TECTONOMETAMORPHIC EVOLUTION OF THE RHODOPE MASSIF

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ABSTRACT

The Rhodope Massif represents a thickened crustal lens situated in the core of the Balkan Peninsula. Its position as a complex tectonic edifice within the Alpine Morava-Rhodope Tectonic Zone (MRTZ) has been a source of different and often contradictory interpretations during more than 150 years of geological studies.

The MRTZ obtained its present shape in late Cretaceous times when a volcanic arc with intra-arc basin (Srednogorie Zone) has been superimposed over older structures. The Srednogorie Zone contains several crystalline basement fragments (Ihtiman, Central Sredna-gora, Sakar and Strandzha crystalline blocks) with Cadomian amphibolite facies relicts and Hercynian granite plutons. The MRTZ also consists of a number of crystalline-cored units the most important being the Morava, Struma, Ograzhden, Rila-West Rhodope, East Rhodope and Pirin-Pangaion units, the last three belonging to the Rhodope Massif s.s. The metamorphic rocks of the Rhodope Massif are referred to two (Prerhodopian and Rhodopian) supercomplexes. The Rhodopian supercomplex consists of one varied (Rupchos) and one metapsammitic-metacarbonate (Bachkovo-Asenovgrad) complex. The metamorphism of all Rhodope complexes corresponds to moderate temperature and pressure conditions, i.e., to the amphibolite facies although relicts of higher-grade (eclogite and granulite) metamorphic events are also present. The Prerhodopian supercomplex and the Rupchos complex contain relicts from Neoproterozoic (Cadomian) rocks, and are affected by Hercynian (320-290 Ma) metamorphism and granitoid magmatism. Jurassic (c. 160-140 Ma) and Cenozoic (60-54, 44-42 and 35-30 Ma) metamorphism and anatexis are irregularly overprinted. The pre-Cenozoic metamorphics have been covered and sealed by Cenozoic sedimentary and Priabonian-Oligocene volcano-sedimentary and volcanic rocks.

The Bachkovo-Asenovgrad complex is known only from the lowermost (Pirin-Pangaion) unit of the Rhodope edifice, and from the Rila-West Rhodope unit. The presumable Neoproterozoic evolution of its protoliths is interpreted as a gradual transgression with initial sedimentation of mature psammites followed by a volcano-sedimentary association passing into a carbonate platform. No traces of Cadomian tectonometamorphism have been detected. Hercynian metamorphism, anatexis and granitoid magmatism are proven in the lowermost (Pirin-Pangaion) unit whereas the Rila-West Rhodope unit suffered extensive Jurassic metamorphism and anatexis.

The Rhodope Massif has been formed as a thickened crustal lens to the South of the Hercynian belt together with the other Peri-Gondvanan crustal fragments of the area. During most of the Mesozoic and the beginning of the Cenozoic being covered by huge thrust sheets it remained within lower and middle crustal position in these times. It has been strongly influenced by the northward subduction of the Vardar Zone at South whereas to the North sedimentation

of Peri-Tethyan character with several breaks and hiatuses persisted. Gradual exhumation proceeded during the Cenozoic. The slab subsidence and break-off in late Eocene to early Oligocene times favored a massive thermal and fluid influx that transformed the massif into a hot core. Combined with the extension and exhumation processes this extensive input led to the coexistence of shallow marine and terrestrial basins with comparatively shallow-crust level of anatexis, granitoid magmatism, and remarkable bimodal volcanism.

Keywords: *Morava-Rhodope Tectonic Zone, Cadomian relicts, Hercynian and Alpine evolution*