



Magyarországi földrengések évkönyve  
Hungarian Earthquake Bulletin  
2012

Tóth L., Mónus P., Zsiros T., Kiszely M., Czifra T.

GeoRisk  
Földrengés Mérnöki Iroda ♦ Earthquake Engineering

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# MAGYARORSZÁGI FÖLDRENGÉSEK ÉVKÖNYVE

## HUNGARIAN EARTHQUAKE BULLETIN

2012

TÓTH LÁSZLÓ, MÓNUS PÉTER, ZSÍROS TIBOR,  
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Horváth F., Bada G., Windhoffer G., Csontos L., Dövényi P., Fodor L., Grenczy Gy., Sikhegyi F., Szafián P., Székely B.,

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## 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 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 2012. év szeizmikus szempontból közepesen aktív időszaknak tekinthető Magyarországon. Az év folyamán 162 szeizmikus eseményről szereztünk tudomást a 45.5-49.0 N szélességi és 16.0-23.0 E hosszúsági koordináták által határolt területen, amelyek közül 97 volt természetes eredetű földrengés, 65 pedig robbantás.

Az észlelt földrengések mérete a  $-0.2 \leq M_L \leq 3.1$  lokális magnitúdó tartományba esett. A fészekmélység jellemzően sekély, kisebb 10 km-nél, de egyetlen rengés sem volt 15 km-nél mélyebben.

A kőbánya robbantások mindegyike  $0.5 \leq M_L < 2.0$  méretű volt, a számított fészekmélység pedig minden esetben kisebb 1 km-nél.

Az évben összesen három olyan földrengés volt, melyet a lakosság is érzett.

A legnagyobb műszeresen meghatározott magnitúdójú rengés  $3.1 M_L$ , míg a legnagyobb földrengés intenzitás, melyet Magyarország területéről az év folyamán jelentettek 5 EMS fokozatú volt, épületkárok nem keletkeztek.

A rengések mindegyike többé-kevésbé ismert forrászónához köthető. A legnagyobb számú szeizmikus esemény 2012-ben is a Vértes hegységben, a Komárom – Berhida közé eső területen, a Móri-árok forrászónában keletkezett. Ennek egyik, nem szeizmotektonikai magyarázata az állomáshálózat fokozott érzékenysége ezen a területen.

Az év első érezhető rengését ( $M_L 2.4$ ) március 20-án éjjel jelezték Eger környékén. A rengés intenzitása 4-5 EMS fokra becsülhető az epicentrum térségében, de nagyon kis területen volt csak érezhető.

Április 6-án, délelőtt Gánton kisebb riadalmat okozott egy  $2.7 M_L$  magnitúdójú földrengés. A rengés erősen érezhető volt (5 EMS) Gánton, a környékbeli településeken azonban nem érezték.

December 25-én este, Zala megye déli részén, a magyar - szlovén - horvát határ közelében, Kiscsehi és Lisperzentadorján környékén érezték földrengést. A  $2.5 M_L$  magnitúdójú rengés néhány száz  $\text{km}^2$  területen volt érezhető, a maximális intenzitása 4 EMS.

# 1.

## SUMMARY

2012 was an averagely active year for Hungarian seismicity. Out of the 162 seismic events located within the area bounded by latitudes 45.5-49.0 N and longitudes 16.0-23.0 E, 97 were identified as natural earthquakes and 65 were known as quarry blasts.

The magnitude of the earthquakes was in the range of  $-0.2 \leq M_L \leq 3.1$ . Each of the earthquakes had shallow focal depth typically less than 10 km; and none of them had depth of more than 15 km.

The size of the quarry blasts was in the range of  $0.5 \leq M_L < 2.0$  with focal depth less than 1 km.

During the year, all together three earthquakes were reported as felt.

The highest magnitude assigned to a shock was 3.1  $M_L$  while the highest intensity reported during the year was 5 EMS. No building damage was reported during the year.

All detected and located earthquakes can be connected to more or less well-known source zones. In 2012, largest number of events was located in the Komárom – Berhida region, in the well-known source zone of the Mór graben. In addition to the undoubted current activity of this area, the high number of detected low magnitude events is partly due to the increased sensitivity of the network here.

In the night of March 20<sup>th</sup>, the first felt event of the year was reported from Eger. The shock was felt 4-5 EMS in a very small area near to the epicenter.

A magnitude 2.7  $M_L$  earthquake alerted people at Gánt in late morning of April 6<sup>th</sup>. The shock was strongly felt (5 EMS) at the epicenter but no reports of being felt at other localities.

In the evening of December 25<sup>th</sup>, a 2.5  $M_L$  magnitude event was felt in a few hundred km<sup>2</sup> area around Kiscsehi and Lispezentadorján at the Hungarian – Croatian – Slovenian border region, SW of Hungary. 4 EMS epicentral intensity was reported.

## 2.

# FÖLDRENGÉS MEGFIGYELŐ ÁLLOMÁSOK MAGYARORSZÁGON

2012-ben 18 állandó szeizmográf állomás működött Magyarországon. Az állomások közül tízet a GeoRisk Földrengés Mérnöki Iroda Kft., nyolcat pedig az MTA CSFK Geodéziai és Geofizikai Intézet (MTA CSFK GGI) üzemeltetett (2.1. Táblázat és 2.1. ábra).

### *Szélessávú állomások*

Az év folyamán 7 szélessávú szeizmológiai állomás működött (BEHE, BUD, LTVH, MORH, PSZ, SOP, TRPA). Az LTVH kivételével az állomások mindegyikén az érzékelő 3 komponenses szélessávú Streckeisen STS-2 szeizmométer; az érzékelő jele EarthData PS-6-24 digitalizáló egységen át jut a SeisComp szoftverrel felszerelt adatgyűjtő számítógépre. Az LTVH állomáson Güralp CMG-3T szeizmométer és Güralp CMG-DM24/S3/EAM adatgyűjtő egység található. Mindegyik állomás internet összeköttetéssel rendelkezik, így az adatok közel valós időben, egy erre a célra kifejlesztett protokoll (SeedLink) felhasználásával jutnak el az adatközpontba, ahol a feldolgozás és archiválás történik. Az adatközpontban az adatok átlagos késése a valós időhöz képest 10 másodperc körüli. Az állomáson tárolt adatok bizonyos idő elteltével törlődnek.

### *Rövidperiódusú állomások*

A 11 rövidperiódusú állomás közül tíz állomáson Lennartz LE-3D, 1 s sajátperiódusú, 3 komponenses szeizmométer és Lennartz MARS88 digitalizáló és adatgyűjtő működik, folyamatos regisztrálással. Egy állomáson (CSKK) az érzékelő három Kinometrics SS-1 rövidperiódusú szeizmométer, az adatgyűjtő Kinometrics K2, szintén folyamatos regisztrálással.

Öt rövidperiódusú állomáson (PKS2, PKS6, PKS7, PKS9, PKSN) az adatok átmeneti tárolása a helyszínen, magneto-optikai lemezeken történik. A lemezek havi cseréjével az adatok legalább két nap, legfeljebb egy hónap késéssel kerülnek az adatközpontba.

További öt rövidperiódusú állomáson (PENC, PKSG, PKSM, PKST, PKSV) – bár az érzékelő és digitalizáló ugyanolyan – az adatgyűjtés on-line történik. Az adatok a helyszínen működő SeisComp rendszerű számítógépbe jutnak, ahol annak merevlemezén tárolódnak, majd interneten keresztül eljutnak az adatközpontba, hasonlóan a szélessávú állomásokhoz. Mivel az itt alkalmazott konfiguráció és a működés részben eltér a szélessávú állomásokétól, ebből adódóan az adatok késése valamivel nagyobb, 10-30 perces. Az állomáson tárolt adatok bizonyos idő elteltével itt is automatikusan törlődnek.

A CSKK állomáson Kinometrics K2 adatgyűjtő és SeisComp PC biztosítja a helyszíni regisztrálást és a kommunikációt az adatközponttal.

## 2.

### SEISMOGRAPH STATIONS IN HUNGARY

In 2012, there were 18 permanent seismograph stations running in Hungary. Ten of the permanent stations were operated by GeoRisk Earthquake Engineering Ltd. and eight of them by Institute of Geodesy and Geophysics, Research Centre for Astronomy and Earth Sciences, Hungarian Academy of Sciences (MTA CSFK GGI). (Table 2.1 and Fig. 2.1)

#### *Broadband stations*

Seven broadband stations (BEHE, BUD, LTVH, MORH, PSZ, SOP, TRPA) were running during the year. All but one of these stations have Streckeisen STS-2 very broadband seismometers as sensors and EarthData PS-6-24 digitizer. Linux PC's with SeisComP software have been used as data acquisition systems. One of the stations, LTVH is equipped with Guralp CMG-3T seismometer and Guralp CMG-DM24/S3/EAM data acquisition module. 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*

Ten of the eleven short period stations consist of a three component short period seismometer, a digital recorder and time signal receiver. The seismometers used at these stations are LE-3D three directional compact size high sensitivity 1 Hz geophones, and the digital acquisition system is the MARS88 recorder. One of the stations, CSKK has Kinometrics short period SS-1 sensors. Continuous data are recorded at each short period station.

In case of five stations (PKS2, PKS6, PKS7, PKS9, PKSN) the data is recorded and temporarily stored on-site on rewritable magneto-optical disks, which are collected and transferred to the data center on a monthly basis.

The configuration at five stations (PENC, PKSG, PKSM, PKST, PKSV) 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. These stations have 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.

Station CSKK has Kinometrics K2 digitizer and SeisComP PC for recording and communication with the Data Centre.

*GeoRisk adatközpont (www.foldrenges.hu)*

Az összes mérőállomáson regisztrált adatot egy központi adatközpontban gyűjtjük és dolgozzuk fel.

Minden állomás digitális adataiból napi szeizmogramok készülnek kép formátumban. A képi szeizmogramok egyrészt az érdeklődők tájékoztatását, 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 hullámfázisainak körültekintő manuális kimérése alapján állítjuk össze havonta a fázisadatokat (kimérési adatokat) tartalmazó jelentést.

A fázisadatok felhasználásával – a saját adatokat kiegészítve a szomszédos országok szeizmológiai intézményeinek hasonló adataival (2.2. ábra) – havonta eseménylista készül (*Havi Jelentés* és *Havi Földrengés Tájékoztató*), mely a helyi és regionális földrengések hipocentrum adatait tartalmazza.

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

Átlagos zaj- (talajnyugtalanosság) viszonyokat feltételezve a magyarországi szeizmológiai hálózat jelenlegi észlelési képessége  $M_L=1.0-2.0$  magnitúdó körül van. Ennek becslése 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 az érzékenységi küszöb. Ez azt jelenti, hogy az ÉK-i területeket kivéve, a lakosság által érzékelt valamennyi rengést a hálózat nagy valószínűséggel detektálja.

*HUN-RENG virtuális szeizmológiai hálózat*

A kommunikáció fejlődése, a valós idejű adatátvitel és az azonos adatátviteli protokoll (SeedLink) Európa-szerte elterjedt használata lehetővé tette, hogy idegen állomások adatait is fogadjuk közel valós időben ugyanúgy, mint a saját állomásainkét. Az összes elérhető hazai és 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 egy automatikus földrengésjelző rendszer elindítását is. 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 (2.2. Táblázat).



*GeoRisk Data Centre (www.foldrenges.hu)*

All recorded data from each station are transmitted to and processed at the *Data Centre*. Data that are collected by the *Data Centre* are published in a variety of formats on 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.

Merging the phase data of the Hungarian network and the same kind of available data sets from neighboring 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.

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 1.0-2.0  $M_L$ , somewhat lower in the middle of the country and a little higher towards the border regions. This means that in most parts of the country, not including the NE territory, it is very unlikely that felt events go undetected.

*HUN-RENG Virtual Seismic Network*

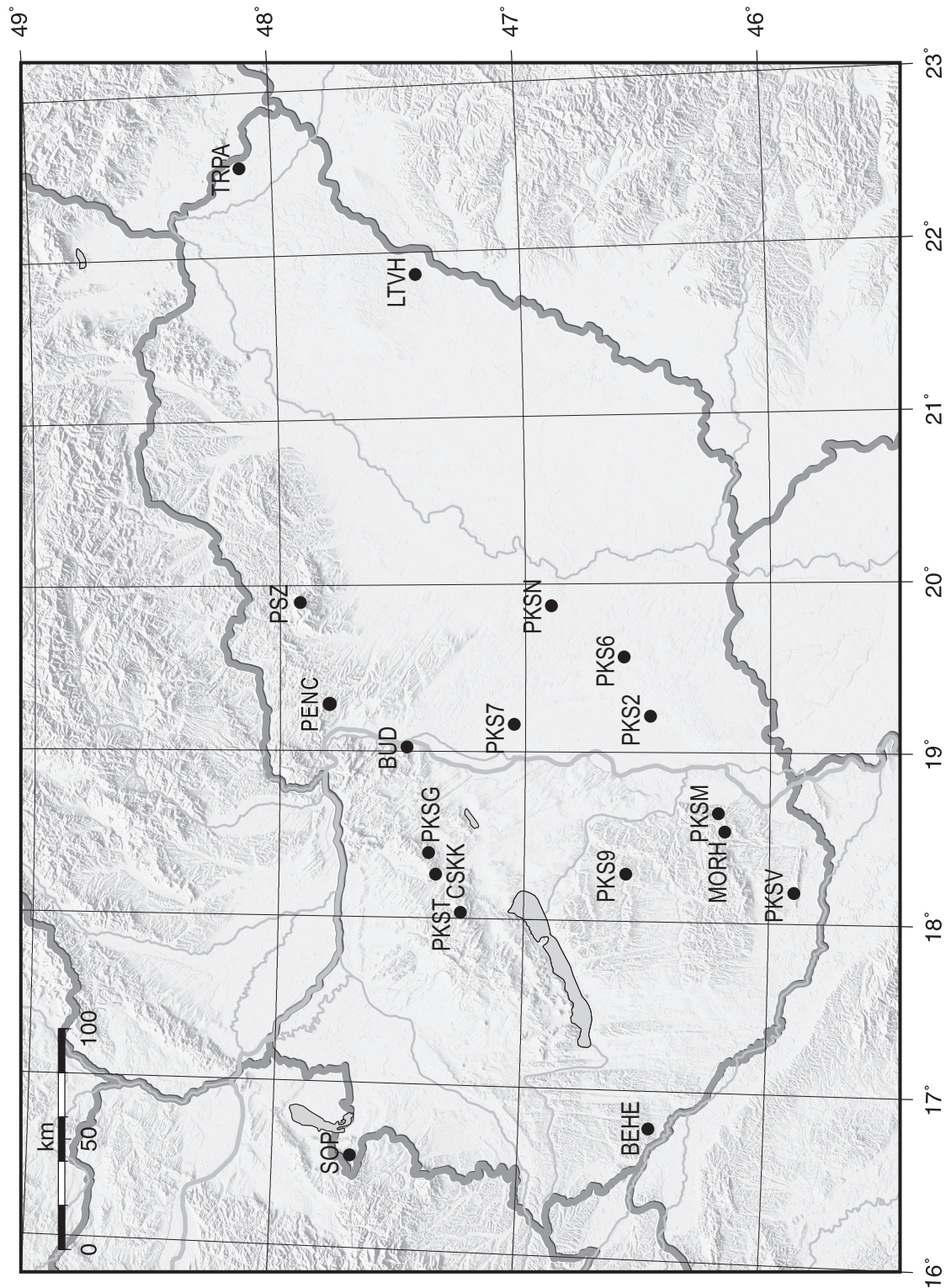
Development in communication technology and standardized communication protocols, software packages made available to access near real time data of stations beyond the domestic network. SeedLink and SeisComP developed at GEOFON became a kind of standard all over Europe. The larger pool of data provided 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 *HUN-RENG* virtual seismic network is shown in Table 2.2.

## 2.1. Táblázat Szeizmológiai állomások, műszerek és alapkőzet

Table 2.1. Seismic stations, instrumentation and lithology

Kód 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	46,4704	16,7757	298	üledék alluvium	3C BB	STS-2	D-C; PS-6-24+ SeisComP PC	GGI
BUD Budapest	47,4836	19,0239	196	dolomit dolomite	3C BB	STS-2	D-C; PS-6-24+ SeisComP PC	GGI
CSKK Csókakő	47,3631	18,2605	319	dolomit dolomite	3C SP	SS-1	D-C; K2+ SeisComP PC	GGI
LTVH <sup>†</sup> Létavértes	47,3849	21,9007	121	homok sand	3C BB	CMG-3T	D-C; CMG- DM24/S3/EAM	GGI
MORH <sup>**</sup> Mórág	46,2149	18,6435	135	gránit granite	3C BB	STS-2	D-C; PS-6-24+ SeisComP PC	GGI
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-C; MARS-88OC	GR
PKS6 Bócsa	46,5998	19,5645	120	homok sand	3C SP	LE-3D	D-C; MARS-88OC	GR
PKS7 Kunszentmiklós	47,0473	19,1609	95	agyag mud	3C SP	LE-3D	D-C; MARS-88OC	GR
PKS9 Tamási	46,5870	18,2789	240	löss loess	3C SP	LE-3D	D-C; MARS-88OC	GR
PKSG Gánt	47,3918	18,3907	200	dolomit dolomite	3C SP	LE-3D	D-C; MARS-88MC+ SeisComP PC	GR
PKSM Mórág	46,2119	18,6413	170	gránit granite	3C SP	LE-3D	D-C; MARS-88MC+ SeisComP PC	GR
PKSN Nyárlőrinc	46,8970	19,8667	110	homok sand	3C SP	LE-3D	D-C; MARS-88OC	GR
PKST Tés	47,2590	18,0343	473	dolomit dolomite	3C SP	LE-3D	D-C; MARS-88MC+ SeisComP PC	GR
PKSV <sup>***</sup> Villány	45,8885	18,2521	420	mészkö limestone	3C SP	LE-3D	D-C; MARS-88MC+ SeisComP PC	GR
PSZ Piszkéstető	47,9184	19,8944	940	andezit andesite	3C BB	STS-2	D-C; PS-6-24+ SeisComP PC	GEO FON /GGI
SOP Sopron	47,6833	16,5583	260	gneisz gneiss	3C BB	STS-2	D-C; PS-6-24+ SeisComP PC	GGI
TRPA Tarpa	48,1304	22,5391	113	andezit andesite	3C BB	STS-2	D-C; PS-6-24+ SeisComP PC	GGI

- (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  
 CMG-3T – Güralp széles sávú szeizmométer / Güralp broad band seismometer  
 SS-1 – Kinematics SS-1 rövidperiódusú szeizmométer / Kinematics SS-1 short period seismometer
- (3) D – digitális / digital; C – folyamatos felvétel / continuous recording; PS-6-24 – Earth Data digitalizáló / Earth Data digitizer  
 CMG-DM24/S3/EAM – Güralp adatgyűjtő / Güralp data acquisition module;  
 SeisComP – GEOFON Seismological Communication Processor  
 MARS-88 – Lennartz adatgyűjtő / Lennartz data acquisition system  
 K2 – Kinematics K2 adatgyűjtő / Kinematics K2 data acquisition system
- (4) GGI – MTA CSFK Geodéziai és Geofizikai Intézet / Geodetic and Geophysical Institute, MTA CSFK  
 GR – GeoRisk Földrengés Mérnöki Iroda Kft. / GeoRisk Earthquake Engineering Ltd.
- (\*) Működés kezdete / Open date: 2012/05/30 (\*\*\*) Működés kezdete / Open date: 2012/03/02  
 (\*\*\*) Működés kezdete / Open date: 2012/11/09



2.1. ábra Szeizmológiai állomások Magyarországon 2012-ben (részletek: 2.1. Táblázat)

Figure 2.1. Seismograph stations in Hungary in 2012 (See Table 2.1. for details)



**2.2. Táblázat** HUN-RENG virtuális szeizmológiai hálózathoz felhasznált fizikai hálózatok  
**Table 2.2.** Physical networks used in HUN-RENG virtual seismic network

Hálózat kódja* Network code*	Az üzemeltető hálózat Operating network
CU	CariUSGS Caribbean Network USGS, Golden, CO
CZ	Czech Seismic Network Geophysical Institute, Czech Academy of Sciences
GE	GEOFON GEOForschungsNetz (Geo Research Network)
GT	Global Telemetered Southern Hemisphere Network USGS Albuquerque Seismological Laboratory
HU	Hungarian National Seismological Network Institute of Geodesy and Geophysics, Research Centre for Astronomy and Earth Sciences
II	IRIS/IDA Network University of California, Scripps Institute of Oceanography
IU	IRIS/USGS Network USGS Albuquerque Seismological Laboratory
JP	Japan Meteorological Agency Seismic Network Japan Meteorological Agency Seismic, Tokyo Japan
MK	Seismological Observatory Skopje, Republic of Macedonia (MK)
MN	MEDNET Istituto Nazionale di Geofisica, Italy
MY	Malaysian National Seismic Network Malaysian Meteorological Service
NZ	New Zealand National Seismograph Network Institute of Geological & Nuclear Sciences, Wellington, New Zealand
OE	Austrian Seismic Network ZAMG - Central Institute for Meteorology and Geodynamics
PL	Polish Seismological Network Polish Academy of Sciences, Warsaw
RO	Romanian Seismic Network National Institute for Earth Physics, Romania
SJ	Serbian Seismological Network Seismological Survey of Serbia
SK	Slovak National Seismic Network Geophysical Institute, Slovak Academy of Sciences
SL	Slovenia Seismic Network Slovenia Geological Survey, Ljubljana

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

# 3.

## ESEMÉNYLISTA

### ÉS

## FÖLDRENGÉS FÉSZKEPARAMÉTEREK

#### A FÖLDRENGÉS FÉSZKEPARAMÉTEREK MEGHATÁROZÁSA

A fészkeparaméterek rutinszerű kiszámításához a HYPO71PC programot használtuk (Lee and Lahr, 1975). A kimérés és magnitúdó meghatározás a K. Stammler által készített SeismicHandler program segítségével történt.

A fészkeparaméterek 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).

<i>Sebesség (<math>v_P</math>)</i> <i>[km/s]</i>	<i>Mélység</i> <i>[km]</i>	<i>Vastagság</i> <i>[km]</i>	$v_P/v_S$
5,60	0,0	20,0	1,78
6,57	20,0	11,0	
8,02	31,0	$\infty$	

### 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. SeismicHandler software package by K. Stammer has been used for phase picking and magnitude determination.

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).

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



## ESEMÉNYLISTA / LIST OF EVENTS

Nap	Kipattanási idő UTC óó pp mp	Földrajzi koordináták Lat Long	Mélys. (km)	ML	I <sub>MAX</sub> (EMS)	Helyszín
Day	Origin time UTC hr mn sec	Geographic coordinates Lat Long	Depth (km)	ML	I <sub>MAX</sub> (EMS)	Locality or Region
JANUÁR / JANUARY, 2012						
05	1:28:37.7	47.568N 22.307E	1	1.8	-	Romania
07	5:43:24.9	45.701N 21.179E	9	2.8	-	Romania
09	19:56:25.0	45.757N 21.654E	13	3.1	-	Romania
24	10:40:50.3	45.556N 16.395E	10	2.6	-	Croatia
25	4:33:32.0	47.319N 18.469E	0	0.3	-	Pátka
FEBRUÁR / FEBRUARY, 2012						
01	9:42:21.9	47.250N 19.906E	8	2.1	-	Újszilvás
01	10:00:49.9	48.355N 19.823E	0	1.9	-	Slovakia (expl.)
11	12:29:15.0	48.657N 20.133E	1	2.4	-	Slovakia
14	17:56:16.9	47.395N 18.226E	1	0.0	-	Mór
14	17:58:29.6	47.328N 18.278E	0	0.2	-	Söréd
15	3:06:42.2	47.409N 18.219E	0	0.4	-	Pusztavám
15	3:07:08.6	47.407N 18.225E	0	-0.1	-	Pusztavám
15	3:12:27.6	47.324N 18.282E	0	0.6	-	Söréd
15	5:01:43.2	47.384N 18.242E	4	0.1	-	Mór
15	11:44:41.8	47.720N 18.597E	0	1.3	-	Mogyorósbánya
21	1:22:30.0	47.491N 18.348E	0	-0.2	-	Oroszlány
21	3:24:31.0	47.368N 18.239E	4	0.0	-	Mór
23	8:50:07.5	47.362N 18.372E	0	0.9	-	Gánt (expl.)
23	8:50:19.9	47.452N 18.381E	0	1.0	-	Várgesztes (expl.)
MÁRCIUS / MARCH, 2012						
01	8:21:19.3	47.323N 18.432E	0	1.5	-	Zámoly (expl.)
01	12:12:10.4	47.275N 18.215E	2	0.6	-	Kincsesbánya
03	23:48:35.4	47.461N 18.264E	10	0.2	-	Pusztavám
05	22:56:58.5	48.535N 17.144E	7	2.9	-	Slovakia
07	14:39:26.1	45.583N 18.413E	7	2.4	-	Croatia
11	18:32:46.3	48.414N 20.121E	10	0.9	-	Slovakia
13	3:26:18.8	47.440N 18.381E	10	1.5	-	Várgesztes
18	23:46:08.6	47.397N 18.500E	10	0.6	-	Csákvár
19	7:18:09.0	47.407N 18.357E	0	1.0	-	Gánt (expl.)
19	9:34:10.4	47.418N 18.352E	0	1.3	-	Gánt (expl.)
19	9:34:29.9	47.453N 18.386E	0	1.5	-	Várgesztes (expl.)
19	12:18:30.6	47.396N 18.214E	0	0.1	-	Mór
20	1:21:22.5	47.978N 20.376E	4	2.4	4	Eger
21	18:19:53.5	47.280N 18.316E	0	0.2	-	Magyaralmás
23	15:40:43.5	48.646N 20.164E	8	1.9	-	Slovakia
28	3:08:00.4	47.131N 17.791E	10	1.1	-	Bánd
28	6:52:58.9	47.436N 18.395E	0	1.3	-	Várgesztes (expl.)
ÁPRILIS / APRIL, 2012						
01	3:18:51.5	47.061N 17.827E	10	1.2	-	Nemesvámos
02	7:50:58.3	47.359N 18.414E	0	0.9	-	Gánt (expl.)
05	22:25:57.7	45.528N 17.905E	4	1.9	-	Croatia
06	9:05:17.2	47.384N 18.387E	7	2.7	5	Gánt
06	9:38:44.3	47.367N 18.384E	7	1.8	-	Gánt



**Földrengés paraméterek**

**Hypocenter Parameters**

06	10:49:52.9	47.387N	18.415E	1	1.1	-	Gánt
06	11:07:30.6	47.394N	18.444E	4	1.4	-	Csákvár
06	12:50:53.0	47.394N	18.444E	0	1.0	-	Csákvár
07	19:28:41.0	47.269N	17.969E	1	0.4	-	Bakonyháza
13	8:29:28.0	47.434N	18.386E	0	0.9	-	Várgesztes (expl.)
15	9:09:22.1	47.389N	18.408E	0	1.2	-	Gánt
18	8:50:50.2	47.435N	18.385E	0	1.4	-	Várgesztes (expl.)
18	8:51:02.1	47.391N	18.392E	0	1.1	-	Gánt (expl.)
18	8:56:56.7	47.403N	18.354E	0	0.7	-	Gánt (expl.)
18	10:33:59.7	48.287N	21.650E	5	2.2	-	Vajdác
23	11:55:35.0	48.628N	21.454E	0	1.7	-	Slovakia (expl.)
26	21:37:51.0	47.389N	18.412E	0	0.9	-	Gánt
27	6:36:36.5	47.442N	18.367E	0	1.1	-	Oroszlány (expl.)
27	6:36:54.4	47.435N	18.380E	0	1.2	-	Várgesztes (expl.)
27	21:26:09.2	47.717N	16.209E	10	0.8	-	Austria
30	3:04:43.7	48.863N	21.723E	3	2.0	-	Slovakia
30	9:38:24.9	47.011N	22.294E	5	1.6	-	Romania

**MÁJUS / MAY, 2012**

02	10:31:46.9	47.449N	18.079E	0	0.6	-	Bakonysárkány (expl.)
02	17:21:06.2	48.878N	21.746E	0	2.3	-	Slovakia
03	7:31:31.0	47.469N	18.213E	0	0.4	-	Bokod
07	7:55:37.4	47.448N	18.277E	0	1.1	-	Pusztavám (expl.)
07	7:55:48.4	47.412N	18.369E	0	1.0	-	Gánt (expl.)
07	8:01:24.5	47.460N	18.319E	0	0.8	-	Oroszlány (expl.)
14	8:03:54.6	47.431N	18.395E	0	1.1	-	Gánt (expl.)
14	8:04:10.0	47.460N	18.404E	0	1.3	-	Várgesztes (expl.)
14	20:44:49.3	47.246N	18.404E	7	0.3	-	Sárkereszt
15	7:08:31.5	47.439N	18.293E	0	1.0	-	Pusztavám (expl.)
15	7:09:08.7	47.417N	18.340E	0	1.0	-	Gánt (expl.)
16	6:28:54.5	47.293N	18.337E	1	0.8	-	Magyaralmás
18	12:20:31.8	48.534N	20.317E	0	1.6	-	Slovakia (expl.)
20	23:22:02.4	47.335N	18.184E	9	0.7	-	Balinka
20	23:24:19.9	47.403N	18.076E	8	1.8	-	Aka
24	8:32:45.6	47.455N	18.382E	0	1.2	-	Várgesztes (expl.)
24	8:33:02.8	47.463N	18.398E	0	1.5	-	Várgesztes (expl.)
24	10:44:08.8	47.180N	18.274E	0	0.5	-	Sárkeszi (expl.)
25	11:23:45.8	47.538N	18.541E	0	1.1	-	Nagyegyháza (expl.)
25	21:54:11.8	47.497N	18.338E	0	0.1	-	Kecskéd
25	23:55:49.2	47.411N	18.222E	1	0.6	-	Pusztavám
27	20:20:56.8	47.311N	18.456E	0	0.2	-	Pátka
30	11:46:19.3	47.492N	18.488E	0	0.9	-	Szárliget
30	23:59:04.2	46.147N	16.649E	10	1.5	-	Croatia
31	3:42:16.5	46.852N	18.148E	6	1.5	-	Siójut
31	9:21:17.9	47.418N	18.371E	0	0.8	-	Gánt (expl.)
31	9:28:11.9	47.451N	18.366E	0	1.1	-	Oroszlány (expl.)
31	10:00:17.0	47.208N	18.307E	0	0.5	-	Székesfehérvár (expl.)
31	21:21:46.2	47.504N	18.422E	0	0.6	-	Várgesztes
31	21:35:42.2	48.944N	20.315E	0	2.6	-	Slovakia

**JÚNIUS / JUNE, 2012**

01	3:47:40.6	48.911N	20.283E	1	2.1	-	Slovakia
02	20:23:01.4	47.314N	18.365E	10	0.1	-	Zámoly
07	7:54:48.2	47.270N	18.455E	0	1.3	-	Pátka (expl.)
11	8:13:35.2	46.942N	18.034E	0	1.5	-	Siófok
14	8:13:46.8	48.075N	20.250E	8	1.2	-	Bekölce
14	9:02:55.1	47.433N	18.345E	0	1.0	-	Oroszlány (expl.)
14	20:02:32.8	47.816N	18.909E	10	1.3	-	Szob
15	7:51:38.0	47.452N	18.404E	0	1.0	-	Várgesztes (expl.)
15	8:00:08.5	47.461N	18.408E	0	0.9	-	Várgesztes (expl.)

**Hypocenter Parameters**
**Földrengés paraméterek**

15	8:00:45.7	47.461N	18.444E	0	1.0	-	Várgesztes (expl.)
18	8:11:54.8	48.558N	20.807E	0	1.4	-	Tornanádaska (expl.)
18	21:10:15.2	47.353N	18.260E	5	0.2	-	Csókakő
21	20:32:02.9	48.792N	19.995E	15	1.6	-	Slovakia
26	11:48:25.5	45.671N	18.164E	11	2.2	-	Croatia
27	9:45:50.8	47.270N	18.240E	13	0.2	-	Kincsesbánya
29	8:13:09.9	47.362N	18.375E	0	0.8	-	Gánt (expl.)
29	8:13:47.3	47.409N	18.360E	0	1.1	-	Gánt (expl.)
29	8:14:12.3	47.488N	18.346E	0	0.9	-	Oroszlány (expl.)
29	8:21:10.6	47.383N	18.371E	0	1.3	-	Gánt (expl.)
30	9:57:50.0	48.659N	20.240E	0	1.5	-	Slovakia (expl.)
JÚLIUS / JULY, 2012							
01	1:46:32.1	48.968N	20.288E	10	1.4	-	Slovakia
01	12:52:33.9	46.202N	17.497E	10	1.8	-	Rinyabesenyő
08	18:46:34.5	47.410N	19.698E	10	1.3	-	Nagykátá
09	8:13:18.4	47.428N	18.377E	0	1.5	-	Gánt (expl.)
09	11:18:55.6	47.311N	18.331E	10	0.8	-	Magyaralmás
12	11:02:40.9	47.209N	18.287E	0	0.6	-	Iszcasztgyörgy (expl.)
13	7:59:10.0	47.359N	18.416E	0	1.3	-	Gánt (expl.)
16	9:36:16.8	47.964N	19.435E	14	1.3	-	Terény
17	11:20:36.8	47.135N	18.340E	0	1.0	-	Úrhida
17	15:12:38.3	48.068N	20.249E	10	0.7	-	Egercsehi
19	9:22:27.2	48.881N	20.497E	7	2.0	-	Slovakia
20	7:05:46.0	47.366N	18.375E	0	1.3	-	Gánt (expl.)
20	7:06:01.1	47.433N	18.359E	0	1.2	-	Oroszlány (expl.)
22	11:16:46.0	45.652N	16.734E	15	2.1	-	Croatia
AUGUSZTUS / AUGUST, 2012							
06	8:13:04.9	48.555N	20.821E	0	1.6	-	Hidvégdárdó (expl.)
09	4:35:06.9	47.373N	19.553E	14	1.7	-	Gomba
10	7:22:01.5	47.406N	18.364E	0	1.1	-	Gánt (expl.)
10	7:22:15.7	47.450N	18.370E	0	1.3	-	Oroszlány (expl.)
12	5:40:30.5	47.811N	16.225E	2	1.1	-	Austria
14	7:30:17.6	47.439N	18.385E	0	1.4	-	Várgesztes (expl.)
14	7:30:30.2	47.436N	18.402E	0	1.4	-	Várgesztes (expl.)
14	18:08:10.7	47.385N	18.530E	0	0.7	-	Csákvár
17	8:54:09.6	46.995N	22.337E	9	1.6	-	Romania
20	10:20:15.1	48.607N	20.763E	0	1.2	-	Slovakia (expl.)
22	7:51:23.3	48.615N	20.758E	0	1.4	-	Slovakia (expl.)
29	10:29:30.1	48.627N	20.720E	0	1.6	-	Slovakia (expl.)
SZEPTEMBER / SEPTEMBER, 2012							
09	1:42:23.3	47.331N	18.141E	5	0.3	-	Bakonycsérnye
17	0:40:58.8	45.600N	18.603E	10	2.1	-	Croatia
19	17:33:50.3	47.039N	18.858E	10	1.8	-	Perkátá
23	12:06:14.3	47.059N	18.111E	7	0.8	-	Balatonkenese
24	20:02:14.8	47.247N	18.539E	0	0.6	-	Pákozd
25	7:06:42.5	48.381N	19.894E	0	1.5	-	Slovakia (expl.)
27	17:05:21.5	47.477N	18.650E	10	2.1	-	Bicske
OKTÓBER / OCTOBER, 2012							
02	1:35:43.3	47.403N	18.226E	10	1.3	-	Pusztavám
05	7:21:24.2	47.260N	18.849E	0	1.3	-	Ráckeresztúr
16	12:10:58.5	48.357N	19.877E	0	1.9	-	Slovakia (expl.)
29	8:34:53.6	47.760N	20.100E	10	1.9	-	Detk
NOVEMBER / NOVEMBER, 2012							
13	9:44:02.4	48.599N	20.645E	0	1.7	-	Slovakia (expl.)
13	10:22:45.1	45.860N	18.418E	0	1.2	-	Nagyharsány (expl.)

