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Bathymetric Compilations of the Scotia Arc

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The grids

- Science driven
- Medium resolution; 100m-250m
- Ascii and arc grid format
- Provided in a range of projections
- Aim is to publish each grid on the web

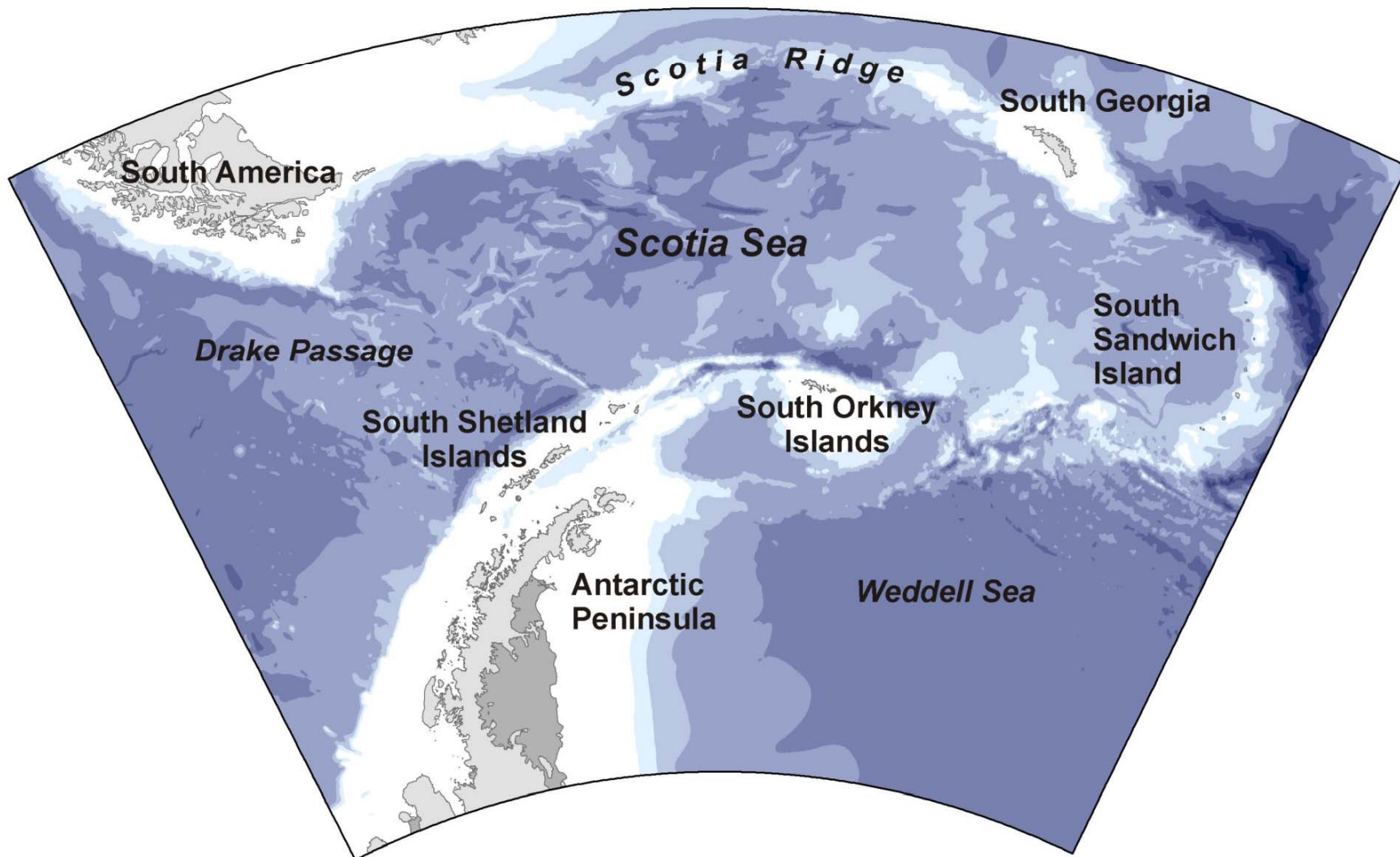


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The Scotia Sea area

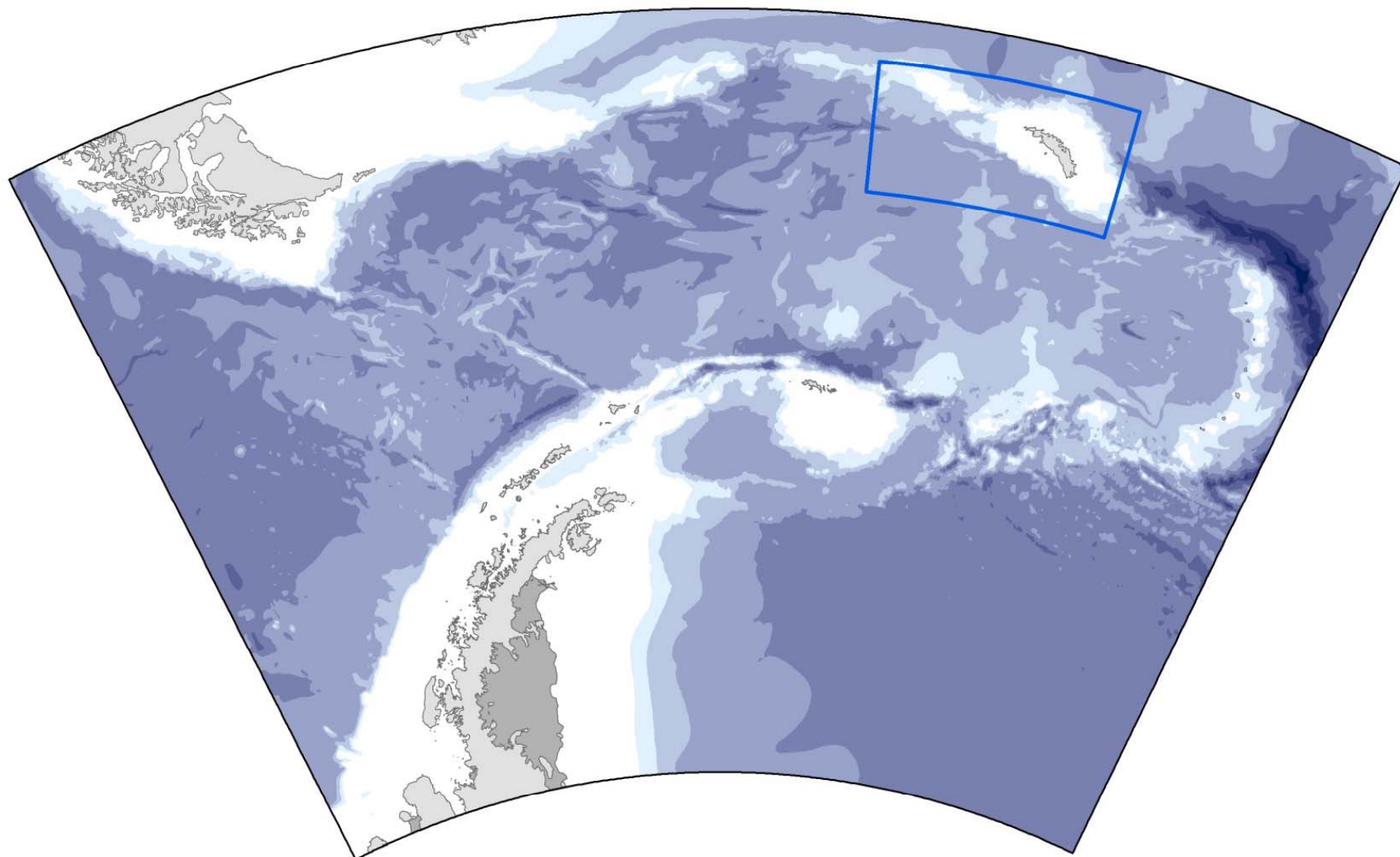


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South Georgia Bathymetric Dataset (SGBD)

