

Seismic Activity after 2000 Swarm and New Results in the Western Bohemia/Vogtland Area

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After the most recent swarm period, August to December 2000, the seismic activity of West Bohemia region has been very low. Only weak events occurred in all the known seismically active zones. Figure 1 shows epicentres of all events located by the means of WEBNET data since January 2001 to March 2004 with their time sequence.

Refined locations of local earthquakes give an idea about the shapes of the individual focal planes. Locations of events in main focal zone Nový Kostel show that earthquake swarms arise repeatedly at one, N-S oriented fault plane in depths between 6 and 11 km (Fischer and Horálek, 2003, see Fig. 2). This plane steeply dipping to west corresponds with focal plane of most of events in this area. Brand new results were obtained by studying the Swarm 2000 events and their focal parameters. The swarm displayed strongly episodic character – nine swarm phases isolated by quiescence periods were distinguished. Foci of more than 20 000 earthquakes were distributed within almost circular fault area of a 3 km diameter at depths between 7.5 to 10.5 km. In the course of the swarm the foci migrated to a great extent because different segments of the MFP were activated in the separate swarm phases. The strike-slip or oblique normal focal mechanisms indicating the left-lateral motion in the N-S direction, predominated in the swarm.

Some swarm earthquakes, for example the 1997 swarm or the most recent February 22, 2004 micros swarm (about 70 $M_{Lmax}=1,4$ events), possess wholly different focal mechanisms, however those swarms were not occurred on the main focal plane. Focal mechanisms of events of 1997 swarm exhibit significant non-shear components, which confirm contribution of fluids in the swarm earthquakes (Horálek et al., 2002). The 2004 swarm took place in the depth of about 14 km, which is much deeper than up to now presumed 12 km margin of a brittle fracturing of the crust in the whole Nový Kostel area. It manifests that relations among tectonics, stress distribution, fluid transport and seismic energy release are very complex and their understanding demand further interdisciplinary research in the region in question.

References

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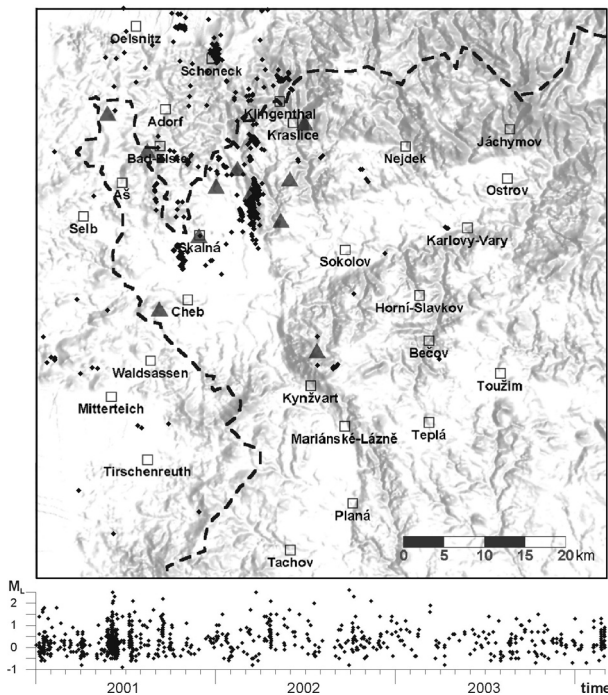


Fig.1. Relief of the West Bohemia region with epicentres of all events located since January 2001 to March 2004. Triangles mark the WEBNET stations. Time sequence of events shows a very low seismic activity in this period.

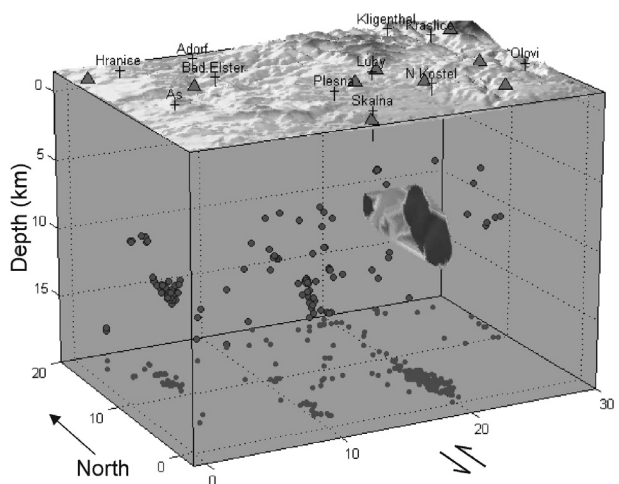


Fig.2. Three-dimensional view of earth surface and earthquake foci which occurred since 1991. A curved plane under Nový Kostel village represents fault, where most of swarm events took place. Activated fault plane is highlighted in dark grey. Dots depict hypocenter of other local earthquakes, the smallish ones represent their projections to the horizontal plane. Triangles mark the WEBNET stations. Couple of arrows denotes direction of movement on the fault.