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What are the Geophysical Fingerprints of hyper-extended Crustal Domains ?

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The Iberian margin is a well-studied region and presently the best tectonic setting for understanding the dynamic process of margin's formation and evolution. The world largest available dataset enabled to properly constrain the crustal structure and opened new paradigms for passive margins studies. Nevertheless, there are numerous remaining questions, as for example what is the spatial extent of continental inheritance along the margin and what is the role of fluids (serpentinization/magmatism) during margin's formation/deformation? The observation of a hyper-extended crustal domain, now also identified in other margins reveals the highly diverse nature of the crust along rifted margins. What are its physical properties and how do they change laterally?

The aim of this study is to explore the physical signature of the serpentinized crust, which composes this hyper-extended domain, to identify the limits of the system and discuss its nature and importance. To investigate the lateral variation of crustal types we use integrated gravity, magnetic, seismic and available geological/well data. Transformations on the potential field data enable us to enhance the horizontal and vertical variations of the crust, and future forward modeling will provide a geological correlation for Iberia.

The preliminary results showed that the transitional crust can be subdivided into two zones, regarding their different geophysical signatures: from the necking zone, the continent ward transitional crust displays decreasing gravity anomaly, low horizontal gradient and smooth magnetic anomalies; towards offshore (to the west of the J anomaly) the transitional crust is characterized by a semi-cyclic magnetic anomaly pattern, with increasing gravity, showing a stronger horizontal gradient and rough bathymetry. We associate this transitional domain with an embryonic oceanic type crust. Comparisons with other margins along the North Atlantic, despite the great spatial variation, reveals preliminarily that the hyper-extended crust at the non-volcanic Iberia Margin displays intrinsic characteristics distinct from the more volcanic transitional domains to the north.

The physical properties of the different crustal types will be further modeled to properly constrain their characteristics. The final results shall enable us to identify the lateral transition between the different continental-transitional hydrated-oceanic crustal types and potentially would allow us to identify similar domains worldwide.