Magyarországi földrengések évkönyve
Hungarian Earthquake Bulletin
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Magyar Tudományos Akadémia
Geodéziai és Geofizikai Kutatóintézet
Szeizmológiai Főosztály

MTA GGKI

Hungarian Academy of Sciences
Geodetic and Geophysical Research Institute
Seismological Observatory

Budapest

MAGYARORSZÁGI FÖLDRENGÉSEK ÉVKÖNYVE

HUNGARIAN EARTHQUAKE BULLETIN

2006

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GEORISK
MTA GGKI

BUDAPEST 2007

Ringló u. 101/B, H-1221 Budapest, HUNGARY
www.georisk.hu
info@georisk.hu

MTA GGKI
Meredek u. 18, H-1112 Budapest, HUNGARY
www.seismology.hu
seismo@seismology.hu

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Hátsó borító: A 2006. december 31-i, gyömrői földrengés (13:39 UTC) izoszeizta térképe (4.1ML)

Back cover page: Isoseismal map of Gyömrő earthquake 31st December 2006, 13:39 UTC (4.1 ML)

TARTALOMJEGYZÉK

CONTENTS

BEVEZETÉS

A Pannon-medencében a földrengés aktivitás a lemezperemi területekhez képest mérsékelt, a rengések epicentrumainak eloszlása pedig első pillantásra rendszertelennek látszik. Nehéz eldönteni, hogy a földrengések izolált területeken, vagy szeizmikusan aktív vonalak mentén keletkeznek. Mindenesetre felismerhető néhány terület, ahol viszonylag gyakran fordult elő a múltban földrengés. Ilyenek pl. Eger és környéke, ahol 70 év alatt legalább 16 földrengés és több mint 50 nagyobb utórengés történt. Komárom és Mór környékén, Jászberény, Kecskemét és Dunaharaszti közelében szintén jelentős volt az aktivitás egy-egy bizonyos időszakban. Az alacsony szeizmicitás nem feltétlenül jelenti a földrengések méretének csekélységét: komoly épületkárokat okozó földrengésekről van szó, néhány esetben talajfolyósodást is okozó gyorsulásokkal (pl. 1763 Komárom, M 6.2; 1911 Kecskemét, M 5.6), esetleg a felszínen is megjelenő töréssel (pl. 1834 Érmellék, M 6.2). Ezek a példák azt mutatják, hogy 6.0-6.5 magnitúdójú rengések lehetségesek, de nem gyakoriak a Pannon-medencében (Tóth et al., 2002a).

A földtudományi kutatás fontos eleme a szeizmicitás vizsgálata, annak megismerése, hogy milyen gyakorisággal, hol és mekkora földrengések keletkeznek, továbbá melyek azok a szeizmotektonikai folyamatok, melyek a földrengéseket létrehozzák.

Az általános ismeretszerzésen túlmenően a földrengés elleni védekezéshez is fontos segítséget nyújt a szeizmicitás pontos ismerete. Egy terület földrengés kockázatát csak komplex szeizmológiai, geofizikai, geológiai ismeretek alapján lehet meghatározni. A legfontosabb információ, mely mennyiségileg meghatározza a földrengéskockázatot, a terület földrengés története, illetve a jelenkori rengések ismerete. Ehhez nyújt kardinális fontosságú segítséget a földrengés monitorozás, a földrengések megfigyelése, mérése és paramétereinek meghatározása.

Magyarországon a földrengésmérő állomások száma és minősége 1995-ben érte el azt a szintet, hogy a lakosság által érzékelt valamennyi rengést a hálózat nagy valószínűséggel detektálja. Ez nagyrészt annak a szeizmikus megfigyelő hálózatnak köszönhető, melyet a Nemzetközi Atomenergia Ügynökség javaslatára a Paksi Atomerőmű Rt. létesített az atomerőmű telephely tágabb környezetében.

Jelen kiadványunk célja és tartalma pontosan az, amit a címe is jelez: évkönyv, melyben megtalálható minden olyan adat és ismeret, melyet az év során a magyarországi földrengésekkel kapcsolatban összegyűjtöttünk. A célterület a 45.5-49.0É szélesség és 16.0-23.0K hosszúság által határolt földrajzi tartomány. A teljesség kedvéért azonban a világ jelentős földrengéseinek listája is megtalálható a mellékletben. Reméljük, hogy hasznát látják munkánknak mindazok, akik földtudományi kutatásaikban felhasználói a szeizmicitás adatoknak, de azok is, akik csupán egy-egy földrengéssel kapcsolatos kérdésükre keresnek választ kiadványunkban.

INTRODUCTION

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 surface 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 (Tóth et al., 2002b).

The study of the recent seismicity is an important element of seismotectonic research. 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.

Moreover, as one of the chief contributor to seismic hazard at a given area, detailed knowledge of seismicity also plays an important role in earthquake risk reduction. To be useful, accurately located earthquakes are required. While good information about larger historical earthquakes exists for about the past few hundred years, these are not well enough located. Only modern seismic monitoring networks, capable of locating small magnitude local earthquakes provide the necessary information to close this knowledge gap. The developing database of well-located earthquakes can be used, in one hand, to resolve the tectonic framework and required on the other hand to refine our understanding of the level of seismic risk.

1995 was a milestone in the history of Hungarian seismological observations. The Paks Nuclear Power Plant Ltd. installed a network of high quality digital seismographs, following the recommendations by the International Atomic Energy Agency (IAEA). For the first time, this network made it possible to detect and locate such small magnitude local seismic events that it is very unlikely so as to felt events go undetected in most parts of the country.

The present Earthquake Bulletin is a united annual summary report of all Hungarian 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.

1.

ÖSSZEFOGLALÁS

A 2006. év szeizmikus szempontból csendes/átlagos időszaknak tekinthető. Az év folyamán 82 szeizmikus eseményről szereztünk tudomást a 45.5-49.0N szélességi és 16.0-23.0E hosszúsági koordináták által határolt területen, amelyek közül 45 volt természetes eredetű földrengés, 37 robbantás. Az események mérete a $0.3 \leq M_L \leq 4.5$ lokális magnitúdó tartományba esett.

Az év folyamán 4 olyan földrengés volt, melyet a lakosság is érzett. Kettő a Kárpátalján a Magyar – Ukrán határ közelében, kettő pedig a Jászság környezetében keletkezett.

A legnagyobb földrengés intenzitás, melyet az év folyamán Magyarország területéről jelentettek 6 EMS fokozat volt. Ez jelentősebb károkat is jelentett néhány hagyományos vagy gyengébb minőségű épületben.

Időrendben az első érezhető szeizmikus esemény a szeptember 15-i 2.9 M_L magnitúdójú földrengés volt a Jászságban. A rengés epicentrális intenzitása 4 EMS fokra becsülhető.

November 15-én 3.2 M_L magnitúdójú földrengés keletkezett a kárpátaljai Beregszász (Ukrajna) környékén. A rengés Magyarországon is érezhető volt a határhoz közeli településeken, a legnagyobb magyarországi intenzitás 4 EMS volt.

Az év legnagyobb magnitúdójú rengése november 23-án pattant ki Beregsurány környékén a magyar – ukrán határ közelében, egy héttel követve az előző rengést. A 4.5 M_L magnitúdójú rengés érezhető volt mintegy 80 km sugarú területen. Magyarországon a legnagyobb megrázottságot (5-6 EMS) Beregsurány és Beregdaróc településekről jelentették. A rengés az epicentrum környékén kisebb épület károkat is okozott.

A lakossági érdeklődést tekintve az év legjelentősebb magyarországi rengése december 31-én pattant ki Gyömrő környékén. A 4.1 M_L magnitúdójú rengés érezhető volt Budapest budai kerületeitől Hatvanig terjedően. A legnagyobb megrázottságot (6 EMS) Gyömrő és Maglód településekről jelentették. A rengés az epicentrum környékén összességében tízmillió forint nagyságrendű épület károkat is okozott, elsősorban azonban régebbi, vagy rosszul, rossz minőségben épített épületek sérülése volt jellemző.

1.

SUMMARY

2006 was a quiet/average year for Hungarian seismicity. Out of the 82 seismic events ($0.3 \leq M_L \leq 4.5$) located within the area bounded by latitudes 45.5-49.0N and longitudes 16.0-23.0E 45 were identified as natural earthquakes, 37 were known quarry blasts.

Four earthquakes were reported as felt. Two of those burst in the Hungarian – Ukrainian border region NE of Hungary, and two in the Jászság area.

The highest magnitude assigned to a shock was 4.5 M_L while the highest intensity reported during the year was 6 EMS causing damages in some old poorer of quality buildings.

Reviewing the more notable events of the year in chronological order, the first felt earthquake was reported from the Jászság area on September 15th. The shock was felt only in a few villages South of Jászberény and produced reports of 4 EMS from Tápiószele.

On November 15th, a 3.2 M_L magnitude earthquake was felt in the Hungarian – Ukrainian border region. In the Hungarian side, the highest intensity 4 EMS was reported.

The highest magnitude (4.5 M_L) earthquake of the year was the Beregsurány event on November 23rd just a week after a smaller earthquake. The earthquake was felt in an area of about 80 km radius. In Hungary, the highest intensity values (5-6 EMS) were reported from Beregsurány and Beregdaróc. Smaller damages in buildings were also reported from the epicenter area.

The highest public attention of the year was produced by the Gyömrő earthquake on December 31st. The 4.1 M_L magnitude earthquake was felt from western districts of Budapest up to Hatvan. The highest intensity values (6 EMS) were reported from Gyömrő and Maglód. All together, a few hundred thousands of Euro damage in buildings was reported from the epicenter area but mainly older and poorer of quality buildings were affected.

2.

A MAGYARORSZÁGI FÖLDRENGÉS-MEGFIGYELŐ HÁLÓZAT

2006-ban 15 szeizmográf állomást működtetett Magyarországon az MTA Geodéziai és Geofizikai Kutatóintézet és a GeoRisk Földrengéskutató Intézet Kft. A két szervezet által kötött megállapodás értelmében az összes mért adatot korlátozás nélkül megosztják egymással. Az adatok együttes feldolgozásának köszönhetően a földrengések paraméterei jóval pontosabban, gyorsabban, megbízhatóbban határozhatók meg (2.1. Táblázat és 2.1. ábra).

Szélessávú állomások

Az év folyamán 6 szélessávú szeizmológiai állomás működött (BEHE, BUD, PKSM, PSZ, SOP, TRPA), melyek mindegyikén az érzékelő egy 3 komponenses szélessávú Streckeisen STS-2 szeizmométer. Az érzékelő jele a PKSM állomáson egy Quanterra Q380 berendezésen keresztül, a többi helyen pedig EarthData PS-6-24 digitalizáló egységen át jut a SeisComp szoftverrel felszerelt adatgyűjtő számítógépre. Mindegyik állomás internet összeköttetéssel rendelkezik, így az adatok közel valós időben, egy erre a célra kifejlesztett protokol (SeedLink) felhasználásával jutnak el a budapesti adatközpontba, ahol a feldolgozás és archiválás történik. Az adatközpontban az adatok átlagos késése a valós időhöz képest 10 másodperc körüli. A helyszínen tárolt adatok bizonyos idő elteltével törlődnek. TRPA állomás 2006. november 1-jén kezdett működni.

Rövidperiódusú állomások

A 9 rövidperiódusú állomás mindegyikén Lennartz LE-3D 1 s sajátperiódusú 3 komponenses szeizmométer és Lennartz MARS88 digitalizáló és adatgyűjtő működik. Hét rövidperiódusú állomáson (PKS2, PKS6, PKS7, PKS8, PKS9, PKSG, PKSN) helyszíni eseményregisztrálás zajlik, vagyis az adatgyűjtő eseményfelismerő algoritmusa dönt, hogy mely időszakokban készüljön felvétel. Az adatok tárolása magneto-optikai lemezeken történik. A lemezek havi kétszeri cseréjével az adatok legalább két nap, legfeljebb két hét késéssel kerülnek az adatközpontba.

Az RHK3 állomásról az adatok telefonos kapcsolat segítségével jutnak el az adatközpontba. A telefonos adatgyűjtés az éjszakai órákban történik, de szükség esetén bármikor mód van a kapcsolat felépítésére.

A penci állomás (PENC) működése eltér a többi rövidperiódusú állomásétól. Az érzékelő és digitalizáló ugyanaz, de az adatrögzítés folyamatos. Az adatok a helyszínen működő SeisComp rendszerű számítógépbe jutnak, ahol annak merevlemezén tárolódnak, és az Interneten keresztül eljutnak a budapesti adatközpontba – hasonlóan a szélessávú állomásokhoz. Azonban itt az alkalmazott konfiguráció és a működés részben eltér a szélessávú állomásokétól, ebből adódóan az adatok késése valamivel nagyobb, 10-30 perces. A helyszínen tárolt adatok bizonyos idő elteltével itt is automatikusan törlődnek (2.2. ábra).

2.

SEISMOGRAPH STATIONS IN HUNGARY

In 2006, there were 15 seismograph stations in Hungary operated by Geodetic and Geophysical Research Institute, Hungarian Academy of Sciences and GeoRisk Earthquake Research Institute Ltd. Based on an agreement, the two institutions shared all data recorded in all seismic stations without limitations and operated a common data centre (Table 2.1 and Fig. 2.1).

Broadband stations

6 broadband stations (BEHE, BUD, PKSM, PSZ, SOP, TRPA) were running during the year. TRPA became operational on 1st November 2006. All of these stations have Streckeisen STS-2 very broadband seismometers as sensors. Each station is equipped with EarthData PS-6-24 digitizer except PKSM where a Quanterra Q380 unit serves as a digitizer. Linux PC's with SeisComP software are used as data acquisition systems. All stations are accessible via Internet in support of near real time data transfer. The average data latency at these stations is typically less than 10 s. SeedLink protocol is used for data collection and all continuous data is archived in the data centre.

Short period stations

Each of the 9 short period stations consist of a three component short period seismometer, a digital recorder and time signal receiver. The seismometers used are the LE-3D three directional compact size high sensitivity 1 Hz geophones. The digital acquisition system is the MARS88 recorder. In case of seven stations (PKS2, PKS6, PKS7, PKS8, PKS9, PKSG, PKSN) the recorder also performs signal detection by its internal STA/LTA algorithm. These stations record and store event data on rewritable magneto-optical disks, which are collected and transferred to the data center on two-week basis.

Station RHK3 is accessible via telephone modem; triggered event data is routinely collected on daily basis during night hours. In case of need, data transfer can be initiated from the data center at any time.

The configuration at PENC is somewhat different from the rest of the short period stations. Having the same sensor and digitizer, continuous data is recorded on a SeisComP PC connected to the MARS88 data logger. The station has near real-time data access via Internet using the SeedLink protocol. Data latency is between 10 and 30 minutes due to the operation schedule of the data converter.

Adatközpont (www.foldrenges.hu)

Az összes mérőállomáson regisztrált adatot a budapesti adatközpontban gyűjtjük és dolgozzuk fel. Az adatközpont nem csak gyűjti a szeizmológiai adatokat, de több formában szolgáltatja is azokat, elsősorban elektronikusan az Interneten keresztül.

Minden állomás digitális adataiból napi szeizmogramok készülnek kép formátumban. A képi szeizmogramok egyrészt az érdeklődők számára készülnek, másrészt a működés ellenőrzését szolgálják. A mérőállomással fennálló adatátviteli módtól függően ezek a szeizmogramok lehetnek közel valós idejűek, vagy a direkt kommunikációval nem rendelkező állomások esetében több napos késéssel készülők.

Az események fázisainak körültekintő manuális kimérése alapján készül havonta a fázisadatokat (kimérési adatokat) tartalmazó jelentés. E jelentéseket elküldjük a szomszédos országok szeizmológiai intézményeinek, valamint a nemzetközi adatközpontoknak.

A fázisadatok felhasználásával – a saját adatokat kiegészítve a szomszédos országok szeizmológiai intézményeinek hasonló adataival – havonta eseménylista készül (Havi Jelentés), mely a helyi és regionális földrengések hipocentrum adatait tartalmazza.

Kétoldalú megállapodások alapján néhány szomszédos országgal, illetve nemzetközi adatközpontokkal (GEOFON, ORFEUS) zajlik valós idejű adatcsere. A valós idejű hullámforma adatok a budapesti adatközpont SeedLink szerverén keresztül érhetők el. Mód van azonban – bizonyos korlátokkal – múltbeli hullámforma adatok kiszolgálására is az adatközpontban működtetett AutoDRM rendszer segítségével (autodrm@seismology.hu).

A mérési adatok, szeizmogramok, a kiértékelés eredményei nagyrészt nyilvánosan elérhetők az interneten a www.foldrenges.hu oldalon.

Átlagos zaj- (talajnyugtalanság) viszonyokat feltételezve a magyarországi szeizmológiai hálózat észlelési képessége ML=1.5-2.0 magnitúdó körül van (2.3. ábra). Ennek számítása azon feltételezésen alapul, hogy az eseményt legalább négy mérőállomás érzékeli, mely a helymeghatározáshoz szükséges minimális állomásszám. Az ország középső részén kissé alacsonyabb, a határok környékén kissé magasabb ez az érték. Ez azt jelenti, hogy az ÉK-i területeket kivéve, a lakosság által érzékelt valamennyi rengést a hálózat nagy valószínűséggel detektálja.

Virtuális szeizmológiai hálózat (HUNRENG)

A kommunikáció fejlődése, a valós idejű adatátvitel és az azonos adatátviteli protokoll (SeedLink) Európa-szerte elterjedt használata lehetővé tette, hogy külföldi állomások adatait is fogadjuk közel valós időben ugyanúgy, mint a saját állomásainkét. A külföldi állomások mérési adatainak felhasználásával a földrengések paraméterei még pontosabban, megbízhatóbban számíthatók ki. Ezen kívül a nagyszámú állomás adatához való valós idejű hozzáférés lehetővé tette *automatikus földrengésjelző rendszerünk* elindítását. Ez a rendszer automatikusan képes felismerni a földrengéseket, és azok paramétereit néhány percen belül ki is számítja. A térképen és listán automatikusan megjelenített földrengés információ elsősorban gyors tájékoztatásul szolgál (2.4. ábra és 2.2. Táblázat).

Data Centre (www.foldrenges.hu)

All recorded data is transmitted to and processed at the *Data Centre* in Budapest. The data that are collected by the *Data Centre* are published in a variety of formats and publications are available electronically via the Internet.

Using digitally recorded data, analogue “live seismograms” are calculated for each station. The main purposes of the “live seismograms” are feeding public interests in one hand, and rapid visualization of the operational status and quality check of the stations on the other. The delay of the “live seismograms” varies from near real time to several days depending on the communication category of the station.

A careful manual offline analysis is used for event identification and picking the phases on each recorded seismogram. Seismogram readings (phase data) are disseminated by email to partner institutions and international data centers.

Merging the phase data of the Hungarian network and the same kind of available data sets from neighbor countries, preliminary event lists are calculated on monthly schedule. Based on technical and operational statistics of the stations, list of local and regional seismic events and their hypocenter information, *Monthly Reports* are compiled.

Real time data from broadband stations can be accessed through a SeedLink server operated at the data centre. Real time data are provided to international data centers (ORFEUS, GEOFON) and some other partner institutions. Waveform data is also available through an AutoDRM service (autodrm@seismology.hu).

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 M_L, somewhat lower in the middle of the country and a little higher towards the border regions. (See Fig. 2.3) This means that in most parts of the country, not including the NE territory, it is very unlikely that felt events go undetected.

Virtual network (HUNRENG)

Development in communication technology and standardized communication protocols, software packages made available to access near real time data of stations beyond the national network. SeedLink and SeisComP developed at GEOFON became a kind of standard all over Europe.

The larger pool of data provided by an extended, “virtual network” of seismic stations helps to have faster and more accurate earthquake locations and parameter determinations. In addition, near real time access to data from large number of stations makes possible to operate automatic rapid earthquake alarm systems. Automatically generated earthquake lists and epicenter maps are the main product of such systems.

The present configuration of the experimental virtual network *HUNRENG* is shown in Fig. 2.4 and Table 2.2.

2.1. Táblázat Szeizmológiai állomások, műszerek és alapkőzet
Table 2.1. Seismic stations, instrumentation and lithology

Jel Helység Code Location	Szélesség Latitude (N)	Hosszúság Longitude (E)	Magasság Elevation (m)	Alapkőzet Foundation	Állomás típusa Station type (1)	Érzékelő típusa Sensor type (2)	Regisztrálás Adatgyűjtő Recording mode Equipment (3)	Szerv. Org. (4)
BEHE Becsehely	46,4702	16,7755	298	üledék alluvium	3C BB	STS-2	D – C PS-6-24 + SeisComP PC	GGKI
BUD Budapest	47,4836	19,0239	196	dolomit dolomite	3C BB	STS-2	D – C PS-6-24 + SeisComP PC	GGKI
PENC Penc	47,7905	19,2817	250	üledék alluvium	3C SP	LE-3D	D – C MARS-88MC + SeisComP PC	GR
PKS2 Kecel	46,4920	19,2131	106	homok sand	3C SP	LE-3D	D – E MARS-88OC	GR
PKS6 Bócsa	46,5998	19,5645	120	homok sand	3C SP	LE-3D	D – E MARS-88OC	GR
PKS7 Kunszentmiklós	47,0473	19,1609	95	agyag mud	3C SP	LE-3D	D – E MARS-88OC	GR
PKS8 Sárbogárd	46,8787	18,6765	135	riolit tufa rhyolite tuff	3C SP	LE-3D	D – E MARS-88OC	GR
PKS9 Tamási	46,5870	18,2789	240	lösz loess	3C SP	LE-3D	D – E MARS-88OC	GR
PKSG Gánt	47,3918	18,3907	200	dolomit dolomite	3C SP	LE-3D	D – E MARS-88OC	GR
PKSM Mórágy	46,2119	18,6413	170	gránit granite	3C BB	STS-2	D – C Q380 + SeisComP PC	GGKI/GR
PKSN Nyárlőrinc	46,8972	19,8673	110	homok sand	3C SP	LE-3D	D – E MARS-88OC	GR
PSZ Piszkéstető	47,9184	19,8944	940	andezit andesite	3C BB	STS-2	D – C PS-6-24 + SeisComP PC	GEOFON /GGKI
RHK3 Tenkes	45,8885	18,2521	420	mészkő limestone	3C SP	LE-3D	D – E MARS-88MC	GR
SOP Sopron	47,6833	16,5583	260	gneisz gneiss	3C BB	STS-2	D – C PS-6-24 + SeisComP PC	GGKI
TRPA* Tarpa	48,1304	22,5391	113	andezit andesite	3C BB	STS-2	D – C PS-6-24 + SeisComP PC	GGKI

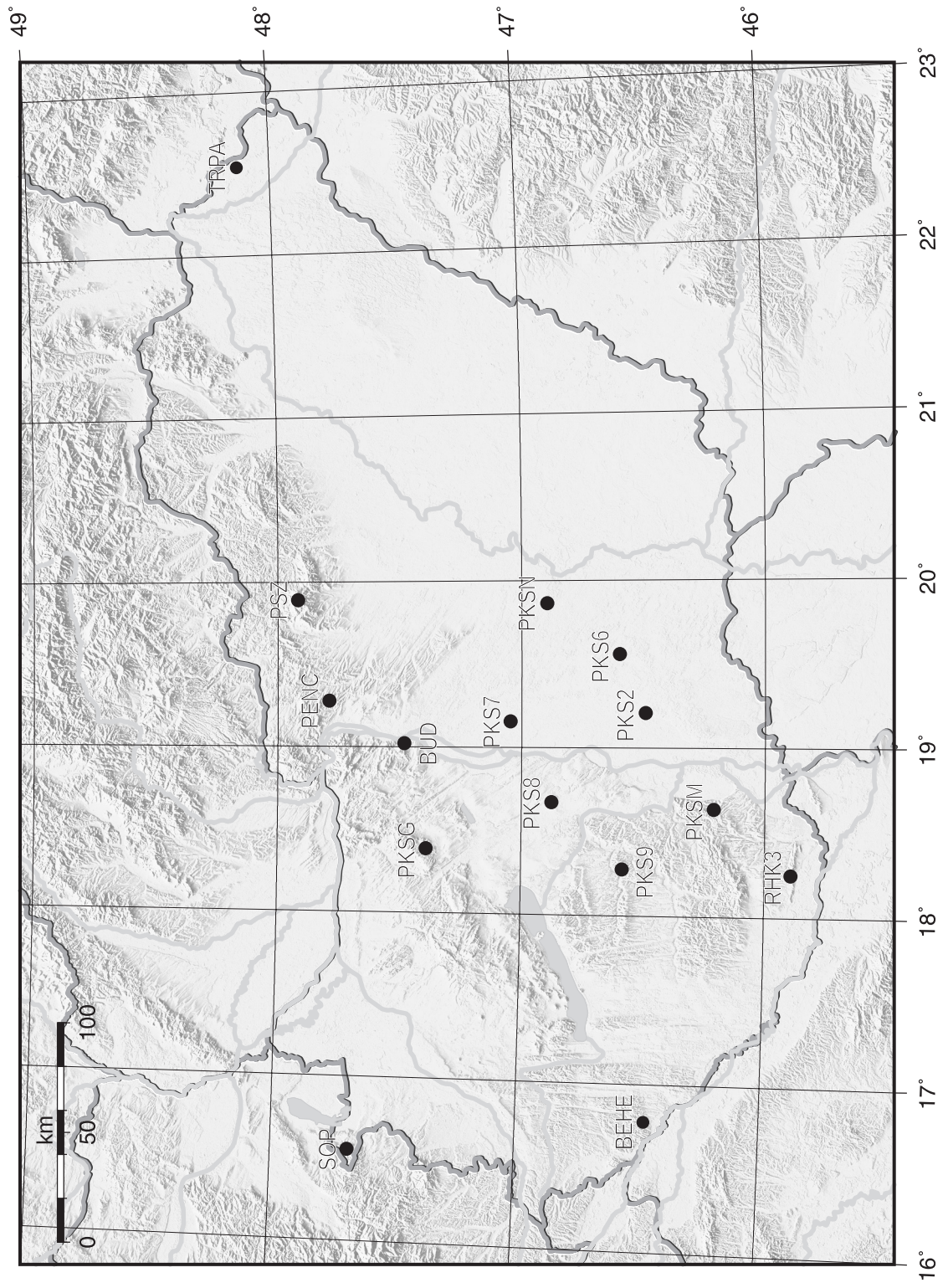
(1) 3C – 3 komponenses szeizmométer / three component seismometer
SP – rövid periódusú szeizmométer / short period seismometer; BB – széles sávú szeizmométer / broad band seismometer

(2) STS-2 – Streckeisen széles sávú szeizmométer / Streckeisen broad band seismometer
LE-3D – Lennartz 3 komponenses 1Hz-es geofon / Lennartz three directional 1Hz geophone

(3) A – analóg / analogue; D – digitális / digital; C – folyamatos felvétel / continuous recording; E – esemény felvétel / event recording
PS-6-24 – Earth Data digitalizáló / Earth Data digitizer
Q-380 – Quanterra adatgyűjtő rendszer / Quanterra data acquisition system
SeisComP – GEOFON Seismological Communication Processor

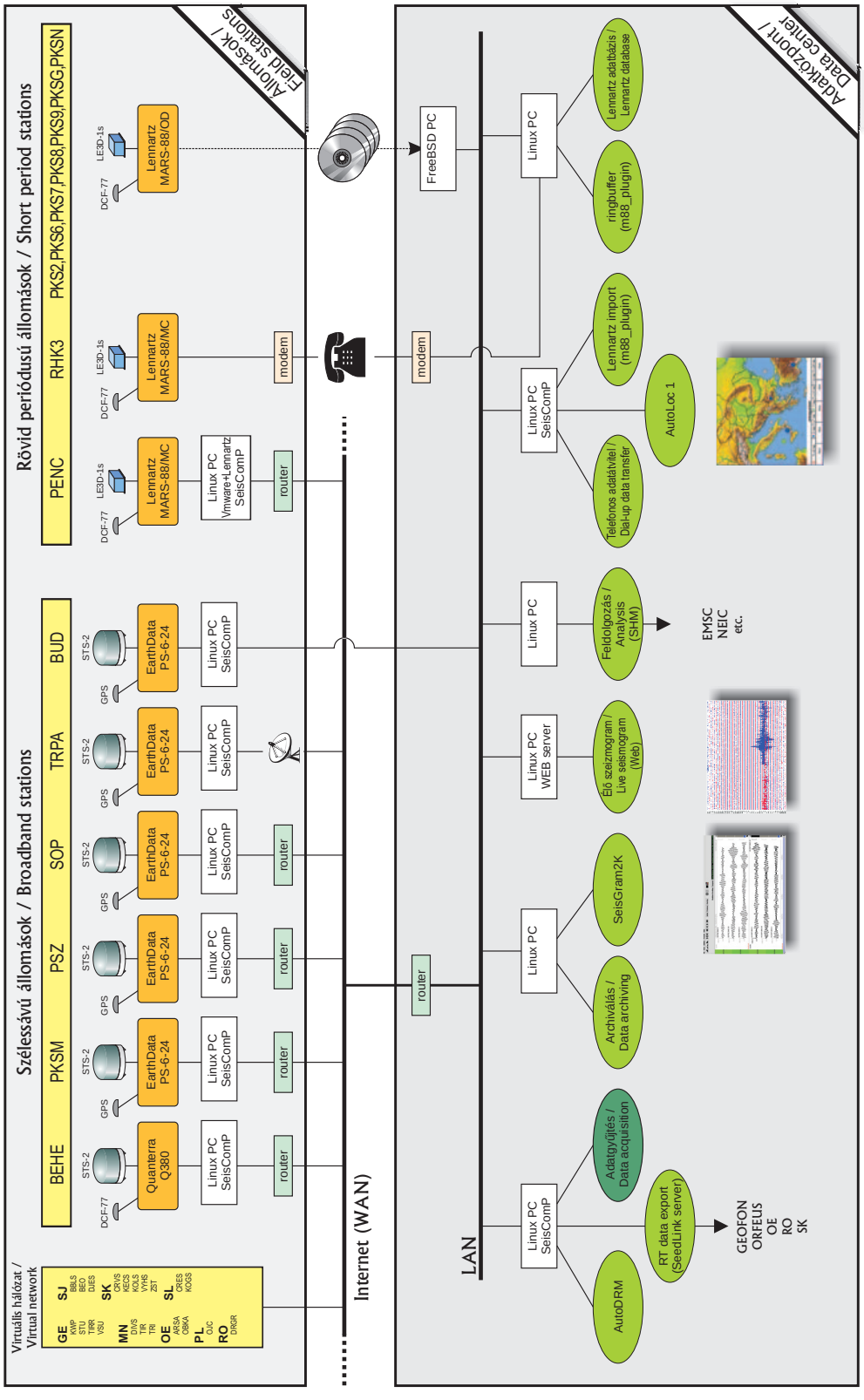
(4) GGKI – MTA Geodéziai és Geofizikai Kutatóintézet / Geodetic and Geophysical Research Institute, HAS
GR – GeoRisk Földrengéskutató Intézet Kft. / GeoRisk Earthquake Research Institute Ltd.

