

### Grøndalen

The Grøndalsgrotta river cave and associated caves

Some of the caves in Grøndalen are shortly described. The Grøndalsgrotta river system has a present surveyed length of 1,11 km, but is still incomplete. An estimate of 2,0 - 2,5 km total passage length seems realistic, including the small hillside caves south of the river system. All these cave passages lies within an area of 500 m X 100 m, giving a cave density of 40 - 50 km / km<sup>2</sup>. Similar figures from other areas are rare, but when comparing with the Leck Fell systems in N. W. England (10 km / km<sup>2</sup>), one might argue this small area in Grøndalen is highly karstified and important as a cave area.

The preliminary survey of Grøndalsgrotta river system is shown. Today the cave is essentially vadose, except from a saturation level downstream of the Aulaen chamber. The cavernous limestone is relative impure, masking the vadose and phreatic characteristics of passage cross sections. However, some benches of homogeneous marble are recognized and they usually contain maze-type passages. The largest part of the active river passage lies in a more impure limestone, rich in schist layers.

The passages follow the strike mainly, which is parallel to the valley. Other structures, such as schist horizons, seem to direct the present watercourse. In Fossprekka, schist flake lies directly under the Z-shaped passage, and a waterfall breaks through it.

The extensive collapse features downstream of the sump in Aulaen are probably caused by frost shattering and draughts between the upper and lower entrances in this part of the cave. Draughts should cause low temperatures in winter and thus frost shattering. The "Krateret" doline is obviously formed by collapse of the cave roof. Upstream of Aulaen, the passages are sumping at least two times. These siphons are believed to block for any draughts in the upstream parts of the cave, thus hindering frost action.

The cross section areas of the river passage increase in downstream direction. Assuming that the solution along a passage like this is relatively constant, this increase in cross section may indicate that the most downstream parts of the cave are the most developed or oldest ones. There are several entrances from the surface along the river passage, and shallow dry valleys on the surface imply that these entrances are abandoned inlets. This fits into a model of knick-point recession of the river along the strike.

However the most interesting question is why the river has an underground course at all. The river follows the valley side for about half a kilometre, instead of cutting straight down the valley side. It is doubtful that the caves should develop from the river in the present topography. It seems reasonable that the present underground course of the river Jordåga follows older cave structures which are inherited from a valley topography different from what we have today.

I am stressing that the theories are tentative, and further work is in progress in the coming years.