

Post Early Miocene vertical-axis clockwise rotation in the West Vardar Zone of Serbia

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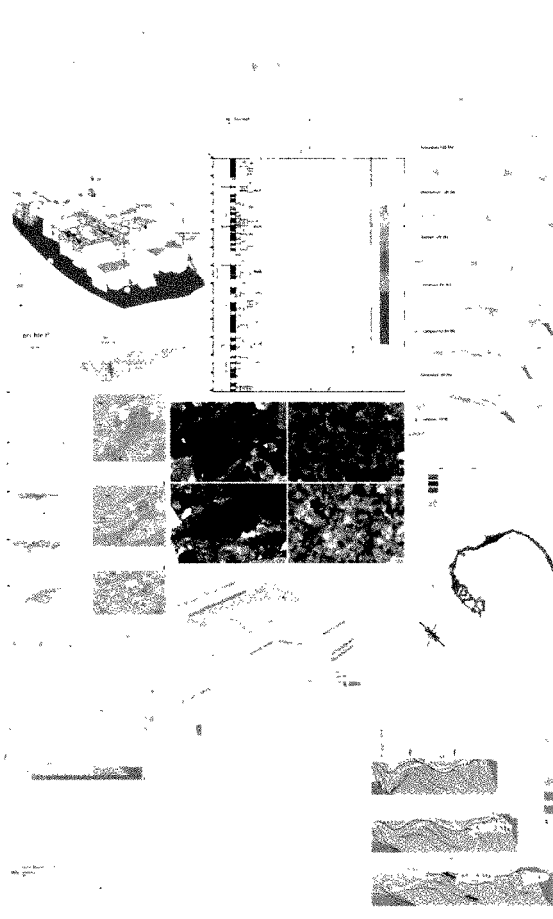
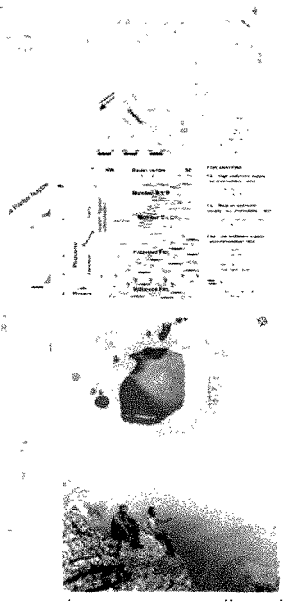
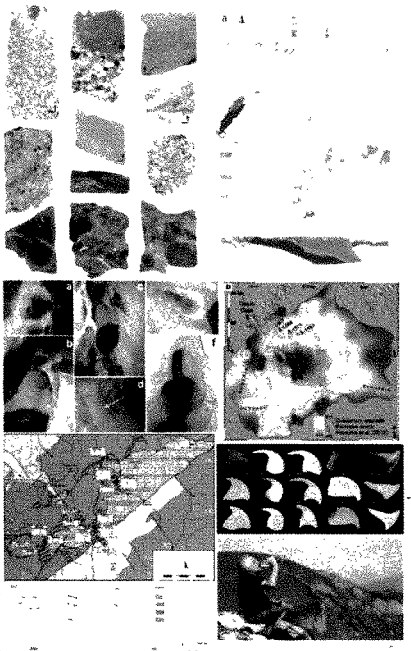
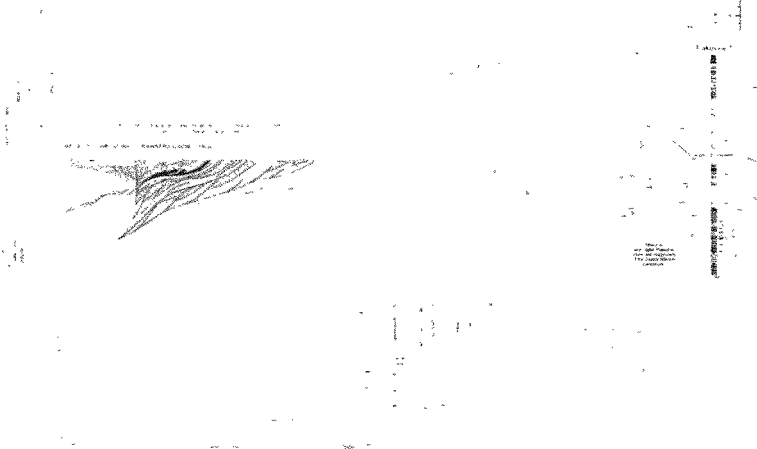
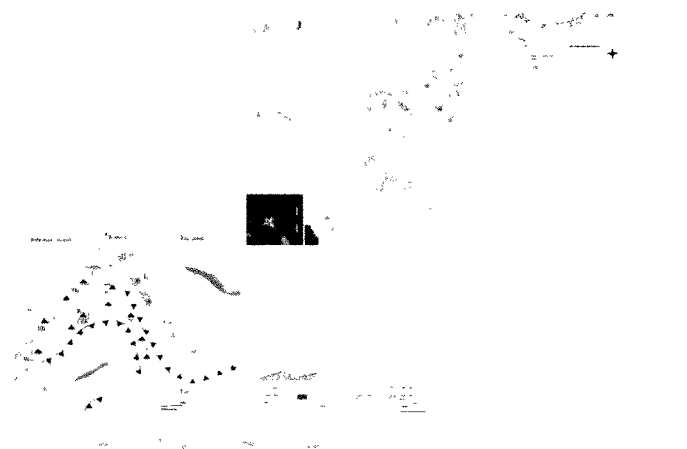
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Post Early Miocene vertical-axis clockwise rotation in the West Vardar Zone of Serbia

