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Fault segment linkage and growth of the Polopos transpressive fault zone and its influence on Pleistocene drainage captures (southeastern Betics).

F. Giaconia (1), G. Booth-Rea (1,2), J.M. Martínez-Martínez (1,2), J.M. Azañón (1,2), and I. Villegas (3)

(1) Departamento de Geodinámica, Universidad de Granada. Granada, Spain (flavio@ugr.es), (2) Instituto Andaluz de Ciencias de la Tierra (CSIC-UGR). Granada, Spain (gbooth@ugr.es; jmmm@ugr.es; jazanon@ugr.es)), (3) Centro de Estudios Materiales y Control de Obra, S.A. CEMOSA. Málaga, Spain irene.villegas@cemosa.es)

The Polopos fault zoneis a dextral-reverse fault-system that developed under Neogene to Quaternary N/S to NNW/SSE convergence between Africa and Iberia. This fault zone is formed by three main fault segments, the North and South Gafarillos dextral strike-slip faults, and the North Alhamilla reverse fault. The whole fault zone with an approximate length of 30 km has an E/W to ESE/WNW orientation and helicoidal geometry that permits the transfer of oblique SE-directed shortening in Sierra Cabrera to NW-directed shortening along the North Alhamilla reverse fault via vertical dextral Gafarillos fault segments, in between.

The north Alhamilla reverse fault to the west of the system produces a fault-propagation fold in the hangingwall and an overturned fold in the footwall cutting through early Tortonian turbidites and folded Quaternary alluvial fans at the north Alhamilla mountain front. The Quaternary paleo-topographic surface formed by the alluvial fan has been displaced approximately 100 m by reverse faulting after 400 - 70 ky with a slip rate ranging between 0.25 and 1.4 mm yr-1.

The South Gafarillos fault includes several N90º-110ºE-striking segments with dextral and reverse-dextral kinematics. This fault cuts through the southeastern limb of the Alhamilla anticline by a fault segment that separates the basement from Messinian sediments, meanwhile other segments in the Nijar basin further south cut through Pleistocene river strath-terraces..

During the late Miocene the locus of dextral displacement occurred along the North Gafarillos fault segment that linked to a reverse fault segment at the northeast of the Sierra Alhamilla . The North Gafarillos fault segment and its associated mountain front was sealed by Messinian reefs. Since the Messinian, recent fault activity migrated towards the south forming the South Gafarillos fault segments. Fault segment migration displaced the active oblique strike-slip-related mountain fronts from the north towards the southeast of the Sierra Alhamilla, parallel to the newly developed fault segments; whilst recent and active reverse activity associated with the NARF was displaced westwards along the north Alhamilla mountain front. Fault segment migration, thus, shifted uplift from the northeastern side of the Sierra Alhamilla during the latemost Tortonian to Messinian to the southern side of the ridge during the latemost Messinian to Quaternary. Growth of the South Gafarillos fault segment towards the W favored the development of the Rambla de Lucainena that captured the previous Sorbas centripetal drainage. Further late Pleistocene uplift associated to the North Alhamilla reverse fault and of the Sierra Cabrera one to the E, promoted headward incision of the Aguas and Andarax drainages that advanced as axial valleys capturing the Sorbas centripetal drainage and the Feos-Aguas transverse drainage.