

DEVELOPMENTS AT POLISH SEISMOLOGICAL NETWORK

P. Wiejacz, W. Dębski, G. Lizurek, Ł. Rudziński, J. Suchcicki, J. Wiszniowski

pwiejacz@igf.edu.pl, debski@igf.edu.pl, lizurek@igf.edu.pl, rudzin@igf.edu.pl, suchcice@igf.edu.pl, jwysz@igf.edu.pl

Institute of Geophysics, Polish Academy of Sciences

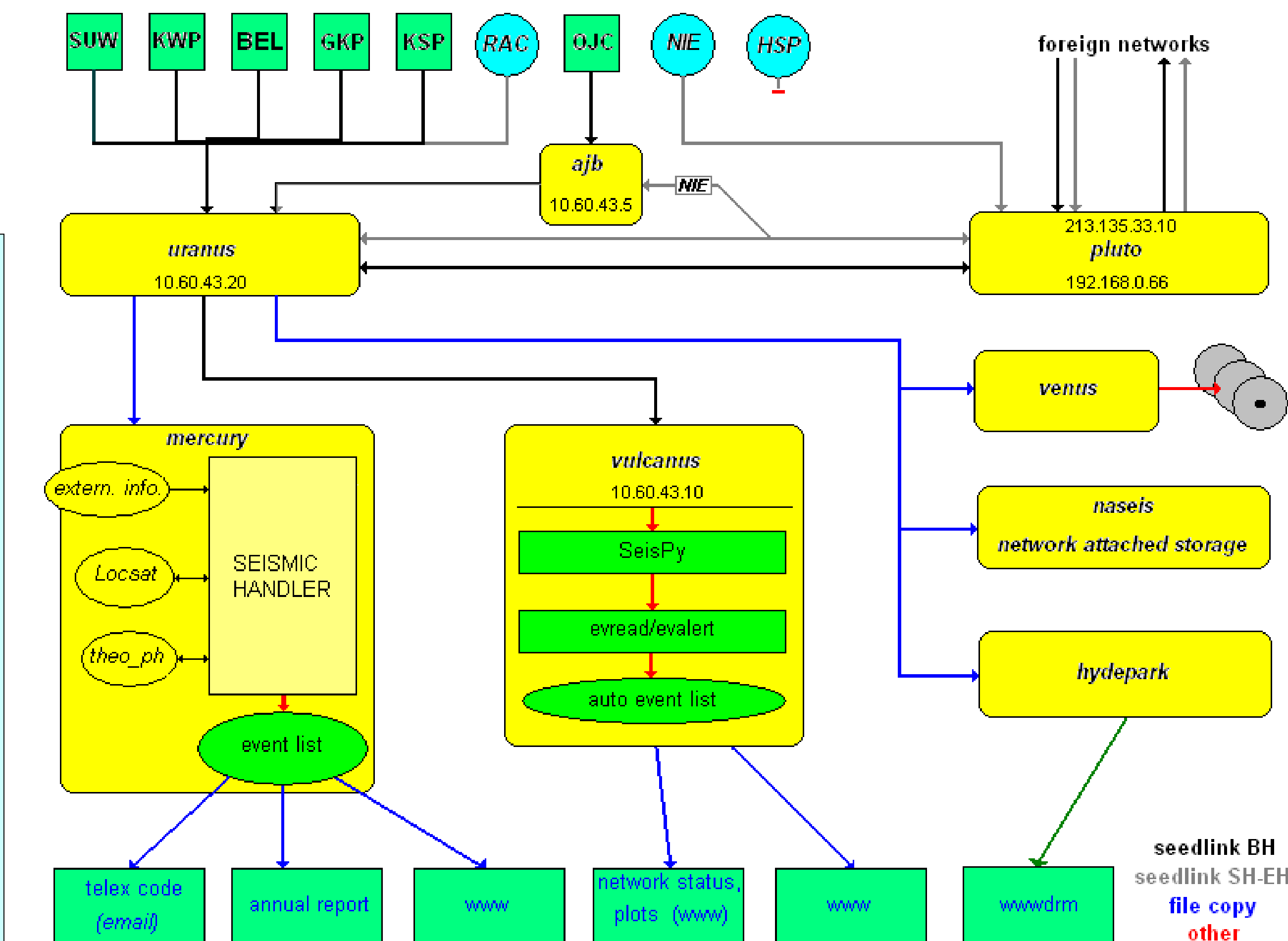
ul Ks. Janusza 64, 01-452 Warszawa, Poland



