

From Slab Pull to Plate Convergence, Active Inversion Tectonics in the Granada Basin, Betics (Western Mediterranean)

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Subduction rollback below the Alboran basin and edge delamination under its margins have driven westward-directed extension, magmatism and regional uplift from the Middle Miocene until present in the Western Mediterranean. These processes have acted coeval to NW-SE plate convergence between Eurasia and Nubia that has produced the main Neogene to Quaternary contractive and transpressive structures observed in this region. Both processes have worked coevally in the region, however, while slab-pull has driven W-SW-directed extensional detachments following a belt of westward-directed thrusts, plate convergence has mostly shortened the unloaded footwalls of the detachments producing ENE/WSW folds and both NW- and SE-directed reverse and strike-slip faults.

At present, a boundary can be drawn between regions extended by westward slab-pull processes situated to the west of a highly segmented extensional system and uplifted regions where plate convergence dominates producing folds, reverse faults and inversion of previous extensional-related faults, in the footwall of the aforementioned active extensional system. This boundary has migrated westward since the middle Miocene following the retreating slab and is located at present in the eastern margin of the Granada basin. Here, Plio- Quaternary extension-related structures in the footwall of the main active normal faults of the basin are mostly inactive, the related sedimentary infilling is starting to fold and both reverse and strike-slip earthquake focal mechanisms compatible with NW-SE convergence occur. Meanwhile, structures and focal mechanisms in the hanging-wall respond mostly to westward slab-pull dominated processes, having E-W- to NE- Woriented pressure axes or producing SW-directed extension.