A preliminary receiver function investigation of the crustal structure in the Iberia-Africa plate boundary

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This study provides a first step in the characterization of the crustal and mantle seismic structure of the Ibero-Maghrebian region. The probed area represents a diffuse plate boundary of distribute seismicity with low-to-moderate magnitudes (Mw< 5.5), of 400 km wide and 1200 km along the Eurasia and Nubia plate contact. In this area of widespread deformation, plate convergence coexists with an extensional process which generated the Alboran Sea. A large number of competing geodynamic models have been proposed to explain this extension process during ongoing African-European convergence. Information about the Earth structure in depth, the crustal and mantle structure, in this area will help to understand which of these geodynamic models could be possible.

A preliminary analysis, using receiver functions, is performed to constraint the crustal thickness and the average Vp/Vs ratio beneath 23 stations located in the south-southeast of the Iberian Peninsula and Northwest of Africa. For stations in the limit of the Hercinian domain (N-NW Andalucía), the values of the crustal thickness are around 30 km and average Vp/Vs ratios of 1.70-1.73. In the Betic domain (S-SE Andalucía) the degree of complexity is higher, crustal thickness range from 17 km under the Alboran ridge to 30 km bellow the Granada basin. A high value of Vp/Vs of 1.88-1.92 is found in the southeast of the Iberian Peninsula in an area characterized by high heat flow and Neogene volcanism.