Locations of seismic stations in Poland

LIST OF STATIONS:

code	name	latitude	longitude	elev.	sensor	logger	data_link	opened	remarks
SUW	Suwałki	54.0125N	23.1808E	152 m	STS-2	Quanterra	seedlink over GPRS	1995	cooperated with GEOFON
KWP	Kalwaria Paćkawska	49.6314N	22.7075E	448 m	STS-2	Quanterra	seedlink over radio link	1999	cooperated with GEOFON
BEL	Belsk	51.8355N	20.7888E	173 m	STS-2	MK-6	seedlink over DSL	2008	
GKP	Górka_Klasztorna	53.2697N	17.2367E	115 m	STS-2	MK-6	seedlink over DSL	2004	
KSP	Książ	50.8428N	16.2931E	353 m	STS-2	MK-6	seedlink over DSL	1970	digital 1997; also on-site analysis
OJC	Ojców	50.2195N	19.7984E	391 m	STS-2	MK-6	seedlink over DSL	1991	digital 1999; on-site analysis & paper rec.
NIE	Niedzica	49.4189N	20.3131E	649 m	SM-3	MK-6	seedlink over DSL	1966	digital 1994; data analyzed at OJC
RAC	Racibórz	50.0833N	18.1942E	209 m	SM-3	MK-5	DSL	1928	noisy; on-site analysis; also long period on KIRN05; museum Mainka seismographs in cellar.
PHL	Hel	54.608N	18.817E	1 m	SM-3	NDL	internet	2007	data handled at WAR; station very noisy
HSP	Hornsund,Svalbard	77.0106N	15.5725E	14 m	SM-3	MK-6	not available		really a 5-site installation; on-site analysis;



Scheme of dataflow through PLSN datacenter



SUW



OJC

M.P. Rudzki Seism. Observatory



KWP



NIE



BEL



RAC

Since 1928, created by C. Mainka;
short period + long period



GKP



PHL

Magnetic observatory Hel



KSP



HSP

Hornsund Polar Base, Svalbard

Developments from Jan/2008 to Mar/2009

Over last year much of the Polish Seismological Network's (PLSN) datacenter has been reorganized. Warsaw Seismological Observatory (WAR) that was suffering from high level of urban noise, has been closed. Instead a new broadband seismic station has been opened at the Central Geophysical Observatory Belsk (BEL), 45 km south of Warsaw, where the local seismic noise conditions are typical as to most of the Polish lowlands. Most of old datacenter computers have been replaced and organization of services has been simplified. Continuous data from 8 (out of 10) Polish seismic stations flow by seedlink into one computer server along with data of other 14 stations of foreign partner networks. Thus the virtual network of PLSN consists of 22 stations. Further data processing is threefold.

The first branch is automatic data processing by Seiscomp-2.5, producing automatic earthquake alerts. These alerts are then distributed by email to subscribers and exported to an html server. The second branch is manual data processing by seismologists. This is partly performed at the PLSN datacenter using Seismic Handler and partly at the three observatories (OJC, RAC and KSP) that have on-site staff for data analysis, using SWIP program. Results of manual data analysis from the four analysis sites are distributed by email to registered subscribers and transferred to an html server. Results from the four analysis sites are later merged to form annual reports of PLSN phase pickings.

The third branch is data archiving; this is done on a network storage device. Backup copies of the data are stored on CD and DVD media. Data is made readily available for download within the Institute's LAN computer network. A wwwdrum interface has been developed for external users.

Data of Polish broadband stations SUW, KWP, BEL, GKP, KSP, OJC and the short period records of NIE are made available by seedlink to international seismological datacenters and to neighbor partner seismic networks.

