



Polyphase alpine speleogenesis – examples from Eastern Totes Gebirge (Austria)

M. Behm (1,2), L. Plan (1,3), R. Seebacher (4)

(1) Speleological Society of Vienna and Lower Austria

(2) Institute of Geodesy and Geophysics, Vienna University of Technology, Austria,
mbehm@mail.tuwien.ac.at

(3) Department for Geodynamics and Sedimentology, University of Vienna, Austria,
lukas.plan@univie.ac.at

(4) Verein für Höhlenkunde in Obersteier (Speleo Club Upper Styria), Bad Mitterndorf,
Austria, hoehle.robert.seebacher@utanet.at

The Totes Gebirge covers an area of 700 km² and is one of the largest karst plateaus in the Northern Calcareous Alps. The stepped plateau reaches from an altitude of about 1500 m a.s.l. up to the summit at 2515 m. On all sides the massif is truncated by deep valleys situated between 400 to 800 m a.s.l. An impressive karst landscape has developed on the plateau and until now about 1400 caves are known. Nevertheless, many areas are still more or less unexplored. We focus on the eastern part of the karst massif, which comprises mainly of Upper Triassic Dachstein Limestone.

Our study is confined to the Eastern Totes Gebirge. Systematic cave exploration started in the 1950'ies, since when overall nearly 100 km cave passages have been mapped by different groups. The presentation also aims at underlining the valuable contributions which practical cave exploration and mapping provide to the scientific community.

A short description of the major cave systems of the Eastern Totes Gebirge is presented, including the Burgunderschacht (total length of mapped passages: 20.2 km, cave depth: -845 m), the DÖF-Sonnenleiter-Höhle (18.2 km, -1054 m), the Grubstein-Westwandhöhle (10.5 km, -396 m) and the Grauer Riese (2.3 km, -418 m). These and many other caves in the area have common morphological features.

Horizontal and phreatic galleries probably date back to the Miocene and are located

at the same altitudinal levels in almost all systems. However, some of the galleries are nearly ideal water table caves according to the 4-state-model and some show significant multiple looping. These galleries are intersected by mostly active vertical shafts that are younger than the phreatic systems. Exploration of one shaft system showed that the karst-water table is found more than 1000 m below the surface, while the actual springs are located considerably deeper. Sediments show similar characteristics throughout the area and paragenesis is widespread.

As the presented type of multiphase cave development can be observed textbook-like in the Eastern Totes Gebirge a simplified model of cave development is presented. Similar features can be found in many cave systems in the Eastern Alps.