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Neotectonic movements in the East Sudeten Mountains and monitoring of recent fault displacements (Czech Republic)

P. Stepancikova (1), J. Stemberk (1), B. Kostak (1), V. Vilimek (2)

(1) Inst. of Rock Structure and Mechanics, Academy of Sciences of the Czech Republic, Prague (2) Faculty of Science of Charles University, Prague (stepancikova@irsm.cas.cz/fax:+420 284 680 105)

The East Sudeten mountains are situated in the territory of the Czech Republic and Poland in the NE spur of the Bohemian Massif (central Europe). NW-SE striking Sudetic Marginal Fault (SMF) zone borders the Sudeten mountains towards the Sudetic Foreland. The studied area comprises the north-eastern part of the Rychlebské Mts, belonging to the Sudeten Mountains and the adjacent part of the Őulovská Hilly Land in the Sudetic Foreland. Methods used in work in order to assess neotectonic movements within the area were as follows: field mapping focused on identification of morphotectonic phenomena, analysis of longitudinal river profiles and valley cross-sections, and investigation of alluvial fans/terraces. In addition, a reconstructed neotectonic evolution was compared with present-day fault movements obtained by fault monitoring by means of TM71 deformeters, which are installed directly across faults within the SMF zone.

Morphotectonic research within the Őulovská Hilly Land in the Sudetic Foreland, which was glaciated by continental ice-sheet twice in the Middle Pleistocene, reveals postglacial uplift. Deformation of Saalian 1 alluvial fans/terraces (0.24-0.28 Ma) attains 20 m, of Saalian 2 age (0.13-0.18 Ma) up to 8 m, and of Weichselian age (0.01-0.08 Ma) 2 - 3 m. This type of postglacial deformation diminishing towards the Late Pleistocene is in accordance with the results of neotectonic research carried out in the Polish part of the Sudetic and Fore-Sudetic region, and it is ascribed to glacioisostatic rebound after deglaciation. Within the mountainous part of the area, the Rychlebské Mts, the uplift is indicated by segments of enhanced erosion, where the beginnings of

the stretches of rejuvenated erosional phase are concentrated at the foot of marginal fault slopes. These stretches correspond well with increased stream gradients, changes in valley cross-sections and irregularities in the longitudinal profiles.

Monitoring of present-day tectonic movements carried out in two karst caves in the studied area revealed slow micro-displacements (hundredths to tenths of millimetres per year), which have an aseismic character and prevailing vertical component. The inferred compressive stress comes generally from the southern sector, which would imply dextral transpression in the studied portion of the SMF. As a result, the south-western part of the Rychlebské Mts is pushed under the north-eastern one beyond the SMF. The trend of these present-day movements corresponds well with asymmetrical uplift of the studied area north of the SMF, which is also indicated by analysis of the drainage network given above.