



Magnetic modeling of the West Iberian Margin constrained by new geophysical data

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The nature of the J magnetic anomaly off West Iberia and its implications on the kinematic and geodynamic evolution of the margin has been addressed by several studies, with several distinct interpretations and resulting models. The main reason for this is that one single geophysical dataset (the IAM-9 seismic profile on the Iberia Abyssal Plain) has until now imaged the respective crust and was available as constraint, leaving a large degree of uncertainty for interpretation and modeling. New geophysical imaging of the structure of J anomaly and nearby domains, preferably in different margin sectors, would then be essential to cast new light on the discussion on the Iberian margin evolution. We here present new constrained magnetic modeling for two profiles across the J anomaly off Iberia, in the Tagus and in the Iberia Abyssal Plain, respectively. These profiles were recently surveyed for wide angle and reflection seismics and for magnetic data, during the FRAME-2018 survey. The joint processing of wide angle and reflection seismic data revealed with unprecedented detail the velocity structure and the tectono-stratigraphy along the profiles. Here, we use these results as constraints for magnetic modeling of the measured anomalies, namely for detailed definition of the basement topography and identification of the different domains. Magnetic modeling allowed inferring the relative contribution of each layer and the existence of additional magnetic sources, such as intrusive bodies in exhumed mantle domains. Regarding the J anomaly, we show that it cannot be attributed only to magnetization contrasts between different layers. The J anomaly is rather the result of an anomalous highly magnetized source body, associated with a locally thicker crust, which claims for an abnormal magmatic composition with strong enrichment in iron oxides. We discuss possible origins for the found structure and composition of the J anomaly off Iberia, as well as implications of the new magnetic modeled profiles for the margin conjugation and kinematics.

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