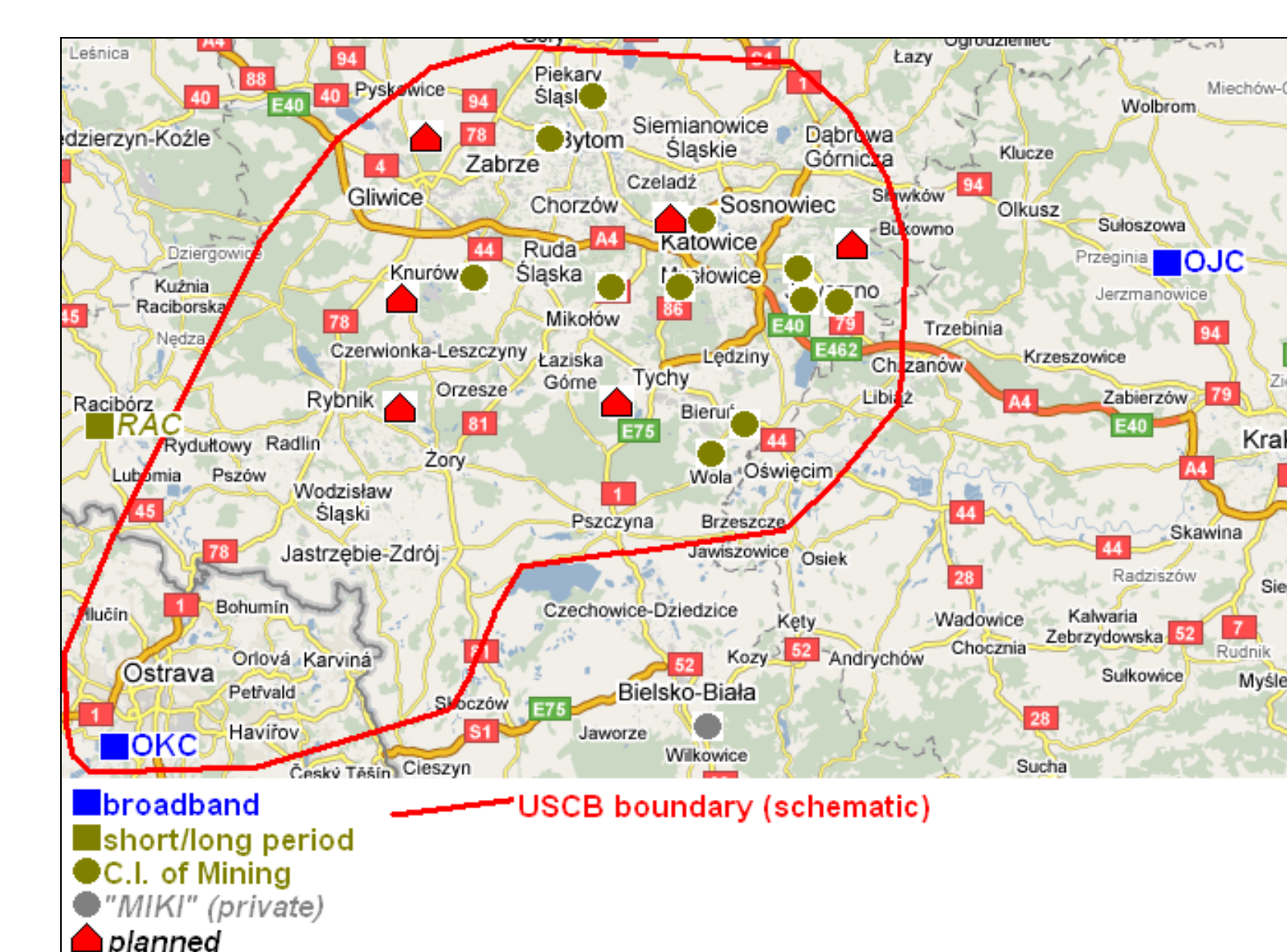
Current development projects

The currently undergoing development projects are aimed at further improvement of the PLSN services.

1. NIE station is to be upgraded to broadband (STS-2). The on-site preparation is currently underway (Apr/2009)
2. HSP (Hornsund, Svalbard) is to be upgraded to broadband. Work is scheduled for Aug/2009. Data transmission from HSP is under consideration, depending on solution of technical problems.
3. RAC observatory is planned to become a museum and local educational center. A new location for seismometer is to be found outside the city and away from traffic noise; data transmission from that site to RAC is to be organized. Planned for Sep/2009.
4. New broadband station for northern Poland. Such station is very desirable in view of the unexpected earthquakes that took place in Kaliningrad Region of Russia in 2004. Installation of this new station was planned for 2009 but most likely will be delayed because of logistic problems in finding the location for the station.
5. Seismological database. The seismological database of seismic event information is already created but it is not fully operational. Work on the database will continue after the tasks no. 1, 2 and 3 get completed.
6. Upper Silesian seismic network. Institute of Geophysics, P.A.S. is to set up a 6-station short period seismic network in and around the Upper Silesian Coal Basin (USCB). The USCB is a major source of induced seismicity in Poland. A 10-site local seismic network is maintained there by the Central Institute of Mining, but the information from that network is not real-time and covers only a part of the USCB. The new planned network is to provide three component data on daily basis that can be used for good location of the events and possibly for source mechanism study (see also the inset on Upper Silesian Network). Similar but smaller local deployments are planned for the future in Lubin area and in Podhale region. **Deployment of the Upper Silesian seismic network is to be done in cooperation with Silesian University** and is planned for summer of 2009.

