



## **Alpine nappe emplacement: A case study of the Suretta nappe (Graubünden, Switzerland)**

Thomas Scheiber and O. Adrian Pfiffner

Bern, Geological Sciences, Tectonics, Switzerland (scheiber@geo.unibe.ch)

Within this field approach on basal accretion processes we intend to get a better understanding of the stacking of crystalline basement nappes as observed in the core of many orogens. The Suretta nappe is a stack of Briançon derived lithospheric slices assembled in a south-dipping subduction zone during the Tertiary orogenic cycle. Today's axial plunge of about 30° towards ENE exposes the basal thrust over tens of kilometres and provides continuous outcrop from bottom to top of the nappe. Emphasis was laid on the frontal part of the nappe where late to post-Variscian intrusive rocks of the Rofna porphyry complex occur. Detailed structural mapping combined with microstructural analyses yield different deformation patterns of the porphyry: undeformed boudins in the interior of the nappe are generally surrounded by L-tectonites indicating WSW-ENE stretching; foliated equivalents reveal various strain intensities. Mylonites were not only detected at the base of the Suretta nappe, but also at the base of internal thrust slices overlying strongly deformed autochthonous Triassic sediments ("nappe separators") in some cases. NNW-SSE trending stretching lineations persisted in zones of intense deformation. Despite the fact that shear sense indicators are generally rare, a top-to-the NNW directed transport has to be assumed. Thrusting-related deformation took place in a temperature regime of about 400°C where quartz deformed by dislocation creep and feldspar was the stronger mineral. Further intercalations of Triassic sediments in the upper parts of the nappe that could be interpreted as isoclinal folds at first sight, seem to be influenced by thrusting as well. In order to understand these fold-thrust relationships, a partial retro-deformation needs to be performed, because the Eocene top north directed stacking (Ferrera Phase after Schmid et al, 1997) predates a phase of backfolding with synchronous orogen-parallel extension (Niemet Beverin Phase). The formation of the aforementioned undeformed boudins in the Rofna porphyry cannot be linked to thrusting in compressional tectonics. Therefore another, earlier phase of pre- or syn-collisional extension must be taken into account.

### References:

Schmid, S. M.; Pfiffner, O. A.; Schreurs, G. (1997): Rifting and collision in the Penninic Zone of eastern Switzerland. Deep Structure of the Swiss Alps: Results of NRP 20, Birkhäuser Verlag: 160-185.