



## **Accommodating west-Aegean rotations by extrusion of the Tisza block into the Carpathians?**

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The west-Aegean region has long been known to rotate approximately  $50^\circ$  since the middle Miocene. Classically, the west-Aegean rotating domain is considered to have a pivot point in northern Albania. This suggestion, however, poses a major kinematic problem: it suggests that the rotation differences in the Aegean region are entirely accommodated by extension that should amount to  $\sim 300$  km between the Gulf of Corinth and the Moesian platform since the middle Miocene. Reconstructions, however, show that this is impossible: the majority of Aegean extension is accommodated in pre-middle Miocene metamorphic core complexes. It is difficult to assess the true amount of Aegean extension since the middle Miocene, but it is unlikely to amount more than 100 km. In this paper we provide paleomagnetic evidence that the Moesian platform – generally considered to form part of the stable Eurasian continent during the post-Eocene development of the Carpathian and Aegean systems – underwent no significant post-Eocene rotation ( $5 \pm 8^\circ$ ). Compared to the re-calculated  $\sim 48^\circ$  clockwise rotation of the west-Aegean rotations since the early Oligocene, implies a rotation difference between these areas close to  $40^\circ$  clockwise. At the same time, the Southern Carpathian system recorded the clockwise rotation associated to eastward extrusion of the Tisza block.

Therefore, we suggest an alternative interpretation, shifting the pivot point to the meridian corresponding to the western margin of the Moesian platform, around Mt. Olympos.

This is in line with the distribution of Aegean extension, which is confined to the east

of this meridian. The consequence of this new interpretation, however, is that part of the west-Aegean rotation is accommodated by either  $\sim$ NE-SW compression in northern Albania, or extrusion of material during the rotation from in between Albania and the Moesian platform. Albeit there seems to be more convergence in the northern Albanian nappe stack than in the Greek equivalent – the nappes form narrower bands in map view –, there is no conclusive kinematic and temporal evidence in literature for this differential convergence. However, there is compelling evidence that the Tisza block of the southern Carpathians underwent large (up to  $90^\circ$ ) post-Eocene clockwise rotation, associated with its motion around the northwestern edge of the Moesian platform, and its intrusion into the Carpathian realm. This extrusion of the Tisza block in between Albania and the Moesian platform provides a new mechanism for accommodating the west-Aegean rotation.

We therefore conclude that our data is consistent with the west-Aegean block rotation about a pivot point on the meridian corresponding to the western limit of the Moesian platform, being accommodated by extension in the Aegean back-arc to the east, and extrusion of the Tisza block (and possibly compression) to its west.