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Abstract

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Fault slips development RECORDED on MAJOR lugicum faults

Based on results of 3D monitoring of fault slip within the Rasovna and Západní caves developed in zones of major Lugicum faults as Lusatian Fault and Sudetic Marginal Fault a comparison of fault movement development along Lausatian Fault and Sudetic Marginal Fault is presented. Fault slips are recorded in three dimensions using specially designed optical-mechanical crack gauges known as TM-71s as a part of the EU-TecNet monitoring network. Network was established about fifteen years ago to record fault displacements across selected tectonic structures in the shallow crust. The network comprises more than one hundred fifty sites, most of which are situated underground, spread across the globe (www.tecnet.cz). Regular monitoring is supported by research infrastructure programme CzechGeo.

The Rasovna Cave is located within the Sudetic Marginal Fault zone approximately 5 km west of Jeseník in north-eastern Bohemia. Extensometer TM-71 was installed across fault 27°/38° in February 2006.

The Západní Cave is located within the Lusatian Fault zone approximately 15 km west of Liberec, close to the village of Jitrava, in northern Bohemia. It is the largest cave found within the karstic part of Ještěd Ridge. Extensometer TM-71 was installed across fault 148°/90° in April 2007.

Data obtained during the past decade demonstrate that periods of tectonic quiescence alternate with shorter periods of increased fault activity. The fault displacement monitoring has also shown notable periods of increased geodynamic activity affected both faults, referred to as pressure pulses, in 2008, 2010/2011, and 2013/2014. It has been found that these periods of pressure pulses occur contemporaneously along both major faults. Based on comparison with fault slips recorded on other major faults across the Bohemian Massif these periods are interpreted to reflect the widespread redistribution of stress and strain through the shallow crust. It is possible to correlate the identified displacement cycles with the strongest earthquakes - swarms which have occurred during the past decade in the Bohemian Massif.