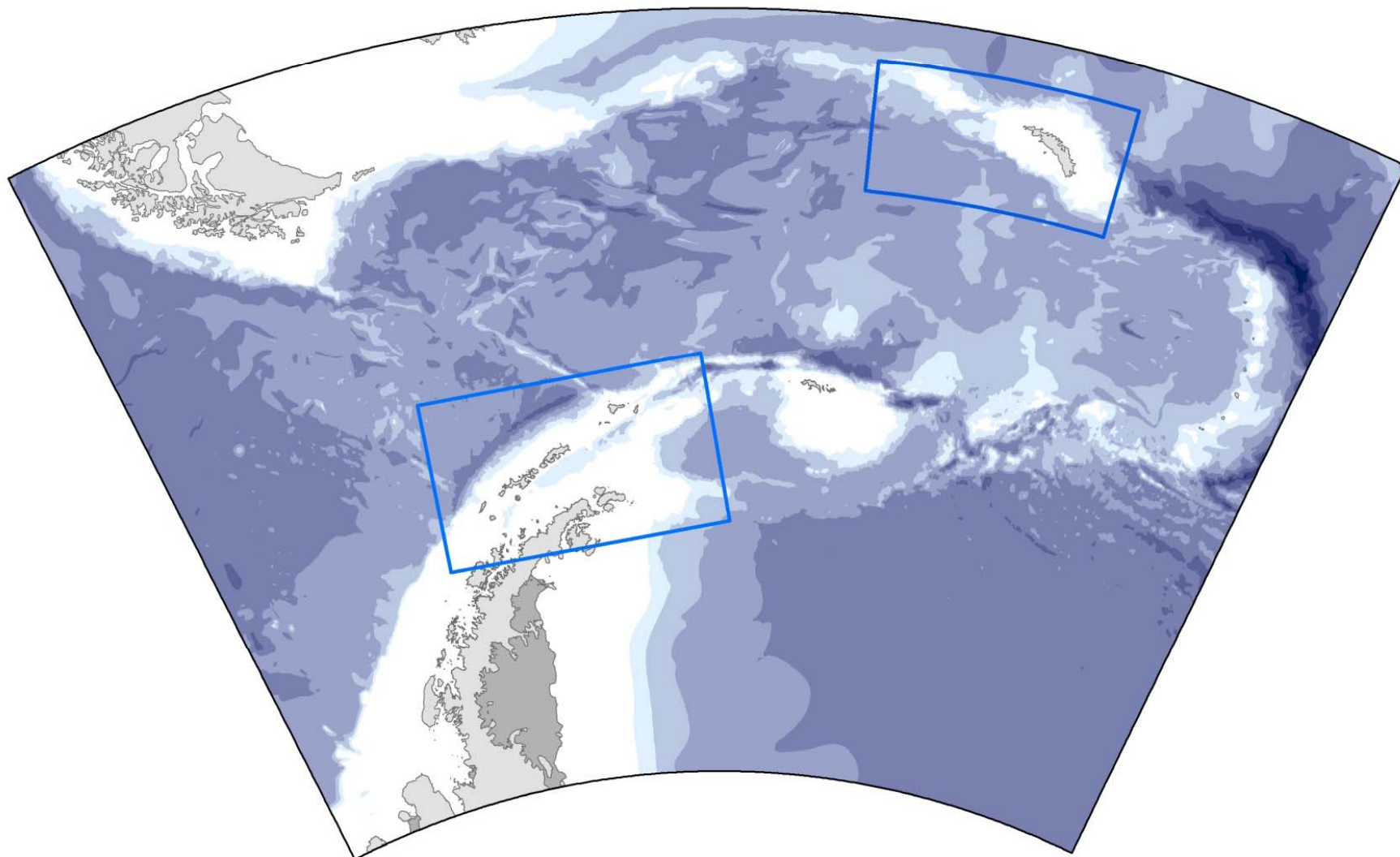


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South Shetland Islands

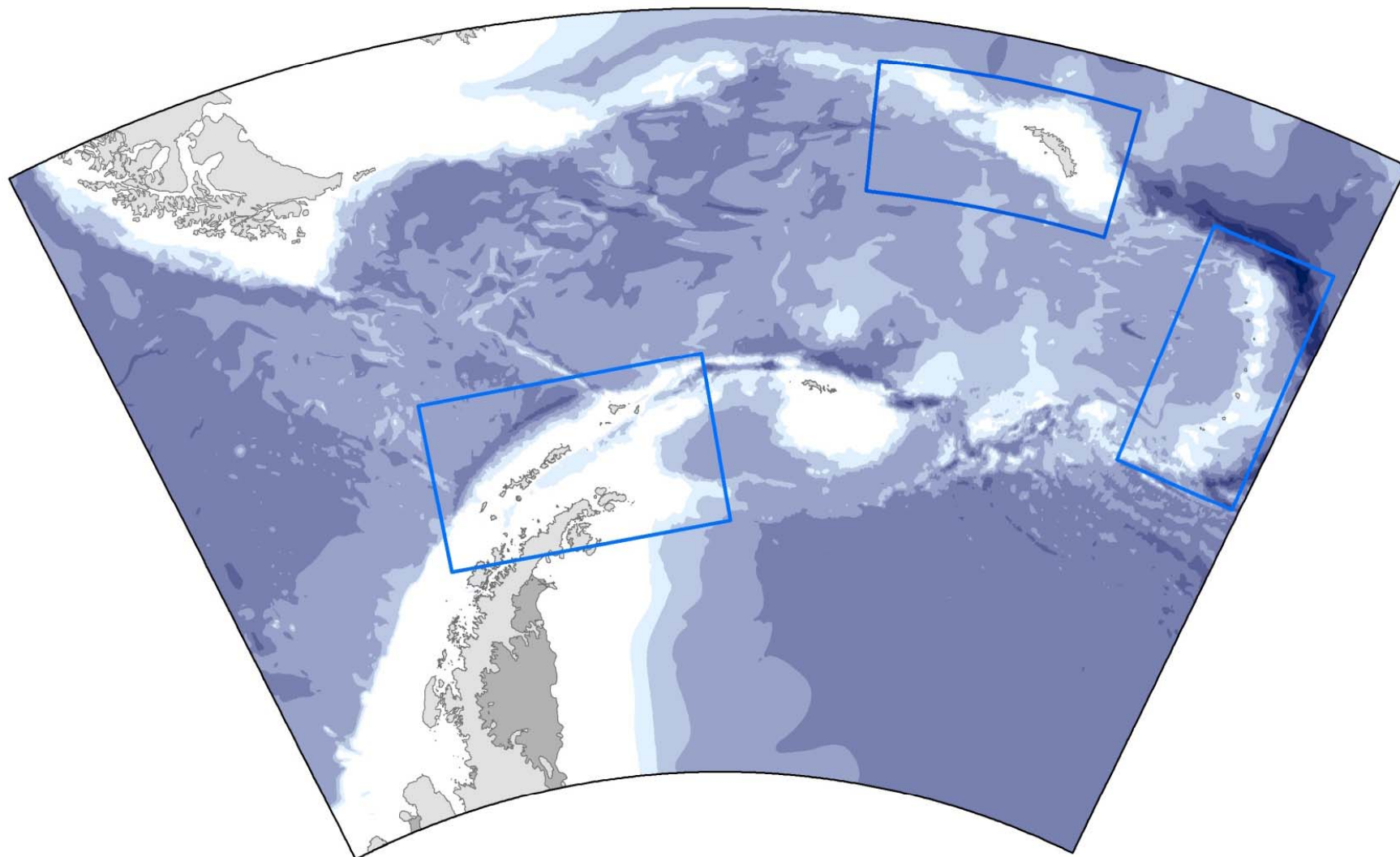


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South Sandwich Islands



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Development

- SGBD provided a working methodology
- Source data
 - BAS swath
 - Endurance swath
 - Single beam fisheries data
 - Old BAS single beam data
 - Soundings
 - Gebco



