SUBCRUSTAL REFLECTIVITY BENEATH CENTRAL AND SOUTH-WEST IBERIA

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Sub-Moho reflectors have been identified in seismic refraction and wide-angle reflection recordings acquired in western Iberia since the late '80s. The surveys have offsets and energy large enough to illuminate the uppermost mantel and reveal some deep reflected energy. The assessment (analysis and modeling) of these reflection events suggest that can be interpreted as resulting from the interaction of the seismic energy with a relatively heterogeneous layer located within the lithospheric mantle beneath the Spanish Iberian Massif. From the considered data-sets, at least two sub-Moho events can be identified. The kinematic and wavelet characteristics of the shallow event can be most probably produced by an increase in P-wave velocity. This velocity contrast is placed at ~70-75 km depth beneath the Ossa-Morena Zone (OMZ) and it shallows up to 50-60 km beneath the Central Iberian Zone (CIZ). The waveform, and time length of the arrival (coda and amplitude) suggest that it can corresponds to a ~10 km thick heterogeneous layer. This feature can be modeled by a layer consisting of heterogeneities randomly distributed bodies with $\Delta Vp=\pm 0.2$ km/s. The estimated constraints (contrast in physical properties and depth level) are consistent with the top of the phase transition from spinel to garnet lherzolite, the so-called Hales discontinuity. A second and deeper event is observed on some shot gathers. Detailed analysis of the reflected wave-forms suggest that the reflected wavelet displays reversed polarity. In this case it would corresponds to a local decrease in velocity with depth. Finite difference acoustic and elastic full wave-field modeling places this discontinuity around 90 km depth beneath the OMZ. A lateral change is observed beneath the CIZ where it is imaged at 103-110 km depth on the southeast and shallows up to 80 km depth on the northeast. The indicated depth of this discontinuity would be consistent with the depth location of the LAB, which is relatively well constraint for the target area by other multidisciplinary geophysical observations. Therefore the reflected energy of this event would correspond to the base of the lithosphere.