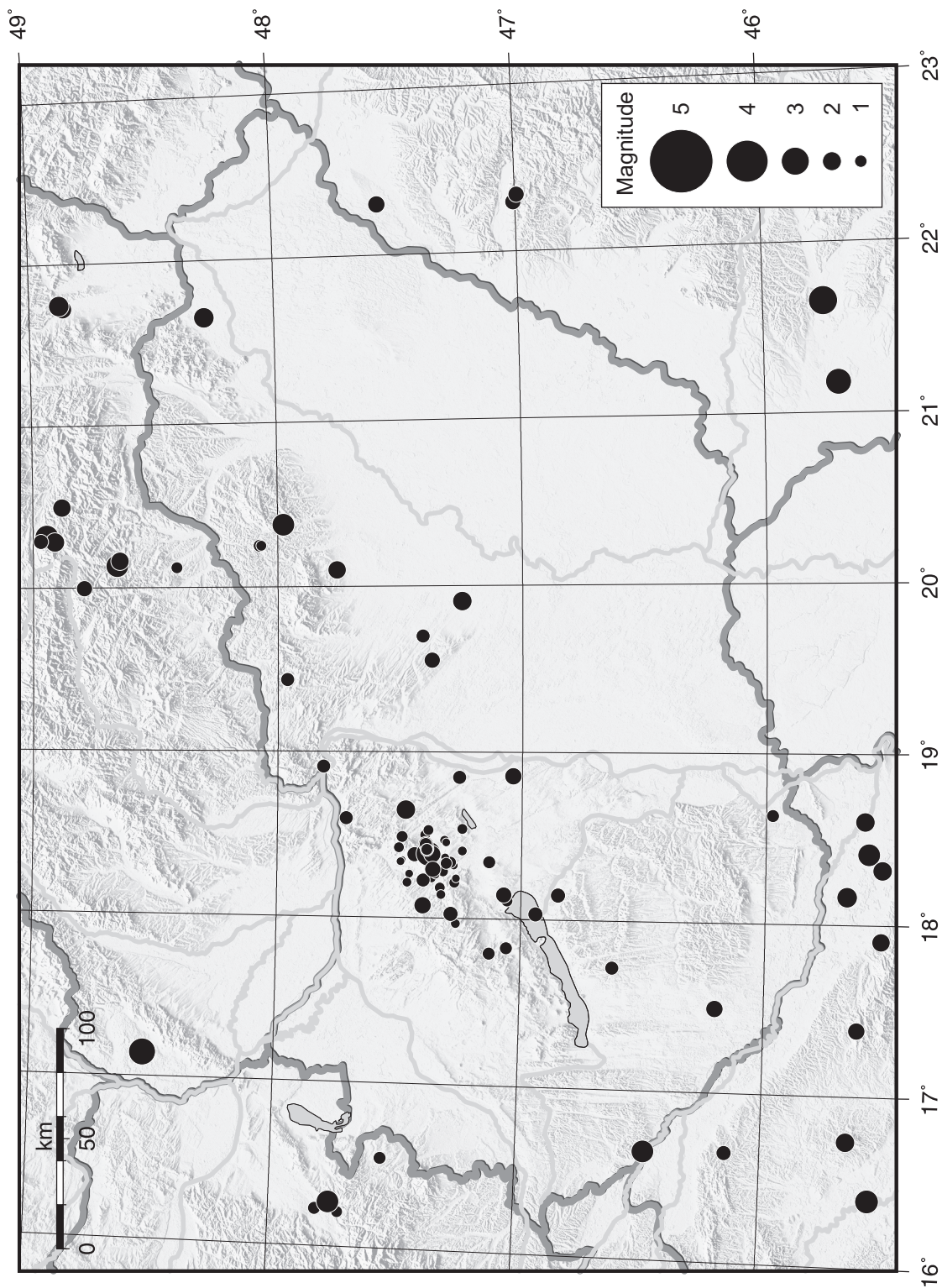
**Földrengés paraméterek**

14	10:12:28.0	45.979N	18.635E	9	1.0	-	Mohács
15	3:17:33.0	47.756N	16.269E	7	2.4	-	Austria
16	5:00:13.0	46.626N	17.721E	0	1.3	-	Gamás
20	10:01:12.7	45.970N	18.203E	0	1.2	-	Szilvás (expl.)
27	7:46:18.4	45.854N	18.426E	0	1.4	-	Nagyharsány (expl.)

## DECEMBER / DECEMBER, 2012

02	9:01:47.2	47.074N	18.144E	10	1.6	-	Küngös
04	9:11:42.6	45.984N	18.250E	0	1.2	-	Pogány (expl.)
04	9:15:19.1	45.873N	18.441E	0	1.3	-	Villány (expl.)
05	15:33:44.5	47.364N	18.292E	10	1.6	-	Csókakő
16	20:08:56.3	47.289N	18.028E	0	1.4	-	Jásd
17	11:55:41.6	45.621N	17.384E	10	1.8	-	Croatia
18	23:32:13.5	45.528N	18.321E	1	2.1	-	Croatia
19	10:56:47.4	48.598N	20.626E	0	1.9	-	Slovakia (expl.)
25	17:01:35.7	46.479N	16.641E	14	2.5	4	Kiscsehi
28	4:14:33.0	47.550N	16.546E	7	1.1	-	Austria

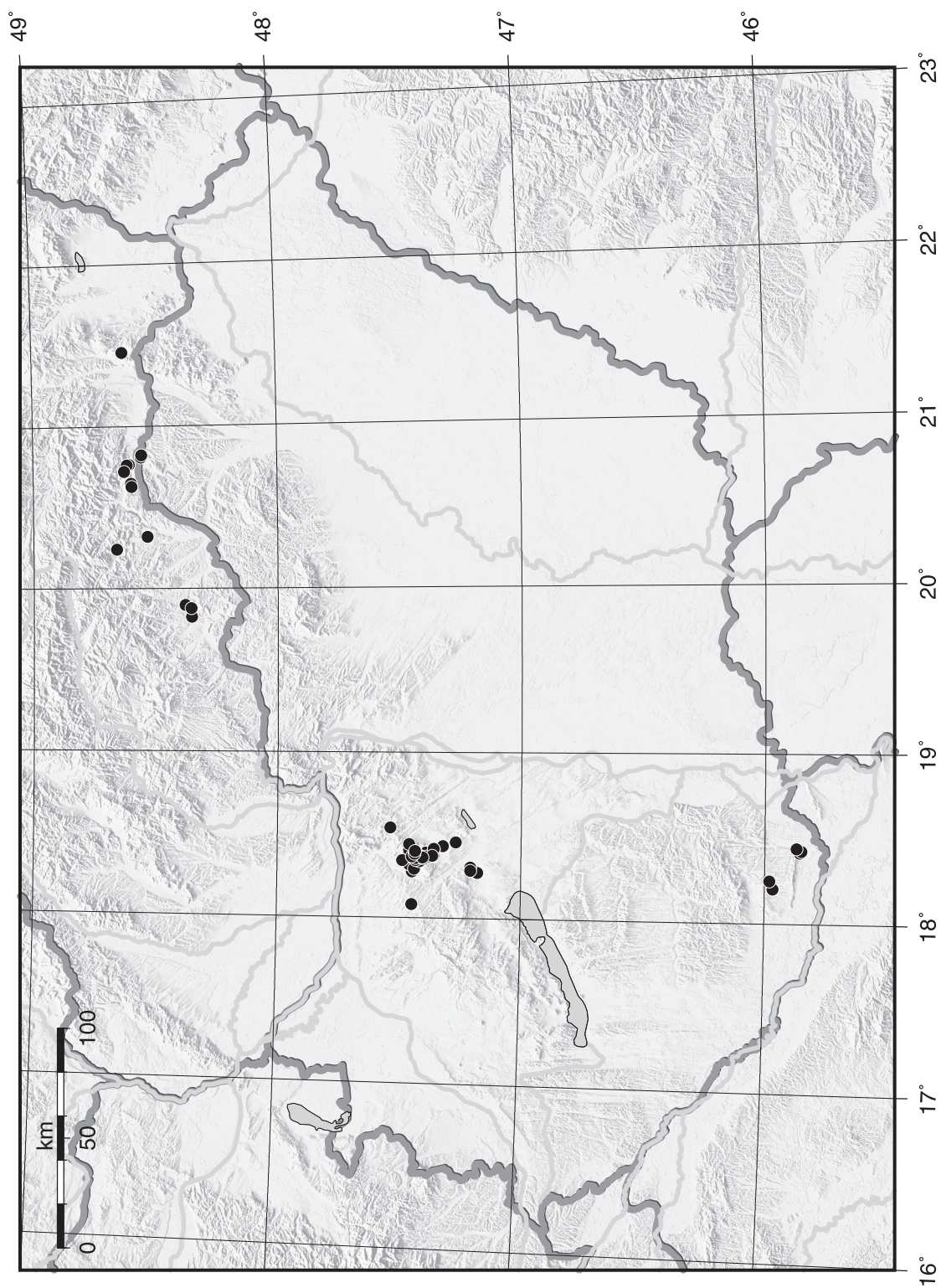
**Hypocenter Parameters**



3.1. ábra A 2012-ben regisztrált földrengések epicentrumai

Figure 3.1. Epicenters of 2012 earthquakes

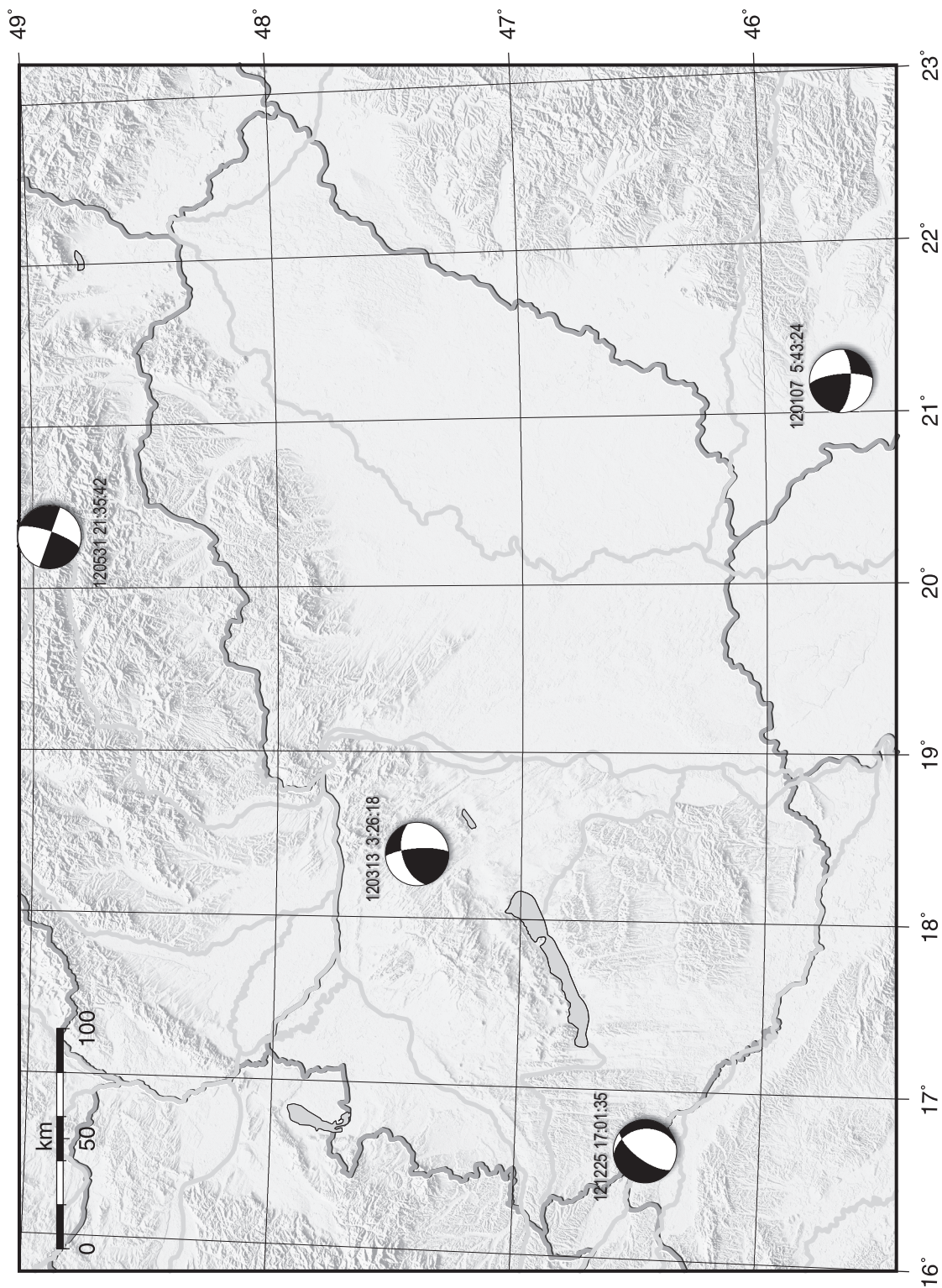




3.2. ábra A 2012-ben regisztrált robbantások epicentrumai

Figure 3.2. Epicenters of 2012 explosions





3.3. ábra A 2012-ben regisztrált földrengések fészekmechanizmusai

Figure 3.3. Fault plane solutions of 2012 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 epicentrumtól 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 fourth 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 (Reasenber and Oppenheimer, 1985). The results are summarized in Fig. 3.3.

## Hypocenter Parameters

## Földrengés paraméterek

1.

2012-01-05 time: 1:28:37.66 UTC ML= 1.8  
 lat: 47.568N lon: 22.307E h= 0.6 km  
 erh= 2.5km erz= 3.0km  
 nr= 14 gap=103 rms=0.51  
 Locality: Romania  
 Comments:

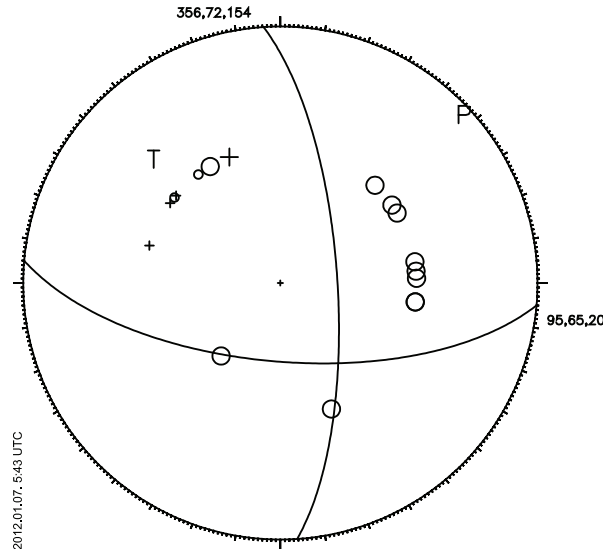
sta	dist	azm	phase	hr mn sec	res
BMR	90.2	83	iPgD	1:28:53.30	-0.46
DRGR	91.6	160	iPg	1:28:53.80	-0.21
CJR	136.5	134	iPnD	1:29:01.90	0.27
SIRR	152.8	199	iPn	1:29:03.70	0.04
CRVS	161.1	337	ePn	1:29:04.50	-0.21
			eSn	29:26.00	0.19
ARCR	163.7	109	iPn	1:29:05.40	0.37
KECS	169.8	307	ePn	1:29:07.90	2.12
			eSn	29:27.80	0.08
PSZ	185.1	282	iPnD	1:29:07.10	-0.60
BURB	218.9	89	iPn	1:29:11.80	-0.11
STHS	220.1	339	ePn	1:29:12.60	0.54
			eSn	29:43.00	4.10
BZS	223.3	194	iPnD	1:29:12.40	-0.06
VYHS	278.6	292	eSn	1:29:59.00	7.12
DOPR	295.1	127	iPn	1:29:21.30	-0.11
VOIR	316.9	138	iPnD	1:29:25.10	0.97

2.

2012-01-07 time: 5:43:24.94 UTC ML= 2.8  
 lat: 45.701N lon: 21.179E h= 8.8 km  
 erh= 2.0km erz= 1.2km  
 nr= 22 gap=101 rms=0.55  
 Locality: Romania  
 Comments:

sta	dist	azm	phase	hr mn sec	res
TIM	5.2	39	iPgD	5:43:26.70	-0.06
BZS	35.4	105	iPg	5:43:31.40	-0.04
BANR	35.5	185	iPg	5:43:31.80	0.33
SIRR	73.2	31	iPg	5:43:37.70	-0.40
MDVR	110.4	158	iPnD	5:43:43.70	-0.91
DEV	135.6	81	iPnD	5:43:47.70	-0.05
PKS6	159.8	309	ePnD	5:43:51.00	0.22
			eSn	44:10.30	-0.63
PKSN	167.1	323	ePnD	5:43:52.40	0.73
			eSn	44:12.10	-0.43
DRGR	169.3	44	iPnD	5:43:52.20	0.24
LOT	204.2	98	iPnD	5:43:57.50	1.20
PKSM	204.8	286	ePnC	5:43:55.70	-0.68
			eSn	44:25.00	4.10
CJR	218.0	59	iPnD	5:43:58.40	0.37
PSZ	265.3	338	ePnC	5:44:04.00	0.07
			eSn	44:32.70	-1.64
ARR	272.4	98	iPnD	5:44:06.50	1.69
PKSG	284.8	311	ePn	5:44:06.30	-0.05
			eSn	44:46.60	7.95
ARCR	288.7	58	iPn	5:44:08.20	1.36
CSKK	290.3	310	ePnC	5:44:09.30	2.25
			eSn	44:39.30	-0.59
PKST	297.2	306	ePnC	5:44:08.00	0.10
			eSn	44:41.10	-0.32
VOIR	303.6	96	iPn	5:44:10.20	1.50
KECS	313.8	350	ePn	5:44:11.10	1.13
DOPR	328.4	85	iPnD	5:44:13.50	1.71
CRVS	356.6	3	ePn	5:44:16.00	0.69
			eSn	44:39.90	-14.70
VYHS	357.9	330	ePn	5:44:16.10	0.63
MLR	372.6	94	iPn	5:44:16.70	-0.60
BURB	375.2	55	iPnD	5:44:19.40	1.77
STHS	413.2	1	ePn	5:44:24.50	2.13
FLOR	425.8	88	iPnD	5:44:24.80	0.86
VRI	431.9	88	iPn	5:44:26.10	1.40
ARSA	467.3	292	Pn	5:44:28.90	-0.21

			Sn	45:15.70	-3.47
CONA	475.4	301	Pn	5:44:31.50	1.38
			Sn	45:17.50	-3.46
MORC	529.0	329	iPnD	5:44:37.40	0.60
VRAC	529.4	319	iPn	5:44:36.90	0.05
MOA	579.5	294	Pn	5:44:44.10	0.99
			Sn	45:43.00	-1.08
DPC	631.3	325	ePn	5:44:50.20	0.64
			eSn	45:52.60	-2.97
KHC	688.8	304	ePn	5:44:56.40	-0.33
			eSn	46:03.10	-5.24



3.

2012-01-09 time: 19:56:24.97 UTC ML= 3.1  
 lat: 45.757N lon: 21.654E h= 12.5 km  
 erh= 2.0km erz= 1.6km  
 nr= 27 gap= 60 rms=0.65  
 Locality: Romania  
 Comments:

sta	dist	azm	phase	hr mn sec	res
BZS	15.8	191	iPg	19:56:28.50	-0.08
TIM	33.8	266	iPg	19:56:31.80	0.39
SIRR	56.8	0	iPg	19:56:35.00	-0.36
BANR	58.1	224	iPg	19:56:35.60	0.02
DEV	98.1	82	iP*	19:56:41.40	-1.06
MDVR	108.5	178	iPn	19:56:43.30	-0.63
DRGR	141.0	35	iPn	19:56:48.10	0.12
LOT	168.5	102	iPn	19:56:52.10	0.68
CJR	183.8	55	iPnD	19:56:54.10	0.78
PKS6	186.6	300	ePnD	19:56:53.60	-0.07
			eSn	57:14.70	-1.36
PKSN	187.1	313	ePn	19:56:54.30	0.56
			eSn	57:20.20	4.03
PKS2	205.6	293	ePnD	19:56:57.70	1.66
			eSn	57:24.60	4.32
PKSM	238.9	282	ePnC	19:56:59.80	-0.39
			eSn	57:24.30	-3.36
PKS7	239.5	307	ePnD	19:57:00.20	-0.07
			eSn	57:34.10	6.30
ARCR	254.7	55	iPn	19:57:02.60	0.44
BMR	255.4	33	iPn	19:57:02.60	0.35
VOIR	267.3	98	iPnD	19:57:05.20	1.47
TRPA	272.3	14	ePnD	19:57:04.00	-0.36
PSZ	275.3	331	ePnD	19:57:04.50	-0.23
			eSn	57:32.30	-3.44
BUD	278.3	314	ePn	19:57:05.00	-0.11
			eSn	57:35.30	-1.11
DOPR	290.9	85	iPn	19:57:08.50	1.82
HUMR	295.1	118	iPn	19:57:08.60	1.40
PKSG	309.3	306	ePnD	19:57:08.80	-0.17

**Földrengés paraméterek**

	eSn	57:40.90	-2.38
CSKK 315.6 304	ePn	19:57:10.00	0.24
	eSn	57:43.20	-1.49
KECS 315.8 344	ePn	19:57:10.50	0.72
	eSn	57:40.70	-4.04
PKST 324.2 301	ePnD	19:57:10.80	-0.03
	eSn	57:44.30	-2.29
MLR 335.9 95	iPn	19:57:14.30	2.01
BURB 342.0 53	iPnD	19:57:14.70	1.66
CRVS 350.0 358	ePn	19:57:14.70	0.65
	eSn	58:05.70	13.37
VYHS 372.0 325	ePn	19:57:16.90	0.12
	eSn	57:56.50	-0.69
VTs 373.0 161	iPn	19:57:17.70	0.79
SULR 380.7 108	iPn	19:57:19.70	1.82
BEHE 385.4 282	ePn	19:57:18.20	-0.26
	eSn	57:58.10	-2.09
PLOR 388.5 88	iPn	19:57:20.60	1.76
VRI 394.5 88	iPn	19:57:20.60	1.00
STHS 408.1 356	ePn	19:57:22.80	1.51
SMOL 443.6 314	eSn	19:58:09.00	-4.09
SOP 444.6 299	ePn	19:57:28.00	2.16
	eSn	58:09.40	-3.92
CFR 511.0 97	iPnD	19:57:35.80	1.68
OKC 524.3 330	ePn	19:57:37.00	1.22
	eSn	58:31.30	0.29
KRLC 602.7 323	ePn	19:57:47.40	1.85
	eSn	58:48.70	0.29
TREC 608.7 310	ePn	19:57:46.80	0.50
	eSn	58:46.40	-3.33
DPC 647.2 322	ePn	19:57:53.00	1.89
	eSn	58:58.20	-0.09
KHC 715.4 302	ePn	19:58:01.70	2.09
	eSn	59:08.40	-5.03

4.

2012-01-24 time: 10:40:50.30 UTC ML= 2.6  
 lat: 45.556N lon: 16.395E h= 10.0 km  
 erh= 2.6km erz= 3.3km  
 nr= 12 gap=199 rms=0.33  
 Locality: Croatia  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
GCIS	69.0	300	iPgC	10:41:03.10			0.35
			eSg	41:12.60			0.13
CRES	79.0	292	iPg	10:41:04.70			0.19
BOJS	89.4	266	iPg	10:41:05.90			-0.47
LEGS	94.5	298	iPg	10:41:07.30			0.03
			iSg	41:20.40			-0.10
KOGS	99.8	354	iPg	10:41:08.40			0.18
			eSg	41:21.20			-0.99
BEHE	105.9	16	eP*	10:41:09.40			0.19
			eS*	41:23.40			-0.56
PKSM	189.1	67	ePn	10:41:17.10			-2.53
			eSn	41:42.70			0.20

5.

2012-01-25 time: 4:33:31.99 UTC ML= 0.3  
 lat: 47.319N lon: 18.469E h= 0.1 km  
 erh= 4.0km erz= 757km  
 nr= 6 gap=295 rms=0.22  
 Locality: Pátka  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKSG	10.0	324	ePg	4:33:34.00			0.23
			eSg	33:35.30			0.15
CSKK	16.4	287	ePgD	4:33:34.70			-0.22
			eSg	33:36.80			-0.42
PKST	33.5	258	ePgD	4:33:38.00			0.03
			eSg	33:42.90			0.26

**Hypocenter Parameters**

6.

2012-02-01 time: 9:42:21.93 UTC ML= 2.1  
 lat: 47.250N lon: 19.906E h= 8.0 km  
 erh= 3.2km erz= 2.5km  
 nr= 20 gap=167 rms=0.96  
 Locality: Újszilvás  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKSN	39.3	184	ePg	9:42:25.30			-3.79
			eSg	42:35.70			1.02
BUD	71.5	291	eSg	9:42:45.80			1.00
PSZ	74.3	359	ePgD	9:42:35.40			0.12
			eSg	42:45.00			-0.70
PENC	76.3	322	ePgC	9:42:35.30			-0.33
			eSg	42:45.20			-1.12
PKS2	99.4	212	eSg	9:42:52.80			-0.83
PKSG	115.6	278	ePn	9:42:42.00			-0.36
			eSn	42:56.60			-1.70
CSKK	125.0	276	ePn	9:42:45.10			1.56
			eSn	42:59.20			-1.19
KECS	143.8	18	ePn	9:42:46.60			0.72
			eSn	43:03.50			-1.07
PKS9	144.2	239	ePn	9:42:47.30			1.38
			eSn	43:05.00			0.36
PKSM	150.5	220	ePn	9:42:47.00			0.29
			eSn	43:05.50			-0.54
VYHS	159.8	330	ePn	9:42:48.00			0.13
			eSn	43:07.50			-0.61

7.

2012-02-01 time: 10:00:49.93 UTC ML= 1.9  
 lat: 48.355N lon: 19.823E h= 0.0 km  
 erh= 3.2km erz= 5.0km  
 nr= 10 gap=100 rms=0.91  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PSZ	48.8	174	ePg	10:00:59.40			0.75
			eSg	01:06.30			0.85
KECS	51.1	74	ePg	10:00:59.40			0.34
			eSg	01:05.50			-0.68
PENC	74.6	213	eSg	10:01:11.80			-1.84
VYHS	74.6	282	ePg	10:01:03.90			0.64
			eSg	01:13.40			-0.25
LANS	92.2	344	eSg	10:01:19.10			-0.15
CRVS	135.3	63	eSn	10:01:30.80			-1.67
STHS	157.5	41	eSn	10:01:38.00			0.59

8.

2012-02-11 time: 12:29:14.98 UTC ML= 2.4  
 lat: 48.657N lon: 20.133E h= 1.3 km  
 erh= 2.9km erz= 3.9km  
 nr= 16 gap= 85 rms=0.99  
 Locality: Slovakia  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
KECS	32.4	127	ePg	12:29:19.80			-0.97
			eSg	29:25.50			0.22
LANS	73.4	318	ePg	12:29:28.50			0.40
			eSg	29:37.50			-0.83
PSZ	84.0	192	ePgD	12:29:29.80			-0.19
			eSg	29:41.50			-0.19
VYHS	97.4	259	ePg	12:29:32.40			0.02
STHS	117.2	44	ePg	12:29:35.80			-0.10
			eSg	29:52.00			-0.23
SRO	164.6	235	eSn	12:30:01.90			-1.83
PKSG	191.5	223	ePn	12:29:48.30			2.57
			eSn	30:13.30			3.58

## Hypocenter Parameters

## Földrengés paraméterek

OKC 195.3 312 ePn 12:29:47.70 1.49  
 eSn 30:12.40 1.84  
 CSKK 200.6 224 ePn 12:29:46.60 -0.26  
 eSn 30:15.50 3.78  
 CONA 327.1 256 Pn 12:30:03.10 0.47  
 Sn 30:41.30 1.50

9.

2012-02-14 time: 17:56:16.89 UTC ML= 0.0  
 lat: 47.395N lon: 18.226E h= 1.0 km  
 erh= 5.3km erz=20.2km  
 nr= 6 gap=228 rms=0.17  
 Locality: Mór  
 Comments:

sta	dist	azm	phase	hr mn sec	res
CSKK	4.4	144	ePgC	17:56:17.80	0.11
			eSg	56:18.40	0.08
PKSG	12.4	92	ePg	17:56:19.10	-0.01
			eSg	56:20.60	-0.24
PKST	21.0	224	ePg	17:56:20.80	0.16
			eSg	56:23.20	-0.37

10.

2012-02-14 time: 17:58:29.61 UTC ML= 0.2  
 lat: 47.328N lon: 18.278E h= 0.2 km  
 erh= 0.6km erz=13.6km  
 nr= 6 gap=198 rms=0.04  
 Locality: Söréd  
 Comments:

sta	dist	azm	phase	hr mn sec	res
CSKK	4.2	341	ePgC	17:58:30.40	0.04
			eSg	58:30.90	-0.04
PKSG	11.1	50	ePgD	17:58:31.60	0.00
			eSg	58:33.10	-0.04
PKST	20.0	248	ePgC	17:58:33.20	0.02
			eSg	58:35.90	-0.06

11.

2012-02-15 time: 3:06:42.20 UTC ML= 0.4  
 lat: 47.409N lon: 18.219E h= 0.1 km  
 erh= 2.4km erz= 108km  
 nr= 6 gap=238 rms=0.12  
 Locality: Pusztavám  
 Comments:

sta	dist	azm	phase	hr mn sec	res
CSKK	6.0	148	ePgC	3:06:43.40	0.13
			eSg	06:44.00	-0.10
PKSG	13.1	98	ePgD	3:06:44.60	0.06
			eSg	06:46.10	-0.26
PKST	21.8	220	ePgD	3:06:46.10	0.02
			eSg	06:49.00	-0.11

12.

2012-02-15 time: 3:07:08.59 UTC ML=-0.1  
 lat: 47.407N lon: 18.225E h= 0.1 km  
 erh= 0.5km erz=30.3km  
 nr= 5 gap=237 rms=0.10  
 Locality: Pusztavám  
 Comments:

sta	dist	azm	phase	hr mn sec	res
CSKK	5.6	151	ePgC	3:07:09.70	0.11
			eSg	07:10.30	-0.07
PKSG	12.6	98	ePg	3:07:10.90	0.05
			eSg	07:12.40	-0.21
PKST	21.9	221	eSg	3:07:15.50	-0.04

13.

2012-02-15 time: 3:12:27.61 UTC ML= 0.6  
 lat: 47.324N lon: 18.282E h= 0.3 km  
 erh= 1.7km erz=26.2km  
 nr= 6 gap=202 rms=0.04  
 Locality: Söréd  
 Comments:

sta	dist	azm	phase	hr mn sec	res
CSKK	4.6	339	ePgC	3:12:28.50	0.06
			eSg	12:29.00	-0.09
PKSG	11.1	47	ePgD	3:12:29.60	0.01
			eSg	12:31.10	-0.04
PKST	20.1	249	ePgD	3:12:31.20	0.00
			eSg	12:34.00	0.00

14.

2012-02-15 time: 5:01:43.16 UTC ML= 0.1  
 lat: 47.384N lon: 18.242E h= 4.0 km  
 erh= 0.6km erz= 0.3km  
 nr= 6 gap=217 rms=0.04  
 Locality: Mór  
 Comments:

sta	dist	azm	phase	hr mn sec	res
CSKK	2.7	149	ePg	5:01:44.10	0.07
			eSg	01:44.70	-0.01
PKSG	11.3	86	ePg	5:01:45.30	0.00
			eSg	01:46.90	-0.06
PKST	21.0	228	ePg	5:01:47.00	0.02
			eSg	01:49.90	-0.06

15.

2012-02-15 time: 11:44:41.78 UTC ML= 1.3  
 lat: 47.720N lon: 18.597E h= 0.1 km  
 erh= 8.6km erz= \*\*\*km  
 nr= 9 gap=191 rms=0.93  
 Locality: Mogyorósbánya  
 Comments:

sta	dist	azm	phase	hr mn sec	res
SRO2	16.0	287	ePg	11:44:43.70	-0.93
SRO	23.7	296	ePg	11:44:46.20	0.19
			eSg	44:49.90	0.59
PKSG	39.7	203	ePg	11:44:50.70	1.83
			eSg	44:53.40	-1.00
CSKK	47.1	213	ePg	11:44:50.60	0.41
			eSg	44:55.70	-1.05
PKST	66.6	220	eSg	11:45:03.00	0.06
VYHS	87.9	12	eSg	11:45:08.90	-0.81

16.

2012-02-21 time: 1:22:30.01 UTC ML=-0.2  
 lat: 47.491N lon: 18.348E h= 0.2 km  
 erh= 1.7km erz=93.8km  
 nr= 6 gap=301 rms=0.07  
 Locality: Oroszlány  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	11.5	164	ePg	1:22:32.10	0.03
			eSg	22:33.60	-0.08
CSKK	15.7	205	ePg	1:22:32.90	0.08
			eSg	22:35.10	0.09
PKST	35.1	223	ePg	1:22:36.20	-0.08
			eSg	22:41.10	-0.06

## Földrengés paraméterek

17.

2012-02-21 time: 3:24:31.01 UTC ML= 0.0  
 lat: 47.368N lon: 18.239E h= 4.4 km  
 erh= 5.6km erz= 1.1km  
 nr= 6 gap=205 rms=0.12  
 Locality: Mór  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
CSKK	1.7	107	ePgD	3:24:32.00			0.14
			eSg		24:32.50		-0.02
PKSG	11.8	77	ePgc	3:24:33.30			0.05
			eSg		24:34.70		-0.31
PKST	19.6	232	ePg	3:24:34.50			-0.10
			eSg		24:37.40		0.00

18.

2012-02-23 time: 8:50:07.53 UTC ML= 0.9  
 lat: 47.362N lon: 18.372E h= 0.0 km  
 erh= 4.3km erz= 491km  
 nr= 6 gap=223 rms=0.29  
 Locality: Gánt  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSG	3.5	23	ePgc	8:50:08.10			-0.06
			eSg		50:08.40		-0.26
CSKK	8.4	270	ePgc	8:50:09.30			0.26
			eSg		50:10.40		0.19
PKST	28.0	246	ePgc	8:50:12.60			0.07
			eSg		50:15.40		-1.04

19.

2012-02-23 time: 8:50:19.87 UTC ML= 1.0  
 lat: 47.452N lon: 18.381E h= 0.0 km  
 erh= 4.7km erz= 581km  
 nr= 6 gap=303 rms=0.34  
 Locality: Várgesztes  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSG	6.7	174	ePgc	8:50:21.10			0.04
			eSg		50:21.90		-0.09
CSKK	13.4	223	ePgc	8:50:22.50			0.24
			eSg		50:23.70		-0.43
PKST	33.8	231	ePgc	8:50:25.60			-0.31
			eSg		50:31.50		0.88

20.

2012-03-01 time: 8:21:19.29 UTC ML= 1.5  
 lat: 47.323N lon: 18.432E h= 0.0 km  
 erh= 5.5km erz= 856km  
 nr= 5 gap=195 rms=0.40  
 Locality: Zámoly  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSG	8.3	338	ePg	8:21:20.40			-0.37
			eSg		21:23.80		0.15
CSKK	13.7	289	ePg	8:21:21.70			-0.04
			eSg		21:23.80		0.15
PKSM	124.6	173	ePgc	8:21:42.10			0.57
			eSg		21:58.30		-0.58

## Hypocenter Parameters

21.

2012-03-01 time: 12:12:10.43 UTC ML= 0.6  
 lat: 47.275N lon: 18.215E h= 2.5 km  
 erh= --km erz= 0.1km  
 nr= 5 gap=215 rms=0.06  
 Locality: Kincsesbánya  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
CSKK	10.4	19	ePgD	12:12:12.30			-0.03
			eSg		12:13.90		0.08
PKSG	18.6	46	ePg	12:12:13.70			-0.07
			eSg		12:16.40		0.01
PKSM	122.6	165	eSg	12:12:49.50			0.10

22.

2012-03-03 time: 23:48:35.40 UTC ML= 0.2  
 lat: 47.461N lon: 18.264E h= 10.0 km  
 erh= 5.6km erz= 1.6km  
 nr= 6 gap=308 rms=0.29  
 Locality: Pusztaván  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
CSKK	10.9	181	ePgc	23:48:38.10			0.06
			eSg		48:40.20		0.10
PKSG	12.3	129	ePgc	23:48:38.00			-0.23
			eSg		48:40.50		0.06
PKSM	141.9	168	ePnD	23:48:59.20			0.36
			eSn		49:16.10		-1.03

23.