(*) Működés kezdete / Open date: 2006/11/01



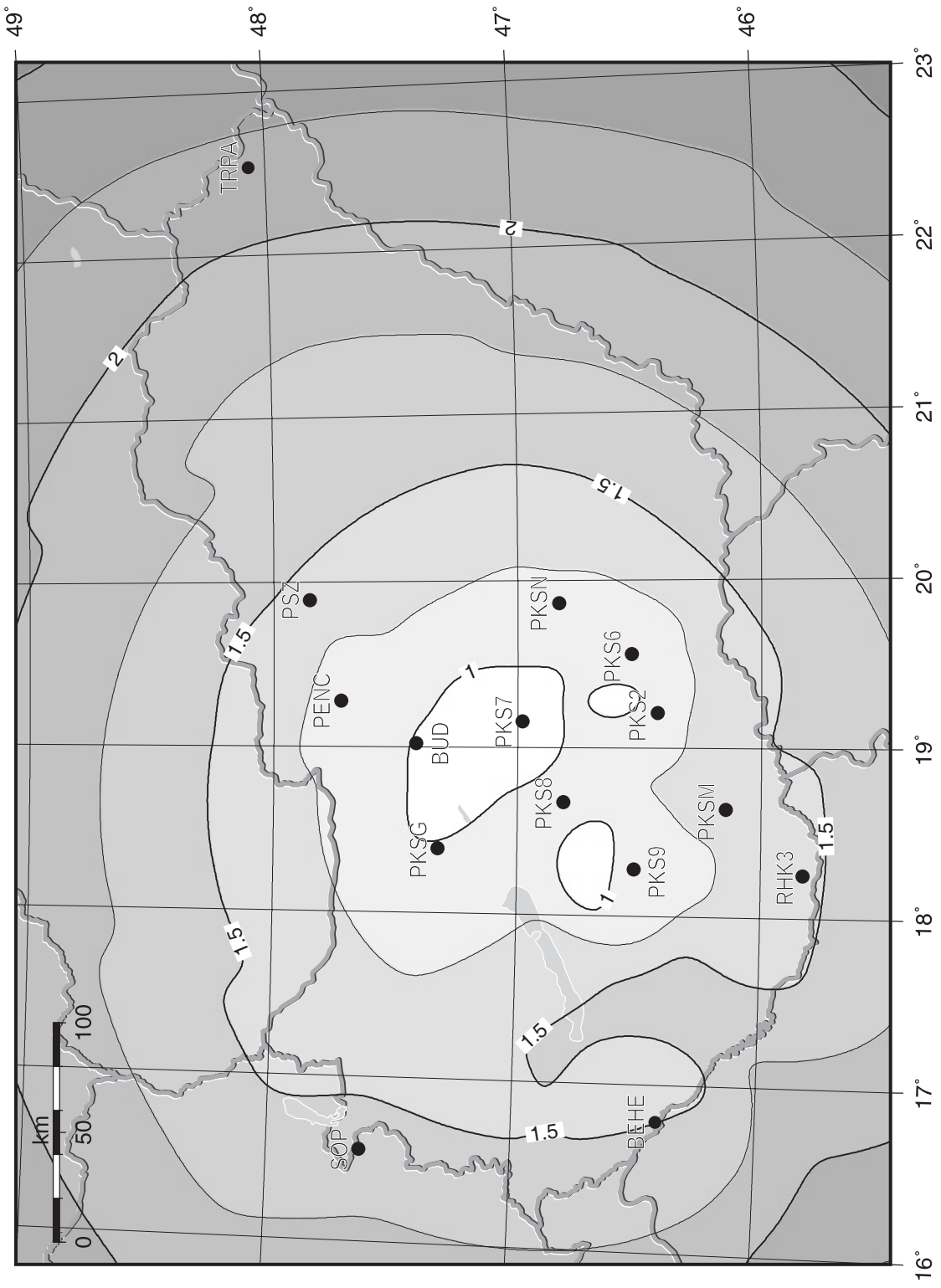
2.1. ábra A magyarországi szeizmológiai állomáshálózat 2006-ban (részletek: 2.1. Táblázat)

Figure 2.1. Seismograph station network in Hungary in 2006 (See Table 2.1. for details)



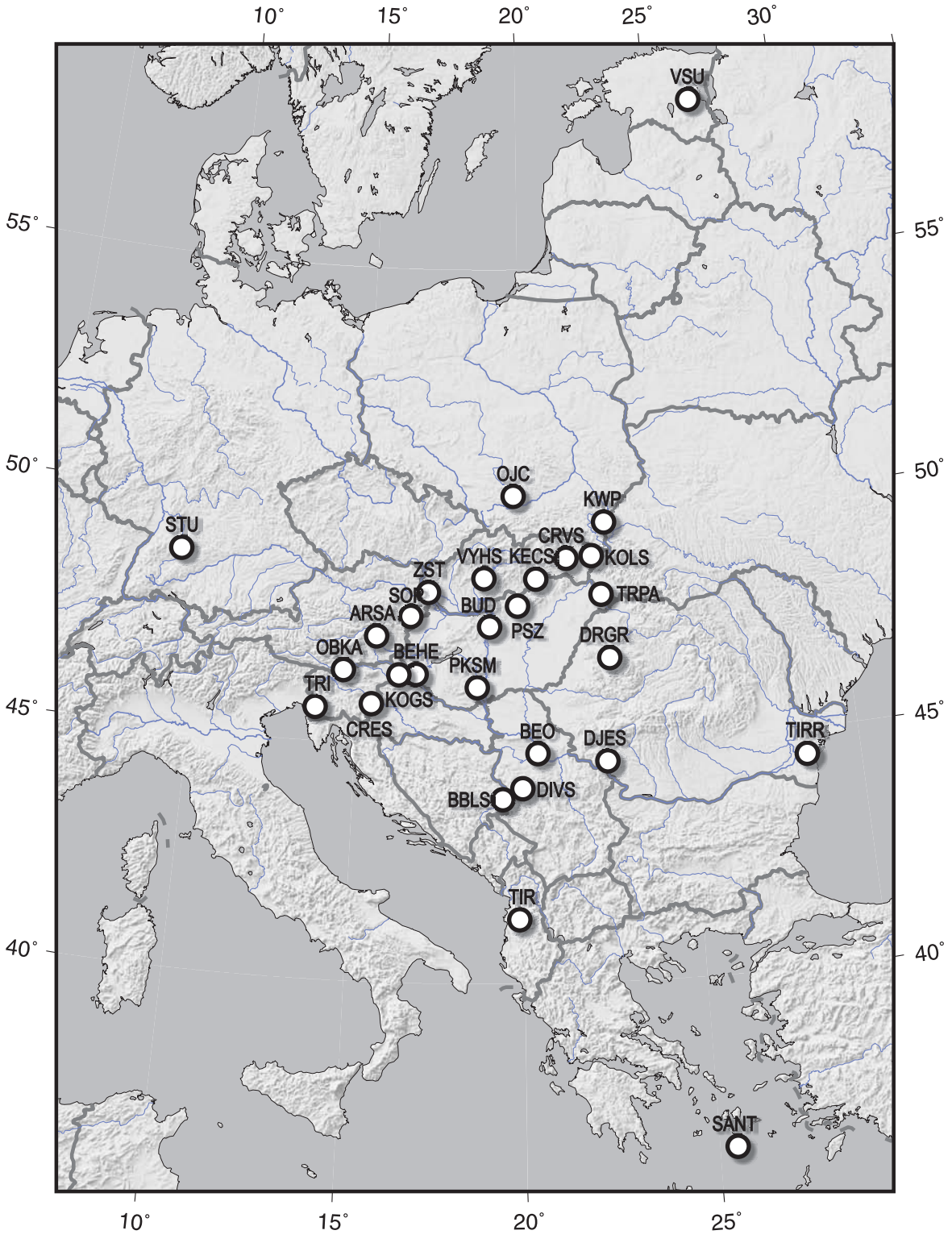
2.2. ábra A magyarországi szeizmológiai hálózat felépítése

Figure 2.2. Structure of the Hungarian seismograph network



2.3. ábra Érzékenységi küszöb átlagos zajviszonyokat feltételezve. Az izovonalak Richter-féle lokális magnitúdót (ML) mutatnak.

Figure 2.3. Detection capability at average noise conditions. Contour values are local Richter magnitudes (ML)



2.4. ábra HUNRENG virtuális szeizmológiai hálózat állomásai

Figure 2.4. Seismic stations used for HUNRENG virtual seismic network

2.2. Táblázat HUNRENG virtuális szeizmológiai hálózat külföldi állomásai
Table 2.2. Supplementary seismic stations used for HUNRENG virtual seismic network

Állomáskód Station code	Az üzembentartó hálózat / Operating network		Ország / Country
	Kódja / Code *	Neve / Name	
KWP	GE	GEOFON	Lengyelország / Poland
SANT			Görögország / Greece
STU			Németország / Germany
TIRR			Románia / Romania
VSU			Észtország / Estonia
DIVS	MN	MEDNET	Szerbia / Serbia
TIR			Albánia / Albania
TRI			Olaszország / Italy
ARSA	OE	Osztrák Szeizmológiai Hálózat / Austrian Seismic Network	Ausztria / Austria
OBKA			
OJC	PL	Lengyel Szeizmológiai Hálózat / Polish Seismological Network	Lengyelország / Poland
DRGR	RO	Román Szeizmológiai Hálózat / Romanian Seismic Network	Románia / Romania
BBLS	SJ	Szerb Szeizmológiai Hálózat / Serbian Seismological Network	Szerbia / Serbia
BEO			
DJES			
CRVS	SK	Szlovák Nemzeti Szeizmológiai Hálózat / Slovak National Seismic Network	Szlovákia / Slovakia
KECS			
KOLS			
VYHS			
ZST			
CRES	SL	Szlovéniai Szeizmológiai Hálózat / Slovenia Seismic Network	Szlovénia / Slovenia
KOGS			

(*) FDSN (International Federation of Digital Seismograph Networks) kód

3.

ESEMÉNYLISTA

ÉS

FÖLDRENGÉS FÉSZEKPARAMÉTEREK

A FÖLDRENGÉS FÉSZEKPARAMÉTEREK MEGHATÁROZÁSA

A fészekparaméterek rutinszerű kiszámításához a HYPO71PC programot használtuk (Lee and Lahr, 1975). Az eredeti kódot kissé módosítottuk a könnyebb kezelhetőség érdekében, és kiegészítettük egy rutinnal, amely a Richter-féle lokális magnitúdót (M_L) számolja Bakun és Joyner (1984) módszerével.

A fészekparaméterek meghatározásánál mind a magyarországi, mind a szomszédos országok állomásainak adatait felhasználtuk. A számításnál az egyes állomások kimérési adatait az epicentrumtól való távolsággal fordított arányban súlyoztuk. Néhány esetben, amikor elegendő P fázis adat állt rendelkezésre, az S fázis adatokat nem használtuk fel.

SEBESSÉGMODELL

A számításnál felhasznált 3 rétegű sebességmodell több száz helyi és közeli földrengés kéregfázis adatain alapul (Mónus, 1995).

Sebesség (v_P) [km/s]	*Mélység [km]*	*Vastagság [km]*	v_P/v_S
5,60	0,0	20,0	1,78
6,57	20,0	11,0	
8,02	31,0	∞	

3.

LIST OF ORIGINS AND 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 adjoining 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 sufficient number of P readings were available, S phase readings were not used in the calculations.

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).

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

ESEMÉNYLISTA / LIST OF EVENTS

Nap	Kipattanási idő (UTC) óó pp mp	Földrajzi koordináták Lat	Long	Mélység (km)	ML	I_{MAX} (EMS)	Helyszín
Day	Origin time UTC hr mn sec	Geographic coordinates Lat	Long	Depth (km)	ML	I_{MAX} (EMS)	Locality/Region
JANUÁR / JANUARY, 2006							
08	15:22:33.5	45.503N	16.246E	4	3.1	-	Croatia
11	4:30:54.1	46.302N	16.821E	10	1.7	-	Croatia
26	12:09:31.4	47.779N	19.045E	10	0.8	-	Dunabogdány
26	12:23:11.9	47.547N	18.547E	0	1.1	-	Nagyegyháza (expl.)
FEBRUÁR / FEBRUARY, 2006							
01	11:41:17.4	48.616N	20.720E	0		-	Slovakia (expl.)
02	11:54:46.7	45.605N	17.642E	15	1.7	-	Croatia
07	12:12:02.0	48.382N	19.854E	0		-	Slovakia (expl.)
08	13:16:10.3	45.592N	17.236E	8	1.9	-	Croatia
15	11:07:02.9	45.665N	17.508E	10	1.7	-	Croatia
23	11:10:22.4	45.787N	17.351E	2	1.3	-	Croatia
MÁRCIUS / MARCH, 2006							
09	20:14:33.3	48.904N	18.176E	1	3.1	-	Slovakia
13	8:28:38.6	48.563N	17.660E	7	2.8	-	Slovakia
28	13:01:25.2	46.230N	16.047E	10		-	Croatia
29	10:36:46.2	47.501N	18.676E	0	0.7	-	Bicske (expl.)
30	10:54:42.0	47.524N	18.743E	0	1.1	-	Herceghalom (expl.)
ÁPRILIS / APRIL, 2006							
02	23:34:58.6	46.397N	19.682E	17	2.2	-	Zsana
09	17:55:35.0	46.202N	16.819E	10	2.0	-	Croatia
20	7:35:20.1	47.443N	18.692E	0	1.0	-	Etyek (expl.)
20	11:49:02.5	47.411N	18.718E	0	0.7	-	Pusztazámor (expl.)
21	9:38:56.8	47.404N	18.539E	0	1.6	-	Vértesboglár (expl.)
MÁJUS / MAY, 2006							
09	12:39:40.8	45.629N	19.683E	18	2.3	-	Serbia
13	8:41:12.6	46.325N	18.838E	10	1.5	-	Bogyiszló
16	13:58:57.9	46.478N	17.858E	10	1.3	-	Somodor
20	3:26:18.1	46.374N	19.708E	6	1.2	-	Zsana
24	11:20:54.1	47.472N	18.704E	0	0.8	-	Herceghalom (expl.)

JÚNIUS / JUNE, 2006

05	3:29:23.9	47.162N	18.798E	10	0.6	-	Pusztaszabolcs
05	13:52:50.5	45.909N	17.747E	20	1.9	-	Endrőc
12	12:01:50.9	47.737N	20.054E	0		-	Karácsond (expl.)
14	11:45:12.2	47.229N	18.299E	3	0.3	-	Moha
20	10:11:51.9	47.896N	20.097E	10	2.4	-	Recsk
27	9:28:38.4	48.462N	18.738E	0	1.5	-	Slovakia (expl.)
27	10:13:03.3	48.401N	19.845E	0	1.2	-	Slovakia (expl.)
28	12:19:08.6	48.398N	19.070E	0	1.0	-	Slovakia (expl.)

JÚLIUS / JULY, 2006

12	11:29:33.1	47.999N	19.964E	7	1.0	-	Mátraterenye
13	11:58:13.5	47.893N	19.244E	0	1.5	-	Alsópetény (expl.)
14	10:12:26.1	48.005N	19.507E	0	1.0	-	Nógrádsipek (expl.)
20	7:46:11.7	47.387N	18.312E	0	0.9	-	Csókakő (expl.)
26	8:23:18.5	48.386N	19.863E	0	1.1	-	Slovakia (expl.)
31	1:39:23.2	46.243N	18.962E	7	1.8	-	Érsekcsanád

AUGUSZTUS / AUGUST, 2006

01	7:38:51.1	45.884N	18.871E	4	2.7	-	Serbia
01	7:58:24.8	45.817N	18.886E	0	2.3	-	Serbia
03	10:21:55.4	48.174N	21.347E	14	1.2	-	Bodrogkisfalud
17	10:07:50.0	47.937N	19.829E	2	2.0	-	Mátraverebély
20	8:51:40.0	45.870N	18.907E	1	2.1	-	Serbia
24	9:03:24.8	48.371N	19.849E	0	1.1	-	Slovakia (expl.)
25	11:04:36.5	47.969N	19.472E	0	0.8	-	Herencsény (expl.)
25	23:04:30.2	48.020N	19.437E	6	1.6	-	Iliny
29	10:33:15.8	48.201N	21.227E	10	1.4	-	Rátka
30	19:09:49.4	45.500N	17.258E	1	2.9	-	Croatia

SZEPTEMBER / SEPTEMBER, 2006

04	8:28:17.5	47.912N	19.833E	1	1.3	-	Mátraszentimre
07	7:41:19.4	47.905N	19.803E	7	1.6	-	Mátraszentimre
07	11:44:00.5	48.032N	19.530E	0	0.8	-	Rimóc (expl.)
13	9:27:02.4	48.383N	19.840E	0	1.1	-	Slovakia (expl.)
13	12:36:53.9	48.099N	20.226E	4		-	Bekölce
14	13:03:05.1	47.084N	19.613E	10	2.2	-	Csemő
15	21:02:04.8	47.458N	19.835E	10	2.9	4	Tápiószele
25	11:38:00.7	48.272N	19.829E	0	1.2	-	Slovakia (expl.)
25	11:57:01.5	47.944N	19.447E	0		-	Terény (expl.)
27	9:25:50.6	48.367N	19.827E	0	1.0	-	Slovakia (expl.)
29	10:48:54.6	47.933N	19.386E	0		-	Becske (expl.)

OKTÓBER / OCTOBER, 2006

02	12:24:45.2	47.930N	19.824E	0	1.3	-	Mátraszentimre
03	9:16:40.5	48.382N	19.830E	0	1.3	-	Slovakia (expl.)

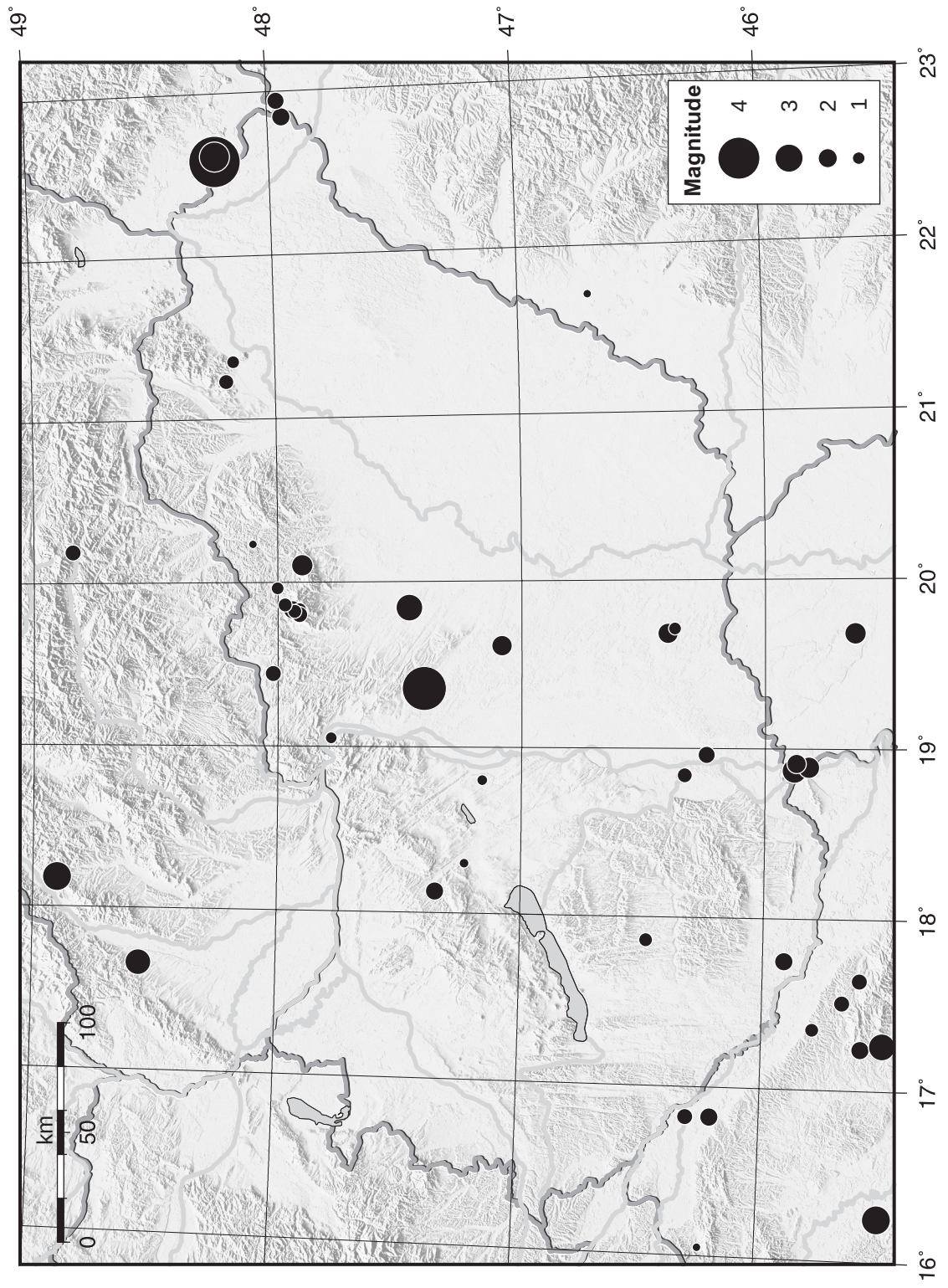
03	10:06:36.4	47.897N	19.410E	0		-	Bercel (expl.)
10	3:36:57.5	47.346N	18.132E	10	2.0	-	Nagyveleg
17	8:37:30.4	48.382N	19.820E	0	1.2	-	Slovakia (expl.)
17	11:16:08.5	47.909N	19.431E	0		-	Szanda (expl.)
21	9:10:03.2	48.360N	19.841E	0	1.2	-	Slovakia (expl.)
24	8:33:35.3	48.384N	19.835E	0	1.5	-	Slovakia (expl.)

NOVEMBER / NOVEMBER, 2006

02	11:19:50.6	47.966N	19.938E	0		-	Mátramindszent (expl)
07	21:20:04.5	46.712N	21.711E	1		-	Romania
15	18:09:39.9	48.224N	22.614E	9	3.2	4	Barabás
21	14:16:01.7	48.841N	20.188E	0	1.6	-	Slovakia
23	7:15:21.1	48.216N	22.583E	10	4.5	5-6	Beregsurány
27	13:44:11.4	48.383N	19.834E	0	1.2	-	Slovakia (expl.)
29	11:30:34.9	47.915N	20.081E	0		-	Parád (expl.)
30	12:14:13.8	47.966N	19.859E	0	1.3	-	Dorogháza

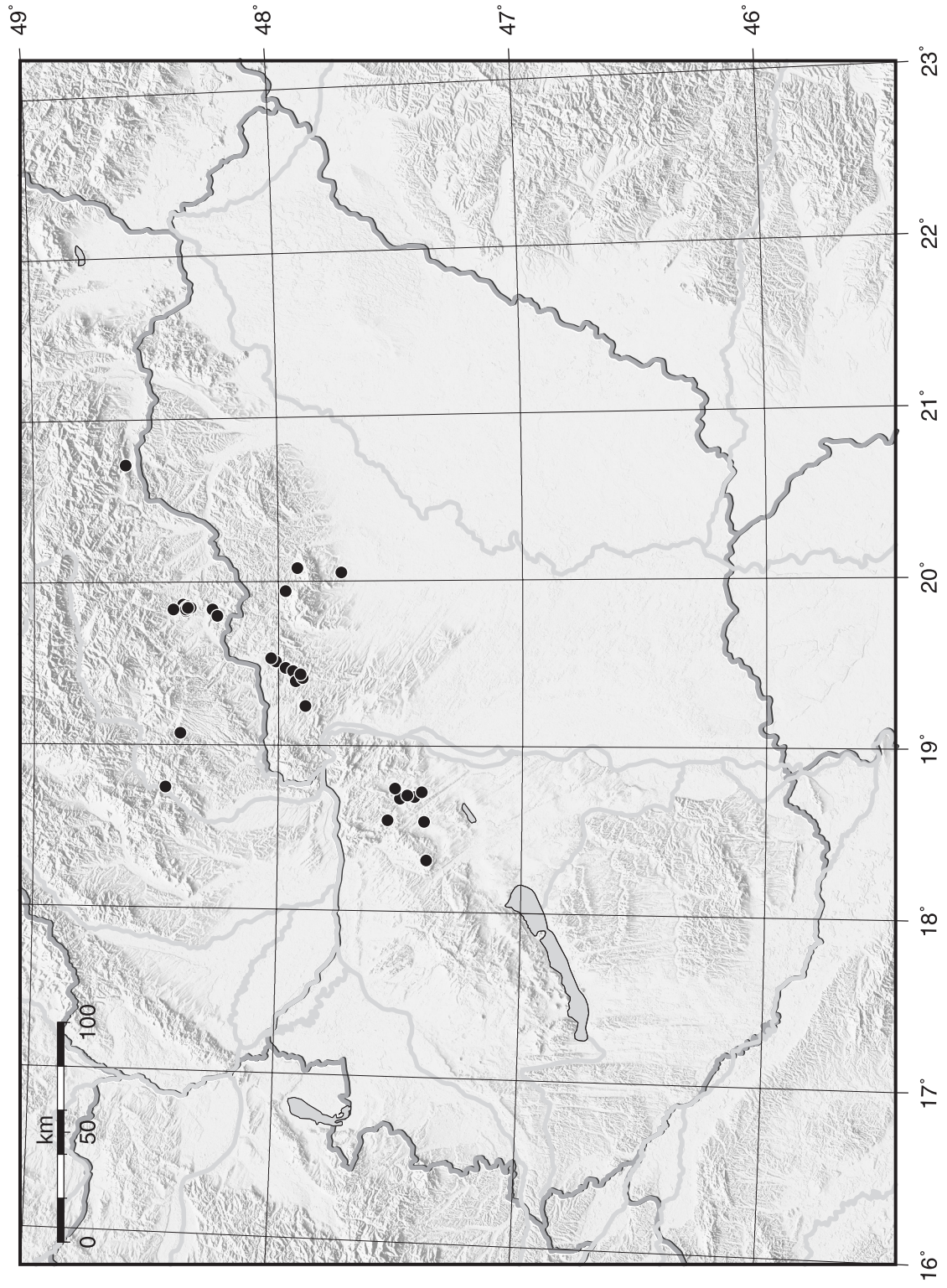
DECEMBER / DECEMBER, 2006

08	11:53:06.6	48.249N	19.788E	0	0.6	-	Slovakia (expl.)
11	22:45:32.3	47.944N	22.838E	10	1.9	-	Méhtelek
14	9:33:47.2	48.429N	19.834E	0	1.0	-	Slovakia (expl.)
16	8:38:11.2	47.964N	22.939E	7	1.8	-	Romania
22	10:29:00.4	48.369N	19.837E	0	1.3	-	Slovakia (expl.)
31	13:39:23.4	47.405N	19.345E	5	4.1	6	Gyömrő



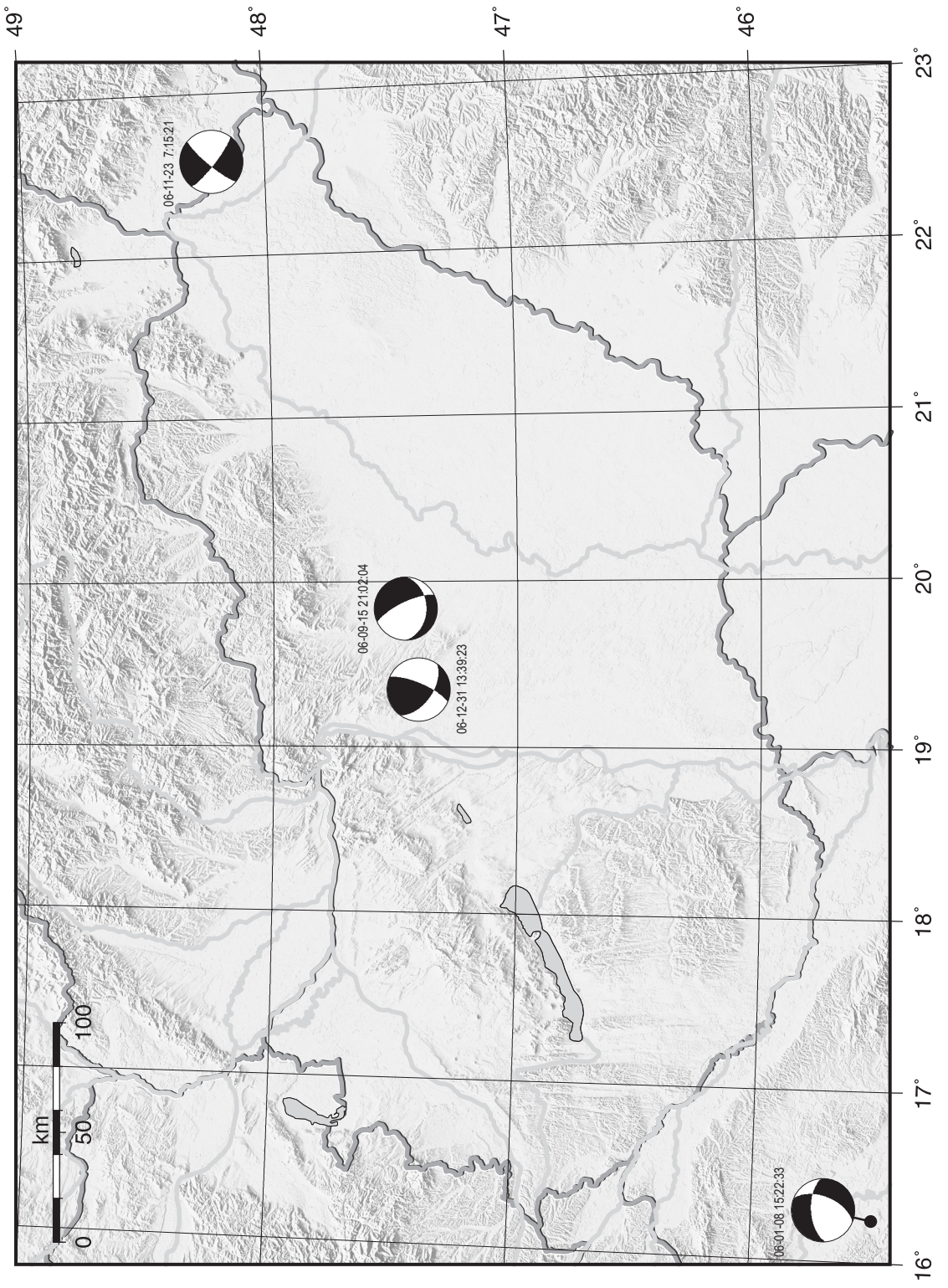
3.1. ábra A 2006-ban regisztrált földrengések epicentrumai

Figure 3.1. Epicenters of 2006 earthquakes



3.2. ábra A 2006-ban regisztrált robbantások epicentrumai

Figure 3.2. Epicenters of 2006 explosions



3.3. ábra A 2006-ban regisztrált földrengések fészekmechanizmusai

Figure 3.3. Fault plane solutions of 2006 earthquakes

FÉSZEKPARAMÉTEREK ÉS FÁZISADATOK

A listában alkalmazott jelek és rövidítések magyarázata:

time: Az esemény kipattanásának ideje (óra:perc:másodperc; UTC).

ML: A rengés Richter-féle lokális magnitúdója.

lat: Az esemény földrajzi szélessége (fok).

lon: Az esemény földrajzi hosszúsága (fok).

h: A fészek mélysége (km).

erh: Horizontális hiba km-ben. ($erh = \sqrt{SDX^2 + SDY^2}$, ahol *SDX* és *SDY* az epicentrum földrajzi szélességének és hosszúságának meghatározási hibái.) Ha *erh* = ---, a kevés rendelkezésre álló adat miatt *erh* nem volt meghatározható.

erz: A fészekmélység meghatározásának hibája (km). *erz* = --- azt jelzi, hogy *erz* nem volt meghatározható a kevés rendelkezésre álló adat miatt.

nr: A számításnál felhasznált fázisadatok száma. Azonos állomásról származó P és S beérkezések 2 adatnak számítanak.

gap: Az állomások közötti legnagyobb irányeltérés (fok).

rms: A számított beérkezési idők átlagnégyzetes hibája (mp). ($rms = \sqrt{\sum R_i^2 / nr}$, ahol R_i az *i* –edik állomás időhibája (reziduál).)

Locality: A rengés földrajzi helyének megnevezése, általában a legközelebbi település neve.

Comments: Az eseménnyel kapcsolatos egyéb közlemény (pl. epicentrális intenzitás).

sta: Az állomás neve. (L. 2. fejezet.)

dist: Az állomás távolsága az epicentrumtól (km).

azm: Az állomás irányszöge az epicentrumból az északi iránytól számítva (fok).

phase: Fázis azonosító; az első betű a kezdetet jellemzi: *e* = lassan emelkedő *i* = hirtelen kitérő; a második és harmadik betű a fázis megnevezése pl. Pn, Pg, Sn, Sg; a negyedik a kitérési irányt jelzi: C=kompresszió/fel, D=dilatáció/le.

hr mn sec: A fázis beérkezési ideje (óra, perc, másodperc).

res: Reziduál (másodperc). ($res = T_{obs} - T_{cal}$, ahol T_{obs} a mért, és T_{cal} a számított menetidő.)

Minden rengésnél, ahol elegendő számú első kitérési adat állt rendelkezésre, megkíséreltük a fészekmechanizmus meghatározását. Az ábrákon az alsó félteke sztereografikus képe látható, **P** a maximális, **T** a minimális feszültségtengely iránya. A fészekmechanizmusokat a 3.3. ábra foglalja össze.

PHASE DATA

Key to phase data encoding

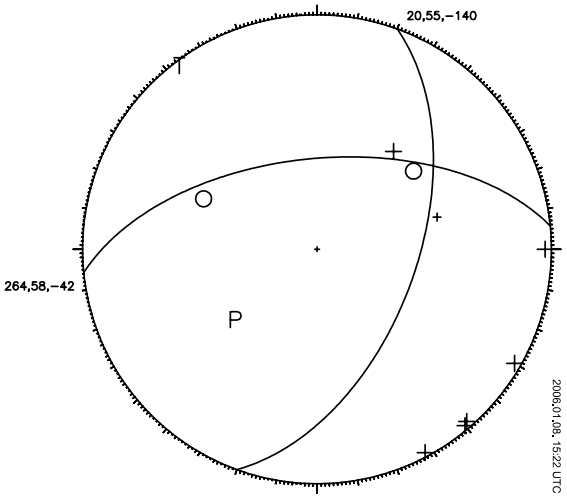
time:	Time of occurrence of event in hours, mins and secs (UTC).
ML:	Richter local magnitude of the earthquake.
lat:	Latitude of the event in degrees.
lon:	Longitude of the event in degrees.
h:	Depth of the hypocenter in km.
erh:	Standard error of the epicenter in km. ($erh = \sqrt{SDX^2 + SDY^2}$, where *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 (Reasenberg and Oppenheimer, 1985). The results are summarized in Fig. 3.3.

