



The continent-ocean transition of the south west Iberia margin imaged on re-processed multichannel seismic data

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The West Iberia Margin is arguably the best studied example of magma-poor rifted margin. However, while the northern Deep Galicia Margin (DGM) and the central Iberia Abyssal Plain (IAP) have been extensively studied and its continent-ocean transition (COT) is reasonably well constrained, the Tagus Abyssal plain (TAP) to the south, has not received the same attention and the structure and extension of its COT is still debated.

The main goal of the present work is to study the COT of the TAP and compare the results to the better studied central IAP. For the study, three multichannel seismic reflection profiles across the TAP and one across the IAP have been re-processed and time migrated. All data were collected with an industry ship from GECO-PARKLA during the Iberian Atlantic Margin (IAM) project in 1993.

Comparing the structure of the TAP to the IAP we found resembling intra-basement reflectivity patterns and similar top-of-the-basement morphology. Three distinct regions commonly present on both IAP and TAP can be identified: 1) an eastern region under the continental slope with the presence of tilted fault blocks and syn-tectonic sediment infill. This region is also characterized by post-rifting compressional deformation related to the convergence of Iberia and Africa plates; 2) a central region under the abyssal plain, with a deep and smooth-top basement containing a high amplitude reflection package 1s beneath basement top; and 3) a western region, east of the J magnetic-anomaly ridge, with a shallower basement characterized by tall ridges with steep flanks, and with intra-basement landward dipping reflections that penetrate several seconds into the basement. We interpret each region to represent different stages of rifting present along the entire margin. The eastern region is interpreted as thinned continental crust, the central region as exhumed continental mantle, and the western region with peridotite ridges next to the initiation of truly oceanic crust spreading.

The presence of exhumed continental mantle in the central region of the TAP is supported by the similarity between the structures imaged in the central regions of the TAP and IAP and by the analysis of isostatically corrected depths to the top of the basement along the region under the abyssal plains. The depth anomaly analysis shows an average depth anomaly of 1 km obtained for both regions which indicates that their basement is not made of a normal-thickness oceanic crust of 6 km. Because the presence of serpentinized mantle was previously proposed in the IAP, we calculated the depth to basement assuming a 5 km thick layer with a rate of serpentinization between 25% and 80% (based on available seismic velocity information). The resulting depth corresponds to the depth to basement corrected by sediment load. Applying the same procedure for the TAP we obtain a 5 km thick layer with a rate of serpentinization between 45% and 70% which also explains the depth anomaly.