2012-03-05 time: 22:56:58.52 UTC ML= 2.9  
 lat: 48.535N lon: 17.144E h= 7.5 km  
 erh= 2.0km erz= 1.7km  
 nr= 52 gap=41 rms=1.12  
 Locality: Slovakia  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
MODS	20.5	151	ePg	22:57:02.70			0.28
			eSg		57:06.40		0.94
SMOL	21.2	97	ePg	22:57:02.40			-0.13
			eSg		57:06.30		0.64
ZST	37.9	185	ePg	22:57:04.40			-1.01
			eSg		57:09.70		-1.08
VRAC	94.9	335	iPgc	22:57:14.50			-1.02
			ePg		22:57:16.40		-0.79
SOP	104.3	205	eSg		57:32.30		0.55
			Pn		22:57:18.30		-0.84
CONA	116.6	235	Sn		57:33.80		-1.42
			ePn		22:57:19.30		-0.05
SRO	118.4	133	eSn		57:33.10		-2.51
			ePn		22:57:19.50		-0.70
VYHS	125.1	92	eSn		57:35.10		-2.01
			ePn		22:57:19.60		-0.79
SRO2	126.7	133	eSn		57:35.20		-2.24
			iPn		22:57:22.10		-0.09
MORC	141.1	12	ePn		22:57:25.30		1.41
			eSn		57:45.30		1.62
PKST	156.8	155	ePn		22:57:24.30		0.16
			eSn		57:42.50		-1.63
PKSG	157.6	144	ePn		22:57:24.40		0.15
			eSn		57:44.40		0.08
OKC	162.2	27	ePn		22:57:24.90		0.08
			eSn		57:44.20		-1.14
BUD	182.6	130	ePn		22:57:29.20		1.83
			eSn		57:58.60		8.73
LANS	183.8	68	ePn		22:57:28.30		0.79
			Pn		22:57:29.80		1.85
ARSA	187.3	220	Sn		57:52.70		1.79

**Hypocenter Parameters**

DPC	210.4	344	ePn	22:57:30.30	-0.53
			eSn	57:58.00	1.96
PSZ	215.6	109	ePn	22:57:33.50	2.02
MOA	227.1	250	Pn	22:57:33.20	0.28
			Sn	57:59.70	-0.05
GOPC	230.2	312	ePn	22:57:33.20	-0.09
			eSn	58:03.40	2.98
BEHE	231.3	187	ePn	22:57:34.50	1.07
			eSn	58:02.40	1.73
UPC	234.1	340	ePn	22:57:33.90	0.12
			eSn	58:04.10	2.81
KOGS	241.6	196	iPn	22:57:35.20	0.48
KECS	247.0	91	ePn	22:57:35.10	-0.29
PRU	249.0	310	ePn	22:57:35.30	-0.34
			eSn	58:08.50	3.91
PERS	260.5	216	ePn	22:57:38.60	1.53
KHC	270.0	284	ePn	22:57:38.30	0.04
			eSn	58:15.10	5.84
PKSN	273.8	132	ePn	22:57:41.70	2.97
PKS2	275.5	146	ePn	22:57:38.30	-0.65
			eSn	58:19.70	9.21
PKSM	282.0	156	ePn	22:57:39.60	-0.16
			eSn	58:09.30	-2.63
PVCC	289.6	320	eSn	22:58:21.60	8.00
OBKA	298.2	221	Pn	22:57:42.70	0.92
			Sn	58:26.10	10.57
STHS	315.8	72	ePn	22:57:45.10	1.14
KBA	327.5	240	Pn	22:57:47.00	1.58
			Sn	58:22.40	0.39
NKC	389.8	299	ePn	22:57:53.10	-0.09
			eSn	58:48.50	12.66
ABTA	400.8	240	Sn	22:58:54.70	16.41
BLY	416.6	180	iPn	22:57:57.60	1.06
DRGR	461.0	115	iPn	22:58:02.80	0.73
BZS	469.8	134	iPnD	22:58:03.70	0.53
RETA	490.2	256	Sn	22:59:20.60	22.47
FETA	509.4	251	Sn	22:59:24.10	21.71
MDVR	544.5	140	iPnD	22:58:13.40	0.92
DAVA	560.5	256	Pn	22:58:14.60	0.12
			Sn	59:14.00	0.28
ARCR	563.6	107	iPn	22:58:16.50	1.63
BURB	610.3	100	iPnD	22:58:21.40	0.71

24.

2012-03-07 time: 14:39:26.09 UTC ML= 2.4  
 lat: 45.583N lon: 18.413E h= 6.9 km  
 erh= 6.1km erz= 3.0km  
 nr= 9 gap=323 rms=0.39  
 Locality: Croatia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSM	72.1	14	ePgD	14:39:38.70	-0.33
			eSg	39:49.60	0.49
MORH	72.6	14	ePgD	14:39:38.80	-0.31
			eSg	39:50.10	0.83
PKS9	112.1	355	ePgD	14:39:46.60	0.46
			eSg	40:01.20	-0.58
PKS2	118.5	32	ePn	14:39:47.20	0.18
			eSn	40:03.50	0.16
PKSG	201.1	360	ePn	14:39:56.90	-0.41

25.

2012-03-11 time: 18:32:46.25 UTC ML= 0.9  
 lat: 48.414N lon: 20.121E h= 10.0 km  
 erh= ---km erz= ---km  
 nr= 3 gap=227 rms=0.00  
 Locality: Slovakia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PSZ	57.6	197	iPg	18:32:56.70	0.00
LANS	95.0	330	ePg	18:33:03.30	-0.01

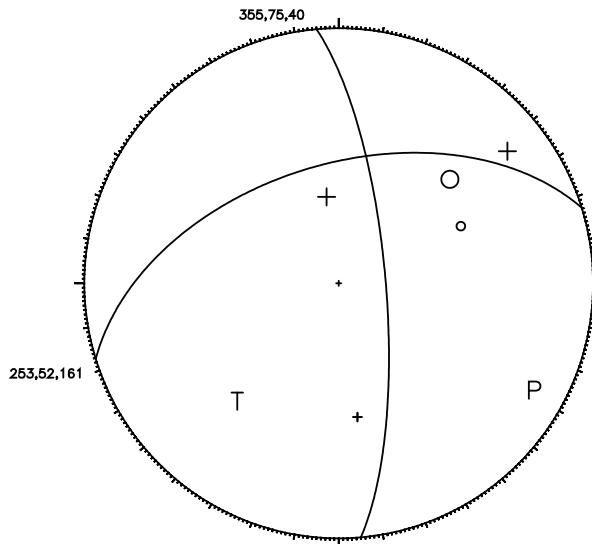
**Földrengés paraméterek**

VYHS 95.5 275 e g 18:33:03.40 0.00

26.

2012-03-13 time: 3:26:18.82 UTC ML= 1.5  
 lat: 47.440N lon: 18.381E h= 10.4 km  
 erh= 1.1km erz= 0.7km  
 nr= 18 gap= 87 rms=0.34  
 Locality: Várgesztes  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	5.5	172	ePgC	3:26:20.90	-0.02
			eSg	26:22.50	-0.05
CSKK	12.5	227	ePgD	3:26:21.70	-0.03
			eSg	26:24.10	0.11
PKST	33.1	232	ePgC	3:26:25.00	-0.01
			eSg	26:29.90	0.06
SRO	41.8	353	ePg	3:26:26.80	0.29
			eSg	26:32.10	-0.40
BUD	48.7	84	ePg	3:26:28.20	0.48
			eSg	26:34.00	-0.66
VYHS	122.0	16	ePn	3:26:39.60	-0.14
			eSn	26:53.10	-2.95
PSZ	125.5	65	ePnD	3:26:40.10	-0.08
			eSn	26:57.20	0.37
MORH	137.6	172	ePnC	3:26:42.00	0.31
			eSn	26:58.10	-1.43
PKSM	138.0	172	ePnC	3:26:42.00	0.26
			eSn	26:58.10	-1.52
SOP	139.8	281	eSn	3:27:00.10	0.09



27.

2012-03-18 time: 23:46:08.62 UTC ML= 0.6  
 lat: 47.397N lon: 18.500E h= 10.0 km  
 erh= 7.4km erz= 4.6km  
 nr= 7 gap=269 rms=0.40  
 Locality: Csákvár  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	8.3	266	ePgD	23:46:10.80	-0.13
			eSg	46:12.00	-0.74
CSKK	18.5	258	ePgD	23:46:12.90	0.53
			eSg	46:14.80	-0.49
PKST	38.4	246	ePgC	23:46:15.90	0.20
			eSg	46:21.50	0.28
PKSM	132.2	175	eSn	23:46:47.80	-0.40

## Földrengés paraméterek

28.

2012-03-19 time: 7:18:09.01 UTC ML= 1.0  
 lat: 47.407N lon: 18.357E h= 0.0 km  
 erh= 5.1km erz= 381km  
 nr= 5 gap=248 rms=0.18  
 Locality: Gánt  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	3.1	124	ePgC	7:18:09.50	-0.06
			eSg	18:09.90	-0.08
CSKK	8.8	236	ePgC	7:18:10.90	0.31
			eSg	18:11.80	-0.01
PKST	29.5	236	ePgC	7:18:14.10	-0.17

29.

2012-03-19 time: 9:34:10.43 UTC ML= 1.3  
 lat: 47.418N lon: 18.352E h= 0.0 km  
 erh= 5.6km erz= 582km  
 nr= 6 gap=261 rms=0.34  
 Locality: Gánt  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	4.1	135	ePgC	9:34:11.20	0.03
			eSg	34:11.60	-0.14
CSKK	9.2	229	ePgC	9:34:12.50	0.42
			eSg	34:13.70	0.34
PKST	29.8	234	ePgC	9:34:15.50	-0.26
			eSg	34:19.20	-0.71

30.

2012-03-19 time: 9:34:29.90 UTC ML= 1.5  
 lat: 47.453N lon: 18.386E h= 0.0 km  
 erh= 2.6km erz= 323km  
 nr= 6 gap=306 rms=0.19  
 Locality: Várgesztes  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	6.8	177	ePgC	9:34:31.20	0.08
			eSg	34:32.00	-0.06
CSKK	13.7	224	ePgC	9:34:32.50	0.14
			eSg	34:34.00	-0.27
PKST	34.2	231	ePgC	9:34:35.80	-0.21
			eSg	34:41.10	0.32

31.

2012-03-19 time: 12:18:30.62 UTC ML= 0.1  
 lat: 47.396N lon: 18.214E h= 0.1 km  
 erh= 4.5km erz= 269km  
 nr= 6 gap=230 rms=0.10  
 Locality: Mór  
 Comments:

sta	dist	azm	phase	hr mn sec	res
CSKK	5.1	137	ePgD	12:18:31.70	0.18
			eSg	18:32.20	-0.03
PKSG	13.3	92	ePgD	12:18:32.90	-0.10
			eSg	18:34.80	-0.05
PKST	20.4	222	ePgD	12:18:34.30	0.03
			eSg	18:37.00	-0.12

34

## Hypocenter Parameters

32.

2012-03-20 time: 1:21:22.46 UTC ML= 2.4  
 lat: 47.978N lon: 20.376E h= 3.7 km  
 erh= 1.9km erz= 1.8km  
 nr= 37 gap= 46 rms=0.75  
 Locality: eger  
 Comments: felt 4-5 EMS

sta	dist	azm	phase	hr mn sec	res
PSZ	36.6	259	ePgD	1:21:29.00	-0.04
			eSg	21:34.60	0.44
KECS	56.7	8	ePg	1:21:32.60	-0.01
			eSg	21:40.10	-0.43
PENC	84.5	256	ePg	1:21:37.20	-0.37
BUD	115.4	242	ePg	1:21:42.50	-0.58
			eSg	21:58.70	-0.47
PKSN	126.2	198	ePn	1:21:44.60	-0.17
			eSn	22:02.20	0.04
VYHS	128.0	297	ePn	1:21:44.20	-0.79
			eSn	21:59.50	-3.06
CRVS	130.4	38	ePn	1:21:45.30	0.01
			eSn	22:01.90	-1.19
LANS	146.6	333	ePn	1:21:47.60	0.29
			eSn	22:04.80	-1.88
SRO	155.4	263	ePnC	1:21:49.10	0.70
			eSn	22:09.50	0.87
TRPA	162.1	84	ePnC	1:21:50.00	0.76
			eSn	22:10.90	0.77
PKSG	162.7	246	ePnD	1:21:49.90	0.58
			eSn	22:10.10	-0.17
STHS	172.2	22	ePn	1:21:51.80	1.30
			eSn	22:13.90	1.53
CSKK	173.0	247	ePnC	1:21:50.90	0.30
			eSn	22:13.90	1.35
PKS2	187.3	208	ePn	1:21:55.00	2.62
			eSn	22:18.80	3.09
PKST	193.4	246	ePnC	1:21:53.30	0.16
			eSn	22:17.00	-0.07
SIRR	213.7	153	iPnD	1:21:54.60	-1.07
DRGR	220.2	127	iPnD	1:21:56.00	-0.49
MORH	236.0	214	ePnD	1:21:56.80	-1.66
			eSn	22:22.20	-4.33
BMR	236.1	98	iPn	1:21:57.60	-0.87
PKSM	236.5	214	ePnC	1:21:56.80	-1.72
			eSn	22:24.10	-2.54
BZS	279.1	160	iPn	1:22:03.60	-0.23
CJR	281.2	120	iPn	1:22:04.20	0.11
ARCR	315.5	108	iPnD	1:22:08.00	-0.37
CONA	337.2	269	Pn	1:22:10.70	-0.37
			Sn	22:41.70	-7.29
KRLC	351.4	312	ePn	1:22:14.20	1.35
BURB	364.9	96	iPnD	1:22:14.80	0.27
ARSA	373.7	257	Pn	1:22:15.10	-0.53
			Sn	22:52.30	-4.80
DPC	396.2	312	ePn	1:22:19.80	1.36
SOKA	429.0	250	Pn	1:22:22.60	0.07

33.

2012-03-21 time: 18:19:53.45 UTC ML= 0.2  
 lat: 47.280N lon: 18.316E h= 0.1 km  
 erh= 4.4km erz= 750km  
 nr= 6 gap=239 rms=0.68  
 Locality: Magyaralmás  
 Comments:

sta	dist	azm	phase	hr mn sec	res
CSKK	10.2	335	ePgC	18:19:54.80	-0.46
			eSg	19:55.40	-1.27
PKSG	13.6	24	ePg	18:19:56.10	0.22
			eSg	19:57.70	-0.08
PKST	21.5	264	ePg	18:19:58.40	1.12
			eSg	20:00.50	0.22

## Hypocenter Parameters

## Földrengés paraméterek

34.

2012-03-23 time: 15:40:43.52 UTC ML= 1.9  
 lat: 48.646N lon: 20.164E h= 7.9 km  
 erh= 1.7km erz= 1.9km  
 nr= 14 gap= 85 rms=0.53  
 Locality: Slovakia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
KECS	29.9	127	ePg	15:40:49.40	0.36
			eSg	40:53.00	-0.34
LANS	75.9	318	ePg	15:40:57.50	0.36
			eSg	41:06.70	-1.07
PSZ	83.3	194	ePgD	15:40:58.70	0.23
			eSg	41:09.20	-0.92
VYHS	99.4	260	ePg	15:41:01.50	0.17
			eSg	41:12.90	-2.33
CRVS	99.5	73	ePg	15:41:01.70	0.35
			eSg	41:13.90	-1.36
PENC	115.5	215	ePnD	15:41:04.00	0.05
			eSn	41:19.20	-0.69
STHS	116.6	43	ePn	15:41:04.60	0.52
			eSn	41:19.90	-0.22

35.

2012-03-28 time: 3:08:00.41 UTC ML= 1.1  
 lat: 47.131N lon: 17.791E h= 10.0 km  
 erh= 2.7km erz= 2.3km  
 nr= 15 gap=150 rms=0.55  
 Locality: Bánd  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKST	23.4	52	ePg	3:08:04.30	-0.65
			eSg	08:08.60	0.11
CSKK	44.0	54	ePg	3:08:09.10	0.63
			eSg	08:18.10	0.26
PKSG	53.9	57	ePg	3:08:10.30	0.10
			eSg	08:18.10	0.26
SRO	85.5	27	ePg	3:08:16.00	0.21
			eSg	08:27.30	-0.48
BEHE	106.7	227	eS*	3:08:33.50	-0.82
			MORH	120.9	147
PKSM	121.1	147	eSn	08:37.50	0.02
			ePn	3:08:21.30	0.03
KOGS	139.9	237	eSn	08:37.50	-0.04
			Pn	3:08:24.90	1.28
VYHS	170.6	27	eSn	08:42.70	0.98
			eSn	3:08:47.50	-1.03

36.

2012-03-28 time: 6:52:58.94 UTC ML= 1.3  
 lat: 47.436N lon: 18.395E h= 0.0 km  
 erh= 2.8km erz= 335km  
 nr= 6 gap=310 rms=0.21  
 Locality: Várgesztes  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	4.9	184	ePgC	6:52:59.90	0.09
			eSg	53:00.50	0.00
CSKK	13.0	232	ePgC	6:53:01.30	0.04
			eSg	53:03.20	0.13
PKST	33.6	234	ePgC	6:53:04.90	-0.04
			eSg	53:08.60	-1.02

37.

2012-04-01 time: 3:18:51.48 UTC ML= 1.2  
 lat: 47.061N lon: 17.827E h= 10.0 km  
 erh= 5.4km erz= 1.7km  
 nr= 8 gap=336 rms=0.33  
 Locality: Nemesvámos  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKST	27.1	36	ePg	3:18:56.20	-0.43
			eSg	19:00.00	-0.65
CSKK	47.0	44	ePg	3:19:00.50	0.44
			eSg	19:06.80	0.05
PKSG	56.4	49	ePg	3:19:01.70	0.00
			eSg	19:09.90	0.23
VYHS	176.4	25	ePn	3:19:19.30	0.07
			eSn	19:41.00	0.13

38.

2012-04-02 time: 7:50:58.29 UTC ML= 0.9  
 lat: 47.359N lon: 18.414E h= 0.0 km  
 erh= 3.5km erz=13.2km  
 nr= 6 gap=275 rms=0.06  
 Locality: Gánt  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	4.0	334	ePgC	7:50:59.00	-0.04
			eSg	50:59.70	0.08
CSKK	11.6	272	ePg	7:51:00.40	0.03
			eSg	51:01.30	-0.69
PKST	30.8	249	ePg	7:51:03.80	0.00
			eSg	51:08.10	0.01

39.

2012-04-05 time: 22:25:57.68 UTC ML= 1.9  
 lat: 45.528N lon: 17.905E h= 4.2 km  
 erh= 8.0km erz= 3.3km  
 nr= 11 gap=249 rms=0.73  
 Locality: Croatia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSM	95.1	37	ePg	22:26:14.30	-0.37
			eSg	26:29.10	1.17
MORH	95.5	37	ePg	22:26:14.40	-0.36
			eSg	26:27.30	-0.78
PKS2	147.4	43	ePn	22:26:23.50	0.94
			eSn	26:41.90	-0.06
PKST	192.6	3	ePnD	22:26:28.50	0.31
			eSn	26:50.40	-1.59
ARSA	265.0	316	Pn	22:26:37.60	0.38
			Sn	27:10.70	2.65
OBKA	281.9	293	Pn	22:26:38.90	-0.42
			CONA	309.2	330
MOA	379.6	313	Sn	27:19.50	1.64
			Pn	22:26:52.40	0.90
			Sn	27:35.00	1.51

40.

2012-04-06 time: 9:05:17.23 UTC ML= 2.7  
 lat: 47.384N lon: 18.387E h= 7.0 km  
 erh= 1.6km erz= 1.1km  
 nr= 44 gap= 57 rms=0.95  
 Locality: Gánt  
 Comments: felt 5 EMS

sta	dist	azm	phase	hr mn sec	res
PKSG	0.9	18	ePg	9:05:17.50	-0.99
			eSg	05:17.50	-1.98



## Földrengés paraméterek

CSKK	9.8	256	ePgD	9:05:19.40	0.01
			eSg	05:20.80	-0.27
PKST	30.1	242	ePg	9:05:22.60	-0.15
			eSg	05:27.10	0.05
SRO	48.0	353	ePg	9:05:27.50	1.61
			eSg	05:34.40	1.75
BUD	49.3	77	ePgC	9:05:26.30	0.18
			eSg	05:33.10	0.05
PKS7	69.6	123	ePg	9:05:21.20	-8.52
			eSg	05:39.90	0.44
PENC	81.0	56	ePgD	9:05:31.60	-0.15
			eSg	05:41.80	-1.28
PKS9	89.0	185	ePg	9:05:34.50	1.32
			eSg	05:47.50	1.88
PKS2	117.5	148	eSn	9:05:54.40	0.17
PKSN	124.7	116	eSn	9:05:57.10	1.27
VYHS	127.9	15	ePn	9:05:39.80	0.49
			eSn	05:55.20	-1.33
PSZ	127.9	62	ePnC	9:05:39.40	0.09
			eSn	05:56.00	-0.53
MORH	131.4	171	ePnD	9:05:39.60	-0.15
			eSn	05:56.30	-1.01
PKSM	131.8	172	ePnD	9:05:39.50	-0.30
			eSn	05:54.50	-2.90
ZST	131.9	313	ePn	9:05:38.80	-1.02
			eSn	05:54.70	-2.74
MODS	137.8	323	ePn	9:05:40.70	0.15
			eSn	05:57.90	-0.84
SOP	141.7	284	ePnD	9:05:41.40	0.37
			eSn	05:58.80	-0.79
SMOL	144.6	330	ePn	9:05:41.70	0.31
			eSn	05:59.50	-0.74
KECS	198.8	52	ePn	9:05:48.30	0.15
			eSn	06:17.90	5.63
CONA	199.1	288	Pn	9:05:48.50	0.31
			Sn	06:12.50	0.17
LANS	212.1	22	ePn	9:05:53.50	3.68
ARSA	217.0	266	Pn	9:05:50.40	-0.03
			Sn	06:15.40	-0.93
SOKA	266.8	253	Pn	9:05:56.40	-0.23
			Sn	06:26.30	-1.07
MORC	273.2	347	iPn	9:05:57.60	0.16
MYKA	370.5	257	Sn	9:06:50.80	0.41
DOPR	558.4	106	iPnD	9:06:31.90	-1.10

41.

2012-04-06 time: 9:38:44.27 UTC ML= 1.8  
 lat: 47.367N lon: 18.384E h= 6.6 km  
 erh= 2.4km erz= 1.5km  
 nr= 19 gap= 96 rms=0.81  
 Locality: Gánt  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	2.8	11	ePg	9:38:44.50	-1.04
			eSg	38:44.60	-1.93
CSKK	9.3	267	ePgD	9:38:46.40	0.10
			eSg	38:48.10	0.21
PKST	29.0	246	ePgD	9:38:49.50	-0.08
			eSg	38:53.80	0.07
SRO	49.9	354	ePg	9:38:54.70	1.45
			eSg	39:01.80	1.54
BUD	50.0	75	eSg	9:39:00.20	-0.10
PSZ	129.0	62	ePnD	9:39:07.40	0.85
			eSn	39:24.10	0.17
MORH	129.5	171	ePn	9:39:07.40	0.78
			eSn	39:23.80	-0.25
VYHS	129.8	15	ePn	9:39:07.20	0.55
			eSn	39:22.20	-1.90
PKSM	129.9	171	ePn	9:39:06.70	0.03
			eSn	39:23.80	-0.34
MODS	139.2	324	eSn	9:39:24.90	-1.29
SMOL	146.1	331	eSn	9:39:26.70	-1.02

## Hypocenter Parameters

42.

2012-04-06 time: 10:49:52.94 UTC ML= 1.1  
 lat: 47.387N lon: 18.415E h= 1.2 km  
 erh= 0.2km erz= 0.2km  
 nr= 5 gap=318 rms=0.11  
 Locality: Gánt  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	1.9	285	ePg	10:49:53.30	-0.04
			eSg	49:53.40	-0.25
CSKK	12.0	257	ePg	10:49:55.20	0.12
			eSg	49:56.80	0.04
PKST	32.1	244	eSg	10:50:03.20	0.05

43.

2012-04-06 time: 11:07:30.62 UTC ML= 1.4  
 lat: 47.394N lon: 18.444E h= 3.5 km  
 erh= 7.2km erz= 2.8km  
 nr= 8 gap=231 rms=0.54  
 Locality: Csákvár  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	4.0	267	ePgD	11:07:31.60	0.03
			eSg	07:31.70	-0.61
CSKK	14.2	256	ePg	11:07:33.50	0.26
			eSg	07:35.20	-0.08
PKST	34.4	244	ePg	11:07:36.90	0.11
			eSg	07:41.30	-0.31
VYHS	125.8	13	ePn	11:07:54.00	1.10
			eSn	08:09.10	-1.17

44.

2012-04-06 time: 12:50:53.00 UTC ML= 1.0  
 lat: 47.394N lon: 18.444E h= 0.2 km  
 erh= 9.2km erz=66.4km  
 nr= 6 gap=337 rms=0.32  
 Locality: Csákvár  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	4.1	267	ePg	12:50:53.70	-0.03
			eSg	50:53.80	-0.49
CSKK	14.3	256	ePg	12:50:55.70	0.15
			eSg	50:57.20	-0.35
PKST	34.4	244	ePg	12:50:59.20	0.05
			eSg	51:04.60	0.65

45.

2012-04-07 time: 19:28:40.98 UTC ML= 0.4  
 lat: 47.269N lon: 17.969E h= 1.0 km  
 erh= 6.9km erz=23.9km  
 nr= 6 gap=322 rms=0.08  
 Locality: Bakonyháza  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKST	5.0	103	ePgC	19:28:41.80	-0.09
			eSg	28:42.70	0.10
CSKK	24.4	65	ePgC	19:28:45.40	0.07
			eSg	28:48.60	-0.13
PKSG	34.6	67	ePgC	19:28:47.20	0.03
			eSg	28:52.00	0.01

## Hypocenter Parameters

## Földrengés paraméterek

46.

2012-04-13 time: 8:29:28.01 UTC ML= 0.9  
 lat: 47.434N lon: 18.386E h= 0.0 km  
 erh= 6.1km erz= 726km  
 nr= 6 gap=302 rms=0.43  
 Locality: Várgesztes  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	4.7	176	ePgC	8:29:28.70	-0.14
			eSg	29:29.50	0.01
CSKK	12.3	230	ePgC	8:29:30.10	-0.10
			eSg	29:30.40	-1.52
PKST	32.9	234	ePgC	8:29:34.20	0.31
			eSg	29:39.00	0.53

47.

2012-04-15 time: 9:09:22.06 UTC ML= 1.2  
 lat: 47.389N lon: 18.408E h= 0.1 km  
 erh= 2.7km erz=45.4km  
 nr= 6 gap=319 rms=0.11  
 Locality: Gánt  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	1.4	284	ePgC	9:09:22.30	0.00
			eSg	09:22.40	-0.10
CSKK	11.5	256	ePgC	9:09:24.30	0.18
			eSg	09:25.80	0.08
PKST	31.7	243	ePgC	9:09:27.60	-0.13
			eSg	09:32.10	-0.05

48.

2012-04-18 time: 8:50:50.15 UTC ML= 1.4  
 lat: 47.435N lon: 18.385E h= 0.0 km  
 erh= 2.8km erz= 335km  
 nr= 6 gap=301 rms=0.19  
 Locality: Várgesztes  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	4.8	175	ePgC	8:50:51.10	0.09
			eSg	50:51.60	-0.08
CSKK	12.3	230	ePgC	8:50:52.40	0.05
			eSg	50:53.80	-0.27
PKST	32.9	234	ePgC	8:50:55.90	-0.13
			eSg	51:01.20	0.58

49.

2012-04-18 time: 8:51:02.10 UTC ML= 1.1  
 lat: 47.391N lon: 18.392E h= 0.0 km  
 erh= 9.1km erz= \*\*\*km  
 nr= 6 gap=309 rms=0.67  
 Locality: Gánt  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	0.1	292	ePgC	8:51:02.00	-0.13
			eSg	51:03.10	0.95
CSKK	10.4	253	ePgC	8:51:03.40	-0.57
			eSg	51:04.70	-0.72
PKST	30.8	241	ePg	8:51:08.70	1.10
			eSg	51:11.60	-0.29

50.

2012-04-18 time: 8:56:56.67 UTC ML= 0.7  
 lat: 47.403N lon: 18.354E h= 0.0 km  
 erh= 3.5km erz= 267km  
 nr= 6 gap=237 rms=0.17  
 Locality: Gánt  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	3.0	114	ePgC	8:56:57.10	-0.12
			eSg	56:57.60	-0.04
CSKK	8.3	238	ePgD	8:56:58.50	0.34
			eSg	56:59.30	-0.02
PKST	29.0	236	ePgC	8:57:01.80	-0.05
			eSg	57:05.70	-0.19

51.

2012-04-18 time: 10:33:59.65 UTC ML= 2.2  
 lat: 48.287N lon: 21.650E h= 5.4 km  
 erh= 2.0km erz= 2.1km  
 nr= 14 gap=116 rms=0.43  
 Locality: Vajdácaska  
 Comments:

sta	dist	azm	phase	hr mn sec	res
TRPA	68.3	105	ePg	10:34:12.30	0.41
			eSg	34:20.90	-0.54
CRVS	69.8	348	ePg	10:34:11.80	-0.35
			eSg	34:22.00	0.11
STHS	129.1	347	ePn	10:34:22.40	0.31
			eSn	34:39.30	-0.29
PSZ	137.1	253	ePn	10:34:22.80	-0.29
			eSn	34:41.20	-0.17
NIE	159.6	322	Pn	10:34:26.70	0.81
			eSn	34:46.20	-0.16
DRGR	184.5	154	Pn	10:34:29.50	0.50
			eSn	34:49.50	-2.40
VYHS	209.7	276	ePn	10:34:31.50	-0.64
			eSn	34:55.20	-2.29

52.

2012-04-23 time: 11:55:35.04 UTC ML= 1.7  
 lat: 48.628N lon: 21.454E h= 0.0 km  
 erh= 9.8km erz=13.0km  
 nr= 11 gap=123 rms=0.72  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
CRVS	30.5	1	ePg	11:55:40.10	-0.39
			eSg	55:43.70	-1.04
STHS	89.1	350	ePg	11:55:50.90	-0.04
			eSg	56:04.00	0.65
TRPA	97.6	125	ePg	11:55:52.60	0.13
			ePn	11:55:58.80	-0.73
PSZ	140.1	236	eSn	56:18.20	-0.44
			ePn	11:56:02.90	1.28
LANS	156.8	292	eSn	56:23.40	1.04
			ePn	11:56:07.20	0.97
VYHS	193.8	266	eSn	56:29.20	-1.37

53.

2012-04-26 time: 21:37:51.04 UTC ML= 0.9  
 lat: 47.389N lon: 18.412E h= 0.0 km  
 erh= 1.8km erz=56.6km  
 nr= 5 gap=321 rms=0.16  
 Locality: Gánt  
 Comments:

sta	dist	azm	phase	hr mn sec	res
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## Földrengés paraméterek

PKSG 1.7 282 ePgC 21:37:51.40 0.06  
 eSg 37:51.40 -0.17  
 CSKK 11.8 256 ePgC 21:37:53.30 0.15  
 eSg 37:54.90 0.11  
 PKST 32.0 243 ePg 21:37:56.50 -0.26

54.

2012-04-27 time: 6:36:36.53 UTC ML= 1.1  
 lat: 47.442N lon: 18.367E h= 0.0 km  
 erh= 3.3km erz= 404km  
 nr= 6 gap=291 rms=0.24  
 Locality: Oroszlány  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	5.9	162	ePgC	6:36:37.70	0.12
			eSg	36:38.20	-0.20
CSKK	11.9	222	ePgC	6:36:38.90	0.24
			eSg	36:40.10	-0.22
PKST	32.4	231	ePgC	6:36:42.00	-0.31
			eSg	36:47.10	0.28

55.

2012-04-27 time: 6:36:54.40 UTC ML= 1.2  
 lat: 47.435N lon: 18.380E h= 0.0 km  
 erh= 4.1km erz= 501km  
 nr= 6 gap=298 rms=0.30  
 Locality: Várgesztes  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	4.9	171	ePgC	6:36:55.40	0.13
			eSg	36:56.00	0.05
CSKK	12.1	229	ePgC	6:36:56.80	0.25
			eSg	36:57.60	-0.63
PKST	32.7	233	ePgC	6:36:59.90	-0.33
			eSg	37:05.10	0.32

56.

2012-04-27 time: 21:26:09.17 UTC ML= 0.8  
 lat: 47.717N lon: 16.209E h= 10.0 km  
 erh= 2.4km erz= 2.1km  
 nr= 11 gap=127 rms=0.60  
 Locality: Austria  
 Comments:

sta	dist	azm	phase	hr mn sec	res
SOP	26.5	98	ePgC	21:26:14.50	0.28
			eSg	26:18.00	-0.16
CONA	35.0	312	Pg	21:26:15.80	0.13
			Sg	26:20.60	-0.15
ARSA	73.3	225	Pg	21:26:22.50	0.13
			Sg	26:31.50	-1.17
MODS	108.0	47	ePn	21:26:27.60	-0.79
			eSn	26:39.60	-3.79
SMOL	126.9	46	ePn	21:26:31.50	0.76
			eSn	26:46.30	-1.26
MOA	146.4	276	Pn	21:26:34.10	0.93
			Sn	26:52.00	0.10

57.

2012-04-30 time: 3:04:43.73 UTC ML= 2.0  
 lat: 48.863N lon: 21.723E h= 2.7 km  
 erh= 3.5km erz= 3.0km  
 nr= 12 gap=173 rms=0.61  
 Locality: Slovakia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
CRVS	19.7	283	ePg	3:04:47.70	0.43

## Hypocenter Parameters

			eSg	04:48.70	-1.34
STHS	70.8	330	ePg	3:04:56.10	-0.28
			eSg	05:06.40	0.15
TRPA	101.4	143	ePgC	3:05:01.80	-0.04
			eSg	05:15.90	-0.06
LANS	168.1	281	ePn	3:05:11.80	0.43
			eSn	05:33.00	0.06
PSZ	171.4	232	ePn	3:05:13.60	1.81
			eSn	05:33.10	-0.58
VYHS	216.5	259	ePn	3:05:17.00	-0.41
			eSn	05:41.70	-1.99

58.

2012-04-30 time: 9:38:24.89 UTC ML= 1.6  
 lat: 47.011N lon: 22.294E h= 5.1 km  
 erh= 1.5km erz= 1.8km  
 nr= 5 gap=158 rms=0.08  
 Locality: Romania  
 Comments:

sta	dist	azm	phase	hr mn sec	res
DRGR	40.1	128	iPg	9:38:32.20	0.10
SIRR	95.9	210	iPg	9:38:42.00	-0.04
CJR	104.8	108	iPg	9:38:43.50	-0.13
TRPA	125.8	8	iPnD	9:38:47.00	0.05
BZS	163.6	199	iPn	9:38:51.70	0.04

59.

2012-05-02 time: 10:31:46.91 UTC ML= 0.6  
 lat: 47.449N lon: 18.079E h= 0.0 km  
 erh= 2.2km erz= 281km  
 nr= 6 gap=276 rms=0.16  
 Locality: Bakonysárkány  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
CSKK	16.7	125	ePgC	10:31:50.10	0.20
			eSg	31:52.40	0.18
PKST	21.4	189	ePgC	10:31:50.70	-0.03
			eSg	31:53.60	-0.10
PKSG	24.4	105	ePgC	10:31:51.20	-0.07
			eSg	31:54.30	-0.36

60.

2012-05-02 time: 17:21:06.15 UTC ML= 2.3  
 lat: 48.878N lon: 21.746E h= 0.5 km  
 erh= 3.9km erz= 3.3km  
 nr= 14 gap=150 rms=0.73  
 Locality: Slovakia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
CRVS	21.1	277	ePg	17:21:10.20	0.29
STHS	70.2	329	ePg	17:21:18.60	-0.09
			eSg	21:28.80	0.33
TRPA	101.7	145	ePgC	17:21:23.90	-0.42
			eSg	21:37.70	-0.79
LANS	169.4	280	ePn	17:21:34.80	0.56
			eSn	21:54.70	-1.46
PSZ	173.8	232	ePn	17:21:34.30	-0.49
			eSn	21:58.60	1.47
BMR	186.7	136	iPnD	17:21:37.50	1.10
VYHS	218.5	259	ePn	17:21:39.30	-1.06
			eSn	22:03.90	-3.15
SIRR	290.3	181	iPnD	17:21:48.10	-1.22
BURB	293.6	119	iPn	17:21:49.70	-0.03

## Hypocenter Parameters

## Földrengés paraméterek

61.

2012-05-03 time: 7:31:31.05 UTC ML= 0.4  
 lat: 47.469N lon: 18.213E h= 0.2 km  
 erh= 6.5km erz= 502km  
 nr= 6 gap=272 rms=0.13  
 Locality: Bokod  
 Comments:

sta	dist	azm	phase	hr mn sec	res
CSKK	12.3	163	ePg	7:31:33.50	0.26
			eSg	31:34.90	-0.05
PKSG	15.9	123	ePgC	7:31:33.80	-0.09
			eSg	31:36.10	0.00
PKST	26.9	210	ePgD	7:31:35.90	0.04
			eSg	31:39.40	-0.21

62.

2012-05-07 time: 7:55:37.36 UTC ML= 1.1  
 lat: 47.448N lon: 18.277E h= 0.0 km  
 erh= 8.4km erz= \*\*\*km  
 nr= 6 gap=265 rms=0.85  
 Locality: Pusztavám  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
CSKK	9.5	188	ePgC	7:55:39.90	0.85
			eSg	55:40.60	0.23
PKSG	10.6	126	ePgC	7:55:38.60	-0.65
			eSg	55:39.00	-1.72
PKST	27.9	221	ePgC	7:55:43.10	0.77
			eSg	55:45.50	-0.71

63.

2012-05-07 time: 7:55:48.36 UTC ML= 1.0  
 lat: 47.412N lon: 18.369E h= 0.0 km  
 erh= 3.7km erz= 395km  
 nr= 6 gap=269 rms=0.23  
 Locality: Gánt  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	2.8	145	ePgC	7:55:48.70	-0.17
			eSg	55:49.40	0.14
CSKK	9.9	236	ePgC	7:55:50.00	-0.13
			eSg	55:51.20	-0.30
PKST	30.5	236	ePgC	7:55:54.20	0.39
			eSg	55:58.10	0.03

64.

