

Present-Day Kinematics of Ibero-Maghrebian Region as Observed by GPS Data

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In this work, we present results of the continuous processing of a network of permanent GPS stations distributed over Iberian Peninsula and North Africa. This task is carried out in the framework of GEODAC and GOMA, collaborative projects endorsed by the partners together with other European and Northern Africa Institutions. These projects intend to support the efforts of the scientific community that is studying the Earth's processes along the Nubian-Eurasian plate boundary, with a particular focus on the Maghrebian region.

We have derived a uniform velocity field using the stations with observations spanning 3.5 years or longer. Most of Iberia can act as a reference to derive the relative motions since it forms a stable block fixed relative to Eurasia with smaller residuals (below the computed accuracy for each station). Stations in Morocco exhibit a motion close to what would be expected for stable Nubia (also all below the computed accuracies). The most distinctive behaviour is found at stations along the southern coast of Spain and the northern coast of Morocco, where larger and more westward velocities are found. Some stations in southern Iberia show differences with respect to stable Eurasia that are distinctly larger than computed accuracies. This is also clearly observed in the derived strain rate field, which shows significant deformation rates in this region.

We discuss that the observed kinematics are not only a consequence of the Nubian-Eurasian plate convergence, but also a result of local lithospheric processes, particularly the effect of the Gibraltar slab, as previously suggested by other authors.

Key words: Crustal Deformation, Nubia-Eurasia Plate Boundary, Global Positioning System (GPS)