Progressive development from type III to type II and type I faults is consistent with increasing displacement and increasing fault core width.

Fault type classification and related paleostress analysis provides evidence from field observation compared to theoretical and analogue models of Mohr-Coulomb fracture evolution.

Changing fluid chemistry during continuous shearing in cataclastic fault zones along the SEMP fault system

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Brittle fault rock samples from carbonate shear zones along the Salzach-Ennstal-Mariazell-Puchberg fault system (SEMP) have been analysed using cathodoluminescence microscopy (CL), microprobe analysis and stable isotope composition. The combination of these analytical methods provides an insight into comminution processes and fluid chemistry. The reconstruction of the evolution of fluid chemistry leads to a chronological classification of five fluid phases with respect to fluid chemistry, CL behavior and related structural processes. Initial cataclasis is accompanied by dedolomitization processes along crystal borders and intragranular fractures derived by Ca-rich fluids (Phase P1). Subsequent fluid phases (P2-P5) are characterized by variable Fe- (and Si-content) and therefore variable CL behavior.

Microprobe element mappings support the discrimination of Fe-enriched, non luminescent phases and Ca- and Mn-enriched fluids with bright luminescent calcite precipitations. Fe-enriched carbonates and Fe-hydroxide precipitation indicates fluid circulation in deeper parts of the stratigraphic sequence. These fluids are assumed to be derived from underlying clastic sequences of the Werfen Formation. Stable isotope signatures (δ13C and δ18O) indicate mainly meteoric origin of penetrating fluids and variable amounts of fluids in the fault zone.

Oligocene and Neogene tectonic processes in the southeastern Alps and northwestern Dinarides: constraints from new (U-Th-Sm)/He apatite ages

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The AlDi-Adria project aims at deciphering the late-stage orogenic evolution for the northern edge of the Adriatic microplate, i.e. the Friuli orocline and its surrounding regions by a combination of structural studies, subsidence analysis and low-temperature thermochronology. Results will form the base for studying the large-scale surface response to deep-seated lithospheric processes, a number of which have been debated for the study area, e.g. slab break-off, slab delamination, orogenic shortening and lateral extrusion. First results from apatite (U-Th-Sm)/He dating (AHe) in combination with existing apatite fission track age constraints allow us to derive some regional patterns of deformation and exhumation in the Southalpine units/Dinarides and phases of fault movement along the PAF. Here, we discuss those constraints on tectonic processes from old to young events.

Only very limited low-temperature thermochronological data are available south of the Periadriatric Fault (PAF). Oligocene AHe ages were derived for samples from the inner portions of the External Dinarides (Fužine). Similar ages were found even in the southernmost Austroalpine units (e.g. the Reifnitz tonalite). Together, these ages are interpreted as belonging to a regional scale deformation event, which caused large-scale low-amplitude folding due to shortening mainly directed to the stiff interior of Adria. The PAF was also initially activated during this stage. Tonalites intruded into the eastern PAF during Early Oligocene (ca. 34 to 32 Ma; GENSER & LIU, 2010) forming a zone of weakness immediately activated as fault zone.

A major phase of dextral shear along the PAF is indicated by cooling ages of ca. 16 to 20 Ma, attributed to lateral extrusion of the Eastern Alps (e.g., RATSCHBACHER et al., 1991). A new Ar-Ar biotite age of 19 Ma from a mylonitic gneiss from the PAF near Kupitsch with a similar age corroborate this phase of exhumation and deformation.

We find latest Miocene/Pliocene AHe ages of ca. 7 – 5 Ma Ma for an Oligocene tonalite just north of the easternmost Periadriatic Fault. Similar ages were recently reported from the Lavanttal fault by WÖLFLER et al. (2010) and ascribed to fault activity and hydrothermal fluid circulation causing rejuvenation. Since our samples do not show any alteration fabrics we interpret them to indicate final uplift, which is supported by the young relief in this area: To the north, the Klagenfurt basin has been overridden by the Karawanken Mountains during Pliocene-Quaternary times. Formation of the Sava fold belt in the south is also of similar age. A denser network of low-temperature data is needed to refine these preliminary patterns and more results from ongoing apatite fission track and AHe work will be presented.

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Mapping the transition between the eo-Alpine HP-nappe system and the Ötztal-Bundschuh Nappe system using garnet zoning types and geothermobarometry

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The investigated area is situated west of the Penninic Tauern Window directly at the already proposed transition between the Ötztal Nappe as part of the Ötztal-Bundschuh Nappe System and the Schneebergzug as part of the Koralpe-Wölz high pressure Nappe System. Aim of this study is to compare garnet major element zoning linked with pseudo-sections from different types of metapelites to be able to distinguish between polymetamorphic and monometamorphic units. Polymetamorphism means combinations of Variscan, Permian and eo-Alpine events which are related to the Ötztal Nappe (Variscan and Eo-Alpine) and the Texel Complex (Varsican, Permian and Eo-Alpine). Monometamorphism means eo-Alpine and is related to the Schneeberzug. Texel Komplex is together with the Schneebergzug part of the Koralpe-Wölz high pressure Nappe System.

Two main types of pre-Alpine garnet zoning patterns in the cores, type-1 and type-2 and two main types of eo-Alpine garnet zoning in the rims, type-3 and type-4 have been