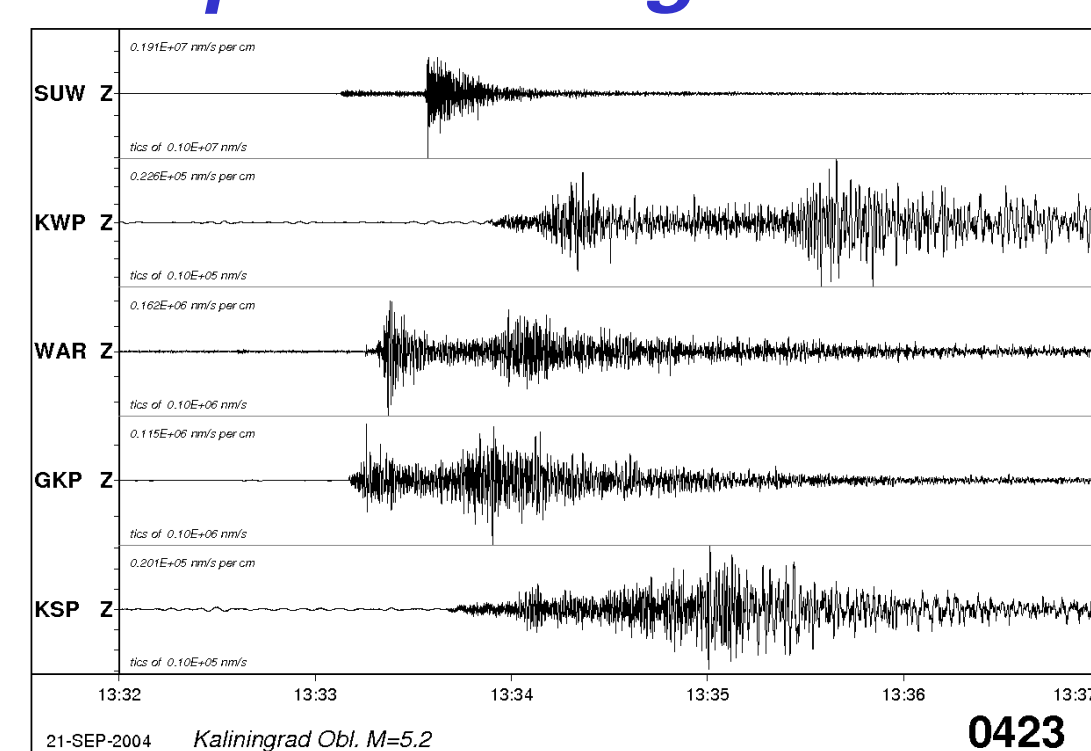
UPPER SILESIAN NETWORK - planned

Map of the Upper Silesian Coal Basin showing the existing seismological observatories (squares) and stations of the Central Institute of Mining. Approximate locations of the new planned short period stations are also marked. The new stations are planned to port their data directly to the PLSN making it possible for PLSN to provide reliable locations of the Upper Silesian induced seismic events within reasonable time. The boundary of the USCB, cutting across the Polish-Czech state border, is shown schematically in red.

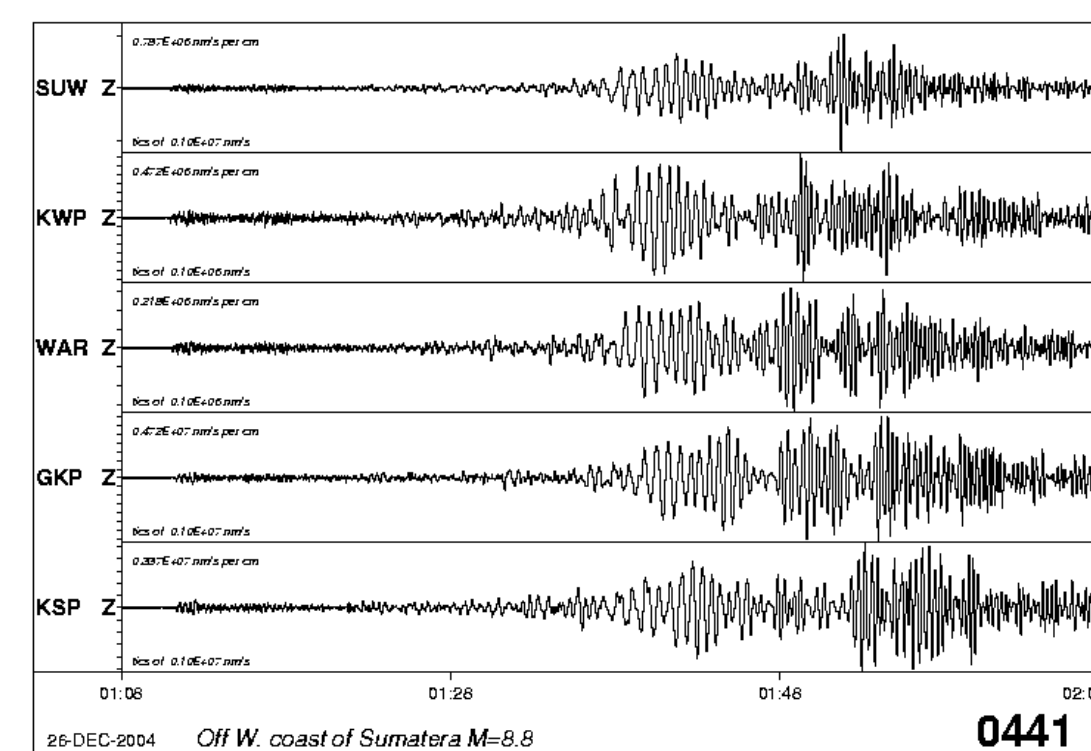


The network is to start mid-2009.

