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Active deformation in eastern Betics (SE Spain) inferred from GPS measurements and numerical modeling

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The area of our investigations, the eastern Betics, located in SE Spain is formed as a result of an ongoing convergence between the African and Eurasian plates. It is part of the Betic-Rif orocline that forms the westernmost part of the Alpine Orogenic Belt. The Betic cordillera represents seismically one of the most active parts of the Iberian Peninsula, covered with an extensive system of faults, dominated by left-lateral NNE-SSW strike-slip faults, such as the Alhama de Murcia, Palomares and Carboneras faults. Since the 15^{th} century the area has experienced at least ten MSK I>X intensity earthquakes. However, in the more recent history, no significant (MSK I>VII) crustal type earthquakes have been recorded, suggesting an increased seismic potential of the faults in question.

With the aim of evaluating the earthquake related hazard in the Betics in 1996 the GPS network (CuaTeNeo) of 15 highly stable geodetic monuments was setup. As of today, the network has been surveyed twice: in 1997 and 2002. The preliminary results based on the analysis of the data from these two observations, indicate relative deformation rates of the order of 0 to 3 mm/yr with an evidence for localized deformation mainly related to the Alhama de Murcia and Palomares faults. We compare the geodetically estimated strain rates with the predictions of the numerical models based on elastic dislocation modeling.