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# Paleomagnetic results from the Rif Chain (Morocco): new constrains for the post-Miocene rotations in the Gibraltar Arc

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Tectonic models on the progressive bending of the Gibraltar Arc provide huge paleomagnetic rotations, mainly CW in the Betics and CCW in the Rif. Paleomagnetic data were mainly collected in Mesozoic sedimentary units and are unable to precisely constrain the time and the amount of paleomagnetic rotations during Neogene. Paleomagnetic results obtained from few magnetostratigraphic investigations in Neogene sediments suggested that no significant rotations about vertical axes have occurred in the Gibraltar Arc since the late Tortonian.

In this study paleomagnetic data from Neogene sedimentary sequences in the Betics are integrated with new paleomagnetic data collected in the Rif Chain in order to define the time and the amount of rotations in the Gibraltar Arc.

In the Betics paleomagnetic results indicate that: (i) the foreland basin underwent no rotations since Late Miocene; (ii) in the Eastern Betics, CCW rotated sediments are Serravallian to Lower Pliocene in age and are located along a deformation belt dominated by Late Miocene-Quaternary left-lateral strike slip faults, such as the Palomares strike slip fault. CCW rotations do not extend to the basins located far away from the main strike slip faults; (iii) in the Central Betics, paleomagnetic data indicated that rotations did not stop in Late Miocene, as previously supposed. Conversely, post Tortonian and post Messinian CW rotations occurred in Alcalà la Real and Granada basins, respectively, suggesting that rotations are younger and occurred after the main phases of nappe emplacement.

New paleomagnetic data in the Rif chain indicate that CCW rotations, previously mea-

sured in the Mesozoic units of the Rif chain, extended also in Late Miocene units of the chain, while no rotations occurred in the foreland Late Tortonian to Pliocene deposits.

Our results imply a re-examination of the timing of paleomagnetic rotations previously considered ended in Late Miocene. Moreover, bending of the Gibraltar Arc might be not completed in the Late Miocene (roll-back processes younger than previously supposed?).