta	dist	azm	phase	hr mn sec	res
PKSC	7.6	197	iPgC	10:19:54.50	-0.42
			iSg	19:56.30	-0.03
PKS9	96.6	189	iPgC	10:20:11.00	0.61
			eSg	20:23.40	-0.48
PKSM	137.9	174	iPnC	10:20:16.50	0.03
			eSn	20:32.90	-1.80

32.

2001-05-24 time: 11:39:32.76 UTC ML= 1.4
lat: 45.567N lon: 17.861E h= 14.3 km
erh= 3.3km erz= 2.1km
nr= 6 gap=335 rms=0.17
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn sec	res
RHK3	47.3	40	iPgD	11:39:41.80	0.21
			iSg	39:48.40	-0.07
RHK1	61.4	16	iPgC	11:39:43.80	-0.22
			iSg	39:52.90	0.10
PKSM	93.9	40	iP*D	11:39:49.40	-0.05
			eS*	40:03.20	0.73

Hypocenter Parameters

33.

2001-05-25 time: 15:15:49.68 UTC ML= 1.7
lat: 45.836N lon: 18.139E h= 10.0 km
erh= 4.6km erz= 4.5km
nr= 8 gap=295 rms=0.48
Locality: Drávaszerdahely
Comments:

sta	dist	azm	phase	hr mn sec	res
RHK3	10.9	55	iPgD	15:15:52.30	-0.02
			iSg	15:54.70	0.32
RHK1	29.6	350	iPgD	15:15:54.90	-0.36
			iSg	15:59.00	-0.61
PKSM	57.1	43	iPgD	15:15:59.80	-0.24
			iSg	16:07.60	-0.51
PKS9	84.2	7	iPgC	15:16:05.60	0.78
			iSg	16:17.30	0.67

34.

2001-05-26 time: 4:30:42.51 UTC ML= 1.9
lat: 47.771N lon: 18.069E h= 10.0 km
erh= 7.7km erz= 6.1km
nr= 12 gap=132 rms=1.32
Locality: Komárom
Comments:

sta	dist	azm	phase	hr mn sec	res
SRO	18.9	75	iPg	4:30:46.50	0.17
			eSg	30:50.10	0.79
PKSC	51.4	147	ePg	4:30:51.90	0.03
			iSg	30:59.50	0.33
ZST	86.3	303	ePg	4:30:57.00	-1.03
			eSg	31:06.90	-3.23
PKS9	132.5	173	iPnD	4:31:05.00	0.21
			eSn	31:21.30	-0.87
PKSM	178.7	166	iPnD	4:31:10.20	-0.35
			iSn	31:29.90	-2.51
ARSA	200.3	253	iPnC	4:31:17.50	4.25
			iSn	31:39.30	2.08

35.

2001-05-26 time: 7:26:48.55 UTC ML= 1.2
lat: 45.513N lon: 17.992E h= 1.4 km
erh= 6.7km erz= 179km
nr= 7 gap=333 rms=0.33
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn sec	res
RHK3	46.7	26	ePgC	7:26:57.30	0.40
			eSg	27:07.20	3.79
RHK1	65.4	6	iPgD	7:27:00.00	-0.23
			eSg	28:09.10	-0.23
PKSM	92.6	33	iPgD	7:27:05.00	-0.09
			eSg	27:17.70	-0.28
PKS9	121.4	11	ePg	7:27:10.70	0.47

36.

2001-05-26 time: 17:36:42.93 UTC ML= 0.8
lat: 45.811N lon: 18.103E h= 10.0 km
erh= 5.3km erz= 6.2km
nr= 7 gap=304 rms=0.44
Locality: Kémes
Comments:

sta	dist	azm	phase	hr mn sec	res
RHK3	14.8	53	iPgD	17:36:46.30	0.18
			iSg	36:48.80	0.20

RHK1	32.0	356	iPgD	17:36:48.90	-0.02
			iSg	36:53.00	-0.59
PKSM	61.0	43	ePgD	17:36:53.80	-0.18
			eSg	37:01.70	-0.89
PKS9	87.3	9	eSg	17:37:11.90	1.03

37.

2001-05-28 time: 9:01:11.37 UTC ML= 1.3
lat: 45.543N lon: 17.288E h= 10.0 km
erh= 7.8km erz= 2.9km
nr= 6 gap=342 rms=0.32
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn sec	res
RHK3	84.6	63	ePgC	9:01:26.70	0.11
			eSg	01:38.80	0.34
RHK1	87.0	45	iPgD	9:01:26.60	-0.40
			iSg	01:39.30	0.11
PKSM	128.8	55	iPnC	9:01:33.50	0.32
			eSn	01:49.60	-0.59

38.

2001-05-29 time: 11:29:05.64 UTC ML= 0.9
lat: 45.858N lon: 18.415E h= 6.1 km
erh= 5.6km erz=14.4km
nr= 6 gap=263 rms=0.41
Locality: Villányi mt.
Comments: explosion

sta	dist	azm	phase	hr mn sec	res
RHK3	13.1	287	ePgC	11:29:08.00	-0.22
			eSg	29:10.20	-0.03
PKSM	43.0	24	ePgC	11:29:13.60	0.20
			eSg	29:19.50	0.04
PKS9	81.7	353	iPgC	11:29:21.90	1.63
			eSg	29:31.10	-0.58

39.

2001-06-02 time: 23:59:41.88 UTC ML= 0.5
lat: 46.794N lon: 19.301E h= 10.0 km
erh=11.4km erz=41.0km
nr= 6 gap=217 rms=0.81
Locality: Soltszentimre
Comments:

sta	dist	azm	phase	hr mn sec	res
PKS6	29.5	137	iPgD	23:59:46.50	-0.95
			eSg	59:52.60	0.81
PKSN	44.7	75	ePgC	23:59:50.40	0.35
			eSg	59:57.30	0.88
PKSM	82.2	218	ePg	23:59:56.70	0.03
			eSg	24:00:09.70	1.49

40.

2001-06-05 time: 12:05:47.97 UTC ML= 1.6
lat: 47.462N lon: 18.516E h= 10.0 km
erh=14.4km erz= 4.7km
nr= 5 gap=323 rms=1.04
Locality: Vértes mt.
Comments: explosion

sta	dist	azm	phase	hr mn sec	res
PKSC	10.9	213	ePgC	12:05:50.40	-0.21
			eSg	05:51.90	-0.76
PKS9	99.0	190	ePg	12:06:07.90	2.17
PKSM	139.3	176	ePnC	12:06:10.80	-0.30
			eSn	06:27.50	-1.64

Hypocenter Parameters

41.

2001-06-07 time: 3:27:06.75 UTC ML= 1.6
lat: 47.863N lon: 16.309E h= 1.5 km
erh= 4.3km erz= 5.5km
nr= 10 gap= 84 rms=0.79
Locality: Austria
Comments:

sta	dist	azm	phase	hr	mn	sec	res
SOP	27.3	137	ePgD	3:27:12.30			0.66
			iSg	27:15.60			0.16
VKA	44.7	1	iPgD	3:27:15.20			0.45
			iSg	27:21.60			0.61
ZST	69.8	58	iPg	3:27:18.70			-0.52
			eSg	27:27.10			-1.85
ARSA	90.2	221	iPgD	3:27:22.20			-0.66
			iSg	27:33.60			-1.82
SRO	150.1	92	ePn	3:27:31.90			-0.42
			eSn	27:48.80			-3.46
MOA	152.9	269	iPnC	3:27:32.30			-0.37
			iSn	27:50.90			-1.98
OBKA	201.1	222	iPnC	3:27:41.10			2.42
			iSn	28:06.00			2.42
KBA	239.9	249	iPnC	3:27:47.20			3.68
			iSn	28:16.20			4.01
KHC	246.3	305	ePn	3:27:44.40			0.09
			eSn	28:12.10			-1.50
PRU	269.6	331	ePn	3:27:48.70			1.49
			eSn	28:17.90			-0.87
DPC	276.7	0	ePn	3:27:52.80			4.70
			eSn	28:24.50			4.16

42.

2001-06-07 time: 20:28:59.53 UTC ML= 1.1
lat: 46.972N lon: 19.272E h= 0.2 km
erh= 3.9km erz= 934km
nr= 10 gap=206 rms=0.71
Locality: Kunadacs
Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKS6	47.0	152	iPgC	20:29:07.70			-0.23
			eSg	29:14.20			-0.28
PKS2	53.6	185	iPgD	20:29:09.40			0.30
			Sg	29:16.60			0.04
PKSC	77.9	306	ePg	20:29:13.90			0.46
			eSg	29:23.40			-0.90
PKS9	87.1	241	ePgD	20:29:15.00			-0.09
			eSg	29:25.90			-1.32
PKSM	97.4	210	ePg	20:29:18.70			1.78
			eSg	29:28.40			-2.09

43.

2001-06-08 time: 9:58:56.34 UTC ML= 1.2
lat: 45.852N lon: 18.131E h= 12.6 km
erh= 0.7km erz= 0.6km
nr= 6 gap=286 rms=0.05
Locality: Rádfalva
Comments:

sta	dist	azm	phase	hr	mn	sec	res
RHK3	10.5	65	iPgD	9:58:59.20			-0.07
			iSg	59:01.60			0.04
RHK1	27.7	351	iPgD	9:59:01.80			0.02
			iSg	59:06.00			-0.02
PKSM	56.2	45	iPgD	9:59:06.70			0.07
			iSg	59:14.60			-0.05

44.

2001-06-08 time: 11:02:29.64 UTC ML= 0.6
lat: 46.076N lon: 18.348E h= 10.0 km
erh= 2.2km erz= 3.0km
nr= 5 gap=220 rms=0.09
Locality: Romonya
Comments: explosion

sta	dist	azm	phase	hr	mn	sec	res
RHK1	21.2	277	Pg	11:02:33.90			0.07
			Sg	02:37.00			-0.10
PKSM	27.2	56	ePgC	11:02:34.70			-0.11
			eSg	02:39.00			0.15
PKS9	57.0	355	ePgC	11:02:40.00			0.03

45.

2001-06-11 time: 11:51:10.10 UTC ML= 1.8
lat: 47.466N lon: 18.446E h= 5.8 km
erh=25.8km erz= 3.2km
nr= 6 gap=347 rms=0.46
Locality: Vértess mt.
Comments: explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSC	9.6	184	iPgC	11:51:11.90			-0.20
			iSg	51:13.50			-0.16
PKS9	98.6	187	iPgC	11:51:28.40			0.66
			eSg	51:40.80			-0.70
PKSM	140.3	174	ePnC	11:51:33.60			-0.28
			eSn	51:49.40			-3.03

46.

2001-06-11 time: 12:04:41.64 UTC ML= 0.6
lat: 45.854N lon: 18.133E h= 11.9 km
erh= 0.6km erz= 0.7km
nr= 6 gap=285 rms=0.05
Locality: Rádfalva
Comments:

sta	dist	azm	phase	hr	mn	sec	res
RHK3	10.3	66	iPgD	12:04:44.40			-0.06
			eSg	04:46.80			0.15
RHK1	27.5	351	iPgD	12:04:47.00			-0.01
			iSg	04:51.20			0.01
PKSM	56.0	45	iPgD	12:04:51.90			0.04
			iSg	04:59.80			-0.03

47.

2001-06-13 time: 13:51:00.81 UTC ML=
lat: 47.585N lon: 16.350E h= 0.6 km
erh= 3.0km erz= 3.3km
nr= 8 gap=184 rms=0.51
Locality: Austria
Comments:

sta	dist	azm	phase	hr	mn	sec	res
SOP	19.1	55	iPgC	13:51:04.30			0.08
ARSA	72.6	239	iPgC	13:51:14.00			0.22
			iSg	51:23.20			-0.70
VKA	75.6	358	iPgC	13:51:13.80			-0.52
			iSg	51:24.90			0.05
ZST	88.2	40	eSg	13:51:28.80			-0.06
MOA	159.1	281	iPnC	13:51:29.00			1.39
			iSn	51:48.70			0.18

Hypocenter Parameters

48.

2001-06-15 time: 13:43:30.77 UTC ML= 2.7
lat: 46.207N lon: 16.008E h= 0.9 km
erh= 4.0km erz= 4.6km
nr= 13 gap=122 rms=1.32
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn sec	res
CESS	49.5	238	iPg	13:43:39.70	0.10
			iSg	43:46.30	-0.19
VBY	97.4	217	ePg	13:43:48.30	0.13
OBKA	117.2	287	iPgC	13:43:51.40	-0.30
			iSg	44:06.40	-1.63
ARSA	121.8	342	iPgC	13:43:52.60	0.08
			iSg	44:08.40	-1.09
RHK1	160.2	94	ePn	13:43:56.50	-1.16
			eSn	44:19.80	1.16
VOY	164.6	263	ePn	13:43:58.30	0.09
			eSn	44:20.90	1.28
KBA	225.8	295	iPnC	13:44:09.70	3.86
			iSn	44:37.70	4.50

49.

2001-06-16 time: 7:35:50.35 UTC ML= 3.0
lat: 46.085N lon: 16.775E h= 10.0 km
erh= 6.6km erz= 5.4km
nr= 26 gap=151 rms=1.63
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn sec	res
PTJ	66.6	252	iPgD	7:36:01.50	-0.87
			eSg	36:10.80	-0.95
RHK1	100.6	89	ePgC	7:36:07.90	-0.49
			eSg	36:22.00	-0.47
RHK3	116.6	101	iPnC	7:36:10.10	-0.54
			eSn	36:25.80	-0.66
PKS9	128.5	64	iPnC	7:36:12.40	0.27
			eSn	36:29.20	0.09
ARSA	161.1	324	iPnC	7:36:15.40	-0.79
			iSn	36:35.00	-1.36
LJU	173.5	268	ePn	7:36:19.20	1.46
			eSn	36:40.00	0.89
OBKA	177.9	285	iPnC	7:36:17.70	-0.59
			iSn	36:38.80	-1.28
PKSC	192.0	41	ePn	7:36:21.70	1.65
VOY	223.1	268	ePn	7:36:26.80	2.88
			eSn	36:55.10	5.00
ZST	236.0	6	ePn	7:36:29.00	3.47
			eSn	36:59.00	6.03
MOA	273.8	316	iPnD	7:36:30.50	0.26
			iSn	36:59.00	-2.35
KBA	285.2	293	iSn	7:37:11.50	7.61
KHC	415.3	325	ePn	7:36:48.40	0.51
			eSn	37:31.70	-1.07
PRU	464.9	339	ePn	7:36:56.90	2.83
			eSn	37:38.70	-5.07
NKC	562.5	325	ePn	7:37:05.80	-0.44

50.

2001-06-16 time: 9:04:35.31 UTC ML= 3.1
lat: 46.053N lon: 16.791E h= 6.1 km
erh=10.4km erz= 9.1km
nr= 14 gap=156 rms=1.03
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn sec	res
PTJ	66.7	255	iPgD	9:04:47.10	-0.17
			eSg	04:51.00	-5.60
RHK1	99.5	87	ePgC	9:04:53.40	0.29
			eSg	05:06.40	-0.60
RHK3	114.8	99	iPgC	9:04:55.60	-0.24
			eSg	05:09.90	-1.95
PKS9	129.1	63	iPnD	9:04:56.40	-1.26
			eSn	05:14.80	-0.29
ARSA	164.8	324	iPnD	9:05:01.00	-1.11
			iSn	05:20.50	-2.51
LJU	174.7	270	ePn	9:05:04.60	1.25
			eSn	05:25.10	-0.12
OBKA	180.1	286	iPnC	9:05:03.30	-0.72
			iSn	05:23.90	-2.51
PKSC	194.0	40	ePnC	9:05:07.20	1.45
			eSn	05:27.00	-2.50
VOY	224.3	269	ePn	9:05:11.70	2.17
			eSn	05:39.80	3.58
ZST	239.5	6	ePn	9:05:14.20	2.78
			eSn	05:39.50	-0.09
MOA	277.2	316	iPnC	9:05:16.10	-0.03
			iSn	05:46.30	-1.67
KBA	287.8	293	iSn	9:05:57.00	6.69
KHC	419.0	325	ePn	9:05:33.90	0.10
			eSn	06:17.20	-2.23
PRU	468.7	339	ePn	9:05:39.00	-1.00
			eSn	06:47.00	16.54
NKC	566.2	325	ePn	9:05:51.80	-0.36

51.

2001-06-19 time: 4:56:35.61 UTC ML= 0.5
lat: 45.858N lon: 18.133E h= 12.8 km
erh= 1.0km erz= 0.9km
nr= 6 gap=282 rms=0.07
Locality: Rádfalva
Comments:

sta	dist	azm	phase	hr mn sec	res
RHK3	10.1	68	ePg	4:56:38.40	-0.13
			eSg	56:40.90	0.09
RHK1	27.1	351	iPgD	4:56:41.00	0.04
			iSg	56:45.10	-0.04
PKSM	55.7	45	ePgC	4:56:45.90	0.09
			eSg	56:53.70	-0.06

52.