2012-05-07 time: 8:01:24.52 UTC ML= 0.8  
 lat: 47.460N lon: 18.319E h= 0.0 km  
 erh= 6.2km erz= 793km  
 nr= 6 gap=281 rms=0.51  
 Locality: Oroszlány  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	9.3	145	ePgC	8:01:26.10	-0.09
			eSg	01:26.50	-0.99
CSKK	11.7	202	ePgC	8:01:27.40	0.79
			eSg	01:28.40	0.16
PKST	31.1	224	ePgC	8:01:30.00	-0.07
			eSg	01:33.90	-0.50

65.

2012-05-14 time: 8:03:54.62 UTC ML= 1.1  
 lat: 47.431N lon: 18.395E h= 0.0 km  
 erh= 2.8km erz= 343km  
 nr= 6 gap=309 rms=0.20  
 Locality: Gánt  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	4.3	184	ePgC	8:03:55.50	0.11
			eSg	03:56.00	0.01
CSKK	12.6	234	ePgC	8:03:56.90	0.03
			eSg	03:58.10	-0.52
PKST	33.2	235	ePg	8:04:00.40	-0.16
			eSg	04:05.50	0.32

66.

2012-05-14 time: 8:04:10.02 UTC ML= 1.3  
 lat: 47.460N lon: 18.404E h= 0.0 km  
 erh= 5.7km erz= 676km  
 nr= 6 gap=316 rms=0.41  
 Locality: Várgesztes  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	7.6	188	ePgC	8:04:11.50	0.13
			eSg	04:12.10	-0.33
CSKK	15.2	225	ePgC	8:04:13.00	0.26
			eSg	04:14.10	-0.76
PKST	35.7	231	ePg	8:04:16.10	-0.30
			eSg	04:22.10	0.72

67.

2012-05-14 time: 20:44:49.28 UTC ML= 0.3  
 lat: 47.246N lon: 18.404E h= 7.3 km  
 erh= 3.1km erz= 3.8km  
 nr= 8 gap=175 rms=0.40  
 Locality: Sárkereszttes  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	16.2	356	ePgD	20:44:52.70	0.24
			eSg	44:54.40	-0.55
CSKK	17.0	320	ePgC	20:44:52.80	0.22
			eSg	44:54.30	-0.86
PKST	28.0	273	ePgC	20:44:54.90	0.44
			eSg	44:58.50	0.00
MORH	116.0	171	eSn	20:45:25.70	-0.18
PKSM	116.4	171	eSn	20:45:25.50	-0.47

68.

2012-05-15 time: 7:08:31.48 UTC ML= 1.0  
 lat: 47.439N lon: 18.293E h= 0.0 km  
 erh= 8.9km erz= \*\*\*km  
 nr= 6 gap=262 rms=0.79  
 Locality: Pusztavám  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
CSKK	8.8	196	ePgC	7:08:33.90	0.84
			eSg	08:34.80	0.51
PKSG	9.1	126	ePgC	7:08:32.60	-0.50
			eSg	08:32.90	-1.46
PKST	28.0	224	ePgC	7:08:37.00	0.52
			eSg	08:39.40	-0.99

## Földrengés paraméterek

69.

2012-05-15 time: 7:09:08.72 UTC ML= 1.0  
 lat: 47.417N lon: 18.340E h= 0.0 km  
 erh= 5.3km erz= 528km  
 nr= 6 gap=253 rms=0.32  
 Locality: Gánt  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	4.7	126	ePgC	7:09:09.40	-0.16
			eSg	09:10.10	-0.11
CSKK	8.4	225	ePgC	7:09:10.70	0.47
			eSg	09:11.50	0.09
PKST	29.0	233	ePgC	7:09:13.90	0.00
			eSg	09:17.20	-0.74

70.

2012-05-16 time: 6:28:54.48 UTC ML= 0.8  
 lat: 47.293N lon: 18.337E h= 1.2 km  
 erh= 1.1km erz= 9.7km  
 nr= 6 gap=240 rms=0.06  
 Locality: Magyaralmás  
 Comments:

sta	dist	azm	phase	hr mn sec	res
CSKK	9.7	324	ePgD	6:28:56.30	0.08
			eSg	28:57.60	0.02
PKSG	11.7	20	ePgD	6:28:56.60	0.02
			eSg	28:58.10	-0.12
PKST	23.2	261	ePgD	6:28:58.60	-0.02
			eSg	29:01.80	-0.05

71.

2012-05-18 time: 12:20:31.83 UTC ML= 1.6  
 lat: 48.534N lon: 20.317E h= 0.0 km  
 erh= 4.7km erz= \*\*\*km  
 nr= 8 gap=141 rms=0.81  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PSZ	75.3	205	ePg	12:20:45.50	0.22
			eSg	20:55.50	-0.27
CRVS	93.6	64	ePg	12:20:48.60	0.05
			eSg	21:00.10	-1.49
VYHS	109.5	268	ePg	12:20:51.50	0.11
			eSg	21:04.70	-1.95
STHS	119.3	35	ePg	12:20:54.40	1.26
			eSg	21:09.80	0.04

72.

2012-05-20 time: 23:22:02.41 UTC ML= 0.7  
 lat: 47.335N lon: 18.184E h= 8.9 km  
 erh= 1.1km erz= 0.2km  
 nr= 6 gap=188 rms=0.02  
 Locality: Balinka  
 Comments:

sta	dist	azm	phase	hr mn sec	res
CSKK	6.6	61	ePg	23:22:04.40	0.01
			eSg	22:05.90	-0.03
PKST	14.1	233	ePgD	23:22:05.40	0.01
			eSg	22:07.70	-0.02
PKSG	16.8	68	ePgD	23:22:05.80	-0.01
			eSg	22:08.50	0.04

## Hypocenter Parameters

73.

2012-05-20 time: 23:24:19.94 UTC ML= 1.8  
 lat: 47.403N lon: 18.076E h= 8.1 km  
 erh= 2.7km erz= 2.1km  
 nr= 24 gap= 94 rms=0.92  
 Locality: Aka  
 Comments:

sta	dist	azm	phase	hr mn sec	res
CSKK	14.6	107	ePg	23:24:22.60	-0.33
			eSg	24:24.00	-1.26
PKST	16.3	191	ePgD	23:24:23.60	0.41
			eSg	24:25.90	0.18
PKSG	23.8	93	ePgD	23:24:24.00	-0.44
			eSg	24:26.70	-1.24
PENC	100.4	65	ePg	23:24:38.10	0.16
			eSg	24:52.70	0.73
ZST	114.4	320	ePn	23:24:40.20	-0.01
			eSn	24:55.00	-1.01
SOP	118.4	285	ePn	23:24:37.70	-3.00
			eSn	24:57.30	0.41
MODS	123.4	331	ePn	23:24:41.70	0.38
			eSn	24:57.20	-0.80
SMOL	132.7	339	eSn	23:24:58.90	-1.16
			ePn	23:24:43.80	1.25
PKS2	133.2	139	eSn	25:00.80	0.61
			ePn	23:24:44.10	1.46
VYHS	134.0	25	ePn	23:24:44.10	1.46
			eSn	24:59.90	-0.45
MORH	138.9	162	ePnD	23:24:43.40	0.14
			eSn	24:59.60	-1.84
PKSM	139.3	162	ePn	23:24:43.40	0.10
			eSn	24:59.70	-1.82
PSZ	148.2	67	ePn	23:24:46.40	1.99
			eSn	24:58.00	-5.50

74.

2012-05-24 time: 8:32:45.62 UTC ML= 1.2  
 lat: 47.455N lon: 18.382E h= 0.0 km  
 erh= 6.0km erz= 733km  
 nr= 6 gap=305 rms=0.44  
 Locality: Várgesztes  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	7.1	175	ePgC	8:32:47.10	0.21
			eSg	32:47.30	-0.57
CSKK	13.8	222	ePgC	8:32:48.40	0.32
			eSg	32:49.60	-0.40
PKST	34.2	230	ePgC	8:32:51.30	-0.42
			eSg	32:57.30	0.82

75.

2012-05-24 time: 8:33:02.81 UTC ML= 1.5  
 lat: 47.463N lon: 18.398E h= 0.0 km  
 erh= 4.5km erz= 532km  
 nr= 6 gap=314 rms=0.33  
 Locality: Várgesztes  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	7.9	184	ePgC	8:33:04.30	0.08
			eSg	33:05.00	-0.32
CSKK	15.2	223	ePgC	8:33:05.70	0.18
			eSg	33:06.80	-0.83
PKST	35.6	231	ePgC	8:33:09.10	-0.07
			eSg	33:14.70	0.57

## Hypocenter Parameters

## Földrengés paraméterek

76.

2012-05-24 time: 10:44:08.76 UTC ML= 0.5  
 lat: 47.180N lon: 18.274E h= 0.0 km  
 erh= 6.5km erz= 838km  
 nr= 6 gap=275 rms=0.49  
 Locality: Sárkeszi  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKST	20.2	296	ePgC	10:44:11.80			-0.56
			eSg		44:15.70		0.53
CSKK	20.4	357	ePgC	10:44:12.60			0.19
			eSg		44:15.10		-0.15
PKSG	25.2	21	ePgC	10:44:13.80			0.54
			eSg		44:16.00		-0.77

77.

2012-05-25 time: 11:23:45.82 UTC ML= 1.1  
 lat: 47.538N lon: 18.541E h= 0.0 km  
 erh= 7.9km erz= 472km  
 nr= 5 gap=344 rms=0.24  
 Locality: Nagyegyháza  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSG	19.8	215	ePgC	11:23:49.40			0.05
			eSg		23:52.40		0.29
CSKK	28.7	228	ePgC	11:23:50.90			-0.05
			eSg		23:54.30		-0.65
PKST	49.2	231	eSg	11:24:01.60			0.13

78.

2012-05-25 time: 21:54:11.79 UTC ML= 0.1  
 lat: 47.497N lon: 18.338E h= 0.0 km  
 erh= 3.3km erz= 365km  
 nr= 5 gap=300 rms=0.17  
 Locality: Kecskéd  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKSG	12.3	161	ePgC	21:54:14.00			0.01
			eSg		54:15.50		-0.21
CSKK	16.0	201	ePgD	21:54:14.70			0.06
			eSg		54:17.20		0.33
PKST	35.0	221	eSg	21:54:22.70			-0.21

79.

2012-05-25 time: 23:55:49.20 UTC ML= 0.6  
 lat: 47.411N lon: 18.222E h= 1.3 km  
 erh= 4.5km erz=18.6km  
 nr= 6 gap=239 rms=0.16  
 Locality: Pusztavám  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
CSKK	6.0	151	ePgC	23:55:50.40			0.10
			eSg		55:50.70		-0.46
PKSG	12.9	99	ePgC	23:55:51.60			0.09
			eSg		55:53.10		-0.22
PKST	22.0	220	ePgC	23:55:53.20			0.06
			eSg		55:56.20		-0.01

80.

2012-05-27 time: 20:20:56.83 UTC ML= 0.2  
 lat: 47.311N lon: 18.456E h= 0.1 km  
 erh= 4.8km erz= 953km  
 nr= 6 gap=289 rms=0.20  
 Locality: Pátka  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKSG	10.3	331	ePgC	20:20:58.80			0.14
			eSg		21:00.20		0.10
CSKK	15.9	291	ePgD	20:20:59.50			-0.17
			eSg		21:01.50		-0.38
PKST	32.5	260	ePg	20:21:02.60			-0.02
			eSg		21:07.50		0.36

81.

2012-05-30 time: 11:46:19.25 UTC ML= 0.9  
 lat: 47.492N lon: 18.488E h= 0.0 km  
 erh= 2.1km erz= 155km  
 nr= 6 gap=341 rms=0.09  
 Locality: Szárliget  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKSG	13.3	213	ePgC	11:46:21.70			0.07
			eSg		46:23.30		-0.18
CSKK	22.3	230	ePgC	11:46:23.20			-0.04
			eSg		46:26.30		-0.05
PKST	42.9	233	ePgC	11:46:26.90			-0.01
			eSg		46:33.10		0.20

82.

2012-05-30 time: 23:59:04.20 UTC ML= 1.5  
 lat: 46.147N lon: 16.649E h= 10.0 km  
 erh= 2.3km erz= 1.9km  
 nr= 19 gap=149 rms=0.66  
 Locality: Croatia  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
BEHE	37.2	15	ePgC	23:59:11.40			0.33
			eSg		59:16.70		0.27
KOGS	45.4	317	iPg	23:59:12.50			0.00
			iSg		59:18.40		-0.58
GCIS	85.0	249	iPg	23:59:19.60			0.11
DOBS	91.2	270	iPg	23:59:20.20			-0.37
CRESE	99.0	249	iPg	23:59:22.00			0.03
BOJS	130.0	237	ePn	23:59:27.40			1.24
SOKA	137.6	295	Pn	23:59:27.90			0.79
			Sn		59:44.80		-0.17
ARSA	149.8	325	Pn	23:59:29.80			1.16
			Sn		59:47.50		-0.20
PKSM	154.0	87	ePnD	23:59:28.10			-1.05
			eSn		59:49.80		1.18
MORH	154.2	87	ePnD	23:59:28.10			-1.08
			eSn		59:50.40		1.73
PKST	162.8	41	ePnC	23:59:29.60			-0.65
			eSn		59:52.10		1.53
PKS2	201.2	79	eSn	23:59:58.30			-0.79

83.

2012-05-31 time: 3:42:16.55 UTC ML= 1.5  
 lat: 46.852N lon: 18.148E h= 5.6 km  
 erh= 1.9km erz= 3.8km  
 nr= 17 gap=101 rms=0.61  
 Locality: Siójtut  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKST	46.1	349	ePg	3:42:25.40			0.56
			eSg		42:31.20		-0.11
CSKK	57.5	9	ePgD	3:42:27.10			0.23
			eSg		42:34.50		-0.42
PKSG	62.8	17	ePgD	3:42:27.50			-0.31
			eSg		42:35.60		-1.00
MORH	80.3	152	ePgC	3:42:31.00			0.08
			eSg		42:40.70		-1.43

## Földrengés paraméterek

PKSM	80.6	152	ePg	3:42:31.00	0.03
			eSg	42:40.80	-1.42
PKS2	90.8	116	ePg	3:42:34.40	1.60
BUD	96.7	43	ePgC	3:42:33.60	-0.25
			eSg	42:47.20	-0.14
BEHE	113.3	248	ePg	3:42:36.80	0.00
			eSg	42:53.00	0.41
PSZ	177.4	48	ePn	3:42:44.40	-0.58
			eSn	43:07.80	0.64

84.

2012-05-31 time: 9:21:17.91 UTC ML= 0.8  
 lat: 47.418N lon: 18.371E h= 0.0 km  
 erh= 2.5km erz= 286km  
 nr= 6 gap=277 rms=0.18  
 Locality: Gánt  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	3.2	152	ePgC	9:21:18.60	0.11
			eSg	21:18.90	-0.04
CSKK	10.3	234	ePgC	9:21:20.00	0.25
			eSg	21:21.00	-0.18
PKST	30.9	235	ePgC	9:21:23.20	-0.23
			eSg	21:27.70	-0.04

85.

2012-05-31 time: 9:28:11.86 UTC ML= 1.1  
 lat: 47.451N lon: 18.366E h= 0.0 km  
 erh= 5.1km erz= 638km  
 nr= 6 gap=294 rms=0.40  
 Locality: Oroszlány  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	6.8	164	ePgC	9:28:13.30	0.23
			eSg	28:13.80	-0.21
CSKK	12.6	219	ePgD	9:28:14.70	0.60
			eSg	28:15.80	-0.05
PKST	32.9	230	ePgC	9:28:17.30	-0.43
			eSg	28:21.80	-0.50

86.

2012-05-31 time: 10:00:16.97 UTC ML= 0.5  
 lat: 47.208N lon: 18.307E h= 0.0 km  
 erh= 2.3km erz= 307km  
 nr= 6 gap=268 rms=0.18  
 Locality: Székesfehérvár  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
CSKK	17.6	348	ePgC	10:00:20.30	0.19
			eSg	00:22.60	0.04
PKSG	21.4	17	ePgC	10:00:20.90	0.12
			eSg	00:23.40	-0.36
PKST	21.4	285	ePgC	10:00:20.60	-0.19
			eSg	00:23.80	0.02

87.

2012-05-31 time: 21:21:46.20 UTC ML= 0.6  
 lat: 47.504N lon: 18.422E h= 0.0 km  
 erh= 2.2km erz= 261km  
 nr= 6 gap=324 rms=0.12  
 Locality: Várgesztes  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	12.7	191	ePgD	21:21:48.50	0.04
			eSg	21:50.10	-0.12
CSKK	19.8	218	ePgD	21:21:49.90	0.16

## Hypocenter Parameters

		eSg	21:52.40	-0.10	
PKST	40.0	227	ePgD	21:21:53.20	-0.14
		eSg	21:59.00	0.10	

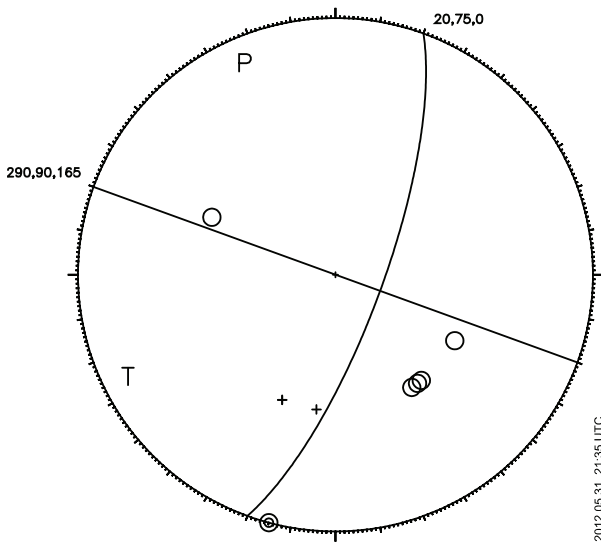
88.

2012-05-31 time: 21:35:42.22 UTC ML= 2.6  
 lat: 48.944N lon: 20.315E h= 0.5 km  
 erh= 2.4km erz= 2.5km  
 nr= 35 gap=151 rms=1.10  
 Locality: Slovakia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
KECS	52.8	166	ePg	21:35:51.90	0.25
			eSg	35:58.40	-0.60
LANS	66.0	290	ePg	21:35:53.60	-0.41
			eSg	36:01.60	-1.60
CRVS	84.2	93	ePg	21:35:57.20	-0.05
			eSg	36:07.80	-1.18
PSZ	118.2	195	iPgD	21:36:03.90	0.57
PSZ	118.2	195	ePgD	21:36:03.80	0.47
			eSg	36:17.70	-2.10
VYHS	119.7	245	ePg	21:36:02.80	-0.80
			eSg	36:17.50	-2.78
OKC	186.1	302	ePn	21:36:13.70	1.30
			eSn	36:36.50	0.56
TRPA	187.6	119	ePn	21:36:12.00	-0.58
			eSn	36:37.00	0.74
TRPA	187.6	119	iPnD	21:36:12.10	-0.48
SRO2	193.7	227	ePn	21:36:14.00	0.65
			eSn	36:38.30	0.67
SMOL	217.6	257	ePn	21:36:16.00	-0.33
			eSn	36:41.80	-1.14
MORC	221.7	295	iPnD	21:36:18.90	2.07
PKSG	224.2	220	ePn	21:36:17.80	0.65
			eSn	36:48.20	3.80
PKSN	230.0	188	ePnC	21:36:18.60	0.72
			eSn	36:52.60	6.91
MODS	232.6	254	ePn	21:36:16.90	-1.29
			eSn	36:41.90	-4.36
CSKK	232.9	221	ePn	21:36:19.80	1.56
			eSn	36:49.00	2.67
ZST	251.2	251	ePn	21:36:19.30	-1.22
			eSn	36:45.80	-4.59
PKST	252.9	222	ePn	21:36:21.30	0.57
			eSn	36:57.40	6.64
VRAC	274.6	278	iPn	21:36:23.90	0.47
BMR	275.2	121	iPn	21:36:23.20	-0.31
KRLC	285.1	296	ePn	21:36:25.50	0.75
			eSn	37:01.70	3.78
DRGR	299.0	143	iPnD	21:36:27.20	0.72
DPC	328.0	298	ePn	21:36:31.60	1.50
			eSn	37:15.20	7.76
MORH	328.3	203	ePnC	21:36:29.90	-0.23
			eSn	37:03.40	-4.11
PKSM	328.8	203	ePnC	21:36:29.80	-0.40
			eSn	37:04.60	-3.02
CJR	349.2	135	iPn	21:36:33.00	0.26
UPC	355.6	299	ePn	21:36:35.00	1.46
			eSn	37:22.50	8.93
BZS	382.8	165	iPn	21:36:38.30	1.37
BURB	392.7	112	iPn	21:36:39.10	0.93
GOPC	415.2	285	ePn	21:36:40.70	-0.27
			eSn	37:40.50	13.70
PRU	434.3	286	ePn	21:36:43.10	-0.25
			eSn	37:45.40	14.38
PVCC	450.1	293	ePn	21:36:45.00	-0.32
LOT	468.7	146	iPnD	21:36:48.60	0.97
KHC	493.0	272	ePn	21:36:50.30	-0.37
			eSn	38:02.40	18.34
ARR	515.2	141	iPnD	21:36:53.70	0.27
TESR	546.8	120	iPn	21:36:58.00	0.63

# Hypocenter Parameters

# Földrengés paraméterek



89.

2012-06-01 time: 3:47:40.57 UTC ML= 2.1  
 lat: 48.911N lon: 20.283E h= 0.9 km  
 erh= 4.1km erz= 5.7km  
 nr= 15 gap=147 rms=1.30  
 Locality: Slovakia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
KECS	49.8	163	ePg	3:47:50.10	0.63
			eSg	47:56.30	-0.11
LANS	65.3	294	ePg	3:47:51.80	-0.43
			eSg	47:59.40	-1.93
CRVS	86.4	91	ePg	3:47:55.20	-0.79
			eSg	48:05.90	-2.12
PSZ	114.1	195	ePgD	3:48:02.10	1.16
			eSg	48:15.90	-0.92
VYHS	116.2	246	ePg	3:48:01.10	-0.21
			eSg	48:15.70	-1.79
OKC	186.2	304	ePn	3:48:11.80	1.09
			eSn	48:33.00	-1.21
TRPA	187.9	118	ePnD	3:48:12.30	1.39
			eSn	48:31.90	-2.68
MORC	221.2	296	iPn	3:48:17.60	2.53
BURB	393.6	111	iPn	3:48:37.50	0.94

90.

2012-06-02 time: 20:23:01.42 UTC ML= 0.1  
 lat: 47.314N lon: 18.365E h= 10.0 km  
 erh= 4.3km erz= 3.9km  
 nr= 6 gap=244 rms=0.21  
 Locality: Zámoly  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	8.9	13	ePgD	20:23:03.80	-0.01
			eSg	23:05.40	-0.28
CSKK	9.6	305	ePgC	20:23:04.10	0.20
			eSg	23:05.80	-0.04
PKST	25.7	256	ePgD	20:23:06.50	0.15
			eSg	23:09.70	-0.50

91.

2012-06-07 time: 7:54:48.21 UTC ML= 1.3  
 lat: 47.270N lon: 18.455E h= 0.0 km  
 erh= 4.6km erz= 602km  
 nr= 6 gap=287 rms=0.72  
 Locality: Pátka  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	14.3	340	ePgC	7:54:50.80	0.03
			eSg	54:51.10	-1.67
CSKK	18.0	305	ePgC	7:54:52.10	0.69
			eSg	54:52.90	-1.01
PKST	31.9	268	ePgC	7:54:54.40	0.51
			eSg	54:58.10	-0.23

92.

2012-06-11 time: 8:13:35.18 UTC ML= 1.5  
 lat: 46.942N lon: 18.034E h= 0.0 km  
 erh= 5.9km erz= 583km  
 nr= 6 gap=332 rms=0.36  
 Locality: Siófok  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKST	35.2	360	ePg	8:13:41.00	-0.47
			eSg	13:46.50	0.12
CSKK	49.9	20	ePg	8:13:44.50	0.41
			eSg	13:50.50	-0.53
PKSG	56.8	28	ePg	8:13:45.60	0.27
			eSg	13:53.30	0.05

93.

2012-06-14 time: 8:13:46.78 UTC ML= 1.2  
 lat: 48.075N lon: 20.250E h= 8.0 km  
 erh= 5.4km erz= 2.9km  
 nr= 7 gap=193 rms=0.46  
 Locality: Bekölce  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PSZ	31.7	237	ePg	8:13:52.30	-0.32
			eSg	13:57.40	0.23
KECS	48.7	21	ePg	8:13:55.50	-0.10
			eSg	14:02.60	0.13
VYHS	114.8	294	ePn	8:14:08.20	1.09
			eSn	14:22.30	-0.66
CRVS	128.4	44	ePn	8:14:08.60	-0.21

94.

2012-06-14 time: 9:02:55.07 UTC ML= 1.0  
 lat: 47.433N lon: 18.345E h= 0.0 km  
 erh= 5.1km erz= 609km  
 nr= 6 gap=273 rms=0.36  
 Locality: Oroszlány  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	5.8	143	ePgC	9:02:56.10	0.00
			eSg	02:56.50	-0.40
CSKK	10.1	219	ePgC	9:02:57.40	0.53
			eSg	02:58.60	0.32
PKST	30.5	230	ePgC	9:03:00.30	-0.21
			eSg	03:04.20	-0.55



## Földrengés paraméterek

95.

2012-06-14 time: 20:02:32.76 UTC ML= 1.3  
 lat: 47.816N lon: 18.909E h= 10.0 km  
 erh= 3.1km erz= 2.9km  
 nr= 16 gap=129 rms=0.85  
 Locality: Szob  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
BUD	37.9	167	ePg	20:02:42.80			3.04
PKSG	61.2	220	ePgD	20:02:43.90			0.08
			eSg	02:52.20			-0.25
CSKK	70.1	224	ePg	20:02:45.30			-0.10
			eSg	02:52.00			-3.26
PSZ	74.6	81	ePgD	20:02:45.50			-0.70
			eSg	02:55.60			-1.09
VYHS	75.6	356	ePg	20:02:47.80			1.42
			eSg	02:56.80			-0.20
PKST	90.4	227	ePgD	20:02:48.80			-0.20
			eSg	03:01.30			-0.36
KECS	138.8	58	ePn	20:02:56.30			0.47
			eSn	03:13.40			-0.42
PKS2	149.0	171	eSn	20:03:16.50			0.43
PKSM	179.5	187	ePn	20:03:00.40			-0.49
			eSn	03:23.30			0.47

96.

2012-06-15 time: 7:51:38.00 UTC ML= 1.0  
 lat: 47.452N lon: 18.404E h= 0.0 km  
 erh= 6.5km erz= 757km  
 nr= 6 gap=316 rms=0.44  
 Locality: Várgesztes  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSG	6.8	189	ePgC	7:51:39.50			0.28
			eSg	51:40.10			-0.07
CSKK	14.7	228	ePgC	7:51:40.80			0.17
			eSg	51:41.80			-0.88
PKST	35.3	232	ePgC	7:51:43.90			-0.40
			eSg	51:50.00			0.78

97.

2012-06-15 time: 8:00:08.50 UTC ML= 0.9  
 lat: 47.461N lon: 18.408E h= 0.0 km  
 erh= 7.1km erz= 805km  
 nr= 6 gap=318 rms=0.48  
 Locality: Várgesztes  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSG	7.8	190	ePgC	8:00:10.10			0.21
			eSg	00:10.60			-0.37
CSKK	15.5	226	ePgC	8:00:11.40			0.12
			eSg	00:12.30			-1.14
PKST	36.1	232	ePgC	8:00:14.80			-0.14
			eSg	00:20.90			0.94

98.

2012-06-15 time: 8:00:45.68 UTC ML= 1.0  
 lat: 47.461N lon: 18.444E h= 0.0 km  
 erh= 9.1km erz= 857km  
 nr= 6 gap=334 rms=0.51  
 Locality: Várgesztes  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSG	8.7	208	ePgC	8:00:47.60			0.37
			eSg	00:48.30			-0.14
CSKK	17.6	232	ePgC	8:00:48.90			0.08

## Hypocenter Parameters

eSg 00:49.90 -1.37  
 PKST 38.2 234 ePgC 8:00:52.20 -0.31  
 eSg 00:58.60 0.77

99.

2012-06-18 time: 8:11:54.80 UTC ML= 1.4  
 lat: 48.558N lon: 20.807E h= 0.0 km  
 erh= 4.2km erz= 4.0km  
 nr= 8 gap=172 rms=0.56  
 Locality: Tornanádaska  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
KECS	25.1	251	ePg	8:11:59.20			-0.09
			eSg	12:03.60			0.81
CRVS	61.5	52	ePg	8:12:06.10			0.32
			eSg	12:14.10			-0.25
PSZ	98.2	224	ePg	8:12:12.70			0.36
			eSg	12:25.40			-0.62
VYHS	145.7	267	ePn	8:12:19.10			-0.90
			eSn	12:37.70			-1.97

100.

2012-06-18 time: 21:10:15.18 UTC ML= 0.2  
 lat: 47.353N lon: 18.260E h= 4.7 km  
 erh= 2.6km erz= 1.0km  
 nr= 6 gap=172 rms=0.05  
 Locality: Csókakő  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
CSKK	1.1	2	ePgC	21:10:16.10			0.07
			eSg	10:16.60			-0.10
PKSG	10.8	66	ePgD	21:10:17.30			0.03
			eSg	10:18.90			-0.01
PKST	20.0	239	ePg	21:10:18.80			-0.04
			eSg	10:21.70			-0.01

101.

2012-06-21 time: 20:32:02.92 UTC ML= 1.6  
 lat: 48.792N lon: 19.995E h= 14.9 km  
 erh= 4.1km erz= 3.5km  
 nr= 8 gap=128 rms=0.73  
 Locality: Slovakia  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
KECS	49.9	134	ePg	20:32:12.20			-0.02
			eSg	32:17.60			-1.87
LANS	55.5	316	ePg	20:32:13.80			0.62
			eSg	32:20.60			-0.58
VYHS	91.6	249	eP*	20:32:19.50			0.29
			eS*	32:30.40			-1.52
PSZ	97.5	184	eP*	20:32:20.80			0.70
CRVS	108.3	84	eSn	20:32:35.70			-0.39

102.

2012-06-26 time: 11:48:25.49 UTC ML= 2.2  
 lat: 45.671N lon: 18.164E h= 10.7 km  
 erh= 3.6km erz= 2.6km  
 nr= 5 gap=278 rms=0.29  
 Locality: Croatia  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKSM	70.6	32	ePgD	11:48:38.10			-0.14
			eSg	48:48.00			-0.19
PKS9	102.2	5	eP*D	11:48:44.10			0.32
			eS*	48:58.30			0.25
BEHE	139.4	310	eSn	11:49:06.00			-0.51

## Hypocenter Parameters

## Földrengés paraméterek

103.

2012-06-27 time: 9:45:50.84 UTC ML= 0.2  
 lat: 47.270N lon: 18.240E h= 12.9 km  
 erh= 9.3km erz= 6.4km  
 nr= 6 gap=225 rms=0.14  
 Locality: Kincsesbánya  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
CSKK	10.5	9	ePgC	9:45:53.90			0.09
			eSg	45:56.00			-0.12
PKST	15.6	266	ePg	9:45:54.60			0.15
			eSg	45:57.10			-0.16
PKSG	17.7	40	ePgD	9:45:54.60			-0.16
			eSg	45:58.00			0.19

104.

2012-06-29 time: 8:13:09.89 UTC ML= 0.8  
 lat: 47.362N lon: 18.375E h= 0.0 km  
 erh= 4.4km erz= 505km  
 nr= 6 gap=226 rms=0.30  
 Locality: Gánt  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSG	3.5	20	ePgC	8:13:10.40			-0.11
			eSg	13:10.80			-0.20
CSKK	8.7	271	ePgC	8:13:11.80			0.36
			eSg	13:12.70			0.06
PKST	28.2	246	ePgC	8:13:15.00			0.07
			eSg	13:18.00			-0.86

105.

2012-06-29 time: 8:13:47.27 UTC ML= 1.1  
 lat: 47.409N lon: 18.360E h= 0.0 km  
 erh= 3.7km erz= 337km  
 nr= 6 gap=254 rms=0.20  
 Locality: Gánt  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSG	3.0	130	ePgC	8:13:47.70			-0.12
			eSg	13:48.30			0.06
CSKK	9.1	236	ePgC	8:13:49.10			0.21
			eSg	13:50.20			0.04
PKST	29.7	236	ePgC	8:13:52.60			0.02
			eSg	13:56.00			-0.72

106.

2012-06-29 time: 8:14:12.33 UTC ML= 0.9  
 lat: 47.488N lon: 18.346E h= 0.0 km  
 erh= 4.3km erz= 965km  
 nr= 8 gap=155 rms=0.72  
 Locality: Oroszlány  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSG	11.2	162	ePgC	8:14:14.30			-0.03
			eSg	14:14.80			-1.08
CSKK	15.3	205	ePgC	8:14:15.70			0.64
			eSg	14:16.80			-0.39
PKST	34.7	223	ePgC	8:14:19.40			0.88
			eSg	14:22.40			-0.95
VYHS	117.7	18	ePg	8:14:32.40			-0.95
			eSg	14:50.20			0.45

107.

2012-06-29 time: 8:21:10.55 UTC ML= 1.3  
 lat: 47.383N lon: 18.371E h= 0.0 km  
 erh= 5.4km erz= 312km  
 nr= 6 gap=185 rms=0.18  
 Locality: Gánt  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSG	1.8	56	ePgC	8:21:10.80			-0.08
			eSg	21:11.10			-0.04
CSKK	8.6	255	ePgC	8:21:12.20			0.11
			eSg	21:13.20			-0.08
PKST	28.9	242	ePgC	8:21:15.90			0.19
			eSg	21:19.20			-0.54

108.

2012-06-30 time: 9:57:50.01 UTC ML= 1.5  
 lat: 48.659N lon: 20.240E h= 0.0 km  
 erh= 2.5km erz= 5.0km  
 nr= 10 gap=119 rms=0.59  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
KECS	26.7	137	ePg	9:57:54.90			-0.19
			eSg	57:58.30			-0.76
LANS	78.7	314	ePg	9:58:04.60			0.43
			eSg	58:14.10			-1.12
PSZ	86.3	197	ePg	9:58:05.80			0.29
			eSg	58:18.40			0.79
CRVS	93.8	73	ePg	9:58:07.40			0.56
			eSg	58:19.50			-0.48
VYHS	105.2	260	eP*	9:58:08.70			-0.12
			eS*	58:21.50			-2.00

109.

2012-07-01 time: 1:46:32.13 UTC ML= 1.4  
 lat: 48.968N lon: 20.288E h= 10.0 km  
 erh= 4.7km erz= 4.1km  
 nr= 10 gap=166 rms=0.87  
 Locality: Slovakia  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
KECS	55.8	165	ePg	1:46:42.80			0.54
			eSg	46:49.30			-0.86
LANS	63.3	289	ePg	1:46:43.90			0.33
			eSg	46:51.40			-1.09
CRVS	86.3	95	ePg	1:46:47.70			0.05
			eSg	46:57.80			-1.95
VYHS	119.1	244	ePn	1:46:53.30			0.57
			eSn	47:07.80			-1.00
PSZ	120.3	194	ePn	1:46:54.20			1.32
			eSn	47:08.10			-0.97

110.

2012-07-01 time: 12:52:33.87 UTC ML= 1.8  
 lat: 46.202N lon: 17.497E h= 10.0 km  
 erh= 4.9km erz= 3.2km  
 nr= 15 gap=189 rms=0.84  
 Locality: Rinyabesenyő  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKS9	73.8	55	ePgD	12:52:47.10			-0.07
			eSg	52:58.80			1.25
PKSM	88.3	89	ePgC	12:52:49.60			-0.14
			eSg	53:02.20			0.08
MORH	88.5	89	ePg	12:52:49.50			-0.28

## Földrengés paraméterek

Station	Dist	Azm	Phase	hr	mn	sec	res
			eSg	53:02.50		0.31	
PKST 124.5	19		ePn	12:52:53.90		-1.25	
			eSn	53:08.60		-3.15	
PKS2 136.0	76		eSn	12:53:15.70		1.41	
ARSA 190.7	308		Pn	12:53:04.20		0.80	
			Sn	53:26.80		0.36	
SOKA 196.7	286		Pn	12:53:03.60		-0.54	
			Sn	53:29.40		1.64	
OBKA 229.5	279		Pn	12:53:07.00		-1.24	
			Sn	53:39.00		3.95	

111.

2012-07-08 time: 18:46:34.46 UTC ML= 1.3  
 lat: 47.410N lon: 19.698E h= 10.0 km  
 erh= 6.8km erz= 7.8km  
 nr= 10 gap=197 rms=0.72  
 Locality: Nagykáta  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PENC 52.7	323		ePg	18:46:44.90		0.87	
			eSg	46:52.60		1.10	
PSZ 58.4	15		ePg	18:46:44.50		-0.54	
			eSg	46:52.20		-1.10	
PKSG 98.8	269		ePgC	18:46:52.10		-0.09	
			eSg	47:04.70		-1.31	
MORH 155.2	211		ePn	18:47:00.00		0.43	
			eSn	48:18.50		-0.66	
PKSM 155.7	211		ePn	18:47:00.50		0.87	
			eSn	47:18.60		-0.67	

112.

