Petrographic and structural investigations of the Laas Unit in the area of the Jennwand (South Tyrol/ Italy)

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The Laas Unit can be traced in the mountains south of the Vinschgau Valley from the Laas Valley (Jennewand) as far as the Martell Valley. It represents the lowermost tectonic unit of the Ortler-Campo crystalline complex and is characterized by a thick, east-west-trending succession of marbles (Laas Marbles), intercallated with micascists, paragneisses and amphibolites. Petrographic investigations were performed on metapelites, metabasites and also on silicate-rich marbles and they all show clear evidence for a polymetamorphic evolution based on textural and chemical criteria such as discontinuous zoning in garnet, plagioclase and amphibole. While the P-T conditions of the Variscan event have not been constrained due to the lack of suitable mineral assemblages, the Eo-Alpine metamorphic conditions range from 0.7–0.9 GPa and 530–550°C. The structures observed in the marbles are perfectly concordant with the structures of the surrounding micascists, which were dated and yielded ages of around 87 Ma (Schuster 2003, written comm.). These data are in accordance with current investigations in the Ortler-Campo crystalline complex which clearly show that the Eo-Alpine metamorphic overprint was very strong and pervasive and thus led to a complete recrystallization in the Laas Unit during the Alpine orogeny.
Detailed field mapping of the Jennewand on a scale 1:5000 was performed to obtain further information about the structural evolution of the Laas Unit and the structural data were subsequently compared to the previous structural observations of the Ortles-Campo crystalline by Froitzheim et al. (1994). In the study area two generations of Alpine (Cretaceous-Tertiary) folds can be distinguished: The first generation (D1) is represented by shallowly plunging fold axes, trending NNW or SSE, and shallowly north- or southward dipping axial plane. The second generation (D2) of fold axes are mostly subhorizontal to shallowly plunging and their trend is ENE or WSW. D2 axial planes vary from gently to steeply dipping, north or southwards. The large scatter of the axial planes is due to the interference of the two fold generations. The D2 fold phase is the dominant fold phase in this area and is represented by folds in the cm to m scale up to the kilometre-scale synform of the Jennwand. The Jennewand is interpreted as an E-W striking synform, with a southward dipping axial plane. The large-scale fold axis of this synform varies somewhat from ENE to E. The last deformation is brittle and is manifested by NW-SE striking faults

in the Laas Valley and at the “Göflaner Schartl”. These faults are parallel to a set of faults in the Pejo Unit (Martell Valley) and the lineations indicate west-directed strike-slip as well as north-directed normal faulting.
The first deformation stage is most likely the result of the E-W oriented compression and can be correlated with the Trupchun Phase described by Froitzheim et al. (1994), which is associated with the W-directed thrusting of the Austroalpine nappes along the Schlinigfault. The fold axes associated with D2 indicate a NNW directed thrusting and can be correlated to the Blaisun Phase according to Froitzheim et al. (1994).

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

Froitzheim, N., Schmid S.,Conti S. (1994): Repeated change from crustal shortening to orogen parallel extension in the Austroalpine units of Graubünden. Eclogae geol.Helv. 87/2, 559-612.