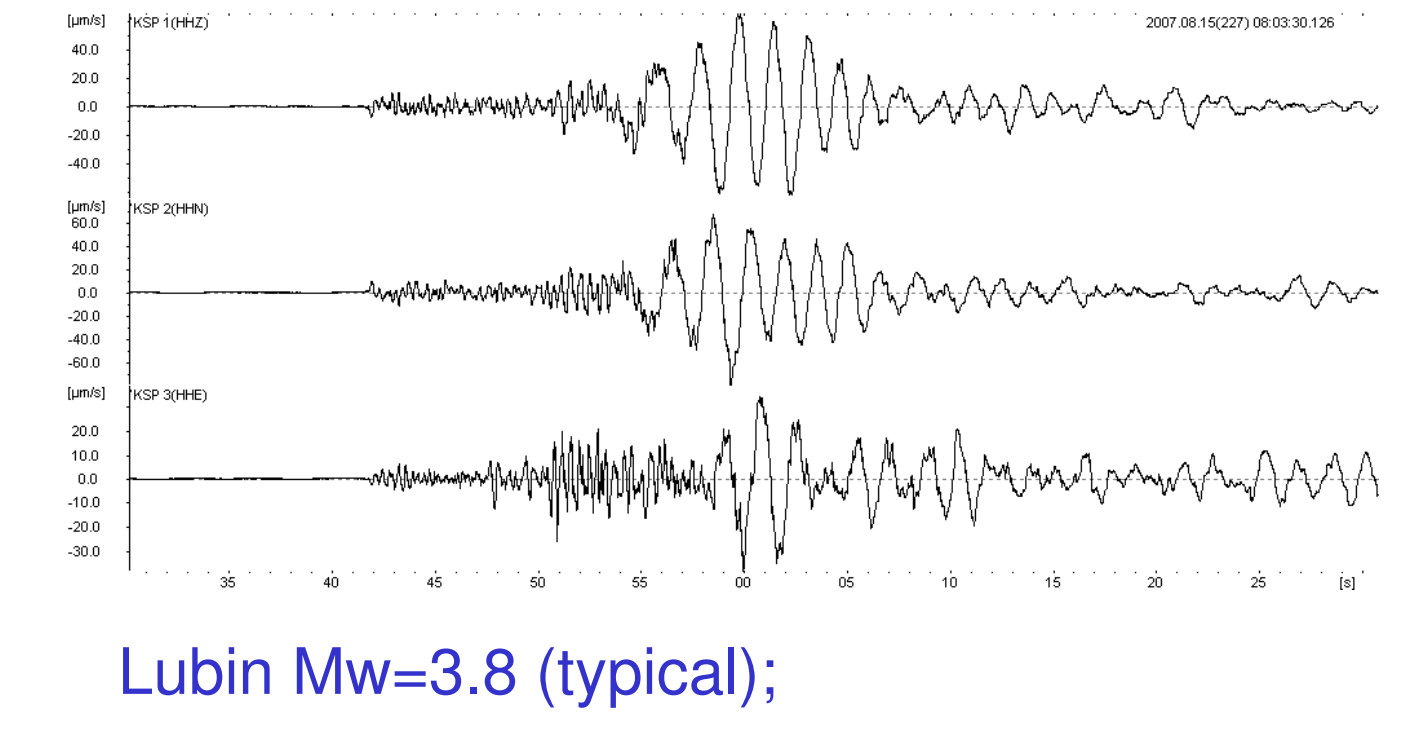
Sample seismograms:



