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Lithospheric structure of the Western Iberian Atlantic Margin

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The Western Iberia Atlantic margin has been the object of multiple geophysical surveys in the last two decades, which highlight the crustal architecture of a hyperextended, magma-poor passive margin with a wide transition zone of exhumed mantle peridotites and anomalously small magma fractions. However, studies dealing with its lithospheric structure are lacking. We present a 2D model of the present-day lithospheric structure along a 530-km transect of the Western Iberian Margin, from the Southern Iberian Abyssal Plain to the Lusitanian Basin. The model combines seismic and geological data, mantle petrology, mineral physics and geophysical observables (gravity, geoid, topography, mantle seismic velocities and heat flow) within a self-consistent thermodynamic framework. Results show that the crustal thickness decreases gradually from ∼30 km below the Lusitanian Basin onshore to ∼11 km in the Abyssal Plain, ∼250 km further oceanwards, while the LAB rises from ∼140 km to ∼110 km, respectively. Furthermore, our results favour a 22% degree of serpentinization of the exhumed mantle which represents a 4.4% of water content.
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