

PASSEQ 2006-2007

PASSIVE SEISMIC EXPERIMENT IN TESZ



Recognition of the lithosphere-asthenosphere system in the transition between Proterozoic and Phanerozoic Europe

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Passive Seismic Experiment in TESZ

1st CIRCULAR

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2 Investigation area

PASSEQ will mainly concentrate on the Trans-European Suture Zone (TESZ) in the transition between Proterozoic and Phanerozoic Europe. Fig. 1 shows geology and tectonic setting of the investigation area.

3 Scientific goals

The main aim of the PASSEQ is an investigation of the seismic structure of the mantle in TESZ in Central Europe, between young Palaeozoic platform of the Western Europe and much older Precambrian East European platform. The knowledge of deep structure of the TESZ is very important for understanding the tectonic processes in Europe. Thanks to very good knowledge of seismic structure of the crust from deep seismic sounding experiments: POLONAISE97, CELEBRATION 2000 and SUDETES 2003 (Fig. 2) it is possible to make very good crustal corrections which are necessary for mantle investigations.

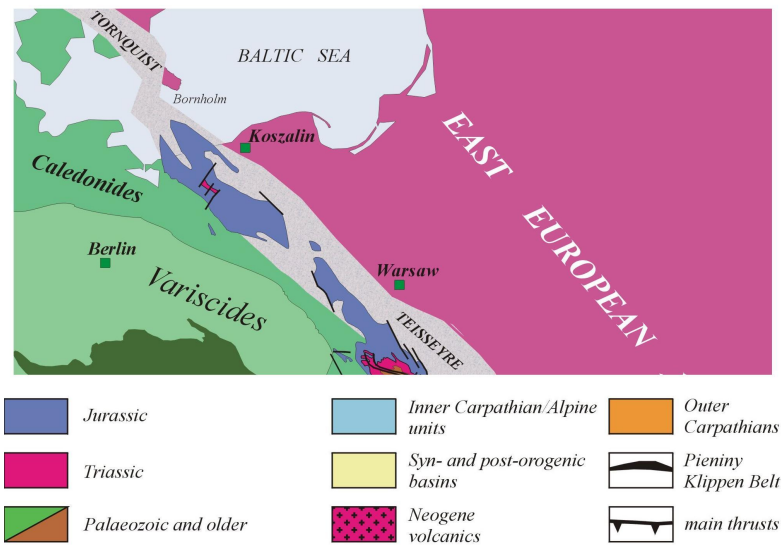


Figure 1: Geology and tectonic setting of the investigation area.

