Norsk Grotteblad nr 56, Juni 2011

Gjensyn med Jordbruelva

Jordbruelv revisited

The Jordbruelv, a large tributary of the Gåsvasselv, drains the western sides of Elgfjell and Jordhulefjell in Grane kommune, south Nordland, within the Lomsdal – Visten National Park. It has a catchment area of c. 30km2, providing an annually-averaged flow rate of ~2m3sec-1. Faulkner (2009a) described the Elgfjell / Jordbruelv area and its geology. The major marble outcrop in the lower Jordbruelv area is mapped as a single outcrop ~600m wide at Bjørkåsen and Fatfjell. This continues north via Gåsvatn to Elgfjell as separate 'fingers' that dip at 60–70°W. However, the caves reported here lie within a narrower band of Vertical Stripe Karst (VSK) that is separated by c. 500m of mica schist from the main outcrop to its east. It follows the Jordbruelv valley north via the Jordbru (Rockbridge) to the head of the Jordbruelv Gorge, where the stream meets the limestone at the Waterfall, and continues along the ridge towards the summit of Jordhulefjell. This marble outcrop comprises grey, or grey and white striped, Low Magnesium Calcite: the yellow-brown striped variety of High Magnesium Calcite, seen on Elgfjell, has not been observed in the lower Jordbruelv area.

The caves near the powerful Jordbruelv Waterfall and downstream via the Jordbruelv Gorge to beyond the Jordbru are summarised, together with their exploration. These include Etasjegrotta, the Invasjonsgrotta – Cliff Cave system and the Vatnhullet – Jordbru Main Rising submerged system. It is now clear that these caves comprise parts of one hydrologically-connected system that has a total length over 3km. The speleogenesis of this system is considered: (a) from the evidence of deglacial neotectonic movements seen on the surface in the Gorge and the Jordbru and underground in Beehive Cave, Cliff Cave and Invasjonsgrotta; (b) from the likely deglacial hydrology at the end of the Weichselian glaciation (Faulkner, 2005); and (c) from the nature of the laminated sediment bank in Oddstue in Invasjonsgrotta that records seismic liquefaction whilst still submerged just below the surface of the Elgfjell ice-dammed lake. By working backwards in time and upwards in elevation, a scenario for the development stages for the system is presented. It is concluded that the Jordbruelv Gorge and the Jordbru have probably existed for two or three glacial cycles, when the Jordbruelv valley started to create the deeper hydraulic gradients necessary for local interglacial cave development during and after the 'Super Saalian' glaciations. The relict Cliff Cave – Invasjonsgrotta phreatic conduit probably enlarged to its present size when submerged during the final Saalian deglaciation that ended about 128,000 years ago, when the water resurged from an entrance north of Vatnhullet. The submerged Whybro Passage beneath it likely started to carry water that emerged as a Vauclusian rising at Vatnhullet at the same time and during the following Eemian interglacial. It then continued to enlarge to its 10m diameter during the Weichselian deglaciation and the Holocene, when the Vatnhullet entrance was bypassed by fractures leading to the Main Rising, after the Gorge and Jordbru had been excavated nearly to the present depth. Etasjegrotta is probably a more-recent development that started synchronous phreatic enlargement of its tiered conduits on about 20 levels during the Weichselian deglaciation (although its inception fractures and the upper phreatic loops may date from the Saalian deglaciation) and has continued with vadose entrenchment and phreatic enlargement at its lowest levels only during the Holocene.