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The Terror Bank (Scotia Sea, Antarctica): a remnant part of the stretched Antarctic passive margin of the Drake Passage opening

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During January-February 2008, in the frame of the IPY, two geophysical profiles 500 km long were recorded in the Drake Passage along spreading corridors between transform faults in the southern flank of West Scotia Ridge. The profiles cross the oldest oceanic crust, the Terror Bank and the oceanic Protector Basin. The survey carried out on board the R/V Hespérides includes swath bathymetry, ultra-high resolution seismics, multichannel seismic reflection, gravity and magnetic data. Our aim was to unravel the enigma of the missing conjugate passive antarctic margin.

Both profiles provide evidence of the continental nature of the Terror Bank, which is an NNE-SSW elongated high, at 2000 m depth, surrounded by the Scotia and Protector abyssal plains exceeding 3000 m depth. The Terror Bank is limited by asymmetrical slopes with NW smooth and SE sharp margins. The sedimentary record shows many erosive (channels, moats, scours, etc) and depositional (drifts with superimposed sedimentary waves) features related to the water mass circulation. Minima values of the Bouguer anomaly point to the thinned continental nature of the Terror Bank. Several half grabens bounded by north-westwards dipping faults and with sedimentary wedges, exceeding 1 km thickness, thickening south-eastwards, suggest that the initial stage of rifting was followed by an oceanic spreading axis located north-westwards. Moreover, linear sea-floor magnetic anomalies indicate that oldest chrons are placed to the west, pointing to an eastward propagation of the oceanic spreading since the initial stages of the Scotia Arc development.

The new data allow us to constrain the tectonic evolution of the Oligocene initial opening stages of the Drake Passage oceanic gateway and its paleoceanographic evolution.

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