2001-06-20 time: 15:44:48.02 UTC ML= 3.1
lat: 45.749N lon: 21.323E h= 10.0 km
erh= 3.9km erz= 3.0km
nr= 13 gap= 70 rms=0.93
Locality: Romania
Comments:

sta	dist	azm	phase	hr mn sec	res
TIM	8.0	260	iPgC	15:44:51.00	0.70
BZS	27.3	123	iPgC	15:44:51.60	-1.60
BANR	43.3	200	iPg	15:44:55.80	-0.15
SIRR	63.2	24	iPg	15:44:58.70	-0.75
GYL	95.1	353	iPgC	15:45:05.90	0.82
			eSg	45:18.30	-0.10
SRE	191.0	129	iPnD	15:45:18.50	0.91
PKSM	214.0	284	iPnD	15:45:20.00	-0.46
			eSn	45:44.70	-1.06
PKS9	252.8	292	ePnC	15:45:36.00	10.70
RHK1	254.9	279	iPnC	15:45:25.20	-0.35
PKSC	286.1	309	eSn	15:46:01.50	-0.25
MTUR	298.2	101	iPn	15:45:33.00	2.05
MLR	361.7	95	ePnC	15:45:39.10	0.23
ZST	420.9	310	eSn	15:46:38.10	6.43

ARSA	475.4	291	iPnC	15:45:53.20	0.15
KHC	694.7	303	ePn	15:46:24.50	4.11
			eSn	47:40.50	8.05
				440.172	



sta	dist	azm	phase	hr	mn	sec	res
RHK3	20.9	146	ePg	9:03:52.10			-0.54
			eSg		03:54.80		-0.75
PKSM	45.4	66	iPgC	9:03:57.40			0.37
			eSg		04:03.10		-0.25
PKS9	61.5	13	ePg	9:04:00.80			0.90
			eSg		04:06.10		-2.37

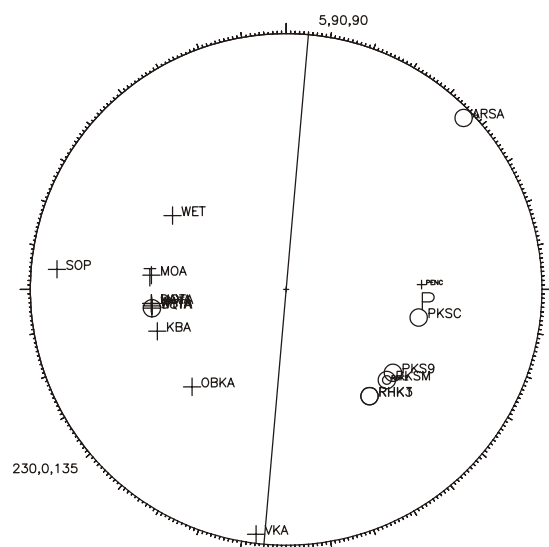
54.

sta	dist	azm	phase	hr	mn	sec	res
PENC	4.3	74	ePgU	13:26:42.08			-0.13
			Sg		26:43.42		0.05
BUD	36.3	205	ePg	13:26:48.20			0.87
			Sg		26:52.00		-0.49
PSZ	52.3	73	iPgD	13:26:50.00			-0.15
			Sg		26:57.86		0.36

55.

sta	dist	azm	phase	hr	mn	sec	res
SOP	25.6	95	iPgC	0:17:14.10			1.32
			iSg		17:17.90		1.50
VKA	62.8	7	iPgC	0:17:19.30			-0.09
			iSg		17:27.70		-0.47
ARSA	72.7	226	iPgD	0:17:20.20			-0.95
			iSg		17:28.80		-2.51
ZST	85.7	50	iPg	0:17:22.90			-0.57
			eSg		17:34.10		-1.33
MOA	147.3	276	iPnC	0:17:31.70			-1.22
			iSn		17:49.70		-2.55
SRO	157.5	86	ePn	0:17:33.60			-0.55
			eSn		17:52.60		-1.91
PKSC	170.8	102	iPnD	0:17:35.60			-0.25
			eSn		17:58.30		0.83
OBKA	183.6	224	iPnC	0:17:37.50			0.05
			iSn		18:01.00		0.69
PKS9	199.6	128	iPnD	0:17:39.80			0.37
			eSn		18:08.30		4.45
PTJ	201.5	186	ePn	0:17:39.60			-0.08
			eSn		18:06.50		2.22
BUD	212.4	97	eSn	0:18:12.70			6.01
LJU	224.9	215	ePn	0:17:43.40			0.80
			eSn		18:13.20		3.72
GEC2	225.9	304	ePn	0:17:43.10			0.38
			eSn		18:10.20		0.50
RHK1	227.7	142	iPnD	0:17:42.70			-0.25
KBA	227.9	252	iPnC	0:17:43.20			0.23
			iSn		18:12.60		2.46
KBA	227.9	252	iPnC	0:17:43.20			0.23
PENC	229.9	88	ePnC	0:17:42.80			-0.41
PKSM	248.0	132	iPnD	0:17:45.10			-0.37
			eSn		18:11.30		-3.30
KHC	251.8	309	ePn	0:17:47.10			1.15
			eSn		18:16.50		1.05
RHK3	254.4	142	iPnD	0:17:46.30			0.03
			iSn		18:14.10		-1.92
VOY	256.9	224	ePn	0:17:46.70			0.11
			eSn		18:21.40		4.82
RHK2	262.4	132	ePnD	0:17:47.00			-0.28
			eSn		18:15.10		-2.71
OKC	276.4	31	ePn	0:17:48.80			-0.22
PRU	282.3	334	Pn	0:17:50.30			0.54
			Sn		18:18.70		-3.52
DPC	294.4	1	ePn	0:17:50.10			-1.16
			eSn		18:29.30		4.40
DPC	294.4	1	ePn	0:17:50.10			-1.16
WET	294.6	303	iPnC	0:17:52.80			1.52
WTTA	348.9	262	iPnC	0:17:58.80			0.75
			iSn		18:45.90		8.91
KSP	349.2	1	ePn	0:17:59.40			1.31
WATA	352.1	263	iPnC	0:17:58.90			0.45
			iSn		18:47.80		10.10
FUR	372.9	278	ePn	0:18:01.50			0.45
SQTA	381.6	262	iPnD	0:18:02.80			0.67
			iSn		18:56.10		11.84
OJC	383.4	43	ePn	0:18:02.60			0.24
MOTA	387.3	264	iPnC	0:18:03.00			0.15
			iSn		18:56.30		10.77
BRG	389.4	335	iPn	0:18:02.00			-1.11
NKC	394.2	316	ePn	0:18:04.00			0.30
			eSn		18:59.60		12.55
GRF	429.2	301	ePn	0:18:08.20			0.13
			eSn		19:10.60		15.77
GRA1	429.2	301	ePn	0:18:08.20			0.13
			eSn		19:10.60		15.77
CLL	463.8	330	ePn	0:18:13.00			0.61

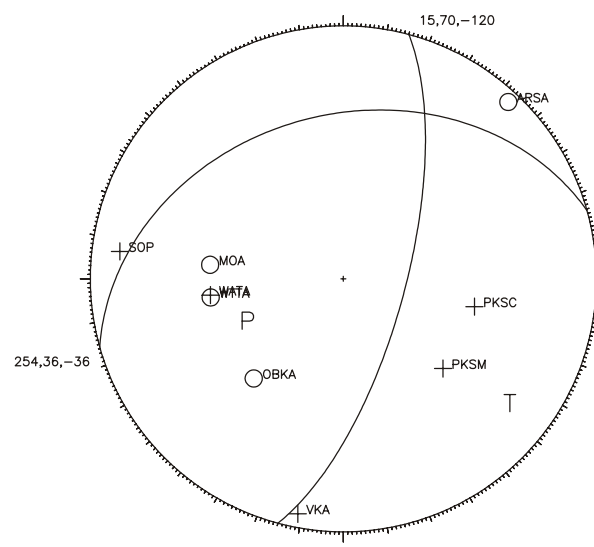
Hypocenter Parameters



56.

2001-06-27 time: 0:25:10.90 UTC ML= 1.4
lat: 47.716N lon: 16.166E h= 6.6 km
erh= 2.9km erz= 3.0km
nr= 9 gap= 91 rms=0.48
Locality: Austria
Comments: felt 3 EMS (Austria)

sta	dist	azm	phase	hr mn sec	res
SOP	29.7	97	iPgC	0:25:16.90	0.56
			iSg	25:20.80	0.23
VKA	62.0	11	iPgC	0:25:22.20	0.16
			iSg	25:30.50	-0.23
ARSA	70.9	223	iPgD	0:25:23.10	-0.52
			iSg	25:31.50	-2.04
ZST	88.0	53	ePg	0:25:25.90	-0.76
			eSg	25:37.00	-1.95
MOA	143.1	276	iPnD	0:25:34.80	-0.14
			iSn	25:51.80	-1.89
PKSC	175.0	102	iPnC	0:25:38.70	-0.22
			eSn	26:00.50	-0.28
OBKA	181.9	222	iPnD	0:25:40.30	0.53
			iSn	26:04.30	2.01
GEC2	221.8	304	ePn	0:25:45.80	1.05
			eSn	26:11.30	0.14
KBA	224.5	252	iPn	0:25:52.60	7.52
			iSn	26:20.90	9.15
KHC	247.8	309	eSn	0:26:18.00	1.07
PKSM	252.0	132	iPnC	0:25:48.10	-0.41
			eSn	26:14.40	-3.45
PRU	279.3	335	Sn	0:26:29.90	5.97
WTTA	345.0	262	iPnD	0:26:01.90	1.79
			iSn	26:48.70	10.20
WATA	348.2	263	iPnC	0:26:01.90	1.39
			iSn	26:48.60	9.39



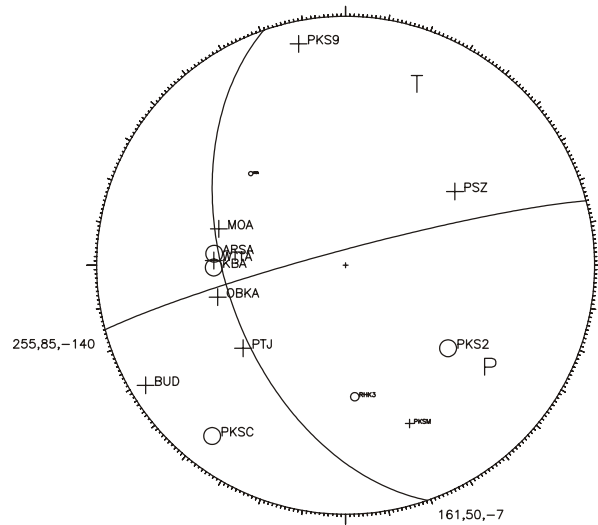
57.

2001-06-28 time: 7:08:34.14 UTC ML= 3.0
lat: 47.107N lon: 18.119E h= 10.0 km
erh= 2.0km erz= 1.9km
nr= 15 gap= 71 rms=0.39
Locality: Vilonya
Comments: felt 4 EMS

sta	dist	azm	phase	hr mn sec	res
PKSC	38.8	38	iPgD	7:08:41.20	-0.10
			eSg	08:46.90	0.01
PKS9	59.1	168	iPgC	7:08:45.20	0.36
			iSg	08:53.00	-0.19
SRO	79.9	11	ePg	7:08:48.80	0.28
			eSg	08:59.30	-0.44
BUD	80.3	59	iPgC	7:08:48.10	-0.49
			eSg	08:58.80	-1.05
PKSM	107.2	158	eP*C	7:08:52.60	-0.67
			iS*	09:05.30	-2.88
PKS2	107.9	129	iPnD	7:08:53.70	0.34
			iSn	09:07.10	-1.25
RHK1	112.2	182	ePn	7:08:53.40	-0.48
			eSn	09:07.30	-1.98
RHK2	120.0	155	iPn	7:08:55.10	0.24
			iSn	09:08.50	-2.52
SOP	134.1	299	ePn	7:08:56.70	0.08
			eSn	09:11.10	-3.05
RHK3	135.5	176	ePnD	7:08:56.40	-0.39
			eSn	09:11.40	-3.06
ZST	143.2	328	iPn	7:08:57.80	0.05
			Sn	09:13.70	-2.46
PSZ	161.4	56	iPnU	7:09:00.38	0.36
			iSn	09:19.99	-0.21
VKA	186.7	314	iPnD	7:09:06.50	3.32
			iSn	09:29.50	3.68
ARSA	197.4	275	iPnD	7:09:04.90	0.39
			iSn	09:29.10	0.90
PTJ	213.3	231	iPnC	7:09:05.60	-0.90
			eSn	09:33.40	1.66
OBKA	280.5	256	iPnC	7:09:15.40	0.53
			iSn	10:01.10	14.46
MOA	301.9	286	iPnC	7:09:19.40	1.86
			iSn	10:03.00	11.60
KBA	362.5	269	iPnD	7:09:26.20	1.10
DPC	384.1	340	ePn	7:09:28.90	1.11
			eSn	10:08.90	-0.74
KHC	406.1	304	ePn	7:09:31.00	0.46

Hypocenter Parameters

WTTA 491.7 272 eSn 10:18.80 4.27
iPnC 7:09:42.40 1.20



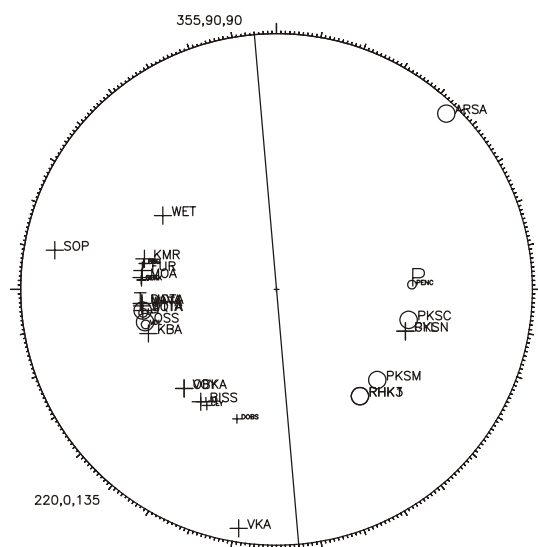
58.

2001-07-01 time: 1:48:59.10 UTC ML= 3.8
lat: 47.726N lon: 16.194E h= 6.4 km
erh= 1.3km erz= 1.5km
nr= 39 gap= 54 rms=0.52
Locality: Austria
Comments: felt 4-5 EMS (Hungary)

sta	dist	azm	phase	hr	mn	sec	res
SOP	27.8	100	iPgC	1:49:05.20			1.00
			iSg	49:09.10			0.93
VKA	60.6	9	iPgC	1:49:09.90			-0.09
			iSg	49:17.80			-0.68
ARSA	73.2	224	iPgD	1:49:11.30			-0.92
			iSg	49:19.90			-2.55
ZST	85.7	52	Pg	1:49:14.10			-0.34
			Sg	49:24.90			-1.51
BISS	144.6	214	iPnC	1:49:22.96			-0.39
			eSn	49:38.88			-3.38
MOA	145.1	275	iPnC	1:49:22.80			-0.61
			iSn	49:40.10			-2.27
KMR	158.5	283	iPnC	1:49:25.20			0.12
			iSn	49:44.40			-0.95
SRO	159.2	87	Pn	1:49:24.80			-0.37
PKSC	173.2	103	iPnD	1:49:26.70			-0.22
			eSn	49:51.60			2.99
VRAC	178.4	10	Pn	1:49:27.08			-0.48
DOBS	183.8	197	ePnC	1:49:28.06			-0.17
			eSn	49:50.91			-0.05
OBKA	184.1	223	iPnC	1:49:28.60			0.32
			iSn	49:50.80			-0.23
CESS	202.7	196	ePn	1:49:30.73			0.14
			eSn	49:56.97			1.82
BUD	214.5	97	ePn	1:49:33.00			0.93
			iSn	50:04.40			6.62
GERE	222.9	304	Pn	1:49:33.22			0.11
GEC2	222.9	304	ePn	1:49:34.40			1.29
			eSn	49:59.70			0.06
LJU	225.9	214	ePnC	1:49:34.00			0.52
			eSn	50:02.50			2.20
KBA	226.8	251	iPnC	1:49:34.30			0.70
			iSn	50:05.10			4.59
RHK1	230.9	142	iPnD	1:49:33.90			-0.21
PENC	231.6	88	ePnD	1:49:34.10			-0.10
			eSn	50:13.10			11.52

KHC	248.7	309	ePn	1:49:36.50			0.17
			eSn	50:02.00			-3.37
PKSM	251.1	132	iPnD	1:49:36.20			-0.43
			eSn	50:02.70			-3.20
VBY	257.2	196	ePn	1:49:37.49			0.10
			eSn	50:12.63			5.38
VOY	257.4	223	iPnC	1:49:37.70			0.29
RHK3	257.6	142	iPnD	1:49:37.40			-0.03
			iSn	50:05.60			-1.73
CEY	259.0	211	ePnC	1:49:37.81			0.20
			eSn	50:08.08			0.44
OKC	275.2	31	ePn	1:49:39.70			0.06
			eSn	50:14.50			3.25
PRU	279.2	334	Pn	1:49:39.80			-0.34
			Sn	50:09.30			-2.85
WET	291.6	303	iPnC	1:49:41.60			-0.08
DPC	292.0	2	ePn	1:49:41.10			-0.62
			eSn	50:20.60			5.63
PKSN	292.7	108	iPnC	1:49:42.20			0.38
KSP	346.7	1	iPn	1:49:55.80			7.25
			eSn	50:22.70			-4.41
WTTA	347.2	261	iPnC	1:49:49.20			0.58
			iSn	50:37.20			9.96
WATA	350.4	263	iPnC	1:49:50.00			0.99
			iSn	50:39.20			11.26
FUR	370.6	278	iPnC	1:49:51.70			0.17
SQTA	380.0	261	iPnD	1:49:54.00			1.30
			iSn	50:47.40			12.90
OJC	382.8	44	ePn	1:49:53.20			0.15
			iSn	50:55.00			19.87
MOTA	385.6	264	iPnC	1:49:54.10			0.70
			iSn	50:48.60			12.85
BRG	386.4	335	iPn	1:49:54.10			0.61
			iSn	50:47.10			11.18
GYL	397.6	108	iPnC	1:49:55.50			0.61
			eSn	50:54.70			16.29
GRF	426.2	301	ePn	1:49:59.30			0.83
			eSn	50:58.80			14.03
GRA1	426.2	301	ePn	1:49:59.30			0.83
			eSn	50:58.80			14.03
HDH	455.5	282	ePn	1:50:02.10			-0.02
			Sn	50:47.50			-3.77
UBR	456.8	269	ePn	1:50:02.50			0.22
CLL	460.7	330	ePn	1:50:04.00			1.24
MOX	465.6	314	ePn	1:50:05.40			2.02
OSS	472.7	256	iPnD	1:50:05.50			1.24
DAVA	478.1	264	iPnC	1:50:05.10			0.16
			iSn	51:15.30			19.01
BEU	513.3	281	ePnC	1:50:09.00			-0.32
			Sn	50:58.10			-5.99
VDL	528.7	255	ePnD	1:50:12.90			1.66
GUT	530.7	274	ePnC	1:50:10.90			-0.59
			Sn	51:01.60			-6.35
LLS	552.6	260	ePnD	1:50:14.40			0.18
SPAK	555.3	274	ePnC	1:50:14.10			-0.46
LBG	559.9	281	ePnC	1:50:14.60			-0.53
			Sn	51:08.20			-6.24
ZLA	587.5	267	ePn	1:50:17.90			-0.68
MLR	787.4	108	Pn	1:50:47.36			3.86

Hypocenter Parameters



59.

```

2001-07-02  time: 11:28:05.18 UTC ML= 1.1
    lat: 45.539N lon: 17.725E h= 14.6 km
    erh= 1.4km   erz= 0.4km
nr= 6          gap=337  rms=0.05
Locality: Croatia
Comments:

```

sta	dist	azm	phase	hr	mn	sec	res
RHK3	56.8	46	ePg	11:28:15.60			-0.06
			eSg	28:23.90			0.07
RHK1	67.8	24	iPgC	11:28:17.60			0.02
			eSg	28:26.90			-0.34
PKSM	103.2	44	iPnD	11:28:23.20			-0.01
			eSn	28:37.30			0.03

60.

