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Structure and structural evolution of the Rechnitz window and adjacent units, Eastern Alps: changing Neogene extension directions due to motion around a foreland promontory

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The Rechnitz window is part of Penninic window group exposed along the South Burgenland basement high within the large Neogene Pannonian basin, which is formed by changing the extension directions during the motion of the Alcapa block around the Bohemian foreland promontory. Based on new data of the structural history of Penninic units, its burial and exhumation is proposed during eastward and northeastward motion around the Bohemian foreland promontory. Two tectonic units within the Rechnitz window are distinguished, the Schlaining unit with ophiolites, which show a Paleogene history of subduction (deformation stage D1), and the Köszeg unit with distal continental margin successions indicated by their richness of continent-derived clastic material. Previous fossil findings indicate a persistence of sedimentation until early Late Cretaceous. Both units were subducted during Paleogene and suffered blueschist metamorphism. The age of ophiolite obduction onto the Köszeg unit must be between latest Paleocene and earliest Miocene associated with peak temperature conditions (deformation stage D2, likely at 22 Ma). A new 40Ar/39Ar white mica age shows a plateau-type pattern at 22.3 $\pm$ 0.2 Ma and a subsequent thermal event of Ar loss at 19.2 $\pm$ 0.5 Ma. Exhumation and extension of buried Penninic rocks were facilitated by a sequence of normal faults and the change of the motion direction from northeastward to eastward motion (D3 and D4a). In present-day coordinates, the initial stage of faulting along a major ductile low-angle normal fault was directed northeastward at ca. 19 Ma. In the subsequent stage (Early Miocene), extension resulted in a ca. eastward prograding rolling hinge, which separates the Rechnitz window from Danube basin located in the east (D4a). Gently W-dipping thrust faults indicate ca. WSW-ENE shortening and also resulted in ca. N-S trending E-vergent folds occur in lower sectors of the Köszeg unit (deformation stage D4b). Finally, small Late Miocene to Early Quaternary alkali-basaltic volcanic centers with lava flows and tuffs spread in a regular sequence over 95 km from Pauliberg/Oberpullendorf (ca. 11 Ma) located in the NE over Güssing (ca. 5 Ma), and finally to the SW (e.g. Klöch, 2.6 to 1.6 Ma). We interpret this volcanism to have resulted from thinning of the lithosphere in the Pannonian basin over a hot-spot with the Alcapa plate moving from SW to the NE between 11 and ca. 2 Ma.
Subsequent ca. ESE-trending dextral and ca. NNW-trending sinistral strike-slip faults indicate NW-SE strike-slip compression (D5a), which progressively shifted to N-S strike-slip compression facilitated by NNE-trending sinistral strike-slip faults and NNW-trending dextral strike-slip faults (D5b). This event (D5b) likely also resulted in gentle high-wavelength crustal-scale folding and is interpreted to result from Pliocene inversion of the entire Pannonian-Carpathian basin system.