

Deep Structure of the Argentine and Conjugated South African Continental Margins

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The last phase of the break-up of Gondwana during the Late Jurassic and Early Cretaceous is associated with a complex history of rifting and magmatism on the conjugate continental margins of southern Africa and Argentina. The opening of the South Atlantic resulted in the development of passive continental margins of the volcanic type on either side.

We present results of two seismic refraction lines, which were acquired by the Federal Institute for Geosciences and Resources (Germany) across the continental slopes. We evaluated these profiles using a 2-D joint refraction and reflection seismic tomography. This method yielded reasonable information about the velocity depth distribution. It also allows assessing the final model in terms of resolution and non-uniqueness.

On both margins, the crust shows a landward decrease in seismic velocity. This fact is due to the transition from oceanic to continental crust. Offshore Argentina, we were able to identify a distinct velocity anomaly within the upper crust in the area of the seaward dipping reflector sequences. The lower crust is characterised by a high velocity (7.3 to 7.5 km/s) body. We can show that the thickness of this body varies across the continental slope, which reflects the episodic character of the opening of the South Atlantic.

With these results, we are able to deliver some constraints on the rifting processes which have governed the early formation of the South Atlantic. Further on, our results are narrowing down some key factors (crustal thickness, heat flow) for a HC maturity modelling study.