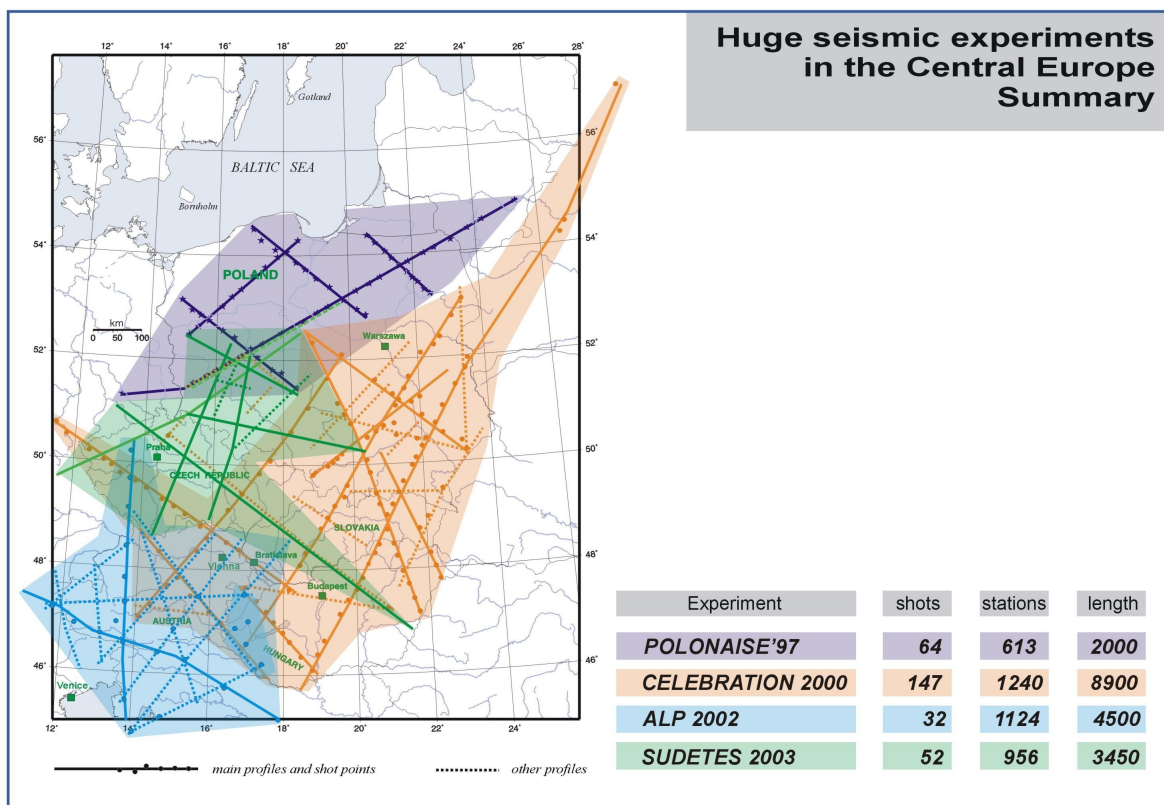


Figure 2: Deep Seismic Sounding profiles in Central Europe in 1997-2003.

The main target of PASSEQ is an investigation the structure of the upper mantle, particularly:

- structure of lower lithosphere,

- lithosphere-asthenosphere boundary (LAB),
- discontinuities "410" and "660".

in transition from East European Craton (EEC) to Variscan Europe.

4 Regional and teleseismic data

Fig. 3 shows backazimuthal distribution of regional and teleseismic events of magnitude > 4.0 from epicentral distance 5° – 20° , magnitude > 4.5 from 20° – 30° , magnitude > 5.4 from 30° – 60° , magnitude > 5.7 from 60° – 100° and magnitude > 6.0 for earthquakes from epicentral distances larger than 100° . The most of the earthquakes are located in north and south according to the investigation area.

year 2003 - number of events 159

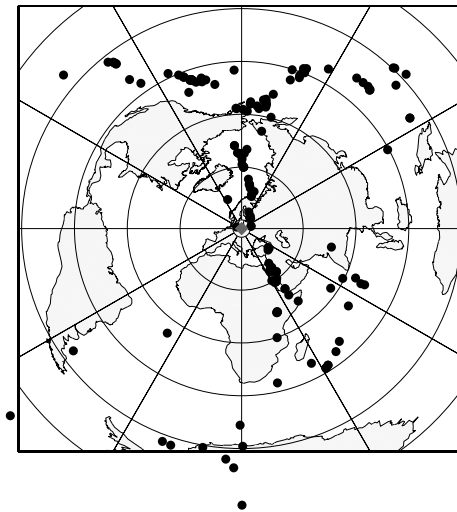


Figure 3: Backazimuthal distribution of regional and teleseismic events of expected good quality seismograms in 2003 based on CMT (Harvard) catalog.

5 PASSEQ - permanent and temporary stations

We will plan during the PASSEQ experiment to record the regional and teleseismic earthquakes, up till now, by about 150 seismic stations located in the TESZ, across the Teisseyre-Tornquist Zone (TTZ), in German, Czech Republic, Poland and Lithuania (Fig. 4). Because of strong attenuations of seismic energy in the TTZ it is necessary to keep the acquisition period at least 18 months to record enough big number of strong events and to have enough time to check the noise-level of recording sites, what is very important particularly for broadband stations. We will expect to start the deployment of the temporary stations in May 2006 and to keep the recording time till the end of December 2007. The table 1 shows the expected number of broadband (BB) and short-period (SP) stations for PASSEQ experiment.

Important part of PASSEQ experiment will be downloading and archiving the raw data, creating the catalogue of the recorded earthquakes and pre-processing of the raw data to create the event data every 2-3 months. The event data will be distribute to all participants of the