1.

2006-01-08 time: 15:22:33.46 UTC ML= 3.1
lat: 45.503N lon: 16.246E h= 3.6 km
erh= 3.8km erz= 2.5km
nr= 27 gap=195 rms=0.63
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn	sec	res
CRES	71.2	300	iPgC	15:22:45.80		-0.39
GOLS	74.3	319	iPgC	15:22:46.90		0.15
			iSg	22:55.70		-1.41
BOJS	77.7	270	iPgC	15:22:46.80		-0.54
			iSg	22:54.90		-3.27
DOBS	93.9	320	iPgC	15:22:50.40		0.17
KOGS	105.1	0	iPg	15:22:52.80		0.57
GROS	121.1	332	iPgC	15:22:54.60		-0.49
LJU	146.6	294	iPnD	15:22:59.00		0.69
PERS	153.3	325	iPn	15:22:58.70		-0.45
			iSn	23:15.80		-3.38
BISS	153.9	326	iPn	15:22:58.90		-0.32
			iSn	23:15.70		-3.62
RHK1	156.5	65	ePn	15:22:59.40		-0.15
			eSn	23:17.20		-2.70
RHK3	162.1	75	ePnC	15:23:00.60		0.36
			eSn	23:22.10		0.97
OBKA	172.6	310	Pn	15:23:01.40		-0.15
			Sn	23:23.70		0.23
VOY	192.2	288	ePn	15:23:03.20		-0.80
			eSn	23:29.30		1.48
PKSM	202.1	67	ePn	15:23:09.90		4.67
			eSn	23:33.70		3.69
ARSA	202.1	344	Pn	15:23:05.30		0.07
			Sn	23:26.40		-3.61
PKS8	242.1	51	iPnD	15:23:09.20		-1.02
			eSn	23:45.30		6.40
PKSG	267.0	38	iPnC	15:23:13.20		-0.12
PKS7	282.8	53	ePn	15:23:23.30		8.01
			eSn	23:58.60		10.67
KBA	284.0	308	Pn	15:23:15.90		0.46
			Sn	23:47.00		-1.19
MOA	301.7	330	Pn	15:23:18.50		0.85
			Sn	23:49.60		-2.52
ZST	306.5	12	ePn	15:23:19.20		0.95
			eSn	23:48.40		-4.79
WTTA	405.0	299	Pn	15:23:31.60		1.06
			Sn	24:14.50		-0.56
WATA	412.8	300	Pn	15:23:31.30		-0.20
			Sn	24:16.60		-0.18
GEC2	418.7	333	ePn	15:23:32.40		0.16
			eSn	24:14.20		-3.89
SQTA	432.1	296	Pn	15:23:34.80		0.89
MOTA	445.2	297	Pn	15:23:36.30		0.76
KHC	451.0	333	ePn	15:23:36.60		0.33
			eSn	24:20.90		-4.36
WET	478.2	328	ePn	15:23:39.10		-0.56
			eSn	24:26.20		-5.10
DAVA	528.2	292	Pn	15:23:46.60		0.70
			Sn	24:05.70		-36.70
CLL	688.7	340	ePn	15:24:07.00		1.09
			eSn	25:09.00		-9.02
MBDF	750.5	263	ePn	15:24:12.30		-1.32
			eSn	25:21.80		-9.94
CDF	755.5	295	ePn	15:24:12.30		-1.94
			eSn	25:20.90		-11.94
HINF	763.6	290	ePn	15:24:13.50		-1.74
			eSn	25:23.50		-11.13
FRF	792.9	254	ePn	15:24:18.20		-0.70
CABF	795.7	279	ePn	15:24:17.70		-1.55
HAU	805.8	290	ePn	15:24:19.80		-0.71
			eSn	25:32.80		-11.21
ORIF	816.9	265	ePn	15:24:20.50		-1.39
			eSn	25:35.70		-10.78



2.

2006-01-11 time: 4:30:54.11 UTC ML= 1.7
lat: 46.302N lon: 16.821E h= 10.0 km
erh= 3.6km erz= 1.8km
nr= 6 gap=173 rms=0.22
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn	sec	res
KOGS	46.8	290	iSg	4:31:09.60		0.27
GOLS	98.0	251	iPgC	4:31:11.50		-0.19
RHK1	99.3	103	ePgD	4:31:12.20		0.28
			eSg	31:24.00		-1.82
GROS	103.0	280	iP*	4:31:12.30		-0.29
LEGS	122.7	251	iPnC	4:31:15.30		0.14
			iSn	31:31.70		0.13

3.

2006-01-26 time: 12:09:31.41 UTC ML= 0.8
lat: 47.779N lon: 19.045E h= 10.0 km
erh= 5.5km erz= 2.8km
nr= 9 gap=241 rms=0.52
Locality: Dunabogdány
Comments:

sta	dist	azm	phase	hr mn	sec	res
RHK5	9.2	167	ePgD	12:09:33.40		-0.43
			eSg	09:35.50		-0.22
RHK6	19.2	127	iPgD	12:09:35.20		-0.07
			eSg	09:38.80		0.51
PSZ	65.4	76	iPgD	12:09:43.00		-0.22
			eSg	09:52.70		0.26
PKS7	81.8	174	iPgD	12:09:47.60		1.48
PKS8	103.9	196	eP*D	12:09:50.40		0.38
			eS*	10:03.40		-1.14

4.

2006-01-26 time: 12:23:11.85 UTC ML= 1.1
lat: 47.547N lon: 18.547E h= 0.0 km
erh= 3.2km erz= 679km
nr= 8 gap=203 rms=0.48
Locality: Nagyegyháza
Comments: probably explosion

sta	dist	azm	phase	hr mn	sec	res
PKSG	20.9	214	ePgC	12:23:15.60		0.02
			eSg	23:18.30		-0.18
SRO2	26.6	334	ePg	12:23:16.30		-0.30
			eSg	23:19.90		-0.40
SRO1	33.6	315	eSg	12:23:22.50		-0.03
SRO	34.4	329	eSg	12:23:23.50		0.71
VYHS	107.5	12	ePg	12:23:31.90		0.85

```
                  eSg      23:44.90   -1.12
ZST  130.0 304    eSg   12:23:49.50   -3.66
```

5.

```
 2006-02-01  time: 11:41:17.39 UTC  ML=
   lat: 48.616N  lon: 20.720E  h=  0.0 km
                 erh=11.6km    erz= 9.5km
   nr=  6        gap=159       rms=0.40
   Locality: Slovak Republic
   Comments: probably explosion

sta   dist azm  phase  hr mn  sec     res
CRVS  63.1  60   ePg   11:41:28.80    0.14
                 eSg      41:36.90   -0.54
PSZ   98.9 218   ePgC  11:41:35.10    0.04
                 eSg      41:48.50   -0.33
VYHS 139.8 264   ePn   11:41:42.50    0.65
                 eSn      42:00.30   -0.63
```

6.

```
 2006-02-02  time: 11:54:46.67 UTC  ML= 1.7
   lat: 45.605N  lon: 17.642E  h= 15.0 km
                 erh= 1.9km    erz= 0.7km
   nr=  6        gap=335       rms=0.08
   Locality: Croatia
   Comments:

sta   dist azm  phase  hr mn  sec     res
RHK3  57.0  56   iPgD  11:54:57.20    0.00
                 eSg      55:05.40   -0.02
RHK1  63.9  32   iPgC  11:54:58.30   -0.10
                 eSg      55:07.70    0.16
PKSM 102.8  49   iPnC  11:55:04.70    0.09
                 eSn      55:18.50   -0.10
```

7.

```
 2006-02-07  time: 12:12:02.01 UTC  ML=
   lat: 48.382N  lon: 19.854E  h=  0.0 km
                 erh= 6.6km    erz=11.5km
   nr=  6        gap=145       rms=0.62
   Locality: Slovak Republic
   Comments: probably explosion

sta   dist azm  phase  hr mn  sec     res
PSZ   51.6 177   iPgC  12:12:11.30    0.07
                 eSg      12:18.00   -0.41
VYHS  76.3 279   ePg   12:12:15.90    0.26
                 eSg      12:25.20   -1.08
CRVS 131.9  64   ePn   12:12:26.40    0.91
                 eSn      12:42.40   -1.40
```

8.

```
 2006-02-08  time: 13:16:10.29 UTC  ML= 1.9
   lat: 45.592N  lon: 17.236E  h=  8.2 km
                 erh= 4.4km    erz= 2.1km
   nr=  6        gap=342       rms=0.16
   Locality: Croatia
   Comments:

sta   dist azm  phase  hr mn  sec     res
RHK1  85.7  49   ePgC  13:16:25.60   -0.05
                 eSg      16:37.70    0.06
RHK3  85.7  67   ePgD  13:16:25.60   -0.05
                 eSg      16:37.80    0.16
PKSM 129.0  58   iPnC  13:16:32.40    0.05
                 eSn      16:46.60   -2.96
```

9.

```
 2006-02-15  time: 11:07:02.90 UTC  ML= 1.7
   lat: 45.665N  lon: 17.508E  h= 10.0 km
                 erh= 3.5km    erz= 1.9km
   nr=  6        gap=336       rms=0.14
   Locality: Croatia
   Comments:

sta   dist azm  phase  hr mn  sec     res
RHK3  63.0  67   ePgD  11:07:14.40    0.11
                 eSg      07:23.10   -0.07
RHK1  64.8  42   iPgC  11:07:14.50   -0.11
                 eSg      07:24.00    0.26
PKSM 106.8  55   iP*D  11:07:22.00    0.03
                 eS*      07:35.90   -0.94
```

10.

```
 2006-02-23  time: 11:10:22.37 UTC  ML= 1.3
   lat: 45.787N  lon: 17.351E  h=  2.1 km
                 erh=10.3km    erz= 212km
   nr=  6        gap=338       rms=0.68
   Locality: Croatia
   Comments:

sta   dist azm  phase  hr mn  sec     res
RHK1  65.6  59   iPgC  11:10:33.60   -0.49
                 eSg      10:42.90   -0.33
RHK3  70.9  81   ePgD  11:10:35.50    0.46
                 eSg      10:43.60   -1.33
PKSM 110.6  65   ePgC  11:10:43.00    0.88
                 eSg      10:58.30    0.78
```

11.

```
 2006-03-09  time: 20:14:33.26 UTC  ML= 3.1
   lat: 48.904N  lon: 18.176E  h=  0.5 km
                 erh= 2.4km    erz= 2.5km
   nr= 22        gap= 69       rms=1.05
   Locality: Slovak Republic
   Comments:

sta   dist azm  phase  hr mn  sec     res
VYHS  66.6 133   iPg   20:14:44.60   -0.56
                 eSg      14:52.80   -1.64
OKC  103.8 359   ePg   20:14:51.90    0.10
                 eSg      15:03.70   -2.56
MORC 107.4 335   ePg   20:14:51.69   -0.75
                 eSg      15:05.49   -1.92
ZST  111.7 225   ePg   20:14:54.00    0.79
                 eSg      15:08.00   -0.77
RAC  131.2   1   ePn   20:14:57.50    0.92
                 eSn      15:15.50    0.74
NIE  166.0  70   ePn   20:15:02.10    1.17
                 eSn      15:23.40    0.89
PSZ  167.9 131   ePnD  20:15:01.00   -0.16
                 eSn      15:21.50   -1.42
PKSG 168.9 175   ePn   20:15:01.00   -0.28
BUD  170.1 158   ePn   20:15:01.90    0.47
OJC  187.6  39   ePn   20:15:04.60    0.99
                 eSn      15:27.50    0.22
DPC  209.3 320   ePn   20:15:08.40    2.08
                 eSn      15:33.80    1.69
KSP  254.6 328   ePn   20:15:14.10    2.13
PRU  289.8 295   ePn   20:15:17.40    1.04
                 eSn      15:57.20    7.22
RHK1 312.4 181   iPnD  20:15:20.70    1.52
MOA  312.5 248    Pn   20:15:19.70    0.51
                  Sn      15:55.90    0.88
KHC  337.3 274   ePn   20:15:23.20    0.92
                 eSn      16:10.90   10.39
BRG  374.9 306    Pn   20:15:37.30   10.34
                  Sn      16:22.40   13.55
CLL  456.6 306   ePn   20:15:38.00    0.85
```

12.

2006-03-13 time: 8:28:38.64 UTC ML= 2.8
lat: 48.563N lon: 17.660E h= 7.0 km
erh= 3.1km erz= 6.6km
nr= 29 gap= 41 rms=0.94
Locality: Slovak Republic
Comments:

sta	dist	azm	phase	hr mn	sec	res
ZST	58.0	225	ePg	8:28:48.60		-0.47
			eSg	28:55.70		-1.51
VRAC	113.9	317	Pn	8:28:58.29		-0.69
SOP	127.6	220	ePn	8:29:00.60		-0.09
			eSn	29:16.20		-1.70
MORC	135.3	356	ePn	8:29:01.28		-0.36
			eSn	29:17.94		-1.65
PKSG	141.2	157	ePnC	8:29:01.30		-1.09
			eSn	29:20.80		-0.11
OKC	146.1	14	ePn	8:29:02.60		-0.40
			eSn	29:19.90		-2.10
BUD	157.4	140	ePnD	8:29:04.70		0.30
			eSn	29:25.20		0.70
RAC	173.5	13	ePn	8:29:08.70		2.29
			eSn	29:28.20		0.13
PSZ	180.8	113	ePnD	8:29:08.00		0.67
			eSn	29:28.90		-0.81
NIE	216.3	64	ePn	8:29:11.70		-0.05
			eSn	29:37.50		-0.07
ARSA	216.4	228	Pn	8:29:14.70		2.94
			Sn	29:41.40		3.81
ARSA	216.4	228	Pn	8:29:11.40		-0.36
DPC	221.1	334	ePn	8:29:12.40		0.05
			eSn	29:36.60		-2.05
OJC	240.9	40	ePn	8:29:14.00		-0.82
			eSn	29:41.20		-1.85
MOA	264.4	253	Pn	8:29:17.90		0.15
			Sn	29:48.80		0.54
PKSM	271.7	164	ePnC	8:29:17.60		-1.06
			eSn	29:45.50		-4.38
KSP	272.0	339	ePn	8:29:19.00		0.30
PRU	276.8	305	ePn	8:29:18.70		-0.59
			eSn	29:56.50		5.50
PERS	287.2	222	ePn	8:29:20.00		-0.59
GERE	293.0	276	Pn	8:29:21.66		0.34
			Sn	29:53.89		-0.71
GEC2	293.0	276	ePn	8:29:21.80		0.48
			eSn	30:04.50		9.90
KHC	306.1	282	ePn	8:29:23.00		0.05
			eSn	30:06.00		8.48
OBKA	327.1	226	Pn	8:29:25.40		-0.17
VISS	336.4	204	iPn	8:29:30.70		3.97
PDKS	341.7	216	iPn	8:29:27.20		-0.19
WET	356.8	280	ePn	8:29:29.60		0.33
			eSn	30:19.20		10.44
KBA	362.9	243	Pn	8:29:30.60		0.58
BRG	371.3	314	iPn	8:29:28.38		-2.69
KWP	387.3	72	ePn	8:29:33.80		0.72
			eSn	30:19.50		3.96
VOY	400.4	225	ePn	8:29:36.60		1.89
DRGR	427.4	117	Pn	8:29:38.20		0.13
BZS	444.5	137	PnD	8:29:41.50		1.30
CLL	452.7	312	iPn	8:29:40.70		-0.53
			eSn	30:27.00		-3.05
MOX	494.5	298	ePn	8:29:46.40		-0.03
			eSn	30:36.60		-2.72
BURB	572.8	101	PnD	8:29:56.10		-0.10
BURA	572.8	101	PnD	8:29:56.06		-0.14
DAVO	620.6	252	Pn	8:30:02.21		0.05
			Sn	31:03.74		-3.57
BFO	690.7	268	ePn	8:30:09.82		-1.08
LPG	896.5	248	ePn	8:30:33.80		-2.76
LPL	896.9	248	ePn	8:30:34.90		-1.71
RFYF	898.9	270	ePn	8:30:33.00		-3.86
SFTF	935.7	268	ePn	8:30:37.00		-4.45
			eSn	32:59.80		42.55
MBDF	936.4	243	ePn	8:30:41.30		-0.23
ORIF	987.2	246	ePn	8:30:46.70		-1.18
LOR	41.6	262	ePn	8:30:50.00		-4.65
SMF	60.8	258	ePn	8:30:52.50		-4.54
SSF	73.2	261	ePn	8:30:54.10		-4.49
VIVF	75.2	247	ePn	8:30:54.40		-4.44
BGF	136.9	259	ePn	8:31:02.40		-4.14
LDF	294.1	90	ePn	8:31:22.70		-3.44
MFF	335.4	99	ePn	8:31:28.90		-2.39
FINE	531.8	21	Pn	8:31:51.10		-4.67

13.

2006-03-28 time: 13:01:25.16 UTC ML=
lat: 46.230N lon: 16.047E h= 10.0 km
erh= 7.3km erz= 3.7km
nr= 10 gap=245 rms=0.64
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn	sec	res
GOLS	40.8	233	ePg	13:01:32.80		0.14
CRES	64.0	225	iPg	13:01:36.20		-0.54
PDKS	82.8	258	ePg	13:01:40.00		-0.06
PERS	84.6	302	ePg	13:01:40.20		-0.17
VISS	105.0	243	eP*	13:01:43.50		-0.45
OBKA	119.4	285	Pn	13:01:46.60		0.79
			Sn	02:01.90		-0.01
ARSA	120.3	341	Pn	13:01:46.00		0.08
			Sn	02:01.30		-0.81
VOY	167.9	262	ePn	13:01:53.90		2.04
			eSn	02:17.70		5.02

14.

2006-03-29 time: 10:36:46.20 UTC ML= 0.7
lat: 47.501N lon: 18.676E h= 0.0 km
erh= 5.7km erz= 722km
nr= 6 gap=214 rms=0.43
Locality: Bicske
Comments: probably explosion

sta	dist	azm	phase	hr mn	sec	res
PKSG	24.7	240	ePgC	10:36:50.30		-0.31
			eSg	36:54.40		0.35
BUD	26.3	94	iPgC	10:36:50.90		0.00
			eSg	36:54.80		0.24
PKS8	69.2	180	ePg	10:36:58.00		-0.57
			eSg	37:09.90		1.69

15.

2006-03-30 time: 10:54:42.04 UTC ML= 1.1
lat: 47.524N lon: 18.743E h= 0.0 km
erh= ***km erz= ***km
nr= 5 gap=221 rms=0.82
Locality: Herceghalom
Comments: probably explosion

sta	dist	azm	phase	hr mn	sec	res
BUD	21.7	102	ePgC	10:54:44.50		-1.41
			eSg	54:51.20		2.27
PKSG	30.4	241	ePg	10:54:47.50		0.04
			eSg	54:52.10		0.41
PKS8	72.0	184	eSg	10:55:04.90		-0.02

16.

2006-04-02 time: 23:34:58.61 UTC ML= 2.2
lat: 46.397N lon: 19.682E h= 16.6 km
erh= 2.5km erz= 1.5km
nr= 16 gap=123 rms=0.51
Locality: Zsana
Comments:

sta	dist	azm	phase	hr mn	sec	res
PKS6	24.3	338	iPgC	23:35:03.80		-0.06
			eSg	35:08.30		0.34
PKS7	82.5	331	eP*	23:35:13.60		0.25
			eS*	35:25.00		0.15
PKSM	82.8	256	P*	23:35:13.10		-0.29

```
PKS8  93.8 305   eP*C  23:35:14.80   -0.26
                 eS*      35:28.40    0.51
PKS9 109.8 281   ePnD  23:35:17.10   -0.10
                 eSn      35:31.10   -0.61
RHK3 124.1 243   ePn   23:35:18.70   -0.29
                 eSn      35:35.90    1.01
PKSG 148.0 318   ePn   23:35:22.20    0.23
                 eSn      35:42.10    1.91
PSZ  169.9   5   iPnC  23:35:23.90   -0.80
                 eSn      35:45.00   -0.05
BZS  173.2 120    PnD  23:35:25.80    0.69
DRGR 236.3  79    Pn   23:35:38.30    5.33
```

17.

```
 2006-04-09  time: 17:55:34.95 UTC  ML= 2.0
   lat: 46.202N  lon: 16.819E  h= 10.0 km
                 erh= 5.5km    erz= 4.4km
   nr= 14        gap=141       rms=0.96
   Locality: Croatia
   Comments:

sta   dist azm  phase  hr mn  sec     res
KOGS  51.6 302    Pg   17:55:44.00   -0.34
GOLS  94.8 257    Pg   17:55:51.70   -0.28
GCIS 101.0 248    Pg   17:55:53.10    0.03
GROS 105.4 286    P*   17:55:52.70   -1.10
RHK3 116.3 107   iPnC  17:55:55.30    0.09
                 eSn      56:09.60   -1.40
LEGS 119.5 256    Pn   17:55:55.70    0.09
PKS9 120.1  69   ePnC  17:55:55.30   -0.39
                 eSn      56:12.70    0.84
ARSA 152.9 320    Pn   17:55:59.00   -0.78
                  Sn      56:17.70   -1.44
OBKA 178.0 281    Pn   17:56:04.30    1.39
                  Sn      56:27.10    2.39
PKSG 178.5  42   iPnC  17:56:04.80    1.83
KBA  283.3 290    Pn   17:56:22.70    6.67
                  Sn      56:57.30    9.23
```

18.

```
 2006-04-20  time:  7:35:20.13 UTC  ML= 1.0
   lat: 47.443N  lon: 18.692E  h=  0.0 km
                 erh= 2.9km    erz= 607km
   nr=  5        gap=184       rms=0.29
   Locality: Etyek
   Comments: probably explosion

sta   dist azm  phase  hr mn  sec     res
PKSG  23.4 256   iPgC   7:35:24.10   -0.21
                 eSg      35:28.50    0.93
BUD   25.4  80   eSg    7:35:28.50    0.28
PKS8  62.7 181   ePgC   7:35:31.20   -0.12
                 eSg      35:40.10    0.05
```

19.

```
 2006-04-20  time: 11:49:02.52 UTC  ML= 0.7
   lat: 47.411N  lon: 18.718E  h=  0.0 km
                 erh= ***km    erz= ***km
   nr=  5        gap=166       rms=0.61
   Locality: Pusztazámor
   Comments: probably explosion

sta   dist azm  phase  hr mn  sec     res
BUD   24.4  71   ePgC  11:49:06.20   -0.68
                 eSg      49:10.70    0.41
PKSG  24.8 265   iPgD  11:49:06.40   -0.55
                 eSg      49:11.20    0.80
PKS8  59.3 183   ePg   11:49:13.70    0.59
```

20.

```
 2006-04-21  time:  9:38:56.84 UTC  ML= 1.6
   lat: 47.404N  lon: 18.539E  h=  0.0 km
                 erh= 1.6km    erz= 218km
   nr=  6        gap=267       rms=0.13
   Locality: Vértesboglár
   Comments: probably explosion

sta   dist azm  phase  hr mn  sec     res
PKSG  11.3 263   iPgC   9:38:58.70   -0.15
                 eSg      39:00.50    0.08
PKS8  59.3 170   ePgC   9:39:07.40   -0.03
                 eSg      39:15.60   -0.09
PKS9  92.9 192   ePgD   9:39:13.70    0.26
                 eSg      39:26.40    0.02
```

21.

```
 2006-05-09  time: 12:39:40.85 UTC  ML= 2.3
   lat: 45.629N  lon: 19.683E  h= 18.3 km
                 erh= 135km    erz= 130km
   nr=  8        gap=330       rms=0.47
   Locality: Serbia
   Comments:

sta   dist azm  phase  hr mn  sec     res
PKSM 103.6 309   ePnD  12:39:58.10   -0.37
                 eSn      40:11.80   -0.40
RHK3 115.0 285   ePn   12:39:59.60   -0.29
                 eSn      40:15.00    0.26
RHK1 135.4 292   ePn   12:40:02.80    0.37
                 eSn      40:19.30    0.03
PKS9 152.1 314   ePn   12:40:05.20    0.69
                 eSn      40:28.30    5.33
```

22.

```
 2006-05-13  time:  8:41:12.63 UTC  ML= 1.5
   lat: 46.325N  lon: 18.838E  h= 10.0 km
                 erh= 2.3km    erz=11.9km
   nr=  8        gap=189       rms=0.37
   Locality: Bogyiszló
   Comments:

sta   dist azm  phase  hr mn  sec     res
PKS2  34.3  57   iPgD   8:41:19.00   -0.01
                 eSg      41:24.20    0.21
PKS9  51.9 304   ePgC   8:41:22.70    0.64
                 eSg      41:30.00    0.58
PKS8  62.8 349   iPgC   8:41:23.90   -0.08
                 eSg      41:31.70   -1.13
RHK1  64.4 247   ePgC   8:41:23.80   -0.46
                 eSg      41:33.20   -0.14
```

23.

```
 2006-05-16  time: 13:58:57.91 UTC  ML= 1.3
   lat: 46.478N  lon: 17.858E  h= 10.0 km
                 erh=19.4km    erz=45.5km
   nr=  6        gap=256       rms=0.48
   Locality: Somodor
   Comments:

sta   dist azm  phase  hr mn  sec     res
PKS9  34.5  69   ePg   13:59:03.70   -0.63
                 eSg      59:10.40    1.06
RHK1  45.7 159   iPgC  13:59:06.50    0.23
                 eSg      59:12.40   -0.38
PKS8  76.9  55   ePg   13:59:12.00    0.24
                 eSg      59:21.90   -0.66
```

24.

2006-05-20 time: 3:26:18.10 UTC ML= 1.2
lat: 46.374N lon: 19.708E h= 6.0 km
erh=10.6km erz= 7.0km
nr= 6 gap=294 rms=0.68
Locality: Zsana
Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKSN	59.4	12	ePgC	3:	26:	28.10	-0.66
			eSg		26:	37.80	0.73
PKS8	96.9	305	iPgD	3:	26:	35.90	0.46
			eSg		26:	48.00	-0.96
PKSG	151.3	318	ePn	3:	26:	42.90	-0.33
			eSn		27:	04.50	1.67

25.

2006-05-24 time: 11:20:54.13 UTC ML= 0.8
lat: 47.472N lon: 18.704E h= 0.0 km
erh= 5.7km erz= 643km
nr= 5 gap=198 rms=0.32
Locality: Herceghalom
Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
BUD	24.2	87	ePgC	11:	20:	58.30	-0.15
			eSg		21:	02.10	0.29
PKSG	25.2	249	ePgC	11:	20:	58.20	-0.44
			eSg		21:	02.70	0.55
PKS9	103.6	198	ePg	11:	21:	12.80	0.18

26.

2006-06-05 time: 3:29:23.90 UTC ML= 0.6
lat: 47.162N lon: 18.798E h= 10.0 km
erh= 0.5km erz= 2.4km
nr= 5 gap=165 rms=0.05
Locality: Pusztaszabolcs
Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKS7	30.4	115	ePgC	3:	29:	29.60	-0.01
			eSg		29:	34.10	0.04
PKS8	32.9	196	ePg	3:	29:	30.00	-0.03
PKSG	40.0	310	iPgD	3:	29:	31.30	0.04
			eSg		29:	36.90	-0.11

27.

2006-06-05 time: 13:52:50.48 UTC ML= 1.9
lat: 45.909N lon: 17.747E h= 20.2 km
erh= 3.7km erz= 5.5km
nr= 17 gap=164 rms=0.66
Locality: Endrőc
Comments:

sta	dist	azm	phase	hr	mn	sec	res
RHK3	39.2	93	ePgD	13:	52:	58.40	0.07
			eSg		53:	03.50	-0.95
PKSM	76.9	64	ePgD	13:	53:	03.60	-0.46
			eSg		53:	15.20	0.55
PKS9	85.8	29	ePgC	13:	53:	05.20	-0.21
			eSg		53:	16.40	-0.65
BEH	97.6	310	ePn	13:	53:	08.10	0.99
			eSn		53:	20.90	0.83
PKS8	129.3	34	ePnD	13:	53:	11.10	0.03
			eSn		53:	27.00	-0.12
GOLS	165.0	274	iPnD	13:	53:	16.00	0.48
			iSn		53:	33.80	-1.24
GCIS	166.0	268	iPn	13:	53:	16.00	0.36
			eSn		53:	34.00	-1.27
CRES	178.0	267	iPn	13:	53:	17.60	0.46
			eSn		53:	37.20	-0.73
BOJS	199.5	257	eSn	13:	53:	39.70	-2.99
MOA	342.0	309	Pn	13:	53:	36.20	-1.38
			Sn		54:	12.70	-1.62

28.

2006-06-12 time: 12:01:50.94 UTC ML=
lat: 47.737N lon: 20.054E h= 0.0 km
erh= ***km erz= ***km
nr= 5 gap=292 rms=0.48
Locality: Karácsond
Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PSZ	23.5	329	iPgC	12:	01:	55.50	0.37
			eSg		01:	58.60	0.20
KECS	89.0	21	eSg	12:	02:	19.00	-0.23
VYHS	123.7	313	ePg	12:	02:	12.50	-0.54
			eSg		02:	25.60	-4.67

29.

2006-06-14 time: 11:45:12.18 UTC ML= 0.3
lat: 47.229N lon: 18.299E h= 3.4 km
erh= 2.7km erz= 1.1km
nr= 6 gap=232 rms=0.11
Locality: Moha
Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKSG	19.4	21	iPgC	11:	45:	15.60	-0.09
			eSg		45:	18.50	0.06
PKS8	48.4	144	iPgC	11:	45:	20.90	0.07
			eSg		45:	27.50	-0.08
VYHS	146.3	16	ePn	11:	45:	37.20	0.18
			eSn		45:	56.20	-0.20

30.

2006-06-20 time: 10:11:51.87 UTC ML= 2.4
lat: 47.896N lon: 20.097E h= 10.0 km
erh=16.3km erz= 4.5km
nr= 5 gap=256 rms=0.64
Locality: Recsk
Comments:

sta	dist	azm	phase	hr	mn	sec	res
PSZ	15.4	279	ePgC	10:	11:	55.00	-0.15
			eSg		11:	58.10	0.39
KECS	71.4	24	eSg	10:	12:	14.60	-0.20
VYHS	115.0	305	ePn	10:	12:	12.70	0.73
			eSn		12:	25.90	-1.74

31.

2006-06-27 time: 9:28:38.40 UTC ML= 1.5
lat: 48.462N lon: 18.738E h= 0.0 km
erh= 1.3km erz= 349km
nr= 9 gap=131 rms=0.26
Locality: Slovak Republic
Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
VYHS	8.1	64	ePg	9:	28:	39.90	0.06
			eSg		28:	41.40	0.43
KOLL	28.0	298	ePg	9:	28:	43.50	0.10
			eSg		28:	46.80	-0.50
PSZ	105.1	125	ePgD	9:	28:	57.20	0.04
			eSg		29:	11.80	0.00
ZST	124.8	256	eSg	9:	29:	18.20	0.12
KECS	129.2	89	ePg	9:	29:	01.20	-0.28
			eSg		29:	15.90	-3.58

32.

2006-06-27 time: 10:13:03.32 UTC ML= 1.2
lat: 48.401N lon: 19.845E h= 0.0 km
erh= 2.0km erz= 2.4km
nr= 7 gap=147 rms=0.41
Locality: Slovak Republic
Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
KECS	48.3	79	ePg	10	13	12.40	0.46
			eSg		13	18.90	0.23
PSZ	53.8	176	ePgC	10	13	12.80	-0.12
VYHS	75.4	278	ePg	10	13	17.20	0.42
			eSg		13	26.80	-0.47
CRVS	131.5	65	ePn	10	13	26.20	-0.55
			eSn		13	44.60	-0.43

33.

2006-06-28 time: 12:19:08.65 UTC ML= 1.0
lat: 48.398N lon: 19.070E h= 0.0 km
erh= 1.6km erz= 2.2km
nr= 7 gap=143 rms=0.58
Locality: Slovak Republic
Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
VYHS	20.3	302	iPg	12	19	12.40	0.12
			eSg		19	15.60	0.50
PSZ	81.3	131	ePgD	12	19	23.20	0.03
			eSg		19	35.20	0.71
KECS	105.2	85	e g	12	19	27.40	-0.03
			eSg		19	41.80	-0.27
ZST	147.7	261	eSn	12	19	51.80	-2.15

34.