2012-07-09 time: 8:13:18.38 UTC ML= 1.5  
 lat: 47.428N lon: 18.377E h= 0.0 km  
 erh= 3.0km erz= 362km  
 nr= 6 gap=291 rms=0.21  
 Locality: Gánt  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSG 4.1	165		ePgC	8:13:19.20		0.09	
			eSg	13:19.70		0.02	
CSKK 11.3	231		ePgC	8:13:20.50		0.10	
			eSg	13:21.50		-0.48	
PKST 31.9	234		ePgC	8:13:23.90		-0.18	
			eSg	13:28.90		0.37	

113.

2012-07-09 time: 11:18:55.59 UTC ML= 0.8  
 lat: 47.311N lon: 18.331E h= 10.0 km  
 erh= 7.3km erz= 6.0km  
 nr= 6 gap=229 rms=0.17  
 Locality: Magyaralmás  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
CSKK 7.8	317		ePg	11:18:57.90		0.04	
			eSg	18:59.30		-0.33	
PKSG 10.0	27		ePgD	11:18:58.10		-0.02	
			eSg	19:00.30		0.20	
PKST 23.2	255		ePgD	11:19:00.00		-0.10	
			eSg	19:03.90		0.29	

114.

2012-07-12 time: 11:02:40.88 UTC ML= 0.6  
 lat: 47.209N lon: 18.287E h= 0.0 km  
 erh= 2.5km erz= 263km  
 nr= 6 gap=265 rms=0.15  
 Locality: Iszkaszentgyörgy  
 Comments: probably explosion

## Hypocenter Parameters

sta	dist	azm	phase	hr	mn	sec	res
CSKK 17.2	353		ePg	11:02:43.80		-0.16	
			eSg	02:46.70		0.34	
PKST 19.9	286		ePgC	11:02:44.50		0.06	
			eSg	02:46.40		-0.82	
PKSG 21.8	21		ePgC	11:02:44.80		0.04	
			eSg	02:47.70		-0.09	

115.

2012-07-13 time: 7:59:10.00 UTC ML= 1.3  
 lat: 47.359N lon: 18.416E h= 0.0 km  
 erh= 2.1km erz= 250km  
 nr= 6 gap=276 rms=0.15  
 Locality: Gánt  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSG 4.2	333		ePgC	7:59:10.80		0.06	
			eSg	59:11.30		-0.02	
CSKK 11.8	273		ePgC	7:59:12.20		0.10	
			eSg	59:13.30		-0.43	
PKST 30.9	249		ePgC	7:59:15.40		-0.11	
			eSg	59:20.00		0.18	

116.

2012-07-16 time: 9:36:16.77 UTC ML= 1.3  
 lat: 47.964N lon: 19.435E h= 14.3 km  
 erh= 2.3km erz= 2.0km  
 nr= 7 gap=135 rms=0.33  
 Locality: Terény  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PSZ 34.7	98		ePgD	9:36:23.20		-0.27	
			eSg	36:29.00		0.31	
VYHS 73.9	323		ePg	9:36:30.70		0.49	
			eSg	36:40.00		-0.69	
KECS 97.1	53		eP*	9:36:33.80		-0.15	
			eS*	36:47.90		0.55	
PKST 131.3	233		ePnC	9:36:38.40		0.05	

117.

2012-07-17 time: 11:20:36.85 UTC ML= 1.0  
 lat: 47.135N lon: 18.340E h= 0.4 km  
 erh= 6.2km erz= 415km  
 nr= 6 gap=293 rms=0.07  
 Locality: Úrhida  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
CSKK 26.1	347		ePgC	11:20:41.50		-0.01	
			eSg	20:45.30		0.16	
PKST 27.0	301		ePg	11:20:41.70		0.03	
			eSg	20:45.10		-0.32	
PKSG 28.8	8		ePg	11:20:42.00		0.00	
			eSg	20:45.90		-0.11	

118.

2012-07-17 time: 15:12:38.25 UTC ML= 0.7  
 lat: 48.068N lon: 20.249E h= 10.0 km  
 erh= 4.3km erz= 2.1km  
 nr= 8 gap=194 rms=0.50  
 Locality: Egercsehi  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PSZ 31.3	238		ePgC	15:12:43.70		-0.41	
			eSg	12:49.20		0.52	
KECS 49.4	21		ePg	15:12:46.90		-0.35	

## Hypocenter Parameters

## Földrengés paraméterek

eSg 12:54.80 0.52  
 VYHS 115.1 294 ePn 15:12:59.30 0.95  
 eSn 13:14.00 -0.04  
 CRVS 129.0 44 ePn 15:12:59.60 -0.49  
 eSn 13:17.30 0.18

119.

2012-07-19 time: 9:22:27.24 UTC ML= 2.0  
 lat: 48.881N lon: 20.497E h= 7.4 km  
 erh= 3.0km erz= 3.1km  
 nr= 10 gap=156 rms=0.66  
 Locality: Slovakia  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
KECS	44.2	181	ePg	9:22:35.50			0.24
			eSg	22:41.00			-0.50
CRVS	70.8	88	ePg	9:22:40.20			0.25
			eSg	22:48.30			-1.56
LANS	81.0	292	ePg	9:22:41.80			0.02
			eSg	22:52.90			-0.21
PSZ	116.0	203	ePn	9:22:48.80			1.01
			eSn	23:04.20			0.39
VYHS	129.6	251	ePn	9:22:49.30			-0.19
			eSn	23:05.00			-1.85

120.

2012-07-20 time: 7:05:45.95 UTC ML= 1.3  
 lat: 47.366N lon: 18.375E h= 0.0 km  
 erh= 3.8km erz= 370km  
 nr= 6 gap=223 rms=0.23  
 Locality: Gánt  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSG	3.1	22	ePgC	7:05:46.50			0.00
			eSg	05:46.90			-0.03
CSKK	8.7	268	ePgD	7:05:47.80			0.30
			eSg	05:48.60			-0.11
PKST	28.4	245	ePgC	7:05:50.80			-0.23
			eSg	05:53.30			-1.69

121.

2012-07-20 time: 7:06:01.15 UTC ML= 1.2  
 lat: 47.433N lon: 18.359E h= 0.0 km  
 erh= 3.9km erz= 383km  
 nr= 6 gap=281 rms=0.23  
 Locality: Oroszlány  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSG	5.2	152	ePgC	7:06:02.00			-0.08
			eSg	06:02.70			-0.11
CSKK	10.8	224	ePgD	7:06:03.40			0.33
			eSg	06:04.40			-0.17
PKST	31.3	232	ePgC	7:06:06.60			-0.13
			eSg	06:09.80			-1.28

122.

2012-07-22 time: 11:16:45.98 UTC ML= 2.1  
 lat: 45.652N lon: 16.734E h= 14.8 km  
 erh= 8.6km erz= 8.6km  
 nr= 12 gap=232 rms=1.13  
 Locality: Croatia  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
BEHE	91.0	2	eP*C	11:17:03.10			0.92
			eS*	17:13.30			-1.52
PKS9	158.3	49	ePn	11:17:13.70			2.84

PKSM	160.5	67	ePnD	11:17:10.00			-1.13
			eSn	17:31.80			1.05
SOKA	174.0	311	Pn	11:17:11.70			-1.12
			Sn	17:32.80			-0.95
OBKA	194.0	299	Sn	11:17:39.50			1.30
ARSA	200.6	332	Pn	11:17:16.70			0.57
			Sn	17:40.10			0.45
CONA	261.7	345	Pn	11:17:23.30			-0.45
			Sn	17:49.20			-4.02
MOA	308.6	322	Pn	11:17:29.20			-0.40
			Sn	18:01.60			-2.03
KHC	454.3	328	ePn	11:17:47.90			0.13
			eSn	18:32.30			-3.66

123.

2012-08-06 time: 8:13:04.87 UTC ML= 1.6  
 lat: 48.555N lon: 20.821E h= 0.0 km  
 erh= 3.6km erz= 3.4km  
 nr= 8 gap=173 rms=0.57  
 Locality: Hidvégdó  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
KECS	26.0	252	ePg	8:13:09.10			-0.42
			eSg	13:13.00			-0.14
CRVS	60.9	51	ePg	8:13:16.20			0.46
			eSg	13:23.90			-0.32
PSZ	98.8	224	ePg	8:13:23.20			0.70
			eSg	13:36.60			0.34
VYHS	146.8	267	ePn	8:13:29.60			-0.60
			eSn	13:47.40			-2.56

124.

2012-08-09 time: 4:35:06.86 UTC ML= 1.7  
 lat: 47.373N lon: 19.553E h= 13.7 km  
 erh= 3.1km erz= 3.3km  
 nr= 14 gap=185 rms=0.48  
 Locality: Gomba  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PSZ	65.8	23	ePg	4:35:19.00			0.13
			eSg	35:27.50			-0.73
PKSG	87.8	271	eP*D	4:35:23.20			0.52
			eS*	35:34.20			-0.82
PKST	115.5	264	ePnD	4:35:26.60			0.05
			eSn	35:41.70			-0.21
PKS9	130.5	228	ePn	4:35:28.00			-0.43
			eSn	35:45.80			0.55
VYHS	135.6	337	ePn	4:35:31.60			2.54
			eSn	35:46.10			-0.28
MORH	146.2	208	ePn	4:35:32.70			2.32
			eSn	35:49.10			0.38
PKSM	146.7	208	ePn	4:35:29.90			-0.54
			eSn	35:49.10			0.27

125.

2012-08-10 time: 7:22:01.47 UTC ML= 1.1  
 lat: 47.406N lon: 18.364E h= 0.0 km  
 erh= 1.9km erz= 143km  
 gap=249 rms=0.07  
 nr= 5  
 Locality: Gánt  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSG	2.5	127	ePgC	7:22:01.90			-0.02
			eSg	22:02.30			0.03
CSKK	9.1	239	ePg	7:22:03.20			0.10
			eSg	22:04.40			0.03
PKST	29.8	237	ePgC	7:22:06.70			-0.09
			eSg	22:08.50			-2.43

## Földrengés paraméterek

## Hypocenter Parameters

126.

2012-08-10 time: 7:22:15.74 UTC ML= 1.3  
 lat: 47.450N lon: 18.370E h= 0.0 km  
 erh= 4.3km erz= 529km  
 nr= 6 gap=296 rms=0.32  
 Locality: Oroszlány  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSG	6.7	166	ePgC	7:22:17.10			0.16
			eSg		22:17.80		-0.07
CSKK	12.7	220	ePg	7:22:18.40			0.39
			eSg		22:19.50		-0.29
PKST	33.1	230	ePgC	7:22:21.30			-0.35
			eSg		22:27.60		1.34

127.

2012-08-12 time: 5:40:30.47 UTC ML= 1.1  
 lat: 47.811N lon: 16.225E h= 2.0 km  
 erh= 2.9km erz= 3.4km  
 nr= 23 gap= 96 rms=1.29  
 Locality: Austria  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
SOP	28.8	120	ePgC	5:40:36.30			0.68
			eSg		40:39.80		0.16
CONA	30.1	296	Pg	5:40:36.50			0.65
			Sg		40:40.50		0.46
ARSA	81.7	220	Pg	5:40:44.70			-0.36
			Sg		40:54.70		-1.75
MODS	100.3	51	ePg	5:40:48.00			-0.38
			eSg		41:00.70		-1.66
SMOL	118.9	49	ePg	5:40:51.50			-0.20
			eSg		41:07.10		-1.16
MOA	146.7	272	Pn	5:40:55.20			-0.33
			Sn		41:13.00		-2.08
SOKA	155.0	216	Pn	5:40:56.60			0.04
			Sn		41:15.10		-1.82
OBKA	192.6	221	Pn	5:41:04.70			3.44
			Sn		41:27.70		2.43
VYHS	208.6	69	e n	5:41:01.50			-1.75
			eSn		41:31.20		2.37
KHC	244.6	307	ePn	5:41:10.10			2.36
			eSn		41:39.10		2.29
GOPC	256.5	336	eSn	5:41:42.10			2.64
PRU	271.7	333	eSn	5:41:46.00			3.17
DPC	282.4	1	eSn	5:41:49.60			4.39
RETA	412.0	265	Pn	5:41:31.00			2.39

128.

2012-08-14 time: 7:30:17.65 UTC ML= 1.4  
 lat: 47.439N lon: 18.385E h= 0.0 km  
 erh= 4.9km erz= 591km  
 nr= 6 gap=303 rms=0.34  
 Locality: Várgesztes  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSG	5.3	176	ePgC	7:30:18.80			0.21
			eSg		30:19.10		-0.23
CSKK	12.7	228	ePgC	7:30:20.00			0.09
			eSg		30:21.30		-0.37
PKST	33.2	233	ePgC	7:30:23.30			-0.28
			eSg		30:29.20		0.99

129.

2012-08-14 time: 7:30:30.16 UTC ML= 1.4  
 lat: 47.436N lon: 18.402E h= 0.0 km  
 erh= 1.5km erz= 169km  
 nr= 5 gap=315 rms=0.08  
 Locality: Várgesztes  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSG	4.9	190	ePgC	7:30:31.10			0.05
			eSg		30:31.70		-0.03
CSKK	13.4	233	ePgC	7:30:32.50			-0.05
			eSg		30:34.30		-0.11
PKST	34.0	235	eSg	7:30:41.10			0.13

130.

2012-08-14 time: 18:08:10.72 UTC ML= 0.7  
 lat: 47.385N lon: 18.530E h= 0.1 km  
 erh= 6.0km erz= 614km  
 nr= 6 gap=336 rms=0.16  
 Locality: Csákvár  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKSG	10.6	274	ePgD	18:08:12.60			-0.01
			eSg		08:13.80		-0.28
CSKK	20.5	263	ePg	18:08:14.60			0.21
			eSg		08:17.40		0.16
PKST	40.0	249	ePg	18:08:17.70			-0.17
			eSg		08:23.50		0.05

131.

2012-08-17 time: 8:54:09.62 UTC ML= 1.6  
 lat: 46.995N lon: 22.337E h= 9.4 km  
 erh= 3.4km erz= 3.5km  
 nr= 6 gap=167 rms=0.25  
 Locality: Romania  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
DRGR	36.4	128	iPg	8:54:16.30			-0.03
CJR	101.2	108	iPg	8:54:27.60			-0.16
BMR	115.6	49	iPn	8:54:30.30			0.43
TRPA	127.1	7	iPn	8:54:31.00			-0.30
BZS	163.0	200	iPn	8:54:35.80			0.03
MDVR	250.8	191	iPnD	8:54:46.90			0.18
DOPR	260.7	116	iPnD	8:54:49.50			1.54

132.

2012-08-20 time: 10:20:15.13 UTC ML= 1.2  
 lat: 48.607N lon: 20.763E h= 0.0 km  
 erh= 6.1km erz= 4.9km  
 nr= 8 gap=163 rms=0.34  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
KECS	24.6	236	ePg	10:20:19.20			-0.33
			eSg		20:23.50		0.54
CRVS	61.0	57	ePg	10:20:26.30			0.29
			eSg		20:34.20		-0.31
PSZ	100.1	220	ePg	10:20:33.30			0.30
			eSg		20:46.90		-0.04
VYHS	142.8	265	ePn	10:20:39.60			-0.36
			eSn		20:57.50		-1.83

## Hypocenter Parameters

## Földrengés paraméterek

133.

2012-08-22 time: 7:51:23.26 UTC ML= 1.4  
 lat: 48.615N lon: 20.758E h= 0.0 km  
 erh= 7.9km erz= 6.3km  
 nr= 7 gap=161 rms=0.34  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
KECS	24.9	234	eSg	7:51:31.00	-0.17
CRVS	60.8	58	ePg	7:51:34.40	0.29
			eSg	51:42.20	-0.38
PSZ	100.5	220	ePg	7:51:41.60	0.39
			eSg	51:55.00	-0.22
VYHS	142.5	265	ePn	7:51:48.00	-0.06
			eSn	52:05.90	-1.51

134.

2012-08-29 time: 10:29:30.09 UTC ML= 1.6  
 lat: 48.627N lon: 20.720E h= 0.0 km  
 erh= 2.1km erz= 4.5km  
 nr= 10 gap=157 rms=0.52  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
KECS	23.6	227	ePg	10:29:34.30	-0.01
			eSg	29:38.00	0.40
CRVS	62.5	61	ePg	10:29:41.50	0.25
			eSg	29:49.40	-0.55
PSZ	99.9	218	ePgC	10:29:48.20	0.27
			eSg	30:01.00	-0.84
LANS	108.7	302	ePg	10:29:50.10	0.59
			eSg	30:04.10	-0.55
VYHS	139.9	264	ePn	10:29:54.80	0.23
			eSn	30:11.80	-1.86

135.

2012-09-09 time: 1:42:23.33 UTC ML= 0.3  
 lat: 47.331N lon: 18.141E h= 5.5 km  
 erh= 2.8km erz= 1.1km  
 nr= 6 gap=203 rms=0.06  
 Locality: Bakonycsernye  
 Comments:

sta	dist	azm	phase	hr mn sec	res
CSKK	9.7	69	ePgD	1:42:25.30	-0.02
			eSg	42:26.90	0.03
PKST	11.4	225	ePgD	1:42:25.60	0.02
			eSg	42:27.30	-0.04
PKSG	20.0	70	ePgD	1:42:27.10	0.07
			eSg	42:29.80	-0.13

136.

2012-09-17 time: 0:40:58.83 UTC ML= 2.1  
 lat: 45.600N lon: 18.603E h= 10.0 km  
 erh= 7.4km erz= 3.1km  
 nr= 10 gap=283 rms=0.50  
 Locality: Croatia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSM	68.0	2	eSg	0:41:20.50	-0.18
MORH	68.5	3	ePgD	0:41:11.50	0.32
			eSg	41:20.70	-0.12
PKS9	112.5	347	ePnD	0:41:18.90	0.29
			eSn	41:34.10	0.06
BEHE	171.4	304	ePn	0:41:24.20	-1.75
			eSn	41:47.90	0.79
PKST	189.5	347	ePnC	0:41:27.90	-0.31

eSn 41:54.00 2.88  
 PSZ 275.9 21 ePn 0:41:39.10 0.12

137.

2012-09-19 time: 17:33:50.25 UTC ML= 1.8  
 lat: 47.039N lon: 18.858E h= 10.0 km  
 erh= 5.7km erz= 4.2km  
 nr= 10 gap=253 rms=0.72  
 Locality: Perkáta  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	52.8	318	ePg	17:34:00.60	0.74
			eSg	34:08.20	0.85
PKST	67.1	291	ePg	17:34:01.70	-0.67
			eSg	34:11.40	-0.41
PENC	89.4	21	ePg	17:34:05.40	-0.92
			eSg	34:18.50	-0.36
PSZ	125.1	39	ePn	17:34:12.70	1.09
			eSn	34:28.80	0.53
KECS	201.7	37	ePn	17:34:20.90	-0.25
			eSn	34:44.30	-0.96

138.

2012-09-23 time: 12:06:14.26 UTC ML= 0.8  
 lat: 47.059N lon: 18.111E h= 7.0 km  
 erh= 1.5km erz= 6.3km  
 nr= 7 gap=189 rms=0.15  
 Locality: Balatonkenese  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKST	23.0	345	ePgC	12:06:18.40	-0.16
			eSg	06:22.10	0.19
CSKK	35.7	19	ePgC	12:06:20.80	0.04
			eSg	06:25.80	-0.03
PKSG	42.7	30	ePg	12:06:21.80	-0.19
			eSg	06:28.30	0.29
MORH	102.2	156	ePg	12:06:32.70	0.14
			eSg	06:45.50	-1.33

139.

2012-09-24 time: 20:02:14.78 UTC ML= 0.6  
 lat: 47.247N lon: 18.539E h= 0.0 km  
 erh= 6.3km erz= 776km  
 nr= 6 gap=307 rms=1.12  
 Locality: Pákozd  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	19.6	325	ePgD	20:02:17.90	-0.38
			eSg	02:18.80	-2.20
CSKK	24.7	301	ePgD	20:02:19.70	0.51
			eSg	02:21.90	-0.72
PKST	38.2	272	ePg	20:02:23.50	1.90
			eSg	02:26.60	-0.32

140.

2012-09-25 time: 7:06:42.52 UTC ML= 1.5  
 lat: 48.381N lon: 19.894E h= 0.0 km  
 erh= 0.8km erz= 223km  
 nr= 7 gap=104 rms=0.15  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
KECS	45.2	76	ePg	7:06:50.50	-0.10
			eSg	06:57.00	0.10
PSZ	51.5	180	ePgD	7:06:51.90	0.18
			eSg	06:58.70	-0.19

**Földrengés paraméterek**

VYHS 79.3 279 ePg 7:06:56.70 0.02  
 eSg 07:05.90 -1.82  
 LANS 91.1 340 eSg 7:07:11.40 -0.08

141.

2012-09-27 time: 17:05:21.52 UTC ML= 2.1  
 lat: 47.477N lon: 18.650E h= 10.0 km  
 erh= 2.2km erz= 1.8km  
 nr= 21 gap= 70 rms=0.78  
 Locality: Bicske  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	21.7	244	ePgD	17:05:26.00	0.21
BUD	28.2	88	ePg	17:05:27.40	0.53
			eSg	05:31.10	0.07
PKST	52.4	243	ePgD	17:05:31.00	-0.05
PENC	58.9	54	ePg	17:05:31.20	-1.00
PKS9	102.8	196	ePg	17:05:40.00	0.03
			eSg	05:52.80	-1.56
PSZ	105.5	62	eP*	17:05:40.10	-0.29
			eS*	05:54.60	-0.51
PKSN	112.5	125	eSn	17:05:58.60	1.86
VYHS	114.0	7	ePn	17:05:42.00	0.51
			eSn	05:55.80	-1.27
PKS2	117.5	159	eSn	17:05:58.20	0.34
PKSM	140.6	180	ePn	17:05:44.40	-0.41
			eSn	06:00.10	-2.87
MODS	143.1	314	ePn	17:05:44.90	-0.22
			eSn	06:02.90	-0.63
KECS	177.0	51	e n	17:05:49.60	0.26
			eSn	06:14.50	3.46
LANS	195.8	18	ePn	17:05:55.30	3.61
VRAC	254.3	323	iPn	17:06:00.10	1.11
BZS	307.4	132	iPn	17:06:06.20	0.59
DRGR	317.4	104	iPnD	17:06:07.60	0.75
DPC	362.3	332	ePn	17:06:14.10	1.65
KHC	418.8	296	ePn	17:06:21.30	1.80

142.

2012-10-02 time: 1:35:43.27 UTC ML= 1.3  
 lat: 47.403N lon: 18.226E h= 10.0 km  
 erh= 9.5km erz= 3.2km  
 nr= 8 gap=220 rms=0.79  
 Locality: Pusztavám  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	12.5	96	ePg	1:35:45.80	-0.33
			eSg	35:47.90	-0.47
PKST	21.6	222	ePg	1:35:47.40	-0.12
			eSg	35:51.10	0.26
BUD	60.9	82	eSg	1:36:03.80	0.92
PKS7	81.1	119	eSg	1:36:00.00	-9.26
PKSM	136.2	167	ePnC	1:36:06.80	0.79
			eSn	36:22.90	-0.85

143.

2012-10-05 time: 7:21:24.20 UTC ML= 1.3  
 lat: 47.260N lon: 18.849E h= 0.1 km  
 erh= 5.9km erz= 721km  
 nr= 6 gap=242 rms=0.35  
 Locality: Ráckeresztúr  
 Comments:

sta	dist	azm	phase	hr mn sec	res
BUD	28.1	28	ePgD	7:21:29.40	0.17
			eSg	21:33.00	-0.15
PKSG	37.6	293	ePgC	7:21:30.60	-0.32
			eSg	21:35.40	-0.76
PKST	61.7	270	ePgC	7:21:35.40	0.19

**Hypocenter Parameters**

eSg 21:44.60 0.80

144.

2012-10-16 time: 12:10:58.53 UTC ML= 1.9  
 lat: 48.357N lon: 19.877E h= 0.0 km  
 erh= 2.2km erz= 658km  
 nr= 8 gap=106 rms=0.48  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
KECS	47.2	73	ePg	12:11:06.40	-0.56
			eSg	11:12.90	-0.64
PSZ	48.8	178	ePgC	12:11:07.40	0.15
			eSg	11:14.30	0.25
VYHS	78.5	281	ePg	12:11:12.60	0.05
			eSg	11:22.20	-1.28
LANS	93.2	341	ePg	12:11:16.00	0.82
KOLL	111.8	283	ePg	12:11:18.50	0.01

145.

2012-10-29 time: 8:34:53.63 UTC ML= 1.9  
 lat: 47.760N lon: 20.100E h= 10.0 km  
 erh= 6.6km erz= 4.1km  
 nr= 11 gap=145 rms=1.38  
 Locality: Detk  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PSZ	23.3	319	ePgC	8:34:58.00	-0.17
			eSg	35:00.00	-1.70
KECS	85.4	20	ePg	8:35:11.90	2.92
			eSg	35:20.60	-0.35
VYHS	124.5	311	ePn	8:35:16.10	1.19
			eSn	35:30.00	-1.51
PKSG	134.9	252	eSn	8:35:35.00	1.17
LTVH	141.8	107	eSn	8:35:35.60	0.25
LANS	161.5	343	eSn	8:35:39.70	-0.02
NIE	185.1	5	eSn	8:35:45.70	0.74
TRPA	186.8	77	eSn	8:35:41.90	-3.45

146.

2012-11-13 time: 9:44:02.41 UTC ML= 1.7  
 lat: 48.599N lon: 20.645E h= 0.0 km  
 erh= 5.4km erz= 3.7km  
 nr= 8 gap=271 rms=0.45  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
KECS	17.5	222	ePg	9:44:04.90	-0.63
			eSg	44:08.70	0.73
PSZ	94.0	216	ePg	9:44:19.50	0.30
			eSg	44:32.40	0.10
LANS	105.9	305	ePg	9:44:21.50	0.17
			eSg	44:35.70	-0.38
VYHS	134.1	265	ePn	9:44:26.40	0.23
			eSn	44:43.50	-1.19

147.

2012-11-13 time: 10:22:45.12 UTC ML= 1.2  
 lat: 45.860N lon: 18.418E h= 0.0 km  
 erh= 1.0km erz= 103km  
 nr= 6 gap=260 rms=0.06  
 Locality: Nagyharsány  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSV	13.2	284	ePg	10:22:47.40	-0.09
			eSg	22:49.40	0.07

## Hypocenter Parameters

PKSM 42.8 24 ePgD 10:22:52.80 0.04  
 eSg 22:58.70 -0.02  
 MORH 43.3 24 ePgD 10:22:52.90 0.05  
 eSg 22:58.80 -0.08

148.

2012-11-14 time: 10:12:28.01 UTC ML= 1.0  
 lat: 45.979N lon: 18.635E h= 9.2 km  
 erh= 8.9km erz=15.7km  
 nr= 5 gap=250 rms=0.02  
 Locality: Mohács  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSM	25.9	1	ePgD	10:12:32.90	-0.01
			eSg	12:36.70	-0.04
MORH	26.3	2	ePgD	10:12:33.00	0.01
			eSg	12:36.90	0.03
PKSV	31.3	251	eSg	10:12:38.40	0.01

149.

2012-11-15 time: 3:17:33.03 UTC ML= 2.4  
 lat: 47.756N lon: 16.269E h= 6.8 km  
 erh= 2.7km erz= 2.5km  
 nr= 40 gap= 53 rms=1.47  
 Locality: Austria  
 Comments:

sta	dist	azm	phase	hr mn sec	res
SOP	23.1	110	ePgC	3:17:38.70	1.36
			eSg	17:42.30	1.60
CONA	36.0	302	Pg	3:17:39.80	0.23
			Sg	17:44.90	0.23
ZST	79.2	52	ePg	3:17:46.60	-0.62
			eSg	17:56.50	-1.79
ARSA	79.5	225	Pg	3:17:46.50	-0.77
			Sg	17:55.50	-2.88
MODS	101.8	48	ePg	3:17:50.40	-0.85
			eSg	18:03.80	-1.66
SMOL	120.6	46	ePn	3:17:55.10	0.87
			eSn	18:09.90	-0.87
PKST	144.0	113	ePn	3:17:57.10	-0.04
			eSn	18:14.60	-1.35
BEHE	148.0	165	ePn	3:17:57.80	0.15
			eSn	18:16.20	-0.65
MOA	150.4	274	Pn	3:17:57.90	-0.05
			Sn	18:16.20	-1.19
SOKA	152.1	218	Pn	3:17:58.40	0.24
			Sn	18:14.70	-3.05
TIH	155.3	128	ePn	3:17:58.60	0.04
PKSG	164.7	104	ePnD	3:17:59.60	-0.12
			eSn	18:19.30	-1.24
TREC	180.6	341	ePn	3:18:02.70	0.99
			eSn	18:23.50	-0.59
OBKA	190.4	223	Pn	3:18:04.90	1.97
			Sn	18:26.10	-0.15
PKS9	200.2	130	ePn	3:18:06.80	2.64
			eSn	18:31.80	3.36
VYHS	208.0	67	ePn	3:18:09.50	4.38
KBA	233.2	251	Pn	3:18:11.70	3.43
			Sn	18:40.20	4.44
MYKA	235.2	238	Pn	3:18:12.70	4.18
MORH	248.9	133	ePnD	3:18:09.80	-0.43
			eSn	18:35.40	-3.84
PKSM	249.1	134	ePnD	3:18:09.80	-0.45
KHC	251.1	308	ePn	3:18:10.20	-0.29
			eSn	18:38.20	-1.52
PKSV	256.9	144	ePn	3:18:11.80	0.58
KRLC	260.7	8	ePn	3:18:12.50	0.81
ABTA	305.7	248	Pn	3:18:24.50	7.19
			Sn	19:00.40	8.55
WATA	356.4	262	Pn	3:18:23.50	-0.13
SQTA	386.0	261	Pn	3:18:28.80	1.48

## Földrengés paraméterek

Sn 19:26.10 16.43  
 MOTA 391.5 263 Pn 3:18:28.90 0.89

150.

2012-11-16 time: 5:00:13.02 UTC ML= 1.3  
 lat: 46.626N lon: 17.721E h= 0.2 km  
 erh= 7.4km erz= 685km  
 nr= 6 gap=225 rms=0.41  
 Locality: Gamás  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKST	74.3	19	ePgD	5:00:26.10	-0.19
MORH	84.3	123	ePg	5:00:28.30	0.22
			eSg	00:38.90	-0.92
PKSM	84.4	123	ePgD	5:00:28.50	0.41
			eSg	00:40.20	0.36
PKSV	91.6	153	eSg	5:00:41.50	-0.64

151.

2012-11-20 time: 10:01:12.68 UTC ML= 1.2  
 lat: 45.970N lon: 18.203E h= 0.0 km  
 erh= 1.7km erz= 155km  
 nr= 5 gap=254 rms=0.07  
 Locality: Szilvás  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSV	9.8	157	eSg	10:01:15.80	-0.01
PKSM	43.3	52	ePgC	10:01:20.40	-0.01
			eSg	01:26.30	-0.13
MORH	43.7	51	ePgC	10:01:20.50	0.01
			eSg	01:26.70	0.13

152.

2012-11-27 time: 7:46:18.38 UTC ML= 1.4  
 lat: 45.854N lon: 18.426E h= 0.0 km  
 erh= 3.4km erz= 350km  
 nr= 6 gap=263 rms=0.24  
 Locality: Nagyharsány  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSV	14.0	286	ePgC	7:46:21.20	0.32
			eSg	46:22.40	-0.44
PKSM	43.2	23	ePgC	7:46:25.90	-0.19
			eSg	46:32.00	-0.10
MORH	43.7	23	ePgC	7:46:26.40	0.23
			eSg	46:32.20	-0.06

153.

2012-12-02 time: 9:01:47.19 UTC ML= 1.6  
 lat: 47.074N lon: 18.144E h= 10.0 km  
 erh= 2.5km erz= 3.4km  
 nr= 11 gap=130 rms=0.50  
 Locality: Küngös  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKST	22.2	338	ePgC	9:01:51.40	-0.14
			eSg	01:54.40	-0.53
TIH	27.2	225	ePg	9:01:52.00	-0.37
			eSg	01:56.90	0.49
PKSG	39.9	28	ePgD	9:01:54.80	0.26
PKS9	55.1	169	ePgC	9:01:59.90	2.71
			eSg	02:05.70	0.70
MORH	102.8	158	ePg	9:02:06.30	0.67
			eSg	02:19.50	-0.52
PKSM	103.1	158	eP*	9:02:05.70	0.01
			eS*	02:18.40	-1.72



## Földrengés paraméterek

## Hypocenter Parameters

154.

2012-12-04 time: 9:11:42.62 UTC ML= 1.2  
 lat: 45.984N lon: 18.250E h= 0.0 km  
 erh= 5.8km erz= 383km  
 nr= 6 gap=231 rms=0.28  
 Locality: Pogány  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSV	10.6	179	ePg	9:11:44.50			-0.01
			eSg	11:45.40			-0.58
PKSM	39.5	50	ePgC	9:11:49.80			0.13
			eSg	11:55.40			0.24
MORH	39.9	50	ePgC	9:11:49.90			0.15
			eSg	11:54.80			-0.51

155.

2012-12-04 time: 9:15:19.07 UTC ML= 1.3  
 lat: 45.873N lon: 18.441E h= 0.0 km  
 erh= 3.9km erz= 248km  
 nr= 5 gap=254 rms=0.11  
 Locality: Villány  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSV	14.7	277	ePg	9:15:21.70			0.00
			eSg	15:22.00			-1.75
PKSM	40.8	22	ePgC	9:15:26.20			-0.15
			eSg	15:32.00			-0.03
MORH	41.3	22	ePgC	9:15:26.60			0.16
			eSg	15:32.20			0.01

156.

2012-12-05 time: 15:33:44.49 UTC ML= 1.6  
 lat: 47.364N lon: 18.292E h= 10.0 km  
 erh= 6.0km erz= 3.4km  
 nr= 10 gap=189 rms=0.79  
 Locality: Csókakő  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKSG	8.0	68	ePgC	15:33:46.70			-0.08
			eSg	33:48.10			-0.46
PKST	22.8	239	ePgD	15:33:48.90			-0.03
			eSg	33:51.90			-0.49
PKS9	86.4	181	ePgD	15:34:01.60			1.58
			eSg	34:13.30			1.16
MORH	130.5	168	ePn	15:34:07.30			0.79
			eSn	34:22.50			-1.19
PKSM	130.9	168	ePn	15:34:07.30			0.74
			eSn	34:22.40			-1.38

157.

2012-12-16 time: 20:08:56.29 UTC ML= 1.4  
 lat: 47.289N lon: 18.028E h= 0.4 km  
 erh= 3.6km erz=13.8km  
 nr= 6 gap=234 rms=0.26  
 Locality: Jásd  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKST	3.4	172	ePgC	20:08:56.60			-0.29
			eSg	08:57.30			-0.06
PKSG	29.7	67	ePgD	20:09:01.70			0.11
			eSg	09:05.90			0.17
TIH	44.4	193	ePg	20:09:04.10			-0.12
			eSg	09:11.10			0.69

158.

2012-12-17 time: 11:55:41.64 UTC ML= 1.8  
 lat: 45.621N lon: 17.384E h= 10.0 km  
 erh= 4.1km erz= 2.1km  
 nr= 8 gap=267 rms=0.33  
 Locality: Croatia  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKSV	73.8	66	ePgD	11:55:55.70			0.76
			eSg	56:04.60			-0.71
BEHE	105.5	333	eP*D	11:56:00.30			-0.20
			eS*	56:15.40			0.20
PKSM	117.6	56	ePnD	11:56:02.00			-0.06
			eSn	56:18.10			0.12
MORH	118.0	56	ePnD	11:56:02.00			-0.11
			eSn	56:18.40			0.32

159.

2012-12-18 time: 23:32:13.52 UTC ML= 2.1  
 lat: 45.528N lon: 18.321E h= 0.5 km  
 erh= 4.5km erz= 2.8km  
 nr= 12 gap=330 rms=0.44  
 Locality: Croatia  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKSV	40.4	352	ePgD	23:32:21.20			0.46
			eSg	32:25.90			-0.48
PKSM	80.0	18	ePgD	23:32:27.50			-0.31
			eSg	32:39.40			0.45
MORH	80.5	18	ePgD	23:32:27.60			-0.29
			eSg	32:39.30			0.20
PKS9	117.8	358	ePgD	23:32:35.40			0.85
			eSg	32:50.50			-0.46
TIH	156.0	348	ePn	23:32:39.50			-0.45
			eSn	33:00.40			-0.16
PKSG	207.3	1	ePn	23:32:46.90			0.57
			eSn	33:14.10			2.17

160.

