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GPS Crustal deformation in the Eastern Betics and the Lorca earthquake of 2011

Giorgi Khazaradze (1), Anna Echeverria (1), Eva Asensio (1), Jorge Gárate (2), and Emma Suriñach (1)

(1) Grupo RISKNAT, Departament de Geodinàmica i Geofísica, Universitat de Barcelona, Barcelona, Spain, (2) Real Instituto y Observatorio de la Armada, San Fernando, Spain

We present an updated crustal deformation field in the Eastern Betics, based on GPS observations of the CuaTeNeo network. This non-permanent network was established in 1996 to quantify the current tectonic deformation of the SE Betics. The network consists of 15 stable monuments distributed between Murcia and Almeria, which were observed five times (1997, 2002, 2006, 2009 and 2011). In general, the results show a velocity field lower than 2 mm/yr with a dominant trend oriented parallel to the Eurasia and Nubia relative plate convergence. Stations located farther inland exhibit lower velocity vectors. The calculated crustal deformation field presents clear evidence that the tectonic faults forming the Eastern Betic Shear Zone remain active. As it was evidenced by the May 11th 2011 Lorca earthquake of magnitude Mw5.2, which was caused by a reverse and sinistral slip of the Alhama de Murcia Fault. Our GPS observations, preceding the occurrence of the earthquake, are in agreement with this type of focal mechanism. Co-seismic deformation related to the earthquake was relatively small: offset of $\sim$5mm to the North was detected at the continuous GPS station LORC located within the city.