lites, solely based on dehydration experiments. The role of a strongly diluted fluid on the high-P/high-T melting behaviour is the focus of further investigations.

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Accessory phases as tools for the unraveling of complex polymetamorphic histories: discontinuously zoned titanites in eclogite-facies carbonates from the Austroalpine basement (Ötztal Stubai Crystalline Complex)

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Carbonates are present in the central part of the Ötztal-Stubai Crystalline Basement (ÖSCB). These marbles are intercalated between a thick mass of metabasic units and the surrounding granitic gneisses. This tectonic contact zone also contains amphibolites, eclogites, granitic gneisses, peridotites and calcsilicate lenses. The ÖSCB represents the polymetamorphic Austroalpine basement. The dominant metamorphic overprint in the ÖSCB is the Variscan metamorphic overprint, which occurred from 390–270 Ma (Hoinkes et al., 1997). The first stage of the Variscan event was a high pressure metamorphism around 373-359 Ma, leading to the formation of eclogites in the central part of the ÖSBC (Miller and Thöni, 1995). The conditions of the eclogite facies were estimated to be 700-750°C and 27–28 kbar (Miller and Thöni, 1995). The subsequent dominant amphibolite facies metamorphism occurred around 240–330 Ma (Tropper and Hoinkes, 1996).

The small lenses of eclogite-facies marbles from the Pollestal from the central part of the ÖSCB contain the assemblage calcite + dolomite + phlogopite + clino-pyroxene (diopside and omphacite) + garnet + biotite + geikelite + titanite + apatite. In addition, some of the marbles also contain chromite and exotic accessory phases such as zirconolite and baddelyite (Mogessie et al., 1988; Purtscheller and Tessadri, 1985). The assemb-lage garnet + omphacite + biotite + geikelite + titanite + calcite represents the eclogite facies peak assemblage. Due to subsequent decompression from eclogite-facies conditions to amphibolite-facies conditions, retrogression led to the formation of extensive symplectite rims around garnet and omphacite. Garnet is replaced by Al-rich hornblende (20 wt% Al_2O_3) and omphacite (Jd_{50}) is replaced by either diopside (Jd_{10}) or by a symplectite of hornblende and plagioclase ($An_{40}Ab_{60}$). Garnet shows discontinuous zoning with an older generation of Cr-rich (3–4 wt% Cr_2O_3) garnet in the core and younger overgrowths of Cr-poor (<1 wt% Cr_2O_3) garnet. Thr latter also show complex zoning and occasionally two zones of overgrowth can be distinguished. The Cr-poor garnet overgrowths contain abundant omphacite and titanite inclusions. Titanite also shows discontinuous zoning with Al-poor cores (2 wt.% Al_2O_3) and Al-rich overgrowths (3 – 4 wt.% Al_2O_3).

Textural data indicate that the titanite cores formed from ilmenite/geikelite during the onset of the presu-mably Variscan metamorphic event. The Al-rich titanite inclusions in omphacite and Cr-poor garnet indicate a second growth episode of titanite during eclogite facies conditions. These observations indicate that the Al-rich rims can clearly be attributed to the eclogite facies, whereas the Al-poor cores either represent a pre-Variscan stage or a very early stage of the eclogite facies overprint. To verify to nature of the discontinuous zoning of the titanites (polymorphic overprint vs. single-phase overprint) these chemical and textural data will be compared to ongoing geochronological SHRIMP investigations on discontinuously zoned titanites from this area.

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