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The Vardar-Tethyan mega-suture lies between the Eurasian and Gondwana margins. It is composed of remnants of obducted ophiolites and ophiolite mélangé, distal parts of adjacent continental margins and post-obduction Late Cretaceous sediments and Cenozoic igneous rocks. The area covered by this study belongs to the West Vardar and Jadar-Kopaonik units *sensu* Schmid et al. (2008). In this 160 km long strip we sampled on the north in the wider Rudnik Mts. area seven localities of Late Cretaceous micritic limestones and one locality of flysch and seventeen sites of Oligocene-Earliest Miocene igneous rocks of different composition. In the south, in the wider Kopaonik Mts. Area we sampled eight sites of dacitoandesites and fifteen localities of granodiorites both of Oligocene age. Samples were drilled and oriented in situ both by magnetic and sun compasses.

In the laboratory samples were cut into standard size specimens, then subjected to standard paleomagnetic measurements which included the measurement of the natural remanent magnetization, followed by the measurement of anisotropy of magnetic susceptibility and stepwise thermal and alternating field demagnetization of pilot specimens. According to the behavior of the pilot specimens during demagnetization it was chosen which method was used to demagnetize the rest of the specimens from each locality/site. Magnetic mineralogy experiments were carried out on selected specimens. The demagnetization curves were then analyzed for linear segments which were used for statistical evaluation on locality/site level. The fold/tilt test was carried out on locality (when applicable) and regional level.

The obtained results show that the remanent magnetization both in the igneous rocks and sediments resides in magnetite. The locality mean directions for Late Cretaceous sediments are well defined and the remanence is of post tilting age. For both the Oligocene-Earliest Miocene and Oligocene igneous rocks (Rudnik Mts. area and Kopaonik Mts. area, respectively) localities/sites mean directions are also well defined. Although, they are somewhat scattered, the overall-mean directions for both groups are statistically well defined.

The conclusions which can be drawn out from our results are that the overall-mean directions and their statistical errors for the Late Cretaceous sediment localities and Oligocene-Earliest Miocene igneous sites from the Rudnik Mts. area and the Oligocene igneous localities/sites from the Kopaonik Mts. area indicate uniform rotations. The directions point to a 30-46°

clockwise vertical-axis rotation which must have occurred after 20 Ma since this is the upper K/Ar age limit of the igneous rocks. Opposite to this sense of rotation, the Adria rotated in the last 20 Ma in the counterclockwise sense (Márton 2006; Márton et al., 2011; Márton et al., 2017). Both of these vertical-axis rotations can be responsible for the large-scale extension in the southern Pannonian basin.

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