2006-07-12 time: 11:29:33.13 UTC ML= 1.0
lat: 47.999N lon: 19.964E h= 7.3 km
erh= 3.8km erz= 3.9km
nr= 6 gap=162 rms=0.54
Locality: Mátraterenye
Comments:

sta	dist	azm	phase	hr	mn	sec	res
PSZ	10.3	210	ePgC	11	29	34.90	-0.48
			eSg		29	37.70	0.56
KECS	66.4	36	eSg	11	29	54.00	-0.36
VYHS	100.3	303	ePg	11	29	52.00	0.92
			eSg		30	04.70	-0.38
CRVS	149.6	48	eSn	11	30	17.40	0.21

35.

2006-07-13 time: 11:58:13.54 UTC ML= 1.5
lat: 47.893N lon: 19.244E h= 0.0 km
erh= ***km erz= ***km
nr= 6 gap=169 rms=0.71
Locality: Alsópetény
Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PENC	11.8	166	ePgD	11	58	15.10	-0.54
			eSg		58	18.30	1.02
VYHS	73.4	336	e g	11	58	27.60	0.97
			eSg		58	35.70	-1.15
KECS	113.3	55	ePg	11	58	33.80	0.04
			eSg		58	49.30	-0.24

36.

2006-07-14 time: 10:12:26.06 UTC ML= 1.0
lat: 48.005N lon: 19.507E h= 0.2 km
erh= ***km erz= ***km
nr= 6 gap=209 rms=0.92
Locality: Nógrádsipek
Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PSZ	30.5	108	ePg	10	12	30.50	-1.01
			eSg		12	36.30	0.54
VYHS	73.7	317	ePg	10	12	39.90	0.67
			eSg		12	47.40	-2.09
KECS	90.0	54	ePg	10	12	42.80	0.66
			eSg		12	55.00	0.32

37.

2006-07-20 time: 7:46:11.68 UTC ML= 0.9
lat: 47.387N lon: 18.312E h= 0.0 km
erh= ***km erz= ***km
nr= 5 gap=263 rms=0.76
Locality: Csókakő
Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSG	6.0	85	iPgC	7	46	12.50	-0.25
			eSg		46	14.10	0.51
PKS8	62.9	154	ePg	7	46	24.00	1.08
			eSg		46	29.50	-2.18
PKS9	89.0	182	ePgC	7	46	27.40	-0.17

38.

2006-07-26 time: 8:23:18.54 UTC ML= 1.1
lat: 48.386N lon: 19.863E h= 0.0 km
erh= 4.9km erz= 8.5km
nr= 6 gap=145 rms=0.52
Locality: Slovak Republic
Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PSZ	52.0	177	ePgC	8	23	27.90	0.07
			eSg		23	35.00	-0.08
VYHS	76.9	279	ePg	8	23	32.60	0.33
			eSg		23	41.80	-1.19
CRVS	131.0	64	ePn	8	23	42.40	0.49
			eSn		23	59.30	-0.84

39.

2006-07-31 time: 1:39:23.17 UTC ML= 1.8
lat: 46.243N lon: 18.962E h= 7.4 km
erh= 2.2km erz= 2.4km
nr= 11 gap=185 rms=0.42
Locality: Érsekcsanád
Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKSM	24.9	262	ePgC	1	39	27.70	-0.11
			eSg		39	31.40	-0.03
PKS6	61.0	49	ePgC	1	39	34.20	0.05
			eSg		39	42.30	-0.41
RHK3	67.5	234	ePgC	1	39	35.50	0.20
			eSg		39	44.60	-0.16
PKS8	74.0	343	iPgC	1	39	36.00	-0.45
			eSg		39	47.10	0.29
PKS7	90.7	10	ePg	1	39	40.20	0.77
PKSG	135.0	341	ePnD	1	39	46.70	0.61
			eSn		40	03.30	-0.66

40.

2006-08-01 time: 7:38:51.11 UTC ML= 2.7
lat: 45.884N lon: 18.871E h= 4.3 km
erh= 2.0km erz= 2.2km
nr= 16 gap=249 rms=0.43
Locality: Serbia
Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKSM	40.6	334	ePgC	7	38	58.50	0.10
			eSg		39	04.40	0.32
RHK3	48.0	271	ePgD	7	38	59.70	-0.02
			iSg		39	06.40	-0.04
PKS2	72.6	21	ePgD	7	39	03.80	-0.30
			Sg		39	14.40	0.17
PKS9	90.5	330	ePg	7	39	07.60	0.30
			Sg		39	19.70	-0.22
PKSG	171.6	348	ePn	7	39	18.40	-0.60
			eSn		39	41.30	0.54
BEH	174.4	292	ePn	7	39	23.80	4.45
KOGS	211.9	287	ePn	7	39	29.10	5.08

```
PSZ  239.3  19   ePnD   7:39:31.70    4.26
                 eSn      40:00.80    5.03
GOLS 252.1 273   ePn    7:39:29.50    0.46
GROS 268.0 284   iPn    7:39:29.20   -1.81
VYHS 290.2 359   ePn    7:39:34.70    0.91
                 eSn      40:04.80   -2.28
ARSA 298.3 301    Pn    7:39:34.30   -0.49
```

41.

```
 2006-08-01  time:  7:58:24.82 UTC  ML= 2.3
   lat: 45.817N  lon: 18.886E  h=  0.4 km
                 erh= 3.1km    erz= 2.8km
   nr=  8        gap=261       rms=0.98
   Locality: Serbia
   Comments:

sta   dist azm  phase  hr mn  sec     res
PKSM  47.8 337   ePgC   7:58:32.60   -0.76
                 eSg      58:39.00   -1.02
RHK3  49.9 279   ePgC   7:58:33.80    0.07
                 eSg      58:40.70    0.03
PKS2  79.2  19   ePg    7:58:39.00    0.04
                  Sg      58:50.00    0.01
BEH  178.5 294   eSn    7:59:20.10    3.22
PSZ  246.0  18   eSn    7:59:35.50    3.66
OBKA 343.7 283    Pn    7:59:13.00   -1.67
```

42.

```
 2006-08-03  time: 10:21:55.36 UTC  ML= 1.2
   lat: 48.174N  lon: 21.347E  h= 14.0 km
                 erh=11.1km    erz= 7.1km
   nr=  7        gap=216       rms=0.92
   Locality: Bodrogkisfalud
   Comments:

sta   dist azm  phase  hr mn  sec     res
CRVS  81.4   6   ePg   10:22:10.70    0.59
                 eSg      22:20.00   -1.61
KOLS 108.6  39   ePn   10:22:14.40    0.24
                 eSn      22:28.50   -0.32
PSZ  111.9 255   ePnC  10:22:14.20   -0.37
VYHS 189.5 281   ePn   10:22:26.70    2.46
                 eSn      22:45.70   -1.06
```

43.

```
 2006-08-17  time: 10:07:50.05 UTC  ML= 2.0
   lat: 47.937N  lon: 19.829E  h=  1.7 km
                 erh=12.2km    erz=47.0km
   nr=  6        gap=196       rms=0.83
   Locality: Mátraverebély
   Comments:

sta   dist azm  phase  hr mn  sec     res
PSZ    5.3 113   ePgC  10:07:50.20   -0.85
                 eSg      07:52.50    0.68
KECS  77.9  39   ePg   10:08:05.20    1.24
                 eSg      08:13.60   -1.21
VYHS  96.3 310   ePg   10:08:07.20   -0.06
                 eSg      08:20.60   -0.07
```

44.

```
 2006-08-20  time:  8:51:39.95 UTC  ML= 2.1
   lat: 45.870N  lon: 18.907E  h=  1.0 km
                 erh= 2.7km    erz= 3.1km
   nr= 14        gap=175       rms=0.52
   Locality: Serbia
   Comments:

sta   dist azm  phase  hr mn  sec     res
PKSM  43.2 332   iPgC   8:51:48.00    0.32
                 eSg      51:52.90   -0.80
RHK3  50.9 272   ePgC   8:51:49.10    0.05
                 iSg      51:55.90   -0.24
PKS9  93.3 329   ePg    8:51:57.10    0.48
                 iSg      52:09.20   -0.41
PKSN 136.0  33   ePn    8:52:03.80   -0.01
                  Sn      52:22.30   -0.12
PKSG 173.8 347   ePn    8:52:09.10    0.58
                 eSn      52:31.20    0.40
BEH  177.7 292   ePnC   8:52:13.00    3.99
                 eSn      52:35.00    3.33
BZS  212.7  98   iPn    8:52:11.90   -1.48
PSZ  239.8  18   ePnC   8:52:17.00    0.24
                 eSn      52:50.10    4.64
DRGR 310.3  71   iPnD   8:52:26.10    0.56
```

45.

```
 2006-08-24  time:  9:03:24.75 UTC  ML= 1.1
   lat: 48.371N  lon: 19.849E  h=  0.3 km
                 erh= 1.9km    erz= 2.9km
   nr=  8        gap=143       rms=0.43
   Locality: Slovak Republic
   Comments: probably explosion

sta   dist azm  phase  hr mn  sec     res
KECS  48.8  75   ePg    9:03:33.20   -0.26
                 eSg      03:39.70   -0.55
PSZ   50.4 176   ePgC   9:03:33.80    0.04
                 eSg      03:40.70   -0.08
VYHS  76.2 280   ePg    9:03:38.70    0.35
                 eSg      03:47.90   -1.06
CRVS 132.7  64   ePn    9:03:48.90    0.61
                 eSn      04:06.80    0.15
```

46.

```
 2006-08-25  time: 11:04:36.52 UTC  ML= 0.8
   lat: 47.969N  lon: 19.472E  h=  0.2 km
                 erh= ***km    erz= ***km
   nr=  6        gap=221       rms=0.85
   Locality: Herencsény
   Comments: probably explosion

sta   dist azm  phase  hr mn  sec     res
PSZ   32.1 100   ePgC  11:04:41.40   -0.85
                 eSg      04:47.30    0.58
VYHS  75.1 321   ePg   11:04:51.10    1.17
                 eSg      04:58.90   -1.49
KECS  94.5  53   ePg   11:04:53.40   -0.01
                 eSg      05:06.80    0.22
```

47.

```
 2006-08-25  time: 23:04:30.23 UTC  ML= 1.6
   lat: 48.020N  lon: 19.437E  h=  6.3 km
                 erh= 1.8km    erz= 2.8km
   nr= 14        gap= 97       rms=0.56
   Locality: Iliny
   Comments:

sta   dist azm  phase  hr mn  sec     res
PENC  28.0 205   ePgC  23:04:35.30   -0.06
                 eSg      04:39.60    0.24
PSZ   35.9 108   iPgC  23:04:37.10    0.36
                 eSg      04:41.60   -0.22
VYHS  69.1 320   ePg   23:04:43.40    0.79
                 eSg      04:51.70   -0.58
KECS  93.3  57   ePg   23:04:46.40   -0.53
                 eSg      04:59.30   -0.66
PKSG 105.1 228   iPgC  23:04:48.50   -0.53
                 eSg      05:04.10    0.40
PKS7 110.1 191   iPgC  23:04:50.20    0.28
                 eSg      05:04.20   -1.08
PKSN 129.0 165   eSn   23:05:10.20    0.26
CRVS 179.0  57   ePn   23:05:02.80    4.03
                 eSn      05:25.90    4.86
```

48.

2006-08-29 time: 10:33:15.79 UTC ML= 1.4
lat: 48.201N lon: 21.227E h= 10.0 km
erh= 7.3km erz= 5.4km
nr= 10 gap=209 rms=0.90
Locality: Rátka
Comments:

sta	dist	azm	phase	hr mn	sec	res
KECS	63.3	300	ePg	10:33:26.50		-0.74
			eSg		33:34.60	-1.56
CRVS	79.8	12	ePg	10:33:30.80		0.64
			eSg		33:42.10	0.73
PSZ	104.2	252	eP*	10:33:34.50		0.04
			eS*		33:48.70	-0.32
KOLS	112.2	43	ePn	10:33:35.20		-0.34
			eSn		33:50.10	-0.84
VYHS	180.2	280	ePn	10:33:46.30		2.28
			eSn		34:07.40	1.36

49.

2006-08-30 time: 19:09:49.36 UTC ML= 2.9
lat: 45.500N lon: 17.258E h= 0.6 km
erh= 9.7km erz= 9.1km
nr= 16 gap=206 rms=0.89
Locality: Croatia
Comments:

sta	dist	azm	phase	hr mn	sec	res
RHK3	88.6	61	ePgC	19:10:03.70		-1.49
			eSg		10:16.10	-1.44
KOGS	131.2	323	iPnD	19:10:13.00		0.32
			eSn		10:32.00	1.14
PKSM	133.4	54	iPnD	19:10:11.50		-1.45
GOLS	139.2	294	ePn	19:10:13.10		-0.58
GROS	173.0	308	iPn	19:10:17.60		-0.29
PERS	208.3	307	iPn	19:10:22.10		-0.20
PKS6	216.3	56	ePn	19:10:24.90		1.61
PKS7	226.0	40	eSn	19:11:00.30		8.39
PKSG	227.6	22	eSn	19:11:01.80		9.54
ARSA	236.0	326	Pn	19:10:26.30		0.56
			Sn		10:54.80	0.68
OBKA	238.0	298	Pn	19:10:26.20		0.21
			Sn		10:55.90	1.34
ZST	300.0	358	ePn	19:10:34.20		0.48
BZS	340.5	88	iPn	19:10:40.20		1.42
MOA	347.3	319	Pn	19:10:40.90		1.27
			Sn		11:20.50	1.66
VYHS	353.8	20	ePn	19:10:39.80		-0.64
GEC2	459.4	324	ePn	19:10:54.80		1.20
			eSn		11:45.30	1.60
MORC	476.0	3	iPn	19:10:56.10		0.43
OKC	486.9	8	eSn	19:11:43.00		-6.80
KHC	490.3	325	ePn	19:10:58.90		1.45
			eSn		11:49.30	-1.27
PRU	539.0	338	ePn	19:11:03.30		-0.23

50.

2006-09-04 time: 8:28:17.45 UTC ML= 1.3
lat: 47.912N lon: 19.833E h= 1.3 km
erh= 3.4km erz= 2.7km
nr= 8 gap=230 rms=0.42
Locality: Mátraszentimre
Comments:

sta	dist	azm	phase	hr mn	sec	res
PSZ	4.7	81	ePgC	8:28:18.20		-0.12
			eSg		28:22.20	3.20
KECS	79.9	37	ePg	8:28:31.80		0.07
			eSg		28:42.20	-0.67
VYHS	98.4	311	ePg	8:28:35.50		0.48
			eSg		28:48.40	-0.33
CRVS	163.3	48	ePn	8:28:44.50		-0.18
			eSn		29:06.40	0.49

51.

2006-09-07 time: 7:41:19.43 UTC ML= 1.6
lat: 47.905N lon: 19.803E h= 7.1 km
erh=11.4km erz=13.1km
nr= 6 gap=234 rms=0.79
Locality: Mátraszentimre
Comments:

sta	dist	azm	phase	hr mn	sec	res
PSZ	7.0	78	ePgC	7:41:20.40		-0.80
			eSg		41:23.40	0.82
KECS	81.9	38	ePg	7:41:35.10		1.00
			eSg		41:44.70	-0.84
VYHS	97.2	312	ePg	7:41:37.50		0.66
			eSg		41:50.30	-0.11

52.

2006-09-07 time: 11:44:00.47 UTC ML= 0.8
lat: 48.032N lon: 19.530E h= 0.0 km
erh= ***km erz= ***km
nr= 5 gap=200 rms=0.86
Locality: Rimóc
Comments: probably explosion

sta	dist	azm	phase	hr mn	sec	res
PSZ	30.0	115	ePgC	11:44:05.60		-0.22
			eSg		44:11.20	1.20
VYHS	72.8	315	ePg	11:44:14.70		1.23
			eSg		44:22.10	-1.50
KECS	86.9	55	eSg	11:44:27.50		-0.60

53.

2006-09-13 time: 9:27:02.40 UTC ML= 1.1
lat: 48.383N lon: 19.840E h= 0.0 km
erh= 1.8km erz= 3.0km
nr= 8 gap=145 rms=0.34
Locality: Slovak Republic
Comments: probably explosion

sta	dist	azm	phase	hr mn	sec	res
KECS	49.1	77	iPg	9:27:11.20		0.03
			eSg		27:17.90	-0.10
PSZ	51.8	176	ePgC	9:27:11.60		-0.05
			eSg		27:18.50	-0.37
VYHS	75.3	279	ePg	9:27:16.10		0.25
			eSg		27:25.80	-0.54
CRVS	132.7	64	ePn	9:27:26.60		0.61
			eSn		27:43.50	-0.88

54.

2006-09-13 time: 12:36:53.93 UTC ML=
lat: 48.099N lon: 20.226E h= 4.2 km
erh= 2.0km erz= 2.3km
nr= 6 gap=185 rms=0.24
Locality: Bekölce
Comments:

sta	dist	azm	phase	hr mn	sec	res
PSZ	31.9	231	ePgC	12:36:59.70		0.03
			eSg		37:04.30	0.15
KECS	46.8	24	ePg	12:37:01.90		-0.43
			eSg		37:09.60	0.72
VYHS	112.1	293	eSg	12:37:29.60		0.01
CRVS	127.7	46	eSn	12:37:33.90		0.07

55.

2006-09-14 time: 13:03:05.06 UTC ML= 2.2
lat: 47.084N lon: 19.613E h= 10.0 km
erh= 4.5km erz= 4.0km
nr= 14 gap=103 rms=0.94
Locality: Csemő
Comments:

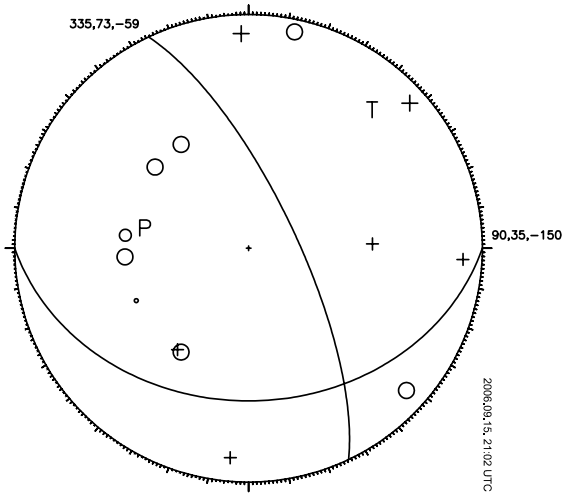
Hypocenter Parameters **Földrengés paraméterek**

sta	dist	azm	phase	hr mn	sec	res
PKSN	28.4	137	iPgC	13:03:10.40		-0.03
			eSg	03:15.70		1.08
PENC	82.4	342	ePgC	13:03:20.00		0.11
			eSg	03:31.50		0.05
PSZ	95.1	13	ePgC	13:03:21.10		-1.04
			eSg	03:33.90		-1.57
PKS9	115.8	242	iPnD	13:03:25.60		0.34
			eSn	03:40.60		-0.41
PKSM	122.2	218	iPn	13:03:25.30		-0.75
VYHS	167.2	340	ePn	13:03:33.80		2.13
			eSn	03:52.50		0.08
KECS	168.7	23	ePn	13:03:34.60		2.75
			eSn	03:52.70		-0.05
CRVS	244.7	34	ePn	13:03:45.10		3.77

56.

2006-09-15 time: 21:02:04.84 UTC ML= 2.9
lat: 47.458N lon: 19.835E h= 10.0 km
erh= 1.5km erz= 1.3km
nr= 17 gap= 72 rms=0.34
Locality: Tápiószele
Comments: felt 4 EMS

sta	dist	azm	phase	hr mn	sec	res
PSZ	51.4	5	ePgC	21:02:13.90		-0.29
			eSg	02:21.50		0.01
PENC	55.7	312	iPgD	21:02:14.90		-0.04
			eSg	02:21.70		-1.12
BUD	61.2	273	ePgC	21:02:16.60		0.68
			eSg	02:23.20		-1.36
PKSN	62.3	178	iPgC	21:02:16.40		0.29
			iSg	02:25.20		0.29
PKS7	68.5	228	iPgC	21:02:16.90		-0.29
			eSg	02:25.90		-0.93
PKS6	97.5	192	iPgD	21:02:22.10		-0.25
			iSg	02:34.80		-1.20
PKSG	109.3	266	iPnD	21:02:23.90		-0.31
			eSn	02:37.70		-1.63
KECS	123.9	23	ePn	21:02:26.00		-0.05
			eSn	02:41.20		-1.39
VYHS	137.3	327	iPn	21:02:27.80		0.09
			eSn	02:44.50		-1.05
PKSM	165.8	213	iPnD	21:02:31.40		0.14
			eSn	02:52.60		0.73
CRVS	201.1	37	ePn	21:02:36.30		0.64
RHK3	212.4	215	ePnC	21:02:40.60		3.53
			eSn	03:05.50		3.29
ZST	220.5	292	ePn	21:02:37.90		-0.18
			eSn	03:01.50		-2.52
DRGR	230.4	109	iPn	21:02:39.00		-0.32
STHS	241.5	26	ePn	21:02:41.90		1.20
BZS	246.1	146	iPn	21:02:40.90		-0.37
SOP	247.9	276	ePnD	21:02:41.80		0.30
			eSn	03:07.90		-2.19
BEH	257.5	245	ePnD	21:02:48.30		5.61
			eSn	03:26.70		14.48
OKC	292.4	335	ePn	21:02:47.80		0.75
MORC	308.4	327	iPnD	21:02:49.40		0.36
VRAC	316.3	311	iPnD	21:02:50.20		0.17
GZR	322.1	135	iPn	21:02:51.50		0.74
ARSA	326.6	266	Pn	21:02:50.20		-1.12
			Sn	03:25.10		-2.47
BURA	405.6	88	PnC	21:03:04.27		3.11
BURB	405.6	88	iPn	21:03:04.30		3.14
DPC	412.1	321	ePn	21:03:02.10		0.13
UPC	439.7	320	ePn	21:03:05.90		0.48
PRU	480.5	306	ePn	21:03:10.60		0.09
			eSn	03:58.60		-3.14
GEC2	481.8	289	ePn	21:03:11.20		0.53
			eSn	04:00.60		-1.41
KHC	500.2	292	ePn	21:03:13.40		0.44
			eSn	04:04.40		-1.70



57.

2006-09-25 time: 11:38:00.66 UTC ML= 1.2
lat: 48.272N lon: 19.829E h= 0.0 km
erh= 2.0km erz= 578km
nr= 6 gap=136 rms=0.34
Locality: Slovak Republic
Comments: probably explosion

sta	dist	azm	phase	hr mn	sec	res
PSZ	39.6	173	ePg	11:38:07.60		-0.13
			eSg	38:13.50		0.25
KECS	54.0	64	ePg	11:38:10.00		-0.30
			eSg	38:18.00		0.18
VYHS	77.6	289	ePg	11:38:15.00		0.49
			eSg	38:24.80		-0.52

58.

2006-09-25 time: 11:57:01.48 UTC ML=
lat: 47.944N lon: 19.447E h= 0.0 km
erh= ***km erz= ***km
nr= 6 gap=229 rms=0.64
Locality: Terény
Comments: probably explosion

sta	dist	azm	phase	hr mn	sec	res
PSZ	33.6	95	ePg	11:57:06.80		-0.67
			eSg	57:12.40		0.26
VYHS	76.2	323	ePg	11:57:15.90		0.82
			eSg	57:24.50		-1.19
KECS	97.7	52	ePg	11:57:19.20		0.27
			eSg	57:32.50		-0.05

59.

2006-09-27 time: 9:25:50.64 UTC ML= 1.0
lat: 48.367N lon: 19.827E h= 0.0 km
erh= 1.7km erz= 466km
nr= 6 gap=154 rms=0.27
Locality: Slovak Republic
Comments: probably explosion

sta	dist	azm	phase	hr mn	sec	res
PSZ	50.2	174	ePg	9:25:59.70		0.11
			eSg	26:06.50		-0.08
KECS	50.4	75	ePg	9:25:59.30		-0.33
			eSg	26:06.90		0.25
VYHS	74.7	281	ePg	9:26:04.30		0.32
			eSg	26:14.00		-0.38

60.

2006-09-29 time: 10:48:54.61 UTC ML=
lat: 47.933N lon: 19.386E h= 0.0 km
erh= 4.7km erz= 691km
nr= 6 gap=234 rms=0.40
Locality: Becske
Comments: probably explosion

sta	dist	azm	phase	hr mn	sec	res
PSZ	38.0	92	ePgC	10:49:	01.10	-0.30
			eSg		49:06.70	0.00
VYHS	74.6	327	ePg	10:49:	07.80	-0.12
			eSg		49:18.30	0.00
KECS	102.1	53	ePg	10:49:	13.60	0.76
			eSg		49:26.60	-0.46

61.

2006-10-02 time: 12:24:45.24 UTC ML= 1.3
lat: 47.930N lon: 19.824E h= 0.0 km
erh= 4.8km erz= 5.6km
nr= 8 gap=207 rms=0.68
Locality: Mátraszentimre
Comments:

sta	dist	azm	phase	hr mn	sec	res
PSZ	5.4	104	ePgC	12:24:	45.60	-0.60
			eSg		24:47.80	0.85
KECS	78.8	39	ePg	12:25:	00.10	0.80
			eSg		25:09.40	-0.87
VYHS	96.6	311	ePg	12:25:	02.90	0.42
			eSg		25:15.50	-0.44
CRVS	162.4	48	ePn	12:25:	11.90	-0.62
			eSn		25:34.90	1.10

62.

2006-10-03 time: 9:16:40.50 UTC ML= 1.3
lat: 48.382N lon: 19.830E h= 0.0 km
erh= 1.9km erz= 3.7km
nr= 8 gap=145 rms=0.36
Locality: Slovak Republic
Comments: probably explosion

sta	dist	azm	phase	hr mn	sec	res
KECS	49.8	77	iPg	9:16:	49.30	-0.09
			eSg		16:56.40	0.07
PSZ	51.8	175	ePgC	9:16:	49.70	-0.05
			eSg		16:56.60	-0.36
VYHS	74.6	280	ePg	9:16:	54.30	0.48
			eSg		17:03.60	-0.60
CRVS	133.4	64	ePn	9:17:	04.60	0.43
			eSn		17:21.20	-1.43

63.

2006-10-03 time: 10:06:36.39 UTC ML=
lat: 47.897N lon: 19.410E h= 0.0 km
erh= ***km erz= ***km
nr= 8 gap=133 rms=0.75
Locality: Bercel
Comments: probably explosion

sta	dist	azm	phase	hr mn	sec	res
PENC	15.2	219	ePgC	10:06:	38.50	-0.61
			eSg		06:41.60	0.37
PSZ	36.3	86	ePgC	10:06:	42.60	-0.27
			eSg		06:48.40	0.48
VYHS	78.9	327	ePg	10:06:	51.70	1.22
			eSg		07:00.20	-1.28
KECS	103.2	51	ePg	10:06:	55.20	0.39
			eSg		07:08.20	-0.99

64.

2006-10-10 time: 3:36:57.48 UTC ML= 2.0
lat: 47.346N lon: 18.132E h= 10.0 km
erh= 2.7km erz= 2.3km
nr= 22 gap=104 rms=0.79
Locality: Nagyveleg
Comments:

sta	dist	azm	phase	hr mn	sec	res
PKSG	20.2	75	iPgD	3:37:	01.60	0.10
			eSg		37:04.30	-0.33
BUD	69.0	77	ePg	3:37:	06.40	-3.53
			eSg		37:18.30	-1.34
PKS7	84.7	113	ePgC	3:37:	12.40	-0.31
			eSg		37:23.80	-0.79
ZST	122.1	321	ePn	3:37:	19.00	0.55
			eSn		37:33.10	-1.71
SOP	124.4	288	ePn	3:37:	18.60	-0.14
			eSn		37:35.50	0.17
PKSM	131.9	163	ePnC	3:37:	20.20	0.51
			eSn		37:35.40	-1.61
PKS6	137.0	127	ePn	3:37:	21.10	0.79
			eSn		37:37.40	-0.72
VYHS	138.1	22	ePn	3:37:	21.40	0.95
			eSn		37:37.90	-0.47
SMOL	140.1	338	eSn	3:37:	37.50	-1.32
PSZ	146.9	64	ePnD	3:37:	22.50	0.94
			eSn		37:42.70	2.37
ARSA	197.6	267	Pn	3:37:	27.90	0.02
			Sn		37:51.90	0.31
KECS	216.6	54	ePn	3:37:	30.70	0.45
BZS	329.5	126	iPn	3:37:	45.10	0.79
DRGR	353.2	100	iPnD	3:37:	47.70	0.42

65.

2006-10-17 time: 8:37:30.44 UTC ML= 1.2
lat: 48.382N lon: 19.820E h= 0.0 km
erh= 1.7km erz= 4.0km
nr= 8 gap=145 rms=0.36
Locality: Slovak Republic
Comments: probably explosion

sta	dist	azm	phase	hr mn	sec	res
KECS	50.5	77	iPg	8:37:	39.20	-0.26
			eSg		37:46.70	0.20
PSZ	51.8	174	iPgD	8:37:	39.70	0.01
			eSg		37:46.40	-0.52
VYHS	73.9	280	ePg	8:37:	44.30	0.68
			eSg		37:53.60	-0.31
CRVS	134.1	64	ePn	8:37:	54.50	0.31
			eSn		38:10.90	-1.82

66.

2006-10-17 time: 11:16:08.46 UTC ML=
lat: 47.909N lon: 19.431E h= 0.0 km
erh= ***km erz= ***km
nr= 6 gap=237 rms=0.61
Locality: Szanda
Comments: probably explosion

sta	dist	azm	phase	hr mn	sec	res
PSZ	34.6	88	ePgC	11:16:	14.10	-0.55
			eSg		16:19.80	0.33
VYHS	78.7	326	ePg	11:16:	23.40	0.89
			eSg		16:32.50	-0.96
KECS	101.1	51	ePg	11:16:	26.50	-0.01
			eSg		16:41.10	0.51

67.

2006-10-21 time: 9:10:03.22 UTC ML= 1.2
lat: 48.360N lon: 19.841E h= 0.0 km
erh= 1.1km erz= 1.6km
nr= 8 gap=142 rms=0.23
Locality: Slovak Republic
Comments: probably explosion

sta	dist	azm	phase	hr mn	sec	res
PSZ	49.3	175	ePgC	9:10:12.10		0.08
			eSg	10:18.50		-0.39
KECS	49.6	74	iPg	9:10:12.00		-0.08
			eSg	10:18.70		-0.29
VYHS	75.9	281	ePg	9:10:17.00		0.24
			eSg	10:26.40		-0.93
CRVS	133.8	63	ePn	9:10:27.10		0.17
			eSn	10:45.70		0.27

68.

2006-10-24 time: 8:33:35.28 UTC ML= 1.5
lat: 48.384N lon: 19.835E h= 0.0 km
erh= 1.5km erz= 2.8km
nr= 8 gap=145 rms=0.43
Locality: Slovak Republic
Comments: probably explosion

sta	dist	azm	phase	hr mn	sec	res
KECS	49.4	77	iPg	8:33:44.10		0.01
			eSg	33:51.90		0.93
PSZ	52.0	175	ePgC	8:33:44.60		0.04
			eSg	33:51.40		-0.39
VYHS	74.9	279	ePg	8:33:49.20		0.54
			eSg	33:58.80		-0.29
CRVS	133.0	64	ePn	8:33:58.40		-0.49
			eSn	34:16.00		-1.31

69.

2006-11-02 time: 11:19:50.59 UTC ML=
lat: 47.966N lon: 19.938E h= 0.0 km
erh= ***km erz= ***km
nr= 6 gap=176 rms=0.70
Locality: Mátramindszent
Comments: probably explosion

sta	dist	azm	phase	hr mn	sec	res
PSZ	6.3	211	ePgD	11:19:50.60		-1.11
			eSg	19:54.50		1.91
KECS	70.4	35	ePg	11:20:03.30		0.14
			eSg	20:12.80		-0.16
VYHS	100.7	306	ePg	11:20:09.10		0.52
			eSg	20:23.00		0.39

70.

2006-11-07 time: 21:20:04.53 UTC ML=
lat: 46.712N lon: 21.711E h= 0.9 km
erh= ---km erz= ---km
nr= 4 gap=187 rms=0.33
Locality: Romania
Comments:

sta	dist	azm	phase	hr mn	sec	res
DRGR	77.0	83	iPg	21:20:18.10		-0.18
BZS	122.0	183	iPgD	21:20:25.90		-0.41
GZR	168.2	151	iPn	21:20:32.90		0.47
PKSM	242.2	257	iPnD	21:20:41.80		0.14

71.

