



Attenuation for P and S waves in the upper mantle beneath Iberian peninsula in the frequency range 0.2 - 8 Hz from Broad-Band recordings of the (600 km) deep earthquake of April 11, 2010.

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We use data a complete set of broad-band three component seismic stations deployed in the Iberian Peninsula, which recorded the April 11, 2010 very deep Mw 6.3 earthquake occurred 620 km beneath Granada basin, in Southern Spain, to estimate the inverse quality factor for P- and S-waves as a function of frequency, in the range between 0.1 and 10 Hz.

The zone under study is characterized by rare and scarce very deep seismicity, with depths greater than 600 km. The origin and source of this very deep focus has been attributed to different mechanisms : detached piece of a cold lithosphere, delamination, convective removal or linked to an active or inactive eastward subduction in the Gibraltar arc.

We estimate the spectrum (averaged over the three components) of the direct P- and S-waves (plus the early P- and S-wave coda) of the recent April 11, 2010 deep earthquake, at more than 50 receiver stations located in the Iberian peninsula. We than average the spectral amplitude in 6 frequency bands, centered respectively at 0.25, 0.5, 1, 2, 4 and 8 Hz with bandwidths of 0 - 0.35, 0.35 - 0.7, 0.7 - 1.4, 1.4 - 2.8, 2.8 - 5.6 and 5.6 - 12 Hz.

We observe that S-wave early coda is contaminated by the P-wave late coda for frequencies larger than 2 Hz, and thus exclude the data in the frequency bands centered at frequencies larger than 2 Hz in the analysis of the S-wave attenuation.

Constraining inverse-Q in the crust to values already estimated in literature, we obtain inverse-Q for P and S waves in the mantle, Q_p -1 and Q_s -1 using the spectral amplitude decay method. Results show that Q_p in the mantle beneath Iberian Peninsula ranges from 20 at 0.25 Hz to 290 at 8 Hz. Q_s ranges from 56 at 0.25 to 153 at 2 Hz.

The present result is compared with others published in literature, showing that beneath Iberian Peninsula the Q-values for P and S waves are close to the lower bound in the range of quality factors estimated through the world. In particular, the Q_s estimated with MLTWA method for intermediate-depth earthquakes beneath Nuevo Cuyo region, Central Andes, are similar. The present results may be of help in the interpretation of upper mantle structures and contribute to the debate on the nature of the upper mantle beneath Spain.