

Mode of Building of the Betic-Rif Orogenic Arc (Westernmost Mediterranean): A Structural, Seismic and Paleomagnetic Approach

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The Gibraltar Arc System, which includes the Alboran Basin, the Betic-Rif orogen and the Cadiz Gulf accretionary prism, derives from the Europe-Africa plate convergence coupled with the westward motion of the arc hinterland (Alboran Domain). A multidisciplinary approach integrating geological, structural, seismic and previously published paleomagnetic data was realized. Although focusing on the external domain of the northern branch of the Gibraltar Arc (the South Iberian paleomargin-derived units and Flysch Trough units), data of its southern branch and of its internal zone (the Alboran Domain common to both sides), are also included. Our results permit to identify:

- a) lateral variations of the structural style in the external domains and a fan pattern of transport directions associated with folding and thrusting around the Arc;
- b) an inventory of structures that evidence strain partitioning, that is structures that accommodated suborthogonal shortening (fold-and-thrust belts developed from the paleomargin- and the Flysch Through-derived units), and normal faults, conjugate strike-slip faults, and distributed minor structures that accommodated arc-parallel stretching;
- c) a 3D distribution of seismic foci which shows that almost all intermediate seismicity is located within the tightest part of the Gibraltar Arc- and focal mechanisms solutions within the whole Betic-Rif orogen that reflect large-scale strain partitioning.

All these type of data allows us to establish a coherent tectonic evolution of the Gibraltar Arc, in particular in terms of mass transfer at regional scale in the external domain, from Miocene onwards. They also provide additional constraints on the mode of formation of this Arc, which was close to a piedmont glacier type mode.

Key words: Betic-Rif, Gibraltar Arc, geological and geophysical data, kinematic pattern.

Acknowledgements : This study was supported by grants CGL2006- 08638/BTE and CTM2005-08071-C03-01/MAR (Spain).