2012-12-19 time: 10:56:47.36 UTC ML= 1.9  
 lat: 48.598N lon: 20.626E h= 0.0 km  
 erh= 1.7km erz= 1.8km  
 nr= 7 gap=164 rms=0.23  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PSZ	93.1	216	ePg	10:57:04.00			0.00
			eSg	57:16.80			-0.17
LANS	104.9	306	ePg	10:57:06.20			0.10
			eSg	57:20.50			-0.21
VYHS	132.7	265	ePn	10:57:11.00			0.50
			eSn	57:28.30			-0.25
TRPA	151.0	110	ePn	10:57:12.60			-0.18
			eSn	57:28.00			-4.61

161.

2012-12-25 time: 17:01:35.69 UTC ML= 2.5  
 lat: 46.479N lon: 16.641E h= 14.1 km  
 erh= 1.7km erz= 1.2km  
 nr= 46 gap=114 rms=0.71  
 Locality: Kiscsehi  
 Comments: felt 4 EMS

sta	dist	azm	phase	hr	mn	sec	res
BEHE	10.4	95	ePgC	17:01:38.10			-0.72
KOGS	30.2	264	iPgC	17:01:41.90			0.26
			iSg	01:47.00			0.72

### Hypocenter Parameters

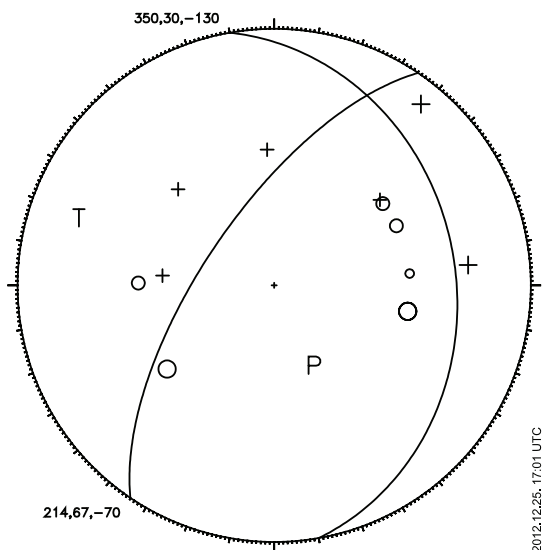
PTJ	83.2	219	iPgC	17:01:50.40	-0.36
ZAG	87.8	215	iP*	17:01:51.80	0.32
GOLS	94.1	236	iP*	17:01:52.40	-0.03
			eS*	02:04.60	-0.89
DOBS	97.4	248	iP*	17:01:52.70	-0.24
			eS*	02:05.40	-0.99
GCIS	103.6	229	iPn	17:01:53.90	0.05
			eSn	02:08.80	0.78
TIH	106.6	64	ePnD	17:01:53.60	-0.62
			eSn	02:08.00	-0.68
CESS	106.8	238	iPn	17:01:54.70	0.45
			iSn	02:08.10	-0.62
CRES	116.7	232	iPnD	17:01:55.70	0.22
			eSn	02:11.00	0.08
LEGS	117.9	240	iPn	17:01:55.80	0.17
			eSn	02:10.50	-0.67
PERS	118.2	279	iPn	17:01:55.40	-0.27
			eSn	02:10.90	-0.34
ARSA	121.0	315	PnC	17:01:55.70	-0.31
			Sn	02:10.50	-1.36
SOKA	125.3	280	Pn	17:01:56.40	-0.15
			Sn	02:13.00	0.19
PKS9	126.2	85	ePnD	17:01:59.40	2.73
			eSn	02:13.70	0.67
SOP	134.1	357	ePnC	17:01:57.30	-0.35
			eSn	02:13.70	-1.07
PKST	137.2	51	ePnC	17:01:57.60	-0.43
			eSn	02:17.10	1.65
BOJS	152.7	225	iPn	17:02:00.30	0.34
VNDS	155.2	254	iPn	17:02:00.50	0.22
PKSM	156.8	101	ePnD	17:01:59.30	-1.18
			eSn	02:21.90	2.08
MORH	157.0	101	ePnD	17:01:59.40	-1.10
			eSn	02:21.40	1.55
VISS	158.2	242	iPn	17:02:01.00	0.35
OBKA	160.7	271	PnD	17:02:01.40	0.44
			Sn	02:24.00	3.33
PKSG	167.5	53	ePnD	17:02:04.20	2.38
			eSn	02:25.10	2.91
CONA	171.7	340	Pn	17:02:02.30	-0.03
			Sn	02:24.40	1.29
PKS2	197.5	90	eSn	17:02:33.10	4.25
MOA	235.9	310	Pn	17:02:11.60	1.25
			Sn	02:37.50	0.13

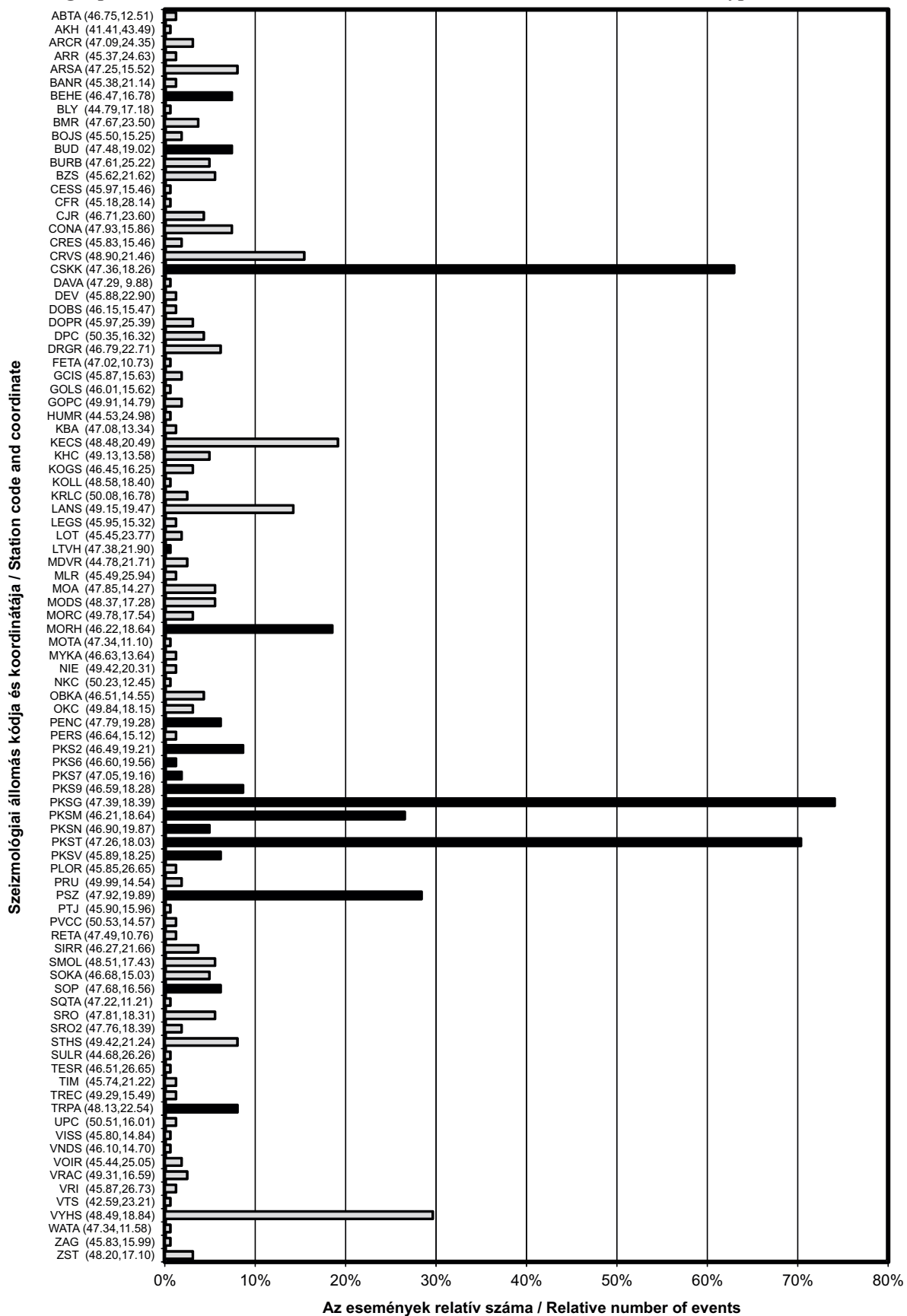
### Földrengés paraméterek

162.

2012-12-28 time: 4:14:33.00 UTC ML= 1.1  
 lat: 47.550N lon: 16.546E h= 6.5 km  
 erh= 5.2km erz= 5.1km  
 nr= 12 gap=141 rms=1.19  
 Locality: Austria  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
SOP	14.9	3	ePgC	4:14:36.00			0.10
			eSg	14:37.70			-0.47
CONA	66.4	309	Pg	4:14:45.20			0.29
			Sg	14:53.10			-1.10
ARSA	84.1	247	Pg	4:14:48.00			-0.06
			Sg	14:58.70			-1.11
PKST	116.9	106	ePn	4:14:54.60			0.83
			eSn	15:07.60			-2.37
PKSG	140.1	97	ePn	4:14:58.60			1.93
			eSn	15:13.90			-1.24
MOA	174.4	281	Pn	4:15:03.40			2.46
			Sn	15:24.70			1.96





3.4. ábra Az egyes állomások részvétele a hipocentrum meghatározásban

Figure 3.4. Contribution of individual stations to the hypocenter determination

## 4.

### JELENTŐS FÖLDRENGÉSEK 2012-BEN (Magyarországon érezhető földrengések)

2012. március 20.	–	Eger
2012. április 6.	–	Gánt
2012. december 25.	–	Kiscsehi

#### AZ INTENZITÁS ELOSZLÁS MEGHATÁROZÁSA

A Magyarországon érezhető földrengések intenzitás eloszlását a ShakeMap program (Field et al., 2003) segítségével modelleztük.

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

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

## 4.

### SIGNIFICANT EARTHQUAKES IN 2012 (Earthquakes felt in Hungary)

20 March 2012	–	Eger
6 April 2012	–	Gánt
25 December 2012	–	Kiscsehi

#### **METHOD USED FOR ESTIMATION OF INTENSITY**

Intensity distribution of earthquakes felt in Hungary has been calculated by ShakeMap program (Field et al., 2003).

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

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

**2012. március 20. - Eger / 20 March 2012 - Eger****FÉSZEKPARAMÉTEREK / HYPOCENTER PARAMETERS**

Dátum / Date:	2012/03/20
Kipattanási idő / Origin Time:	01:21:22.5 UTC
Szélesség és hosszúság / Latitude and Longitude:	47.978 N 20.376 E (S.D. 1.9 km)
Mélység / Depth:	3.7 km (S.D. 1.8 km)
Magnitúdó / Magnitude:	2.4 ML
Maximális intenzitás / Maximum Intensity:	4-5 EMS

**LEÍRÁS**

Március 20-án éjjel 2.4  $M_L$  magnitúdójú földrengést éreztek Eger – Felsőtárkány – Szarvaskő térségében. A rengés intenzitása 4-5 EMS fokra becsülhető az epicentrum térségében. A rengés csak nagyon kis területen volt érezhető.

Az esemény szeizmogramja a 4.1. ábrán látható.

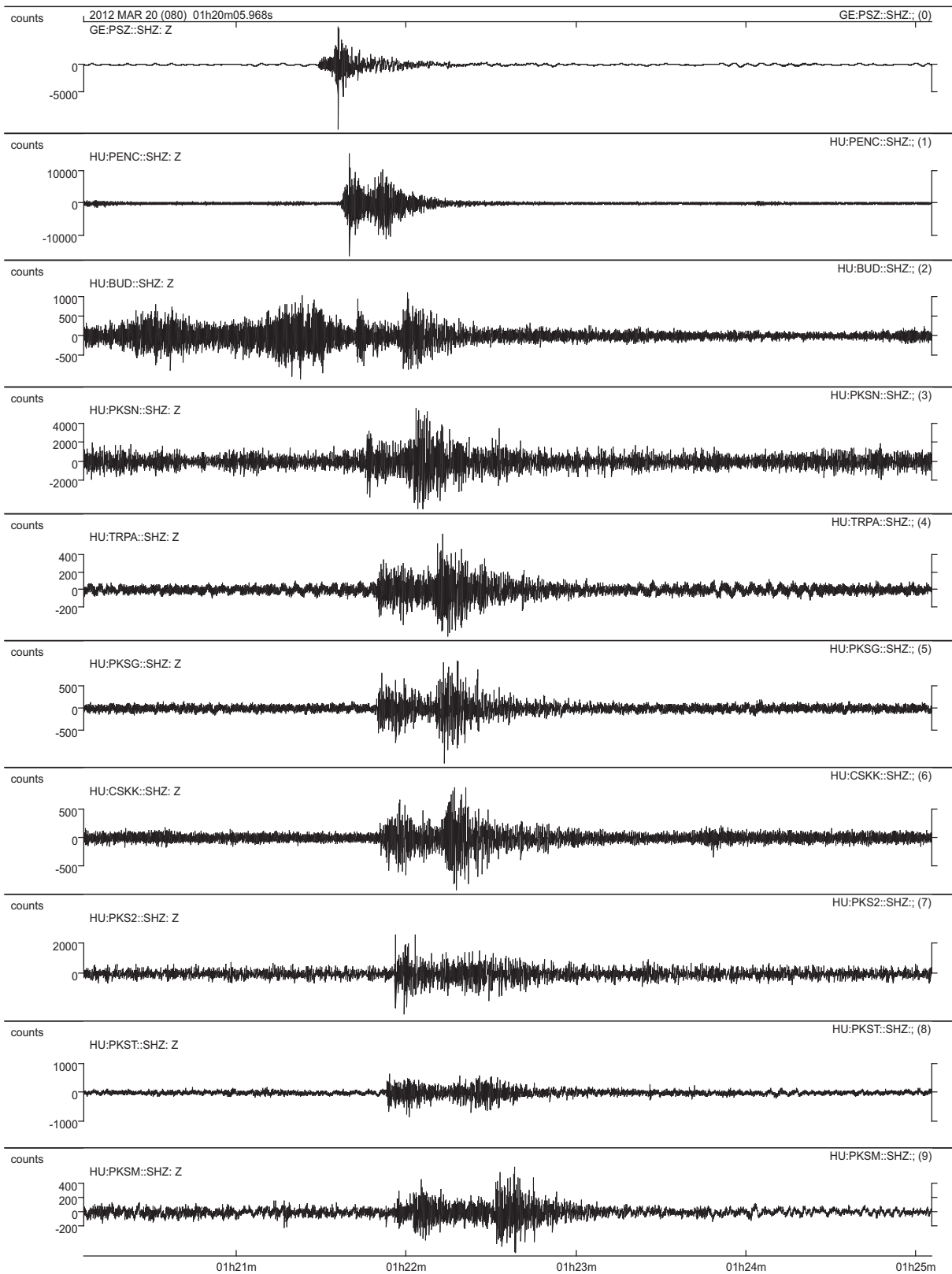
A rengés számított és makroszeizmikus intenzitás eloszlását a 4.2. ábra mutatja, a makroszeizmikus intenzitásokat a 4.1. táblázat tartalmazza.

**DISCUSSION**

Early morning of March 20<sup>th</sup>, a 2.4  $M_L$  magnitude earthquake was reported from Eger – Felsőtárkány – Szarvaskő. The maximum intensity was estimated 4-5 EMS and the shock was felt only in a very small area.

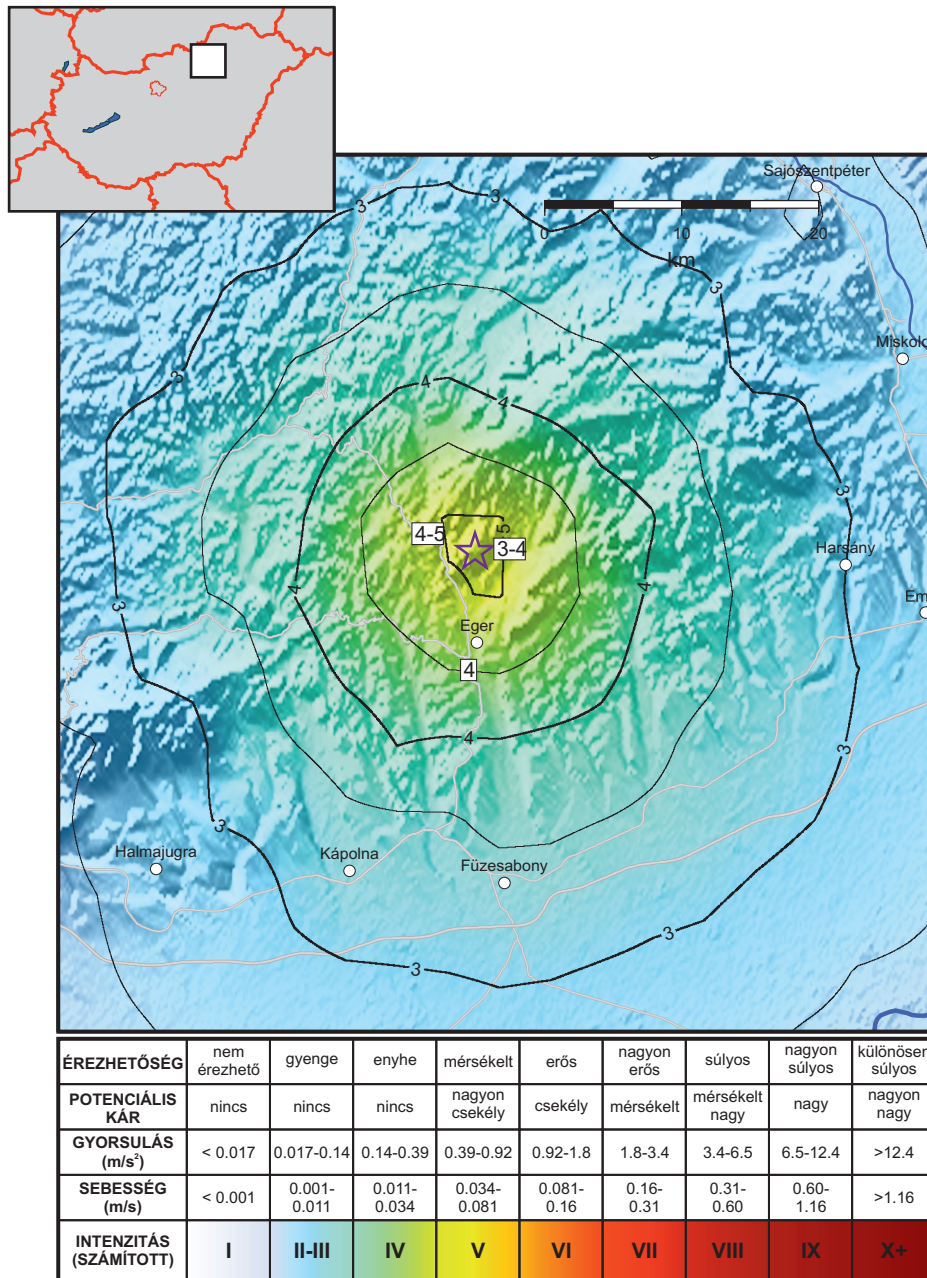
Seismograms of the event are shown in Figure 4.1.

Calculated and macroseismic intensity distribution of the event is shown in Figure 4.2 while Table 4.1 lists available macroseismic intensity points.



4.1. ábra A 2012. március 20-i, egri földrengés (01:21 UTC) szeizmogramjai

Figure 4.1. Seismograms of the Eger earthquake 20<sup>th</sup> March 2012 (01:21 UTC)



4.2. ábra A 2012. március 20-i, egeri földrengés (01:21 UTC) intenzitás eloszlása (csillag - műszeres epicentrum; keretezett szám - makroszeizmikus intenzitás)

Figure 4.2. Intensity distribution of the Eger earthquake 20<sup>th</sup> March 2012 (01:21 UTC) (star - instrumental epicentre; boxed numbers - macroseismic intensity points)



**4.1. Táblázat**

A 2012. március 20-i, egeri földrengés (01:21 UTC) makroszeizmikus intenzitása

**Table 4.1.**

Macroseismic intensity points of the Eger earthquake 20<sup>th</sup> March 2012 (01:21 UTC)

Helység / Location		Koordináta Coordinates		I
		Szélesség Latitude (N)	Hosszúság Longitude (E)	Intenzitás Intensity
1	Eger	47.903	20.370	4.0
2	Felsőtárkány	47.977	20.414	3.5
3	Szarvaskő	47.989	20.332	4.5

**2012. április 6. - Gánt / 6 April 2012 - Gánt****FÉSZKEPARAMÉTEREK / HYPOCENTER PARAMETERS**

Dátum / Date:	2012/04/06
Kipattanási idő / Origin Time:	09:05:17.2 UTC
Szélesség és hosszúság / Latitude and Longitude:	47.384 N 18.387 E (S.D. 1.6 km)
Mélység / Depth:	7.0 km (S.D. 1.1 km)
Magnitúdó / Magnitude:	2.7 ML
Maximális intenzitás / Maximum Intensity:	5 EMS

**LEÍRÁS**

Április 6-án délelőtt Gánton kisebb riadalmat okozott egy 2.7  $M_L$  magnitúdójú földrengés. A rengés erősen érezhető volt (5 EMS) Gánton, a környékbeli településeken azonban nem érezték.

Az esemény szeizmogramja a 4.3. ábrán látható.

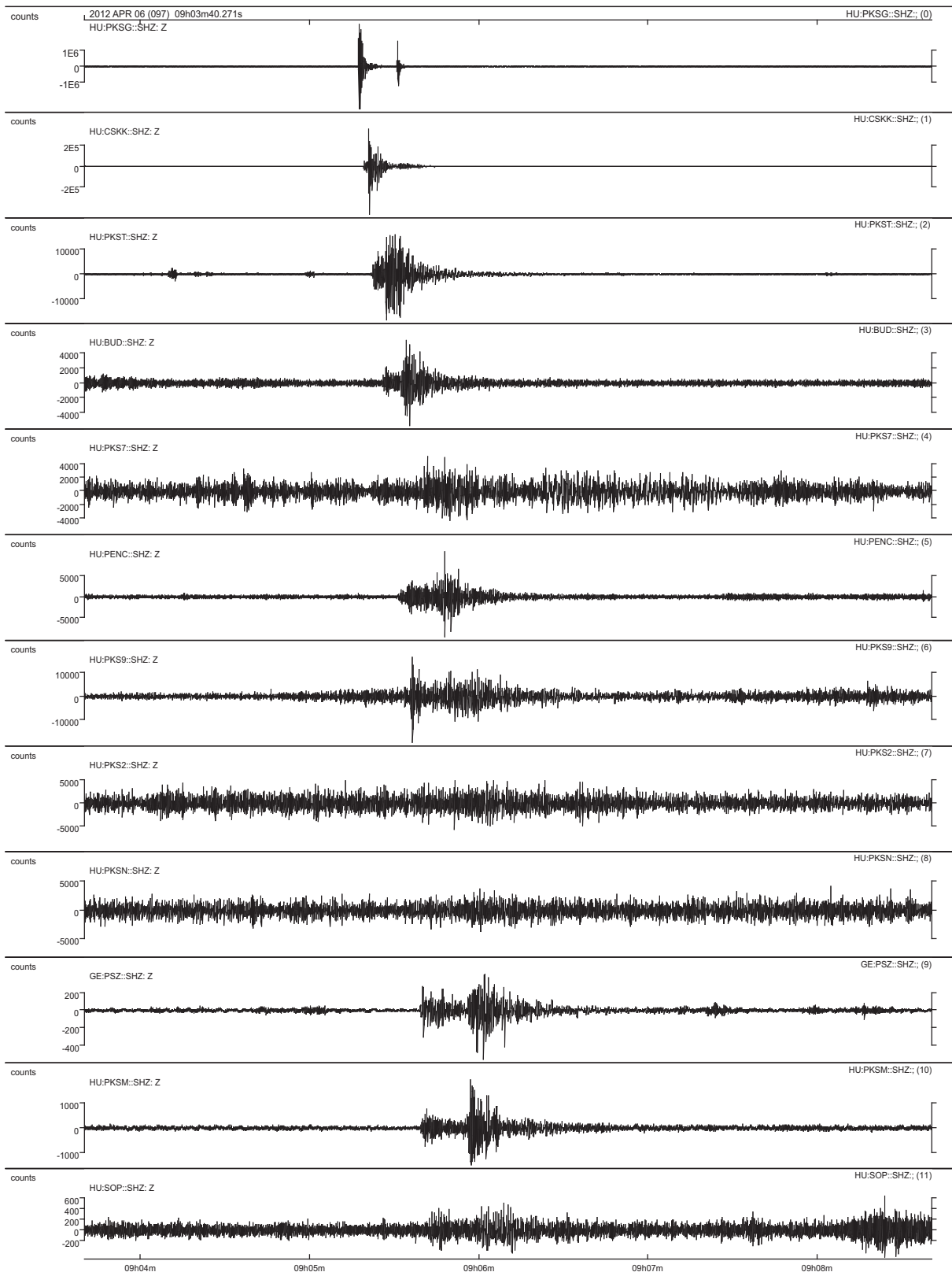
A rengés számított és makroszeizmikus intenzitás eloszlását a 4.4. ábra mutatja, a makroszeizmikus intenzitásokat a 4.2. táblázat tartalmazza.

**DISCUSSION**

A magnitude 2.7  $M_L$  earthquake alerted people at Gánt on late morning of April 6<sup>th</sup>. The shock was strongly felt (5 EMS) at the epicenter but no reports of being felt at other localities.

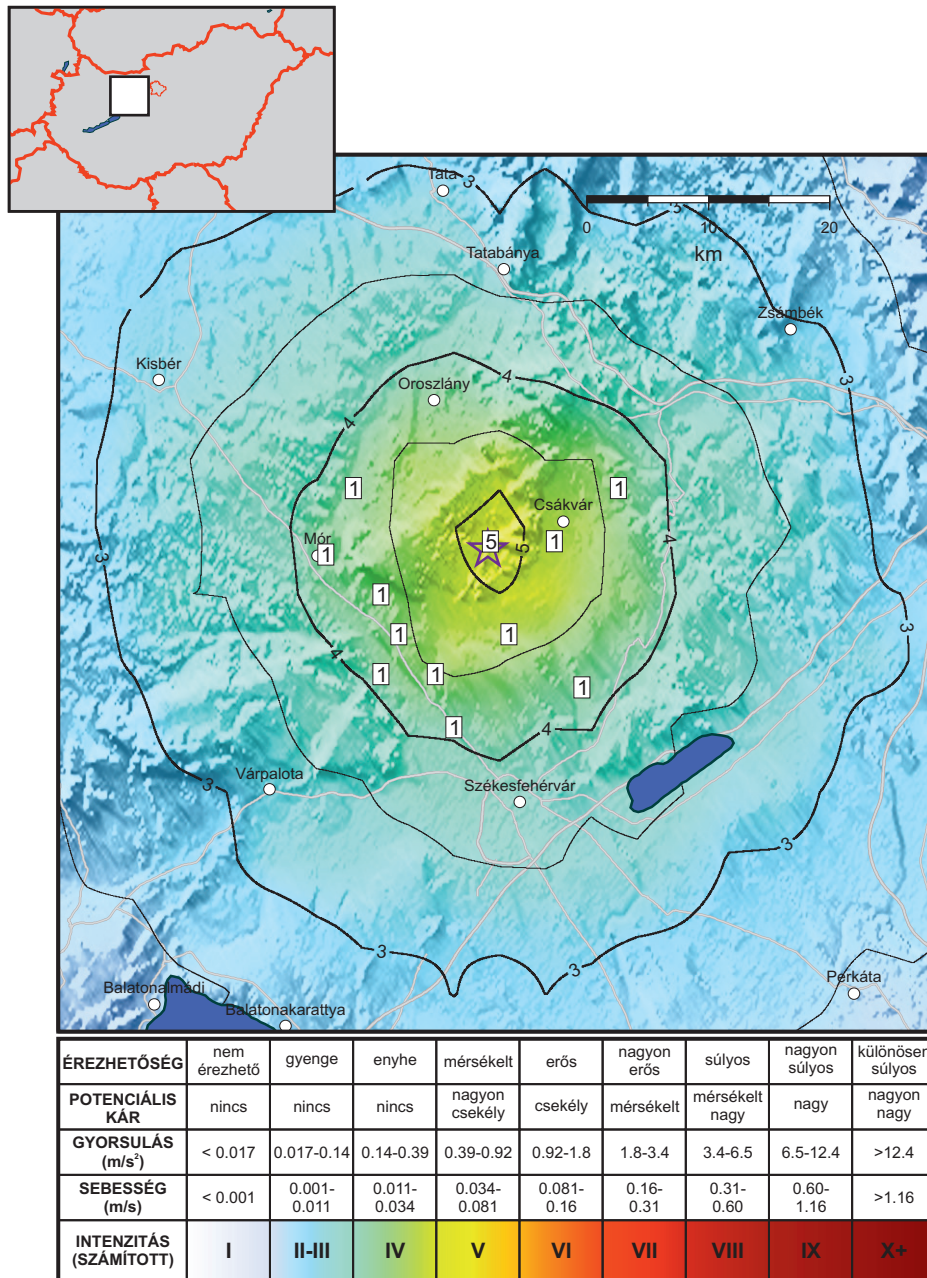
Seismograms of the event are shown in Figure 4.3.

Calculated and macroseismic intensity distribution of the event is shown in Figure 4.4 while Table 4.2 lists available macroseismic intensity points.



4.3. ábra A 2012. április 6-i, gánti földrengés (09:05 UTC) szeizmogramjai

Figure 4.3. Seismograms of the Gánt earthquake 6<sup>th</sup> April 2012 (09:05 UTC)



4.4. ábra A 2012. április 6-i, gánti földrengés (09:05 UTC) intenzitás eloszlása (csillag - műszeres epicentrum; keretezett szám - makroszeizmikus intenzitás)

Figure 4.4. Intensity distribution of the Gánt earthquake 6<sup>th</sup> April 2012 (09:05 UTC) (star - instrumental epicentre; boxed numbers - macroseismic intensity points)

**4.2. Táblázat**

A 2012. április 6-i, gánti földrengés (09:05 UTC) makroszeizmikus intenzitása

**Table 4.2.**

Macroseismic intensity points of the Gánt earthquake 6<sup>th</sup> April 2012 (09:05 UTC)

Helység / Location		Koordináta Coordinates		I
		Szélesség Latitude (N)	Hosszúság Longitude (E)	Intenzitás Intensity
1	Csákvár	47.393	18.464	1.0
2	Csókakő	47.353	18.271	1.0
3	Fehérvárcsurgó	47.291	18.268	1.0
4	Gánt	47.392	18.392	5.0
5	Magyaralmás	47.291	18.329	1.0
6	Mór	47.376	18.212	1.0
7	Pátka	47.277	18.494	1.0
8	Pusztavám	47.430	18.235	1.0
9	Sárkeresztes	47.251	18.355	1.0
10	Söréd	47.321	18.286	1.0
11	Vértesszőlős	47.430	18.532	1.0
12	Zámoly	47.319	18.412	1.0

**2012. december 25. - Kiscsehi / 25 December 2012 - Kiscsehi****FÉSZKEPARAMÉTEREK / HYPOCENTER PARAMETERS**

Dátum / Date:	2012/12/25
Kipattanási idő / Origin Time:	17:01:35.7 UTC
Szélesség és hosszúság / Latitude and Longitude:	46.479 N 16.641 E (S.D. 1.7 km)
Mélység / Depth:	14.1 km (S.D. 1.2 km)
Magnitúdó / Magnitude:	2.5 M <sub>L</sub>
Maximális intenzitás / Maximum Intensity:	4 EMS

**LEÍRÁS**

December 25-én este, Zala megye déli részén, a magyar - szlovén - horvát határ közelében, Kiscsehi és Lisspeszentadorján környékén éreztek földrengést. A 2.5 M<sub>L</sub> magnitúdójú rengés néhány száz km<sup>2</sup> területen volt érezhető, a maximális intenzitás 4 EMS.

Az esemény szeizmogramja a 4.5. ábrán látható.

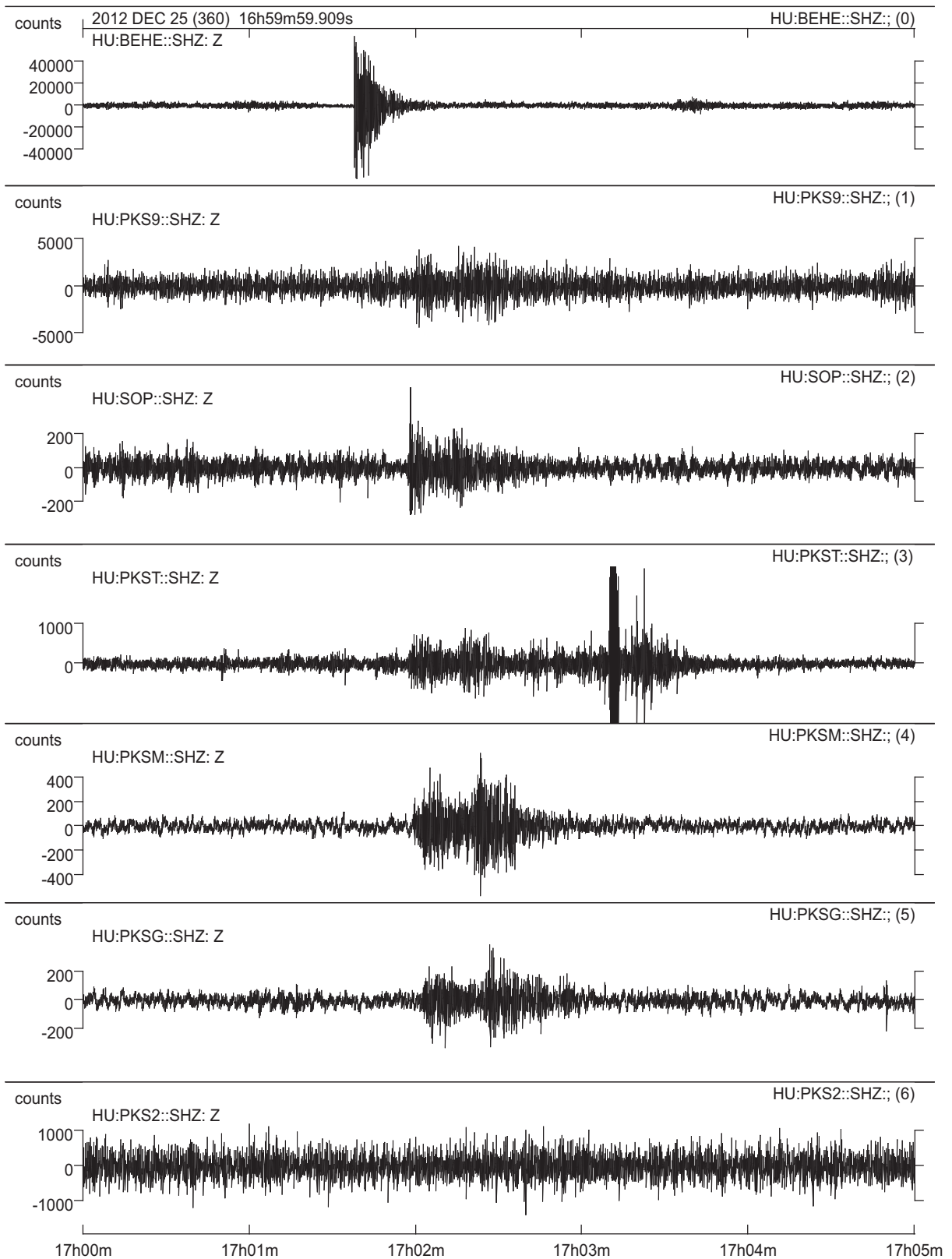
A rengés számított és makroszeizmikus intenzitás eloszlását a 4.6. ábra mutatja, a makroszeizmikus intenzitásokat a 4.3. táblázat tartalmazza.

**DISCUSSION**

In the evening of December 25<sup>th</sup>, a 2.5 M<sub>L</sub> magnitude event was felt in a few hundred km<sup>2</sup> area around Kiscsehi and Lisspeszentadorján at the Hungarian – Croatian – Slovenian border region, SW of Hungary. 4 EMS epicentral intensity was reported.

Seismograms of the event are shown in Figure 4.5.