2001-07-10 time: 9:58:14.50 UTC ML= 1.7
lat: 47.455N lon: 18.500E h= 10.0 km
 erh=17.7km erz= 5.1km
nr= 6 gap=326 rms=0.44
Locality: Vêrtes mt.
Comments: explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSC	9.5	210	ePgC	9:58:16.80			-0.16
			eSg		58:18.30		-0.58
PKS9	97.9	190	ePgC	9:58:32.70			0.62
			eSg		58:45.80		0.01
PKSM	138.6	176	ePnC	9:58:37.70			0.16
			eSn		58:54.70		-0.80

61.

```

2001-07-15   time: 23:39:38.10 UTC   ML= 1.1
   lat: 45.737N lon: 18.375E   h= 0.3 km
                   erh= 1.5km   erz=68.3km
nr= 6          gap=310       rms=0.43
Locality: Croatia
Comments:

```

sta	dist	azm	phase	hr	mn	sec	res
RHK3	19.6	331	iPgD	23:39:41.20			-0.40
			eSg		39:43.70		-0.63
PKSM	56.7	21	iPgD	23:39:48.30			0.07

		iSg	39:55.80	-0.32
PKS9	94.8	iPgC	23:39:55.60	0.57
	356	eSg	40:09.00	0.77

62.

2001-07-17 time: 10:08:15.57 UTC ML= 1.4
lat: 47.443N lon: 18.509E h= 4.1 km
erh= 4.2km erz= 3.6km
nr= 7 gap=311 rms=0.28
Locality: Vértes mt.
Comments: explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSC	8.8	218	iPgC	10:08:17.20			-0.11
			iSg	08:18.60			-0.06
PKS8	64.0	169	iPgC	10:08:27.10			0.07
			eSg	08:35.30			-0.67
PKS9	96.8	190	ePgC	10:08:33.50			0.63
			eSg	08:46.30			-0.06
PKSM	137.3	176	ePnC	10:08:39.10			-0.09
			eSn	08:54.90			-2.72

63.

2001-07-19 time: 1:33:40.42 UTC ML= 0.8
lat: 46.535N lon: 18.331E h= 10.0 km
 erh= 2.5km erz= 3.3km
nr= 7 gap=179 rms=0.29
Locality: Gyulaj
Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKS9	7.0	325	iPgC	1:33:42.60		0.00	
			iSg	33:44.20	-0.10		
PKSM	43.2	146	iPgC	1:33:48.50		0.17	
			iSg	33:54.10	-0.40		
PKS8	46.4	35	iPgC	1:33:48.90		0.00	
			eSg	33:54.50	-1.01		
PKS6	94.8	86	eSg	1:34:11.40		0.67	

64.

```

2001-07-25  time:  8:53:25.90  UTC  ML= 1.2
   lat: 45.512N  lon: 17.878E   h= 10.0 km
           erh= 0.6km   erz= 2.1km
nr=   6      gap=336      rms=0.51
Locality: Croatia
Comments:

```

sta	dist	azm	phase	hr	mn	sec	res
RHK3	51.4	35	ePg	8:53:35.80			0.56
			eSg	53:43.70			1.17
RHK1	67.0	13	ePgC	8:53:37.70			-0.29
			eSg	53:47.00			-0.42
PKSM	97.8	37	ePgC	8:53:43.20			-0.25
			eSg	53:56.70			-0.45

65.

2001-07-26 time: 9:48:39.04 UTC ML= 1.3
lat: 47.463N lon: 18.506E h= 10.0 km
erh= 8.8km erz= 3.1km
nr= 5 gap=319 rms=0.17
Locality: Vértes mt.
Comments: explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSC	10.5	209	iPgC	9:48:41.60			-0.03
			eSg		48:43.60		-0.05
PKS8	66.3	169	eSg	9:49:00.40			0.06
PKSM	139.5	176	ePnC	9:49:02.30			0.11

Hypocenter Parameters

66. eSn 49:18.40 -1.84

2001-07-26 time: 12:31:55.55 UTC ML= 1.7
lat: 45.570N lon: 17.396E h= 11.6 km
erh= 6.2km erz= 2.0km
nr= 6 gap=340 rms=0.25
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn sec	res
RHK3	75.8	62	iPgC	12:32:09.40	0.16
			eSg	32:19.90	-0.02
RHK1	79.0	42	ePgD	12:32:09.30	-0.51
			eSg	32:21.10	0.17
PKSM	120.2	54	iPnC	12:32:16.20	0.11
			eSn	32:31.70	-0.41

67.

2001-07-26 time: 13:22:23.21 UTC ML= 1.3
lat: 45.757N lon: 17.257E h= 10.7 km
erh= 1.1km erz= 0.4km
nr= 6 gap=340 rms=0.04
Locality: Croatia
Comments:

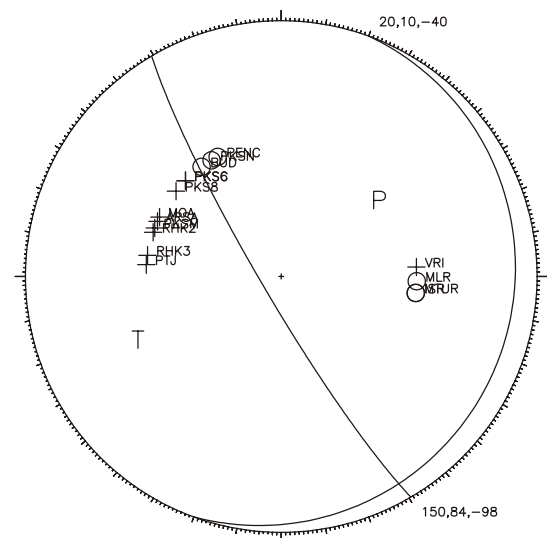
sta	dist	azm	phase	hr mn sec	res
RHK1	74.0	59	ePg	13:22:36.60	0.04
			eSg	22:46.90	-0.07
RHK3	78.9	79	iPgC	13:22:37.40	-0.03
			eSg	22:48.60	0.07
PKSM	118.6	65	ePn	13:22:43.70	0.03
			eSn	22:59.60	-0.02

68.

2001-08-02 time: 21:50:47.55 UTC ML= 3.0
lat: 45.592N lon: 20.989E h= 10.0 km
erh= 7.8km erz= 6.1km
nr= 25 gap=178 rms=1.64
Locality: Romania
Comments:

sta	dist	azm	phase	hr mn sec	res
TIM	24.3	48	iPg	21:50:51.02	-1.22
			iSg	50:54.07	-1.82
BZS	49.1	87	iPg	21:50:52.05	-4.44
			iSg	50:57.00	-6.47
PKS6	157.1	315	iPnC	21:51:13.40	0.50
			iSn	51:33.30	0.64
PKSN	168.9	329	iPnD	21:51:14.90	0.53
			iSn	51:36.30	1.02
RHK2	181.1	289	iPnC	21:51:15.60	-0.28
			eSn	51:38.20	0.21
PKSM	194.8	291	iPnC	21:51:17.20	-0.39
			eSn	51:39.80	-1.22
RHK3	215.4	279	iPnC	21:51:19.60	-0.57
			eSn	51:44.50	-1.11
PKS8	228.6	309	iPnC	21:51:21.70	-0.11
			eSn	51:45.80	-2.74
PKS9	237.0	298	eSn	21:51:47.60	-2.79
BUD	258.7	324	iPnD	21:51:25.80	0.23
PENC	277.1	332	iPnD	21:51:28.20	0.34
PKSC	279.1	315	iPnC	21:51:28.20	0.09
			eSn	51:59.80	0.05
MTUR	321.5	97	iPnD	21:51:38.22	4.82
			iSn	52:20.25	11.09
SNX	354.8	94	iPn	21:51:39.40	1.86
MLR	387.3	92	iPnD	21:51:41.51	-0.09
			iSn	52:37.91	14.15
PTJ	393.0	275	iPnC	21:51:41.40	-0.91

ZST	414.2	314	iPn	21:51:45.10	0.15
DOBS	433.0	278	ePn	21:51:46.30	-1.00
			eSn	52:32.20	-1.70
ISR	438.2	97	iPnD	21:51:47.28	-0.67
VRI	447.6	86	iPnC	21:51:58.51	9.39
ARSA	458.8	294	iPnC	21:51:50.50	-0.02
			iSn	52:38.90	-0.73
BISS	468.0	285	ePn	21:51:51.20	-0.47
			eSn	52:39.60	-2.08
CEY	511.7	272	ePn	21:51:46.80	-10.30
OJC	522.2	350	ePn	21:51:59.70	1.28
			eSn	53:31.90	38.21
MOA	572.0	296	iPnC	21:52:05.40	0.77
			iSn	53:02.00	-2.74
KHC	684.3	305	ePn	21:52:18.70	0.07
			eSn	53:27.10	-2.57
PRU	687.3	315	ePn	21:52:18.00	-1.00
			eSn	53:27.30	-3.03



69.

2001-08-03 time: 8:30:04.61 UTC ML= 1.8
lat: 45.506N lon: 17.803E h= 2.6 km
erh= 4.9km erz= 3.6km
nr= 7 gap=337 rms=0.28
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn sec	res
RHK3	55.4	39	iPgC	8:30:14.80	0.28
			eSg	30:23.20	0.95
RHK1	69.2	18	iPgD	8:30:16.80	-0.17
			iSg	30:26.60	-0.02
PKSM	102.0	40	iPgC	8:30:22.40	-0.43
			eSg	30:37.20	0.16
PKS9	125.7	17	iPnC	8:30:27.20	0.22

70.

2001-08-06 time: 12:04:55.79 UTC ML= 1.5
lat: 45.574N lon: 17.964E h= 10.0 km
erh= 5.6km erz=31.5km
nr= 5 gap=322 rms=0.16
Locality: Croatia
Comments:

Hypocenter Parameters

sta	dist	azm	phase	hr	mn	sec	res
RHK1	58.9	8	ePgC	12:05:06.50			0.04
			eSg	05:14.80			0.02
PKSM	88.2	37	iPgD	12:05:11.50			-0.15
			eSg	05:24.00			-0.02
RHK2	89.0	46	ePg	12:05:12.10			0.31

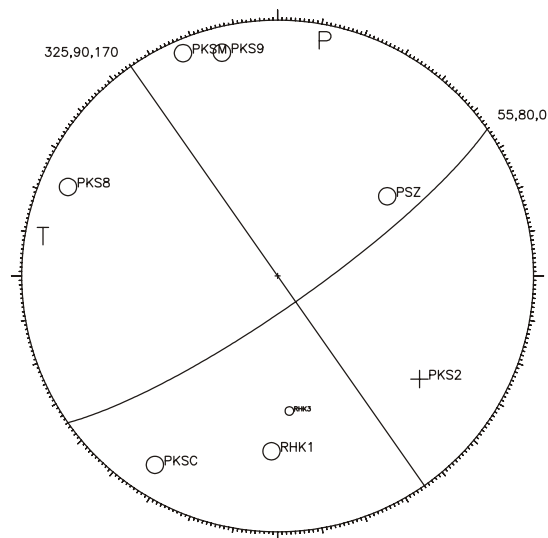
71.

2001-08-06 time: 18:48:23.03 UTC ML=2.3
lat: 45.513N lon: 17.199E h= 10.0 km
erh=33.0km erz= km
Locality: Northwestern Balkan Peninsula
Comments:
Reported by NEIC

72.

2001-08-08 time: 18:46:30.57 UTC ML= 1.7
lat: 47.041N lon: 18.119E h= 10.0 km
erh= 3.4km erz= 2.7km
nr= 16 gap=211 rms=0.77
Locality: Balatonkenese
Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKSC	44.8	33	iPgD	18:46:38.20			-0.56
			iSg	46:44.40		-0.75	
PKS8	46.1	113	iPgD	18:46:39.60			0.61
			iSg	46:45.50		-0.06	
PKS9	51.9	166	iPgD	18:46:41.00			0.99
			eSg	46:48.30		0.92	
PKSM	100.5	157	iPgD	18:46:48.40			-0.20
			eSg	47:01.20		-1.47	
PKS2	103.5	126	iP*C	18:46:49.80			0.68
			eS*	47:03.60		0.01	
RHK1	104.9	182	iP*D	18:46:49.30			-0.03
			iS*	47:02.50		-1.47	
RHK3	128.2	175	ePnD	18:46:53.70			1.39
			eSn	47:07.10		-2.17	
PSZ	165.6	54	iPnD	18:46:57.10			0.13
			eSn	47:16.30		-1.26	
OKC	311.0	0	ePn	18:47:14.80			-0.30
			eSn	47:19.30		-30.53	



73.

2001-08-09 time= 1:10:41.81 UTC ML= 1.1
lat= 45.831N lon= 17.889E h= 10.0 km
erh= 3.9km erz= 4.2km
nr= 10 gap=303 rms=0.44
Locality: Kemse
Comments:

sta	dist	azm	phase	hr	mn	sec	res
RHK3	29.1	77	iPgD	1:10:47.30			-0.01
			iSg		10:52.10		0.50
RHK1	33.0	26	iPgD	1:10:48.00			0.03
			iSg		10:53.10		0.33
PKSM	72.0	54	iPgD	1:10:54.40			-0.39
			iSg		11:04.20		-0.71
PKS9	89.2	20	iPgC	1:10:57.60			-0.24
			eSg		11:10.80		0.45
PKS8	131.3	28	ePn	1:11:04.90			0.97
			eSn		11:18.80		-2.39

74.

```

2001-08-09  time:  9:53:55.18  UTC  ML= 1.5
      lat: 47.444N lon: 18.352E  h= 10.0 km
              erh=11.7km      erz= 4.6km
nr= 8          gap=314          rms=0.90
Locality: Oroszlány
Comments: explosion

```

sta	dist	azm	phase	hr	mn	sec	res
PKSC	9.5	137	iPgC	9:53:57.00			-0.65
			eSg		53:58.60		-0.97
PKS8	67.5	159	ePgC	9:54:08.30			0.94
			eSg		54:16.90		0.04
PKS9	95.4	183	iPgC	9:54:13.60			1.29
			eSg		54:25.10		-0.57
PKSM	138.7	171	ePnC	9:54:18.10			-0.13
			eSn		54:33.90		-2.31

75.

2001-08-13 time: 23:42:48.41 UTC ML= 0.9
lat: 45.554N lon: 18.449E h= 10.0 km
erh= 2.7km erz= 9.7km
nr= 6 gap=323 rms=0.12
Locality: Croatia
Comments:

sta	dist	azm	phase	hr	mn	sec	res
RHK3	40.5	338	iPgC	23:42:55.80			-0.05
			eSg		43:01.70		0.05
RHK1	67.1	334	ePgD	23:43:00.80			0.28
			eSg		43:09.80		-0.17
PKSM	74.6	12	iPgC	23:43:01.80			-0.04
			eSg		43:12.40		0.07

76.

2001-08-14 time: 10:32:27.49 UTC ML= 1.0
lat: 46.190N lon: 18.285E h= 15.1 km
erh= 2.3km erz= 3.5km
nr= 6 gap=207 rms=0.17
Locality: Zobákpusztá
Comments: explosion

sta	dist	azm	phase	hr	mn	sec	res
RHK1	19.1	238	iPgC	10:32:31.80			-0.04
			eSg	32:35.30			0.06
PKSM	27.6	85	ePgC	10:32:33.00			-0.11
			eSg	32:37.70			0.20
RHK3	33.3	184	ePgC	10:32:34.20			0.18

Hypocenter Parameters

eSg	32:38.40	-0.71
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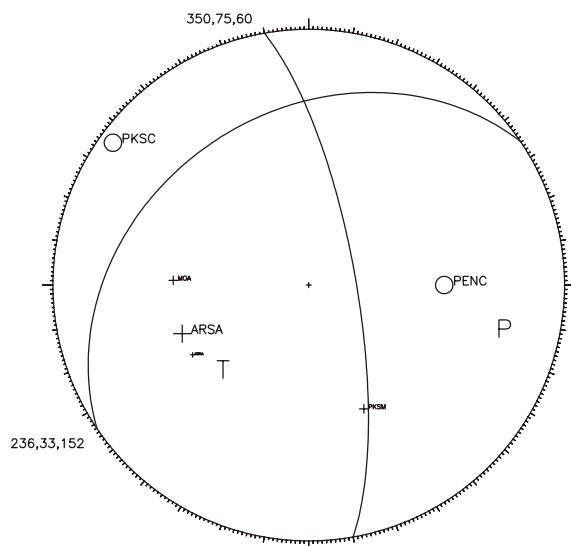
77.

```

2001-08-14 time: 19:18:03.70 UTC ML= 2.0
lat: 47.787N lon: 17.618E h= 7.6 km
erh= 3.1km erz= 2.7km
nr= 20 gap= 80 rms=0.97
Locality: Vámoszszabadi
Comments: felt 3 EMS

```

sta	dist	azm	phase	hr	mn	sec	res
ZST	59.6	320	iPg	19:18:14.80			0.37
			iSg		18:22.40		-0.40
MOD	69.9	339	ePg	19:18:16.60			0.34
			eSg		18:25.80		-0.26
PKSC	76.4	126	iPgD	19:18:17.10			-0.31
			eSg		18:26.60		-1.50
BUD	110.9	108	eSg	19:18:40.00			0.97
VYH	119.9	49	iPn	19:18:24.50			-0.21
			eSn		18:38.70		-2.39
PENC	124.6	90	iPnD	19:18:25.90			0.60
			eSn		18:41.10		-1.05
PKS9	142.5	159	eSn	19:18:45.70			-0.42
ARSA	168.7	249	iPnC	19:18:30.90			0.10
			iSn		18:50.80		-1.14
RHK1	190.9	170	ePn	19:18:36.10			2.53
PKSM	191.6	156	ePnC	19:18:32.40			-1.26
			eSn		18:53.00		-4.02
PKS6	197.9	132	eSn	19:19:01.10			2.68
MOA	251.2	272	iPnC	19:18:44.40			3.32
			iSn		19:13.10		2.86
OBKA	272.8	239	iPnC	19:18:50.10			6.33
			iSn		19:22.30		7.27
KHC	334.1	297	ePn	19:18:51.10			-0.32



78.

```

2001-08-22   time:   9:16:36.81 UTC    ML= 1.0
      lat: 46.169N lon: 18.292E h= 13.2 km
              erh= 0.4km   erz= 0.9km
nr=   5      gap=195      rms=0.03
Locality: Zobákpusztá
Comments: explosion

```

sta	dist	azm	phase	hr	mn	sec	res
RHK1	18.5	245	iPgC	9:16:40.90			0.04
			iSq	16:44.00			-0.02

PKSM	27.4	80	ePgC	9:16:42.20	-0.04
			eSg	16:46.50	0.03
RHK3	31.0	185	eSq	9:16:47.50	-0.02

79.

