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Faulting and tectonic geomorphology of the Jumilla area

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This poster presents an analyses of the tectonic geomorphology in the Jumilla area (external Betics; 100 km west of Alicante).

The morphology of the stydy area is characterized by elevated remnants of a marine Tortonian peneplain, pointing at significant post-orogenic plateau-like uplift
with a magnitude in the order of 1 km. The area is traversed by a low lying, NE-SW oriented, elongated depression, which is filled with Late Tortonian-Recent sediments. The depression can be further subdivided into several intramontane basins
. This tectonic structure is associated with a deep seated fault inherited from the Mesozoic passive margin
stage. This fault, which can also be identified by thickness and facies changes in the Mesozoic
sequences of the surrounding mountains, parallels the well-known Crevillente fault . Two of the basins, La Celia and La Alqueria, are inverted during the Pliocene-Pleistocene. In contrast,
the Jumilla basin is still actively subsiding. The La Celia and La Alqueria basins are morphologically characterized by fresh, WNW-ESE oriented fault scarps and a tectonically affected drainage network, shwoing that deformation is ongoing. Paleostress analyses shows
that the most recent deformation phase in these basins is transpressive. The fault scarps are therefore interpreted as hanging wall collapse structures of reverse faults. Dating of the fault scarps using numerical landscape evolution modeling assuming different fault event scenarios demonstrate that their age is probably less than 2 Ma, and that they developed by creeping processes. In
contrast, the Jumilla basin does not show fault scarps or other geomorphic indicators for deformation, except that it is an endorheic intramontane basin.
We propose that the La Celia
and La Alqueria basins developed as transtensional basins in Late Tortonian times, and
were inverted by transpressive motions during the Quaternary. The transpression also gave rise to formation of salt-anhydrite-gypsum walls, which rise up to the surface. The Jumilla basin is best explained as a step-over basin. Our study implies active tectonic activity in the northeastern part of the Betics, characterized by plateau-uplift and strike-slip deformation.