



Lateral Variations in OCT Structure of the Campos Rifted Margin (SE Brazil) and Control by Lithosphere Inheritance

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Deep-water rifted continental margins show diverse architectures which reflect the complexities of local and regional processes controlling their formation. Theory, experiments and observations show that their evolution is influenced by first-order elements like compositional inheritance, temperature and kinematics. Nevertheless, to unravel their interaction and relative importance is still challenging. We present results of a case study of the Campos rifted margin, offshore SE Brazil, to examine the control by crustal inheritance on margin structure. The Campos margin is characterized by contrasting margin OCT geometry along strike,

Based on new aeromagnetic and seismic data, integrated with 3D gravity inversion, we investigate the Campos margin architecture, with the aim to understand the role of basement inheritance and early magmatism on margin evolution until breakup. Our geophysical mapping shows that the necking zone is wider in the central and southern Campos segments than in the northern Campos, though the hyper-extended domain is wide regionally.

We examine the onshore-offshore prolongation of continental geological terrains, which would have resulted in lateral variations of crustal rheology along the margin. We show that the rheological contrasts between these distinct terrains and the differences in crustal thickness and composition can be correlated with variations in ocean-continent transition structure and magmatism from south to north. Our analysis shows that margin thinning geometry constitutes a first-order parameter in defining the margin architecture and is associated with the pre-rift crustal geology. The pre-rift basement heterogeneities represented by the layered crust of the Cabo Frio Tectonic Domain in the southern and central Campos margin contrasts with a more homogeneous crust of the Aracuaí Belt to the north. This determined the localization of the deformation, segmentation and the variation of the depositional space of the Campos Rifted Margin. At late rifting stages, when the crust was hyper-extended and inheritance and mantle dynamics interplay changed, the rifting evolved more homogeneously, leading to a regional saline basin formation (Stanton et al. 2019).

Important remaining questions include: (i) how wide are the regions of crustal necking and hyper-extension on the Kwanza margin which is conjugate to the Campos margin, (ii) how do the dimensions of these domains on these conjugate margins compare, (iii) how do they compare and contrast with the Santos-Namibe margin segments to the south, (iv) can these differences be correlated with lithosphere inheritance?