

MULTIPLE SUBDUCTION AND EXHUMATION OF ULTRA-HIGH- AND HIGH-P ROCKS: ARCHITECTURE, RHEOLOGY AND HISTORY OF AN ALPINE PLATE BOUNDARY AREA (RHODOPE MOUNTAINS, NE-GREECE)

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The Rhodope thrust and nappe complex exposes alpine high-P and ultra high-P rocks, formed within the framework of Cretaceous material accretion onto and Tertiary collision of Europe with Apulia. Between 65 - 18 Ma, seemingly unconnected tectonic pulses successively exhumed several superimposed high-P units. The structural relationships among, and the P-T-d histories of these units give a unique insight into the mechanical properties of rocks, and the velocity and kinematics of material flow within the lithosphere and upper asthenosphere during collision.

(i) A tectonic pulse at 65 ± 2 Ma exhumed ultra high-P metamorphic crustal rocks and intimately associated mantle-derived associations mostly preserved at the uppermost Rhodope Complex ("Kimi Complex"). Crustal rocks record ~60 kbar and quite high peak temperatures of ~1150 °C (MPOSKOS et al., this volume).

(ii) At about $42 - 40 \pm 1$ Ma, after emplacement of the UHP-rocks, a migmatic assemblage ("Sidironero Complex") containing kyanite eclogites that indicate ≥ 19 kbar at 700 °C intruded into the already cooled upper crustal domain. High-P / medium-T assemblages mainly consisting of orthogneisses, Al-rich metapelites, albite gneisses, eclogite lenses and ultramafic bodies that were not exposed to temperatures higher than 550 °C underlie this migmatic assemblage ("Kechros Complex"; E-Rhodope). Emplacement of the hot viscous migmatic assemblage is associated with contraction structures at its base, radial extension structures at its top, and with isothermal decompression consistent with rapid exhumation.

(iii) Subsequent to intrusion of migmatites, at about 37 ± 2 Ma, weakening of this crustal section associated with thermal relaxation facilitated formation of low angle normal detachment systems. They extend over more than 100 km, cut across the earlier structures, and excise, in sum, several tens of km of material within the crustal profile. Lutetian (ca. 48 - 43 Ma) to Oligocene marine basins transgressed atop the upper plate of all detachment generations.

(iv) The Thasos/Pangeon metamorphic core complexes formed at 26 - 8 Ma, simultaneously to the Aegean metamorphic complexes, clearly unrelated to exhumation of any HP and UHP rocks.

We show that the Rhodope high-P complex was assembled during a long-term tectonic evolution in a channel of extremely low viscosity.

References

MPOSKOS, E., BAZIOTIS, I., HOINKES, G. & PROYER, A. (2005): this volume.