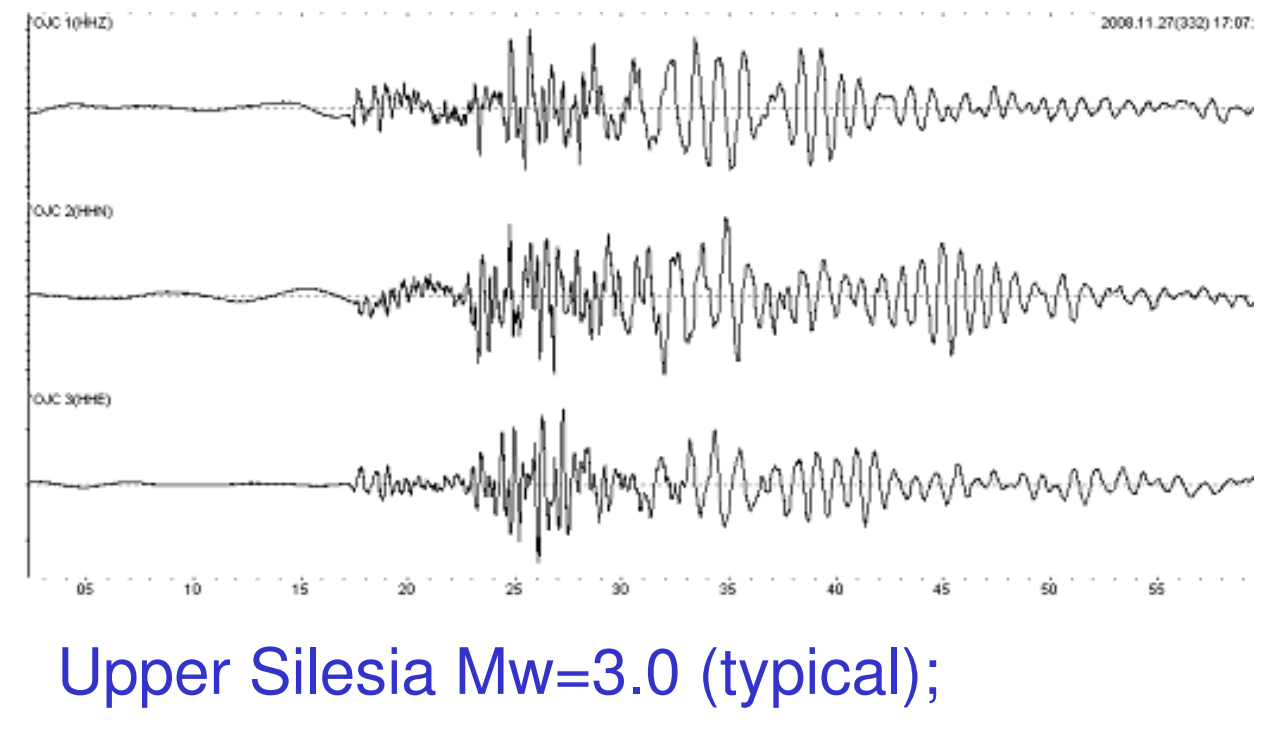
Kaliningrad, 2004/09/21



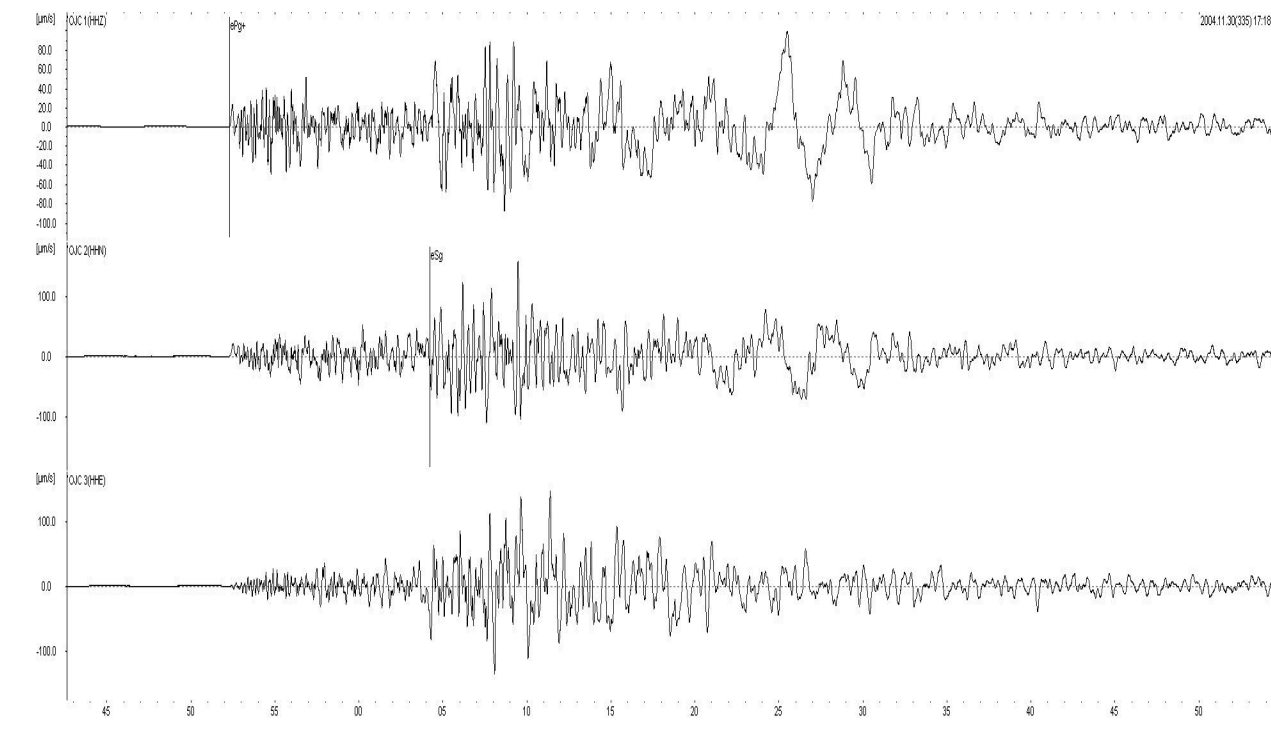
Sumatra, 2004/12/26



Lubin Mw=3.8 (typical);
recorded at KSP



