



## **Metamorphic evolution of the Rechnitz metamorphic core complex in relation to the Neogene Pannonian basin, Eastern Alps: Constraints from Ar-Ar white mica ages**

Shuyun Cao (1,2), Franz Neubauer (2), Johann Genser (2), Manfred Bernroider (2), and Gertrude Friedl (2)

(1) State Key Laboratory of Geological Processes and Mineral Resources, China University of Geosciences, Lumo Rd. 29, Wuhan, 430074, (2) Salzburg University, Fachbereich Geographie und Geologie, Salzburg, Austria (shuyun.cao@sbg.ac.at)

The exhumation of Cordilleran-type metamorphic core complexes (MCC) is generally related to largely contemporaneous collapse-type sedimentary basins (mainly halfgrabens). Here, we investigate the example of the Rechnitz MCC, which formed by Miocene orogen-parallel extension within the Neogene Pannonian basin. The Rechnitz MCC is located on the South Burgenland basement High within the western part of the Neogene Pannonian basin, with the Styrian basin in the west and the Danube basin in the east. The Rechnitz MCC is metamorphosed within greenschist facies conditions (maximum temperature of 430 °C) ideal for Ar-Ar white mica dating. For the first time, we undertook an extensive survey of  $^{40}\text{Ar}/^{39}\text{Ar}$  white mica dating combined with microfabrics and electron microprobe compositional data and we compare the new data with major evolutionary stages of adjacent sedimentary basins, mainly based on re-evaluation of existing reflection seismic lines.

The internal structure of the Rechnitz window is characterized by two tectonic cover nappes, a lower nappe with distal continental affinity, and an upper nappe representing the infilling of an oceanic basin. Both within greenschist facies metamorphic conditions and few blueschists were found in the northwestern part of the upper nappe. We found a number of distinct white mica age spectra: (1) A sample from the northwesternmost upper nappe yield a staircase pattern ranging from  $14.8 \pm 0.9$  Ma to  $41.5 \pm 1.0$  Ma. We interpret the older age as minimum age of high-pressure metamorphism and the younger age as age of overprint during extensional exhumation. (2) A number of samples from the western part, independent from positions within the nappes yield plateau ages between 20 and maximum 23 Ma and are variably affected by a younger thermal overprint between 13 and 15 Ma. (3) The eastern and lower units show plateau-like patterns with plateau ages of 17 – 19 Ma with a majority at ca. 18 Ma and a single younger outlier at ca. 16 Ma. Some samples are thermally overprinted at ca. 13 Ma.

We interpret the plateau ages between 23 Ma and 17 Ma as represent peak conditions of greenschist facies metamorphism. The younger ages (ca. 18 Ma) of the 17 – 23 Ma age group coincide with the onset of subsidence and terrestrial sedimentation in the Styrian basin during Otnagian and Karpathian and is well constrained by east down normal faults. The ages also indicate an earlier stage cooling of the western part than in the east of overprint representing evidence for an eastward migrating rolling hinge type exhumation of the Rechnitz MCC. The age of overprint centering at ca. 13 Ma correlates with last extensional motions, which are also constrained by youngest normal faults in reflection seismic lines of the Styrian basin. Together the data indicate the main stage of crustal thinning in the early Miocene between 19 and 13 Ma in response of eastward retreating subduction of the land-locked Carpathian basin.