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The Capricorn/Australian plates' suture highlighted by seamounts morphology

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The Amsterdam-St. Paul (ASP) plateau is located in the central part of the Indian Ocean and results from the interaction between the ASP hotspot and the South-East Indian Ridge (SEIR). The plateau and its direct surroundings are located near the St Paul Fracture Zone, which is regarded as the southern border of the diffuse Capricorn-Australian plate boundary. From this, it seems likely that the successive tectonic settings may have also influenced its construction.

The study of the structure morphology combined with geochronology confirmed that tectonic processes have influenced the submarine morphology of this area. The seamount chain of the Dead Poets (CDP), located to the northeast of the plateau, is made of two groups of seamounts: (1) large seamounts, with a flat summit which are about 8-10 Ma old and (2) smaller seamounts, with a sharp summit and built within the last 2 Myr. The small seamounts appear too young to be related directly to the ASP plume activity. Therefore we suggest that their construction occurred from plume derived melts pounded and erupting through a weaker lithosphere, i.e. along the divergent boundary of Capricorn and Australian plates.

The construction of these seamounts in response to lithosphere flexure seems to respond to a similar mechanism that triggered the eruption of small and irregularly shaped volcanoes along the Japan and Tonga trenches and so called "petit spot" volcanoes [Hirano and co-workers]. The morphology of these seamounts thus highlights the boundary between the Capricorn and Australian plates and reveals where the maximal horizontal divergence occurs. The N65° orientation of the CDP, as well as the seamount's elongated shapes, support an opening motion between the two plates along a suture oriented in the N155° direction.