2006-11-15 time: 18:09:39.90 UTC ML= 3.2
lat: 48.224N lon: 22.614E h= 9.2 km
erh= 2.3km erz= 1.3km
nr= 24 gap=107 rms=0.68
Locality: Barabás
Comments: felt 4 EMS

sta	dist	azm	phase	hr mn	sec	res
TRPA	11.8	208	iPgU	18:09:42.74		0.16
			Sg	09:44.99		0.33
KOLS	82.7	342	iPg	18:09:54.10		-0.67
			eSg	10:05.80		-0.56
KWP	156.6	3	ePn	18:10:05.10		-0.19
DRGR	159.4	177	iPnD	18:10:05.30		-0.34
KECS	160.3	280	ePn	18:10:06.80		1.05
			eSn	10:25.90		-0.01
STHS	166.5	323	ePn	18:10:08.10		1.59
			eSn	10:27.80		0.53
PSZ	205.5	260	ePnD	18:10:10.30		-1.08
			eSn	10:37.40		1.47
BURB	206.0	109	iPnD	18:10:11.70		0.25
NIE	214.9	308	ePn	18:10:13.40		0.84
			eSn	10:38.40		0.37
PENC	253.3	259	ePnC	18:10:16.60		-0.74
LIKS	274.4	290	eSn	18:10:51.40		0.18
VYHS	281.6	276	iPn	18:10:20.20		-0.66
			eSn	10:50.80		-2.02
OJC	302.2	317	ePn	18:10:25.90		2.47
			eSn	10:56.60		-0.79
OKC	372.7	299	ePn	18:10:31.10		-1.13
PKSM	375.0	233	ePn	18:10:31.70		-0.81
SMOL	385.5	275	ePn	18:10:32.90		-0.93
VRI	408.0	130	iPnD	18:10:51.30		14.67
MORC	409.3	295	iPnD	18:10:42.80		6.01
VRAC	458.7	285	Pn	18:10:42.16		-0.79
			Sn	11:29.39		-2.75
BEH	482.4	246	ePnD	18:11:04.60		18.70
			eSn	11:50.60		13.22
DPC	515.2	297	ePn	18:10:49.30		-0.70
			eSn	11:40.60		-4.07
ARSA	542.8	258	ePn	18:10:52.45		-0.98
KIEV	551.4	60	ePn	18:11:06.79		12.28
AKBB	552.8	60	ePn	18:11:03.32		8.64
GERE	661.8	276	Pn	18:11:07.61		-0.67
			Sn	12:13.07		-4.15
GEC2	661.8	276	ePn	18:11:07.50		-0.78
			eSn	12:13.40		-3.82
KHC	673.0	279	ePn	18:11:07.90		-1.78
			eSn	12:15.30		-4.40

72.

2006-11-21 time: 14:16:01.71 UTC ML= 1.6
lat: 48.841N lon: 20.188E h= 0.0 km
erh= 6.1km erz= 833km
nr= 6 gap=262 rms=0.49
Locality: Slovak Republic
Comments:

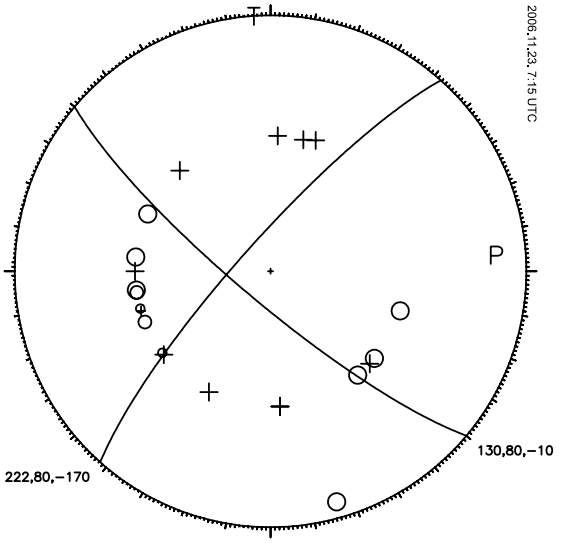
sta	dist	azm	phase	hr mn	sec	res
KECS	45.4	151	iPg	14:16:09.50		-0.32
			eSg	16:16.10		-0.04
PSZ	104.8	192	ePgD	14:16:21.40		0.97
			eSg	16:35.20		0.16
VYHS	106.8	249	ePg	14:16:20.90		0.12
			eSg	16:34.90		-0.75

73.

2006-11-23 time: 7:15:21.06 UTC ML= 4.5
lat: 48.216N lon: 22.583E h= 10.0 km
erh= 2.6km erz= 1.4km
nr= 35 gap= 70 rms=0.97
Locality: Beregsurány
Comments: felt 5-6 EMS

sta	dist	azm	phase	hr mn	sec	res
TRPA	10.1	199	iPgU	7:15:24.05		0.45
			eSg	15:26.25		0.67
UZH	50.8	335	ePg	7:15:28.00		-2.32
KOLS	82.9	344	iPgD	7:15:35.44		-0.54
			eSg	15:47.59		-0.02
KWP	157.6	3	iPnU	7:15:46.27		-0.20
KECS	158.2	281	ePn	7:15:48.00		1.45
			eSn	16:06.20		-0.23

DRGR	158.7	176	ePnU	7:15:46.62	0.01
			iSn	16:05.87	-0.66
STHS	165.8	324	ePn	7:15:49.60	2.11
			eSn	16:08.60	0.50
LVIV	176.6	37	ePn	7:15:52.00	3.16
			Sn	16:16.20	5.69
PSZ	203.1	261	ePnD	7:15:51.70	-0.44
			eSn	16:19.00	2.62
LVV	207.3	31	ePn	7:15:52.00	-0.67
BURB	208.0	109	iPn	7:15:52.70	-0.05
BURA	208.0	109	Pn	7:15:52.45	-0.30
NIE	213.7	309	ePn	7:15:53.60	0.14
			eSn	16:20.20	1.47
PENC	250.8	259	ePn	7:15:57.49	-0.61
PKSN	251.6	234	ePn	7:16:04.60	6.41
LIKS	272.5	290	ePn	7:16:00.20	-0.60
BUD	278.5	253	ePnC	7:16:00.50	-1.05
VYHS	279.4	276	iPnD	7:16:01.44	-0.21
BZS	298.2	194	iPn	7:16:03.60	-0.41
OJC	301.3	318	iPnU	7:16:03.47	-0.92
PKSG	327.1	254	ePnD	7:16:06.60	-1.01
JAVC	369.7	281	Pn	7:16:11.60	-1.32
OKC	371.1	299	ePn	7:16:12.70	-0.39
			eSn	16:50.40	-3.28
PKSM	372.6	233	ePnD	7:16:11.70	-1.58
RAC	381.6	303	ePn	7:16:24.80	10.40
SMOL	383.3	275	ePn	7:16:14.20	-0.42
IAS	390.6	107	iPnD	7:16:16.90	1.37
MLR	397.0	140	iPnD	7:16:17.30	0.98
PLOR	405.9	130	iPn	7:16:17.40	-0.03
ZST	407.3	270	iPnU	7:16:16.72	-0.89
MORC	407.6	295	iPnD	7:16:16.80	-0.84
VRI	409.3	130	iPnD	7:16:18.70	0.85
BEO	411.2	203	Sn	7:17:27.81	25.24
RHK3	418.6	232	ePn+	7:16:17.97	-1.05
SOP	453.9	262	iPnD	7:16:22.42	-1.00
			Sn	17:36.92	24.87
VRAC	456.8	285	iPn	7:16:22.90	-0.87
KRUC	465.6	282	Pn	7:16:23.70	-1.18
DPC	513.6	298	ePn	7:16:30.80	-0.06
			eSn	17:22.70	-2.60
KOGS	517.4	248	ePnD	7:16:37.80	6.46
ARSA	540.3	259	Pn	7:16:33.70	-0.49
KSP	541.0	303	ePn	7:16:33.80	-0.47
			eSn	17:27.10	-4.28
UPC	541.0	298	ePn	7:16:33.80	-0.48
			eSn	17:27.90	-3.49
BBLS	542.2	207	ePnU	7:16:36.33	1.91
KIEV	553.9	60	ePn	7:16:33.90	-1.98
			eSn	17:28.60	-5.63
AKBB	555.2	60	ePn	7:16:33.91	-2.14
			eSn	17:29.86	-4.67
SZH	608.8	155	iPn	7:16:42.60	-0.13
TIRR	613.2	133	iPnU	7:16:44.36	1.08
PRU	619.4	289	ePn	7:16:43.20	-0.85
			eSn	17:45.00	-3.78
MOA	621.6	266	Pn	7:16:43.90	-0.43
VTS	627.1	176	iPnU	7:16:44.61	-0.40
OBKA	635.9	253	ePn	7:16:46.23	0.12
PVCC	636.3	294	ePn	7:16:45.20	-0.96
			eSn	17:48.20	-4.33
GERE	659.7	276	Pn	7:16:48.84	-0.23
			Sn	17:54.30	-3.42
GEC2	659.7	276	ePn	7:16:48.80	-0.27
KHC	670.9	279	ePn	7:16:49.70	-0.78
			eSn	17:54.20	-6.02
VOY	702.7	250	ePn	7:16:55.30	0.87
KBA	705.5	260	Pn	7:16:54.30	-0.49
NKC	771.6	287	ePn	7:17:01.90	-1.13
			eSn	19:00.30	37.74
VSU	173.3	14	iPnU	7:17:50.54	-2.58



74.

2006-11-27 time: 13:44:11.41 UTC ML= 1.2
lat: 48.383N lon: 19.834E h= 0.0 km
erh= 2.1km erz= 531km
nr= 6 gap=157 rms=0.31
Locality: Slovak Republic
Comments: probably explosion

sta	dist	azm	phase	hr mn	sec	res
KECS	49.5	77	iPg	13:44:20.10		-0.15
			eSg	44:27.20		0.06
PSZ	51.8	175	ePgC	13:44:20.80		0.14
			eSg	44:27.70		-0.18
VYHS	74.9	280	ePg	13:44:25.30		0.53
			eSg	44:34.50		-0.70

75.

2006-11-29 time: 11:30:34.89 UTC ML=
lat: 47.915N lon: 20.081E h= 0.0 km
erh= ***km erz= ***km
nr= 6 gap=246 rms=1.01
Locality: Parád
Comments: probably explosion

sta	dist	azm	phase	hr mn	sec	res
PSZ	14.0	271	ePgC	11:30:37.20		-0.19
			eSg	30:39.40		0.06
KECS	69.9	25	ePg	11:30:47.50		0.12
			eSg	30:56.20		-0.92
VYHS	112.7	305	ePg	11:30:56.50		1.48
			eSg	31:07.60		-3.13

76.

2006-11-30 time: 12:14:13.75 UTC ML= 1.3
lat: 47.966N lon: 19.859E h= 0.0 km
erh= ***km erz= ***km
nr= 5 gap=154 rms=0.86
Locality: Dorogháza
Comments:

sta	dist	azm	phase	hr mn	sec	res
PSZ	6.0	153	ePgC	12:14:13.90		-0.92
			eSg	14:17.30		1.65
KECS	74.0	39	eSg	12:14:37.10		-0.16
VYHS	96.0	308	ePg	12:14:31.80		0.91
			eSg	14:44.10		-0.16

77.

2006-12-08 time: 11:53:06.57 UTC ML= 0.6
lat: 48.249N lon: 19.788E h= 0.0 km
erh= 3.7km erz= 975km
nr= 5 gap=132 rms=0.47
Locality: Slovak Republic
Comments: probably explosion

sta	dist	azm	phase	hr mn	sec	res
PSZ	37.6	168	ePgC	11:53:12.90		-0.38
			eSg		53:22.20	3.69
KECS	57.9	63	ePg	11:53:17.50		0.59
			eSg		53:24.80	-0.18
VYHS	75.6	291	eSg	11:53:30.80		0.19

78.

2006-12-11 time: 22:45:32.35 UTC ML= 1.9
lat: 47.944N lon: 22.838E h= 10.0 km
erh= 6.0km erz= 2.3km
nr= 14 gap=202 rms=0.63
Locality: Méhtelek
Comments:

sta	dist	azm	phase	hr mn	sec	res
TRPA	30.4	313	iPgD	22:45:38.00		-0.07
			eSg		45:42.70	0.16
KOLS	117.7	339	ePn	22:45:52.10		-0.68
			eSn		46:07.70	-1.02
DRGR	128.5	184	iPn	22:45:54.10		-0.03
CRVS	147.4	316	ePn	22:45:56.80		0.31
			eSn		46:15.70	0.38
KECS	184.8	289	ePn	22:46:01.00		-0.16
			eSn		46:26.30	2.68
STHS	201.5	324	ePn	22:46:05.20		1.96
			eSn		46:29.10	1.78
PSZ	220.0	269	iPnD	22:46:05.10		-0.44
BZS	275.1	200	iPn	22:46:12.30		-0.11
GZR	283.6	181	iPnD	22:46:15.10		1.63
VYHS	303.6	282	iPn	22:46:15.90		-0.07
			eSn		47:00.50	10.51

79.

2006-12-14 time: 9:33:47.20 UTC ML= 1.0
lat: 48.429N lon: 19.834E h= 0.0 km
erh= 4.2km erz= 4.3km
nr= 8 gap=151 rms=0.69
Locality: Slovak Republic
Comments: probably explosion

sta	dist	azm	phase	hr mn	sec	res
KECS	48.6	83	ePg	9:33:55.70		-0.17
			eSg		34:01.90	-0.73
PSZ	57.0	175	ePg	9:33:56.90		-0.47
			eSg		34:10.60	5.30
VYHS	74.2	276	ePg	9:34:01.20		0.76
			eSg		34:10.20	-0.57
CRVS	130.9	66	ePn	9:34:11.20		0.65
			eSn		34:29.30	0.53

80.

2006-12-16 time: 8:38:11.23 UTC ML= 1.8
lat: 47.964N lon: 22.939E h= 7.1 km
erh= 5.3km erz= 2.5km
nr= 14 gap=207 rms=0.63
Locality: Romania
Comments:

sta	dist	azm	phase	hr mn	sec	res
TRPA	35.1	302	iPgD	8:38:17.70		0.08
			eSg		38:22.00	-0.61
KOLS	118.5	335	ePn	8:38:31.90		-0.23
			eSn		38:47.60	-0.83
DRGR	131.5	188	iPn	8:38:33.80		0.04
CRVS	151.1	314	ePn	8:38:36.50		0.30
			eSn		38:56.30	0.62
KECS	191.2	288	ePn	8:38:40.70		-0.50
			eSn		39:05.90	1.32
STHS	204.1	322	ePn	8:38:45.40		2.59
			eSn		39:09.20	1.76
PSZ	227.6	269	iPnD	8:38:44.80		-0.93
BZS	279.8	201	iPn	8:38:52.40		0.15
GZR	286.1	182	iPn	8:38:54.70		1.67
VYHS	310.5	281	ePn	8:38:55.50		-0.57

81.

2006-12-22 time: 10:29:00.41 UTC ML= 1.3
lat: 48.369N lon: 19.837E h= 0.0 km
erh= 2.7km erz= 4.8km
nr= 8 gap=143 rms=0.53
Locality: Slovak Republic
Comments: probably explosion

sta	dist	azm	phase	hr mn	sec	res
KECS	49.7	75	ePg	10:29:09.30		0.02
			eSg		29:15.70	-0.49
PSZ	50.3	175	ePgC	10:29:09.40		0.01
			eSg		29:16.10	-0.30
VYHS	75.4	281	ePg	10:29:14.20		0.33
			eSg		29:23.70	-0.66
CRVS	133.6	64	ePn	10:29:25.10		1.00
			eSn		29:41.30	-1.28

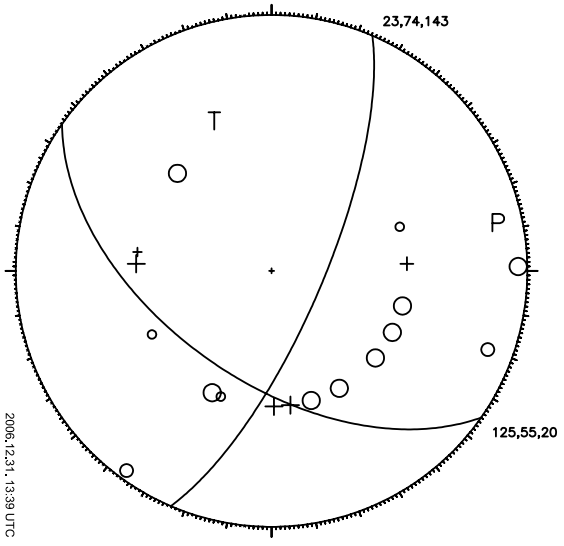
82.

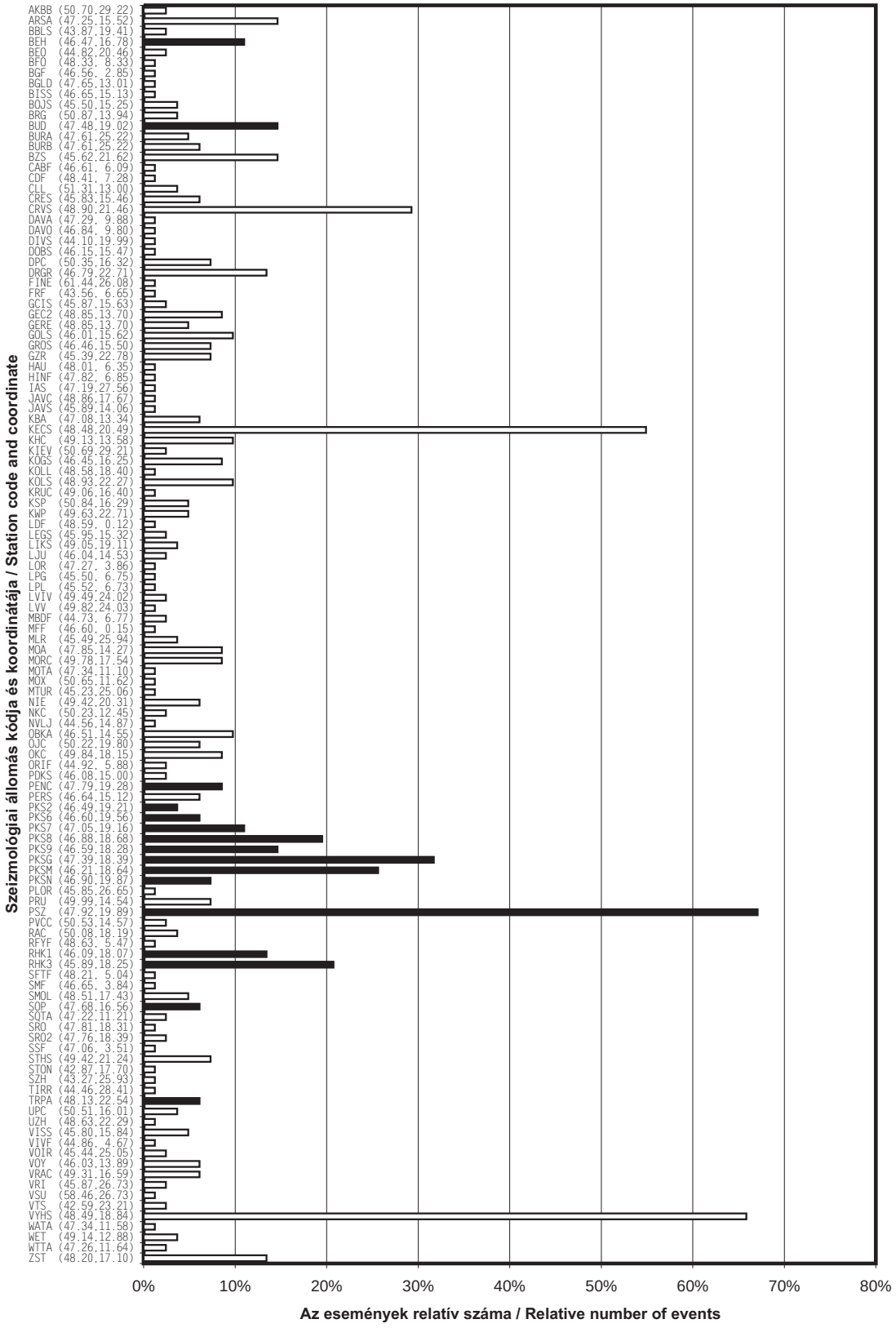
2006-12-31 time: 13:39:23.38 UTC ML= 4.1
lat: 47.405N lon: 19.345E h= 5.2 km
erh= 1.9km erz= 2.1km
nr= 37 gap= 34 rms=0.68
Locality: Gyömrő
Comments: felt 6 EMS

sta	dist	azm	phase	hr mn	sec	res
BUD	25.8	290	ePgD	13:39:28.40		0.33
			eSg		39:31.80	0.07
PSZ	70.4	36	ePgD	13:39:35.30		-0.69
			eSg		39:44.40	-1.43
PKSG	72.1	269	iPgD	13:39:36.30		0.02
			iSg		39:45.60	-0.74
VYHS	126.9	343	iPn	13:39:45.10		-0.48
			eSn		39:59.20	-3.70
PKSM	143.1	202	ePnD	13:39:47.00		-0.59
			eSn		40:04.00	-2.48
KECS	147.1	35	ePn	13:39:47.80		-0.29
			eSn		40:06.40	-0.97
LIKS	183.8	354	e n	13:39:55.10		2.43
			eSn		40:15.50	-0.02
RHK3	188.2	206	iPnD	13:39:52.90		-0.32
			eSn		40:20.20	3.71
SMOL	188.9	311	ePn	13:39:52.70		-0.61
			eSn		40:17.60	0.94
ZST	189.7	298	ePn	13:39:53.00		-0.40
			eSn		40:16.00	-0.82
SOP	212.1	278	ePnC	13:39:56.80		0.60
			eSn		40:23.20	1.41
BEH	221.5	242	ePnD	13:39:57.00		-0.38
CRVS	229.2	43	ePn	13:39:59.20		0.87
			eSn		40:31.70	6.11
NIE	235.1	18	ePn	13:40:00.20		1.13
TRPA	252.7	71	ePnD	13:39:59.40		-1.86
			eSn		40:36.80	6.00
KOGS	258.6	246	iPn	13:40:01.50		-0.50
STHS	264.2	32	ePn	13:40:03.50		0.80
			eSn		40:39.50	6.14
BZS	264.4	139	iPn	13:40:03.10		0.38
DRGR	264.5	105	iPnD	13:40:02.80		0.07
OKC	284.6	342	ePn	13:40:05.40		0.16
ARSA	289.4	267	Pn	13:40:06.30		0.46
			Sn		40:37.00	-1.96
VRAC	293.9	316	iPnD	13:40:06.80		0.40
MORC	295.4	333	iPn	13:40:06.40		-0.19
BEO	299.7	163	iPnD	13:40:07.66		0.54
			eSn		40:50.76	9.52

Földrengés paraméterek **Hypocenter Parameters**

GROS	310.9	250	ePn	13:40:08.40	-0.12
OJC	314.8	6	ePn	13:40:09.30	0.30
VISS	322.2	236	iPn	13:40:18.40	8.47
GOLS	324.0	241	ePn	13:40:08.90	-1.25
PERS	332.7	255	iPn	13:40:11.20	-0.03
CRES	345.7	239	Pn	13:40:21.45	8.59
GZR	345.9	130	iPnD	13:40:14.40	1.52
KWP	350.7	45	ePn	13:40:14.90	1.42
DIVS	371.0	172	iPnU	13:40:16.39	0.38
OBKA	378.4	255	Pn	13:40:17.40	0.46
			Sn	40:56.50	-2.21
BOJS	378.9	236	iPn	13:40:22.20	5.21
MOA	385.0	277	Pn	13:40:18.90	1.15
BBLS	393.1	179	iPnU	13:40:19.97	1.20
			eSn	41:02.76	0.78
DPC	395.5	326	ePn	13:40:19.00	-0.07
LJU	398.2	248	iPn	13:40:20.40	1.00
UPC	422.6	325	ePn	13:40:22.40	-0.05
JAVS	437.8	247	iPn	13:40:25.00	0.66
KSP	442.5	330	ePn	13:40:25.10	0.17
BURB	443.0	87	iPn	13:40:25.30	0.32
BURA	443.0	87	PnC	13:40:25.26	0.28
VOY	443.9	250	ePn	13:40:26.60	1.50
GERE	449.6	291	Pn	13:40:26.31	0.49
			Sn	41:14.16	-0.36
GEC2	449.6	291	ePn	13:40:26.20	0.38
			eSn	41:13.80	-0.72
PRU	455.6	309	ePn	13:40:25.90	-0.66
			eSn	41:12.60	-3.25
KBA	455.8	265	Pn	13:40:27.50	0.92
			Sn	41:15.50	-0.38
NVLJ	469.0	228	iPn	13:40:28.56	0.33
			iSn	41:17.90	-0.91
KHC	469.2	294	ePn	13:40:28.80	0.54
			eSn	41:15.50	-3.36
BGLD	477.7	273	iPnC	13:40:30.40	1.09
VOIR	490.1	117	iPnD	13:40:32.70	1.84
PVCC	492.9	315	ePn	13:40:30.70	-0.51
WET	517.5	292	ePn	13:40:34.30	0.02
STON	520.1	194	iPn	13:40:36.74	2.13
			iSn	41:28.45	-1.72
MLR	550.0	113	Pn	13:40:38.96	0.63
BRG	551.5	314	Pn	13:40:37.72	-0.80
WTTA	582.9	268	Pn	13:40:43.90	1.47
NKC	596.2	302	ePn	13:40:43.50	-0.60
VTS	615.6	150	iPnD	13:40:46.80	0.30
SQTA	615.6	268	Pn	13:40:47.80	1.29





3.4. ábra Az egyes állomások részvétele a hipocentrum meghatározásban

Figure 3.4. Contribution of individual stations to the hypocenter determination

4.

JELENTŐS FÖLDRENGÉSEK 2006-BAN

(Magyarországon érezhető földrengések)

2006. szeptember 15. - Tápiószele
2006. november 15. - Barabás
2006. november 23. - Beregsurány
2006. december 31. - Gyömrő

A MAKROSZEIZMIKUS INTENZITÁS MEGHATÁROZÁSA

A földrengés érezhető és épített környezetben okozott hatásainak összegyűjtése kérdőívek segítségével történt. Az összegyűjtött válaszok alapján került meghatározásra az intenzitás értéke (Zsíros et al, 1990 és Zsíros, 1994).

Az intenzitás leírása az *Európai Makroszeizmikus Skála (EMS)* szerint történik, mely részletesen megtalálható Grünthal (1998) munkájában. (*A Melléklet*)

4.

SIGNIFICANT EARTHQUAKES IN 2006

(Earthquakes that were felt in Hungary)

15 September 2006 - Tápiószele

15 November 2006 - Barabás

23 November 2006 - Beregsurány

31 December 2006 - Gyömrő

METHOD USED FOR ESTIMATION OF INTENSITY

The earthquake effects (macroseismic observations) were gathered by 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)

2006. szeptember 15. - Tápiószele / 15 September 2006 - Tápiószele

FÉSZEKPARAMÉTEREK / HYPOCENTER PARAMETERS

Dátum / Date:	2006/09/15
Kipattanási idő / Origin Time:	21:02:04.8 UTC
Szélesség és hosszúság / Latitude and Longitude:	47.458 N 19.835 E (S.D. 1.5 km)
Mélység / Depth:	10.0 km (S.D. 1.3 km)
Magnitúdó / Magnitude:	2.9 ML
Maximális intenzitás / Maximum Intensity:	4 EMS

LEÍRÁS

Szeptember 15-én este 2.9 M_L magnitúdójú földrengés keltett riadalmat a Jászságban. A rengés intenzitása 4 EMS fokra becsülhető (Tápiószele). A rengés csak néhány településen volt érezhető Jászberénytől délre.

Az esemény szeizmogramja a 4.1. ábrán látható.

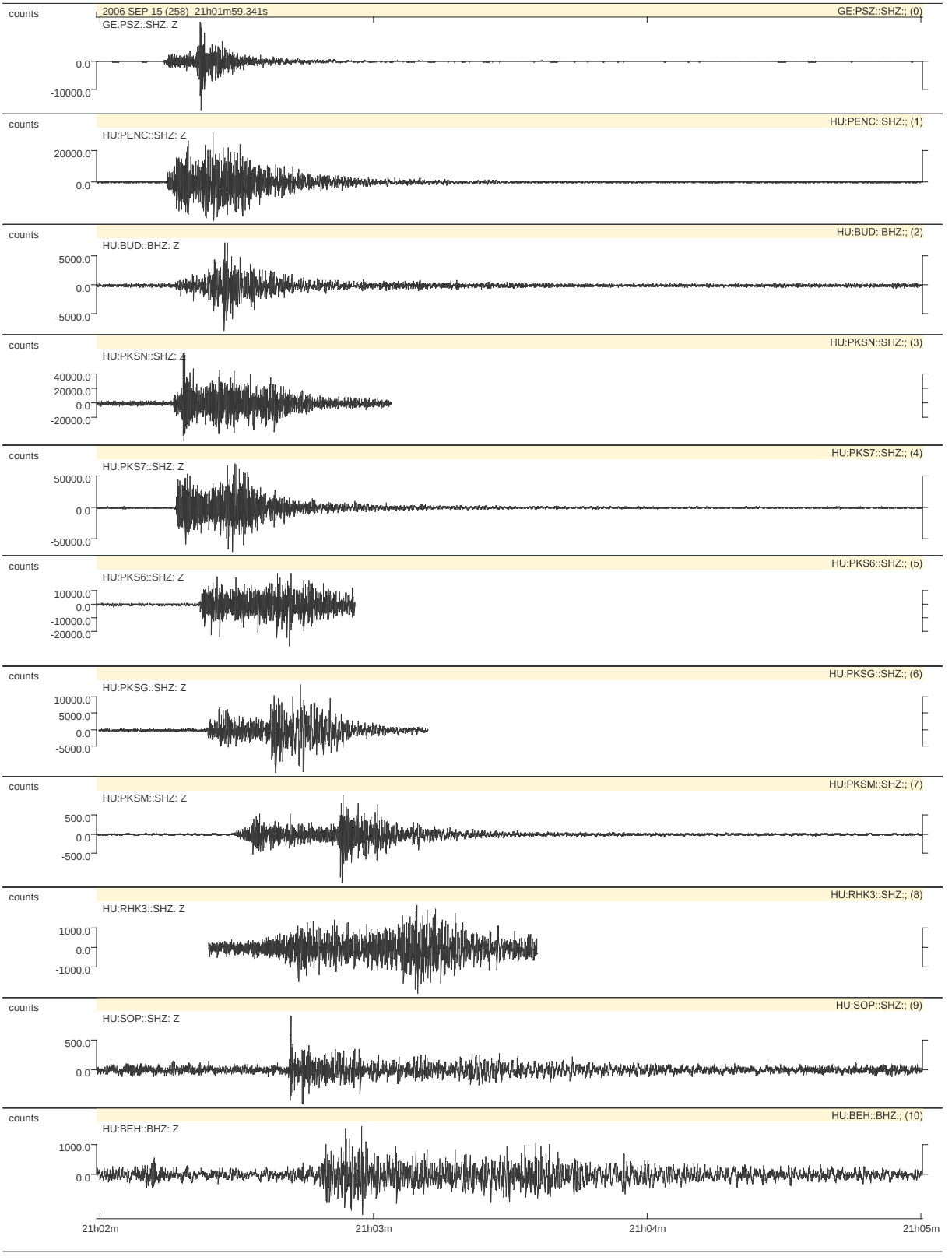
A rengés intenzitás eloszlását a 4.1. táblázat tartalmazza és a 4.2. ábra mutatja.

DISCUSSION

On September 15th late afternoon, a 2.9 M_L magnitude earthquake alarmed people in the Jászság area. The shock was felt only in a few villages South of Jászberény and produced reports of 4 EMS from Tápiószele.

Seismograms of the event are shown in Figure 4.1.