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Methodology

- Source data cleaned
- Structured hierarchy developed and source data clipped to this
- Gridded in ARCGIS using the TOPOGRID algorithm
- Spikes assessed using
 - maximum slope
 - Visual 3D interpretation
- Cleaned iteratively



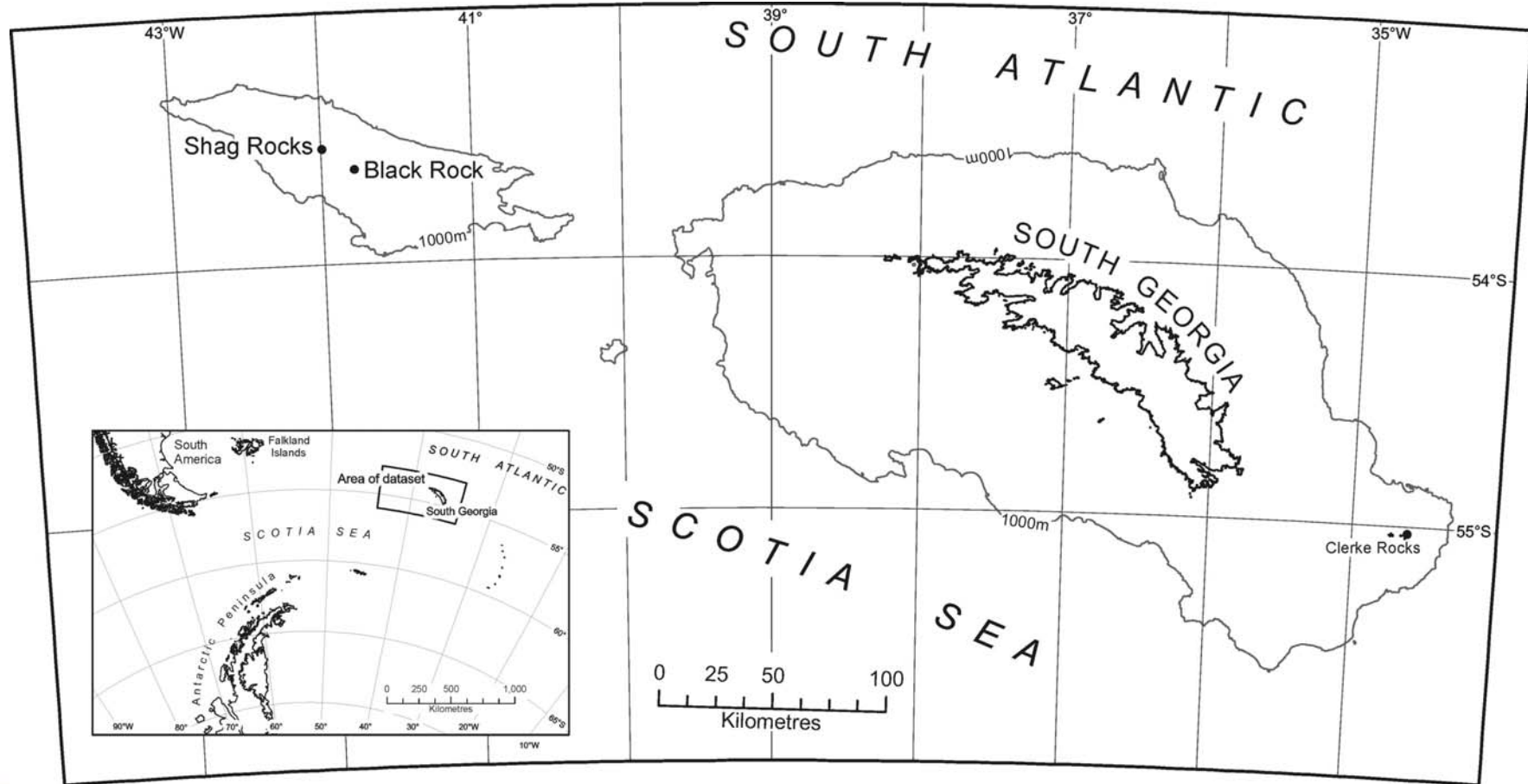
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SGBD area



