



Forward migration of recent extension related with the exhumation of the Sierra Nevada elongated dome (Betics, southern Spain)

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Upper-Miocene to recent structures in the central Betics are thought to have formed in a context of NW-SE convergence between Africa and Eurasia. In this context, active extension is interpreted, as subsidiary to the convergent regime. The recent identification of transfer faults linking active extensional depocentres, kinematically incompatible with the NW-SE convergent scenario, suggests however that active extension could be driven by some other mechanism summed to Africa-Eurasia convergence. To determine the dynamics and rates of active extension we have obtained fault-scarp ages by means of stratigraphic data and radiometric dating (U/Th-isochrone and AMS-C¹⁴ methods). The Sierra-Nevada elongated dome has been exhumed by a rolling hinge mechanism, the westwards mountain front having migrated more than 60 km between the lowermost Tortonian and the upper Pliocene. More than 2 km of Pliocene to Quaternary continental sediments have deposited in the hanging-wall of the main active normal fault segments in the Granada depression (Granada fault). However, the main scarp bounding the Sierra Nevada dome is stepped back and coincides with the boundary between Neogene-Pliocene sediments and the metamorphic basement. Sedimentary, geomorphic and seismologic criteria indicate that the main extensional activity has migrated forward from the western mountain front of Sierra Nevada to the Granada fault during the lower Pleistocene. Calcite fibres in one of the most active fault segments of the western mountain front of Sierra Nevada, the Nigüelas fault, have yielded a U/Th age of 130.1 ± 7.9 ka. Calcite fibres in several fault scarps from the

Granada fault have given U/Th ages ranging from 300 to 56 ± 4 ka. Basinwards from the Granada fault, we have identified an active fault (Malahá fault) with very-high associated Holocene sedimentation rates (0.4 to 1.7 mm/yr). The oldest fault related sediments gave an AMS-C¹⁴ age of 3010 ± 25 BP. Altogether, these data suggest that the faults were formed sequentially with the main extensional front related to the exhumation of the Sierra Nevada dome having migrated forwards continuously since the middle Miocene. Both the westward migration of the extensional loci and the high asymmetry of the extensional systems can be related to edge delamination below the south Iberian margin coupled with roll-back under the Alboran Sea.