



Seismic images of the lithospheric structure of the North Iberian continental margin. New results from the MARCONI Project.

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During the summer 2003 an oceanographic seismic survey was carried out by the R/V BIO HESPERIDES to investigate the structure and geodynamics of the southern margin of the Bay of Biscay. The crustal reflectivity and the velocity-depth distribution of the eastern half of the margin, between longitudes 6°W-2°W and latitudes 42.5°N-46°N, were investigated from a set of 5 N-S, 4 E-W and 2 NW-SE seismic

profiles totalling 2000 km of multichannel reflection seismics, recorded also at wide angle offsets in an onshore-offshore network of 24 OBS/OBH instruments and 36 land stations. The basic aims of this study were to establish the lithospheric structural features, the transition from continental to oceanic crust, the recent geodynamic evolution of this margin and its relationship to the Pyrenean realm. The results obtained from the wide-angle seismic profiles are analysed here, documenting strong lateral variations of the crustal structure along the margin. These results provide an extensive test of the undercrusted models previously proposed for the Alpine convergence in this northern part of the Iberian Peninsula. The N-S profiles show that the complex deep structure imaged in the central and western Pyrenees by the ECORS-Pyrenees and ECORS-Arzacq profiles extends westwards, to the Basque-Cantabrian Basin and the Cantabrian Mountains. In all this area the European plate indents the thicker Iberian one and forces an Iberian plate subduction to the north. The presence of an Alpine crustal root beneath the Cantabrian Mountains with a subduction of the Iberian crust down to 55 km depth, revealed by ESCI-N and related projects, is confirmed from the modeling of our N-S wide-angle profiles. The interpretation of the E-W and the westernmost N-S profiles reveal the transitional continental to oceanic crust to the NW, showing an important crustal thinning towards the central sector of the Bay of Biscay. In the north-westernmost part of the study area, high velocities are interpreted in the lower crust, together with low velocities in the layers above it. The typical structure of a continental crust, differentiated in upper, middle and lower levels, disappear towards the NW, where data are more suitably fitted by velocities similar to those from oceanic layers 2 and 3. Therefore, these seismic results provide new constraints on the south-easternmost limit of oceanic crust in the Bay of Biscay.