

Seismological Station Network in Hungary (HU)

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Introduction

The Geodetic and Geophysical Research Institute (GGRI) is a member institution of the Research Centre of Earth Sciences which is supervised by the Hungarian Academy of Sciences (HAS). The institute was founded in 1971, but some parts of it have an earlier origin (e.g. the predecessor of the Seismological Observatory was founded in 1905). The main tasks of the institute are carrying out basic researches both in geodesy and in geophysics, running observatories (seismological, geomagnetic, ionospheric and geodynamic observations) and geophysical and geodetic measurements and interpretation. The institute has two main structural units: Department of Geodesy and Department of Geophysics. Seismological Observatory belongs to the latter one.

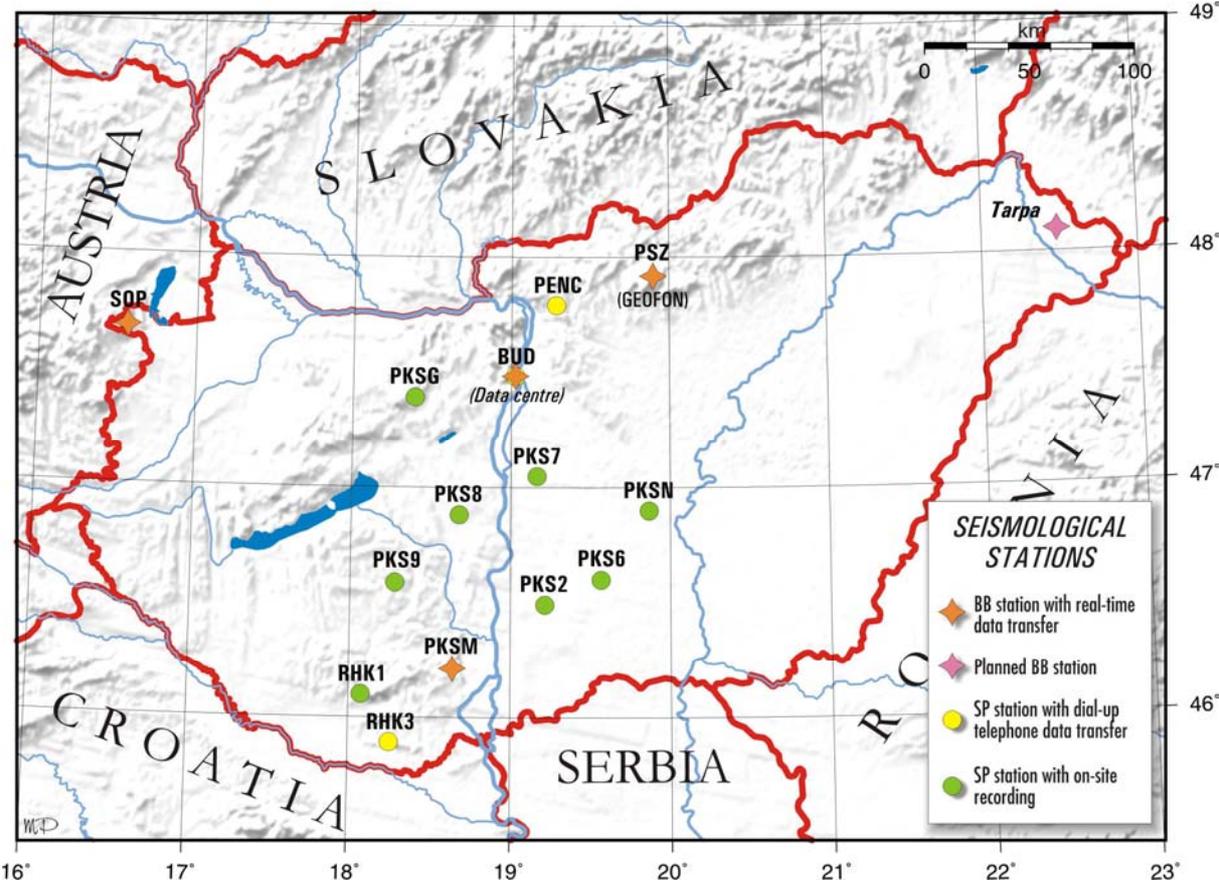


Fig. 1 Seismological stations in Hungary

Seismological station network

There are 14 seismological stations in Hungary operated by two different institutions: GGRI and GeoRisk Earthquake Research Institute Ltd. The two institutions share all the measured data. Table 1 and Table 2 contain all the important data of the Hungarian seismic stations and Figure 1 shows the areal distribution of them.

