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METAMORPHIC EVOLUTION OF THE UHP KIMI COMPLEX, EASTERN RHODOPE MOUNTAINS, GREECE

Schneider, Y.[1], Puhr, B.[1], Tirk, H.[1], Krenn, K.[1], Bauer, C.[1], Proyer, A.[1], Mposkos, E.[2], Perraki, M.[2] & Hoinkes, G.[1]

[1]Institute of Earth Sciences, Department of Mineralogy and Petrology, Karl Franzens University of Graz, Universitätsplatz 2, 8010 Graz, Austria
[2]National Technical University of Athens, 9 Heroon Politechniou St., GR-15780, Zografou, Athens, Greece
e-mail: y.schneider@gmx.at

The Kimi Complex represents the highest tectonostratigraphic unit of the Rhodope Metamorphic Province and consists of orthogneisses, amphibolites, marbles, metapelites, serpentinites and late subvolcanic intrusives. For this unit, an early Alpine ultra high pressure (UHP) history is documented by μm - sized diamond inclusions in garnets from metapelites, but it has been mostly obliterated by the subsequent metamorphic evolution.

Two key areas near the city of Xanthi and Kimi village were investigated in detail and show striking similarities concerning their structural and metamorphic features. The UHP-units were exhumed during dominant SW - directed shearing and folded into a NE - SW striking fold and thrust belt during amphibolite facies metamorphism. Two types of stretching lineations are distinguished in the Kimi Complex: a steep oblique plunging stretching lineation always associated with boudin structures and a second subhorizontal NE - SW lineation, which is responsible for the penetrative tectonic overprinting of both areas. Late discordant aplitic to pegmatoid dyke swarms and the formation of brittle faults parallel and perpendicular to the strike direction of the lithologies deformed the Kimi Complex into phacoid bodies, which contain remnants of the ductile, deformed and folded lithologies. These remnants are surrounded by cataclasites and represent, in combination with pegmatoids, the typical appearance of the Kimi Complex.

An axial plane cleavage developed in the metapelites (grt-ky micaschists) within in the kyanite stability field. Granulite- and amphibolite-facies overprint is predominant; P-T conditions for grt-ky micaschists range from 13 - 18 kbar and 750 - 900 °C.

Metabasites occur mainly as boudins in metagranitoid gneisses and are surrounded by ductile shear zones. The asymmetry of these boudins and shear indicators within the surrounding host rocks suggest a constrictional strain and an additive lateral sinistral component during the formation of the ductile fold belt. The boudins are penetratively overprinted during folding at amphibolite facies conditions and contain remnants of eclogitic and/or granulitic mineral assemblages. Granulitic rocks show medium- to coarse-grained symplectite textures after omphacite, indicating an early eclogite stage. The dominant mineral assemblage consists of cpx (Jd_{15}), hbl, plag, grt, ±bt, ±ky, ±qtz, demonstrating a granulite- to amphibolite facies overprint. Pyroxene often contains amphibole lamellae oriented along the cleavage planes, sometimes accompanied by quartz. Garnets are small (50 - 500 μm), clear and show slight chemical zoning. Relict lenses with zoned pyroxenes (Jd_{40}) with decreasing X_{Jd} towards the rims and omphacite (Jd_{35}) inclusions in kyanite, interpreted as breakdown products of paragonite, indicate temperatures of ca. 800 °C and pressures of more than 20 kbar.