Paradiso Massif, the Upper Pennine nappes, the Monte Rosa Massif, and the Dent Blanche complex. The older subgroup of the Tertiary zircons (40 Ma) may have been supplied by metamorphic and migmatitic rocks affected by an Eocene high-temperature phase.

A Late Cretaceous age cluster (~ 70–60 Ma) is related to cooling after the main Austroalpine metamorphic event at 110–100 Ma. Most of the recently exposed Austroalpine nappe complex displays mica cooling ages and zircon FT ages between 95–70 Ma and 99–55 Ma, respectively.

Finally, an ill-defined Jurassic age cluster, with a mean in Late Jurassic times, is related to rift-shoulder heating of the Austroalpine/South-Alpine crystalline basement due to rifting of the Pennine oceanic domain. Presently, the Silvretta nappe complex, situated at the western termination of the Austroalpine realm, and the South-Alpine basement west of the Canavese Line, display similar zircon FT ages. Therefore, a westward continuation of the Silvretta complex prior to deep Neogene erosion is suggested.

TRANSALP: Struktur von Kruste und Oberem Mantel in den Ostalpen

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P nach *S* konvertierte Wellen werden benutzt, um Geschwindigkeitsdiskontinuitäten im Untergrund abzubilden (*receiver function method*). Der Schwerpunkt liegt auf der Geometrie und Tiefenlage der Kruste-Mantelgrenze. Die Europäische Moho taucht unter den Ostalpen auf ca. 55-60km ab, wobei die maximale Tiefe südlich des Tauernfensters erreicht wird. Der Übergang zur Adriatischen Moho ist steil, ein vertikaler Versatz von 15km wird auf einer Distanz von weniger als 40km realisiert.

Die Polarisationsanalyse von *SKS* Phasen ermöglicht die Bestimmung der sogenannten *splitting parameter:* die Richtung der schnellen Achse ϕ und die Verzögerungszeit δt. Gemeinsam charakterisieren sie die Anisotropieeigenschaften des Oberen Mantels. Entlang der TRANSALP Linie sind die Werte von δt hoch (im Mittel 1.3 s), die Richtung der schnellen Achse beträgt ca. 65°-70°N und ist damit annähernd parallel zum Streichen des Orogens. Dies deutet darauf hin, dass die Anisotropie eng mit dem transpressiven Spannungsfeld während der Alpenorogenese verbunden ist.

Texture analysis within high-pressure units – constraints for the mechanisms of the exhumation of high-pressure rocks in the Alps

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Crystallographic Preferred Orientations (CPOs) (textures), especially of quartz and calcite, within tectonites are used by numerous (structural) geologists routinely, generally in terms of shear criteria and „geothermometer".

The evaluation of CPOs combined with microstructural studies are some of the the most important tools to get information on the deformational evolution and the rheology of shear zones, and of deformation and recrystallization mechanisms operating in naturally deformed rocks. CPOs within tectonites allow the evaluation of various factors (e.g., strain geometry, finite strain, temperature, strain rate) that have been operating during deformation of the crystal lattice, and bear information on the deformation history of shear zones. In this study we would like to demonstrate how the analysis of textures can be applied to the reconstruction of the exhumation of high-pressure units in the Alps. Two case studies will be presented.

Quartz textures have been investigated along a south-north oriented section across the Plattengneis of the Koralm Complex (Eastern Alps). The Plattengneis forms an important shear zone within the Austroalpine nappe complex of the Eastern Alps, which has developed during the Cretaceous evolution of the Alpine orogen. The quartz c-axes form small circle distributions in the southernmost parts of the Koralm Complex, which represent the uppermost structural level of the Plattengneis. Further to the North two maxima between the Y and Z directions of the finite strain can be

interpreted in terms of preferred slip on the rhomb planes. These fabrics continuously grade into (type I and type II crossed) girdle distributions in a northward direction. A strong maximum near the Y-axis with the tendency to be distributed along a single girdle, with three corresponding maxima of a-axes near the margin of the pole figure, can be observed in the central and northern parts. A continuous increase of peak temperatures from approximately 550°C to approximately 750°C from the South to the central parts can be inferred from geothermometric calculations. The temperatures then decrease to approximately 650°C from the central parts to the North. The related pressures increase from 8 to 16 kbar, and then decrease to 10 kbar. The CPO changes are best interpreted in terms of temperature dependence of the activation of glide systems within quartz aggregates. The temperature and pressure evolution may indicate that the central parts of the Koralm Complex have been exhumed by larger amounts than the northern and southern parts. This is also documented by the CPO evolution. Therefore, we assume that the Plattengneis shear zone formed during the exhumation of the Koralm Complex within an extensional regime, and is related to the exhumation of high-pressure units in the footwall of this shear zone. This is also indicated by textures of omphacite which document a strain geometry within the flattening field (S-type).

Omphacite textures within eclogites from the Adula Nappe (Western Alps) show well defined clusters of c-axes near the stretching lineation, the b-axes show a girdle distribution perpendicular to the foliation plane (L-type) The omphacite shape fabrics can be described as linear or strongly lineated, indicating a constrictional strain geometry which is related to the boudinage of eclogite layers within the host rock (mainly para- and orthogneisses). Microstructural observations indicate that this deformational phase occurred along the decompressional path, and may be related to the extrusion of the Adula Nappe during the collision of the European continental margin within the Brianconnais microplate, subsequent to the subduction of the Valais ocean.

Interpretation of the TRANSALP seismic section: the crocodile model

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The TRANSALP seismic profile revealed a 300 km long continuous whole crustal section from Munich to Treviso in the Ventian plain. It allowed new insights into the deep structures of the Eastern Alps but the deep reflectors can be interpreted in different ways. Two main models are discussed currently. In the “lateral extrusion model” the Eastern Alps are explained in a classical way, it will be presented in a different talk by A. Castellarin. The “crocodile model”, which is presented here, is based mainly on the unexpected seismic reflection pattern. Critical is the region beneath and south of the Tauern window. South dipping reflectors are here very prominent. On the contrary, the Periadraiatic fault (Pustertal fault) can only indirectly be inferred in the section. The overall reflective pattern of the deep crust favorises a model, in which the Tauern were pushed up along a transcrustal ramp by the lower Adriatic crust, which indents the European crust between 30 and 40 kilometers. On the other hand, a wedge of European crust is driven over a distance of about 20 kilometer into the Adriatic crust between 30 and 20 kilometers depth, and pushed the Dolomite block southwards and upwards.

In a balanced section it will be shown, that this construction gives a viable interpretation of the Eastern Alps.