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From an active continental plate margin to continental collision: New constraints from the petrological, structural and geochronological record of the (ultra) high-P metamorphic Rhodope domain (N-Greece)

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The Rhodope domain occupies a key area along the suture between the European and the Apulian/Adriatic plate (Schmid et al., 2008), which collided in the early Tertiary (closure of the Vardar/Axios ocean, cf. Mposkos & Krohe, 2006). An integrated study of the geochronological, tectonic and petrological data of the Rhodope domain provides the unique opportunity resolving a 160 my lasting metamorphic evolution (Jurassic to Miocene) of an active plate margin to a high degree.

The Greek Rhodope consists of several composite metamorphic complexes bounded by the Nestos thrust and several normal detachment systems. The PT- and structural records of the complexes constrain metamorphic, magmatic and tectonic processes, associated with subduction along a convergent plate margin including UHP metamorphism, MP to HP metamorphism associated with continental collision, and core complex formation linked to Aegean back arc extension. We focus on the Sidironero Complex that shows a polymetamorphic history. This is documented by SHRIMP and LA-ICP-MS U-Pb zircon ages of ca. 150 Ma from garnet-kyanite gneisses that are interpreted to record the HP/UHP metamorphism (Liati, 2005; Krenn et al., 2010). SHRIMP zircon ages of ca. 51 Ma from an amphibolitized eclogite is interpreted by Liati (2005) to record a second Eocene HP metamorphic event.

We present new data from an integrated petrological, geochronological and tectonic study. Granulite facies and upper amphibolite facies metamorphic conditions are recorded by the mineral assemblage Grt-Ky-Bt-Pl-Kfs-Qtz-Rt and Grt-Ky-Bt-Ms-Pl-Qtz-Rt, respectively, in deformed migmatitic metapelites. Deformation occurred under granulite facies conditions. Monazites from the matrix, that formed during the granulite facies deformation, lack core/rim structures and are only locally patchy zoned. Monazite chemical compositions are related to varying reaction partners. Single grains and fractions of few grains yield ID-TIMS U-Pb ages that plot along the concordia between 64 to 60 Ma. One date of 55 Ma might represent Pb-loss during later fluid-induced dissolution-reprecipitation.

We discuss the following questions: What is the history of the high-P metamorphic rocks in the Sidironero Complex? Were high-P rocks that have been already exhumed again dragged into the subduction channel? Which rocks from the upper plate are affected by high-P metamorphism evincing that subduction erosion is an important mechanism?

We reconsider the significance of the P-T-t evolution in the light of the tectonic processes that took place along the depth extension of a convergent plate interface and during subsequent continental collision along the European/Apulian Suture zone.

Krenn et al., 2010. Tectonics 29, TC4001.
Liati, A., 2005. Contribution to Mineralogy and Petrology 150, 608–630.
Mposkos, E. & Krohe, A. 2006. Canadian Journal of Earth Sciences 43, 1755–1776.
Schmid S.M., et al. 2008. Swiss Journal of Geoscience 101, 139–183.