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3D modelling from multichannel seismic, ODP sediments and potential fields analysis of the South Orkney Microcontinent (southern Scotia Arc, Antarctica)

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The South Orkney Microcontinent (SOM) is a key element in the reconstruction of the opening and deepening of the Powell Basin, and hence the Drake Passage. The SOM is the largest continental block, with an area of more than 70.000 km2, and is located in the central sector of the South Scotia Ridge and the northern Weddell Sea. Geological and geophysical modelling enables to characterise the nature of the margins and the complex structure of the SOM that respond to different tectonic phases since the Mesozoic.

Geological records in the area include the Hole 696B from the Ocean Drilling Program (ODP) located in the south-eastern margin of the SOM. This hole span from Middle Eocene to the Quaternary in its 650 m of sedimentary record. We combine the results from sonic data obtained on shipboard at 696B with multi-channel seismic profiles that cross the hole and nearby to make an age-depth conversion. Seismic data come from the Seismic Data Library (SDLS) and Spanish cruises (i.e. SCAN97; DRAKE2018). In addition, the modelling of gravimetric satellite data and compiled magnetic data from WDMAM allows to establish the basement geometry. This study presents new insights into the 3D geometry of structural highs and sedimentary basins and the tectonic evolution of the SOM.