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Title: Paleomagnetic Evidence for Pliocene Initiation of Clockwise Block Rotation in Central Greece and Implications for the Evolution of the Hellenic Subduction Zone

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Publication: American Geophysical Union, Fall Meeting 2012, abstract #T43E-2721

Publication Date: 12/2012

Origin: [AGU](#)

Keywords: [1525] GEOMAGNETISM AND PALEOMAGNETISM / Paleomagnetism applied to tectonics: regional, global, [8002] STRUCTURAL GEOLOGY / Continental neotectonics, [8109] TECTONOPHYSICS / Continental tectonics: extensional, [8170] TECTONOPHYSICS / Subduction zone processes

Bibliographic Code: [2012AGUFM.T43E2721B](#)

Abstract

The Aegean region presents one of the best examples of distributed continental extension in the upper plate of a rapidly retreating oceanic slab. We present new paleomagnetic data from Early Miocene to Pliocene terrestrial sediments and volcanics in Central Greece that constrain the history of vertical-axis rotation along the central part of the western limb of the Aegean arc. The present-day pattern of rapid block rotation within a broad zone of distributed deformation linking the right-lateral North Anatolian and Kephallonia continental transform faults initiated after Early Pliocene time, resulting in a uniform clockwise rotation of $24.3 \pm 6.5^\circ$ over a region >250 km long and >150 km wide encompassing Central Greece and the western Cycladic archipelago. Pliocene initiation of rapid clockwise rotation in Central and Western Greece reflects the propagation of the North Anatolia-Kephallonia Fault system through the previously extending Aegean Sea region in response to entry of dense oceanic lithosphere of the Ionian Sea into the Hellenic subduction zone and consequent accelerated slab rollback. Comparison of our results with the published paleomagnetic dataset indicates that the Aegean geometric arc formed in two short-duration pulses characterized by rapid vertical-axis rotation and strong upper-plate deformation.

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