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Post-rift magmatism on the central West Iberian Margin: New evidence from magnetic and gravimetric data inversion in the Estremadura Spur

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The West Iberian Margin (WIM) is a type-example of a magma-poor passive margin (e.g., Wilson et al., 2001). However, the onshore sector of the WIM was the locus of three discrete magmatic cycles during the Mesozoic (e.g. Mata et al., 2015): 1) tholeiitic ∼200-198 M.a., 2) transitional 148-140 M.a. and 3) alkaline 94-69 M.a., from which the third cycle is the most voluminous and widespread on the margin. This latter cycle occurred on a post-rift setting and is temporally associated with the rotation of Iberia and initiation of the alpine compression. It includes the Sintra, Sines and Monchique intrusions, the volcanic complex of Lisbon and several other minor intrusions (Miranda et al., 2009).

New seismic, gravimetry and magnetic data from the offshore segment of central WIM, across the Estremadura Spur revealed that magmatism is far more important and widespread than anticipated (e.g. Pereira et al., 2017). This work presents the preliminary results that describe the distribution and nature of a Late Cretaceous post-rift magmatic event on the Estremadura Spur, based on magnetic and gravimetric data inversion supporting evidence from seismic profiles.

Our analysis supports evidence from seismic profiles and suggests that offshore magmatism on the Estremadura Spur includes a batholith-like feature intruding its westernmost sector, a volcanic edifice, numerous sills and lava flows (?), most probably coeval of the onshore occurrences marking the third magmatic Mesozoic cycle in the Iberia margin.

Based on earth's magnetic anomaly and seismic profiles, this offshore batholith-like magmatic feature, with an area of approximately 280 km2 and elliptical shape (broadly oriented W-E), intrudes Jurassic and Early Cretaceous depositional sequences. Its shape and areal extent are similar to the onshore Sintra massif, suggesting strong affinities both on emplacement mechanism and timing.

We will pursue the investigation of the nature and distribution of the individual offshore magmatic features, based on gravimetric-magnetic inversion, aiming to constrain the magnitude of the event, its implications on the thermal evolution of the WIM and, ultimately, on the regional effects on widespread uplift and impact on postulated petroleum systems.

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