2001-08-23 time: 11:23:08.20 UTC ML= 2.0
lat: 47.365N lon: 19.691E h= 14.5 km
erh= 2.1km erz= 2.0km
nr= 12 gap=152 rms=0.49
Locality: Tápióbitske
Comments:

sta	dist	azm	phase	hr	mn	sec	res
BUD	52.0	285	ePg	11:23:17.80			-0.04
			eSg		23:25.30		-0.07
PKSN	53.7	166	ePgC	11:23:18.30			0.18
			eSg		23:26.10		0.23
PSZ	63.5	14	ePgD	11:23:20.10			0.28
			eSg		23:27.90		-0.99
PKSC	94.7	271	eP*C	11:23:25.60			0.60
			eS*		23:38.10		0.00
PKS9	137.9	231	iPnC	11:23:30.70			0.12
			eSn		23:45.90		-2.13
PKSM	151.1	212	ePnD	11:23:31.80			-0.43
			eSn		23:49.20		-1.77

80.

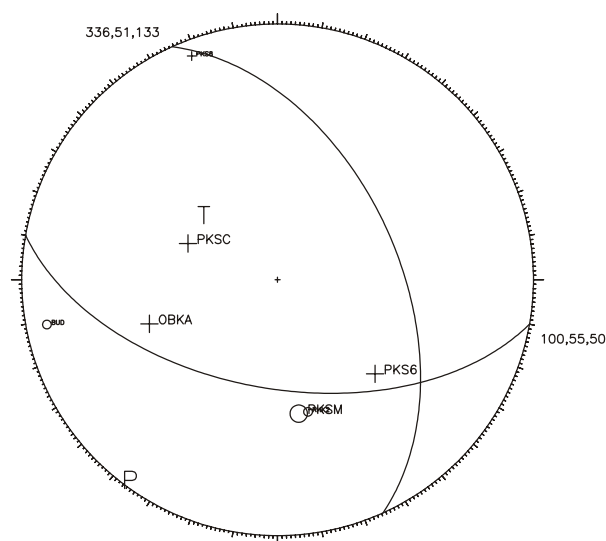
```

2001-08-26  time:  0:50:03.07 UTC    ML= 1.9
      lat: 47.397N lon: 18.379E  h= 7.8 km
      erh= 5.8km   erz= 2.0km
nr= 16      gap=254      rms=0.94
Locality: Gánt
Comments:

```

sta	dist	azm	phase	hr	mn	sec	res
PKSC	4.7	112	iPgC	0:50:04.20			-0.49
			eSg	50:06.90			0.94
BUD	49.6	79	ePgD	0:50:11.00			-1.03
			eSg	50:17.90			-1.12
PKS8	61.8	159	ePgC	0:50:14.90			0.70
			eSg	50:23.70			0.82
PKS9	90.3	185	ePg	0:50:19.60			0.34
			eSg	50:31.90			0.02
PKSN	125.8	116	eSn	0:50:43.40			1.65
PKS6	126.4	134	iPnC	0:50:26.10			1.23
			eSn	50:42.60			0.72
PKSM	133.2	171	iPnD	0:50:25.10			-0.62
			eSn	50:41.80			-1.59
RHK2	144.1	167	ePnD	0:50:27.10			0.02
			eSn	50:44.60			-1.21
RHK3	167.6	183	eSn	0:50:49.40			-1.62
QBKA	307.8	251	iPnC	0:50:45.90			-1.59

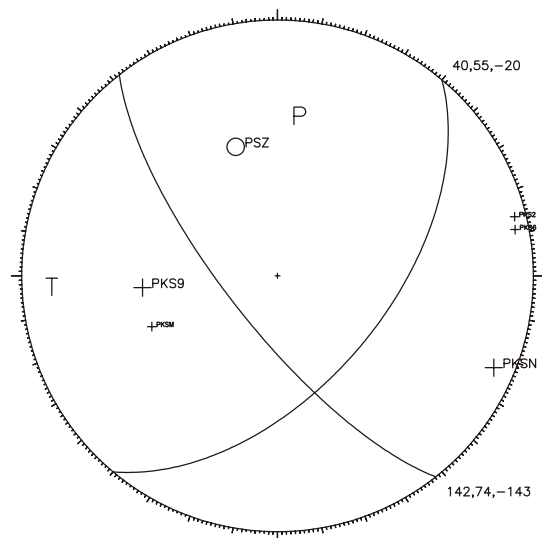
Hypocenter Parameters



81.

2001-08-26 time: 10:44:16.86 UTC ML= 1.9
lat: 46.718N lon: 20.484E h= 8.1 km
erh= 4.3km erz= 2.2km
nr= 15 gap=267 rms=0.64
Locality: Eperjes
Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKSN	51.1	293	iPgC	10:44:26.10		0.00	
			eSg	44:34.00		0.69	
PKS6	71.6	259	ePgC	10:44:29.70		-0.03	
			eSg	44:40.10		0.33	
PKS2	100.6	256	ePgC	10:44:34.20		-0.68	
			eSg	44:48.00		-0.93	
PKS8	139.2	277	ePn	10:44:40.00		-0.21	
			eSn	44:57.70		-0.73	
PSZ	140.7	342	iPnD	10:44:40.30		-0.11	
			eSn	44:56.60		-2.17	
PKSM	152.3	248	ePnC	10:44:41.70		-0.15	
			eSn	45:00.50		-0.85	
PKS9	169.5	265	iPnC	10:44:45.20		1.21	
			eSn	45:07.70		2.55	
PKSC	172.1	295	eSn	10:45:06.40		0.66	



82.

2001-08-28 time: 10:04:28.52 UTC ML= 1.1
lat: 47.423N lon: 18.363E h= 10.0 km
erh=34.4km erz= 9.7km
nr= 6 gap=319 rms=0.59
Locality: Vértés mt.
Comments: explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSC	7.3	130	ePgC	10:04:30.60		-0.14	
			eSg	04:31.60		-0.86	
PKS8	65.1	159	ePg	10:04:40.40		0.13	
			eSg	04:50.10		0.66	
PKSM	136.3	171	ePnC	10:04:51.90		0.62	
			eSn	05:07.70		-1.33	

83.

2001-08-29 time: 5:25:01.24 UTC ML= 2.1
lat: 45.565N lon: 16.430E h= 5.3 km
erh= 4.2km erz= 2.9km
nr= 26 gap=190 rms=1.19
Locality: Croatia
Comments:

sta	dist	azm	phase	hr	mn	sec	res
PTJ	52.3	315	iPgD	5:25:11.00		0.38	
			eSg	25:17.50		-0.44	
CESS	87.8	301	iPg	5:25:17.71		0.76	
			iSg	25:28.51		-0.70	
VBY	91.9	266	iPg	5:25:16.43		-1.25	
			iSg	25:29.89		-0.61	
DOBS	98.9	311	iPgD	5:25:18.95		0.02	
			iSg	25:32.81		0.08	
RHK1	140.9	65	iPnD	5:25:25.00		-0.15	
			iSn	25:41.80		-2.01	
RHK3	146.5	76	iPnD	5:25:25.70		-0.15	
			eSn	25:42.80		-2.25	
LJU	156.7	290	iPn	5:25:30.79		3.66	
			iSn	25:47.37		0.04	
BISS	156.9	320	iPn	5:25:27.45		0.30	
			iSn	25:45.77		-1.60	
CEY	157.4	277	iPn	5:25:26.79		-0.42	
			iSn	25:46.90		-0.56	
OBKA	179.5	306	iPnC	5:25:32.30		2.33	
			iSn	25:56.40		4.02	
PKSM	186.1	67	iPnC	5:25:30.40		-0.38	
			eSn	25:51.50		-2.33	
ARSA	199.9	340	iPnC	5:25:33.30		0.79	
			iSn	25:58.40		1.50	
VOY	203.9	285	ePn	5:25:35.50		2.49	
			eSn	25:58.90		1.10	
MOA	303.1	327	iPnD	5:25:47.00		1.62	
			iSn	26:21.20		1.39	
KHC	451.2	331	ePn	5:26:05.00		1.15	
			eSn	26:50.50		-2.18	

84.

2001-08-30 time: 9:57:33.04 UTC ML= 1.5
lat: 45.538N lon: 17.755E h= 14.7 km
erh= 4.6km erz= 1.6km
nr= 6 gap=337 rms=0.19
Locality: Croatia
Comments:

sta	dist	azm	phase	hr	mn	sec	res
RHK3	55.3	45	ePg	9:57:43.00		-0.26	
			eSg	57:51.70		0.48	
RHK1	67.1	22	iPgC	9:57:45.40		0.09	
			eSg	57:54.60		-0.27	
PKSM	101.7	43	ePn	9:57:50.90		0.03	

Hypocenter Parameters

85. eSn 58:04.80 0.02

2001-09-04 time: 10:44:06.97 UTC ML= 0.8
lat: 47.724N lon: 18.527E h= 10.0 km
erh=30.4km erz=45.4km
nr= 6 gap=231 rms=0.39
Locality: Lábatlan
Comments: explosion

sta	dist	azm	phase	hr mn sec	res
SRO	18.8	302	iPg	10:44:10.60	-0.17
			eSg	44:14.30	0.56
PKSC	38.8	190	ePgC	10:44:13.80	-0.33
			eSg	44:19.20	-0.51
PKS8	94.7	173	ePgC	10:44:24.60	0.62
			eSg	44:37.40	0.16

86.

2001-09-05 time: 9:58:13.35 UTC ML= 1.4
lat: 47.492N lon: 18.489E h= 10.0 km
erh=22.2km erz= 6.4km
nr= 7 gap=331 rms=0.88
Locality: Vértes mt.
Comments: explosion

sta	dist	azm	phase	hr mn sec	res
PKSC	13.0	197	iPgC	9:58:15.90	-0.39
			eSg	58:17.70	-0.87
PKS8	69.7	168	ePgC	9:58:28.30	2.37
			eSg	58:35.10	-0.63
PKS9	101.9	189	iPgC	9:58:32.40	0.76
PKSM	142.8	175	ePnC	9:58:37.10	0.18
			eSn	58:53.00	-2.30

87.

2001-09-12 time: 10:19:38.82 UTC ML= 1.3
lat: 47.451N lon: 18.501E h= 10.0 km
erh=10.8km erz= 4.0km
nr= 8 gap=316 rms=0.68
Locality: Vértes mt.
Comments: explosion

sta	dist	azm	phase	hr mn sec	res
PKSC	9.2	212	iPgC	10:19:41.00	-0.24
			eSg	19:42.20	-0.94
PKS8	65.0	168	ePg	10:19:50.80	0.24
			eSg	19:59.00	-0.72
PKS9	97.5	190	iPgC	10:19:57.60	1.28
			eSg	20:10.80	0.82
PKSM	138.2	176	ePnC	10:20:01.70	-0.10
			eSn	20:18.00	-1.73

88.

2001-09-16 time: 12:54:35.64 UTC ML= 1.3
lat: 45.624N lon: 18.361E h= 6.2 km
erh= 3.9km erz=14.8km
nr= 8 gap=319 rms=0.29
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn sec	res
RHK3	30.9	344	ePgD	12:54:41.30	0.04
			eSg	54:45.90	0.25
RHK1	57.2	337	iPgD	12:54:45.70	-0.21
			eSg	54:53.60	-0.32
PKSM	68.8	18	iPgD	12:54:47.90	-0.08
			eSg	54:57.30	-0.31
PKS9	107.2	357	ePg	12:54:55.40	0.59

89. eSg 55:10.40 0.63

2001-09-19 time: 7:30:57.42 UTC ML= 2.6
lat: 45.772N lon: 21.049E h= 10.0 km
erh= 255km erz= 244km
nr= 6 gap=335 rms=0.43
Locality: Romania
Comments:

sta	dist	azm	phase	hr mn sec	res
PKSM	192.9	285	ePnD	7:31:26.50	-0.72
			eSn	31:50.80	0.34
PKS8	220.3	304	iPnC	7:31:30.90	0.26
			eSn	31:55.80	-0.75
RHK1	233.5	279	ePn	7:31:32.50	0.22
			eSn	31:59.70	0.22

90.

2001-09-27 time: 10:34:51.01 UTC ML= 1.4
lat: 45.543N lon: 17.723E h= 14.5 km
erh= 2.0km erz= 0.7km
nr= 6 gap=337 rms=0.08
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn sec	res
RHK3	56.7	47	iPgD	10:35:01.40	-0.05
			eSg	35:09.80	0.20
RHK1	67.6	24	iPgD	10:35:03.40	0.05
			eSg	35:12.80	-0.17
PKSM	103.0	44	iPnD	10:35:09.00	-0.04
			eSn	35:23.20	0.10

91.

2001-09-27 time: 10:56:30.93 UTC ML= 1.4
lat: 46.039N lon: 18.347E h= 2.6 km
erh= 1.2km erz= 8.5km
nr= 6 gap=238 rms=0.10
Locality: Magyarsarlós
Comments:

sta	dist	azm	phase	hr mn sec	res
RHK1	22.0	288	iPgC	10:56:34.90	0.02
			eSg	56:37.90	-0.07
PKSM	29.8	50	ePgC	10:56:36.20	-0.08
			eSg	56:40.50	0.05
PKS9	61.2	355	ePg	10:56:42.00	0.14
			eSg	56:50.10	-0.29

92.

2001-09-28 time: 10:43:00.74 UTC ML= 1.6
lat: 47.472N lon: 18.437E h= 10.0 km
erh=13.8km erz= 4.2km
nr= 8 gap=323 rms=0.69
Locality: Vértes mt.
Comments: explosion

sta	dist	azm	phase	hr mn sec	res
PKSC	9.6	201	iPgC	10:43:02.80	-0.42
			eSg	43:04.50	-0.65
PKS8	68.5	165	ePgC	10:43:13.10	0.00
			eSg	43:19.50	-3.23
PKS9	99.2	187	iPgC	10:43:19.40	0.86
			eSg	43:33.00	0.58
PKSM	141.0	174	ePn	10:43:23.90	-0.18
			eSn	43:41.20	-1.08

Hypocenter Parameters

93.

2001-09-28 time: 19:25:13.84 UTC ML= 1.8
lat: 45.564N lon: 16.437E h= 0.1 km
erh= 4.5km erz= 5.5km
nr= 14 gap=141 rms=1.20
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn sec	res
SISC	11.6	206	iPgD	19:25:15.84	-0.07
			iSg	25:17.34	-0.18
PTJ	52.7	315	iPg	19:25:23.60	0.34
			eSg	25:28.50	-2.10
CESS	88.3	301	eSg	19:25:41.10	-0.82
VBY	92.4	266	ePg	19:25:29.80	-0.55
VBY	92.4	266	eSg	19:25:41.60	-1.63
DOBS	99.4	311	ePg	19:25:32.00	0.41
			eSg	25:45.70	0.27
RHK1	140.4	65	iPnC	19:25:38.00	-0.38
			eSn	25:54.70	-2.81
BISS	157.3	320	ePn	19:25:40.30	-0.18
OBKA	180.0	306	iPnC	19:25:46.90	3.59
			iSn	26:07.00	0.71

94.

2001-09-30 time: 15:55:48.72 UTC ML= 1.8
lat: 45.538N lon: 18.048E h= 1.2 km
erh= 3.4km erz=64.5km
nr= 6 gap=340 rms=0.25
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn sec	res
RHK3	42.4	22	ePgD	15:55:56.00	-0.29
			eSg	56:02.10	-0.10
RHK1	62.3	2	iPgD	15:55:59.80	-0.04
			eSg	56:08.30	-0.22
PKS9	117.9	9	ePg	15:56:10.20	0.42
			eSg	56:26.60	0.40

95.

2001-10-17 time: 11:02:47.57 UTC ML= 1.5
lat: 45.557N lon: 17.725E h= 15.4 km
erh= 1.0km erz= 0.4km
nr= 6 gap=336 rms=0.05
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn sec	res
RHK3	55.4	48	ePg	11:02:57.80	-0.04
			eSg	03:05.90	0.05
RHK1	66.0	24	iPgD	11:02:59.70	0.04
			eSg	03:09.00	-0.10
PKSM	101.7	44	ePnD	11:03:05.30	-0.02
			eSn	03:19.20	0.03

96.

2001-10-20 time: 11:11:46.06 UTC ML= 2.5
lat: 45.834N lon: 17.403E h= 10.0 km
erh=11.0km erz= 7.8km
nr= 11 gap=183 rms=0.86
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn sec	res
RHK1	59.8	61	iPgD	11:11:57.10	0.22
			eSg	12:05.10	-0.23
RHK3	66.4	85	ePgD	11:11:57.70	-0.34

			eSg	12:06.00	-1.39
PKSM	104.7	66	eP*	11:12:03.50	-1.29
			eS*	12:16.90	-2.50
PKS9	107.5	39	ePn	11:12:06.30	1.08
			eSn	12:20.50	0.33
PTJ	112.4	274	ePn	11:12:02.60	-3.23
			eSn	12:16.40	-4.86
CESS	151.3	276	ePn	11:12:11.00	0.32
			eSn	12:29.00	-0.89
PKS8	151.9	40	eSn	11:12:31.90	1.88
DOBS	153.9	283	ePn	11:12:12.00	1.00
			eSn	12:29.40	-1.05
PKSG	188.9	24	ePn	11:12:16.20	0.83
			eSn	12:38.20	-0.03
ARSA	213.5	318	iPnD	11:12:17.60	-0.83
			iSn	12:41.50	-2.18
CEY	231.7	267	ePn	11:12:24.30	3.60
MOA	327.8	313	iPnD	11:12:32.60	-0.08
			iSn	13:06.90	-2.15

97.

2001-10-20 time: 11:31:51.13 UTC ML= 0.9
lat: 46.171N lon: 18.295E h= 10.0 km
erh= 0.9km erz= 2.5km
nr= 6 gap=196 rms=0.10
Locality: Zobákpuszt
Comments: explosion

sta	dist	azm	phase	hr mn sec	res
RHK1	18.8	245	ePgC	11:31:54.90	-0.03
			eSg	31:58.00	0.11
PKSM	27.1	80	ePg	11:31:56.20	-0.10
			eSg	32:00.40	0.07
RHK3	31.2	186	ePg	11:31:57.10	0.11
			eSg	32:01.40	-0.15

98.