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



4.1. ábra A 2006. szeptember 15-i, tápiószelei földrengés (21:02:04.8 UTC) szeizmogramjai

Figure 4.1. Seismograms of the Tápiószele earthquake 15th September 2006 (21:02:04.8 UTC)

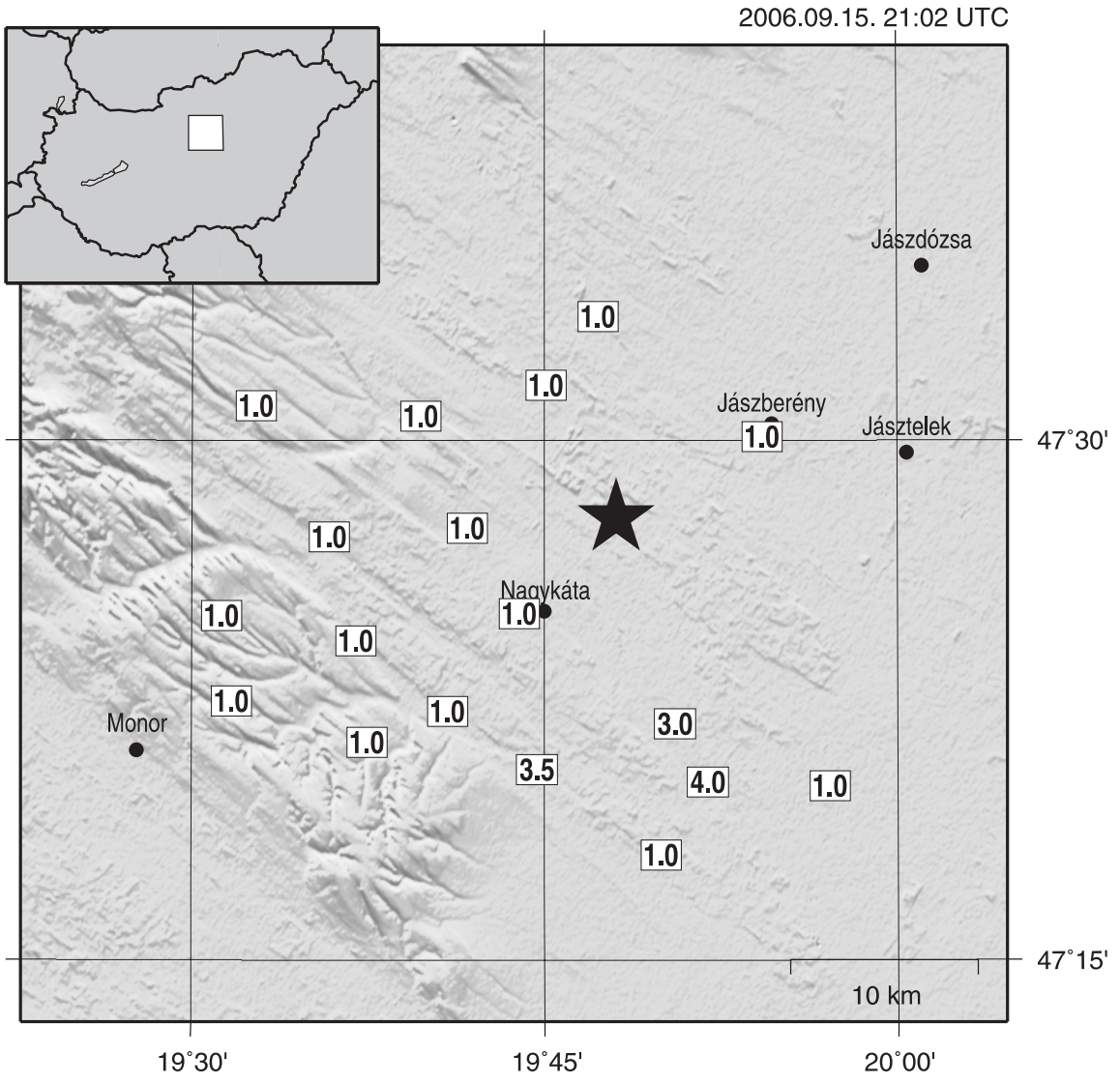
4.1. Táblázat

A 2006. szeptember 15-i, tápiószelei földrengés (21:02:04.8 UTC) intenzitás eloszlása

Table 4.1.

Intensity distribution of the Tápiószele earthquake 15th September 2006 (21:02:04.8 UTC)

Helység / Location		Koordináta Coordinates		I	R	N
		Szélesség Latitude (N)	Hosszúság Longitude (E)	Intenzitás Intensity	Rel. megbízhatóság Rel. reliability	Jelentések száma No. of reports
1	Dány	47.517	19.544	1.0	0%	1
2	Farmos	47.364	19.842	3.0	38%	2
3	Gomba	47.375	19.527	1.0	0%	1
4	Jászberény	47.502	19.903	1.0	0%	1
5	Nagykáta	47.417	19.731	1.0	0%	2
6	Pánd	47.355	19.623	1.0	0%	1
7	Pusztamonostor	47.560	19.787	1.0	0%	1
8	Szentlőrinckáta	47.527	19.750	1.0	0%	1
9	Szentmártonkáta	47.458	19.694	1.0	0%	1
10	Tápióbicske	47.370	19.680	1.0	0%	1
11	Tápiógyörgye	47.334	19.951	1.0	0%	2
12	Tápiság	47.404	19.615	1.0	0%	1
13	Tápiószecső	47.454	19.596	1.0	0%	2
14	Tápiószele	47.336	19.865	4.0	60%	1
15	Tápiószentmárton	47.342	19.744	3.5	36%	1
16	Tápiószőlős	47.301	19.831	1.0	0%	2
17	Tóalmás	47.512	19.661	1.0	0%	2
18	Úri	47.416	19.520	1.0	0%	2



4.2. ábra A 2006. szeptember 15-i, tápiószelei földrengés (21:02:04.8 UTC) intenzitás eloszlása (a csillag a műszeresen meghatározott epicentrumot jelöli)

Figure 4.2. Intensity distribution of the Tápiószele earthquake 15th September 2006 (21:02:04.8 UTC) (star - instrumental epicentre)

2006. november 15. - Barabás / 15 November 2006 - Barabás

FÉSZEKPARAMÉTEREK / HYPOCENTER PARAMETERS

Dátum / Date:	2006/11/15
Kipattanási idő / Origin Time:	18:09:39.9 UTC
Szélesség és hosszúság / Latitude and Longitude:	48.224 N 22.614 E (S.D. 2.3 km)
Mélység / Depth:	9.2 km (S.D. 1.3 km)
Magnitúdó / Magnitude:	3.2 ML
Maximális intenzitás / Maximum Intensity:	4 EMS

LEÍRÁS

November 15-én 3.2 M_L magnitúdójú földrengés keletkezett a kárpátaljai Beregszász (Ukrajna) környékén. A rengés Magyarországon is érezhető volt a határhoz közeli településeken. A rengés legnagyobb magyarországi intenzitása 4 EMS fokra becsülhető.

Az esemény szeizmogramja a 4.3. ábrán látható.

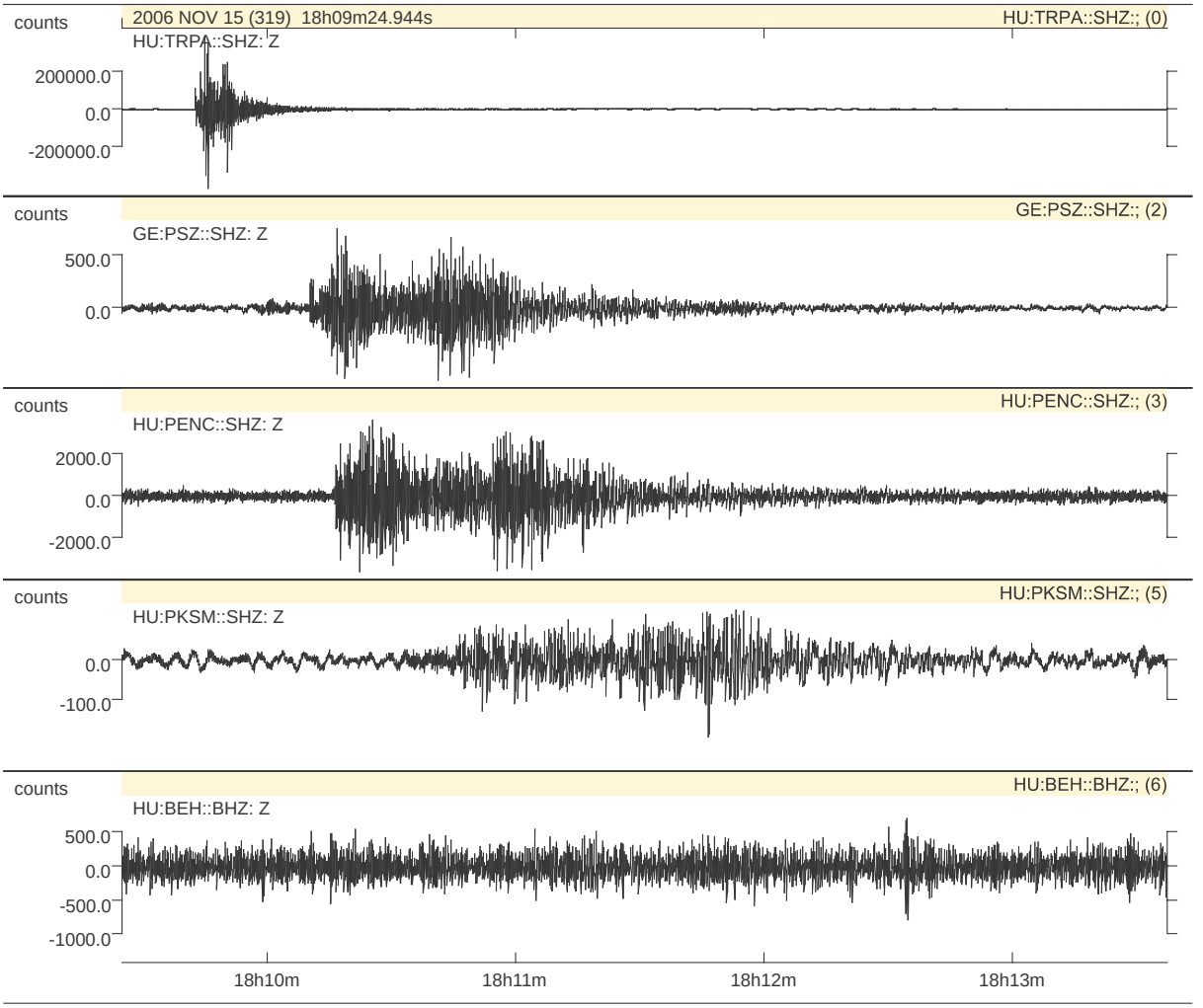
A rengés intenzitás eloszlását a 4.2. táblázat tartalmazza és a 4.4. ábra mutatja.

DISCUSSION

On November 15th, a 3.2 M_L magnitude earthquake was felt in the Hungarian – Ukrainian border region. In the Hungarian side, the highest intensity 4 EMS was reported from the villages of Barabás and Beregsurány.

Seismograms of the event are shown in Figure 4.3.

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



4.3. ábra A 2006. november 15-i, barabási földrengés (18:09:39.9 UTC) szeizmogramjai

Figure 4.3. Seismograms of the Barabás earthquake 15th November 2006 (18:09:39.9 UTC)

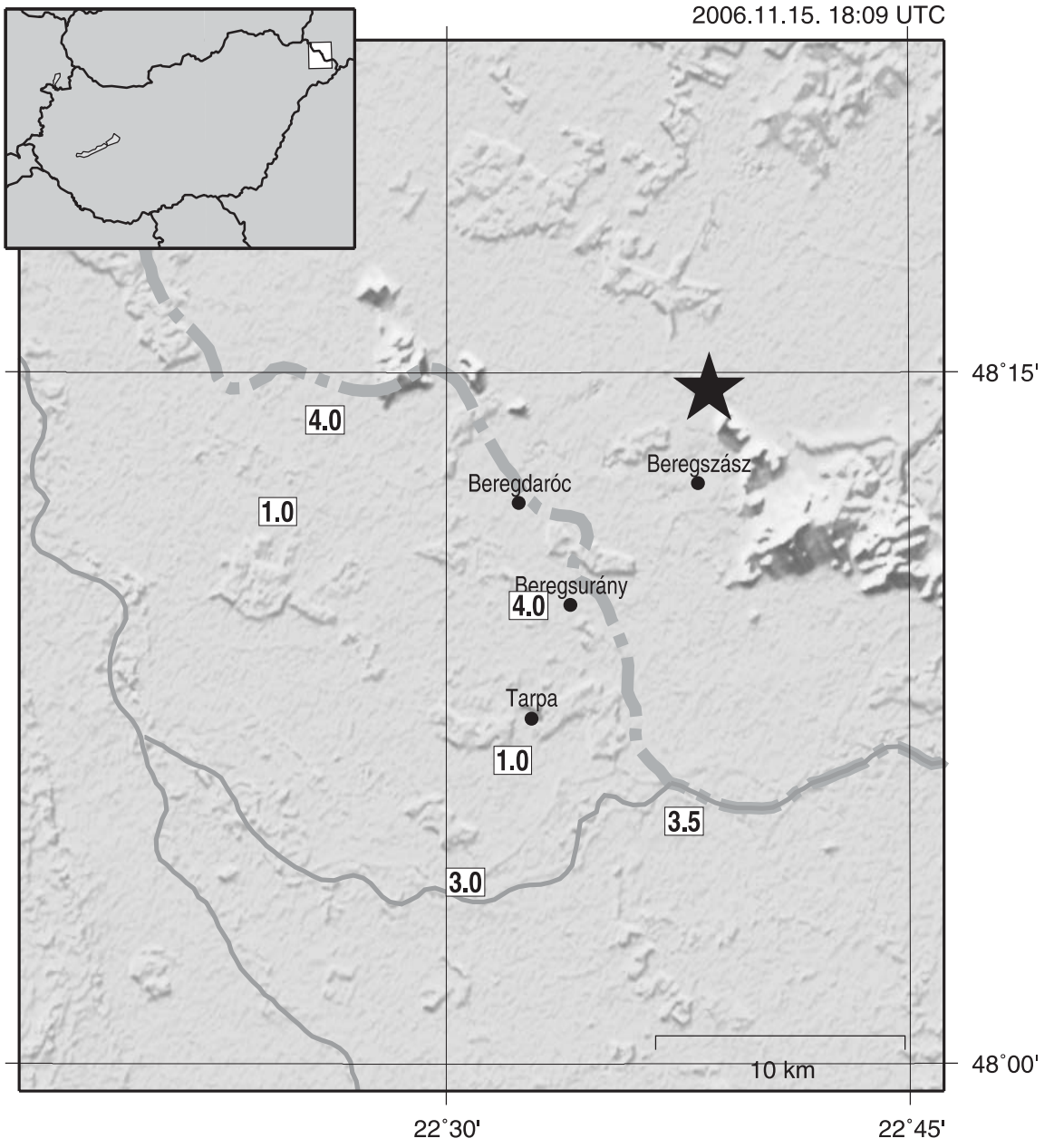
4.2. Táblázat

A 2006. november 15-i, barabási földrengés (18:09:39.9 UTC) intenzitás eloszlása

Table 4.2.

Intensity distribution of the Barabás earthquake 15th November 2006 (18:09:39.9 UTC)

Helység / Location		Koordináta Coordinates		I	R	N
		Szélesség Latitude (N)	Hosszúság Longitude (E)	Intenzitás Intensity	Rel. megbízhatóság Rel. reliability	Jelentések száma No. of reports
1	Barabás	48.233	22.434	4.0	41%	5
2	Beregsurány	48.166	22.544	4.0	44%	1
3	Szatmárcseke	48.088	22.628	3.5	38%	1
4	Tarpa	48.110	22.535	1.0	0%	1
5	Tivadar	48.066	22.510	3.0	43%	1
6	Vámosatya	48.200	22.408	1.0	0%	1



4.4. ábra A 2006. november 15-i, barabási földrengés (18:09:39.9 UTC) intenzitás eloszlása (a csillag a műszeresen meghatározott epicentrumot jelöli)

Figure 4.4. Intensity distribution of the Barabás earthquake 15th November 2006 (18:09:39.9 UTC) (star - instrumental epicentre)

2006. november 23. - Beregsurány / 23 November 2006 - Beregsurány

FÉSZEKPARAMÉTEREK / HYPOCENTER PARAMETERS

Dátum / Date:	2006/11/23
Kipattanási idő / Origin Time:	07:15:21.06 UTC
Szélesség és hosszúság / Latitude and Longitude:	48.216 N 22.583 E (S.D. 2.6 km)
Mélység / Depth:	10 km (S.D. 1.4 km)
Magnitúdó / Magnitude:	4.5 ML
Maximális intenzitás / Maximum Intensity:	5-6 EMS

LEÍRÁS

Az év legnagyobb magnitúdójú rengése november 23-án pattant ki Beregsurány környékén a magyar – ukrán határ közelében, egy héttel követve az előző rengést. A 4.5 M_L magnitúdójú rengés érezhető volt mintegy 80 km sugarú területen. Magyarországon a legnagyobb megrázottságot (5-6 EMS) Beregsurány és Beregdaróc településekről jelentették. A rengés az epicentrum környékén kisebb épület károkat is okozott.

Az esemény szeizmogramja a 4.5. ábrán látható.

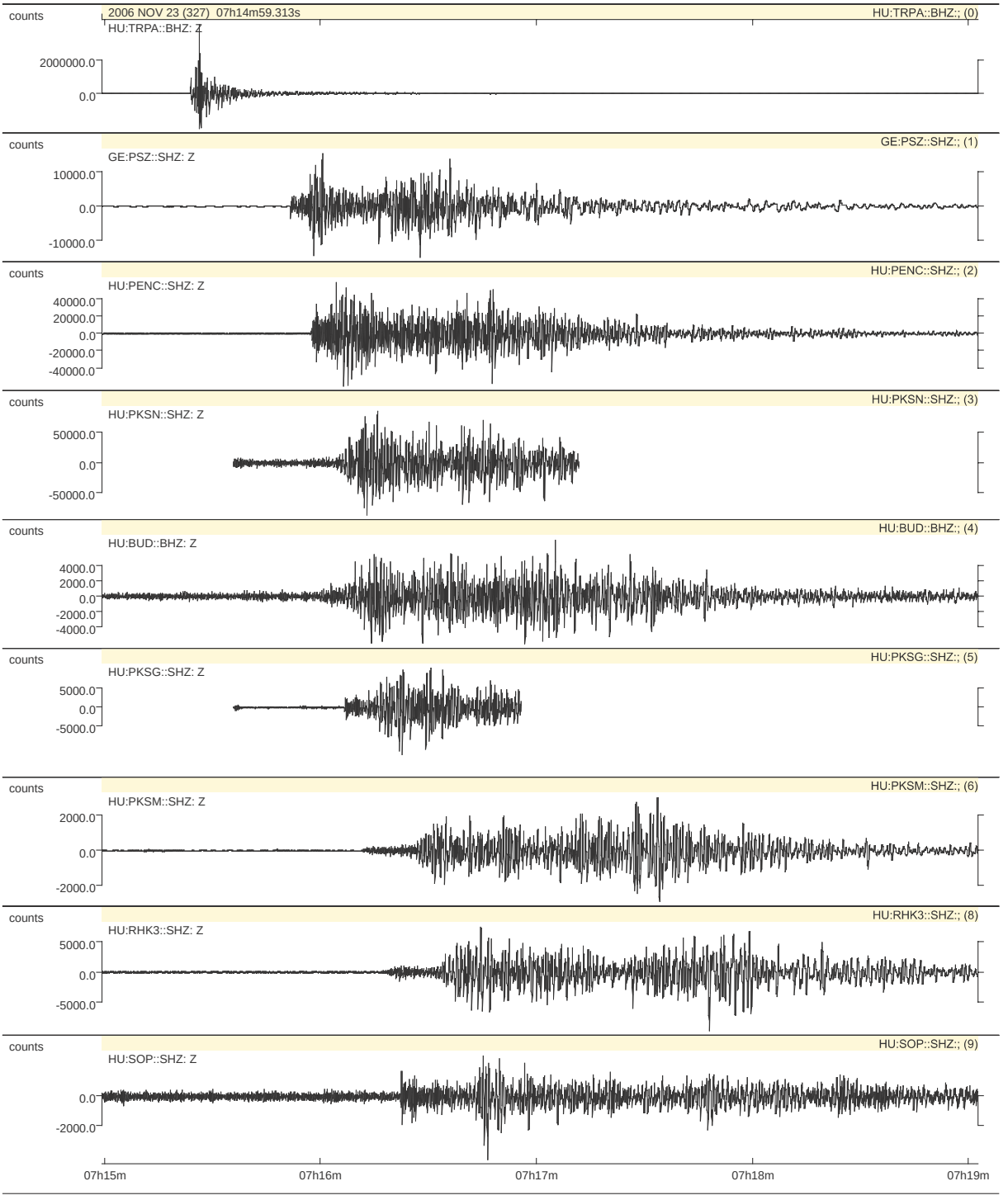
A rengés intenzitás eloszlását a 4.3. táblázat tartalmazza és a 4.6. ábra mutatja.

DISCUSSION

The highest magnitude (4.5 M_L) earthquake of the year was the Beregsurány event on November 23rd just a week after a smaller 3.2 M_L magnitude earthquake. The earthquake was felt in an area of about 80 km radius in NE Hungary in the Hungarian – Ukrainian border region. The highest intensity values (5-6 EMS) were reported from Beregsurány and Beregdaróc. Smaller damages in buildings were also reported from the epicenter area.

Seismograms of the event are shown in Figure 4.5.

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



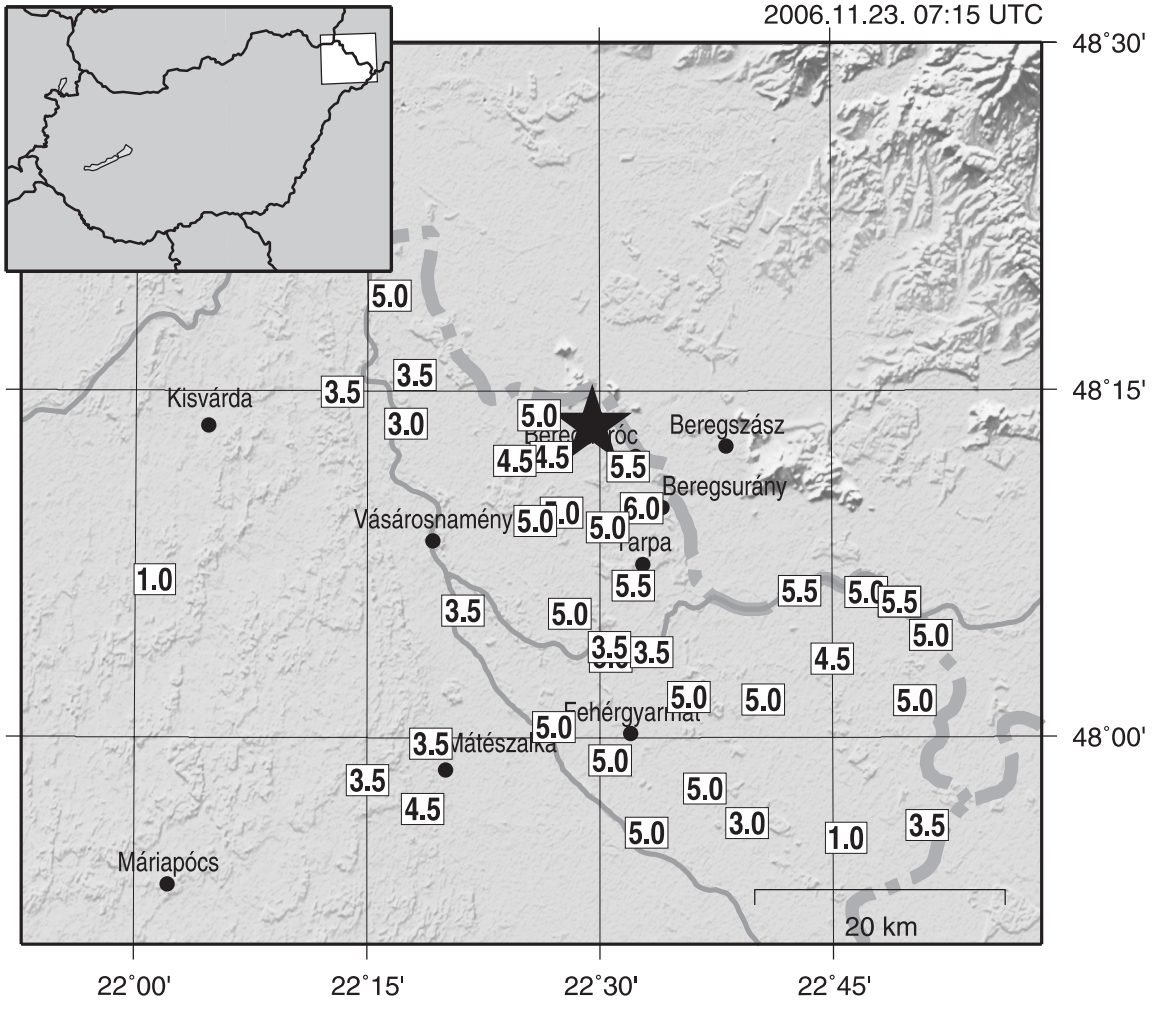
4.5. ábra A 2006. november 23-i, beregsurányi földrengés (7:15:21.1 UTC) szeizmogramjai

Figure 4.5. Seismograms of the Beregsurány earthquake 23rd November 2006 (7:15:21.1 UTC)

4.3. Táblázat
A 2006. november 23-i, beregsurányi földrengés (07:15:21.06 UTC) intenzitás eloszlása

Table 4.3.
Intensity distribution of the Beregsurány earthquake 23rd November 2006 (07:15:21.06 UTC)

Helység / Location		Koordináta Coordinates		I	R	N
		Szélesség Latitude (N)	Hosszúság Longitude (E)	Intenzitás Intensity	Rel. megbízhatóság Rel. reliability	Jelentések száma No. of reports
1	Barabás	48.233	22.434	5.0	46%	16
2	Beregdaróc	48.196	22.530	5.5	33%	1
3	Beregsurány	48.166	22.544	6.0	27%	2
4	Cégénydányád	47.932	22.549	5.0	74%	1
5	Csaroda	48.163	22.458	5.0	38%	1
6	Fehérgyarmat	47.984	22.510	5.0	74%	1
7	Fülesd	48.028	22.675	5.0	60%	1
8	Gacsály	47.928	22.762	1.0	0%	1
9	Gelénes	48.203	22.447	4.5	30%	1
10	Gulács	48.090	22.467	5.0	65%	2
11	Jánkmajtis	47.939	22.657	3.0	38%	1
12	Jármi	47.970	22.250	3.5	42%	1
13	Kisar	48.059	22.511	5.0	74%	1
14	Kispalád	48.027	22.838	5.0	74%	1
15	Kömörő	48.030	22.595	5.0	74%	1
16	Lónya	48.319	22.273	5.0	74%	1
17	Márokpapi	48.152	22.508	5.0	47%	2
18	Mátészalka	47.949	22.309	4.5	34%	2
19	Méhtelek	47.937	22.850	3.5	41%	1
20	Milota	48.105	22.786	5.0	49%	1
21	Nábrád	48.008	22.450	5.0	74%	1
22	Nagyar	48.062	22.555	3.5	43%	1
23	Nagyszekeres	47.964	22.612	5.0	44%	1
24	Nyírtass	48.114	22.019	1.0	0%	1
25	Olcsvaapáti	48.092	22.352	3.5	35%	1
26	Ópályi	47.996	22.318	3.5	32%	2
27	Sonkád	48.057	22.749	4.5	40%	1
28	Tarpa	48.110	22.535	5.5	34%	1
29	Tákos	48.157	22.430	5.0	47%	2
30	Tiszaadony	48.227	22.290	3.0	42%	1
31	Tiszabecs	48.098	22.822	5.5	41%	1
32	Tiszabezdéd	48.367	22.153	3.5	41%	1
33	Tiszacsécse	48.098	22.822	5.5	41%	1
34	Tiszakerecseny	48.262	22.300	3.5	40%	1
35	Tiszakóród	48.106	22.714	5.5	41%	1
36	Tivadar	48.066	22.510	3.5	38%	2
37	Uszka	48.074	22.855	5.0	74%	1
38	Újkenéz	48.250	22.222	3.5	20%	1
39	Vámosatya	48.200	22.408	4.5	33%	2



4.6. ábra A 2006. november 23-i, beregsurányi földrengés (07:15:21.1 UTC) intenzitás eloszlása (a csillag a műszeresen meghatározott epicentrumot jelöli)

Figure 4.6. Intensity distribution of the Beregsurány earthquake 23rd November 2006 (07:15:21.1 UTC) (star - instrumental epicentre)

2006. december 31. - Gyömrő / 31 December 2006 - Gyömrő

FÉSZEKPARAMÉTEREK / HYPOCENTER PARAMETERS

Dátum / Date:	2006/12/31
Kipattanási idő / Origin Time:	13:39:23.38 UTC
Szélesség és hosszúság / Latitude and Longitude:	47.405 N 19.345 E (S.D. 1.9 km)
Mélység / Depth:	5.2 km (S.D. 2.1 km)
Magnitúdó / Magnitude:	4.1 ML
Maximális intenzitás / Maximum Intensity:	6 EMS

LEÍRÁS

A lakossági érdeklődést tekintve az év legjelentősebb magyarországi rengése december 31-én pattant ki Budapesttől 20-30 km-rel K-re, Gyömrő környékén. A 4.1 M_L magnitúdójú rengés érezhető volt mintegy 1500-2000 km^2 területen, Budapest budai kerületeitől Hatvanig terjedően. A legnagyobb megrázottságot (6 EMS) Gyömrő és Maglód településekről jelentették. A fokozott lakossági és média érdeklődés a főváros közelségének és részbeni érintettségének tudható be. A rengés az epicentrum környékén összességében tízmillió forint nagyságrendű épület károkat is okozott, elsősorban azonban régebbi, vagy rosszul, rossz minőségben épített épületek sérülése volt jellemző.

Az esemény szeizmogramja a 4.7. ábrán látható.

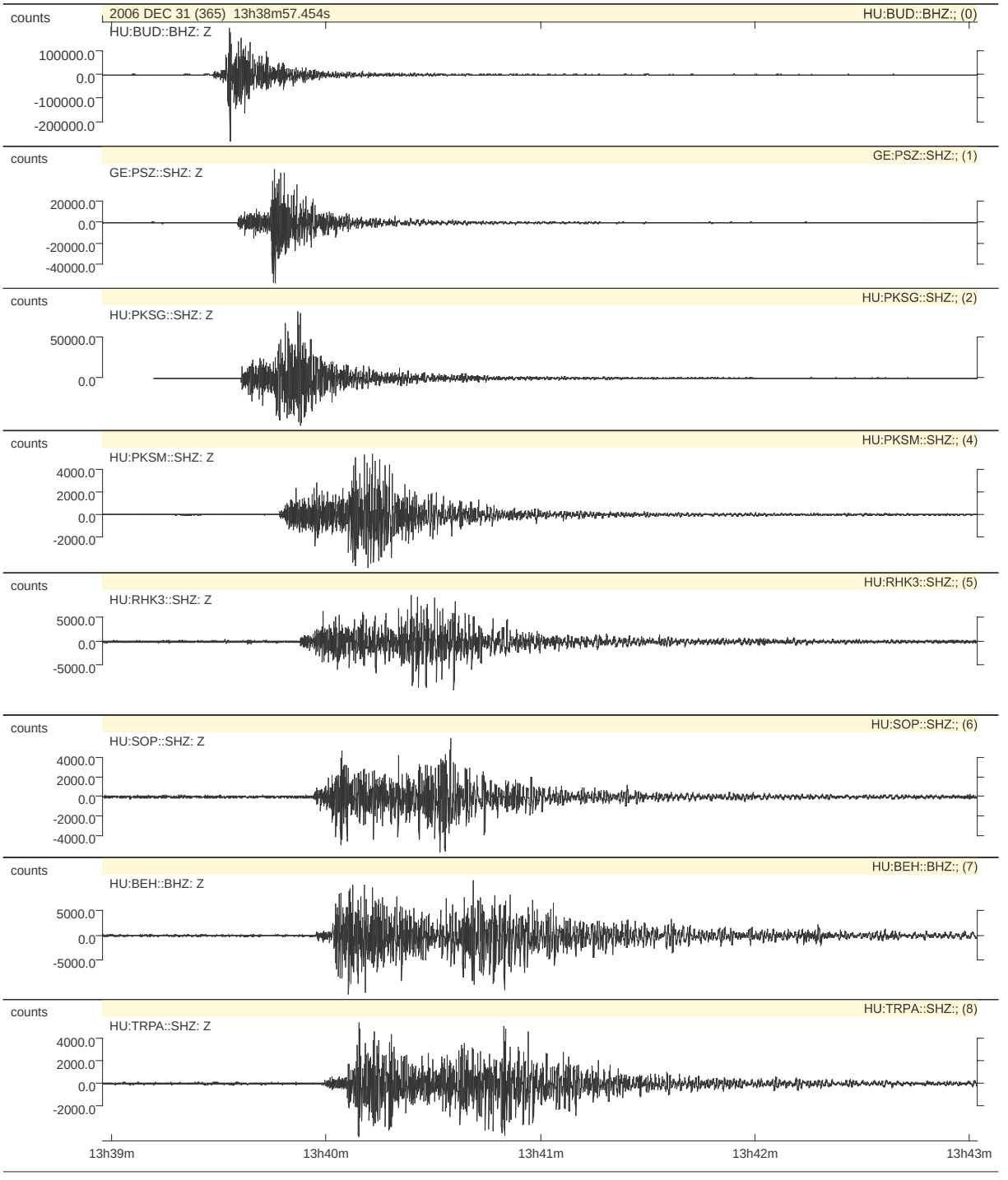
A rengés intenzitás eloszlását a 4.4. táblázat tartalmazza és a 4.8. ábra mutatja.

