Geophysical Research Abstracts,
Vol. 10, EGU2008-A-03267, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-03267
EGU General Assembly 2008

Crustal structure beneath North-West Iberia imaged using receiver functions.

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During the last decade, the deep crustal configuration of the North-Western part of the Iberian Peninsula has been explored using teleseismic receiver function (RF) analysis of P to S conversions at main crustal interfaces in the framework of different Spanish research projects. This area has been previously investigated by seismic reflection and refraction experiments and therefore provides an excellent opportunity to compare the results of both approaches. The aim of this contribution is to compile the results from the different experiment carried over the zone to present a rather complete view of the crustal structure beneath NW Iberia. In a first stage, a N-S transect was deployed across the Cantabrian Mountains, over an area affected by the Alpine compressional tectonics. Later on, the limit between the undisturbed Variscan units and the zones reworked during the Alpine orogeny was explored along N-S and E-W transects. Finally, a passive seismic array was deployed over the NW edge of Iberia, a part of the Variscan Central Iberian Zone (CIZ) without evidences of major Alpine rework.

The receiver functions are calculated by frequency domain deconvolution of the L component from the Q component, and the resulting RF are processed using a simple form of migration to obtain images of the lithosphere in depth domain that can be compared to the 2-D velocity models from active seismic experiments. The deep crustal structure constrained by both techniques are remarkably consistent, and provides evidence on the crustal doubling and wedging between Iberian and European crusts throughout the Northern part of the Iberian Peninsula affected by the Alpine compressional tectonics. The undisturbed Variscan domains appear in the southern

edge of the N-S transects and in the transects over the CIZ domain, and it is characterized by a sub-horizontal Moho and few intercrustal reflectors. The crust affected by Alpine rework seems to extend further West that its surface expression and presents a complex structure, including dipping reflectors and “crocodrile” structures similar to those observed in marine seismic profiles.