

Widespread Permian granite magmatism in Lower Austroalpine units: Significance for Permian rifting in Eastern Alps

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The Permian tectonic setting of the Alpine orogen remains controversial (i.e., continental rift: Neubauer et al., 2000; Variscan collapse: Ménard & Molnar, 1988, underplating: Schuster & Stüwe, 2008; Paleotethys subduction: Finger & Steyrer, 1990) and is crucial for palinspastic reconstructions of the western Tethys domain during the breakup of Pangea. In this study, we present new U–Pb data for the Permian “Grobgneis” granite, a porphyric orthogneiss (266 ± 19 Ma; 272.0 ± 1.8 Ma) of the Raabalpen complex in the Lower Austroalpine unit. A similar Permian granite age (263 ± 16 Ma) (Tropper et al., 2007) was reported from Stubenberg metagranite in the same subunit. Locally, the Permian “Grobgneis” is associated with small bodies of undated gabbro. The new geochronological results reveal that the “Grobgneis” of the Lower Austroalpine unit was emplaced during Middle Permian (Guadalupian) times. Some zircons with a very low Th/U ratio zircon in the sample SG3A show Triassic age (ca. 230 Ma), we interpret it present a late Triassic metamorphic age. In addition, the Rb–Sr ages of white micas from the granite yield cooling ages of 231 Ma, also indicating little metamorphic overprint (Schuster’s unpublished data as cited in Tropper et al., 2007), which correspond the second extensional event (Neubauer et al., 2018) in Eastern Alps. Interestingly, the Raabalpen basement is covered by locally thick volcanics and then by of latest Permian and Lower Triassic siliciclastic succession and Middle Triassic dolomites. This suggest an interesting relationship between Middle Triassic granites and volcanics in the basement and the relatively thin cover, and these are tentively interpreted as a rift.

As a whole, Permomesozoic siliciclastic syn-rift sequences spread in overall Eastern Alps (Neubauer et al., 2018), we suggest the Permian magmatism (including granite, pegmatite, gabbro and extrusive equivalents) coeval with the HT/LP metamorphism in the Eastern Alps were formed at the onset of lithospheric extension associated with initial rifting of the Variscan orogen during Pangea breakup, the following Middle Triassic tectonothermal event heralding the opening of the Meliata Ocean.

References

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