DISCUSSION

The highest public attention of the year was produced by the Gyömrő earthquake on December 31st. Having an epicenter just 20-30 km East from Budapest, the 4.1 M_L magnitude earthquake was felt in an area of about 1500-2000 km^2 from western districts of Budapest up to Hatvan. The highest intensity values (6 EMS) were reported from Gyömrő and Maglód. The increased public and media attention created by the event was due to the nearby capital Budapest. All together, a few hundred thousands of Euro damage in buildings was reported from the epicenter area but mainly older and poorer of quality buildings were affected.

Seismograms of the event are shown in Figure 4.7.

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



4.7. ábra A 2006. december 31-i, gyömrői földrengés (13:39:23.4 UTC) szeizmogramjai

Figure 4.7. Seismograms of the Gyömrő earthquake 31st December 2006 (13:39:23.4 UTC)

4.4. Táblázat

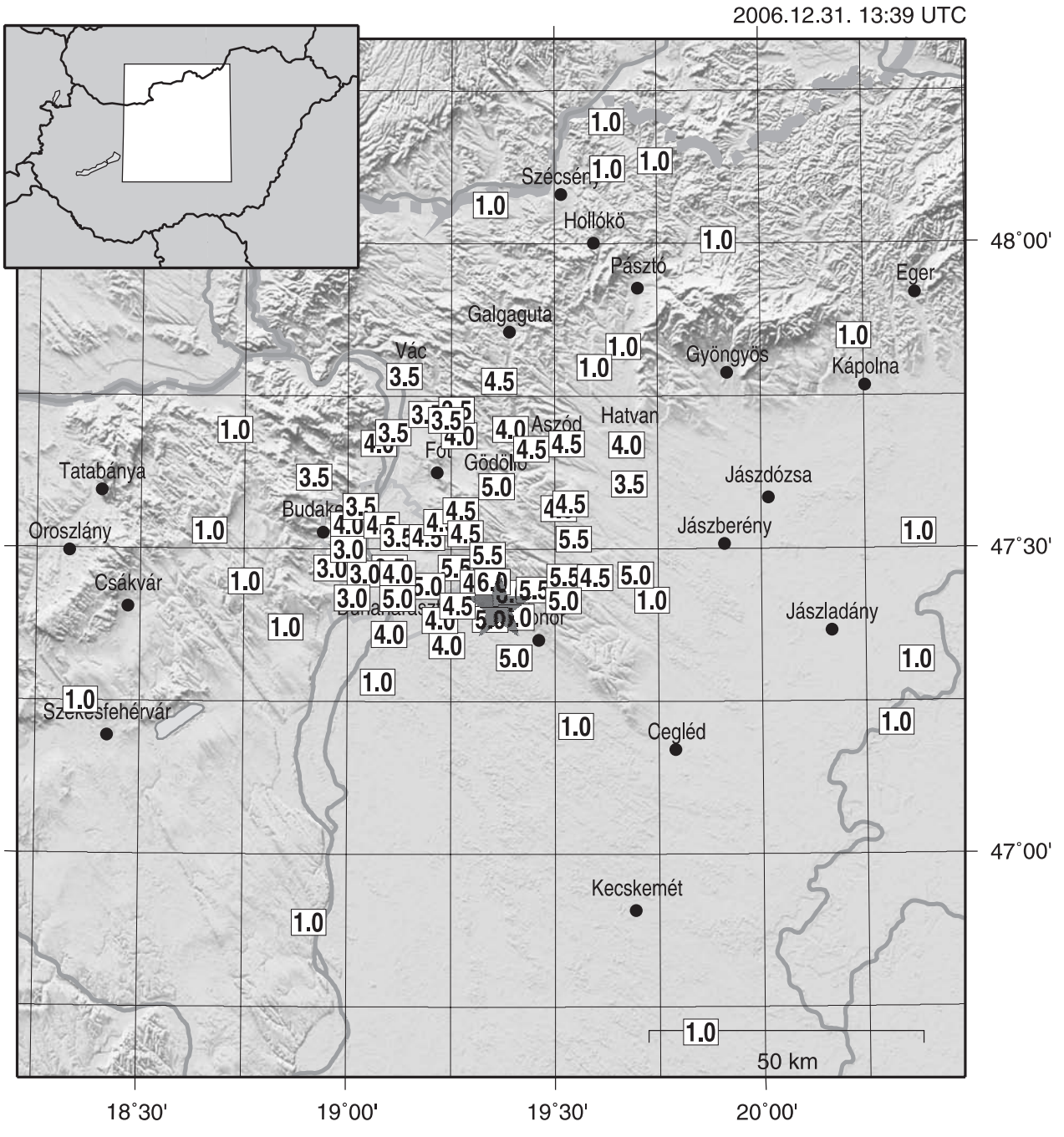
A 2006. december 31-i, gyömrői földrengés (13:39:23.38 UTC) intenzitás eloszlása

Table 4.4.

Intensity distribution of the Gyömrő earthquake 31st December 2006 (13:39:23.38 UTC)

	Helység / Location	Koordináta Coordinates		I	R	N
		Szélesség Latitude (N)	Hosszúság Longitude (E)	Intenzitás Intensity	Rel. megbízhatóság Rel. reliability	Jelentések száma No. of reports
1	Baracs	46.889	18.907	1.0	0%	1
2	Boldog	47.607	19.680	3.5	50%	1
3	Budaörs	47.469	18.961	3.0	28%	2
4	Budapest II	47.540	19.000	4.0	50%	1
5	Budapest III	47.570	19.030	3.5	41%	1
6	Budapest IX	47.470	19.100	3.5	38%	3
7	Budapest XI	47.460	19.040	3.0	41%	1
8	Budapest XII	47.500	19.000	3.0	33%	1
9	Budapest XIII	47.540	19.080	4.5	36%	1
10	Budapest XIV	47.520	19.120	3.5	41%	1
11	Budapest XVI	47.520	19.190	4.5	37%	2
12	Budapest XVII	47.470	19.260	5.5	19%	7
13	Budapest XVIII	47.440	19.190	5.0	24%	5
14	Budapest XIX	47.460	19.120	4.0	38%	1
15	Budapest XX	47.420	19.120	5.0	33%	1
16	Budapest XXII	47.420	19.010	3.0	40%	1
17	Csolnok	47.695	18.722	1.0	0%	1
18	Csömör	47.544	19.225	4.5	36%	2
19	Dánszentmiklós	47.210	19.548	1.0	0%	1
20	Dány	47.517	19.544	5.5	37%	1
21	Dunaharaszti	47.361	19.099	4.0	29%	2
22	Dunavarsány	47.283	19.070	1.0	0%	1
23	Ecser	47.445	19.313	4.5	33%	1
24	Etyek	47.447	18.750	1.0	0%	2
25	Felsőpakony	47.343	19.238	4.0	50%	1
26	Galgamácsa	47.697	19.392	4.0	39%	2
27	Gödöllő	47.603	19.358	5.0	54%	1
28	Gyál	47.384	19.221	4.0	42%	2
29	Gyömrő	47.429	19.393	6.0	26%	21
30	Hatvan	47.671	19.674	4.0	50%	1
31	Hunyadfalva	47.318	20.369	1.0	0%	1
32	Iklad	47.664	19.443	4.5	33%	2
33	Jobbágyi	47.832	19.664	1.0	0%	2
34	Karancsalja	48.136	19.743	1.0	0%	1
35	Kartal	47.673	19.528	4.5	36%	1
36	Kerepestarcsa	47.564	19.272	4.5	34%	2
37	Kiskunfélegyháza	46.709	19.843	1.0	0%	1

38	Maglód	47.447	19.348	6.0	29%	2
39	Mány	47.530	18.663	1.0	0%	2
40	Mende	47.434	19.449	5.5	34%	1
41	Mihálygerge	48.200	19.624	1.0	0%	1
42	Nagykáta	47.417	19.731	1.0	0%	1
43	Nagytarcsa	47.526	19.284	4.5	34%	1
44	Nemti	48.007	19.896	1.0	0%	1
45	Őrbottyán	47.686	19.267	4.0	51%	1
46	Palotás	47.798	19.594	1.0	0%	1
47	Patvarc	48.064	19.341	1.0	0%	1
48	Pécel	47.491	19.336	5.5	36%	2
49	Péteri	47.389	19.406	5.0	52%	1
50	Pilisvörösvár	47.618	18.916	3.5	36%	2
51	Püspökhatvan	47.776	19.365	4.5	33%	2
52	Sárkeresztes	47.251	18.355	1.0	0%	1
53	Sülysáp	47.455	19.522	5.5	32%	2
54	Szalmatercs	48.123	19.627	1.0	0%	1
55	Szentendre	47.674	19.073	4.0	38%	1
56	Szentmártonkáta	47.458	19.694	5.0	31%	1
57	Szigetmonostor	47.691	19.108	3.5	38%	1
58	Sződ	47.721	19.188	3.5	32%	1
59	Tarnaszentmiklós	47.528	20.376	1.0	0%	1
60	Tápiószecső	47.454	19.596	4.5	33%	1
61	Tárnok	47.372	18.848	1.0	0%	1
62	Tiszapüspöki	47.215	20.318	1.0	0%	1
63	Úri	47.416	19.520	5.0	57%	1
64	Üllő	47.386	19.343	5.0	24%	4
65	Valkó	47.567	19.509	4.0	37%	1
66	Vasad	47.323	19.401	5.0	0%	1
67	Vác	47.783	19.135	3.5	38%	1
68	Váchartyán	47.728	19.261	3.5	31%	2
69	Vácrátót	47.712	19.236	3.5	35%	1
70	Vácszentlászló	47.575	19.537	4.5	33%	2
71	Vecsés	47.408	19.264	4.5	33%	1
72	Verpelét	47.849	20.224	1.0	0%	1



4.8. ábra A 2006. december 31-i, gyömrői földrengés (13:39:23.4 UTC) intenzitás eloszlása (a csillag a műszeresen meghatározott epicentrumot jelöli)

Figure 4.8. Intensity distribution of the Gyömrő earthquake 31st December 2006 (13:39:23.4 UTC) (star - instrumental epicentre)

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A MELLÉKLET

EURÓPAI MAKROSZEIZMIKUS SKÁLA (EMS)

1 ☞ **Nem érezhető**

Nem érezhető, még a legkedvezőbb körülmények között sem.

2 ☞ **Alig érezhető**

A rezgést csak egy-egy, elsősorban fekvő ember érzi, különösen magas épületek felsőbb emeletein.

3 ☞ **Gyenge**

A rezgés gyenge, néhány ember érzi, főleg épületen belül. A fekvő emberek lengést vagy gyenge remegést éreznek.

4 ☞ **Széles körben érezhető**

A rengést épületen belül sokan érzik, a szabadban kevesen. Néhány ember felébred. A rezgés mértéke nem ijesztő. Ablakok, ajtók, edények megcsörrennek, felfüggesztett tárgyak lengenek.

5 ☞ **Erős**

A rengést épületen belül a legtöbben érzik, a szabadban csak néhányan. Sok alvó ember felébred, néhányan a szabadba menekülnek. Az egész épület remeg, a felfüggesztett tárgyak nagyon lengenek. Tányérok, poharak összekoccannak. A rezgés erős. Felül nehéz tárgyak felborulnak. Ajtók, ablakok kinyílanak vagy bezáródnak.

6 ☞ **Kisebb károkat okozó**

Épületen belül szinte mindenki, szabadban sokan érzik. Épületben tartózkodók közül sokan megijednek, és a szabadba menekülnek. Kisebb tárgyak leesnek. Hagyományos épületek közül sokban keletkezik kisebb kár, hajszálrepedés a vakolatban, kisebb vakolatdarabok lehullanak.

7 ☞ **Károkat okozó**

A legtöbb ember megrémül, és a szabadba menekül. Bútorok elmozdulnak, a polcokról sok tárgy leesik. Sok hagyományos épület szenved mérsékelt sérülést: kisebb repedések keletkeznek a falakban, kémények ledőlnek.

8 ☞ **Súlyos károkat okozó**

Bútorok felborulnak. Sok hagyományos épület megsérül: kémények ledőlnek, a falakban nagy repedések keletkeznek, néhány épület részlegesen összedől.

9 ☞ **Pusztító**

Oszlopok, műemlékek ledőlnek vagy elferdülnek. Sok hagyományos épület részlegesen, néhány teljesen rombadől.

10 ☞ **Nagyon pusztító**

Sok hagyományos épület összedől.

11 ☞ **Elsöprő**

A legtöbb épület összedől.

12 ☞ **Teljesen elsöprő**

Gyakorlatilag minden építmény megsemmisül.

(Részletesen lásd: Grünthal, 1998)

APPENDIX A

EUROPEAN MACROSEISMIC SCALE (EMS)

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)

B MELLÉKLET

A VILÁG JELENTŐS FÖLDRENGÉSEI

2006

Forrás:

U.S. Geological Survey
National Earthquake Information Center
(USGS - NEIC)

APPENDIX B

SIGNIFICANT EARTHQUAKES OF THE WORLD

2006

Source:

U.S. Geological Survey
National Earthquake Information Center
(USGS - NEIC)

Halálos áldozatot követelő földrengések a világon 2006-ban

Deaths from Earthquakes in 2006

Dátum Date	Ország, terület Region	Magnitúdó Magnitude	Áldozatok száma Number killed
2006 02 14	Sikkim, India	5.3	2
2006 02 22	Mozambique	7.0	4
2006 03 10	Pakistan	4.9	1
2006 03 14	Seram, Indonesia	6.7	4
2006 03 20	Northern Algeria	5.0	4
2006 03 25	Southern Iran	5.9	1
2006 03 31	Western Iran	6.1	70
2006 04 25	Tasmania, Australia Region	2.2	1
2006 05 26	Java, Indonesia	6.3	5 749
2006 06 03	Southern Iran	5.1	2
2006 07 17	South of Java, Indonesia	7.7	730
2006 07 22	Sichuan-Yunnan-Guizhou, China	5.0	22
2006 07 29	Tajikistan	5.6	3
2006 08 25	Eastern Sichuan, China	5.2	1
2006 09 29	Trinidad and Tobago	5.5	1
2006 12 01	Sumbawa Region, Indonesia	6.3	1
2006 12 17	Northern Sumatra	5.8	7
2006 12 26	Taiwan Region	7.1	2
	Összesen / Total		6 605

A 7.0 vagy annál nagyobb magnitúdójú földrengések a világon 2006-ban

Earthquakes of magnitude 7.0 and greater in 2006

	Év Year	Hónap Month	Nap Day	Idő Time (UTC)	Szélesség Latitude	Hosszúság Longitude	Mélység Depth (km)	Magnitúdó Magnitude	Ország, terület Region
1.	2006	01	02	06:10:49.2	-60.934	-21.575	10	7.4	East of the South Sandwich Islands
2.	2006	01	02	22:13:40.4	-19.926	-178.178	583	7.2	Fiji Region
3.	2006	01	27	16:58:53.6	-5.473	128.131	397	7.6	Banda Sea
4.	2006	02	22	22:19:07.8	-21.324	33.583	11	7.0	Mozambique
5.	2006	04	20	23:25:02.1	60.949	167.089	22	7.6	Koryakia, Russia
6.	2006	05	03	15:26:40.2	-20.187	-174.123	55	8.0	Tonga
7.	2006	05	16	10:39:23.3	-31.810	-179.307	152	7.4	Kermadec Islands Region
8.	2006	07	17	08:19:28.7	-9.254	107.411	34	7.7	South of Java, Indonesia
9.	2006	08	20	03:41:47.5	-61.029	-34.365	10	7.0	Scotia Sea
10.	2006	11	15	11:14:13.5	46.592	153.266	10	8.3	Kuril Islands
11.	2006	12	26	12:26:21.1	21.799	120.547	10	7.1	Taiwan Region

A 6.5 vagy annál nagyobb magnitúdójú, és a jelentősebb károkat okozó földrengések a világon 2006-ban

Earthquakes of magnitude 6.5 or greater or ones that caused fatalities, injuries or substantial damage in 2006

DÁTUM	IDŐ Ó M S	KOORDINÁTA SZÉL	HOSSZ	MÉLYSÉG KM	MAG		ÁLLOMÁS SZÁM	RÉGIÓ, TOVÁBBI MAGNITÚDÓK, MEGJEGYZÉSEK
DATE UTC	ORIGIN TIME UTC HR MN SEC	GEOGRAPHIC COORDINATES LAT	LONG	DEPTH	MAG	SD	NO. STA USED	REGION, ADDITIONAL MAGNITUDES AND COMMENTS
JAN 02	06 10 49.2	60.934 S	21.575 W	10 G	7.4	1.2	209	EAST OF THE SOUTH SANDWICH ISLANDS. MW 7.4 (HRV), 7.1 (GS). mb 6.4 (GS). MS 7.3 (GS). ME 7.0 (GS). Mo 6.5*10**19 Nm (GS), 1.4*10**20 Nm (HRV), 1.8*10**20 Nm (PPT). Es 8.1*10**14 Nm (GS).
JAN 02	22 13 40.4	19.926 S	178.178 W	583 D	7.2	1.1	646	FIJI REGION. MW 7.2 (HRV), 7.1 (GS). mb 6.5 (GS). ME 7.2 (GS). Mo 7.1*10**19 Nm (HRV), 5.1*10**19 Nm (GS). Es 1.4*10**15 Nm (GS). Felt at Nuku`alofa, Tonga.
JAN 04	08 32 32.4	28.164 N	112.117 W	14 G	6.6	1.3	323	GULF OF CALIFORNIA. MW 6.6 (HRV), 6.5 (GS). mb 6.1 (GS). MS 6.7 (GS). ME 6.8 (GS). Mo 8.8*10**18 Nm (HRV), 6.8*10**18 Nm (GS), 5.1*10**18 Nm (PPT). Es 3.3*10**14 Nm (GS). Felt (IV) at Guaymas, Hermosillo and Bahia de Kino. Also felt at Guerrero Negro, Mulege, San Quintin and Santa Isabel.
JAN 08	11 34 55.5	36.305 N	23.217 E	66 G	6.7	1.3	713	SOUTHERN GREECE. MW 6.7 (GS), 6.7 (HRV). mb 6.5 (GS). ME 6.7 (GS). Mo 1.5*10**19 Nm (HRV), 1.3*10**19 Nm (GS). Es 2.6*10**14 Nm (GS). Three people slightly injured on Crete. Eighty homes and an airport damaged and phone service interrupted on Kythira. Minor damage and phone service interrupted on Crete and in Lakonia. Minor damage also on Karpathos. Felt (VI) at Amarousion; (V) at Irakleion, Kalamata, Chania and Nea Smirni; (IV) at Athens, Glifadha and Oikismos Papagou; (III) at Ermoupolis and Kifisia; (II) at Psikhikon. Also felt (IV) at Catania and Motta Sant'Anastasia; (III) at Caltagirone and Rutigliano; (II) at Campobasso, Italy. Felt (III) at Mgarr, Naxxar and San Ghiljan, Malta. Also felt (III) at Al Jizah and Cairo, Egypt. Also felt at Amman, Jordan and at Ramat Gan, Israel.
JAN 27	16 58 53.6	5.473 S	128.131 E	397 G	7.6	0.9	560	BANDA SEA. MW 7.6 (HRV), 7.5 (GS). mb 7.0 (GS). ME 7.4 (GS). Mo 3.5*10**20 Nm (HRV), 2.6*10**20 Nm (GS), 3.8*10**20 Nm (PPT). Es 2.5*10**15 Nm (GS). Felt (V) on Ambon; (IV) at Kupang, Saumlaki, Sorong, Tual, and Waingapu; (III) at Makassar, Indonesia. Felt at Denpasar. Felt (IV) at Dili, East Timor and (III) at Darwin, Australia. Felt (III) at Davao and Marawi, Mindanao, Philippines. Also felt at Jabiru and Humpty Doo-MacMinns Lagoon, Australia.
FEB 02	12 48 43.4	17.747 S	178.390 W	598 D	6.7	1.0	644	FIJI REGION. MW 6.7 (GS), 6.7 (HRV). mb 5.9 (GS). Mo 1.5*10**19 Nm (HRV), 1.4*10**19 Nm (GS), 8.5*10**18 Nm (PPT).
FEB 14	00 55 25.0	27.382 N	88.388 E	30 D	5.3	0.8	260	SIKKIM, INDIA. MW 5.3 (HRV). mb 5.4 (GS). MS 4.8 (GS). Mo 1.1*10**17 Nm (HRV). Two people killed by landslides at Sherathang. Two people injured in eastern Sikkim. Buildings and roads were damaged in the Gangtok area and at Bardan and Rangpo. Minor damage to buildings at Shiliguri, West Bengal. Felt at Darjiling, Guwahati, Itanagar, Jalpaiguri, Karsiyang, Koch Bihar, Maldah and Shillong. Also felt at Kathmandu, Nepal; at Dinajpur, Nilphamari, Pabna, Rajshahi, Rangpur, Sylhet and Thakurgaon, Bangladesh; and at Paro Chhu, Phuntsholing and Thimphu, Bhutan.
FEB 20	17 20 09.0&	41.708 N	25.544 E	10 G	4.6		140	GREECE-BULGARIA BORDER REGION. . mb 4.6 (GS). ML 4.6 (THE), 4.6 (ATH). MD 4.5 (SOF), 4.4 (PDG). Two people injured, at least 175 buildings slightly damaged and power and telephone service interrupted in the Murgovo area, Bulgaria.
FEB 22	22 19 07.8	21.324 S	33.583 E	11 G	7.0	1.4	412	MOZAMBIQUE. MW 7.0 (GS), 7.0 (HRV). mb 6.5 (GS). MS 7.5 (GS). ME 6.9 (GS). Mo 4.6*10**19 Nm (GS), 4.5*10**19 Nm (HRV), 1.3*10**19 Nm (PPT). Es 4.4*10**14 Nm (GS). One person killed at Espungabera, one killed at Machaze and 2 killed at Beira. Thirty-six people injured and at least 294 buildings damaged in the Espungabera-Beira-Chimoio area. Power outages occurred at

										Maputo. Felt (V) at Beira, Inhambane and Maputo; (IV) at Matola. Felt (IV) at Harare and Mutare, Zimbabwe. Also felt (IV) at Louis Trichardt and Phalaborwa; (III) at Durban and Middelburg; (II) at Johannesburg and Pretoria, South Africa. Felt throughout Mozambique and eastern Zimbabwe. Felt in Swaziland and at Lobatse, Botswana and Lusaka, Zambia.
FEB	28	07 31 02.6	28.120 N	56.865 E	18 G	6.0	1.3	480	SOUTHERN IRAN. MW 6.0 (GS), 6.0 (HRV). mb 5.8 (GS). MS 6.2 (GS). ME 5.4 (GS). mbLg 5.8 (TEH). Mo 1.3*10**18 Nm (HRV), 1.1*10**18 Nm (GS). Es 2.5*10**12 Nm (GS). Six people injured in Kahnuj. Many buildings damaged or destroyed at Faryab. Minor damage to many buildings at Baft and to some buildings in the Jiroft-Orzuieh area. Felt at Kahnuj and Kerman. Felt (III) at Dubai, United Arab Emirates. Also felt at Ash Shariqah and Ras al Khaymah, United Arab Emirates.
MAR	07	18 20 46.1	23.777 N	70.899 E	10 G	5.5	1.1	199	GUJARAT, INDIA. MW 5.5 (GS), 5.5 (HRV). mb 5.2 (GS). MS 5.1 (GS). Mo 2.2*10**17 Nm (GS), 2.0*10**17 Nm (HRV). At least seven people injured in the Jatawada-Rapar area and some buildings damaged at Jatawada. Felt (IV) at Ahmadabad, Bhuj, Morbi and Rajkot; (II) at Vadodara. Felt in much of Gujarat and in southern Rajasthan. Also felt at Matli, Pakistan.
MAR	10	07 50 14.3	33.129 N	73.887 E	10 G	4.9	0.9	124	PAKISTAN. mb 4.9 (GS). One person killed and 22 injured in Mirpur District. Felt at Islamabad, Jhelum, Lahore and Peshawar.
MAR	14	06 57 33.8	3.595 S	127.214 E	30 D	6.7	1.2	306	SERAM, INDONESIA. MW 6.7 (GS), 6.7 (HRV). mb 6.4 (GS). MS 6.7 (GS). ME 7.0 (GS). Mo 1.5*10**19 Nm (GS), 1.4*10**19 Nm (HRV), 2.5*10**19 Nm (PPT). Es 7.6*10**14 Nm (GS). At least three people killed and one missing due to a local tsunami with an observed wave height (peak-to-trough) of 7 meters on Buru. Maximum run-in was about 100 meters. Ground cracks about 500 meters long with maximum width of about 15 centimeters were observed in the area. Liquefaction was also observed in the area. One hundred sixteen houses damaged or destroyed at Pela, 54 at Batu Jugku, 30 at Waimorot, 25 at Wailawa and 16 at Waimoly. Felt (VI) at Namlea, Buru and (V) on Ambon.
MAR	20	19 44 25.1	36.623 N	5.328 E	10 G	5.0	1.1	283	NORTHERN ALGERIA. mb 5.0 (GS). MS 4.9 (GS). Four people killed and nine injured; 30 houses destroyed and 32 damaged; roads damaged, power outages occurred and water lines broken in the Kherrata area. Felt strongly in eastern Bejaia.
MAR	25	07 28 57.6	27.574 N	55.685 E	18 G	5.9	1.1	503	SOUTHERN IRAN. MW 5.9 (HRV), 5.8 (GS). mb 5.7 (GS). MS 5.5 (GS). ME 5.4 (GS). ML 5.6 (TEH), 5.4 (THR). Mo 7.6*10**17 Nm (HRV), 5.7*10**17 Nm (GS). Es 2.6*10**12 Nm (GS). One person killed and one person injured at Fin. Damage to homes in Hormozgan Province. Felt at Bandar-e Abbas. Also felt at Abu Dhabi, Dubai, Ra's al Khaymah and Sharjah, United Arab Emirates.
MAR	31	01 17 00.9	33.500 N	48.780 E	7 G	6.1	1.1	586	WESTERN IRAN. MW 6.1 (HRV), 5.9 (GS). mb 5.7 (GS). MS 6.0 (GS). ME 6.0 (GS). ML 6.1 (THR). mbLg 5.9 (TEH). Mo 1.6*10**18 Nm (HRV), 1.0*10**18 Nm (GS). Es 2.1*10**13 Nm (GS). At least 70 people killed, more than 1300 people injured and 40 villages completely destroyed in the Borujerd-Dorud area. Felt (VIII) at Borujerd and (IV) at Hamadan.
MAR	31	13 21 00.3	29.609 S	176.825 W	17 G	6.5	1.0	206	KERMADEC ISLANDS REGION. MW 6.5 (GS), 6.5 (HRV). mb 5.9 (GS). MS 6.7 (GS). ME 6.3 (GS). Mo 7.3*10**18 Nm (HRV), 6.6*10**18 Nm (GS), 1.1*10**19 Nm (PPT). Es 5.6*10**13 Nm (GS).
APR	01	10 02 19.5	22.868 N	121.278 E	9 G	6.1	1.0	429	TAIWAN REGION. MW 6.1 (GS), 6.1 (HRV). mb 6.0 (GS). MS 6.1 (GS). ME 6.6 (GS). ML 6.4 (TAP). Mo 2.0*10**18 Nm (GS), 2.0*10**18 Nm (HRV). Es 1.8*10**14 Nm (GS). Forty-two people injured and some buildings damaged in T'ai-tung County. Felt in much of Taiwan. Recorded (6 TAP) at T'ai-tung. Recorded (5 TAP) in T'ai-tung; (4 TAP) in Kao-hsiung, P'ing-tung and T'ai-nan; (3 TAP) in Chia-i, Hua-lien, Nan-t'ou and Yun-lin; (2 TAP) in Chang-hua, Miao-li and I-lan; (1 TAP) in P'eng-hu Counties.
APR	04	09 12 23.4	34.600 N	73.136 E	10 G	4.6	1.2	109	PAKISTAN. MW 4.6 (HRV). mb 4.8 (GS). Mo 1.0*10**16 Nm (HRV). Twenty-eight people injured and several houses damaged or destroyed at Batgram. Felt at Balakot, Islamabad, Kohistan, Mansehra and Peshawar. Also felt at Muzaffarabad, Kashmir.
APR	07	08 30 44.6	16.527 S	176.989 E	14 G	6.5	1.1	247	FIJI REGION. MW 6.5 (HRV), 6.4 (GS). mb 5.9 (GS). MS 6.4 (GS). ME 7.4 (GS). Mo 6.2*10**18 Nm (HRV), 5.3*10**18 Nm (GS), 7.8*10**18 Nm (PPT). Es 2.4*10**15 Nm (GS). Felt (IV) at Nadi and (III) at Lautoka. Felt at Lami and Nausori.

APR 20 23 25 02.1 60.949 N 167.089 E 22 G 7.6 0.9 579 NEAR THE EAST COAST OF KORYAKIA, RUSSIA. MW 7.6 (HRV), 7.3 (GS), 7.2 (OBN). mb 6.8 (GS). MS 7.6 (GS). ME 7.3 (GS). Mo 9.6*10**19 Nm (GS), 3.0*10**20 Nm (HRV), 7.9*10**19 Nm (OBN), 7.3*10**20 Nm (PPT). Es 1.7*10**15 Nm (GS). About 40 people injured and the villages of Apuka, Khailino and Vyvenka were destroyed. Some buildings and water supply systems badly damaged in the Korf-Tilichiki area. Damage estimated at 55 million U.S. dollars. Felt (V) at Korf, Ossora and Tilichiki; (II) at Magadan.

APR 25 11 26 25.1& 41.164 S 146.863 E 4 2.2 4 TASMANIA, AUSTRALIA REGION. . ML 2.2 (MEL). A rockfall in a mine near Beaconsfield killed one miner and trapped two others for 14 days. Also felt at Launceston.

APR 29 16 58 06.3 60.491 N 167.516 E 11 G 6.6 0.8 645 NEAR THE EAST COAST OF KORYAKIA, RUSSIA. MW 6.6 (HRV), 6.4 (GS), 6.6 (OBN). mb 6.4 (GS). MS 6.6 (GS). ME 6.5 (GS). Mo 9.4*10**18 Nm (HRV), 4.4*10**18 Nm (GS), 9.0*10**18 Nm (OBN). Es 1.1*10**14 Nm (GS). Felt at Tilichiki.

APR 30 19 17 14.9 27.017 S 71.022 W 12 G 6.7 1.2 277 OFFSHORE ATACAMA, CHILE. MW 6.7 (GS), 6.6 (HRV). mb 6.0 (GS). MS 6.4 (GS). ME 6.5 (GS). ML 6.3 (GUC). Mo 1.6*10**19 Nm (GS), 1.0*10**19 Nm (HRV), 1.0*10**19 Nm (PPT). Es 1.3*10**14 Nm (GS). Felt (V) at Copiapo; (IV) at Caldera and Chanaral; (III) at Huasco. Felt at Taltal. Also felt at San Juan, Argentina.

APR 30 21 40 58.4 27.211 S 71.056 W 12 G 6.5 1.3 282 OFFSHORE ATACAMA, CHILE. MW 6.5 (HRV). mb 5.9 (GS). MS 6.7 (GS). ME 6.2 (GS). ML 6.3 (GUC). Mo 6.5*10**18 Nm (HRV), 1.0*10**19 Nm (PPT). Es 4.2*10**13 Nm (GS). Felt (VI) at Copiapo, (IV) at Caldera and (II) at La Serena.

MAY 03 15 26 40.2 20.187 S 174.123 W 55 G 8.0 1.2 626 TONGA. MW 8.0 (HRV), 7.9 (GS). mb 7.2 (GS). MS 7.8 (GS). ME 8.1 (GS). Mo 8.5*10**20 Nm (GS), 1.1*10**21 Nm (HRV), 1.4*10**21 Nm (PPT). Es 2.8*10**16 Nm (GS). One person injured, a church damaged, windows broken and items knocked from shelves (VII) at Nuku`alofa. Felt (VII) at Neiafu. Felt at Hihifo, Pangai and Vaini. Felt (III) at Apia, Samoa. Felt in American Samoa. Felt at Atiu and Avarua, Cook Islands; at Suva, Fiji; at Alofi, Niue; at Mulifanua, Samoa. Also felt at Auckland, Minginui, Napier, Wanganui, Wellington and Whakatane, New Zealand. A tsunami was generated with recorded wave heights in meters (peak-to-trough) at the following selected tide stations: 0.54 at Pago Pago, American Samoa; 0.10 at Tofino, British Columbia, Canada; 0.13 at Raratonga, Cook Islands; 0.07 at Suva, Fiji; 0.15 at Hanasaki, Japan; 0.48 at Noumea, New Caledonia; 0.15 at Jackson Bay, New Zealand; 0.42 on Niue; 0.42 at Apia, Samoa; 0.42 at Nuku`alofa, Tonga; 0.13 at King Cove, Alaska, 0.54 at Crescent City, California, 0.35 at Santa Barbara, California, 0.10 at San Francisco, California, 0.49 at Kahului, Hawaii, 0.12 at Portland, Oregon, 0.11 at La Push, Washington, U.S.A; 0.45 at Port-Vila, Vanuatu.

