

A brief review on the geophysical model of East Vardar ophiolites: Serbia, North Macedonia and Greece

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Дигитални репозиторијум Рударско-геолошког факултета Универзитета у Београду

[ДР РГФ]

A brief review on the geophysical model of East Vardar ophiolites: Serbia, North Macedonia and Greece | Dragana Đurić | 16th Workshop of the International Lithosphere Program Task Force Sedimentary Basins & 7th Geoscience Symposium, Bucharest, Romania, 06-07.10.2022 | 2022 | |

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BOOK OF ABSTRACTS



GEO SCIENCE 2022

Editors: Florina Chitea, Ioan Munteanu,
Liviu Matenco, Raluca Dinescu, Irina Stanciu

Book of Abstracts

 **ILP**^{16th}
Sedimentary Basins

GEOSCIENCE^{7th} **Symposium**
2022

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ISBN e-book.pdf – 978-606-537-578-9
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**A BRIEF REVIEW ON THE GEOPHYSICAL MODEL OF EAST VARDAR OPHIOLITES:
SERBIA, NORTH MACEDONIA AND GREECE**

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ABSTRACT

The central Balkan Peninsula is characterized by very complex tectonic settings since the Tethys Ocean was closed during the late Mesozoic yielding Dinaric (west) and the Vardar Zone (east), representing the important relicts of the former oceanic lithosphere. The easternmost ophiolite belt, East Vardar Zone (EVZ), differs from other Balkan ophiolites in displaying the foremost pronounced supra-subduction geochemical signatures. This zone is in Serbia placed between the continental Kopaonik Unit and Serbo-Macedonian Massif. It extends to the Apuseni Mts. in Romania within the north, and in the south, it continues through central parts of the North Macedonia, and Peonias subzone in Greece.

This research aimed to contribute to resolving the spatial position of EVZ ophiolite, which continues to be a matter of debate. The applied methodology included geological, geophysical (gravity and geomagnetic) and remote sensing data. For the modelling within the Oasis Montaj/GM SYS software, density, susceptibility, and remanent magnetization, previously laboratory determined, were used. The modelling was conducted along 7 profiles, between 20 and 50 km long with depths between 2 and 4 km, placed perpendicular to EVZ, as well as three control sections.

The results invariably suggest that the East Vardar Zone ophiolites represent one body elongated in the NNW-SSE direction. The western border of the East Vardar Zone ophiolite is sharp and may be determined, while the eastern border is diffuse, but it's evident that below the surface this ophiolite dips to the east below the Serbo-Macedonian Massif. The inferred buried ophiolite bodies display steep contacts at shallow levels, but the contacts become much less steep with depth. Based on 2D models, a pseudo-3D model was created. The results of this research imply that the mode of emplacement of the East Vardar Zone ophiolites was associated with the accretion/underthrusting mechanism. Accretion mechanism is more related to Cordilleran type than to Tethyan and it was strikingly different from the emplacement of the other Balkan ophiolites that were uniformly subducted toward the west.

An independent study of mantle xenolith and lamproitic lavas supports this scenario indicating that at least parts of the mantle underneath the Tethyan Mesozoic suture are compositionally more like an oceanic supra-subduction mantle.