

EXHUMATION AND LATERAL EXTRUSION BETWEEN TAUERN WINDOW AND PERIADRIATIC LINEAMENT: VARIATION OF FLOW BETWEEN NONPARALLEL PLATES

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The Adriatic-African-plate motion during Oligocène released combined transpression and extrusion between the southwestern margin of the Tauern Window and the Periadriatic Lineament. Major structural elements include subvertical foliations and subhorizontal east-west oriented stretching lineation. These structures are related to coeval activity of shear deformation within an eastward widening wrench corridor and backthrusting of Penninic Tauern Window units to the south onto the Austro-Alpine block. Oligocene shear deformation was accompanied by intrusion of magmatic bodies, namely the Rensen and Rieserferner magmatic bodies (MÜLLER et al., 2000; BORSI et al., 1978).

Lateral, east-west variations of vertical and horizontal displacement components are inferred from flow parameters and intrusion depth of syntectonic granitoids as well as from data on strain and flow geometries in host rocks. Data suggest major vertical displacement in western parts of the wrench corridor that is decreasing to the east. Vorticity analyses accounts for pure shear dominated transpression simultaneously with east west extrusion. The orientation of compressional flow apophyses with 20°–40° in respect to stable Europe is interpreted to reflect the relative plate motion vector during Oligocene convergence. Rotation of shortening axes from NE to NNW is inferred from progressively evolving structures and interpreted as post-intrusional anticlockwise rotation of the African plate.

A variable amount of vertical displacement along strike of the wrench corridor is evident from syntectonic textures and microstructures as

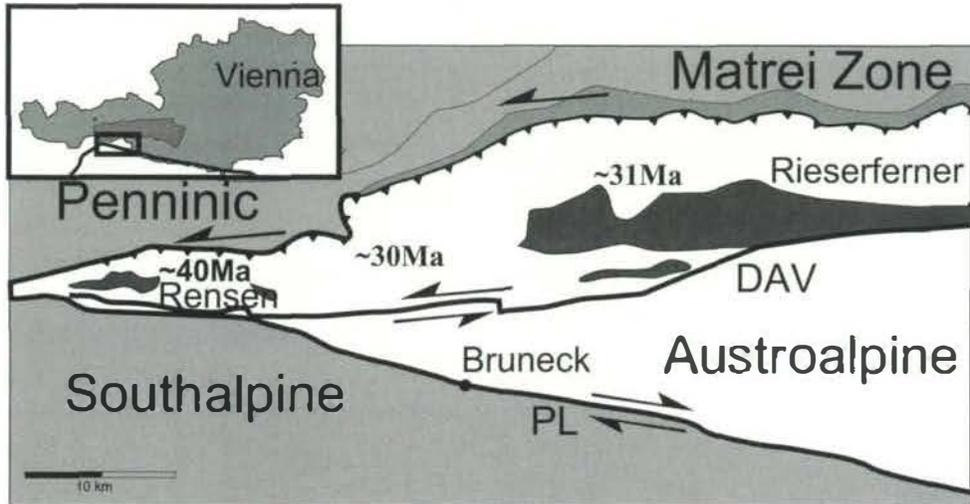
well as from intrusion depth of granitoids. Intrusion depth decrease from the western Rensen Pluton (ca. 8 kbar) towards the eastern Rieserferner Pluton (ca. 2–3 kbar). This goes along with different amount of horizontal north-south shortening. In order to explain the situation a 3 dimensional kinematic model of flow between nonparallel plates was established that has to fit data on the flow regime, published data on Tertiary plate motion and variable amount of exhumation. The corridor can be described as a obliquely convergent pure shear dominated wrench zone. Divergent flow and variable amount of horizontal shortening between nonparallel plates accounts for exhumation of rocks from variable depth (Fig. 1). Boundary effects include west-east coaxial stretch along the rheologically soft Tauern Window boundary and discrete shear along the stiff Periadriatic Lineament.

References

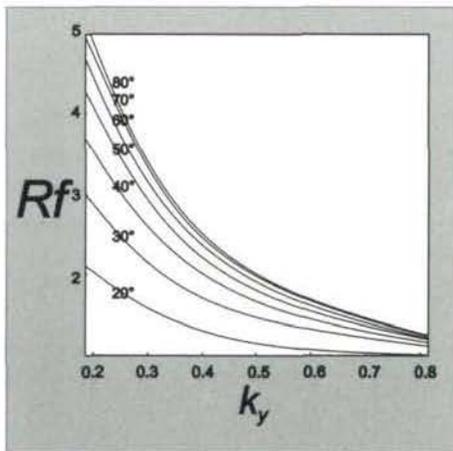
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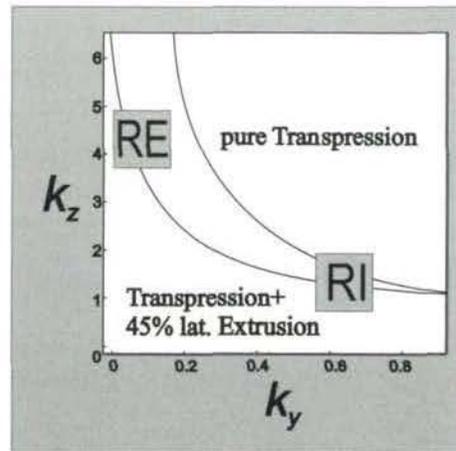
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Sketch of eastward widening wrench corridor between Tauern Window and Periadriatic Lineament



Transpression Model shows Variation of vertical strain (Rf^3) against horizontal (~N-S) shortening for different angles of plate convergence



Kombined Transpression and 45% Extension translated to variable exhumation (stretch). The model suggest major exhumation at Renssen (RE) and minor exhumation at Rieserferner (RI)