



Lithosphere-scale geodynamics in the Rhodope: assumptions and implications

Evangelos Moulas (1,2), Jean-Pierre Burg (1), Dimitrios Kostopoulos (3), and Filippo Schenker (2)

(1) ETH Zurich, Geological Institute, Earth Sciences, Zurich, Switzerland (evangelos.moulas@erdw.ethz.ch), (2) University of Lausanne, (3) Eldorado Gold Corporation, 23A Vasilissis Sophias Avenue, Athens 10674, Greece

The Rhodope Metamorphic Complex (RMC) is a synmetamorphic nappe stack located in the hinterland of the Hellenide orogen which is part of the Alpine-Himalayan chain. Advances in analytical instrumentation in petrology over the last 10 years made possible the documentation of high-to ultrahigh-pressure conditions in this complex. Despite the wealth of petrologic P-T-t data and the multitude of generic models on the evolution of the RMC, only few geodynamic restorations project long enough back in time to cover the entire life span of the orogen since the Jurassic. There are many reasons for the different (and often contrasting) models proposed for the RMC that deserve to be mentioned.

Here, we present the different reconstructions published together with the assumptions on which they were built and their geodynamic implications. We then proceed to carefully assess those implications individually from the mineral to the lithosphere scale. Our assessment poses important constraints on the pressure, temperature and deformation history of the complex on a regional scale that cannot be satisfied by all reconstructions.

Such constraints involve the length of the subducting plate, the thermal histories of the metamorphic rocks, the age response of the isotopic systems and last, but not least, the structural record of km-scale movements that can be identified in the field. In addition, the presence of ultrahigh-pressure rocks is restricted to shear zones all across the RMC and this requires an explanation. We examine the possibility of non-lithostatic pressure variations within crustal-scale ductile shear zones.