



Seismic Anisotropy Beneath Southern Iberian Peninsula from Splitting of SKS Phases

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Upper mantle seismic anisotropy of the southern part of the Iberian Peninsula is investigated using shear wave splitting of SKS phases. We analysed teleseismic events recorded by sixteen permanent broadband stations situated in southern Iberia and northern Africa, to determine the splitting parameters: fast polarization direction and delay time between the fast and the slow component. The area of investigation includes two of the most important geological structures in the Peninsula, the Variscan Massif in the center of the Peninsula, an ancient Hercynian chain, and the Betic Cordillera in the Southeast, that represents the most westerly Alpine mountain chain in southern Europe. Shear wave splitting measurements from stations in the Betic in Southeastern Spain show a smoothly varying trend of fast directions that are nearly parallel to the coast. Stations further North, in the southern part of the Variscan also show spatially continuous fast directions, however with NE-SW oriented fast polarization directions, different from those recorded in the Betic and also different from those in central Iberia. Along the Gibraltar arc, we observe a smooth rotation of fast direction, from ENE-WSW in the Eastern Betic to E-W for the stations in the Western Betic middle part to a N-S trend in the area of Gibraltar and Ceuta, following more or less the coastline, and the general trend of the mountain belt. A similar rotation is apparent in the Pn anisotropy, suggesting that the anisotropy has a vertical coherence starting from just below the Moho. We discuss geodynamic models that are consistent with the observations.