



## **New Exploration of North Kerguelen Plateau Margins : Constraints for the Australia-Antarctica Separation**

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France ratified the United Nations Convention on the Law of the Sea in 1996, and has since undertaken an ambitious program of bathymetric and seismic data acquisition (EXTRAPLAC Program) to support claims for the extension of the legal continental shelf, in accordance with Article 76 of this convention. For this purpose, three oceanographic surveys took place on board of the R/V Marion Dufresne II, operated by the French Polar Institute, on the Kerguelen Plateau, in the Southern Indian Ocean: MD137-Kergueplac1 (February 2004), MD150-Kergueplac2 (October 2005) and MD165-Kergueplac3 (January 2008). Thus, more than 20 000 km of multibeam bathymetric, magnetic and gravimetric profiles, and almost 6 000 km of seismic profiles were acquired during a total of 62 days of survey in the study area. Ifremer's "rapid seismic" system was used, comprised of 4 guns and a 24 trace digital streamer, operated at speeds up to 10 knots.

In addition to its use for the Extraplac Program, the data set issued from these surveys provides the opportunity to improve our knowledge of the structure of the Kerguelen Plateau and more particularly of its complex margins. In this poster, we show different kinds of data. The high resolution bathymetry (200 m grid) data set allows us to specify the irregular morphology of the sea floor in the north Kerguelen Plateau region, characterised by ridges and volcano chains that intersect the oceanic basin on its NE edge. The seismic profiles show that the acoustic basement of the plateau is not much tectonised, and displays a very smooth texture, clearly contrasting it from typical oceanic basement. Both along the edge of the plateau and in the abyssal plain, sediments have variable thicknesses. The sediments on the margin of the plateau are up to 1200 meters thick and display irregular crisscross patterns, suggesting the presence of important bottom currents. An important concentration of new magnetic data, in a key area (Northern Kerguelen Plateau) and at a key period (Oligocene), helps us understand the setting up of the oceanic plateau and the kinematics reconstructions between Antarctica and Australia plates.

We focused on the northeastern margin of the Kerguelen Plateau, from 77E30 up to the Amsterdam Saint-Paul fracture zone, where the South East Indian Ridge (SEIR) shows a large offset toward the Kerguelen Plateau. On a larger scale, the opening between Kerguelen Plateau and Broken Ridge has kept very morphologically homologous margins on each side of the SEIR: in the Southern Kerguelen Plateau, the magnetic anomalies are regular, parallel to the SEIR and also to the morphological boundary of the plateau. In contrast, the northeastern margin of the Northern Kerguelen Plateau is not much explored and its interpretation less obvious, because volcanic masses overlie discordantly the oceanic crust. We compiled the magnetic anomalies pickings, integrating data from recent Kergueplac surveys and previous studies, to identify with more confidence the oldest anomalies at the plateau margin. We used it for reconstructions at different stages (from a80 to initial opening), realised with rotation poles of Cande & Stocks (2004). These reconstructions confirm that kinematic in the whole SE Indian Ocean, and in particular in the Northern part of the Kerguelen Plateau, remains unresolved. In particular, we discuss both the fit between Kerguelen and Broken Ridge and the implication for the opening between Australia and Antarctica as well as the possible junctions along the Amsterdam fracture zone with the Crozet basin where the spreading rate was much faster before A18.