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New magnetic survey in the Tagus Abyssal Plain (TECTAP Project)

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The southern segment of the West Iberia Margin (WIM), the Tagus Abyssal Plain (TAP), and its conjugate margin, the southeast Grand Banks in Newfoundland, have not been drilled and geophysical data are sparse. On the contrary, the central and northern segments of the WIM are well-studied and the deep structure of the crust is well established.

Nevertheless, a geological transect of the crust and upper mantle structure in the Tagus Abyssal Plain (TAP) was published in 2006, extending from the un-thinned continental crust in the East to the typical oceanic crust in the West (Afilhado, 2006; Afilhado et al., 2008). The results of the interpretation and modelling of seismic data, which includes refraction and wide-angle reflection and near vertical reflection, along IAM-5 multi-channel (MCS) profile are distinct to the one already available in the Iberia Abyssal Plain. These results on the deep structure indicate that nearly the entire TAP is underlain by oceanic crust. Both seismic, magnetic and free-air anomaly data modelling concur to the identification of a major rock property contrast at 10.5ºW, which is interpreted as the eastern limit of the oceanic crust. A 40 km wide domain, to the east of 10.5ºW, with high velocity gradient and seismic velocity in the range 6.0 km/s to 7.2 km/s (Afilhado, 2006; Afilhado et al., 2008) was recognized. Numerical modeling favours a serpentinized mantle composition in this domain, instead of continental crust affinity rocks (Neves et al., 2008), i.e. similar to the domain of exhumed serpentinized mantle recognized in the Iberia Abyssal Plain, to the north. However, this exhumed serpentinized mantle domain in the TAP is rather narrower than in the Iberia Abyssal Plain. This interpretation has important consequences to explain the nature of the crust in the transitional domain and for kinematics reconstructions.

Moreover, the TAP is characterized, eastward of the J anomaly, by a set of low amplitude magnetic anomalies, suggesting a near N-S alignment. The origin of these anomalies and consequently the nature and age of the crust in the area, are matters of scientific dispute, unsolved till today.

In order to confirm the interpretation of Afilhado et al., 2008 and to determine if low amplitude magnetic anomalies are really formed by seafloor spreading, we have acquired a new survey of the magnetic profiles in the TAP. These data and other available data on magnetics, geology and geophysics, from the TAP and its conjugate margin, will be used to update the plate kinematic evolution model for Iberia. The amount of stretching thus computed will put additional constrains on the model to explain the formation of this margin.