



Evolution of the stresses in the eastern Betic Cordillera from Early Miocene to present-day

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The present work is a comparative study between the palaeostresses and the present-day stresses in the Eastern Betic Cordillera. Palaeostresses have been determined using the Search Grid Method by Galindo Zaldívar & González Lodeiro (1988), while the present-day stresses have been calculated using the phocal mechanisms of several earthquakes occurred during the period 1999-2005. The calculations of the present-day stresses have been performed with the method by Gephart & Forsyth (1984) and Gephart (1990). The palaeostress analyses have been done on 39 measurement stations with microfaults and striae. At each station, an average of 20 microfaults with their striae has been measured. Two main sets of ellipsoids have been determined. The first one is characterized by a σ_1 axis with mean NW-SE trend and a σ_3 axis with NE-SW trend. The second set has a NE-SW σ_1 axis orientation, with a σ_3 axis of NW-SE orientation. The analysis of the phocal mechanisms indicates a present-day ellipsoid with an axial ratio of 0.5 and a N320°E maximum compressive axis, with σ_3 at N50°E orientation. The σ_2 is subvertical in the area studied. The structural study suggests that the palaeostresses indicating a NW-SE compression have been active since the Middle Burdigalian to the present-day. These results are in accordance with previous works by Montenat & Ott d'Estevou (e.g. Montenat & Ott d'Estevou, 1993) in closer areas. Moreover, the palaeostresses indicating NE-SW compression were active prior to the NW-SE compression, probably in Early-Middle Burdigalian times.

References:

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