



Lithospheric-scale geoelectrical characterisation of a continental collision zone in Pyrenees: preliminary results.

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Continental collision orogenic systems, responsible of large mountains ranges like the Himalaya and the Alps, play a primary role in the development of the continents creating, shaping and destroying the lithosphere over millions of years. A particular case of continental collision between the Iberian and European plates resulted in the Pyrenees during the Alpine orogeny. The significant amount of available geophysical data and the well-constrained geological evolution make this mountain chain an ideal area to study orogenic processes. Although the geological evolution is as well constrained as possible from surface and crustal geophysics, lithospheric-scale physical processes are less well characterised and their interpretations differ significantly.

To aid understanding of this orogen we have undertaken a series of magnetotelluric studies with the latest in 2011. In total, data at 70 broadband magnetotelluric (BBMT) sites and 27 long period magnetotelluric (LMT) sites were recorded in the Pyrenees, mixing old BBMT data with new BBMT and LMT data. Sites are distributed on four along-strike profiles from the Eastern to the Western part of the Pyrenees that border France and Spain. Each profile crosses the mountain range approximately from south to north and their lengths are from 70 km, the shortest, to 180 km, the longest. Additionally, some sites were located between MT profiles helping to constrain the three-dimensional geometries of the geoelectrical structures inbetween them.

The geoelectrical information obtained from MT data is independent of other physical properties typically analyzed in lithospheric studies like density and velocity anomaly. Comparison of the MT data with independent available geological and geophysical data helps us to determine better the geological and physical processes of the study area. The results obtained in this study characterise the geological structures and the physical properties of the Pyrenees at lithospheric scale and deepen our understanding of the continental collisions and the physical properties associated.

Apparent resistivities, phases and induction arrows are used to image the geoelectrical structures at lithospheric scale. The main structures are related with a partial melting region associated with the Iberian Subducted Lower Crust, the lithosphere-asthenosphere boundary and the electrical resistivity of the asthenosphere. Moreover, major crustal structures associated with the presence of fluids, sediments and graphite have been also characterised. Definitive results from the two central profiles, and preliminary results from the two lateral profiles, will be shown and discussed. Comparison between them constrains the lateral changes of the geoelectrical structures showing a main variation associated with the Iberian subducted lower crust.