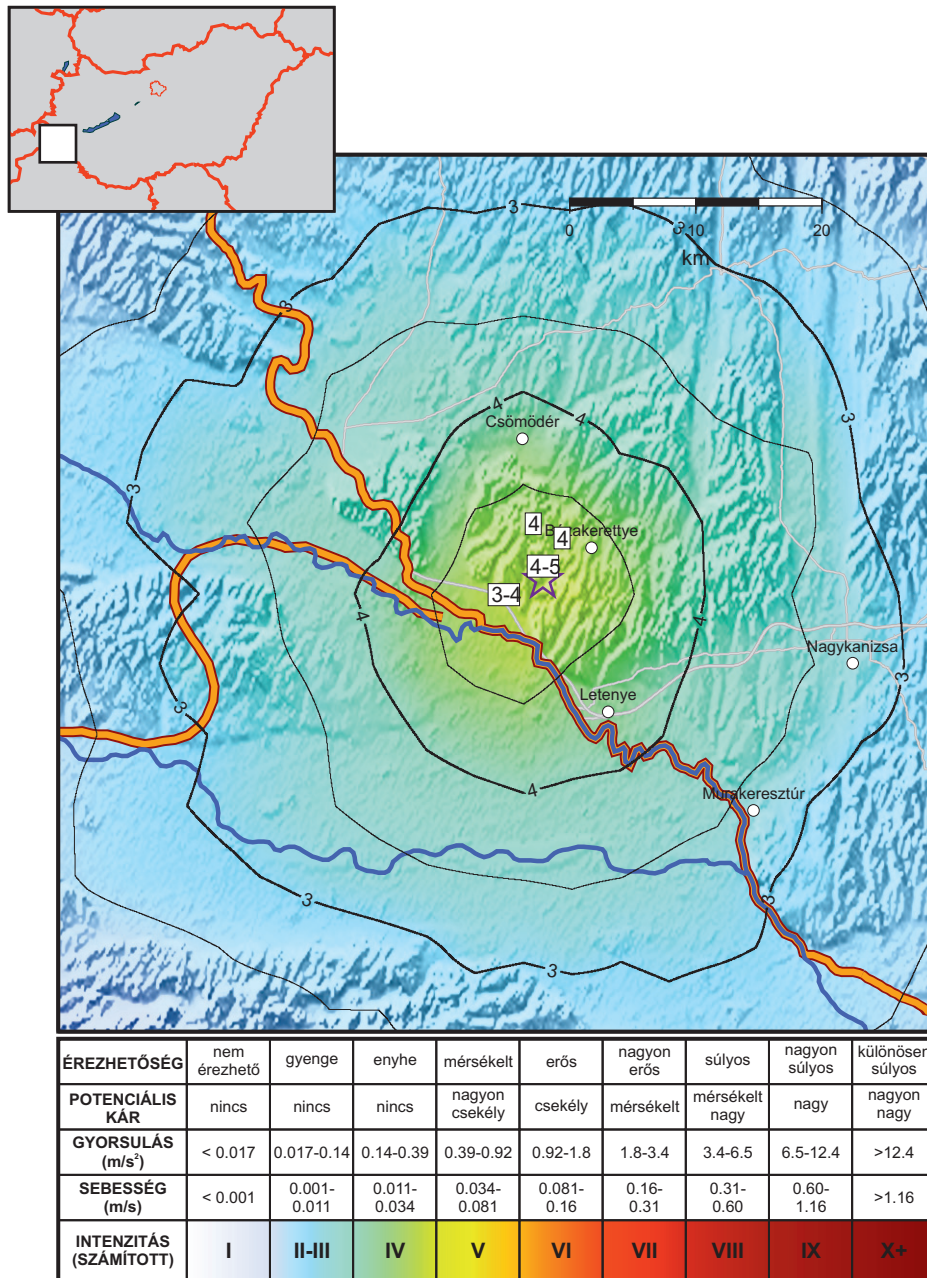
Calculated and macroseismic intensity distribution of the event is shown in Figure 4.6 while Table 4.3 lists available macroseismic intensity points.



4.5. ábra A 2012. december 25-i, kiscsehi földrengés (17:01 UTC) szeizmogramjai

Figure 4.5. Seismograms of the Kiscsehi earthquake 25<sup>th</sup> December 2012 (17:01 UTC)





4.6. ábra A 2012. december 25-i, kiscsehi földrengés (17:01 UTC) intenzitás eloszlása (csillag - műszeres epicentrum; keretezett szám - makroszeizmikus intenzitás)

Figure 4.6. Intensity distribution of the Kiscsehi earthquake 25<sup>th</sup> December 2012 (17:01 UTC) (star - instrumental epicentre; boxed numbers - macroseismic intensity points)



**4.3. Táblázat**

A 2012. december 25-i, kiscsehi földrengés (17:01 UTC) makroszeizmikus intenzitása

**Table 4.3.**

Macroseismic intensity points of the Kiscsehi earthquake 25<sup>th</sup> December 2012 (17:01 UTC)

Helység / Location		Koordináta Coordinates		I
		Szélesség Latitude (N)	Hosszúság Longitude (E)	Intenzitás Intensity
1	Csörnyeföld	46.499	16.633	3.5
2	Kiscsehi	46.521	16.674	4.5
3	Lispezsentadorján	46.539	16.691	4.0
4	Maróc	46.550	16.664	4.0

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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 rezgést 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 rezgést 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 összekocognak. A rezgés erős. Felül nehéz tárgyak felborulnak. Ajtók, ablakok kinyílnak vagy bezáródnak.

### 6 ☞ **Kiseb károkat okozó**

Épületen belül szinte mindenki, szabadban sokan érzik. Épületben tartózkodók közül sokan megijednek, és a szabadba menekülnek. Kiseb 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 rombadól.

### 10 ☞ **Nagyon pusztító**

Sok hagyományos épület összedől.

### 11 ☞ **Elsőpró**

A legtöbb épület összedől.

### 12 ☞ **Teljesen elsőpró**

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

2012

Forrás:

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

## APPENDIX B

# SIGNIFICANT EARTHQUAKES OF THE WORLD

2012

Source:

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

## Halálos áldozatot követelő földrengések a világon 2012-ben

## Deaths from Earthquakes in 2012

Dátum Date	Ország, terület Region	Magnitúdó Magnitude	Áldozatok száma Number killed
2012 02 06	Negros-Cebu region, Philippines	6.7	113
2012 03 20	Oaxaca, Mexico	7.4	2
2012 03 25	Maule, Chile	7.1	1
2012 04 11	off the west coast of Northern Sumatra	8.6	10
2012 04 17	Valparaiso, Chile	6.7	2
2012 05 12	Tajikistan	5.7	1
2012 05 20	Northern Italy	6.0	7
2012 05 29	Northern Italy	5.8	17
2012 06 11	Hindu Kush region, Afghanistan	5.7	75
2012 06 24	Sichuan-Yunnan border region, China	5.5	4
2012 07 20	Jiangsu, China	4.9	1
2012 08 11	Northwestern Iran	6.4	306
2012 08 18	Sulawesi, Indonesia	6.3	6
2012 08 31	Philippine Islands region	7.6	1
2012 09 05	Costa Rica	7.6	2
2012 09 07	Sichuan-Yunnan-Guizhou region, China	5.5	81
2012 11 07	Offshore Guatemala	7.4	139
	<b>Összesen / Total</b>		<b>768</b>



## A 7.0 vagy annál nagyobb magnitúdójú földrengések a világon 2012-ben

## Earthquakes of magnitude 7.0 and greater in 2012

	Év Year	Hónap Month	Nap Day	Idő Time (UTC)	Szélesség Latitude	Hosszúság Longitude	Mélység Depth (km)	Magnitúdó Magnitude	Ország, terület Region
1.	2012	01	10	18:36:59	2.433	93.210	19	7.2	Off the West Coast of Northern Sumatra
2.	2012	02	02	13:34:40	-17.827	167.133	23	7.1	Vanuatu
3.	2012	03	20	18:02:47	16.493	-98.231	20	7.4	Oaxaca, Mexico
4.	2012	03	25	22:37:06	-35.200	-72.217	41	7.1	Maule, Chile
5.	2012	04	11	08:38:36	2.327	93.063	20	8.6	Northern Sumatra
6.	2012	04	11	10:43:10	0.802	92.463	25	8.2	Northern Sumatra
7.	2012	04	12	07:15:48	28.696	-113.106	13	7.0	Gulf of California
8.	2012	08	14	02:59:42	49.784	145.126	626	7.7	Sea of Okhotsk
9.	2012	08	27	04:37:19	12.139	-88.590	28	7.3	Offshore El Salvador
10.	2012	08	31	12:47:33	10.819	126.627	28	7.6	Philippine Islands region
11.	2012	09	05	14:42:07	10.099	-85.308	35	7.6	Costa Rica
12.	2012	09	30	16:31:35	1.929	-76.362	170	7.3	Colombia
13.	2012	10	28	03:04:11	52.769	-131.927	17.5	7.7	Queen Charlotte Islands region
14.	2012	11	07	16:35:46	13.977	-91.876	24	7.4	Offshore Guatemala
15.	2012	12	07	08:18:24	37.89	144.09	36.1	7.3	Honsu, Japan
16.	2012	12	10	16:53:09	-6.52	129.81	157.6	7.1	Banda Sea

**A 6.5 vagy annál nagyobb magnitúdójú,  
és a jelentősebb károkat okozó földrengések a világon 2012-ben**

**Earthquakes of magnitude 6.5 or greater  
or ones that caused fatalities, injuries or substantial damage in 2012**

DÁTUM	IDŐ ÓÓ MM SEC	KOORDINÁTA SZÉL LONG	MÉLYS. MAG	ÁLL. SZÁM	RÉGIÓ, TOVÁBBI MAGNITÚDOK, 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 01	05 27 55.9	31.456 N 138.072 E	365 6.8	0.8 628	IZU ISLANDS, JAPAN REGION. MW 6.8 (WCMT), 6.8 (UCMT), 6.8 (GCMT). mb 6.2 (GS). Mo $1.8 \cdot 10^{19}$ Nm (WCMT), $1.9 \cdot 10^{19}$ Nm (UCMT), $1.9 \cdot 10^{19}$ Nm (GCMT), $1.8 \cdot 10^{19}$ Nm (PPT). Felt (V) at Chiba; (IV) at Fussa, Kawasaki, Saitama, Tokyo, Yokohama and Yokosuka; (III) at Ebina, Zama and Zushi; (II) at Misawa and Narita, Honshu. Recorded (4 JMA) in Chiba, Fukushima, Gumma, Ibaraki, Kanagawa, Miyagi, Saitama, Tochigi and Tokyo.
JAN 10	18 36 59.0	2.433 N 93.210 E	19 G 7.2	1.1 443	OFF THE WEST COAST OF NORTHERN SUMATRA. MW 7.2 (WCMT), 7.2 (UCMT), 7.1 (GS), 7.2 (GCMT). mb 6.6 (GS). MS 7.0 (GS). ME 7.6 (GS). Mo $7.1 \cdot 10^{19}$ Nm (WCMT), $7.2 \cdot 10^{19}$ Nm (UCMT), $5.8 \cdot 10^{19}$ Nm (GS), $7.2 \cdot 10^{19}$ Nm (GCMT), $4.1 \cdot 10^{19}$ Nm (PPT). Es $5.5 \cdot 10^{15}$ Nm (GS). Felt (IV) at Banda Aceh and (II) at Mandailing, Medan and Pematangsiantar. Also felt in Padang Pariaman and at Sigli. Felt (III) on Pulau Simeulue. Felt (II) at Gelugor, Georgetown and Tanjung Tokong, Malaysia. Also felt at Ayer Itam, Butterworth, Kuah, Sungai Ara and Tangkak. Felt in Singapore, at Colombo, Sri Lanka and at Bangkok and Phuket, Thailand.
JAN 15	13 40 19.5	60.948 S 56.113 W	8 G 6.6	1.1 147	SOUTH SHETLAND ISLANDS. MW 6.6 (WCMT), 6.6 (UCMT), 6.4 (GS), 6.5 (GCMT). mb 6.5 (GS). MS 6.4 (GS). ME 7.4 (GS). Mo $1.1 \cdot 10^{19}$ Nm (WCMT), $5.8 \cdot 10^{18}$ Nm (GS), $1.1 \cdot 10^{19}$ Nm (UCMT), $8.3 \cdot 10^{18}$ Nm (GCMT). Es $3.1 \cdot 10^{15}$ Nm (GS).
JAN 19	12 35 51.3&	36.288 N 58.835 E	8 5.1	290	NORTHEASTERN IRAN. <TEH>. MW 5.1 (WCMT), 5.1 (GS), 5.3 (GCMT). mb 5.6 (GS). mbLg 5.5 (TEH). Mo $5.9 \cdot 10^{16}$ Nm (WCMT), $6.3 \cdot 10^{16}$ Nm (GS), $1.1 \cdot 10^{17}$ Nm (GCMT). About 238 people injured and minor damage in Khorasan-e Razavi.
FEB 02	13 34 40.6	17.827 S 167.133 E	23 G 7.1	1.1 573	VANUATU. MW 7.1 (WCMT), 7.1 (UCMT), 7.0 (GCMT). mb 6.5 (GS). MS 6.9 (GS). ME 7.2 (GS). Mo $4.9 \cdot 10^{19}$ Nm (WCMT), $5.2 \cdot 10^{19}$ Nm (UCMT), $4.5 \cdot 10^{19}$ Nm (GCMT), $9.6 \cdot 10^{19}$ Nm (PPT). Es $1.6 \cdot 10^{15}$ Nm (GS). Felt (V) at Port-Vila. Also felt at Luganville. Felt at Noumea, New Caledonia and at Gold Coast, Australia.
FEB 06	03 49 12.5	9.999 N 123.206 E	11 G 6.7	1.1 572	NEGROS - CEBU REGION, PHILIPPINES. MW 6.7 (WCMT), 6.7 (UCMT), 6.7 (GCMT). mb 6.3 (GS). MS 6.6 (GS). ME 6.6 (GS). Mo $1.5 \cdot 10^{19}$ Nm (WCMT), $1.4 \cdot 10^{19}$ Nm (UCMT), $1.3 \cdot 10^{19}$ Nm (GCMT). Es $1.7 \cdot 10^{14}$ Nm (GS). At least 51 people killed, 112 injured, 62 missing, 23,000 displaced, about 15,000 buildings destroyed or damaged, at least 17 bridges and many roads destroyed or damaged and utilities disrupted on Negros. Many landslides occurred including two that buried 100 homes at La Libertad and 30 homes at Guihulngan. Large waves reported at La Libertad. Some buildings damaged and landslides occurred on Cebu and utilities disrupted at Iloilo, Panay. Estimated 15 million U.S. dollars damage on Negros and Cebu. Felt (VII PIVS) at Dumaguete, Guihulngan, Tayasan and Vallehermoso and (VI PIVS) at La Carlota, La Castellana, Manjuyod and Tanjay, Negros. Felt (VI PIVS) at Clarin, Bohol and at Argao, Barili, Cebu City and Dalaguete, Cebu. Also felt (VI) at Moalboal, Cebu. Felt throughout the Visayan Islands, in much of Mindanao and as far as the Manila area, Luzon.

- FEB 26 06 17 19.7 51.708 N 95.991 E 12 G 6.7 0.9 596 SOUTHWESTERN SIBERIA, RUSSIA. MW 6.7 (WCMT), 6.5 (GS), 6.6 (GCMT). mb 6.4 (GS). MS 6.6 (GS). ME 6.4 (GS). Mo  $1.3 \cdot 10^{19}$  Nm (WCMT),  $6.8 \cdot 10^{18}$  Nm (GS),  $1.0 \cdot 10^{19}$  Nm (GCMT). Es  $9.5 \cdot 10^{13}$  Nm (GS). Felt (V) at Kyzyl; (IV) at Krasnoyarsk and Minusinsk; (III) at Novokuznetsk, Novosibirsk, Tomsk and Zheleznogorsk. Also felt at Abakan, Abaza, Angarsk, Barnaul, Biysk, Chernogorsk, Cheremushki, Irkutsk, Kansk, Kemerovo, Sayanogorsk and Ulan-Ude. Felt (II) at Ulaanbaatar, Mongolia. Also felt at Ulaangom.
- FEB 27 18 48 55.3& 31.428 N 56.778 E 10 5.2 211 CENTRAL IRAN. <TEH>. mb 5.2 (GS). mbLg 5.4 (TEH). ML 5.2 (THR). Six people injured and some buildings damaged in the Ravar area.
- MAR 03 12 19 55.0 22.141 S 170.340 E 14 G 6.6 1.0 418 SOUTHEAST OF THE LOYALTY ISLANDS. MW 6.6 (WCMT), 6.6 (UCMT), 6.6 (GS), 6.6 (GCMT). mb 6.5 (GS). MS 6.4 (GS). Mo  $9.0 \cdot 10^{18}$  Nm (WCMT),  $9.0 \cdot 10^{18}$  Nm (UCMT),  $8.6 \cdot 10^{18}$  Nm (GS),  $9.3 \cdot 10^{18}$  Nm (GCMT),  $1.2 \cdot 10^{19}$  Nm (PPT).
- MAR 05 23 06 30.8 12.354 N 123.700 E 37 5.6 0.9 135 MASBATE REGION, PHILIPPINES. MW 5.6 (GCMT). mb 5.2 (GS). MS 5.1 (GS). Mo  $2.7 \cdot 10^{17}$  Nm (GCMT). Ten people injured, one building destroyed and several buildings damaged (VI PIVS) at Masbate. Felt (IV PIVS) at Irosin and Sorsogon and (II PIVS) at Legaspi City, Luzon. Also felt at Iriga and Libog. Felt (IV PIVS) at Roxas City, (III PIVS) at Sigma, (II PIVS) at Iloilo and (I PIVS) at Kalibo and Numancia, Panay. Felt (III PIVS) on Almagro Island, Capul Island and Tagapul-an Island and at Catarman, Samar. Also felt at Calbayog.
- MAR 09 07 09 50.9 19.125 S 169.613 E 16 G 6.7 0.9 488 VANUATU. MW 6.7 (WCMT), 6.7 (UCMT), 6.6 (GCMT). mb 6.1 (GS). MS 6.7 (GS). ME 6.5 (GS). Mo  $1.2 \cdot 10^{19}$  Nm (WCMT),  $1.2 \cdot 10^{19}$  Nm (UCMT),  $1.1 \cdot 10^{19}$  Nm (GCMT),  $1.8 \cdot 10^{19}$  Nm (PPT). Es  $1.1 \cdot 10^{14}$  Nm (GS). Felt at Lakatoro, Luganville and Port-Vila.
- MAR 14 09 08 35.1 40.887 N 144.944 E 12 G 6.9 0.9 552 OFF THE EAST COAST OF HONSHU, JAPAN. MW 6.9 (WCMT), 7.0 (UCMT), 6.8 (GS), 6.9 (GCMT). mb 6.7 (GS). MS 6.9 (GS). ME 7.1 (GS). Mo  $2.9 \cdot 10^{19}$  Nm (WCMT),  $4.7 \cdot 10^{19}$  Nm (UCMT),  $2.2 \cdot 10^{19}$  Nm (GS),  $3.1 \cdot 10^{19}$  Nm (GCMT),  $3.5 \cdot 10^{19}$  Nm (PPT). Es  $9.9 \cdot 10^{14}$  Nm (GS). Felt (IV) at Aomori, Misawa and Yokosuka and (III) at Tokyo. Also felt (III) at Sapporo, Hokkaido. Felt widely on Hokkaido and Honshu. Recorded (4 JMA) in Aomori and Iwate. Also recorded (4 JMA) in southeastern Hokkaido.
- MAR 16 07 58 02.5 10.037 N 125.633 E 18 G 5.8 1.0 421 LEYTE, PHILIPPINES. MW 5.8 (WCMT), 5.6 (GS), 5.8 (GCMT). mb 5.8 (GS). MS 5.3 (GS). ME 5.5 (GS). Mo  $6.8 \cdot 10^{17}$  Nm (WCMT),  $3.5 \cdot 10^{17}$  Nm (GS),  $6.2 \cdot 10^{17}$  Nm (GCMT). Es  $3.5 \cdot 10^{12}$  Nm (GS). At least 55 people injured and minor damage (VI PIVS) at Surigao, Mindanao. Felt (IV PIVS) at Carrascal and Tandag; (IV) at Butuan; (III PIVS) at Bislig, Cagayan de Oro, Cagwait, Cateel, Davao and Tarragona. Four houses destroyed (V PIVS) at Basilisa, Dinagat Island. Also felt (V PIVS) at General Luna. Felt (V PIVS) at San Ricardo and (III PIVS) at Hinunangan, Maasin, Tacloban and Tolosa, Leyte; (III PIVS) at Borongan, Catbalogan, Dolores, Oras and Sulat, Samar; (III) at Cebu City, Cebu. Felt widely on Mindanao and in the Visayan Islands.
- MAR 20 18 02 47.4 16.493 N 98.231 W 20 G 7.4 1.0 672 OAXACA, MEXICO. MW 7.4 (WCMT), 7.4 (UCMT), 7.3 (GS), 7.4 (GCMT), 7.4 (UNM). mb 6.6 (GS). MS 7.6 (GS). ME 7.7 (GS). Mo  $1.4 \cdot 10^{20}$  Nm (WCMT),  $9.5 \cdot 10^{19}$  Nm (GS),  $1.8 \cdot 10^{20}$  Nm (UCMT),  $1.5 \cdot 10^{20}$  Nm (GCMT),  $1.0 \cdot 10^{20}$  Nm (PPT). Es  $7.8 \cdot 10^{15}$  Nm (GS). At least two people killed in Guerrero, 11 people injured in Oaxaca and two injured at Mexico. At least 800 houses collapsed at Iguapala, Guerrero. Felt (VIII) at Pinotepa Nacional; (VI) at Acatzingo, Chilpancingo and Nezahualcoyotl; (V) at Acapulco, Coatzacoalcos, Mexico, Minatitlan, Ometpec, Tehuacan and Tlaxcala. Felt widely in central and southern Mexico as far as Campeche, Ciudad Madero, Puerto Vallarta and San Luis Potosi. Felt (III) at Antigua Guatemala and Guatemala, Guatemala. Felt in much of western Guatemala. A seiche was observed in a

swimming pool at Santa Fe, New Mexico, USA.

- MAR 21 22 15 06.1 6.242 S 145.955 E 118 G 6.6 1.0 640 NEW GUINEA, PAPUA NEW GUINEA. MW 6.6 (WCMT), 6.6 (UCMT), 6.6 (GS), 6.6 (GCMT). mb 6.3 (GS). ME 6.0 (GS). Mo  $9.3 \times 10^{18}$  Nm (WCMT),  $9.1 \times 10^{18}$  Nm (UCMT),  $8.5 \times 10^{18}$  Nm (GS),  $9.5 \times 10^{18}$  Nm (GCMT),  $5.7 \times 10^{18}$  Nm (PPT). Es  $2.1 \times 10^{13}$  Nm (GS). Felt (V) at Goroka, Kainantu and Madang and (IV) at Lae, Mount Hagen and Port Moresby. Also felt at Kerema and Tari.
- MAR 25 22 37 06.0& 35.200 S 72.217 W 41 7.1 553 MAULE, CHILE. <GUC>. MW 7.1 (WCMT), 7.1 (UCMT), 7.2 (GCMT), 7.0 (GUC). mb 6.5 (GS). MS 7.0 (GS). ME 7.0 (GS). MD 6.8 (SJA). Mo  $5.0 \times 10^{19}$  Nm (WCMT),  $5.3 \times 10^{19}$  Nm (UCMT),  $7.4 \times 10^{19}$  Nm (GCMT). Es  $7.5 \times 10^{14}$  Nm (GS). One person died from a heart attack at Parral, at least 11 people injured in the Santiago area and 3 injured in Bio-Bio. Some buildings damaged slightly at Santiago. Felt (VIII) at Cauquenes, Constitucion, Pelluhue and Talca; (VII) at Cobquecura, Linares, Molina, Parral, Pelarco, Rengo, Rio Claro and Villa Alegre. Felt strongly throughout south-central Chile. Felt (IV) at Mendoza and San Martin; (III) at Buenos Aires, San Juan and San Rafael, Argentina.
- APR 11 08 38 36.7 2.327 N 93.063 E 20 G 8.6 1.3 499 OFF THE WEST COAST OF NORTHERN SUMATRA. MW 8.6 (WCMT), 8.6 (UCMT), 8.6 (GCMT). mb 7.4 (GS). MS 8.5 (GS). ME 8.7 (GS). Mo  $9.0 \times 10^{21}$  Nm (WCMT),  $8.5 \times 10^{21}$  Nm (UCMT),  $9.0 \times 10^{21}$  Nm (GCMT),  $1.2 \times 10^{22}$  Nm (PPT). Es  $2.7 \times 10^{17}$  Nm (GS). At least 2 people killed, 8 others died from heart attacks, 12 injured and some buildings damaged in Aceh. Felt (VII) at Banda Aceh and Meulaboh, (VI) at Padang and (V) at Sibolga and Singkil. Also felt (V) at Gunungsitoli, Nias and at Jitra, Malaysia. Felt in much of Sumatra and Java. Felt widely in South and Southeast Asia, including Bangladesh, Bhutan, Brunei, Burma, India, Laos, Malaysia, Maldives, Singapore, Sri Lanka, Thailand and Vietnam. Felt as far as Bombay, India and Broome, Australia. A small tsunami was recorded, with maximum wave heights (one-half peak-to-trough) at the following selected tide stations: 1.08 m at Meulaboh, 37 cm at Sabang and 14 cm on Pulau Enganno, Indonesia; 8 cm at Cocos Island, Australia; 23 cm at Chittagong, Bangladesh; 21 cm at Male, Maldives; 17 cm at Port Louis, Mauritius; 11 cm at Trincomalee, Sri Lanka.
- APR 11 10 43 10.8 0.802 N 92.463 E 25 8.2 0.9 341 OFF THE WEST COAST OF NORTHERN SUMATRA. MW 8.2 (UCMT), 8.2 (GCMT). mb 7.2 (GS). Mo  $2.2 \times 10^{21}$  Nm (UCMT),  $2.5 \times 10^{21}$  Nm (GCMT),  $3.9 \times 10^{21}$  Nm (WCMT). Felt (V) at Sibolga. Also felt at Banda Aceh, Bukittinggi, Duri, Medan and Padang. Felt at Jakarta, Java. Felt (V) at Ayer Itam; (IV) at Petaling Jaya and Sungai Ara; (III) at Butterworth, Gelugor, Georgetown and Kuala Lumpur, Malaysia. Felt (IV) at Chetpet and (III) at Bangalore and Madras, India. Felt (IV) at Colombo and (II) at Kotte, Sri Lanka. Felt (II) at Kathu and Phuket, Thailand. Also felt in Bangladesh, Brunei, Maldives, Singapore and Vietnam. A local tsunami with a maximum wave height (one-half peak-to-trough) of 22 cm was recorded on Pulau Enggano.
- APR 11 22 55 10.2 18.229 N 102.689 W 20 G 6.5 1.0 599 MICHOACAN, MEXICO. MW 6.5 (GS), 6.7 (GCMT). mb 5.8 (GS). MS 6.7 (GS). ME 6.3 (GS). MD 6.4 (UNM). Mo  $6.0 \times 10^{18}$  Nm (GS),  $1.2 \times 10^{19}$  Nm (GCMT). Es  $5.5 \times 10^{13}$  Nm (GS). Felt (VII) at La Mira, (VI) at Acatzingo and (IV) at Aguascalientes, Arteaga, Colima, Guadalajara, Ixtapa, Jocotepec, Mexico, Morelia, Nezahualcoyotl, Patzcuaro, Tlajomulco, Tlaquepaque, Villa de Alvarez and Zamora. Felt as far as Acapulco, Durango, Monterrey and the Jalapa area.
- APR 12 07 15 48.5 28.696 N 113.104 W 13 G 7.0 1.2 474 GULF OF CALIFORNIA. MW 7.0 (WCMT), 6.9 (GS), 7.0 (GCMT). mb 6.2 (GS). MS 6.9 (GS). ME 7.4 (GS). MD 6.8 (UNM). Mo  $4.1 \times 10^{19}$  Nm (WCMT),  $2.4 \times 10^{19}$  Nm (GS),  $4.3 \times 10^{19}$  Nm (GCMT),  $5.9 \times 10^{19}$  Nm (PPT). Es  $2.5 \times 10^{15}$  Nm (GS). Felt (VI) at San Luis and (V) at Santa Isabel, Baja California and (V) at Guerrero Negro, Baja

California Sur. Felt (V) at Bahia de Kino and (IV) at Hermosillo and Providencia, Sonora. Also felt in parts of Chihuahua, Durango and Sinaloa. Felt (II) at Benson, Hereford and Tucson, Arizona. Also felt (II) at San Diego, California and at El Paso, Texas. Felt in parts of Arizona, southern California, southern Nevada and central New Mexico.

APR 17 03 50 15.6 32.625 S 71.365 W 29 G 6.7 1.0 518 VALPARAISO, CHILE. MW 6.7 (WCMT), 6.7 (UCMT), 6.6 (GS), 6.7 (GCMT). mb 6.2 (GS). MS 6.2 (GS). ME 6.2 (GS). ML 6.3 (GUC). MD 6.5 (SJA). Mo  $1.6 \cdot 10^{19}$  Nm (WCMT),  $9.4 \cdot 10^{18}$  Nm (GS),  $1.6 \cdot 10^{19}$  Nm (UCMT),  $1.3 \cdot 10^{19}$  Nm (GCMT),  $1.4 \cdot 10^{19}$  Nm (PPT). Es  $4.5 \cdot 10^{13}$  Nm (GS). One person died of a heart attack in Quillota and one person killed at Papudo. Some buildings damaged slightly at Valparaiso. Rockslides occurred at Santiago. Felt (VII) at Casablanca, Hijuelas, La Calera, Petorca, Quillota, Rancagua, San Antonio, Tiltil, Valparaiso, Villa Alemana and Zapallar; (VI) at Calera, La Ligua, Lampa, Limache, Melipilla, Navidad, Peñaflor, Pichilemu, Placilla, Quilpue, San Bernardo, San Felipe, San Fernando, San Jose de Maipo, Santiago and Talagante. Felt throughout central Chile and as far as Antofagasta and Puerto Varas. Felt (V) at Mendoza, (IV) at Cordoba and in San Juan, (III) at La Rioja and San Rafael and (II) at Buenos Aires, Argentina.

APR 17 07 13 49.0 5.462 S 147.117 E 198 G 6.8 0.9 597 EASTERN NEW GUINEA REG, PAPUA NEW GUINEA. MW 6.8 (WCMT), 6.8 (UCMT), 6.8 (GS), 6.8 (GCMT). mb 6.5 (GS). Mo  $2.1 \cdot 10^{19}$  Nm (WCMT),  $2.2 \cdot 10^{19}$  Nm (UCMT),  $2.0 \cdot 10^{19}$  Nm (GS),  $2.2 \cdot 10^{19}$  Nm (GCMT),  $1.8 \cdot 10^{19}$  Nm (PPT). Felt (V) at Lae, (IV) at Mount Hagen and (III) at Madang and Port Moresby. Also felt at Bulolo, Finschhafen, Goroka and Kainantu. Felt at Kimbe, New Britain.

APR 21 01 16 52.7 1.617 S 134.276 E 16 G 6.7 1.1 370 NEAR THE NORTH COAST OF PAPUA, INDONESIA. MW 6.7 (WCMT), 6.6 (GS), 6.7 (GCMT). mb 6.3 (GS). MS 6.6 (GS). ME 7.0 (GS). Mo  $1.2 \cdot 10^{19}$  Nm (WCMT),  $8.8 \cdot 10^{18}$  Nm (GS),  $1.2 \cdot 10^{19}$  Nm (GCMT),  $2.0 \cdot 10^{19}$  Nm (PPT). Es  $7.4 \cdot 10^{14}$  Nm (GS). Felt (VI) at Ransiki; (V) at Manokwari; (IV) at Bintuni; (III) at Biak, Fakfak, Nabire and Sorong; (II) at Kaimana.

APR 28 10 08 08.0 18.685 S 174.705 W 135 D 6.6 1.0 529 TONGA. MW 6.6 (WCMT), 6.7 (UCMT), 6.7 (GS), 6.7 (GCMT). mb 6.4 (GS). Mo  $1.1 \cdot 10^{19}$  Nm (WCMT),  $1.3 \cdot 10^{19}$  Nm (UCMT),  $1.3 \cdot 10^{19}$  Nm (GS),  $1.2 \cdot 10^{19}$  Nm (GCMT),  $9.8 \cdot 10^{18}$  Nm (PPT). Felt at Neiafu, Nuku'alofa and Pangai. Felt at Afono, Atu'u and Pava'ia'i, American Samoa and at Apia and Faleula, Samoa.

MAY 07 04 40 27.7 41.549 N 46.789 E 11 G 5.6 0.9 438 AZERBAIJAN. MW 5.6 (WCMT), 5.6 (GS), 5.7 (GCMT). mb 5.7 (GS). MS 5.7 (GS). ML 5.7 (TIF), 5.6 (AZER). Mo  $3.5 \cdot 10^{17}$  Nm (WCMT),  $3.6 \cdot 10^{17}$  Nm (GS),  $4.4 \cdot 10^{17}$  Nm (GCMT). About 50 people injured and at least 3,100 buildings destroyed or damaged in the Balakan-Qax-Zaqatala area by this earthquake and subsequent aftershocks. Some buildings damaged at Dedop'listsqaro and Tbilisi, Georgia. Felt (IV) at Tbilisi. Also felt at K'ut'aisi, Rust'avi and Tsnori. Felt at Vanadzor and Yerevan, Armenia.

MAY 11 12 41 35.3 26.175 N 92.889 E 43 D 5.4 0.9 164 ASSAM, INDIA. MW 5.4 (GS), 5.4 (GCMT). mb 5.2 (GS). Mo  $1.5 \cdot 10^{17}$  Nm (GS),  $1.7 \cdot 10^{17}$  Nm (GCMT). Two people injured by a wall collapse in Kamrup and several buildings damaged in the Guwahati area. Felt (IV) at Shillong and (II) at Kolkata. Also felt at Bali, Dhuburi, Dibrugarh, Haripur, Jamshedpur, Jowai, Krishnanagar, Nowgong and Tezpur. Felt (III) at Dhaka, Bangladesh. Felt at Thimphu, Bhutan.

MAY 12 23 28 43.5 38.612 N 70.354 E 10 G 5.7 1.1 451 TAJIKISTAN. MW 5.7 (WCMT), 5.9 (UCMT), 5.6 (GS), 5.7 (GCMT), 5.6 (RMT). mb 6.0 (GS). MS 5.7 (GS). Mo  $4.4 \cdot 10^{17}$  Nm (WCMT),  $9.5 \cdot 10^{17}$  Nm (UCMT),  $3.5 \cdot 10^{17}$  Nm (GS),  $5.3 \cdot 10^{17}$  Nm (GCMT),  $3.2 \cdot 10^{17}$  Nm (RMT). At least one person killed, many buildings destroyed and some livestock killed in the epicentral area. Felt (III) at Dushanbe. Also felt (III) at Tashkent, Uzbekistan.