MAY 07 06 20 53.7& 30.790 N 56.700 E 14 G 5.0 148 CENTRAL IRAN. . MW 5.0 (HRV). mb 4.8 (GS). MS 4.1 (GS). mbLg 5.2 (TEH). ML 4.7 (THR). Mo 3.4*10**16 Nm (HRV). More than 70 people injured slightly and some buildings and roads damaged in the Zarand area.

MAY 16 10 39 23.3 31.810 S 179.307 W 152 G 7.4 1.3 613 KERMADEC ISLANDS REGION. MW 7.4 (GS), 7.4 (HRV). mb 6.8 (GS). ME 7.2 (GS). Mo 1.8*10**20 Nm (HRV), 1.6*10**20 Nm (GS), 3.9*10**20 Nm (PPT). Es 1.2*10**15 Nm (GS). Felt (III) at Christchurch and Wellington, New Zealand. Also felt at Auckland, Gisborne, Hastings, Napier, Tauranga and Wanganui, New Zealand. Also felt on Kapiti Island, New Zealand.

MAY 16 15 28 25.9 0.093 N 97.050 E 12 G 6.8 0.8 701 NIAS REGION, INDONESIA. MW 6.8 (GS), 6.8 (HRV). mb 6.6 (GS). MS 6.8 (GS). ME 7.6 (GS). Mo 2.1*10**19 Nm (GS), 2.1*10**19 Nm (HRV). Es 5.2*10**15 Nm (GS). Felt (VI) at Gunungsitoli. Felt (V) at Sibolga; (IV) at Banda Aceh and Padang; felt at Bukittinggi and Medan, Sumatra. Felt at Balakong, Butterworth and Kuala Lumpur, Malaysia. Also felt in Singapore. Ground cracks observed on Nias.

MAY 22 11 12 00.8 60.772 N 165.743 E 19 G 6.6 1.0 548 NEAR THE EAST COAST OF KORYAKIA, RUSSIA. MW 6.6 (HRV), 6.5 (GS), 6.4 (OBN). mb 6.0 (GS). MS 6.7 (GS). ME 6.8 (GS). Mo 7.3*10**18 Nm (GS), 1.0*10**19 Nm (HRV), 5.0*10**18 Nm (OBN), 1.0*10**19 Nm (PPT). Es 4.1*10**14 Nm (GS). Felt (VII) at Tilichiki.

MAY 26 22 53 58.9 7.961 S 110.446 E 13 D 6.3 1.3 213 JAVA, INDONESIA. MW 6.3 (GS), 6.3 (HRV). mb 6.0 (GS). MS 6.2 (GS). ME 6.8 (GS). Mo 4.2*10**18 Nm (GS), 4.2*10**18 Nm (HRV), 6.8*10**18 Nm (PPT). Es 3.8*10**14 Nm (GS). At least 5,749

people were killed, 38,568 were injured and as many as 600,000 people were displaced in the Bantul-Yogyakarta area. More than 127,000 houses were destroyed and an additional 451,000 were damaged in the area, with the total loss estimated at approximately 3.1 billion U.S. dollars. Felt (IX) at Bantul and Klaten, (VIII) at Sleman and Yogyakarta, (V) at Surakarta, (IV) at Salatiga and Blitar and (II) at Surabaya. Felt in much of Java. Also felt at Denpasar, Bali.

MAY 28 03 12 08.7 5.724 S 151.133 E 34 G 6.5 0.9 477 NEW BRITAIN REGION, PAPUA NEW GUINEA. MW 6.5 (HRV), 6.4 (GS). mb 5.9 (GS). MS 6.6 (GS). ME 5.8 (GS). Mo 6.1*10**18 Nm (HRV), 4.6*10**18 Nm (GS), 6.5*10**18 Nm (PPT). Es 9.8*10**12 Nm (GS). Felt at Kimbe.

JUN 03 07 15 35.6 26.759 N 55.843 E 12 D 5.1 1.0 344 SOUTHERN IRAN. MW 5.1 (HRV). mb 5.4 (GS). ML 5.1 (THR). Mo 6.5*10**16 Nm (HRV). Two people killed and four injured on Qeshm. Some buildings damaged at Ramkan. Felt at Khamir.

JUN 11 20 01 26.3 33.134 N 131.145 E 140 G 6.3 0.8 623 KYUSHU, JAPAN. MW 6.3 (GS), 6.3 (HRV), 6.3 (NIED). mb 5.9 (GS). ME 5.8 (GS). Mo 4.2*10**18 Nm (GS), 4.2*10**18 Nm (HRV), 4.1*10**18 Nm (NIED). Es 1.3*10**13 Nm (GS). At least eight people injured in Miyazaki Prefecture, Kyushu; Ehime Prefecture, Shikoku; and Hiroshima and Yamaguchi Prefectures, Honshu. Felt (V) at Hiroshima and Iwakuni, Honshu. Felt widely in southern and western Japan. Recorded (5L JMA) in Oita; (4 JMA) in Kumamoto and Miyazaki; (3 JMA) in Fukuoka, Kagoshima and Saga; (2 JMA) in Nagasaki Prefectures, Kyushu. Recorded (5L JMA) in Hiroshima; (4 JMA) in Okayama, Shimane and Yamaguchi; (3 JMA) in Hyogo and Tottori; (2 JMA) in Aichi, Gifu, Kyoto, Mie, Nara, Osaka, Shiga and Wakayama; (1 JMA) in Fukui, Nagano and Shizuoka Prefectures, Honshu. Also recorded (5L JMA) in Ehime; (4 JMA) in Kagawa and Kochi; (3 JMA) in Tokushima Prefectures, Shikoku.

JUN 13 14 15 38.3& 40.270 N 19.960 E 10 4.5 286 ALBANIA. . mb 4.5 (GS). ML 4.8 (ATH), 4.5 (ROM), 4.5 (PDG), 4.5 (CSEM), 4.0 (BUC). One person slightly injured and at least 12 houses damaged at Tepelene.

JUN 14 04 18 42.5 51.752 N 177.082 E 14 G 6.5 1.3 470 RAT ISLANDS, ALEUTIAN ISLANDS, ALASKA. MW 6.5 (HRV), 6.4 (GS). mb 5.9 (GS). MS 6.4 (GS). ME 6.9 (GS). ML 6.1 (AEIC). Mo 6.4*10**18 Nm (HRV), 5.5*10**18 Nm (GS), 3.9*10**18 Nm (PPT). Es 4.6*10**14 Nm (GS). Felt (V) on Shemya.

JUN 20 16 52 57.9 33.068 N 104.950 E 24 4.9 0.9 198 GANSU, CHINA. MW 4.9 (HRV). mb 5.1 (GS). MS 4.5 (GS). Mo 3.0*10**16 Nm (HRV). Five people injured in Gansu. Twenty-five houses damaged at Xinsi. At least six buildings damaged at Linjiang and Liping. Two landslides damaged the road between Wen Xian and Wudu Counties.

JUN 28 21 02 09.9 26.925 N 55.866 E 11 G 5.8 1.0 608 SOUTHERN IRAN. MW 5.8 (HRV), 5.7 (GS). mb 5.8 (GS). MS 5.5 (GS). ME 5.6 (GS). ML 5.6 (THR). Mo 6.4*10**17 Nm (HRV), 5.3*10**17 Nm (GS). Es 5.5*10**12 Nm (GS). Nine people injured and power outages occurred on Jazireh-ye Qeshm. Felt at Bandar `Abbas. Felt (IV) at Ra's al Khaymah and (III) at Abu Dhabi, Dubai and Sharjah, United Arab Emirates. Felt at Ajman, United Arab Emirates.

JUL 08 20 40 00.9 51.214 N 179.312 W 22 G 6.6 1.0 632 ANDREANOF ISLANDS, ALEUTIAN IS., ALASKA. MW 6.6 (GS), 6.6 (HRV). mb 6.2 (GS). MS 6.4 (GS). ME 6.0 (GS). ML 6.5 (AEIC). Mo 1.1*10**19 Nm (GS), 1.0*10**19 Nm (HRV), 1.2*10**19 Nm (PPT). Es 2.1*10**13 Nm (GS). Felt on Adak.

JUL 17 08 19 28.7 9.254 S 107.411 E 34 G 7.7 1.1 299 SOUTH OF JAVA, INDONESIA. MW 7.7 (HRV), 7.2 (GS). mb 6.1 (GS). MS 7.2 (GS). ME 7.2 (GS). Mo 8.1*10**19 Nm (GS), 4.0*10**20 Nm (HRV), 1.2*10**20 Nm (PPT). Es 1.2*10**15 Nm (GS). Four-hundred and thirteen people killed, 2,741 injured and 15 missing in Ciamis; 62 people killed, 6,124 injured and 2 missing in Tasikmalaya; 15 people killed and 244 injured at Banjar; 1 person killed and 30 injured in Garut; 157 people killed, 104 injured and 15 missing in Cilacap; 10 people killed, 22 injured and 33 missing in Kebumen; 1 person killed in Banyumas; 3 people killed and 10 injured in Gunung Kidul; 3 people killed in Bantul. At least 1,540 buildings damaged or destroyed, 176 boats destroyed and many roads damaged in Jawa Barat. At least 83 buildings damaged and 698 boats damaged or destroyed in Jawa Tengah. Felt (IV) at Bandung, Jakarta, Pangandaran and Tasikmalaya; (III) at Cianjur; (II) at Karangkates, Sawahan and Yogyakarta. Felt at Banda Aceh, Sukabumi and Surabaya. Also felt at Broome, Australia; Subang Jaya, Malaysia and in Singapore. All deaths and damage were a result of a tsunami with maximum

runup heights of 4.6 m at Widarapayung, 3.6 m at Cikembulan, 3.4 m at Parang Kusumo and 1.8 m at Pangandaran. Inundation was at least 457 m at Buntong, 422 m at Cikembulan and 304 m at Suwuk. Wave heights in centimeters (peak-to-trough) were recorded at the following selected tide stations: 82.7 at Christmas Island, 28.8 at Hillarys, 19.5 at Esperance, 11.9 at Cocos Island and 4.5 at Broome, Australia; 24.3 at Benoa and 11.9 at Sabang, Indonesia; 21.4 at Hanimaadhoo, Maldives; 73.8 at Rodriguez, Mauritius.

JUL 22 01 10 29.0 27.995 N 104.138 E 56 5.0 0.9 263 SICHUAN-YUNNAN-GUIZHOU REGION, CHINA. mb 5.0 (GS). MS 4.6 (GS). Twenty-two people killed and at least 106 injured due to a landslide in Yanjin County.

JUL 29 00 11 51.3 37.255 N 68.828 E 34 D 5.6 0.9 184 TAJIKISTAN. MW 5.6 (HRV), 5.4 (GS). mb 4.8 (GS). MS 5.2 (GS). Mo 2.8*10**17 Nm (HRV), 1.5*10**17 Nm (GS). Three people killed, 19 injured, 721 houses destroyed, 1,205 damaged and power outages occurred in the Panj-Qumsangir area.

AUG 07 22 18 54.0 15.777 S 167.799 E 141 D 6.8 1.1 550 VANUATU. MW 6.8 (GS), 6.8 (HRV). mb 6.0 (GS). ME 6.8 (GS). Mo 2.0*10**19 Nm (HRV), 1.9*10**19 Nm (GS), 2.4*10**19 Nm (PPT). Es 3.5*10**14 Nm (GS). Felt at Luganville, Espiritu Santo.

AUG 20 03 41 47.5 61.029 S 34.365 W 10 G 7.0 1.0 322 SCOTIA SEA. MW 7.0 (GS), 7.0 (HRV). mb 6.4 (GS). MS 6.8 (GS). ME 7.6 (GS). Mo 3.6*10**19 Nm (HRV), 3.5*10**19 Nm (GS). Es 5.3*10**15 Nm (GS).

AUG 24 21 50 36.6 51.148 N 157.522 E 43 G 6.5 0.8 700 NEAR THE EAST COAST OF KAMCHATKA, RUSSIA. MW 6.5 (GS), 6.5 (HRV). mb 5.9 (GS). MS 6.2 (GS). ME 6.0 (GS). Mo 6.1*10**18 Nm (GS), 6.1*10**18 Nm (HRV), 7.5*10**18 Nm (PPT). Es 2.3*10**13 Nm (GS). Felt at Petropavlovsk-Kamchatskiy.

AUG 25 00 44 46.1 24.405 S 67.028 W 184 D 6.6 0.9 455 SALTA, ARGENTINA. MW 6.6 (GS), 6.6 (HRV). mb 5.9 (GS). Mo 9.2*10**18 Nm (HRV), 8.9*10**18 Nm (GS), 8.5*10**18 Nm (PPT). Felt (III) at Salta. Felt (IV) at Antofagasta, Baquedano, Calama, Chanaral, Maria Elena, Mejillones and Sierra Gorda; (III) at Caldera, Copiapo, Huara, Iquique, Pozo Almonte, San Pedro de Atacama, Tierra Amarilla and Tocopilla; (II) at Diego de Almagro, El Salvador, Freirina, Huasco and Vallenar, Chile.

AUG 25 05 51 44.3 28.012 N 104.151 E 22 5.2 0.7 255 EASTERN SICHUAN, CHINA. mb 5.2 (GS). MS 4.6 (GS). At least one person killed, 31 injured, buildings destroyed and landslides damaged roads in the Doushaguan-Yanjin area. Felt as far north as Chengdu.

SEP 01 10 18 51.6 6.759 S 155.512 E 38 G 6.8 0.8 459 BOUGAINVILLE REGION, PAPUA NEW GUINEA. MW 6.8 (GS), 6.7 (HRV). mb 6.3 (GS). MS 6.7 (GS). ME 6.5 (GS). Mo 1.7*10**19 Nm (GS), 1.5*10**19 Nm (HRV), 1.4*10**19 Nm (PPT). Es 1.1*10**14 Nm (GS).

SEP 28 06 22 09.7 16.592 S 172.033 W 28 G 6.9 0.9 702 SAMOA ISLANDS REGION. MW 6.9 (HRV), 6.7 (GS). mb 6.5 (GS). MS 6.6 (GS). ME 6.7 (GS). Mo 2.5*10**19 Nm (HRV), 1.3*10**19 Nm (GS). Es 2.9*10**14 Nm (GS). Felt (IV) at Alofi and (III) at Tamakautoga, Niue. Felt (III) at Apia. Also felt (III) at Neiafu, Tonga. A tsunami with a wave height of 16 cm (peak-to-trough) was recorded at Pago Pago, American Samoa.

SEP 29 13 08 26.1 10.876 N 61.756 W 53 D 6.1 0.9 595 TRINIDAD REGION, TRINIDAD AND TOBAGO. MW 6.1 (HRV), 6.0 (GS), 6.1 (CAR). mb 5.9 (GS). MS 5.4 (GS). Mo 1.5*10**18 Nm (HRV), 1.1*10**18 Nm (GS). Three people injured in the Port-of-Spain area. One building destroyed and one damaged at California. Several buildings damaged on Tobago and in parts of northern Trinidad, including minor damage to buildings at Port-of-Spain. Felt (VI) at Arima, Arouca, Chaguanas, Couva, Mucurapo, Princes Town, Saint Joseph, San Juan, Tacarigua and Tunapuna; (V) at Point Fortin, Port-of-Spain and San Fernando. Felt (IV) at Ciudad Guayana, Venezuela; (III) at Georgetown, Guyana and Kingstown, Saint Vincent and the Grenadines. Felt throughout Trinidad and Tobago and in parts of northern Venezuela, including Caracas. Also felt in Grenada, St. Lucia and Saint Vincent and the Grenadines. Also felt at Georgetown, Guyana. Power outages occurred in northern and eastern Trinidad and parts of Tobago.

SEP 29 18 23 05.9 10.814 N 61.758 W 52 D 5.5 1.1 359 TRINIDAD REGION, TRINIDAD AND TOBAGO. MW 5.5 (GS), 5.5 (HRV), 5.4 (CAR). mb 5.3 (GS). MS 4.8 (GS). Mo 2.4*10**17 Nm (HRV), 2.1*10**17 Nm (GS). One person killed at Gasparillo. Felt (VI) at San Juan and (V) at Arouca, Chaguanes, Port-of-Spain, San Fernando and Tunapuna. Felt (III) at Cuidad Guayana, Venezuela. Felt in Grenada and Saint Vincent and the Grenadines.

SEP 30 17 50 23.0 46.351 N 153.166 E 11 G 6.6 1.0 603 KURIL ISLANDS. MW 6.6 (GS), 6.6 (HRV). mb 6.1 (GS). MS 6.5 (GS). ME 6.4 (GS). Mo 9.3*10**18 Nm (HRV), 1.0*10**19 Nm (GS), 1.6*10**19 Nm (PPT). Es 8.6*10**13 Nm (GS).

OCT 01 09 06 02.3 46.470 N 153.240 E 19 G 6.6 0.9 628 KURIL ISLANDS. MW 6.6 (HRV), 6.5 (GS). mb 6.1 (GS). MS 6.4 (GS). ME 6.5 (GS). Mo 8.8*10**18 Nm (HRV), 6.0*10**18 Nm (GS), 1.6*10**19 Nm (PPT). Es 1.3*10**14 Nm (GS). Felt (II) at Misawa, Japan.

OCT 09 05 12 50.9* 30.941 N 66.541 E 10 G 4.4 1.0 16 PAKISTAN. mb 4.4 (GS). At least three injured in Chaman.

OCT 15 17 07 49.2& 19.878 N 155.935 W 39 6.7 425 ISLAND OF HAWAII, HAWAII. . MW 6.7 (GS), 6.7 (HRV). mb 6.2 (GS). MS 6.6 (GS). ME 6.7 (GS). Mo 1.3*10**19 Nm (HRV), 1.2*10**19 Nm (GS). Es 2.3*10**14 Nm (GS). Numerous people suffered minor injuries, at least 1,173 buildings damaged, roads damaged and landslides blocked roads on Hawai`i. Power outages occurred throughout the Hawaiian Islands. Damage estimated at 73 million dollars. Felt (VII-VIII) in northern and western Hawai`i and (V-VI) in eastern and southern Hawai`i. Also felt (VI) on Maui; (V) on Lana`i, Moloka`i and O`ahu; (IV) on Kaua`i. A tsunami with a wave height of 10 cm was recorded at Kawaihae Harbor.

OCT 17 01 25 12.2 5.881 S 150.982 E 32 G 6.7 1.0 533 NEW BRITAIN REGION, PAPUA NEW GUINEA. MW 6.7 (HRV), 6.6 (GS). mb 6.4 (GS). MS 6.9 (GS). ME 6.5 (GS). Mo 1.3*10**19 Nm (HRV), 1.0*10**19 Nm (GS), 2.8*10**19 Nm (PPT). Es 1.2*10**14 Nm (GS). Felt at Kimbe, Kokopo and Rabaul.

OCT 20 10 48 56.0 13.457 S 76.677 W 23 G 6.7 1.0 444 NEAR THE COAST OF CENTRAL PERU. MW 6.7 (HRV), 6.6 (GS). mb 5.9 (GS). MS 6.6 (GS). ME 6.5 (GS). MD 6.5 (QUI). ML 6.2 (LIM). Mo 1.3*10**19 Nm (HRV), 1.0*10**19 Nm (GS), 1.5*10**19 Nm (PPT). Es 1.1*10**14 Nm (GS). Minor damage (IV) to some houses at Pisco. Felt (IV) at Chincha and Lima. Felt at Chaclacayo, Chincha Alta, Chosica, Ica, Nuevo Imperial, Pachacamac and San Luis. Also felt at Guayaquil, Ecuador.

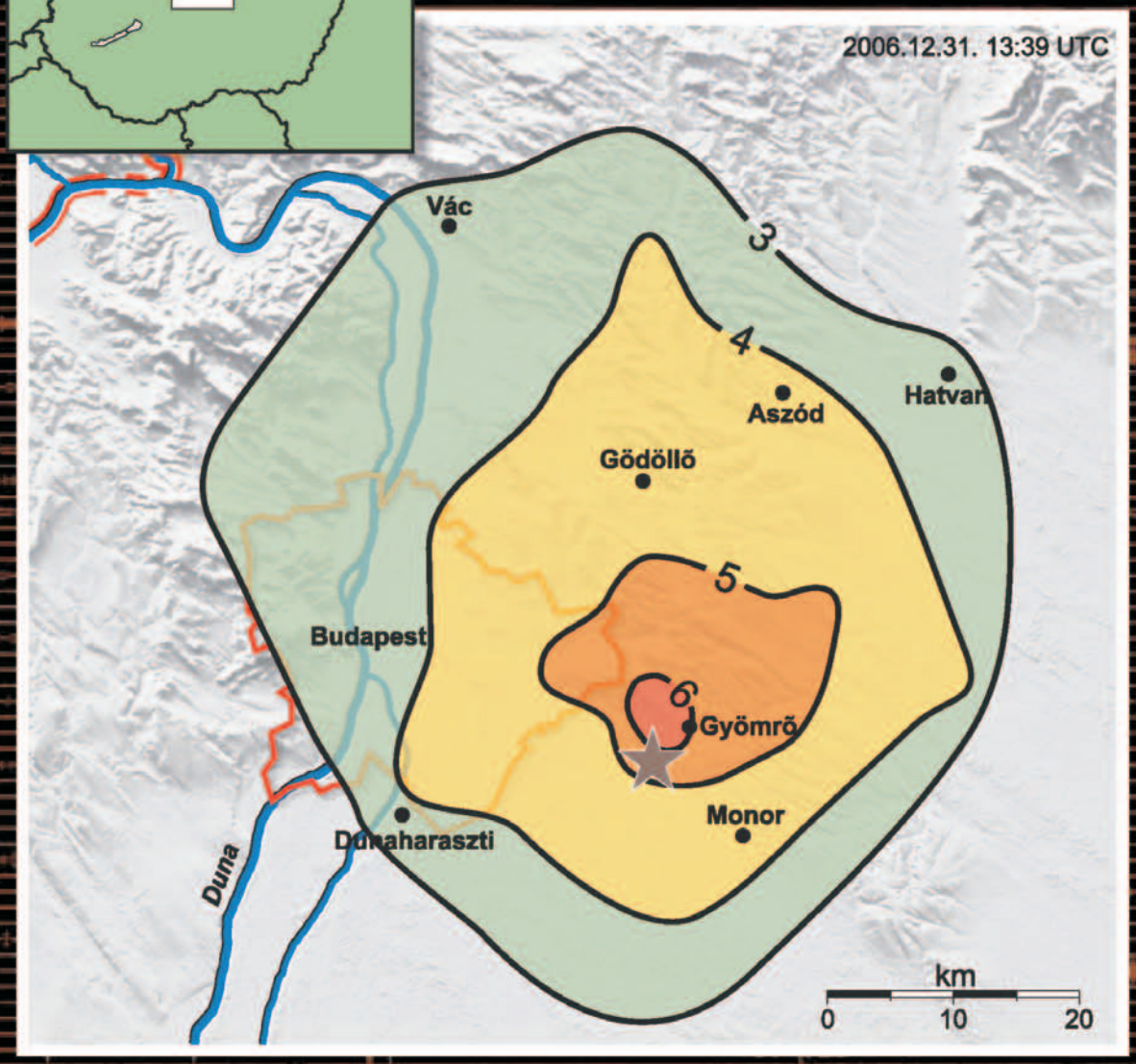
NOV 07 17 38 33.6 6.482 S 151.195 E 10 G 6.5 1.0 350 NEW BRITAIN REGION, PAPUA NEW GUINEA. MW 6.5 (HRV), 6.4 (GS). mb 6.2 (GS). MS 6.3 (GS). Mo 7.6*10**18 Nm (HRV), 4.3*10**18 Nm (GS).

NOV 13 01 26 34.2 26.041 S 63.221 W 552 6.8 0.9 481 SANTIAGO DEL ESTERO, ARGENTINA. MW 6.8 (GS), 6.8 (HRV). mb 6.3 (GS). ME 6.6 (GS). Mo 2.1*10**19 Nm (HRV), 1.8*10**19 Nm (GS), 1.7*10**19 Nm (PPT). Es 1.5*10**14 Nm (GS). Felt (III) in Catamarca, Corrientes, La Rioja and San Juan. Also felt at Asuncion, Paraguay and Antofagasta, Chile.

NOV 15 11 14 13.5 46.592 N 153.266 E 10 G 8.3 1.1 576 KURIL ISLANDS. MW 8.3 (HRV), 7.9 (GS). mb 6.5 (GS). MS 7.8 (GS). ME 7.7 (GS). Mo 8.7*10**20 Nm (GS), 3.4*10**21 Nm (HRV), 2.0*10**21 Nm (PPT). Es 6.8*10**15 Nm (GS). One person injured at Waikiki by a tsunami with a recorded wave height of 34 cm at Honolulu, Hawaii. One parking lot was flooded at Nawiliwili, Hawaii by a tsunami with a recorded wave height of 88 cm. Two docks destroyed and at least one damaged at Crescent City, California by a tsunami with a recorded wave height of 176 cm. Felt at Misawa and Yokosuka, Japan and at Petropavlovsk-Kamchatskiy, Russia. Recorded (2 JMA) in eastern and south-central Hokkaido. Recorded (1 JMA) in western Hokkaido and in Aomori, Iwate and Miyagi Prefectures, Honshu. Tsunami wave heights in centimeters (peak-to-trough) were recorded at the following tide stations: 44 at Pago Pago, American Samoa; 97 at Talcahuano, 82 at Arica, 76 at Caldera, 66 at Coquimbo, 64 at Iquique, 46 at Antofagasta and 40 at Juan Fernandez, Chile; 18 at Rarotonga, Cook Islands; 88 at Nuku Hiva and 11 at Rikitea, French Polynesia; 67 at Santa Cruz and 62 at Baltra, Galapagos Islands; 120 at Tokachi-ko, 100 at Chichi-jima, 80 at Hana-saki, 60 at Hachinohe, 40 at Hakodate, 40 at Kushiro, 40 at Nemuro and 13 at Naha, Japan; 35 on Shikotan, Kuril Islands; 6 on Kanton, Kirbati; 96 on Midway Island; 28 on Kwajalein, Marshall Islands; 58 at Timaru Port, 56 at Kaingaroa, Chatham Island, 33 at Lyttelton Port, 33 at Sumner Head, 32 at Kaikoura and 21 at Moturiki Island, New Zealand; 13 on Niue; 13 on Manus Island, Papua New Guinea; 73 at Callao-La Punta and 24 at Atico, Peru; 57 at Apia, Samoa; 7 at Honiara, Solomon Islands; 5 at Betio, Tarawa; 9 at Nuku`alofa, Tonga; 6 at Funafuti, Tuvalu; 39 at Adak, 36 at King Cove, 32 at Nikolski, 25 at Sitka, 21 at Sand Point, 20 at Shemya Island and 8 at Amchitka Island, Alaska, United States; 118 at Arena Cove, 79 at Santa Barbara, 62 at Point Reyes, 30 at Santa Monica, 22 at Los Angeles, 18 at San Diego and 17 at Richmond, California, United States; 152 at

										Kahului, 115 at Hale`iwa, 100 at Wai`anae, 98 at Hilo, 88 at Kalaupapa, 85 at Hanalei, 65 at Kawaihae, 64 at Makapu`u, 45 at Lahaina, 26 at Honokohau, 23 at Miloli`i, 13 at Kapoho and 10 at Mokuolo`e, Hawaii, United States; 112 at Port Orford, 38 at Charleston and 34 at South Beach, Oregon, United States; 24 at Port Angeles, Washington, United States; 29 at Port-Vila, Vanuatu; 22 on Wake Island.
NOV 15	11 34 58.1	46.640 N	155.312 E	10 G	6.5	0.8	419	EAST OF THE KURIL ISLANDS. mb 6.5 (GS).
DEC 01	14 01 47.5	8.251 S	118.777 E	43	6.3	1.1	200	SUMBAWA REGION, INDONESIA. MW 6.3 (HRV), 6.2 (GS). mb 5.9 (GS). MS 6.0 (GS). Mo 3.4*10**18 Nm (HRV), 2.4*10**18 Nm (GS), 1.4*10**18 Nm (PPT). One person died of a heart attack, 14 people injured and at least 20 houses destroyed and many damaged at Bima. Felt (V) at Bima; (IV) at Labuhan Bajo; (III) at Makassar, Sulawesi and (II) at Mataram, Lombok.
DEC 17	21 39 17.4	0.626 N	99.859 E	30 G	5.8	1.1	290	NORTHERN SUMATRA, INDONESIA. MW 5.8 (HRV). mb 5.5 (GS). MS 5.8 (GS). Mo 6.0*10**17 Nm (HRV). Seven people killed, 100 injured and more than 680 homes damaged or destroyed in the Muarasipongi area. Landslides reported in the Muarasipongi district. Felt (VI) at Muarasipongi; (IV) at Aekgodang and Payakumbuh; (III) at Airbangis, Duri, Mandailing, Padangpanjang and Pekanbaru; (II) at Padang. Felt (II) at Kuala Lumpur, Malaysia and in Singapore. Also felt at Johor Bahru and Petaling Jaya, Malaysia.
DEC 26	12 26 21.1	21.799 N	120.547 E	10 G	7.1	1.0	744	TAIWAN REGION. MW 7.1 (GS), 6.9 (HRV). mb 6.4 (GS). MS 7.3 (GS). ME 7.4 (GS). Mo 5.7*10**19 Nm (GS), 3.3*10**19 Nm (HRV), 4.2*10**19 Nm (PPT). Es 2.5*10**15 Nm (GS). Two people killed, over forty injured and several buildings damaged or destroyed. Undersea telecommunication cables were cut, disrupting voice and internet communication in much of East and Southeast Asia. Felt (V) at Kao-hsiung and (III) at T'ai-nan and Taipei. Also felt (IV) at Quanzhou and Xiamen; (III) at Fuzhou, Guangzhou, Hong Kong, Jiulong, Shating, Shenzhen and Yuanlong; (II) at Quanwan, China. Felt (IV PIVS) at Basco, Batan Islands and (II PIVS) at Pasuquin and Santo Domingo, Luzon, Philippines. Recorded (5 TAP) in P'ing-tung; (4 TAP) in Chang-hua, Chia-i, Kao-hsiung, Nan-t'ou, P'eng-hu, T'ai-nan, T'ai-tung and Yun-lin; (3 TAP) in Hua-lien, T'ai-chung and I-lan; (2 TAP) in Miao-li and T'ao-yuan; (1 TAP) in Hsin-chu and T'ai-pei Counties. Recorded (1 JMA) on Iriomote-jima, Ryukyu Islands.
DEC 26	12 34 13.8	21.974 N	120.493 E	10 G	6.9	1.1	466	TAIWAN REGION. MW 6.9 (HRV). mb 6.5 (GS). MS 7.1 (GS). Mo 2.4*10**19 Nm (HRV). Felt throughout Taiwan. Also felt along the coast of southeastern China from Shantou to Fuzhou. Felt (V PIVS) at Basco, Batan Islands; (II PIVS) at Pasuquin and (I PIVS) at Baguio, Luzon, Philippines. Recorded (5 TAP) in Kao-hsiung and P'ing-tung; (4 TAP) in Chang-hua, Chia-i, Nan-t'ou, P'eng-hu, T'ai-nan, T'ai-tung and Yun-lin; (3 TAP) in Hua-lien; (2 TAP) in Hsin-chu; (1 TAP) in Kin-men Counties. Recorded (1 JMA) on Ishigaki-jima, Iriomote-jima, Tarama-shima and Yonaguni-jima, Ryukyu Islands.
DEC 30	08 30 49.7	13.313 N	51.365 E	15 G	6.6	1.2	474	GULF OF ADEN. MW 6.6 (HRV), 6.5 (GS). mb 5.9 (GS). MS 6.4 (GS). ME 6.9 (GS). Mo 7.4*10**18 Nm (GS), 1.0*10**19 Nm (HRV). Es 5.0*10**14 Nm (GS).

Compiled by Pamela J. Benfield and NEIC Operations Staff.



A 2006. december 31-i, gyömrői földrengés (13:39 UTC)
izoszeizta térképe (4.1 ML)

Isoseismal Map of Gyömrő Earthquake
31st December 2006, 13:39 UTC (4.1 ML)

★ Műszeresen meghatározott epicentrum
Instrumental Epicentre