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The occurrence of clino-ferroholmquistite in two metapelite samples from the Ortler-Campo crystalline complex (South Tyrol/ Italy): constraints on the *P*-stability of minerals of the clinoholmquistite group

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The Ortler-Campo crystalline represents a polymetamorphic Austroalpine crystalline basement which occurs southwest of the Ötztal crystalline between the Vinschgau Valley in the north and the Peio Line in the south. During the Eo-Alpine orogeny, the Ötztal Crystalline was juxtaposed onto the northern part of the Ortler-Campo Crystalline and its sedimentary cover. Tectonically, the Ortler crystalline represents a stack of three distinct units which can be distinguished by their polymetamorphic P-T evolution:

A): The Laas Unit: It is the lowermost unit and is characterized by intensely deformed, mylonitic amphibolites, micaschists, paragneisses and almost pure marbles (Laas Marble).

B): The Peio Unit: It is on top of the Laas Series and is comprised of a more or less homogeneous stack of micaschists (Grt-Sta-Bt-bearing schists) with intercalations of amphibolites, orthogneisses and impure marbles.

C): The Zebru Schuppenzone: This unit consists mainly of quartzphyllites with small intercalations of greenschists and quartzites. This unit is tectonically emplaced into the Peio Unit and forms at the base of the overlying sedimentary cover (Ortler Trias).

Almost all samples show clear petrographic evidence for a polymetamorphic evolution based on textural and chemical criteria such as discontinuous zoning in garnet,

plagioclase and amphibole. Most samples show only incomplete re-equilibration to the Eo-Alpine metamorphic overprint, thus Variscan relics such as staurolite, garnet and rarely biotite occur. While the $P-T$ conditions of the Variscan event have not been constrained yet, the Eo-Alpine metamorphic conditions range from 6.7 – 8.5 kbar and 480 – 540˚C. These data are in accordance with geochronological investigations which clearly indicate an Eo-Alpine metamorphic evolution.

In addition, some metapelite samples (Grt1 + Bt + Ms + Pl + Qtz) from the Peio Unit show a high-T overprint, based on the formation of the assemblage Grt2 + Crd + Sill which formed by Permian contact metamorphism of the Martell Granite. The $P-T$ conditions of this event were estimated to be ca. 550˚C und 4 – 6 kbar. In addition, the intrusion of the Martell Granite body also seems to be associated with Li-metasomatism, which leads to the occurrence of a mineral of the holmquistite group in two metapelite samples from the Laas- and the Peio Unit. Electron microprobe analysis yielded X_{Mg} = 0.45 and further investigations with micro-Raman-spectroscopy revealed that this holmquistite group mineral is clino-ferroholmquistite. Further investigations, concerning determination of the Li-content by laser-ICP-MS will be undertaken in the courso of this study.

Both samples show evidence for a strong Eo-Alpine metamorphic overprint, leading to the formation of newly grown Grt, Pl, Ms, Chl $\pm$ Mrg $\pm$ Pg $\pm$ Ctd. Although no experimental data exist on the $P-T$ stability limits of clinoholmquistite, petrological data clearly point to a high-T stability of this mineral. Concerning constraints on the P-stability, textural observations from this study indicate clinoholmquistite to be in equilibrium with the Eo-Alpine metamorphic assemblage and thus to be compatible with these P-accenuated $P-T$ conditions.

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