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Penninic units within the Rechnitz window, Eastern Alps: U-Pb zircon ages and lithostratigraphy reveal rifting processes

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The Rechnitz window group exposes Penninic oceanic and continental margin successions along the South Burgenland basement high within the Pannonian basin. Based on new lithological and U-Pb zircon data, the tectonic evolution of Penninic units is reinterpreted. Two tectonic units are distinguished, the Schlaining unit with ophiolites, which show a Paleogene history of subduction, and the Kőszeg unit with distal continental margin successions indicated by their richness of continent-derived clastic material and a structurally overlying mélangé with ophiolitic elements like blueschist and metagabbro. Previous fossils indicate a persistence of sedimentation until ca. the Early/Late Cretaceous boundary. Concordant zircons from a meta-plagiogranite (now a blueschist) from the mélangé yield a $^{206}\text{Pb}/^{238}\text{U}$ mean age of 142.5 ± 2.8 Ma.

Ca. 200 zircon grains from three samples of quartzite of the Kőszeg unit yield two different age population patterns: (1) Two samples are dominated by zircons with Variscan ages ranging from 284.9 ± 3.62 Ma to 357.8 ± 4.4 Ma, zircons as young as 182.4 ± 1.4 Ma and 188 ± 1.4 Ma (Early Jurassic), few Early Paleozoic and Panafrican ages ranging from 428.1 ± 5.4 Ma to 614.2 ± 4.3 Ma and a variety of Middle Proterozoic ages between 1032 ± 10 Ma and 1577.4 ± 8.1 Ma. (2) In contrast, another sample yields only a small Variscan age population, a high diversity of early Paleozoic and Panafrican ages and a significant amount of unexpected Kryogenian and Tonian ages (684.1 ± 8.3 Ma to 992 ± 13 Ma), uncommon in Central Europe, and no Middle Proterozoic grains but few Early Proterozoic ones. Together with lithological data (e.g., Csák Conglomerate with Middle Triassic Wetterstein Dolomite boulders), the new ages allow reconstruction with northern continental margin similar to the Variscan Bohemian Massif (or Tauern Central Gneiss unit) and a southern passive Austroalpine margin, which were rifted during Jurassic times.