



Crustal structure of the Spanish Central System: Constraints from ambient noise autocorrelation and controlled source data

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The Spanish Central System is the most relevant topographic feature in central Iberia. Along with the surrounding Duero and Tajo basins it presents an anomalous high elevation. This high topography is, most probably, the result of a combination of deep and surface processes. The crustal thickness, geometry of the Moho discontinuity and the crustal architecture are the main targets of current research efforts developed in the area. As part of a multi-seismic project limited controlled source data has been acquired, jointly with ambient noise seismic records.

The preliminary results provide relatively strong constraints on the deep structure of the Spanish Central System. The ambient seismic noise records were acquired by a set of 24 short period (2 Hz) seismic stations deployed along a 120 km long NW-SE-trending profile with a 4.8 km average spacing. The transect crossed the southern branch of the mountain range. The stations recorded the ambient seismic field continuously for a month. Processing consisted on: phase autocorrelation of the seismic noise to retrieve the zero-offset reflection response at the receivers and, time-frequency domain phase weighted stack used to stack the auto correlations. For calibration and, along the same transect, over 500 TEXANS were deployed to record a wide-angle shot gather. The recording units with an approximate station spacing of 400 m recorded relatively high amplitude crustal and Moho events. The lower crust and the crust-mantle transition are constrained by both data sets. Further more small crustal discontinuities and structures are interpreted and correlated with surface geology features. The results of the processing are compared to synthetic models to certify the validity of our interpretations. (Research support, Ref: CGL2016-81964-REDE, CGL2014-56548-P, EU grant 730900).