There are four broadband stations in the network: PSZ which is operated in cooperation with the German GEOFON network, BUD, PKSM and SOP. PKSM has been installed with the contribution of MEREDIAN project. All these stations are equipped with STS-2 sensor, EarthData PS-6-24 or Quanterra Q380 (PKSM) digitizer and SeisComP (Seismological Communication Processor) PC.

Table 1 Broadband seismic stations, instrumentation and lithology

Code	Latitude (N)	Longitude (E)	Elev. (m)	Foundation	Station type (1)	Sensor type (2)	Recording equipment (3)	Recording (4)	Org. (5)
BUD	47.4836	19.0239	196	dolomite	3C BB	STS-2	PS-6-24+ SeisComP PC	D - C	GGKI
PKSM	46.2119	18.6413	170	granite	3C BB	STS-2	Q380+ SeisComP PC	D - C	GGKI
PSZ	47.9184	19.8944	940	andesite	3C BB	STS-2	PS-6-24+ SeisComP PC	D - C	GEOFON- GGKI
SOP	47.6833	16.5583	260	gneiss	3C BB	STS-2	PS-6-24+ SeisComP PC	D - C	GGKI

Table 2 Other seismic stations, instrumentation and lithology

Code	Latitude (N)	Longitude (E)	Elev. (m)	Foundation	Station type (1)	Sensor type (2)	Recording equipment (3)	Recording (4)	Org. (5)
BUD	47.4836	19.0239	196	dolomite	3C LP 3C SP	Kirnos LE-3D	drum recorder MARS-88/MC	A - C D - E	GGKI GR
PENC	47.7905	19.2817	250	alluvium	3C SP	LE-3D	MARS-88/MC	D - E	GGKI
PKS2	46.4920	19.2131	106	sand	3C SP	LE-3D	MARS-88/OC	D - E	GR
PKS6	46.5998	19.5645	120	sand	3C SP	LE-3D	MARS-88/OC	D - E	GR
PKS7	47.0473	19.1609	95	mud	3C SP	LE-3D	MARS-88/OC	D - E	GR
PKS8	46.8787	18.6765	135	rhyolite tuff	3C SP	LE-3D	MARS-88/OC	D - E	GR
PKS9	46.5870	18.2789	240	loess	3C SP	LE-3D	MARS-88/OC	D - E	GR
PKSG	47.3918	18.3907	200	dolomite	3C SP	LE-3D	MARS-88/OC	D - E	GR
PKSN	46.8972	19.8673	110	sand	3C SP	LE-3D	MARS-88/OC	D - E	GR
RHK1	46.0948	18.0720	297	limestone	3C SP	SS-1	K2	D - E	GGKI-GR
RHK3	45.8885	18.2521	420	limestone	3C SP	LE-3D	MARS-88/MC	D - E	GGKI-GR

- (1) 1C – one component vertical seismometer; 3C – three component seismometer
 SP – short period seismometer; BB – broad band seismometer; LP – long period seismometer
- (2) STS-2 – Streckeisen broad band seismometer
 LE-3D – Lennartz three directional 1Hz geophone
 SS-1 – Kinematics 1Hz seismometer
 Kirnos – 12 s long period seismometer
- (3) MARS-88 – product of Lennartz electronic

- PS-6-24 –Earth Data digitizer
Q-380 – Quanterra data acquisition system
SSR-1 and K2 – product of Kinematics Inc.
SeisComP – Seismological Communication Processor
- (4) A – analogue; D – digital; C – continuous recording; E – event recording
(5) GEOFON – Network of GeoForschungsZentrum (Potsdam, Germany)
GGKI – Geodetic and Geophysical Research Institute, HAS (Budapest, Hungary)
GR – GeoRisk Earthquake Research Institute Ltd. (Budapest, Hungary)

(Near) real-time data transfer

All four broadband stations have near real-time data transfer between the remote site and the Budapest data center (BUD). Data are transferred via Internet with TCP/IP protocol. All stations use SeedLink for data transfer.

Data storage and availability

Continuous data from the broad-band stations are stored at data center BUD. Data from stations PSZ, SOP and PKSM received, archived and redistributed by GEOFON. At BUD several months of data are on-line but these are not available publicly – it has to be solved later in the frame of MEREDIAN project (AutoDRM). Live seismograms are provided on the world-wide web. Data are archived to CDs.

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