Upper Silesia Mw=3.0 (typical);
recorded at OJC

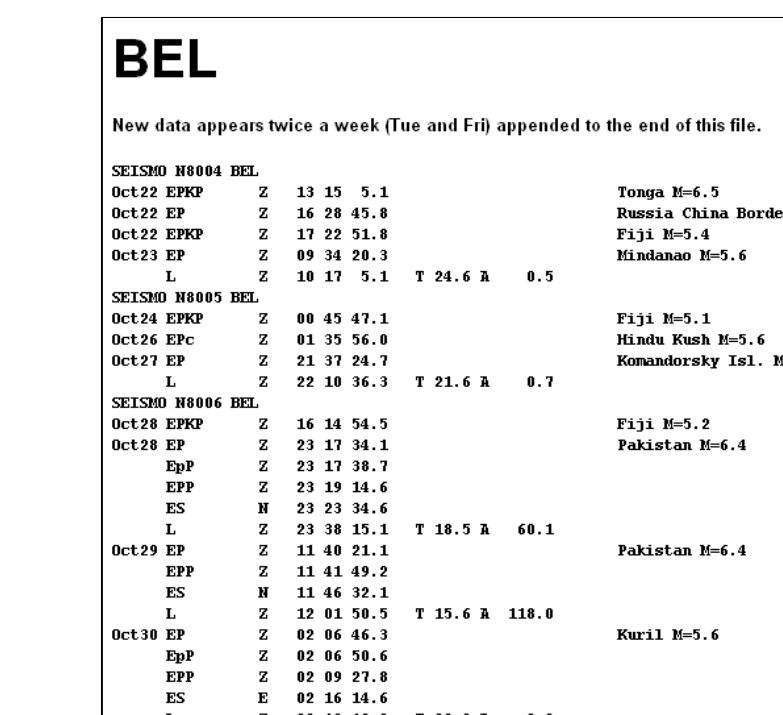


Podhale, 2004/11/30 (from OJC)

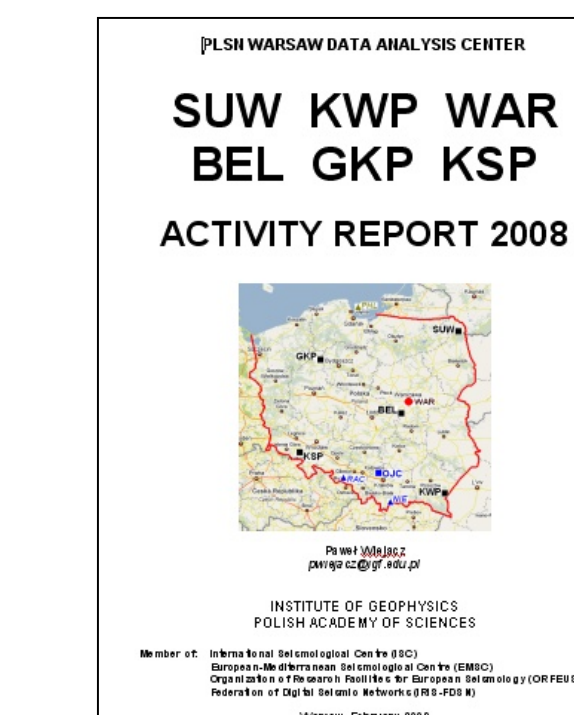
PRODUCTS:



