



## **Revision of the timing, magnitude and distribution of Neogene rotations in the western Aegean region, and consequences for the extrusion of Anatolia**

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To evaluate the dimension and the timing of the clockwise rotating domain and the nature of the structures that accommodate the rotating domain in the western Aegean region, paleomagnetic analyses were carried out in northern, western and southwestern Greece. The results show that the rotating domain covers an area including the external Albanides, western mainland Greece including Evia and probably at least partly the Peloponnesos. Smaller clockwise rotations on the order of 30–40° were reported previously from the Chalkidiki peninsula and the islands of Skyros and Limnos. Previously, two phases of approximately 25° of rotation were suggested, the last one during the Plio-Pleistocene.

Our analysis shows that the western Aegean domain rotated approximately 40° clockwise between 15–13 and 8 Ma, followed by an additional 10° after 4 Ma. The rotating domain is accommodated in the north by deformation associated with the Scutari–Pec fault zone and in the west by the Ionian thrust and the Hellenic subduction zone. To the south, no rocks older than ~10 Ma are available so no conclusive data are obtained. To the east of the rotating domain, extensional detachment systems of the Cyclades and Rhodope areas were active during the rotation phase and may explain at least part of the differences in finite amounts of rotation between nonrotation or counterclockwise rotations observed in northern and eastern Greece and the large clockwise rotations in western Greece.

Extension in Greece already started in late Eocene, but has not been associated with extension until the middle Miocene. At that time, rapid uplift in eastern Turkey begins and forms the oldest extrusional strike-slip systems, rotations start to occur, the Klematia-Paramythia halfgraben in western Greece inverts and formation of the

Mediterranean Ridge is initiated.

The amount of extension cannot explain the magnitudes of rotation since the middle Miocene. This suggests that the model of Taymaz et al. (*Geophys. J. Int.*, 106, 433-490, 1991), invoking extrusion of Anatolia to cause rotation in western Greece, is in good agreement with our observations, but we suggest it started around 13 Ma, rather than around 5 Ma.