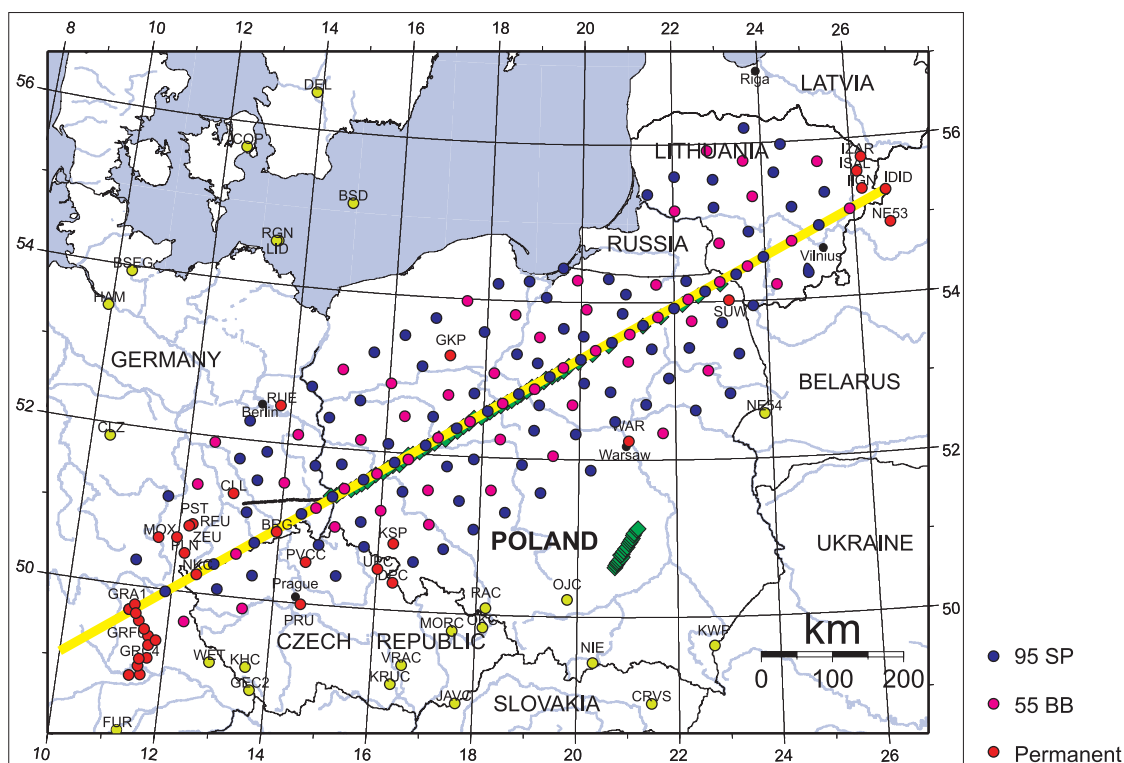


Figure 4: Preliminary location of seismic stations during the PASSEQ experiment.

Table 1: Expected number of broadband (BB) and short-period (SP) stations for PASSEQ experiment in May 2006–December 2007.

Participant's name and country	No of BB	No of SP	Remarks
Ewald Brückl (Austria)	4		
Soren Gregersen (Denmark)	5–6		
Aleksander Guterch (Poland)		20+20?	
Endre Hegedűs (Hungary)		10	
Randy Keller (USA)	15		for 1 year
Rainer Kind (Germany)	ca 25	ca 25	from summer 2006
Elena Kozlovskaya (Finland)		4	for shorter time
Frank Krueger (Germany)		ca10	
Peter Maguire (UK)	10		
Gediminas Motuza (Lithuania)		4	in borehole
PASSCAL (USA)	APL*		
Jarka Plomerová (Czech Republic)	10		
Timo Tiira (Finland)		8	
TOTAL	ca 70	ca 77	

APL* - application sent to PASSCAL (IRIS) for 40–100 BB stations and we are still looking for partner from USA to push/support our proposal

experiment. The format of data will be miniseed. Programs for downloading the data from the stations in the field and programs for conversion from station's format to miniseed will be delivered by participants before the begin the experiment. We propose to settle the data center in Warsaw (Poland) in Warsaw University or/and in Podstam (German) in GEOFON center. The stations will be settled close to farms to use electric power and to be locked.

6 Interpretation teams

- Teleseismic tomography — Germany, Poland, Switzerland, Finland
- Receiver function — Germany, Poland
- Surface wave tomography — Czech Republic
- P residuals method — Czech Republic, Poland
- Anisotropy, SKS waves — Czech Republic, Germany

7 Funds

Polish team have already submitted the project to Polish State Committee for Scientific Research. The decision are expected at the end of July. This fund should cover the deployment of the stations in Poland (not included the cost of transport of the stations to/back Poland), maintaining them, downloading their data during the experiment and pre-processing the raw data to miniseed and event data.