

## NEW CONSTRAINTS ON POST-20 MA COUNTER-CLOCKWISE ROTATION OF ADRIA RELATIVE TO EUROPE

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Adriatic Microplate, Kinematic Reconstruction, Neogene Rotation

The Adriatic microplate (Adria) has been caught in the convergence of Africa and Europe since late Cretaceous time. Its boundaries are highly deformed and comprise the Alps, Apennines, Dinarides and the Calabrian Arc. The junctions of these orogens are marked by switches in subduction polarity, with Adria being the upper plate in the Alps and the lower plate in the Apennines and Dinarides. The Apennines have been the site of Oligo-Miocene roll-back subduction, "soft" collision and extensive backarc extension (Tyrrhenian and Liguro-Provencal Basins). Reconstructing the past motion of Adria is therefore key to a better understanding of the forces driving its motion, and more generally, the processes underlying the complexity of the Alpine-Mediterranean mobile belt.

We reconstructed the motion of Adria since 20 Ma by retrodeforming Neogene shortening in the Alps and by balancing Oligo-Miocene back-arc extension and shortening in the northern Apennines. In the northern Apennines, extension in the Ligurian-Tyrrhenian basins exceeds shortening by some  $47 \pm 14$  km. Together with the shortening estimates in the Alps, this indicates that Adria has moved 113 km to the NW (Azimuth  $325^\circ$ ) and rotated counterclockwise (CCW) by some  $13 \pm 2^\circ$  relative to Europe since 20 Ma. If Moesia is regarded as a fixed (stable) part of Europe on the Dinaric side of Adria, the  $13^\circ$  CCW rotation implies c. 240 km of shortening in the Dinarides. This exceeds the 210 km length of the Adriatic slab anomaly underlying the southern Dinarides, which we interpret to represent the maximum shortening along this transect since slab-breakoff at c. 37-22 Ma. Therefore, we propose an  $11^\circ$  CCW rotation of Adria relative to Europe since 20 Ma in order to provide an optimal fit of available data from the Alps, Apennines and Dinarides. This rotation requires about 150-200 km of Neogene extension between Africa and Africa in the Ionian Sea, which remains a challenge to verify.