Seismic characterization & geodynamic significance of the mid-crustal discontinuity across the Variscan Iberia.

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ABSTRACT

A number of deep, vertical incidence seismic profiles have been recorded along the Iberian Massif since the 1990's employing different acquisition techniques. These datasets image the different seismic signatures of the Variscan upper and lower crust, as well as the middle crust in between. In this work, I have reprocessed the seismic datasets to make the images comparable, to produce a comprehensive interpretation of the Variscan crust across the Iberian Massif. The post-stack processing flow has been designed to enhance the image of the middle crust, because it holds the key to unravel the evolution of the different paleographical zones during the Variscan collision, as it can preserve a document the amount of crustal deformation undergone by the crust.

The South Portuguese Zone, in the southwestern part of the Iberian Massif, presents the most characteristic and well imaged of this crust, which is divided in two crustal zones with opposite vergence. In the Ossa Morena and Central Iberian zones, the middle crust is very reflective and with great lateral thickness variation, and it was greatly affected by the Variscan extensional stage and the associated igneous intrusions. In the Northern margin, the middle crust becomes shallower while when the upper and lower crust thicknesses remain constant. These northwestern zones present generalized crustal melting involving the lower and upper mantle, describing a complex crustal structure. Nevertheless, the crustal organization in the northwestern part of the Iberian Peninsula is not continuous toward the East, where the effect of the Alpine orogeny is more pronounced and substitute the Variscan structures.

Ellaborating a complete and homogeneous image with all the deep seismic data recorded along the Iberian Massif makes possible the interpretation of the geometry and the role of the middle crust in the evolution of the Variscan Iberia. The characteristics (geometry and reflectivity) of the different reflection packages in the upper, middle and lower crust provide unique insights of the diverse deformation and accommodation mechanisms developed during the complex history of the Iberian Massif.

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