2001-10-25 time: 9:24:14.75 UTC ML= 1.2
lat: 45.535N lon: 17.727E h= 13.9 km
erh= 0.6km erz= 0.2km
nr= 6 gap=337 rms=0.03
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn sec	res
RHK3	57.0	46	ePg	9:24:25.20	-0.03
			eSg	24:33.40	0.00
RHK1	68.2	23	iPgD	9:24:27.20	0.03
			eSg	24:36.80	-0.07
PKSM	103.4	43	iPnD	9:24:32.90	0.00
			eSn	24:47.10	0.03

99.

2001-10-25 time: 14:16:43.56 UTC ML= 1.8
lat: 45.547N lon: 17.922E h= 3.2 km
erh= 7.2km erz=14.5km
nr= 7 gap=279 rms=0.45
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn sec	res
RHK3	46.2	34	ePg	14:16:52.10	0.28
RHK1	62.4	11	iPgD	14:16:54.80	0.08
			eSg	17:02.90	-0.52
PKSM	92.6	37	iPgD	14:16:59.70	-0.41
			eSg	17:13.30	0.29
PKS9	118.8	13	ePg	14:17:05.60	0.81
ARSA	264.4	316	iPnC	14:17:21.70	-1.44
MOA	379.1	312	iPnC	14:17:36.80	-0.65

Hypocenter Parameters

100.

2001-11-05 time: 12:32:30.51 UTC ML= 1.4
lat: 47.732N lon: 18.272E h= 8.8 km
erh= 2.2km erz= 0.4km
nr= 5 gap=352 rms=0.02
Locality: Almásfüzitő
Comments: explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	38.9	167	ePg	12:32:37.60	-0.03
			eSg	32:43.20	0.02
PKS8	99.7	162	iPgC	12:32:48.40	0.01
			eSg	33:02.30	-0.03
PKSM	171.3	171	ePnC	12:32:57.80	0.01

101.

2001-11-07 time: 10:59:03.65 UTC ML= 1.8
lat: 47.464N lon: 18.285E h= 10.0 km
erh=42.2km erz=13.2km
nr= 5 gap=326 rms=1.08
Locality: Oroszlány
Comments: explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	11.3	135	ePgC	10:59:06.10	-0.25
			eSg	59:07.10	-1.35
PKS8	71.5	155	ePg	10:59:18.10	1.56
PKSM	141.8	169	ePn	10:59:27.60	0.51
			eSn	59:42.90	-2.47

102.

2001-11-11 time: 3:35:58.80 UTC ML= 1.4
lat: 46.001N lon: 16.787E h= 10.0 km
erh= 9.1km erz= 3.1km
nr= 5 gap=324 rms=0.23
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn sec	res
RHK1	100.3	84	ePg	3:36:17.10	0.31
			eSg	36:30.50	-0.33
RHK3	114.4	96	ePn	3:36:18.60	-0.21
			eSn	36:34.60	0.17
PKS9	132.1	60	ePn	3:36:21.00	-0.02

103.

2001-11-15 time: 10:35:05.78 UTC ML= 1.2
lat: 45.543N lon: 17.696E h= 13.8 km
erh= 3.3km erz= 1.1km
nr= 6 gap=337 rms=0.13
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn sec	res
RHK3	58.2	48	iPgD	10:35:16.50	0.04
			eSg	35:24.60	-0.18
RHK1	68.4	26	ePgD	10:35:18.40	0.16
			eSg	35:27.70	-0.25
PKSM	104.4	45	iPnC	10:35:24.00	-0.08
			eSn	35:38.60	0.25

104.

2001-11-21 time: 10:42:59.50 UTC ML= 1.2
lat: 47.717N lon: 18.537E h= 8.9 km
erh= 5.6km erz= 3.4km
nr= 5 gap=235 rms=0.11
Locality: Bajót
Comments:

sta	dist	azm	phase	hr mn sec	res
SRO	19.9	303	iPg	10:43:03.30	-0.10
			eSg	43:06.60	0.16
PKSG	37.8	197	ePg	10:43:06.60	0.16
			eSg	43:11.70	-0.15
PKSM	167.5	177	iPnD	10:43:26.30	0.02
			eSn	43:45.80	-1.37

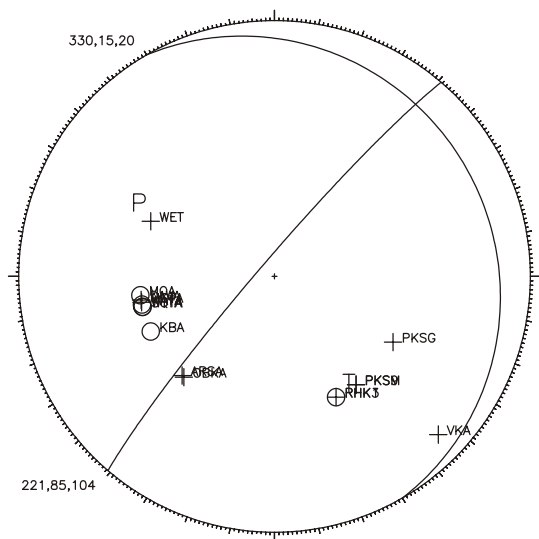
105.

2001-11-21 time: 17:10:20.34 UTC ML= 2.5
lat: 48.060N lon: 16.631E h= 6.8 km
erh= 1.9km erz= 2.3km
nr= 30 gap= 47 rms=0.53
Locality: Austria
Comments: felt 5 EMS (Austria)

sta	dist	azm	phase	hr mn sec	res
VKA	32.6	314	iPgC	17:10:26.10	-0.19
			eSg	10:31.00	0.07
ZST	38.2	67	iPg	17:10:27.60	0.32
			iSg	10:32.70	0.01
MOD	59.3	54	iPg	17:10:30.80	-0.21
			iSg	10:38.60	-0.73
ARSA	122.6	223	iPnC	17:10:40.20	-1.59
			iSn	10:55.50	-3.01
SRO	128.6	102	ePn	17:10:42.50	-0.04
			iSn	10:58.30	-1.56
PKSG	151.5	119	iPnC	17:10:45.20	-0.19
			eSn	11:02.00	-2.92
MOA	178.2	262	iPnD	17:10:49.00	0.28
			iSn	11:09.90	-0.96
BISS	193.8	216	ePn	17:10:50.80	0.13
PKS9	205.7	143	iPnC	17:10:52.40	0.25
OKC	226.8	29	ePn	17:10:54.80	0.02
			eSn	11:23.20	1.57
DOBS	230.0	203	iPn	17:10:55.35	0.17
OBKA	233.5	222	iPnC	17:10:56.10	0.48
			iSn	11:29.10	5.96
GEC2	233.7	292	ePn	17:10:56.00	0.36
RHK1	244.1	153	iPnD	17:10:56.80	-0.14
			eSn	11:22.50	-2.98
CESS	248.4	201	iPn	17:10:57.98	0.51
KHC	254.8	298	ePn	17:10:58.30	0.03
			eSn	11:28.70	0.85
DPC	255.7	355	ePn	17:10:58.10	-0.29
			eSn	11:32.20	4.14
PKSM	255.9	143	iPnC	17:10:58.00	-0.40
			eSn	11:24.40	-3.69
PKS2	261.8	132	ePn	17:11:00.00	0.85
PRU	263.4	325	Pn	17:10:59.10	-0.24
			eSn	11:31.90	2.14
KBA	270.3	246	iPnD	17:11:01.10	0.89
			iSn	11:34.30	3.00
RHK3	270.8	153	iPnC	17:11:00.10	-0.17
			eSn	11:28.10	-3.32
LJU	275.1	215	ePn	17:11:07.20	6.40
			eSn	11:42.30	9.94
WET	301.9	294	iPnC	17:11:04.40	0.26
VBY	302.8	200	ePn	17:11:04.60	0.34
VOY	306.8	223	ePn	17:11:05.30	0.54
			eSn	11:39.30	-0.10
CEY	307.9	213	ePn	17:11:05.26	0.37

Hypocenter Parameters

KSP	310.5	355	ePn	17:11:04.90	-0.32
BRG	368.6	328	ePn	17:11:11.80	-0.66
WTTA	385.5	257	iPnD	17:11:16.00	1.43
			iSn	12:08.60	11.74
WATA	387.9	258	iPnD	17:11:15.90	1.03
			iSn	12:09.00	11.61
NKC	389.3	308	eSn	17:12:09.10	11.38
SQTA	418.0	257	iPnD	17:11:20.60	1.97
			iSn	12:18.40	14.31
MOTA	422.4	259	iPnC	17:11:20.00	0.83
			iSn	12:18.70	13.64
GRA1	436.4	295	ePn	17:11:21.60	0.69
			eSn	12:22.20	14.05
GRF	436.4	295	ePn	17:11:21.60	0.69
			eSn	12:22.20	14.05
CLL	446.4	324	iPn	17:11:22.30	0.14
MOX	464.2	308	ePn	17:11:25.60	1.21
			eSn	12:13.80	-0.54
DAVA	514.2	260	iPnC	17:11:30.80	0.18
			iSn	12:45.70	20.27



108.

2001-11-30 time: 12:05:14.97 UTC ML= 0.1
lat: 46.088N lon: 18.253E h= 5.8 km
erh= 2.5km erz= 3.6km
nr= 6 gap=191 rms=0.14
Locality: Pécs
Comments:

sta	dist	azm	phase	hr	mn	sec	res
RHK1	13.8	275	iPgC	12:05:17.50			-0.13
			iSg		05:19.80		0.09
PKSM	33.0	65	ePg	12:05:20.70			-0.25
			eSg		05:25.70		0.08
RHK2	41.7	83	iPgC	12:05:22.60			0.12
			eSg		05:28.50		0.16

109.

2001-12-04 time: 9:31:19.00 UTC ML=2.1
lat: 46.197N lon: 16.035E h= 10.0 km
erh=14.5km erz= km
Locality: Northwestern Balkan Peninsula
Comments:
Reported by NEIC

110.

2001-12-27 time= 0:32:42.36 UTC ML= 1.1
lat= 45.691N lon= 17.956E h= 10.0 km
erh= 5.7km erz=12.1km
nr= 8 gap=325 rms=0.42
Locality: Croatia
Comments:

sta	dist	azm	phase	hr	mn	sec	res
RHK3	32.1	46	ePgC	0	32	48.90	0.54
			eSg		32	53.40	0.36
RHK1	46.2	12	iPgD	0	32	50.80	0.01
			eSg		32	56.60	-0.77
PKSM	78.5	43	iPgD	0	32	56.40	-0.09
			eSg		33	06.50	-1.02
PKS9	102.6	14	ePg	0	33	00.60	-0.17
			eSg		33	16.20	1.07

106.

2001-11-26 time: 18:04:15.00 UTC ML=1.7
lat: 45.540N lon: 16.470E h= 7.0 km
erh= 0.0km erz= km
Locality: Northwestern Balkan Peninsula
Comments:
Reported by NEIC

107.

```

2001-11-29 time: 12:03:00.53 UTC ML= 1.2
lat: 45.679N lon: 18.014E h= 10.0 km
erh= ---km erz= ---km
nr= 4 gap=326 rms=0.22
Locality: Croatia
Comments:

```

sta	dist	azm	phase	hr	mn	sec	res
RHK3	30.1	38	iPgC	12:03:06.40			0.21
			eSg		03:08.10		-2.51
RHK1	46.9	6	iPgD	12:03:09.00			-0.09
			eSg		03:19.40		3.64
PKSM	76.6	39	iPgC	12:03:14.00			-0.33
			iSg		03:14.90		-10.20
PKS9	103.0	11	iP* C	12:03:19.20			0.19

Hypocenter Parameters

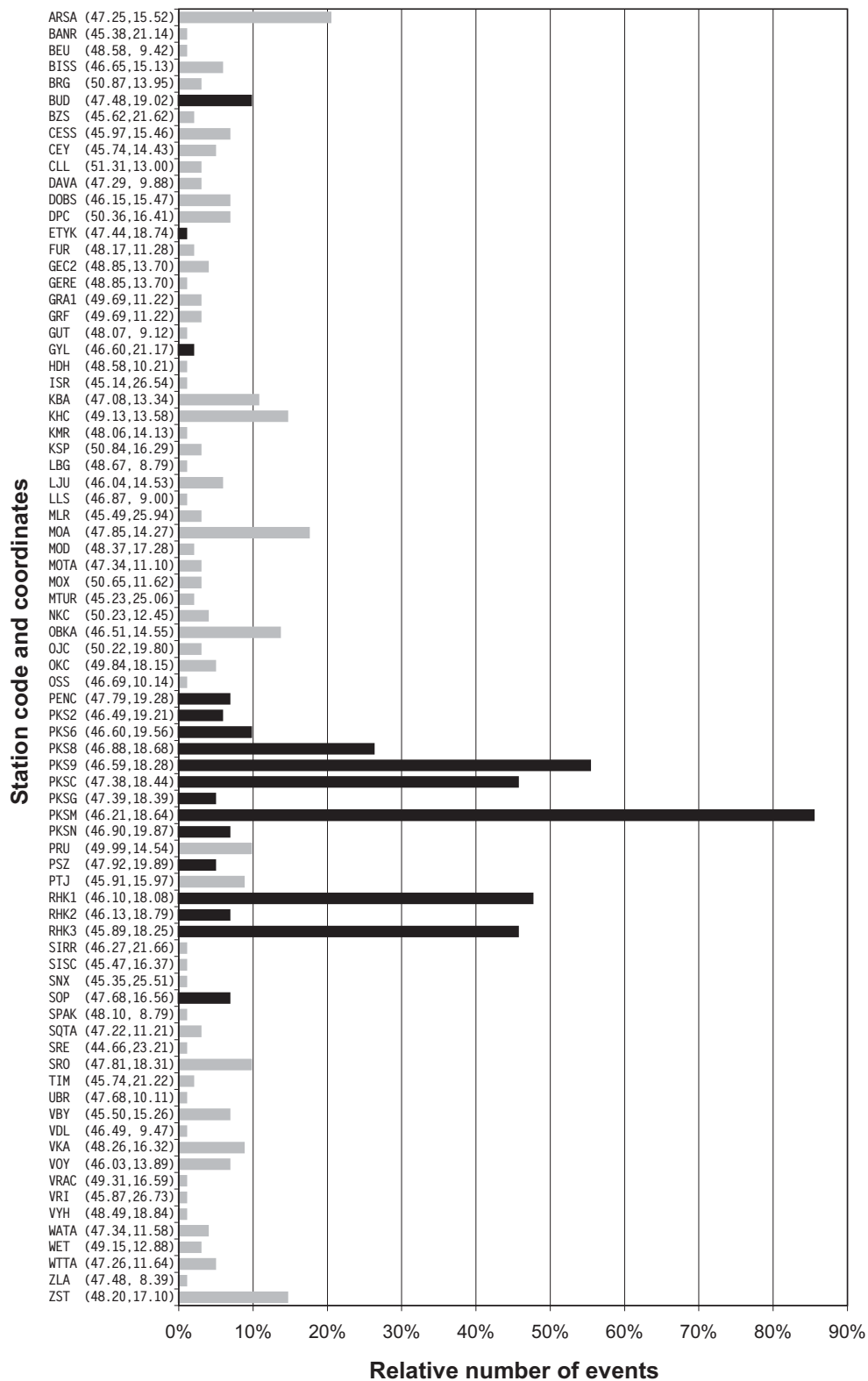


Figure 3.4.
Contribution of individual stations to the hypocenter determination

4.

SIGNIFICANT EARTHQUAKES IN 2001

(Earthquakes that was felt in Hungary)

22 June 2001	- Örbottyán
28 June 2001	- Vilonya
1 July 2001	- Austria

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

22 June 2001 - Órbottyán

Date:	2001/06/22
Origin Time:	13:26:40.7 UTC
Latitude and Longitude:	47.780N 19.227E (S.D. 8.1 km)
Depth:	7.1 km (S.D. 2 km)
Magnitude:	1.8 ML
Maximum Intensity:	4.5 EMS

DISCUSSION

On June 22nd, a small magnitude 1.8 ML event was felt and reported from Órbottyán and produced reports of intensity 3-4 EMS in Órbottyán and Vácrátót. Later, this event turned to be a blast in the nearby quarry.

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.

22 June 2001 - Örbottyán

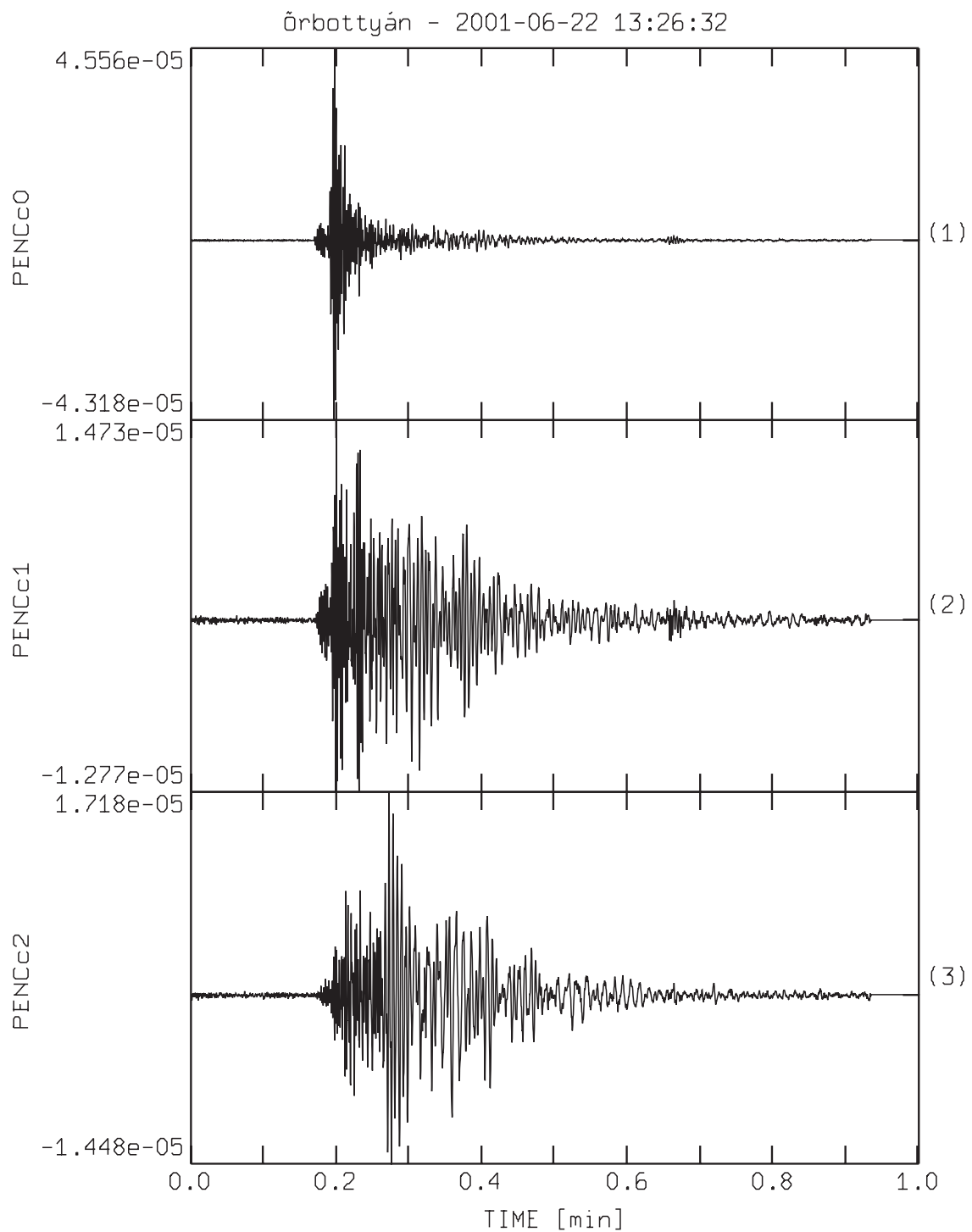


Figure 4.1.
Seismograms of the Örbottyán explosion 22nd June 2001, 13:26:41 UTC
(PENC three components)
The vertical axis is ground velocity in m/s.

