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Deep resistivity image of the western transect of the Betic Cordilleras (Southern Spain) from MT soundings

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The Betic Cordillera is located at the westernmost end of the Mediterranean Alpine orogenic belt and constitutes the northern branch of the Gibraltar Arc that surrounds the Alboran Sea. This orogen is located at the present-day Eurasian-African plate boundary and includes two main domains. The External Zones are formed by Mesozoic and Cenozoic sedimentary rocks while the Internal Zones, that have undergone different degrees of metamorphism, also comprises Paleozoic rocks. Although there are geophysical data to constraint the crustal structure of the eastern part of the cordillera, including deep reflection seismic profiles, the knowledge of the deep crustal structure of the western part is scarce.

2D inversion of new MT soundings along a NW-SE profile located in the western part of the Betic Cordilleras (from Internal Zones, crossing the External Zones, the Guadalquivir Foreland Basin and up to the Iberian Massif), provides the first deep resistivity image of the region. A sharp variability in depth of resistivity may represent a crustal detachment, probably separating the heterogeneous upper crust of the Alborán Domain, characterized by high variability on resistivity values, from the homogeneous lower crust of the Iberian Massif. In the frontal part, shallow seismicity suggests that this structure is active. The activity of this crustal detachment may be related to the relief uplift of the western Betic Cordilleras and the development of the Gibraltar Arc.