

## SPELEOLOGICAL EVIDENCES OF CURRENT TECTONIC ACTIVITY ALONG MAJOR FAULT SYSTEMS OF THE EASTERN ALPS

BAROŇ, Ivo\* (1); PLAN, Lukas (1); GRASEMANN, Bernhard (2); MITROVIC, Ivanka (1,2)

1: Naturhistorisches Museum Wien, Austria; 2: Universität Wien, Austria

ivo.baron@nhm-wien.ac.at

Eastern Alps, active tectonics, fault, seismicity

Caves in the Eastern Alps were investigated for evidences of active tectonics related to the Salzach-Ennstal-Mariazell-Puchberg (SEMP), Mur-Mürz, Periadriatic, Lavanttal, and Vienna Basin Transform faults within the framework of the "Speleotect" project of the Austrian Science Fund (FWF P25884-N29). A branch of the sinistral SEMP cut through the Hirschgruben cave on Mt. Hochschwab and caused sheared stalagmites, striated and faulted flowstone with an offset of at least 20 cm between 118 ka (end of the Last Interglacial) and 9 ka BP (early Holocene). Similarly, preliminary dating of a normal fault in nearby Speikboden Cave indicates an activity between 364 and 51 ka BP. Another cave in that area, Potential Shaft also revealed an E-W (SEMP sub-parallel) active oblique reverse fault with an offset of about 1.3 cm, but the radiometric dating was not successful yet as the flowstone was too old or contained too much detritus. At the eastern termination of the SEMP fault in Emmerberg Cave near the Vienna Basin, a parallel sinistral fault with 4 cm of offset showed an activity between 77.2 and 136.2 ka BP. So far the most spectacular examples of faulted cave galleries and deformed flowstone were found in Wartburg Cave (a part of the Obir Caves) located few kilometers north of the Periadriatic Fault within a broader zone of transpression. Deformed flowstones along a NNE-SSW striking fault with a documented left-lateral 38 cm offset showed an activity between 7 and 45 ka BP.

Seven automated 3D crack-gauges TM71 were installed at active faults in six karst caves throughout the Eastern Alps. Several micro-displacement events have been registered; these events sometimes revealed the same mechanisms as the geologically documented kinematics of the particular active faults, but in some cases performed completely opposite kinematics. Compared to regional seismic activity (data provided by ZAMG), these events occurred in seismically rather quiet days, however, usually about 1 – 10 days prior to local earthquakes of different magnitudes (varying between ML 0.1 and 3.3). These events could probably be related to regional elastic strain accumulation, relaxation and further gravitational mass movements at some sites.