22 June 2001 - Órbottyán

Table 4.1.

Intensity distribution of the Órbottyán event 22nd June 2001 (13:26:41 UTC)

Location		Coordinates		I	R	N
		Latitude (N)	Longitude (E)	Intensity	Relative reliability	Number of reports
1	Erdőkertes	47.676	19.308	1.0	0%	2
2	Fót	47.615	19.193	1.0	0%	2
3	Galgamácsa	47.697	19.392	1.0	0%	2
4	Göd	47.690	19.138	1.0	0%	1
5	Órbottyán	47.686	19.267	4.5	32%	2
6	Püspökszilágy	47.741	19.319	1.0	0%	2
7	Szada	47.637	19.312	1.0	0%	1
8	Sződ	47.721	19.188	1.0	0%	2
9	Váchartyán	47.728	19.261	1.0	0%	2
10	Váckisújfalu	47.707	19.351	1.0	0%	2
11	Vácrátót	47.712	19.236	3.5	44%	2
12	Veresegyház	47.653	19.285	1.0	0%	2

22 June 2001 - Örbottyán

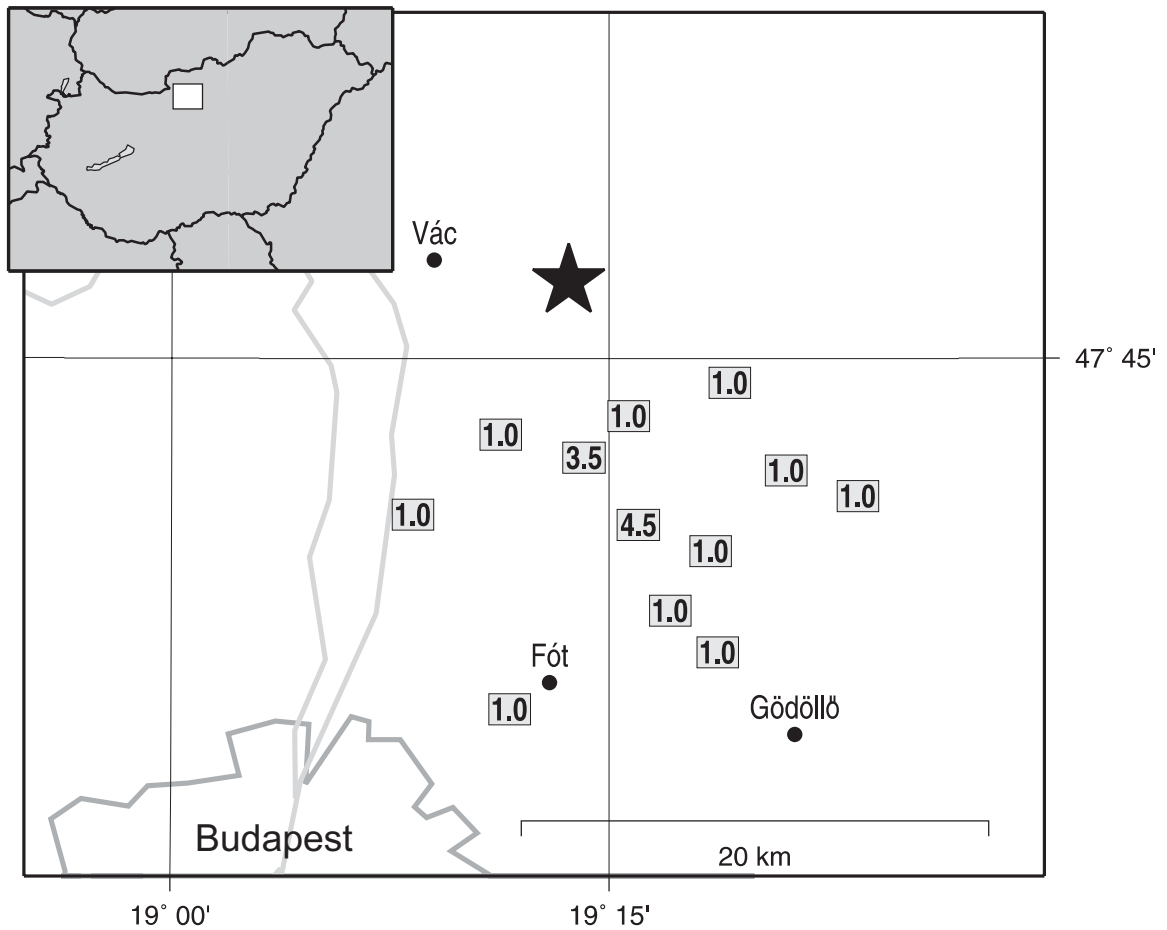


Figure 4.2.
Intensity distribution
of the Örbottyán explosion 22nd June 2001, 13:26:41 UTC
(star - instrumental epicentre)

HYPOCENTER PARAMETERS

28 June 2001 - Vilonya

Date:	2001/06/28
Origin Time:	07:08:34.1 UTC
Latitude and Longitude:	47.107N 18.119E (S.D. 2.0 km)
Depth:	10.0 km (S.D. 1.9 km)
Magnitude:	3.0 ML
Maximum Intensity:	4 EMS

DISCUSSION

Berhida – Peremarton area is seismically one of the most active region in Hungary. Several small size earthquakes were recorded from this area during 2001 as well as almost each year in the last decade. On June 28th, an earthquake with a magnitude of 3.0 ML was felt in a relatively large area of about 400-500 km² (Várpalota – Veszprém – Siófok triangle). Maximum intensity of 4 EMS was reported from Vilonya, Küngös, Balatonalmádi and Felsőörs.

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.

28 June 2001 - Vilonya

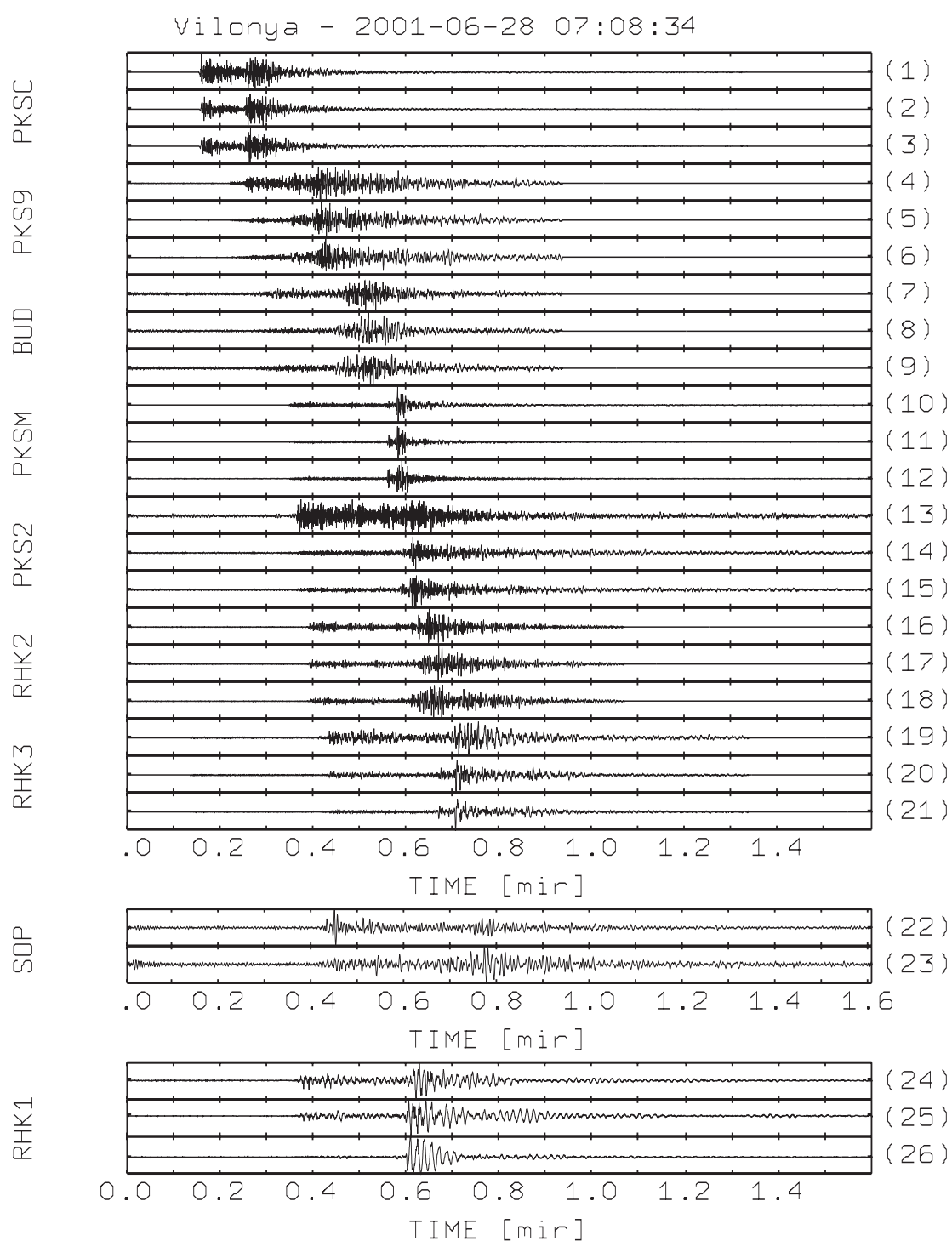


Figure 4.3.
 Seismograms of the Vilonya earthquake 28th June 2001, 07:08:34 UTC
 (PKSC, PKS9, BUD, PKSM, PKS2, RHK2, RHK3, SOP and RHK1
 three components)
 The vertical axis is ground velocity in m/s.

Table 4.2.

Intensity distribution of the Vilonya Earthquake 28th June 2001 (07:08:34 UTC)

Location		Coordinates		I	R	N
		Latitude (N)	Longitude (E)	Intensity	Relative reliability	Number of reports
1	Balatonalmádi	47.028	18.010	4.0	54%	2
2	Balatonfőkajár	47.019	18.218	1.0	0%	2
3	Balatonfüred	46.963	17.891	1.0	0%	1
4	Balatonkenese	47.036	18.109	4.0	35%	2
5	Balatonvilágos	46.965	18.161	3.5	33%	4
6	Bánd	47.124	17.786	3.5	38%	1
7	Berhida	47.113	18.134	3.0	46%	1
8	Csajág	47.044	18.188	3.0	37%	2
9	Csopak	46.979	17.923	1.0	0%	2
10	Enying	46.928	18.246	1.0	0%	1
11	Felsőörs	47.017	17.959	4.0	25%	1
12	Füle	47.052	18.253	1.0	0%	2
13	Gyulaírádót	47.145	17.955	1.0	0%	2
14	Hajmáskér	47.146	18.023	3.5	41%	2
15	Jenő	47.105	18.254	3.0	38%	1
16	Királyszentistván	47.109	18.044	1.0	0%	1
17	Küngös	47.066	18.177	4.0	48%	2
18	Lepsény	46.991	18.246	1.0	0%	2
19	Litér	47.100	18.013	3.0	31%	1
20	Lovas	46.992	17.955	1.0	0%	2
21	Mezőszentgyörgy	46.989	18.281	1.0	0%	2
22	Nádasladány	47.137	18.248	4.0	21%	1
23	Nemesvámos	47.056	17.878	1.0	0%	1
24	Ósi	47.141	18.188	3.0	42%	2
25	Öskü	47.162	18.072	3.5	36%	1
26	Papkeszi	47.084	18.083	3.0	31%	2
27	Peremarton	47.112	18.110	3.0	50%	1
28	Polgárdi	47.059	18.304	1.0	0%	2
29	Siófok	46.904	18.055	3.5	42%	3
30	Sóly	47.130	18.034	3.5	43%	1
31	Tótvázsony	47.008	17.790	1.0	0%	2
32	Várpalota	47.199	18.145	3.0	31%	2
33	Vilonya	47.112	18.067	4.0	38%	2
34	Veszprém	47.094	17.913	3.0	36%	3

28 June 2001 - Vilonya

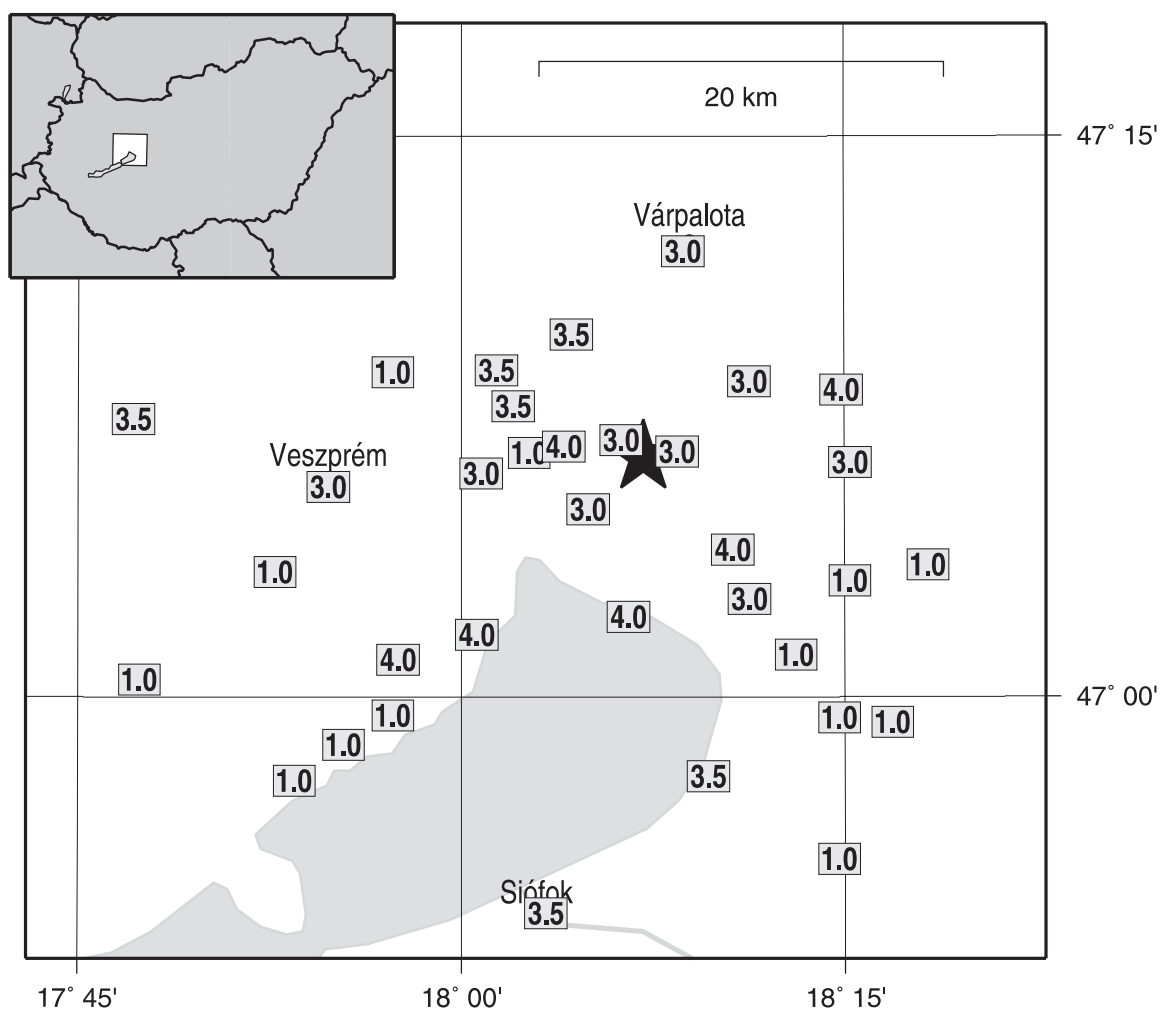


Figure 4.4.
Intensity distribution
of the Vilonya earthquake 28th June 2001, 07:08:34 UTC
(star - instrumental epicentre)

HYPOCENTER PARAMETERS

1 July 2001 - Austria

Date:	2001/07/01
Origin Time:	01:48:59.1 UTC
Latitude and Longitude:	47.726N 16.194E (S.D. 1.3 km)
Depth:	6.4 km (S.D. 1.5 km)
Magnitude:	3.8 ML
Maximum Intensity:	4.5 EMS (in Hungary)

DISCUSSION

The 3.8 ML earthquake of 1st July in E Austria was widely felt in Sopron-Kőszeg- area in NW Hungary. Maximum intensity of 4-5 EMS was reported from the border region.

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.

