

Pseudotachylites along the Pustertal-Gailtal-Line, eastern Periadriatic Fault system, Austria

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The Pustertal-Gailtal Line (PGL) belongs to the dextrally transpressive Periadriatic Fault system and forms the border between Southern and Eastern Alps. Although part of the ongoing convergence between Adria and Europe appears to be accommodated by this fault system, it reveals little instrumental and historical seismicity. In our study, we attempted to find evidence for past seismic activity along the PGL by investigating pseudotachylite occurrences. We investigated an area of c. 19 km² to either sides of the PGL around Maria Luggau (Austria). We identified cataclasites and fault gouges along the fault core zone, from which we investigated only the cohesive rocks. Cataclastic, foliated Oligocene granitoids as well as garnet-mica schists of the Austroalpine basement are crosscut by cm- to dm-scale veins containing black fault rocks, which were sampled for further analyses (Fig. 1).

Polarisation microscopy reveals that the vein-forming black fault rocks are often optically isotropic, testifying to their origin as quenched melts. Sharp margins of mm- to cm-sized injection veins against the surrounding host rock, well-rounded quartz and feldspar clasts, the absence of hydrous minerals in the matrix, as well as spherulites are further hints at a seismogenic origin of the studied fabrics. Some of the optically isotropic veins are internally foliated; their *in-situ* μ -XRF analysis of major element concentrations revealed chemical composition variations in the foliation. Even if this foliation might suggest overprinting by aseismic creep, our observations indicate a seismogenic origin of the studied fabrics as pseudotachylites.



Figure 1: Pseudotachylite veins ('Pt') crosscutting paragneiss of the Austroalpine basement along the Pustertal-Gailtal Line (locality: Maria-Luggau, Lesachtal, Austria).