



Coda Attenuation Analysis in Western Iberia and its SW offshore area

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In this study, we determine the seismic attenuation of both onshore zones in the west and south of Iberia and of the offshore zone southwest. We apply the Coda Wave Decay (CWD) method for each hypocenter station pair. Then we compute average values on a geographical grid using regionalization and tomography. We use seismic data recorded by the permanent seismic network and multiple datasets from 4 temporary networks of ocean-bottom seismometers (OBS) deployed offshore SW Iberia. These OBS networks that covered the Gulf of Cadiz, the eastern Horseshoe Abyssal Plain and at the Gorringe Bank, provide a unique opportunity to map the coda Q values of the offshore of SW Iberia. We analyze seismograms of 999 selected earthquakes occurred between January 1999 and October 2018, which were recorded by stations within 100 km epicentral distance and the focal depths were less than 50 km.

We find that coda Q can clearly distinguish areas with different Q in Western Iberia and its offshore areas, moreover, our observations of coda Q values are spatially well correlated with geology and tectonics. Interestingly, we observe very low Q values in the extreme offshore SW area, the Gorringe Bank and surrounding where the sediments overlay directly exhumed mantle. The high Q values are observed in Western Iberia, the stable Iberian Massif and the intermediate Q values are found in the sedimentary basins, the Lusitanian and the Lower Tagus basins. Additionally, we find that the area with similar lower Q value is in the SE Iberia (Betics range) which is also the area that has been associated with low Q in the other previous studies. Comparing with coda Q for other regions, where coda Q has been determined with the CWD method and the same parameters, the largest Q in the Iberian Massif is higher than the Q in Norway, and the lowest Q is comparable to the low Q area of the Azores. We conclude that coda Q is a useful tool to study detailed regional differences in attenuation when small epicentral distances are used.