1 July 2001 - Austria

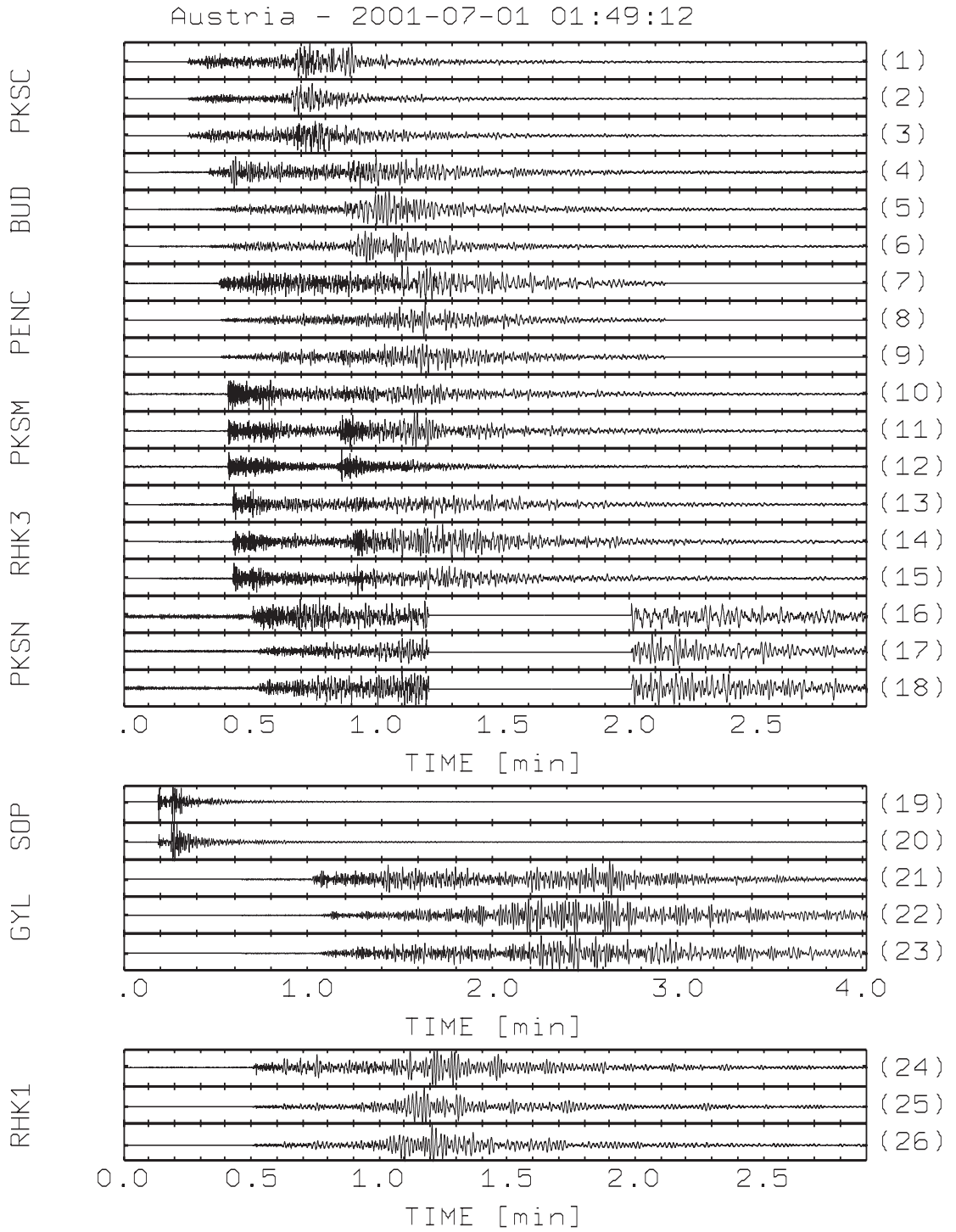


Figure 4.5.
 Seismograms of the Austria earthquake 1st July 2001, 01:48:59 UTC
 (PKSC, BUD, PENC, PKSM, RHK3, PKSN, SOP, GYL and RHK1
 three components)
 The vertical axis is ground velocity in m/s.

1 July 2001 - Austria

Table 4.3.

Intensity distribution of the Austria Earthquake 1st July 2001 (01:48:59 UTC)

Location		Coordinates		I	R	N
		Latitude (N)	Longitude (E)	Intensity	Relative reliability	Number of reports
1	Ágfalva	47.689	16.522	4.0	38%	2
2	Ebergőc	47.566	16.818	1.0	0%	2
3	Fertőboz	47.637	16.704	4.5	34%	1
4	Fertőd	47.619	16.887	1.0	0%	1
5	Fertőhomok	47.622	16.774	1.0	0%	2
6	Fertőrákos	47.722	16.655	3.5	38%	1
7	Fertőszentmiklós	47.587	16.885	1.0	0%	2
8	Harka	47.633	16.607	4.5	35%	1
9	Hegykő	47.623	16.802	4.0	22%	1
10	Hidegség	47.628	16.747	1.0	0%	2
11	Kópháza	47.638	16.651	4.0	40%	3
12	Kőszeg	47.390	16.548	1.0	0%	1
13	Nagycenk	47.607	16.697	4.0	41%	1
14	Nagylózs	47.566	16.776	1.0	0%	3
15	Peresznye	47.426	16.651	3.0	28%	2
16	Petőháza	47.595	16.901	1.0	0%	2
17	Pinnye	47.585	16.773	1.0	0%	1
18	Répcévis	47.441	16.674	4.0	35%	2
19	Röjtökmuzsaj	47.555	16.840	1.0	0%	1
20	Sárród	47.635	16.865	1.0	0%	2
21	Sopron	47.682	16.593	3.5	37%	5
22	Sopronhorpács	47.481	16.744	1.0	0%	1
23	Sopronkövesd	47.547	16.746	1.0	0%	1
24	Und	47.487	16.702	1.0	0%	1
25	Völcséj	47.497	16.769	1.0	0%	2
26	Zsira	47.452	16.688	1.0	0%	1

1 July 2001 - Austria

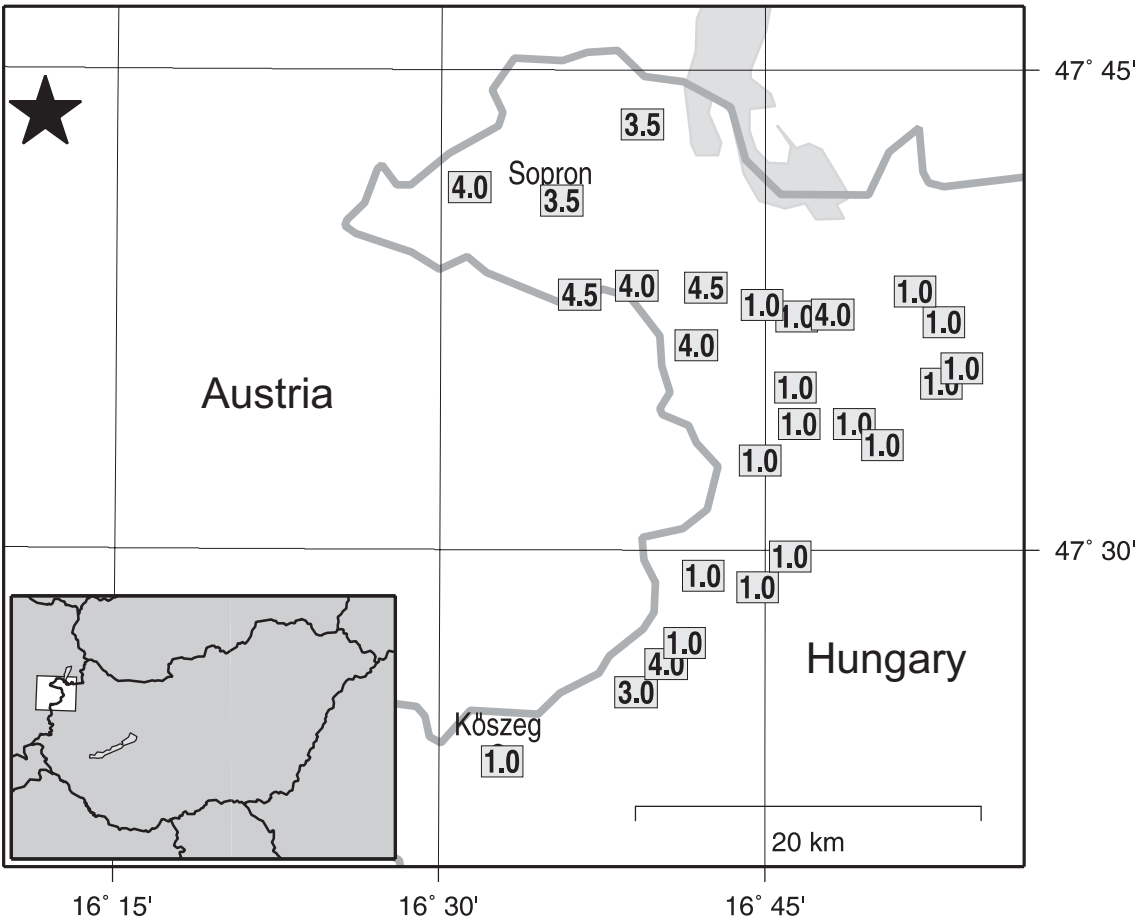


Figure 4.6.
Intensity distribution
of the Austria earthquake 1st July 2001, 01:48:59 UTC
(star - instrumental epicentre)

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APPENDIX A

EUROPEAN MACROSEISMIC SCALE (EMS)

EMS INTENSITY SCALE

1 ☞ Not felt

Not felt, even the most favourable circumstances.

2 ☞ Scarcely felt

Vibration is felt only by individual people at rest in houses, especially on upper floors of buildings.

3 ☞ Weak

The vibration is weak and is felt indoors by a few people. People at rest feel a swaying or light trembling.

4 ☞ Largely observed

The earthquake is felt indoors by many people, outdoors by very few. A few people are awakened. The level of vibration is not frightening. Windows, doors and dishes rattle. Hanging objects swing.

5 ☞ Strong

The earthquake is felt indoors by most, outdoors by few. Many sleeping people awake. A few run outdoors. Buildings tremble throughout. Hanging objects swing considerably. China and glasses clatter together. The vibration is strong. Top heavy objects topple over. Doors and windows swing open or shut.

6 ☞ Slightly damaging

Felt by most indoors and many outdoors. Many people in buildings are frightened and run outdoors. Small objects fall. Slight damage to many ordinary buildings eg. fine cracks in plaster and small pieces of plaster fall.

7 ☞ Damaging

Most people are frightened and run outdoors. Furniture is shifted and objects fall from shelves in large numbers. Many ordinary buildings suffer moderate damage: small cracks in walls, partial collapse of chimneys.

8 ☞ Heavily damaging

Furniture may be overturned. Many ordinary buildings suffer damage: chimneys fall, large cracks appear in walls and few buildings may partially collapse.

9 ☞ Destructive

Monuments and columns fall or are twisted. Many ordinary buildings partially collapse and few collapse completely.

10 ☞ Very destructive

Many ordinary buildings collapse.

11 ☞ Devastating

Most ordinary buildings collapse.

12 ☞ Completely devastating

Practically all structures above and below ground are heavily damaged or destroyed.

(For details see Grünthal, 1998)

APPENDIX B

SIGNIFICANT EARTHQUAKES OF THE WORLD

2001

Earthquakes of magnitude 6.5 or greater or ones that caused fatalities, injuries or substantial damage.

Source: U.S. Geological Survey
National Earthquake Information Center

Significant Earthquakes of the World, 2001

DATE UTC	ORIGIN TIME UTC HR MN SEC	GEOGRAPHIC COORDINATES LAT LONG		DEPTH	MAG	SD	NO. STA USED	REGION, ADDITIONAL MAGNITUDES AND COMMENTS
JAN 01	06 57 04.1	6.898 N	126.579 E	33 N	7.5	1.1	324	MINDANAO, PHILIPPINES. MW 7.5 (HRV), 7.4 (GS). mb 6.4 (GS). MS 7.2 (GS). ME 7.3 (GS). MS 7.3 (BRK). Mo 1.7*10**20 Nm (HRV). 1.5*10**20 Nm (GS), 2.5*10**20 Nm (PPT). Es 1.8*10**15 Nm (GS). Felt at Butuan. Felt (III) on Ternate and at Manado, Sulawesi, Indonesia.
JAN 01	08 54 31.5	6.631 N	126.899 E	33 N	6.8	0.9	64	MINDANAO, PHILIPPINES. MW 6.8 (HRV). mb 5.6 (GS). MS 6.0 (GS). Mo 1.8*10**19 Nm (HRV).
JAN 09	16 49 28.0	14.928 S	167.170 E	103 G	7.1	1.1	372	VANUATU ISLANDS. MW 7.1 (GS), 7.0 (HRV). mb 6.3 (GS). ME 7.0 (GS). Mo 5.2*10**19 Nm (GS), 4.2*10**19 Nm (HRV), 2.4*10**19 Nm (PPT). Es 6.6*10**14 Nm (GS). Felt in northern Vanuatu.
JAN 10	16 02 44.2	57.078 N	153.211 W	33 N	7.0	1.2	549	KODIAK ISLAND REGION, ALASKA. MW 7.0 (HRV), 6.8 (GS). mb 6.2 (GS). MS 6.8 (GS). ME 6.7 (GS). ML 6.8 (AEIC), 6.7 (PMR). MS 6.7 (BRK). Mo 3.3*10**19 Nm (HRV), 1.7*10**19 Nm (GS), 1.3*10**19 Nm (PPT). Es 2.3*10**14 Nm (GS). Felt (VI) at Kodiak and (III) at Anchorage and Seward. Also felt at Anchor Point, Dillingham, Kenai, King Salmon, Old Harbor and Perryville.
JAN 13	17 33 32.3	13.049 N	88.660 W	60 G	7.7	1.1	427	EL SALVADOR. MW 7.7 (HRV), 7.6 (GS). mb 6.4 (GS). MS 7.8 (GS). ME 7.7 (GS). MS 7.7 (BRK). Mo 4.6*10**20 Nm (HRV), 2.9*10**20 Nm (GS), 4.2*10**20 Nm (PPT). Es 6.8*10**15 Nm (GS). At least 844 people killed, 4,723 injured, 108,226 houses destroyed and more than 150,000 buildings damaged in El Salvador. About 585 of the deaths were caused by large landslides in Nueva San Salvador and Comasagua. Utilities and roads damaged by more than 16,000 landslides. Damage and injuries occurred in every department of El Salvador. Eight people killed in Guatemala. Felt from Mexico City to Colombia.
JAN 16	13 25 09.8	4.022 S	101.776 E	28 G	6.9	1.2	117	SOUTHERN SUMATERA, INDONESIA. MW 6.9 (GS), 6.8 (HRV). mb 6.5 (GS). MS 6.8 (GS). ME 6.5 (GS). MS 6.3 (BRK). Mo 2.5*10**19 Nm (GS), 2.0*10**19 Nm (HRV). Es 1.1*10**14 Nm (GS). Felt (V) at Bengkulu. Felt (II) at Jakarta, Jawa.
JAN 26	03 16 40.5	23.419 N	70.232 E	16 G	7.7	1.3	472	SOUTHERN INDIA. MW 7.7 (HRV), 7.6 (GS), 7.7 (CSEM). mb 6.9 (GS). MS 8.0 (GS). ME 7.6 (GS). MS 7.9 (BRK). Mo 3.4*10**20 Nm (HRV), 2.9*10**20 Nm (GS), 3.8*10**20 Nm (CSEM). Es 6.4*10**15 Nm (GS). At least 20,005 people killed, 166,836 injured, approximately 339,000 buildings destroyed and 783,000 damaged in the Bhuj-Ahmadabad-Rajkot area and other parts of Gujarat. Many bridges and roads damaged in Gujarat. At least 18 people killed and some injured in southern Pakistan. Felt throughout northern India and much of Pakistan. Also felt in Bangladesh and western Nepal. The earthquake occurred along an approximately east-west trending thrust fault at shallow depth. The stress that caused this earthquake is due to the Indian plate pushing northward into the Eurasian plate.
FEB 08	16 54 41.0	23.654 N	70.425 E	10 G	5.1	1.2	62	SOUTHERN INDIA. mb 4.9 (GS). MS 5.1 (GS). At least 40 people injured in Gujarat.
FEB 13	14 22 05.8	13.671 N	88.938 W	10 G	6.6	1.4	273	EL SALVADOR. MW 6.6 (HRV), 6.5 (GS). mb 5.5 (GS). MS 6.5 (GS). ME 6.5 (GS). MS 6.5 (BRK). MD 6.1 (CIG), 6.1 (CASC). Mo 8.1*10**18 Nm (HRV), 6.2*10**18 Nm (GS), 1.2*10**19 Nm (PPT). Es 1.1*10**14 Nm (GS). At least 315 people killed, 3,399 injured and extensive damage. The most severe damage occurred in the San Juan Tepezontes-San Vicente-Cojutepeque area. Landslides occurred in many areas of El Salvador. Felt throughout El Salvador and in Guatemala and Honduras.
FEB 13	19 28 30.2	4.680 S	102.562 E	36 G	7.4	1.3	221	SOUTHERN SUMATERA, INDONESIA. MW 7.4 (HRV), 7.2 (GS). mb 6.2 (GS). MS 7.2 (GS). ME 6.8 (GS). MS 7.1 (BRK). Mo 6.5*10**19 Nm (GS), 1.2*10**20 Nm (HRV), 4.7*10**19 Nm (PPT). Es 4.0*10**14 Nm (GS). Felt strongly at Bengkulu. Felt (II) at Jakarta, Jawa.

