Limpopo magma-rich transform margin (South Mozambique), implications for the Gondwana breakup

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The continental rifted margins of Mozambique provide an excellent example of continental passive margins with a significant structural variability associated to magmatism and inheritance. Despite accumulated knowledge in this area, the tectonic structure and nature of the crust from Mozambique margins, especially the Limpopo transform margin are still poorly known. Here, we use high-resolution seismic reflection dataset and wells from industry to propose a structural interpretation of this area.

Our results indicate that the Limpopo transform fault zone limits a continental crust westward, with deep Karoo grabens, from an oceanic crust domain eastward. The Limpopo transform margin also shows a widespread magmatism, attested by the presence of lava flows and highly magmatic oceanic crust, implying different thermal perturbations through time and space.

We suggest that the expression of thermal perturbations started with the Karoo Large Igneous province emplacement at about 180 Ma. This intense magmatism event is favored by pre-existing and neo-formed faults, which may contribute significantly to the distribution of magma generated. We propose an evolution model from the onset of the rifted margin to the seafloor spreading along the Limpopo magma-rich transform margin with (i) an E-W extension trend responsible for the formation of a large fault-controlled basin during the Permo-Trias (T_1); (ii) the extension becoming NNW-SSE, oblique to the margin direction as attested by the presence of flower structures, allows for reactivation of previous structures inducing the deposition of a volcano-sedimentary wedge, and the formation of several magmatic infilling during the Jurassic (T_2); (iii) the onset of oceanic spreading after ca. M25 (*i.e.* 156 Ma) in the Limpopo area which triggered the uplift and erosion of the proximal parts of the margin as well as the formation of several other magmatic infilling (T_3).

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