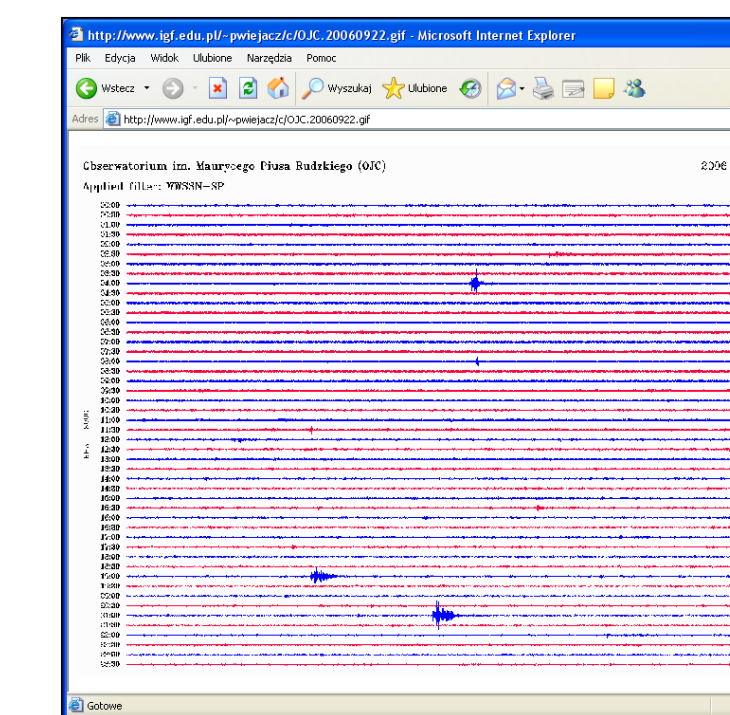
Automatic event list



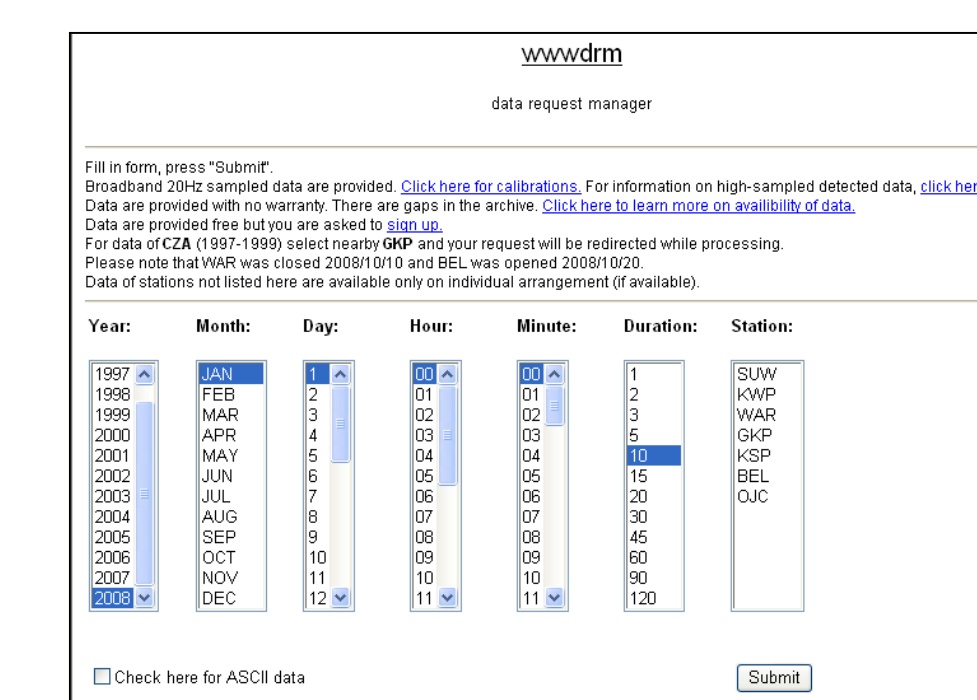
Phase pickings



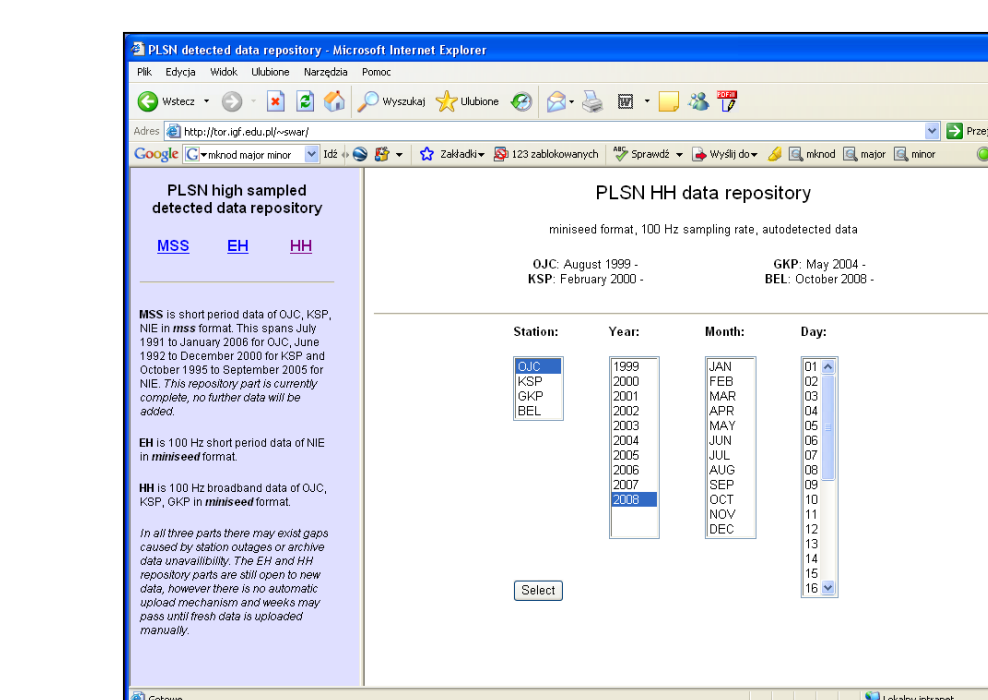
Annual reports



Seismogram plots



wwwdrum data request manager



Detected data archive

Disclaimer: Effective mid-2008, Institute of Geophysics, Polish Academy of Sciences is running a short period network in Southern Poland within a project of Seismic Monitoring of Poland, funded by the Polish Ministry of Environment. This Seismic Monitoring network, currently numbering 21 stations, is not part of the Polish Seismological Network.