Significant Earthquakes of the World, 2001

FEB 17	20 25 15.7?	13.79 N 89.11 W	10 G 4.1 1.6	18	EL SALVADOR. mb 4.1 (GS). One person killed, three injured, additional damage and landslides in the epicentral area.
FEB 19	15 51 35.9	21.396 N 102.715 E	10 G 4.9 1.3	33	LAOS. mb 4.7 (GS). MS 4.9 (GS). Several people injured and many buildings damaged at Dien Bien Phu, Vietnam.
FEB 23	00 09 23.6	29.513 N 101.129 E	33 N 5.6 1.0	368	SICHUAN, CHINA. MW 5.6 (GS), 5.6 (HRV). mb 5.7 (GS). MS 5.4 (GS). Mo 3.0*10**17 Nm (HRV), 2.4*10**17 Nm (GS). Three people killed, 109 injured and 60,000 homes destroyed in Kangding and Yajiang Counties.
FEB 24	07 23 48.7	1.271 N 126.249 E	35 G 7.1 1.0	426	NORTHERN MOLUCCA SEA. MW 7.1 (GS), 7.1 (HRV), 7.3 (OBN). mb 6.6 (GS). MS 7.0 (GS). ME 7.0 (GS). MS 6.9 (BRK). Mo 4.5*10**19 Nm (GS), 4.5*10**19 Nm (HRV), 9.2*10**19 Nm (OBN), 7.0*10**19 Nm (PPT). Es 8.4*10**14 Nm (GS). Felt (V) on Ternate and (IV) at Manado, Sulawesi.
FEB 28	12 30 14.0	21.986 S 170.207 E	10 G 6.7 1.1	243	SOUTHEAST OF LOYALTY ISLANDS. MW 6.7 (HRV), 6.5 (GS). mb 6.0 (GS). MS 6.5 (GS). ME 6.4 (GS). MS 6.7 (BRK). Mo 6.0*10**18 Nm (GS), 1.1*10**19 Nm (HRV), 1.4*10**19 Nm (PPT). Es 9.4*10**13 Nm (GS).
FEB 28	18 54 32.8&	47.149 N 122.727 W	52 6.8	606	WASHINGTON. . MW 6.8 (HRV), 6.7 (GS), 6.7 (BRK). mb 6.5 (GS). MS 6.6 (GS). ME 6.5 (GS). Mo 1.8*10**19 Nm (HRV), 1.4*10**19 Nm (GS), 1.4*10**19 Nm (BRK). Es 1.1*10**14 Nm (GS). About 400 people injured and major damage in the Seattle-Tacoma-Olympia area. Maximum intensity (VIII) in the Capitol Hill area of Olympia and in the Pioneer Square area south of downtown Seattle. Preliminary estimates of damage are between 1 and 4 billion U.S. dollars. Felt from central Oregon to southern British Columbia and as far east as northwestern Montana. The maximum recorded acceleration was 0.3g at Seward Park. Landslides occurred in the Tacoma area and near Renton. Liquefaction and sand blows occurred in parts of Olympia and South Seattle.

DATE	ORIGIN TIME UTC HR MN SEC	GEOGRAPHIC COORDINATES LAT LONG	DEPTH	MAGNITUDES GS MB Msz	SD	NO. STA USED	REGION.	CONTRIBUTED MAGNITUDES	AND COMMENTS
MAR 19	05 52 15.8	4.029 S 128.020 E	33 N	6.0 6.5	1.1	206	BANDA SEA.	Mw 6.5 (GS), 6.5 (HRV). Mo=6.7*10**18 Nm (GS). Mo=6.1*10**18 Nm (HRV). Mo=1.4*10**19 Nm (PPT). Felt (VI) on Ambon, Indonesia.	
MAR 24	06 27 53.5	34.083 N 132.526 E	50 D	6.4 6.5	0.9	596	WESTERN HONSHU, JAPAN.	Mw 6.7 (GS), 6.8 (HRV). Me 6.4 (GS). Es=9.2*10**13 Nm (GS). Mo=1.1*10**19 Nm (GS). Mo=2.0*10**19 Nm (HRV). Mo=2.9*10**19 Nm (PPT). Two people killed, 161 injured and about 3,700 buildings damaged or destroyed in the Hiroshima area. Main water lines broken and railroad tracks damaged in the epicentral area. Felt throughout western Japan from the Kyoto area to Kyushu. Also felt in South Korea. Recorded (5U JMA) in Hiroshima and Okayama Prefectures, Honshu and Kagawa Prefecture, Shikoku; (5L JMA) in other parts of Okayama Prefecture, Honshu and Ehime and Kochi Prefectures, Shikoku. Also recorded (5U JMA) on Shodo-shima.	
APR 03	14 57 10.8	34.898 N 138.021 E	33 N	5.1 4.8	0.9	183	NEAR S. COAST OF HONSHU, JAPAN.	Eight people injured, furniture overturned, windows and water pipes broken in Shizuoka Prefecture. Recorded (5U JMA) in the Shimizu-Shizuoka area; (5L JMA) in south central Shizuoka Prefecture; (4 JMA) in the Hamamatsu area; (3 JMA) in Aichi, Nagano, Tokyo, Yamanashi and southern Chiba Prefectures. Recorded (2 JMA) from northern Chiba to Shiga Prefectures.	
APR 09	09 00 57.1	32.668 S 73.109 W	11 G	6.1 6.3	1.1	314	OFF COAST OF CENTRAL CHILE.	Mw 6.6 (GS), 6.7 (HRV). Me 6.3 (GS). Es=5.5*10**13 Nm (GS). Mo=9.2*10**18 Nm (GS). Mo=1.2*10**19 Nm (HRV). Felt (IV) at Constitucion, Curepto, Curico, El Quisco, Iloca, La Ligua, Los Andes, San Antonio, San Felipe, Santa Cruz, Santiago, Santo Domingo, Talca, Valparaiso, Vina del Mar and	

Significant Earthquakes of the World, 2000

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Significant Earthquakes of the World, 2001

3.7 (FBB). One person killed. Mining induced.

JUN 23	20 33 14.1	16.265 S	73.641 W	33 N	6.7 8.2	1.0	518	NEAR COAST OF PERU. Mw 8.3 (GS). 8.4 (HRV). Me 7.8 (GS). Es=9.9*10**15 Nm (GS). Mo=3.7*10**21 Nm (GS). Mo=4.9*10**21 Nm (HRV). Mo=3.1*10**21 Nm (PPT). At least 75 people killed, including 26 killed by a tsunami. 2,687 injured. 17,510 homes destroyed and 35,549 homes damaged in the Arequipa-Camana-Tacna area. An additional 64 people missing due to the tsunami in the Camana-Chala area. Landslides blocked highways in the epicentral area. Many of the historic buildings at Arequipa were damaged or destroyed. Some people injured and damage reported in the Arica, Chile area. Felt (VIII) at Arica, (VI) at Iquique, (V) at Calama and (III) at Tocopilla, Chile. Felt strongly in much of southern Peru and northern Chile. Also felt in Bolivia. Tsunami runup heights near Camana are estimated from field evidence to have reached approximately 7m at some locations; at other locations, the tsunami inundation distance extended more than 1 km inland from the coast. Tsunami wave heights (peak-to-trough) recorded from selected tide stations: 2.5m at Arica; 1.5m at Iquique; 1.0m at Coquimbo, Chile. The earthquake occurred at the boundary between the Nazca and South American tectonic plates. The two plates are converging towards each other at a rate of about 78mm per year. The earthquake occurred as thrust-faulting on the interface between the two plates, with the South American plate moving up and seaward over the Nazca plate. Southwestern Peru has a history of very large earthquakes. The June 23 shock originated just southeast of the source of a magnitude 7.7 earthquake that occurred in 1996, and it appears to have involved rupture of part of the plate boundary segment that produced an earthquake of magnitude approximately 9.0 in 1868. The 1868 earthquake was destructive in towns that were heavily damaged in the June 23 earthquake. The 1868 earthquake produced a tsunami that killed thousands of people along the South American coast and also caused damage in Hawaii and alarm in Japan. Complex event. The initial onset consists of two events separated by about 6 seconds. It is followed by at least one larger complex event occurring about 40 seconds later.
JUN 25	13 28 46.5	37.238 N	36.206 E	5 G	5.2 4.9	1.3	288	TURKEY. Mw 5.4 (HRV). MD 5.5 (ISK). ML 5.5 (GII). Mo=1.5*10**17 Nm (HRV). One hundred thirty people injured and 66 buildings damaged in Osmariye Province.
JUN 26	04 18 31.3	17.745 S	71.649 W	24 G	6.2 6.7	1.1	422	NEAR COAST OF PERU. Mw 6.7 (GS). 6.8 (HRV). Me 6.7 (GS). Es=2.2*10**14 Nm (GS). Mo=1.2*10**19 Nm (GS). Mo=1.9*10**19 Nm (HRV). Mo=1.5*10**19 Nm (PPT). Felt (IV) at Ilo, Moquegua and Punta de Bombon. Felt (V) at Arica; (IV) at Tignamar; (III) at Camarones, Iquique and Parinacota; (II) at Chitita, Chile.
JUN 28	03 46 28.1	6.990 S	108.275 E	37	5.0	1.3	67	JAWA, INDONESIA. Several dozen people injured and 2,500 buildings damaged in Jawa Barat Province. Felt (III) at Bandung, Ciamis and Tasikmalaya.
JUL 03	13 10 42.6	21.641 N	142.984 E	290 D	6.0	0.9	474	MARIANA ISLANDS REGION. Mw 6.5 (GS). 6.5 (HRV). Mo=5.6*10**18 Nm (GS). Mo=5.6*10**18 Nm (HRV). Recorded (1 JMA) in Kanagawa Prefecture, Japan.
JUL 04	07 06 31.6	21.725 S	176.705 W	185 D	5.9 5.8	0.8	429	FIJI ISLANDS REGION. Mw 6.5 (GS). 6.5 (HRV). Mo=7.3*10**18 Nm (GS). Mo=6.2*10**18 Nm (HRV). Mo=1.2*10**19 Nm (PPT).
JUL 05	13 53 48.3	16.086 S	73.987 W	62 G	6.2	1.4	324	NEAR COAST OF PERU. Mw 6.6 (GS). 6.6 (HRV). Me 6.5 (GS). Es=1.2*10**14 Nm (GS). Mo=8.6*10**18 Nm (GS). Mo=7.9*10**18 Nm (HRV). Mo=7.7*10**18 Nm (PPT). At least 300 structures previously weakened by the June 23 earthquake were destroyed. Felt (V) at Caraveli and Chala. Felt (III) at Arica, Iquique and Parinacota, Chile. Also felt at Cochabamba, La Paz and Santa Cruz, Bolivia.

Significant Earthquakes of the World, 2000

JUL 07	09 38 43.5	17.543 S	72.077 W	33 N	6.6 7.3	1.1	398	NEAR COAST OF PERU. Mw 7.5 (GS). 7.6 (HRV). Me 7.5 (GS). Es= 3.5*10**15 Nm (GS). Mo=2.0*10**20 Nm (GS). Mo=2.6*10**20 Nm (HRV). Mo=2.6*10**20 Nm (PPT). One person killed, 26 injured, four seriously in Arequipa Department, hundreds of buildings destroyed that had been weakened by the previous earthquakes. A very large boulder fell and blocked the Pan American Highway. Some power outages in the epicentral area and in Arica, Chile. Felt (VI) at Ocona and in the Tacna area. Felt strongly at Arequipa and Ilo. Felt (V) at Arica, Caleta, and Tocola; (IV) at Camarones, Codpa, Illapata and Iquique; (III) at Putre; (II) in the Antofagasta-Pisagua area, Chile.
JUL 10	21 42 08.8	39.832 N	41.623 E	33 N	5.0	1.1	269	TURKEY. MD 5.4 (ISK). At least 46 people injured and 17 houses damaged in the Erzurum area.
JUL 14	18 36 08.3	24.455 N	102.660 E	33 N	4.6 4.3	1.1	62	YUNNAN, CHINA. At least two people injured; more than 150 houses and some schools destroyed or damaged; some reservoirs damaged in Jiangchuan County.
JUL 16	16 12 46.7	27.957 N	85.178 E	33 N	5.0	1.0	124	NEPAL. One person injured and one house collapsed in the Dhading area. Felt in much of central and eastern Nepal.
JUL 17	15 06 15.2	46.735 N	11.201 E	10 G	5.0	1.2	321	NORTHERN ITALY. Mw 4.7 (CSEM). ML 5.5 (GRF). 5.3 (FBB). 5.3 (FUR). 5.2 (BRG). 5.2 (LDG). Mo=1.2*10**16 Nm (CSEM). Two people killed, one person missing and presumed killed by landslides near Gargazzone and Val D'Ultimo. One person died of a heart attack at Bolzano. At least 3 people injured and minor damage in the Merano area. Felt throughout northeastern Italy as far south as Venice. Also felt in Austria, southern Germany, Slovenia and Switzerland.
JUL 24	05 00 09.0	19.448 S	69.255 W	33 N	5.7 6.2	1.3	300	NORTHERN CHILE. Mw 6.3 (GS). 6.3 (HRV). Mo=3.5*10**18 Nm (GS). Mo=3.5*10**18 Nm (HRV). Mo=3.2*10**18 Nm (PPT). One person killed at Jaina and 3 people injured. Electrical power interrupted and water lines broken at Cerro Colorado mine. Felt (VII) at Chusmisa and Jaina; (VI) at Challapa, Huara, Mamina and Pachica; (V) at Arica, Iquique, Pisagua, Pozo Almonte and Putre; (IV) at Chuquicamata and Pica; (III) at Calama, Sierra Gorda and Tocopilla.
JUL 24	17 42 41.5	32.855 S	71.582 W	33 N	5.5 4.7	1.0	228	NEAR COAST OF CENTRAL CHILE. Mw 5.4 (GS). 5.3 (HRV). MD 5.1 (GUC). Mo=1.4*10**17 Nm (GS). Mo=1.0*10**17 Nm (HRV). Four people injured at Vina del Mar, two at Valparaiso and one at Quintero. Felt (V) at Concon, La Calera, Quillota, Quilpue, San Antonio, Santo Domingo, Valparaiso and Villa Allemana; (IV) at La Ligua, Llayllay, Rancagua, Santiago and Vina del Mar; (III) at Los Andes; (II) at Linares and Talca.
JUL 26	00 21 36.9	39.059 N	24.244 E	10 G	6.0 6.6	1.0	483	AEGEAN SEA. Mw 6.5 (GS). 6.5 (HRV). 6.4 (CSEM). Me 7.0 (GS). ML 6.1 (PDG). 5.9 (THE). Es=6.0*10**14 Nm (GS). Mo=5.4*10**18 Nm (GS). Mo=5.7*10**18 Nm (HRV). Mo=5.2*10**18 Nm (CSEM). Mo=8.2*10**18 Nm (PPT). At least 100 houses and some older buildings damaged, including Saint George Monastery; falling rocks from a castle destroyed 30 cars; damage to the mainwater supply system on Skyros, Greece. Felt throughout much of Greece. Also felt (III) in southern Macedonia.
JUL 28	07 32 43.0	59.025 N	155.116 W	131 D	5.7 5.7	1.1	564	SOUTHERN ALASKA. Mw 6.6 (GS). 6.6 (HRV). Me 6.2 (GS). Es=5.1*10**13 Nm (GS). Mo=8.5*10**18 Nm (GS). Mo=1.0*10**19 Nm (HRV). Mo=9.0*10**18 Nm (PPT). Felt (IV) at Anchorage, Chignik, Chignik Lake, Cooper Landing, Kenai, Levelock, Perryville, Sand Point, Seward, Sterling and Willow; (III) at Anchor Point, Cantwell, Clam Gulch, Elmendorf AFB, Kodiak, Soldotna, Tyonek and Wasilla; (II) at King Cove, McGrath, Moose Pass, Platinum, Port Heiden and Yakutat. Felt in many parts of southern Alaska.
AUG 06	03 52 59.5	55.537 S	123.422 W	10 G	6.1 6.5	1.1	294	SOUTHERN EAST PACIFIC RISE. Mw 6.6 (GS). 6.7 (HRV).

Significant Earthquakes of the World, 2001

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Significant Earthquakes of the World, 2000

(GS). Some houses destroyed in the Xidatan area southwest of Golmud. Felt strongly at Golmud. Felt in Qinghai, southeastern Xinjiang, western Gansu and northern Sichuan Provinces. Felt by people in high-rise buildings at Lanzhou.

DEC 02	13 01 53.6	39.402 N	141.089 E	124 D	6.5	0.8	203	EASTERN HONSHU, JAPAN. MW 6.5 (GS), 6.5 (HRV). mb 6.1 (GS). Mo 6.9*10**18 Nm (GS), 5.5*10**18 Nm (HRV). Felt from central Honshu to southern and eastern Hokkaido. Recorded (5L JMA) in Miyagi; (4 JMA) in Aomori, Iwate and Yamagata; (3 JMA) in Akita, Fukushima, Ibaraki and Tochigi; (2 JMA) in many parts of central Honshu; (1 JMA) in Ishikawa Prefectures and on Mikura-jima, Miyake-jima and Oshima. Also recorded (3 JMA) in eastern and southern Hokkaido and (2 JMA) in many parts of western Hokkaido.
DEC 04	05 57 17.9	15.350 S	72.516 W	33 N	5.8	1.0	203	SOUTHERN PERU. MW 5.8 (GS), 5.8 (HRV). mb 5.5 (GS). MS 5.6 (GS). Mo 5.8*10**17 Nm (GS), 5.5*10**17 Nm (HRV). Two people killed at Pucuncho, 5 injured at Chuquibamba and at least 30 houses damaged in Condesuyos Province. Felt (II) at Arequipa.
DEC 12	14 02 35.0	42.813 S	124.688 E	10 G	7.1	1.0	255	SOUTH OF AUSTRALIA. MW 7.1 (HRV), 7.0 (GS). mb 6.5 (GS). MS 6.7 (GS). Mo 4.4*10**19 Nm (HRV), 3.2*10**19 Nm (GS). Felt in the Albany and Esperance areas.
DEC 18	04 02 58.1	23.917 N	122.774 E	14 G	6.9	1.1	334	TAIWAN REGION. MW 6.9 (HRV), 6.8 (GS). mb 6.4 (GS). MS 7.3 (GS). ME 6.7 (GS). Mo 2.2*10**19 Nm (HRV), 1.7*10**19 Nm (GS), 4.6*10**19 Nm (PPT). Es 2.9*10**14 Nm (GS). Felt strongly in much of northern Taiwan. Recorded (4 TAP) at I-lan and Su-ao; (3 TAP) in Chang-hua, Hua-lien, I-lan, Taipei and Tao-yuan Counties; (2 TAP) throughout Taiwan. Also recorded (4 JMA) on Yonaguni-jima; (3 JMA) on Ishigaki-jima and Tarama-jima; (1 JMA) on Miyaki-jima, Ryukyu Islands. Small (10 cm) tsunami reported.
DEC 19	07 54 07.9	23.619 N	90.364 E	10 G	0.0	0.8	12	BANGLADESH. At least 80 people injured at Dhaka Central Jail. Some buildings damaged in the old part of Dhaka. Also felt at Chittagong, Munshiganj and Narayanganj.
DEC 23	22 52 56.9	9.651 S	159.529 E	33 N	6.8	1.0	121	SOLOMON ISLANDS. MW 6.8 (HRV), 6.7 (GS). mb 6.3 (GS). MS 7.0 (GS). ME 6.7 (GS). Mo 2.0*10**19 Nm (HRV), 1.1*10**19 Nm (GS). Es 2.3*10**14 Nm (GS). Felt strongly at Honiara.

Compiled by Waverly J. Person

HISTORY OF HUNGARIAN SEISMOLOGICAL STATION NETWORK (1902 - 1994)

