

**THERMOBAROMETRIC INVESTIGATIONS ON MIGMATITES FROM THE
WESTERN AND CENTRAL ÖTZTAL-STUBAI-KRISTALLIN**

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The pre-Variscan events in the Ötztal-Stubai Crystalline Complex (ÖSCB) are manifested in localized migmatite occurrences in the central ÖSCB (Winnebach migmatite) and the western ÖSCB (Verpeil migmatite, Nauderer migmatite). The migmatite from Verpeil in the Kaunertal, western ÖSCB, is a stromatic migmatite. The observed mineral assemblage is garnet + biotite + plagioclase + K-feldspar + quartz ± muscovite ± cordierite ($X_{Mg}=0.45$). Cordierite rarely occurs within pseudomorphs of biotite + muscovite ± andalusite ± kyanite aggregates suggesting a later breakdown reaction such as cord + K-spar + melt/H₂O = bt + ky. Thermobarometry yields T of ca. 600°C and P of about 6 kbar. These P - T conditions are in very good agreement with the Variscan P - T conditions obtained by TROPPEL & HOINKES (1996) from the southern Kaunertal area and hence are thought to represent the Variscan metamorphic overprint. Based on the textural evidence cordierite is thought to be the only relict of the pre-Variscan metamorphic overprint. The formation of cordierite could be due to a reaction such as bt + sill + qtz = cord + grt + H₂O/melt which requires T of 700-750°C and P of 4.5 and 5 kbar (SPEAR et al., 1999). The Winnebachmigmatite is a "schollen"-migmatite which is characterized by a higher degree of migmatization. The mineral assemblage is garnet [Grt₁ (Alm₇₆Prp₉Grs₄Sps₁₁), Grt₂ (Alm₆₂Prp₅Grs₂₄Sps₉)] + kyanite (two generations, based on fluorescence) + plagioclase [Plag₁ (An₁₇Ab₈₃), Plag₂ (An₅Ab₉₅)] + K-feldspar + biotite + muscovite + chloritoid. The pre-Variscan metamorphic evolution can only be estimated. The observed reaction mus + kfs + qtz + H₂O = L requires at least 650°C and 3.8 kbar (SPEAR et al., 1999). These conditions fit very well with data by HOINKES et al. (1972). Thermobarometric calculations with the assemblage garnet₁ + plagioclase₁ + biotite + kyanite₁ yield P - T conditions of about 530-540°C and 5-6 kbar and are thought to represent the Variscan event. Garnet₂ + plagioclase₂ + kyanite₂ + chloritoid only occur in small microdomains and most likely represent the youngest Eo-Alpine event. The calculations with the Eo-Alpine assemblage yield P - T conditions of 485°C and 8.5 kbar, which agree well with Eo-Alpine P - T estimates from the Austroalpine nappes west of the Tauern Window. The Nauderer migmatite is also a stromatic migmatite and contains the mineral assemblage garnet + biotite + plagioclase + muscovite + quartz. Biotite + kyanite aggregates are interpreted as pseudomorphs after older cordierite. Thermobarometry yields P - T conditions of 580-610°C and 5-6 kbar, which represent the Variscan metamorphic event.

References

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