



The structure and evolution of conjugate margins of the southern South Atlantic: a synthesis

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The southern segment of the South Atlantic is a prime example for volcanic rifting and continental break-up, reflected today in seaward dipping reflectors (SDRs) in reflection seismic data as well as high velocity lower crust in refraction seismic data.

Reflection, refraction seismic and potential field data reveal an Early Cretaceous South to North progressing rift and subsequent continental breakup. This is well reflected in a time-progressive breakup unconformity along the margins, and a successive northward pinch-out of magnetic anomalies against SDR wedges.

The continental margins are considerably and symmetrically segmented. This segmentation is defined by large transfer zones and corresponding horizontal offsets in the distribution of the SDRs. Distinct along-margin variations in architecture, volume, and width of the SDRs indicates a close link between segmentation and melt supply during rifting and initial seafloor-spreading.

Several superimposed SDR sequences, suggesting episodicity of volcanic emplacement are distinct along southerly lines, losing prominence northwards. However, both conjugate southernmost margin segments were found to be magma-starved.

While the two conjugated margins share much of their structural features such as segmentation and abundant volcanism, their architecture is by no means symmetrical. This is for example shown in strength of the magnetic anomalies, volume of high-velocity lower crustal bodies and orientation of breakup related sedimentary basins.

A main outcome of our study is that the passive margins are not continuously of the volcanic type and that the change from a non-volcanic to a volcanic margin occurs abruptly. This is an argument against a deep mantle origin for the rift-related magmatism. The position of the hot-spot responsible for the Paraná-Etendeka volcanic provinces coincides with the location of maximal rift propagation delay. Well established seafloor spreading systems were at work to the south and north when this location still was in the continental extension phase.