From transpression to extension: The Polinik shear zone – insight into a major shear zone of the Eastern Alps (Carinthia)

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The Polinik shear zone is situated in the Austroalpine units southeast of the Tauern Window. It strikes in NW-SE direction and separates two Austroalpine blocks with different thermochronological ages. Although this shear zone is hardly known, recent studies demonstrated that it played a key role during unroofing of the eastern Tauern Window. The Polinik shear zone is characterized by both ductile strike slip and brittle dip slip displacement.
A combination of structural- zircon- and apatite fission track analysis demonstrate that this shear zone underwent northwest-directed transpression followed by Oligocene to Middle Miocene southeast-directed extension. The change from transpression to extension occurred at the transition from ductile to brittle conditions and its timing is well constrained by zircon fission track ages which sensitivity is about the same temperature range. Together with fault related data of the Eastern Alps we propose that this kinematic change is in direct connection with the unroofing of the Tauern Window and the Niedere Tauern contemporaneous with southeast directed detachment of the so called Gurktal Block and northeast- to east- directed detachment of the Seckauer Tauern. Therefore the Polinik shear zone plays a crucial role by the lateral escape of crustal blocks during Miocene lateral extrusion.

Geochemical and stable isotope studies of shear zone related talc mineralization: constraints from the Gemerska Poloma talc deposit

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The Gemerska Poloma talc deposit is part of Inner Western Carpathians Gemer unit that consists of Middle Triassic metacarbonates and Upper Triassic pelagic limestones and radiolarites. The talc mineralizations are hosted within a massiv magnesite body. To the footwall it is bounded by a tectonically altered granitoid body. The fluids leading to the talc mineralization are supposed to be induced during thrusting of the magnesite body. Stable Isotope studies of C and O of carbonates (magnesite and secondary dolomite from within the talc mineralizations) show mixing of fluids of differing origin. Fluidchemistry as well a rockchemistry show that fluids interacted with the granitoid body in the footwall of the magnesite body. Thus it can be concluded that fluids were activated during thrusting, mobilized elements from the granitoid body and the magnesite body and precipitated talc, quartz and secondary dolomite within the damage zone of the fault zone.