



## **Variability of the geothermal gradient across passive continental margins of the North and South Atlantic Ocean**

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Comprehension of the lithosphere-scale thermal field at passive continental margins is a key to unravel obscure processes of the plate tectonic cycle and to explore the subsurface resources.

In this study, we investigate variations of the geothermal gradient for two differently aged passive continental margins in the North and South Atlantic. Therefore, we analyze two 3D conductive and lithospheric-scale thermal models of the Southwest African and the Norwegian passive margins. These 3D models resolve various sedimentary, crustal and mantle units. Both models are consistent with different geophysical data such as seismic observations and the gravity field, as well as surface heat-flux and measured temperature. In comparing the two margins we address three main questions:

- 1) How does the geothermal gradient vary with depth and laterally?
- 2) What are the controlling factors of these variations?
- 3) How are shallow geothermal gradients related to the lithospheric-scale thermal field?

We answer these questions by comparing the 3D geological structural models and the geothermal gradient variations for both thermal models and show how radiogenic heat production, sediment insulating effects, and thermal Lithosphere-Asthenosphere Boundary depth influence the shallow thermal field pattern.

The results indicate that the present-day thermal field is significantly different in South and North Atlantic and ultimately determined by the lithospheric mantle characteristics.