



Pre-Badenium exhumation of the Leithagebirgs-Horst (Vienna Basin, Austria)

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Digital field mapping, tectonic geomorphology, fault slip analysis and microstructural investigations are used to study a major brittle fault zone at the margin of the Vienna Basin (Eastern Austria). The major aim of the study is a better understanding of the age and the growth history of this fault zone, which facilitated the exhumation of the Leithagebirge.

The geological evolution of the Vienna Basin plays an important role for the understanding of the geology of the Leithagebirge. This NNE-SSW striking mountain chain is located at the southeastern margin of the Vienna Basin and it is bordered by major faults against the sediments of the Vienna Basin in the W, the Eisenstadt Basin in the S and the Pannonien Basin in the E. The mountain chain is a horst/ridge and has a longitudinal extension of 34 km with a maximum width of 9 km. The elevation rises from the flat Vienna Basin (a.s.l. 118m) to 484 m (Sonnenberg). The lithology of the Leithagebirge consists mainly of Paleozoic gneisses and mica schists (i.e. Variscan metamorphic basement) and its weakly metamorphosed Permo-Mesozoic cover as a part of the Lower Austroalpine realm. During the Eoalpine event, the rocks have been strongly deformed under greenschist facies conditions. Thick layers of Badenian and Sarmatian sediments preserved along the margins of the Leithagebirge. Because the outcrop situation in the Leithagebirge are generally poor, we digitally mapped the quarry "Schraufstädter" near Wimpassing at the SW margin of the Leithagebirge in detail. In the quarry, mainly metamorphic Permo-Triassic sediments comprising marble ultramylonites and ductily deformed quartzites are exposed. All lithologies are strongly overprinted by an intense cataclastic deformation. The zone of pervasive cataclasis is exposed over a structural thickness of more than 500m. In zones of less intense brittle overprint, the dolomite mylonites can be discriminated from calcite ultramylonitic marbles. Brittle fault planes with polished slickensides and slickenlines, form a conjugate N-S striking normal fault system. Some of the faults have been later reactivated by dextral strike-slip movements. Calcite veins clearly post-date W-E extension and precipitate in the partly non-cohesive cataclasites. As a result of this brittle deformation, meta-quartzite lenses are juxtaposed within the dolomitic marble cataclasites separated by up to several meters of non-cohesive cataclasites and fault gouges. Interestingly, the brittle fault zone is overlain by clastic sediments of Badenium age and these sediments have no evidence of tectonic deformation. We therefore suggest that the exhumation of the Leithagebirge ridge develop prior to the Badenium.