

## RAPID OLIGOCENE EXHUMATION OF THE ECLOGITE ZONE, TAUERN WINDOW, EASTERN ALPS

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The Eclogite Zone (EZ) is a ~20 km long and 2 - 3 km wide coherent unit of the Tauern Window, sandwiched between the Venediger- and Glockner nappes. Thrusting of the EZ onto the underlying Venediger Nappe is documented by top-N shear indicators. The boundary of the EZ to the overlying Glockner Nappe is characterized by amphibolite to greenschist facies carbonate bearing mylonites and schists showing a sinistral sense of shear.

Within the EZ, eclogites occur as lenses of varying sizes enclosed in a matrix of metasedimentary rocks. Thermobarometry combined with information derived from P-T pseudosections constrain peak metamorphic conditions in the EZ to ~24 kbar and ~650 °C. With help of P-T pseudosections, both the prograde (blueschist to eclogite facies) and retrograde evolution (amphibolite facies) of the EZ rocks is visualized.

Five multi-mineral Rb/Sr internal isochrons of pristine eclogites and eclogite-facies veins gave identical ages, with a weighted average of  $31.5 \pm 0.7$  Ma. Initial Sr-isotopic equilibria among all phases indicate absence of any significant posteclogitic isotope redistribution. Therefore, the above ages date eclogite facies assemblage crystallization (GLODNY et al., in revision). A retrograde amphibole-bearing vein crosscutting an eclogite body yielded an age of  $31.5 \pm 0.5$  Ma, dating amphibolite-facies retrogression at ~8 kbar and ~500 °C. These two ages bracket the time interval for exhumation from eclogite facies to amphibolite facies conditions to between 32.2 and 30.8 Ma and suggest extremely fast exhumation of the EZ from ~80 km to ~20 km within less than 1.4 Ma, at rates of > 40 - 50 mm / a. Similarly rapid exhumation rates have been suggested by DACHS & PROYER (2002) from intragranular diffusion pattern in garnet. They suggested that < 1 Ma elapsed between prograde eclogitisation and cooling below 450 °C implying exhumation rates of 46 to 74 mm / a.

A Rb/Sr mineral isochron age of  $31.4 \pm 0.5$  Ma for a mafic schist from the base of the Glockner Nappe, directly above the EZ, dates blueschist facies metamorphism within the Glockner Nappe. Rb/Sr data from carbonate-dominated mylonites marking the lower and upper contacts of the EZ provide deformation ages between 31 and 30 Ma. The youngest ages are obtained from the most fine-grained muscovites in these rocks, which are further characterized by particularly high Sr concentrations. This may be due to a change of the Sr partition coefficient between carbonate and muscovite during progressive deformation and decompression, related to the aragonite-to-calcite phase transition.

With respect to emplacement and exhumation of the EZ, we suggest that thrusting and large-scale folding due to N-S shortening was coeval with sinistral strike-slip faulting. In summary, our data indicate that today's nappe architecture must have been established in less than 2 Ma after the eclogite facies event.

### References

DACHS, E. & PROYER, A. (2002): *J. metam. Geol.*, 20, 769-780.

GLODNY, J., RING, U., KUEHN, A., GLEISSNER, P. & FRANZ, G. (2005): *Contrib. Min. Pet.*, in revision.