The P-T-t evolution of the Ortler-Campo Crystalline (South-Tyrol/Italy)

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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. In addition, some samples show a high temperature overprint, based on the formation of cordierite which formed by Permian contact metamorphism of the Martell Granite. The most prominent indicator for the Eo-Alpine metamorphic overprint is the formation of chloritoid.

The medium-grade staurolite-garnet micaschists of the Peio Unit yielded pre-Alpine Ar-Ar muscovite ages in the range of 170 to 196 Ma and a Rb-Sr biotite age of 138 Ma. These ages might be interpreted as Permo-Triassic cooling ages or Variscan ages partly reset during the Eo-Alpine metamorphic event. The sample collected from the uppermost part of

the Peio Unit near the Zebru fault, yielded a typical Eo-Alpine Rb-Sr age of biotite of 86 Ma.

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. Previous investigations suggested that the deformation and metamorphic evolution of the Ortler Crystalline was mainly Variscan of age with a slight Eo-Alpine overprint, while our results clearly show that the Eo-Alpine metamorphic overprint was very strong and pervasive and thus led in the Laas Unit to a complete recrystallization during the Alpine orogeny. The metamorphic overprint also decreases towards the W, indicated by the diminuishing overprint of the Peio Unit since in its westernmost part the Variscan mineral assemblage is completely preserved.

Acknowledgements:
Financial and logistic support from the projects CARG-PAT and CARG-PAB of the Autonomous Provinces of Trento and Bolzano-Südtirol.