- MAY 20 02 03 52.0& 44.890 N 11.230 E 6 6.0 729 NORTHERN ITALY. <ROM>. MW 6.0 (WCMT), 6.1 (GS), 6.0 (UCMT), 6.1 (ROM), 6.1 (GCMT), 6.1 (RMT). mb 5.8 (GS). MS 6.0 (GS). ME 5.9 (GS). ML 6.1 (LDG), 5.9 (ROM), 5.9 (ZUR). Mo  $1.2 \cdot 10^{18}$  Nm (WCMT),  $2.1 \cdot 10^{18}$  Nm (GS),  $1.4 \cdot 10^{18}$  Nm (UCMT),  $1.8 \cdot 10^{18}$  Nm (ROM),  $1.7 \cdot 10^{18}$  Nm (GCMT),  $1.6 \cdot 10^{18}$  Nm (RMT). Es  $1.5 \cdot 10^{13}$  Nm (GS). At least 7 people killed, 50 injured, about 11,000 displaced and many buildings damaged (VII) in the Mirandola-Sant'Agostino area. Liquefaction observed at San Carlo. Felt (V) in the Bologna-Mantova-Rovigo area. Felt throughout northern Italy, in much of central Italy and as far as Foggia and Naples. Also felt in Monaco and in parts of Austria, Croatia, Slovenia, southeastern France, southern Germany and Switzerland.
- MAY 28 05 07 23.4 28.043 S 63.094 W 587 D 6.7 0.8 548 SANTIAGO DEL ESTERO, ARGENTINA. MW 6.7 (WCMT), 6.8 (GS), 6.7 (UCMT), 6.7 (GCMT). mb 6.0 (GS). MD 6.4 (SJA). Mo  $1.4 \cdot 10^{19}$  Nm (WCMT),  $1.7 \cdot 10^{19}$  Nm (GS),  $1.4 \cdot 10^{19}$  Nm (UCMT),  $1.3 \cdot 10^{19}$  Nm (GCMT),  $7.4 \cdot 10^{18}$  Nm (PPT).
- MAY 29 07 00 03.0& 44.851 N 11.086 E 10 5.8 678 NORTHERN ITALY. <ROM>. MW 5.8 (WCMT), 5.8 (GS), 6.0 (ROM), 5.9 (GCMT). mb 5.9 (GS). MS 5.8 (GS). ME 5.9 (GS). ML 5.9 (ZUR), 5.8 (LDG). Mo  $5.5 \cdot 10^{17}$  Nm (WCMT),  $6.6 \cdot 10^{17}$  Nm (GS),  $1.1 \cdot 10^{18}$  Nm (ROM),  $7.7 \cdot 10^{17}$  Nm (GCMT). Es  $1.6 \cdot 10^{13}$  Nm (GS). At least 17 people killed, 350 injured and many buildings destroyed or damaged (VIII) in the Cavezzo-Medolla-Mirandola area. Felt (VI) at Cento; (V) at Carpi, Ferrara, Mantova and Modena; (IV) at Bologna, Brescia, Genoa, Milan, Padova, Parma, Pisa, Ravenna, Trento, Venice, Verona, Viareggio and Vicenza. Felt throughout northern and central Italy and as far as Naples. Also felt in parts of western Austria, Croatia, southeastern France, Liechtenstein, Slovenia and Switzerland.
- JUN 04 11 18 13.4 7.692 S 106.371 E 50 G 5.9 0.9 542 JAVA, INDONESIA. MW 5.9 (WCMT), 5.7 (GS), 5.8 (GCMT). mb 5.9 (GS). MS 5.2 (GS). ME 5.8 (GS). Mo  $8.1 \cdot 10^{17}$  Nm (WCMT),  $4.7 \cdot 10^{17}$  Nm (GS),  $6.0 \cdot 10^{17}$  Nm (GCMT). Es  $1.0 \cdot 10^{13}$  Nm (GS). Two people injured and minor damage at Jakarta. Felt (IV) at Bandung and Pangandaran; (III) at Jakarta; (II) at Bogor and Cisarua. Felt widely in western Java. Also felt on Christmas Island, Australia.
- JUN 10 12 44 16.5& 36.420 N 28.880 E 35 6.0 529 DODECANESE ISLANDS, GREECE. <ATH>. MW 6.0 (WCMT), 5.8 (GS), 6.1 (GCMT). mb 5.8 (GS). MS 5.9 (GS). ML 6.0 (ISK), 5.9 (THE), 5.8 (ATH). Mo  $1.3 \cdot 10^{18}$  Nm (WCMT),  $7.3 \cdot 10^{17}$  Nm (GS),  $1.8 \cdot 10^{18}$  Nm (GCMT). At least 6 people injured and several buildings damaged in Mugla, Turkey. Felt (VI) at Fethiye; (V) at Dalaman; (IV) at Alanya, Marmaris and Ortaca; (III) at Antalya, Bodrum, Izmir, Kas and Koycegiz. Felt (IV) at Kos and Rodos, (III) at Lardos and (II) at Irakleio, Greece. Felt (II) at Nicosia, Cyprus and at Cairo, Egypt. Felt in much of southwestern Turkey and the Dodecanese Islands, Greece and in parts of Cyprus, northeastern Egypt and western Lebanon.
- JUN 11 05 29 11.5 36.023 N 69.351 E 16 G 5.7 1.1 332 HINDU KUSH REGION, AFGHANISTAN. MW 5.7 (WCMT), 5.7 (UCMT), 5.6 (GS), 5.8 (GCMT). mb 5.6 (GS). MS 5.6 (GS). Mo  $4.3 \cdot 10^{17}$  Nm (WCMT),  $4.0 \cdot 10^{17}$  Nm (UCMT),  $3.1 \cdot 10^{17}$  Nm (GS),  $5.6 \cdot 10^{17}$  Nm (GCMT). At least 75 people killed, 13 injured, 114 buildings destroyed and 593 damaged after landslides occurred in Baghlan. At least 19 buildings destroyed or damaged in Takhar. Felt (V) at Kunduz; (III) at Bagrami, Charikar, Jabal us Saraj, Kabul and Bazar-e Sharif; (II) at Jalalabad. Also felt at Abbottabad and Islamabad, Pakistan and at Dushanbe, Tajikistan.
- JUN 14 05 52 53.6& 37.294 N 42.325 E 5 5.3 338 TURKEY-SYRIA-IRAQ BORDER REGION. <ISK>. mb 5.3 (GS). ML 5.5 (ISK), 5.5 (DDA). At least 23 people slightly injured and 25 buildings damaged in Sirnak, Turkey. Felt (IV) at Erbil and (III) at Dahuk, Iraq. Also felt at Mosul.
- JUN 24 07 59 34.8 27.767 N 100.781 E 10 G 5.5 1.1 272 SICHUAN-YUNNAN BORDER REGION, CHINA. MW 5.5 (WCMT), 5.5 (GCMT). mb 5.5 (GS). MS 5.3 (GS). Mo  $2.3 \cdot 10^{17}$  Nm (WCMT),  $2.6 \cdot 10^{17}$  Nm (GCMT). Four people killed and at least 394 injured in the

Lijiang-Yanyuan area. At least 6,768 houses damaged or destroyed, some roads damaged and water supplies disrupted in the epicentral area. Felt at Dali and Zhaotong. Also felt at Khonsa, India.

JUN 29 21 07 33.8 43.433 N 84.700 E 18 G 6.3 0.9 526 NORTHERN XINJIANG, CHINA. MW 6.3 (WCMT), 6.3 (UCMT), 6.2 (GS), 6.3 (GCMT). mb 6.2 (GS). MS 6.4 (GS). ME 6.5 (GS). Mo  $3.4 \cdot 10^{18}$  Nm (WCMT),  $3.0 \cdot 10^{18}$  Nm (UCMT),  $2.4 \cdot 10^{18}$  Nm (GS),  $4.1 \cdot 10^{18}$  Nm (GCMT). Es  $1.3 \cdot 10^{14}$  Nm (GS). At least 52 people injured, 48,000 people displaced, more than 7,500 rooms collapsed, 64,000 rooms damaged and 2,217 livestock killed in Xinyuan. Rockslides blocked roads in the area. Preliminary estimate of damage is about 68 million U.S. dollars. Felt (VI) at Shihezi and (IV) at Urumqi. Also felt at Changji, Karamay and in Hejing. Felt (IV) at Almaty, Kazakhstan.

JUL 20 12 11 52.0 32.978 N 119.593 E 10 G 4.9 0.8 167 JIANGSU, CHINA. mb 4.9 (GS). One person killed and two injured at Yangzhou. Thirteen rooms collapsed and 506 damaged at Taizhou and Yangzhou. Felt (III) at Changzhou, Nanjing, Xiaolingwei and Yangzhou. Also felt at Chuzhou, Gaoyou, Hefei, Huaiyin, Yancheng and Zhenjiang.

JUL 26 05 33 31.4 17.606 S 66.367 E 10 G 6.7 1.0 79 MAURITIUS - REUNION REGION. MW 6.7 (WCMT), 6.7 (UCMT), 6.6 (GS), 6.6 (GCMT). mb 5.8 (GS). MS 6.3 (GS). ME 6.9 (GS). Mo  $1.3 \cdot 10^{19}$  Nm (WCMT),  $1.2 \cdot 10^{19}$  Nm (UCMT),  $1.1 \cdot 10^{19}$  Nm (GS),  $1.0 \cdot 10^{19}$  Nm (GCMT). Es  $5.3 \cdot 10^{14}$  Nm (GS).

JUL 28 20 03 56.7 4.655 S 153.159 E 41 6.5 0.9 539 NEW IRELAND REGION, PAPUA NEW GUINEA. MW 6.5 (WCMT), 6.5 (UCMT), 6.5 (GS), 6.5 (GCMT), 6.5 (UCMT). ME 5.9 (GS). Mo  $8.0 \cdot 10^{18}$  Nm (WCMT),  $8.1 \cdot 10^{18}$  Nm (GS),  $7.5 \cdot 10^{18}$  Nm (UCMT),  $7.5 \cdot 10^{18}$  Nm (GCMT),  $6.3 \cdot 10^{18}$  Nm (PPT). Es  $1.4 \cdot 10^{13}$  Nm (GS). Felt at Kavieng and Manatani. Also felt at Kokopo, New Britain.

AUG 11 12 23 18.2 38.358 N 46.812 E 10 G 6.4 1.3 419 NORTHWESTERN IRAN. MW 6.4 (WCMT), 6.4 (UCMT), 6.3 (GS), 6.5 (GCMT). mb 6.2 (GS). MS 6.7 (GS). ME 6.9 (GS). ML 6.2 (TEH). Mo  $5.2 \cdot 10^{18}$  Nm (WCMT),  $5.8 \cdot 10^{18}$  Nm (UCMT),  $4.0 \cdot 10^{18}$  Nm (GS),  $6.3 \cdot 10^{18}$  Nm (GCMT). Es  $5.5 \cdot 10^{14}$  Nm (GS). At least 250 people killed and 2,000 injured in numerous villages in epicentral area. Four villages were destroyed and 60 were heavily damaged. Structural damage to some buildings at Tabriz and power and phone lines were disrupted. Felt (III) at Yerevan, Armenia. Also felt at Kapan. Felt (II) at Tbilisi, Georgia and at Van, Turkey.

AUG 14 02 59 42.0 49.784 N 145.126 E 626 7.7 0.7 960 SEA OF OKHOTSK. MW 7.7 (WCMT), 7.7 (UCMT), 7.7 (GCMT), 7.7 (UCMT). ME 7.6 (GS). Mo  $4.6 \cdot 10^{20}$  Nm (WCMT),  $5.0 \cdot 10^{20}$  Nm (UCMT),  $4.8 \cdot 10^{20}$  Nm (GCMT). Es  $4.8 \cdot 10^{15}$  Nm (GS).

AUG 18 09 41 52.5 1.318 S 120.102 E 10 G 6.3 1.2 299 SULAWESI, INDONESIA. MW 6.3 (WCMT), 6.3 (UCMT), 6.3 (GS), 6.3 (GCMT). mb 5.8 (GS). MS 6.1 (GS). ME 6.6 (GS). Mo  $3.2 \cdot 10^{18}$  Nm (WCMT),  $4.0 \cdot 10^{18}$  Nm (UCMT),  $3.6 \cdot 10^{18}$  Nm (GS),  $3.6 \cdot 10^{18}$  Nm (GCMT). Es  $1.6 \cdot 10^{14}$  Nm (GS). Six people were killed and at least 43 injured in the epicentral area. At least 471 homes were destroyed and 1097 were damaged. Landslides blocked access to 14 villages, and roads and bridges were destroyed. Felt (V) at Palu and (IV) at Kulawi. Also felt at Poso.

AUG 26 15 05 37.0 2.190 N 126.837 E 91 6.6 0.9 497 MOLUCCA SEA. MW 6.6 (WCMT), 6.6 (UCMT), 6.5 (GS), 6.6 (GCMT), 6.6 (UCMT). mb 6.3 (GS). Mo  $9.1 \cdot 10^{18}$  Nm (WCMT),  $9.3 \cdot 10^{18}$  Nm (UCMT),  $6.3 \cdot 10^{18}$  Nm (GS),  $8.9 \cdot 10^{18}$  Nm (GCMT),  $6.2 \cdot 10^{18}$  Nm (PPT).

AUG 27 04 37 19.4 12.139 N 88.590 W 28 G 7.3 1.3 417 OFF THE COAST OF EL SALVADOR. MW 7.3 (WCMT), 7.4 (UCMT), 7.3 (GCMT). mb 6.0 (GS). MS 6.9 (GS). ME 6.4 (GS). MD 6.7 (SNET). Mo  $1.2 \cdot 10^{20}$  Nm (WCMT),  $1.8 \cdot 10^{20}$  Nm (UCMT),  $1.2 \cdot 10^{20}$  Nm (GCMT),  $8.4 \cdot 10^{19}$  Nm (PPT). Es  $9.3 \cdot 10^{13}$  Nm (GS). Felt (II) at Antiguo Cuscatlan, Nueva San Salvador and San Salvador. Also felt at Apopa, Mejicanos, Santo Tomas and Usulután. Felt at Tegucigalpa, Honduras and at Managua, Nicaragua. A small tsunami was recorded, with maximum wave heights (one-half peak-to-

trough) at the following selected tide stations: 11 cm at Acajutla, El Salvador and 21 cm at La Libertad, 35 cm on Isla Baltra and 22 cm on Isla Santa Cruz, Ecuador.

- AUG 30 13 43 25.1 71.438 N 10.584 W 14 G 6.8 1.1 564 JAN MAYEN ISLAND REGION. MW 6.8 (WCMT), 6.7 (UCMT), 6.6 (GS), 6.7 (GCMT), 6.8 (GS). ME 7.1 (GS). Mo  $1.7 \cdot 10^{19}$  Nm (WCMT),  $1.4 \cdot 10^{19}$  Nm (UCMT),  $1.0 \cdot 10^{19}$  Nm (GS),  $1.6 \cdot 10^{19}$  Nm (GCMT). Es  $8.5 \cdot 10^{14}$  Nm (GS).
- AUG 31 12 47 33.3 10.819 N 126.627 E 28 G 7.6 1.0 637 PHILIPPINE ISLANDS REGION. MW 7.6 (WCMT), 7.6 (UCMT), 7.5 (GS), 7.6 (GCMT). mb 7.2 (GS). MS 7.6 (GS). ME 7.9 (GS). Mo  $3.1 \cdot 10^{20}$  Nm (WCMT),  $3.4 \cdot 10^{20}$  Nm (UCMT),  $2.6 \cdot 10^{20}$  Nm (GS),  $3.3 \cdot 10^{20}$  Nm (GCMT),  $4.4 \cdot 10^{20}$  Nm (PPT). Es  $1.8 \cdot 10^{16}$  Nm (GS). One person killed and one injured at Cagayan de Oro, Mindanao. Several roads and bridges damaged and power outages occurred in several towns. A small landslide occurred on Mindanao. A local tsunami with wave heights of 0.03 meters observed at Davao, Mindanao and at Daet and Legaspi City, Luzon. Felt (VII PIVS) at Borongan, General MacArthur, Guiuan, Llorente, Oras and Sulat and (VI PIVS) at San Julian, Samar. Also felt (VII PIVS) at Tacloban and (VI PIVS) at Palo, Leyte. Felt (VI PIVS) on Siargao Island. Felt (V PIVS) at Duero, Tagbilaran City and Talibon, Bohol; Panganiban, Catanduanes Island; Cebu City, Cebu; Legaspi City and Sorsogon, Luzon; Barobo, Bislig, Butuan, Carrascal, Cateel, Compostela, Davao, Lingig, Mati and Tandag, Mindanao; Iloilo and Roxas City, Panay. Felt (IV PIVS) at Masbate, Masbate and at Bacolod and Dumaguete, Negros. Felt (III PIVS) at Mambajao, Camiguin Island, at Jordan, Guimaras Island and at Siquijor, Siquijor Island. Felt (III) on Pulau Ternate, Indonesia.
- SEP 05 14 42 07.8 10.099 N 85.308 W 35 G 7.6 1.2 702 COSTA RICA. MW 7.6 (WCMT), 7.6 (UCMT), 7.6 (GCMT). mb 6.8 (GS). MS 7.7 (GS). ME 7.0 (GS). Mo  $2.9 \cdot 10^{20}$  Nm (WCMT),  $2.8 \cdot 10^{20}$  Nm (UCMT),  $3.1 \cdot 10^{20}$  Nm (GCMT),  $2.1 \cdot 10^{20}$  Nm (PPT). Es  $6.5 \cdot 10^{14}$  Nm (GS). One person killed and one died of a heart attack. Some houses collapsed, one bridge damaged and landslides occurred in the epicentral area. Power and communications outages occurred. Felt strongly at San Jose and throughout much of Costa Rica. Also felt in parts of Belize, El Salvador, Guatemala, Honduras, Nicaragua and Panama.
- SEP 07 03 19 42.5 27.575 N 103.985 E 10 G 5.5 1.0 381 SICHUAN-YUNNAN-GUIZHOU REGION, CHINA. MW 5.5 (WCMT), 5.6 (GS), 5.6 (GCMT). mb 5.6 (GS). MS 5.4 (GS). Mo  $2.2 \cdot 10^{17}$  Nm (WCMT),  $3.5 \cdot 10^{17}$  Nm (GS),  $3.3 \cdot 10^{17}$  Nm (GCMT). At least 81 people killed, 821 people injured, 37,000 buildings destroyed, 133,000 houses damaged, landslides and power outages occurred in the epicentral area. Felt at Chengdu and Zhaotong.
- SEP 30 16 31 35.9 1.929 N 76.362 W 170 G 7.3 0.9 934 COLOMBIA. MW 7.3 (WCMT), 7.2 (UCMT), 7.2 (GS), 7.2 (GCMT). mb 7.0 (GS). ME 6.8 (GS). Mo  $9.6 \cdot 10^{19}$  Nm (WCMT),  $8.8 \cdot 10^{19}$  Nm (UCMT),  $8.4 \cdot 10^{19}$  Nm (GS),  $8.9 \cdot 10^{19}$  Nm (GCMT). Es  $3.7 \cdot 10^{14}$  Nm (GS). Felt (V) at Cali and Pereira; (IV) at Armenia, Envigado, Manizales, Medellin, Pasto and Popayan; (III) at Bogota. Also felt (IV) at Bahia de Caraquez and (III) at Guayaquil and Quito, Ecuador. Felt in much of south-western Colombia and north-western Ecuador. Also felt in parts of Panama.
- OCT 09 12 32 04.3 61.033 S 153.960 E 10 6.6 0.8 44 BALLENY ISLANDS REGION. MW 6.6 (WCMT), 6.3 (GS), 6.6 (GCMT). Mo  $1.1 \cdot 10^{19}$  Nm (WCMT),  $4.2 \cdot 10^{18}$  Nm (GS),  $9.0 \cdot 10^{18}$  Nm (GCMT).
- OCT 12 00 31 28.2 4.893 S 134.027 E 13 G 6.6 1.0 289 NEAR THE SOUTH COAST OF PAPUA, INDONESIA. MW 6.6 (WCMT), 6.5 (UCMT), 6.5 (GS), 6.6 (GCMT). mb 6.3 (GS). ME 6.8 (GS). Mo  $1.0 \cdot 10^{19}$  Nm (WCMT),  $8.0 \cdot 10^{18}$  Nm (UCMT),  $6.2 \cdot 10^{18}$  Nm (GS),  $9.0 \cdot 10^{18}$  Nm (GCMT). Es  $3.2 \cdot 10^{14}$  Nm (GS). Felt (IV) at Ambon and (III) at Nabire, Timika and Wamena. Felt (II) at Darwin, Australia.
- OCT 24 00 45 32.9 10.085 N 85.298 W 17 G 6.5 0.9 691 COSTA RICA. MW 6.5 (WCMT), 6.4 (UCMT), 6.4 (GS), 6.4 (GCMT). mb 6.0 (GS). MS 6.2 (GS). ME 6.2 (GS). Mo  $6.8 \cdot 10^{18}$  Nm (WCMT),



- 5.9\*10\*\*18 Nm (UCMT), 4.4\*10\*\*18 Nm (GS), 5.3\*10\*\*18 Nm (GCMT). Es 4.3\*10\*\*13 Nm (GS). Felt (V) at Grecia and Nicoya; (IV) at Alajuela, Santa Ana, Santa Cruz, Sardinal and Tres Rios; (III) at Escazu and Nandayure. Felt in much of central and western Costa Rica and as far north as Managua, Nicaragua.
- OCT 25 23 05 24.0& 39.880 N 16.010 E 6 5.3 248 SOUTHERN ITALY. <ROM>. MW 5.3 (WCMT), 5.3 (GCMT), 5.2 (RMT). mb 5.2 (GS). ML 5.0 (ROM). Mo 1.1\*10\*\*17 Nm (WCMT), 1.1\*10\*\*17 Nm (GCMT), 9.4\*10\*\*16 Nm (RMT). One person died of a heart attack in Cosenza. Felt at Mormanno.
- OCT 28 03 04 09.7 52.781 N 132.103 W 20 G 7.8 1.0 740 QUEEN CHARLOTTE ISLANDS REGION. MW 7.8 (WCMT), 7.8 (UCMT), 7.7 (GCMT). ME 7.6 (GS). Mo 5.7\*10\*\*20 Nm (WCMT), 6.1\*10\*\*20 Nm (UCMT), 5.2\*10\*\*20 Nm (GCMT). Es 5.8\*10\*\*15 Nm (GS). WP 7.7 (GS). Felt (V) in the Masset-Queen Charlotte City area and (IV) at Fort Saint James, Kelowna, Kitimat, Prince Rupert and Revelstoke. Felt from Seattle, Washington to Juneau, Alaska and Calgary, Alberta.
- NOV 07 16 35 46.8 13.977 N 91.876 W 24 G 7.4 1.2 687 OFFSHORE GUATEMALA. MW 7.4 (WCMT), 7.3 (UCMT), 7.3 (GCMT). mb 6.6 (GS). MS 7.4 (GS). ME 7.0 (GS). Mo 1.5\*10\*\*20 Nm (WCMT), 1.3\*10\*\*20 Nm (UCMT), 1.3\*10\*\*20 Nm (GCMT). Es 6.1\*10\*\*14 Nm (GS). At least 39 people killed, 155 injured, 100 missing and dozens of buildings damaged in Quetzaltenango and San Marcos. Felt (VII) in Quetzaltenango; (VI) at Antigua Guatemala and Villa Nueva; (V) at Cahabon, Fraijanes, Guatemala, Huehuetenango and Panajachel; (IV) at Champerico, Coban, Mixco, San Bartolome Milpas Altas, Santa Catarina Pinula and Santiago Atitlan. Also felt (VI) at Tapachula; (IV) at Centro, Lazaro Cardenas, San Cristobal de Las Casas, Tuxtla Gutierrez and Jalapa; (III) at Granjas Mexico, Mexico and Villahermosa, Mexico. Felt (IV) at San Salvador and (III) at Antiguo Cuscatlan, Ilopango and Nueva San Salvador, El Salvador. Felt (III) at Belize City and Dangriga, Belize. Felt in many parts of Belize, El Salvador, Guatemala, Honduras, Mexico and Nicaragua. A tsunami was recorded with wave heights of 30 centimeters at Puerto Chiapas, Mexico and 7 centimeters at Acajutla, El Salvador.
- NOV 11 01 12 38.9 23.005 N 95.883 E 14 G 6.8 1.0 322 MYANMAR. MW 6.8 (WCMT), 6.8 (UCMT), 6.8 (GS). ME 7.1 (GS). Mo 2.3\*10\*\*19 Nm (WCMT), 2.0\*10\*\*19 Nm (UCMT). Es 9.4\*10\*\*14 Nm (GS).
- NOV 11 22 15 00.4 14.164 N 92.167 W 27 6.5 1.1 568 OFFSHORE GUATEMALA. MW 6.5 (WCMT), 6.4 (UCMT), 6.2 (GS), 6.5 (GS). ME 5.7 (GS). Mo 7.3\*10\*\*18 Nm (WCMT), 5.8\*10\*\*18 Nm (UCMT), 2.2\*10\*\*18 Nm (GS). Es 9.0\*10\*\*12 Nm (GS).
- NOV 16 18 12 39.9 49.273 N 155.478 E 29 6.4 0.8 11 790 KURIL ISLANDS. MW 6.5 (WCMT), 6.5 (UCMT), 6.4 (GS), 6.5 (GCMT). ME 6.4 (GS). Broadband Source Parameters (GS): Dep 29 km; Fault plane solution: NP1: Strike=20, Dip=70, Slip=90; NP2: Strike=200, Dip=20, Slip=90; Radiated energy 8.7\*10\*\*13 Nm. Centroid, Moment Tensor (UCMT): Centroid origin time 18:12:55.7; Lat 49.08 N; Lon 155.60 E; Dep 45.0 km; Principal axes (scale 10\*\*18 Nm): (T) Val=7.36, Plg=77, Azm=291; (N) Val=-0.42, Plg=3, Azm=32; (P) Val=-6.94, Plg=13, Azm=123; Best double couple: Mo=7.2\*10\*\*18 Nm; NP1: Strike=31, Dip=58, Slip=87; NP2: Strike=217, Dip=32, Slip=95. Centroid, Moment Tensor (WCMT): Centroid origin time 18:12:39.0; Lat 49.17 N; Lon 155.63 E; Dep 50.0 km; Principal axes (scale 10\*\*18 Nm): (T) Val=6.61, Plg=68, Azm=295; (N) Val=-0.51, Plg=2, Azm=31; (P) Val=-6.10, Plg=21, Azm=122; Best double couple: Mo=6.4\*10\*\*18 Nm; NP1: Strike=218, Dip=23, Slip=97; NP2: Strike=30, Dip=67, Slip=87. Moment Tensor (GS): Dep 35 km; Principal axes (scale 10\*\*18 Nm): (T) Val=4.54, Plg=74, Azm=316; (N) Val=-0.15, Plg=6, Azm=205; (P) Val=-4.38, Plg=15, Azm=114; Best double couple: Mo=4.5\*10\*\*18 Nm; NP1: Strike=29, Dip=60, Slip=97; NP2: Strike=195, Dip=31, Slip=79. Centroid, Moment Tensor (GCMT): Centroid origin time 18:12:46.7; Lat 49.16 N; Lon 155.99 E; Dep 43.8 km; Half-duration 4.3 sec; Principal axes (scale 10\*\*18 Nm): (T) Val=6.46, Plg=76, Azm=293; (N) Val=0.39, Plg=3, Azm=33; (P) Val=-6.85, Plg=14, Azm=123; Best double couple: Mo=6.7\*10\*\*18 Nm; NP1: Strike=217, Dip=31, Slip=95; NP2: Strike=31, Dip=59, Slip=87.

DEC 07 08 18 23.1 37.890 N 143.949 E 31 MW 7.3 14 918 OFF THE EAST COAST OF HONSHU, JAPAN. MW 7.3 (WCMT), 7.3 (GS), 7.2 (GCMT). ME 7.3 (GS). At least 5 people injured in Miyagi and 5 injured in Tokyo. Felt (V) at Hachinohe, Kasukabe, Kawasaki, Koriyama, Misawa, Saitama, Tsuchiura and Tsukuba and in Aomori, Chiba, Mito, Morioka and Sendai; (IV) at Fussa, Narita, Tokyo and Yokosuka and in Yokohama; (III) in Niigata and at Sagamihara. Felt widely in northern Honshu and parts of southern Hokkaido. Recorded (5L JMA) in Aomori, Ibaraki, Iwate, Miyagi and Tochigi. A tsunami was recorded with a wave height (above sea level) of 17 cm at Ofunato. Broadband Source Parameters (GS): Dep 31 km; Fault plane solution: NP1: Strike=175, Dip=60, Slip=80; NP2: Strike=14, Dip=31, Slip=107; Radiated energy  $2.0 \times 10^{15}$  Nm. Complex earthquake. Depths 31 and 36 km for the initial small onset and first large event, respectively. seismograms. Apparent Stress 1.78 MPa. Centroid, Moment Tensor (WCMT): Centroid origin time 08:18:24.0; Lat 38.19 N; Lon 144.47 E; Dep 35.0 km; Principal axes (scale  $10^{20}$  Nm): (T) Val=1.08, Plg=48, Azm=105; (N) Val=0.12, Plg=8, Azm=5; (P) Val=-1.20, Plg=39, Azm=267; Best double couple: Mo= $1.1 \times 10^{20}$  Nm; NP1: Strike=303, Dip=10, Slip=28; NP2: Strike=186, Dip=85, Slip=99. Moment Tensor (GS): Dep 42 km; Principal axes (scale  $10^{19}$  Nm): (T) Val=9.80, Plg=71, Azm=36; (N) Val=-0.31, Plg=16, Azm=183; (P) Val=-9.49, Plg=9, Azm=276; Best double couple: Mo= $9.7 \times 10^{19}$  Nm; NP1: Strike=24, Dip=38, Slip=116; NP2: Strike=172, Dip=56, Slip=71. Centroid, Moment Tensor (GCMT): Centroid origin time 08:18:34.9; Lat 38.01 N; Lon 144.09 E; Dep 57.8 km; Half-duration 11.8 sec; Principal axes (scale  $10^{19}$  Nm): (T) Val=5.95, Plg=54, Azm=13; (N) Val=3.89, Plg=35, Azm=183; (P) Val=-9.83, Plg=5, Azm=276; Best double couple: Mo= $7.9 \times 10^{19}$  Nm; NP1: Strike=38, Dip=51, Slip=138; NP2: Strike=158, Dip=59, Slip=48.

DEC 10 16 53 08.7 6.533 S 129.825 E 155 6.6 8 517 BANDA SEA. MW 7.1 (WCMT), 7.1 (UCMT), 7.1 (GS), 7.1 (GCMT). ME 7.2 (GS). Felt (IV) at Amahai, Indonesia. Also felt at Sorong. Felt (IV) at Dili, East Timor. Also felt at Manatuto. Felt (IV) at Kununurra; (III) at Cox Peninsula, Darwin, Humpty Doo-MacMinns Lagoon and Palmerston; (II) at Katherine, Australia. Also felt at Alice Springs, East Arnhem, Galiwinku, Howard Springs and Jabiru. Broadband Source Parameters (GS): Dep 155 km; Fault plane solution: NP1: Strike=40, Dip=80, Slip=40; NP2: Strike=302, Dip=51, Slip=167; Radiated energy  $1.4 \times 10^{15}$  Nm. Apparent Stress 0.18 MPa. Centroid, Moment Tensor (WCMT): Centroid origin time 16:53:09.0; Lat 6.52 S; Lon 130.01 E; Dep 160.0 km; Principal axes (scale  $10^{19}$  Nm): (T) Val=5.93, Plg=37, Azm=280; (N) Val=-0.85, Plg=43, Azm=57; (P) Val=-5.08, Plg=22, Azm=171; Best double couple: Mo= $5.6 \times 10^{19}$  Nm; NP1: Strike=310, Dip=45, Slip=168; NP2: Strike=49, Dip=81, Slip=45. Centroid, Moment Tensor (UCMT): Centroid origin time 16:53:23.5; Lat 6.57 S; Lon 129.82 E; Dep 148.0 km; Principal axes (scale  $10^{19}$  Nm): (T) Val=5.70, Plg=36, Azm=279; (N) Val=-0.96, Plg=46, Azm=59; (P) Val=-4.74, Plg=21, Azm=173; Best double couple: Mo= $5.2 \times 10^{19}$  Nm; NP1: Strike=49, Dip=81, Slip=43; NP2: Strike=311, Dip=48, Slip=167. Moment Tensor (GS): Dep 156 km; Principal axes (scale  $10^{19}$  Nm): (T) Val=5.89, Plg=39, Azm=281; (N) Val=-0.25, Plg=39, Azm=52; (P) Val=-5.64, Plg=27, Azm=166; Best double couple: Mo= $5.8 \times 10^{19}$  Nm; NP1: Strike=46, Dip=83, Slip=51; NP2: Strike=307, Dip=40, Slip=168. Centroid, Moment Tensor (GCMT): Centroid origin time 16:53:15.1; Lat 6.61 S; Lon 129.90 E; Dep 161.5 km; Half-duration 8.6 sec; Principal axes (scale  $10^{19}$  Nm): (T) Val=6.07, Plg=37, Azm=279; (N) Val=-1.02, Plg=46, Azm=58; (P) Val=-5.05, Plg=21, Azm=172; Best double couple: Mo= $5.6 \times 10^{19}$  Nm; NP1: Strike=310, Dip=47, Slip=167; NP2: Strike=49, Dip=81, Slip=44. urface waves: sta=154, comp=411, per=50.

DEC 21 22 28 07.2 14.332 S 167.295 E 188G 6.1 A 0.9 13 521 VANUATU. MW 6.7 (WCMT), 6.7 (UCMT), 6.7 (GS), 6.7 (GCMT). Felt at Sola. Centroid, Moment Tensor (UCMT): Centroid origin time 22:28:28.1; Lat 14.31 N; Lon 167.37 E; Dep 198.0 km; Principal axes (scale  $10^{19}$  Nm): (T) Val=1.35, Plg=75, Azm=168; (N) Val=-0.04, Plg=15, Azm=341; (P) Val=-1.31, Plg=2, Azm=72; Best double couple: Mo= $1.3 \times 10^{19}$  Nm; NP1: Strike=328, Dip=48, Slip=70; NP2: Strike=177, Dip=45, Slip=111. Centroid, Moment Tensor (WCMT): Centroid origin time 22:28:09.0; Lat 14.28 S; Lon 166.95 E; Dep 210.0 km; Principal axes (scale  $10^{19}$  Nm): (T) Val=1.27, Plg=77, Azm=175; (N) Val=-0.07, Plg=12, Azm=341; (P) Val=-1.20, Plg=3, Azm=72; Best double couple: Mo= $1.2 \times 10^{19}$  Nm; NP1: Strike=175, Dip=43, Slip=108; NP2: Strike=330, Dip=49, Slip=73. Moment Tensor (GS): Dep 190 km; Principal axes (scale  $10^{19}$  Nm): (T) Val=1.50, Plg=81, Azm=202; (N) Val=-0.13, Plg=5, Azm=326; (P) Val=-1.38, Plg=8, Azm=57; Best double couple: Mo= $1.4 \times 10^{19}$  Nm

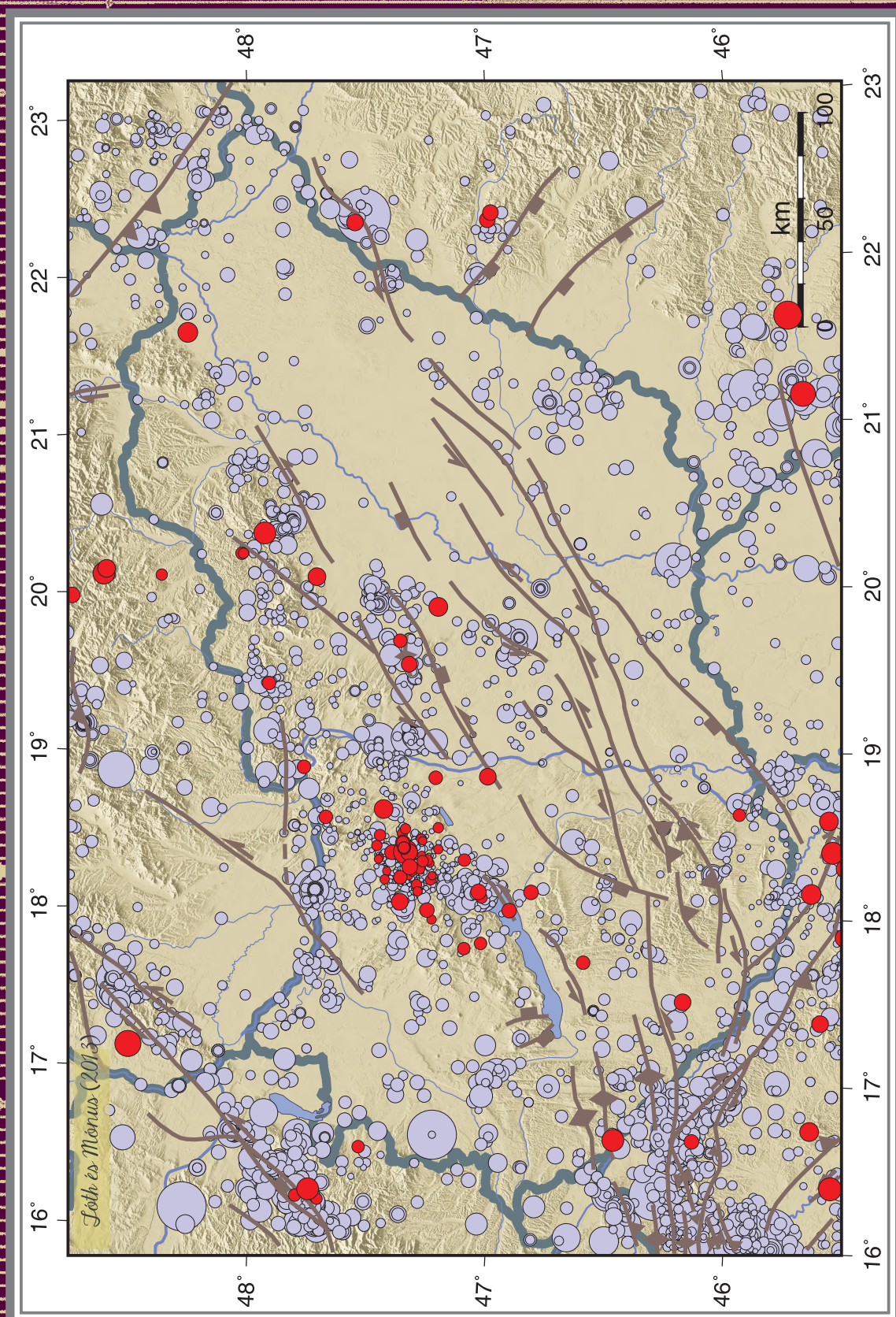
Nm; NP1: Strike=322, Dip=53, Slip=84; NP2: Strike=153, Dip=38, Slip=98.  
Centroid, Moment Tensor (GCMT): Centroid origin time 22:28:12.8; Lat 14.27  
S; Lon 167.16 E; Dep 199.1 km; Half- duration 5.3 sec; Principal axes (scale  
 $10^{19}$  Nm): (T) Val=1.32, Plg=77, Azm=183; (N) Val=-0.10, Plg=12, Azm=344;  
(P) Val=-1.23, Plg=4, Azm=75; Best double couple: Mo= $1.3 \cdot 10^{19}$  Nm; NP1:  
Strike=178, Dip=43, Slip=108; NP2: Strike=334, Dip=50, Slip=74. 384, per=50.

Compiled by Pamela J. Benfield and NEIC Operations Staff.

## JEGYZETEK / NOTES

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# Szeizmotektonika / Seismotectonics



○ 456-2011

● 2012

— Neotektonikai aktív szerkezetek  
Active neotectonic structures