



Cretaceous extensional faults: a major control in the development of the Cenozoic architecture of the Catalan Coastal Ranges (western Mediterranean).

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The Catalan Coastal Ranges (CCR) are around 30 km wide and separate the Ebro basin (to the NW) from the Western Mediterranean (to the SE). They constitute the northwestern margin of the Northwestern Mediterranean Basin and its structure is given by a horst-graben system that developed during the Neogene. These extensional structures are superimposed to the pre-existent ENE-to-NE-trending Paleogene thick-skinned thrust system. Geometric relationships between both extensional and compressional structures have revealed that Neogene structures resulted from the tectonic inversion of the main Paleogene faults. On the other hand, it is known that the CCR also constituted the northwest edge of a Mesozoic basins system that developed in the western Tethys. Nevertheless, the role played by the Mesozoic structures in the Cenozoic deformation is still unknown. In order to understand how Mesozoic structures controlled the structural evolution, a cross-section through the central CCR has been constructed. This cross-section, based on surface and magnetotelluric data, was carried out where the contact between the Tarragona-Salou-Garraf basin and a coeval structural high crops out at surface. Magnetotelluric data allows identifying the geometry of the Mesozoic cover-Hercynian basement boundary.

Two structural units have been identified in the cross-section: the Querol unit and the Montmell unit. The Querol unit, located to the northwest, is a flat and slightly deformed area which was uplifted by a northwest directed thrust during the Paleogene. It includes pre-contractual Paleogene and Triassic sediments unconformably

overlying the Hercynian basement. The Montmell unit, located to the southeast, is a strongly deformed area that underwent a bigger uplift than the Querol unit. It includes a thicker Mesozoic sequence with Jurassic and early Cretaceous rocks lying on a deeper Hercynian basement. The boundary between both units presents a complex structure consisting on a set of southeast-dipping thrusts and their northwest-vergent related folds. It coincides with the southwest end of the major Vallès-Penedès Fault. The structure depicted in the cross-section denotes that the Paleogene deformation of the CCR is strongly controlled by the pre-existent Mesozoic structures. Taking into account that Paleogene structures also control the later Neogene extensional deformation, one can conclude that the structures observed along the CCR have been inverted twice since Cretaceous times.