

## THE *P-T-d* EVOLUTION OF THE ECLOGITE-FACIES AUSTRALPINE SIEGGRABEN UNIT (EASTERN ALPS)

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The sequence of Alpine tectonometamorphic events was studied in the eclogitic Austroalpine Sieggraben Structural Complex (SSC) in the Eastern Alps. Although, the age of formation of this high-*P* complex is unknown, U-Pb zircon ages from orthogneiss bodies show discordant ages with a lower intercept at ca. 105 Ma and an upper intercept age of ca. 312 Ma. These age data indicate that the eclogite-facies SSC represents a strongly attenuated pre-Alpine continental crust fragment, which was subducted within a collisional wedge of the Meliata-Hallstatt Ocean passive margin during the Eo-Alpine event.

Thermobarometry of the Sieggraben eclogites, performed by simultaneous calculation of all possible reactions within the peak metamorphic assemblage garnet + omphacite + clinozoisite + barrosite + quartz with the program THERMOCALC v 3.1. (HOLLAND, 2001, written comm.) yields 580 – 650 °C and 1.4 – 1.9 GPa and low *a*(H<sub>2</sub>O). The *P-T* conditions of adjacent metapelites are 630 ± 30 °C and 0.6 ± 0.2 GPa. Calculations by using the software THERIAK-DOMINO (DE CAPITANI, 2004, written comm.) yielded the same results.

Eclogite-facies D1 microstructures are represented by parallel oriented aggregates of omphacite and zoisite, omphacite-barrosite and zoisite or barrosite and zoisite. During subsequent isothermal exhumation (D2), as indicated by *P-T* data from the surrounding metapelites, symplectitic intergrowths of clinopyroxene (Jd<sub>3,22</sub>) and plagioclase in the eclogites and high-*P* amphibolites formed. Microstructurally, the exhumation stage D2 was enhanced by dynamic strain softening of omphacite (Jd<sub>38</sub>) and zoisite into aggregates of minor clinopyroxene (Jd<sub>18-31</sub>) and zoisite. Dynamic recrystallization of omphacite, barrositic hornblende, plagioclase and quartz ribbons at medium-*T* (D2) was followed by low-*T* quartz recrystallization and calcite twinning. The textures indicate dislocation creep as the principal micromechanism of ductile deformation of clinopyroxene, amphibole, plagioclase and quartz, and mechanical twinning in calcite. The observed textures are mainly related to the medium-*T* (ca. 600 - 500 °C) mesoscopic fabrics of the D2 stage (foliation, layering, mineral and stretching lineation). Exhumation occurred along a detachment fault by top-to-the SSE extensional unroofing of the eclogitized SSC now overlying the low-grade *MP* / *HP* Grobneiss and Wechsel nappes. The extensional exhumation of the Sieggraben *HP* complex around 100 Ma is obviously related to the start of the subduction of the South-Penninic oceanic crust below the Austro-Alpine – Centro-Carpathian continental margin (PUTIŠ et al., 2005).

### Reference

PUTIŠ, M., GAWLICK, H.-J., FRISCH, W. & SULÁK, M. (2005): VII. Alp. Workshop, Abstracts.