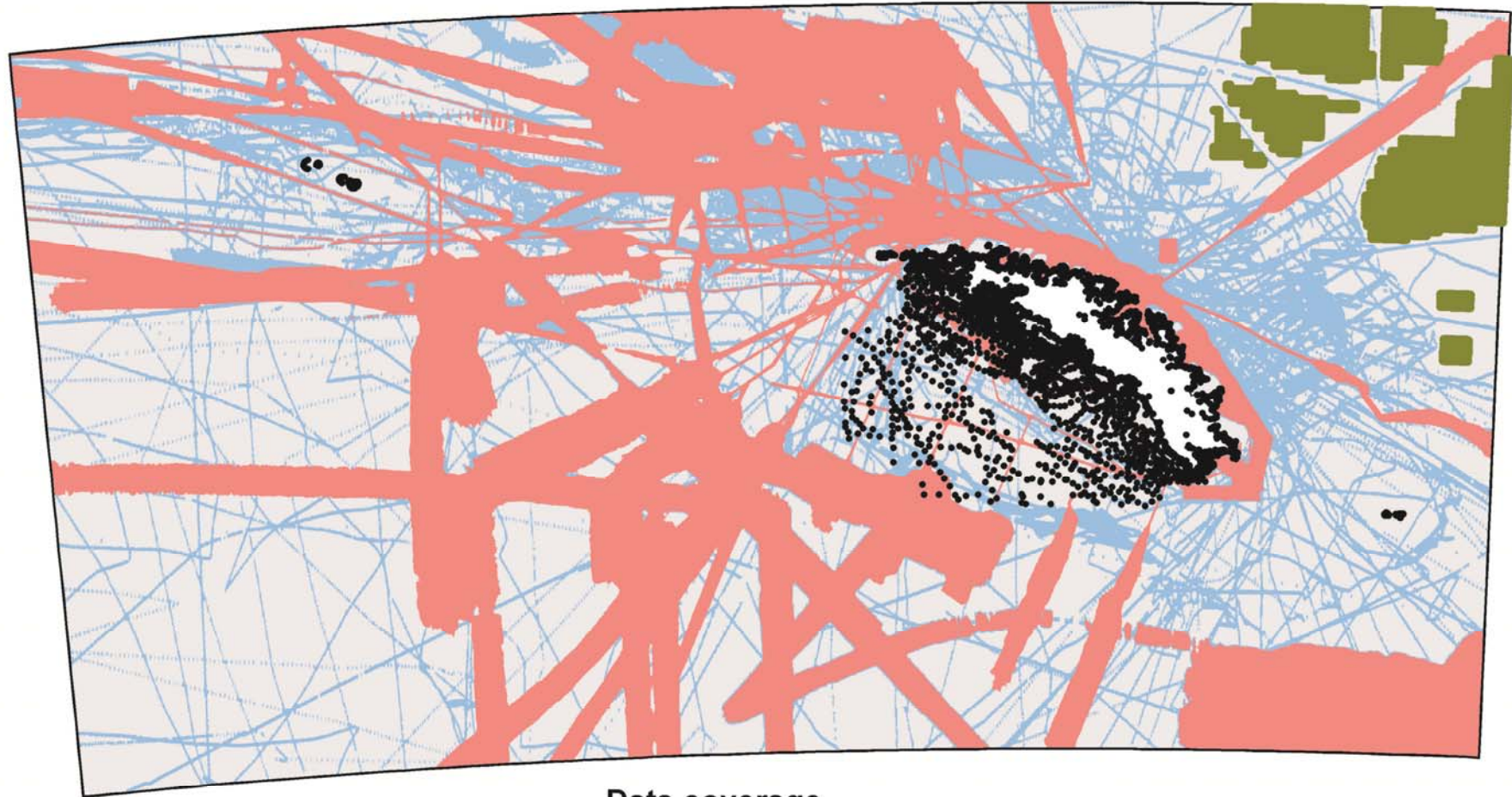
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SGBD coverage

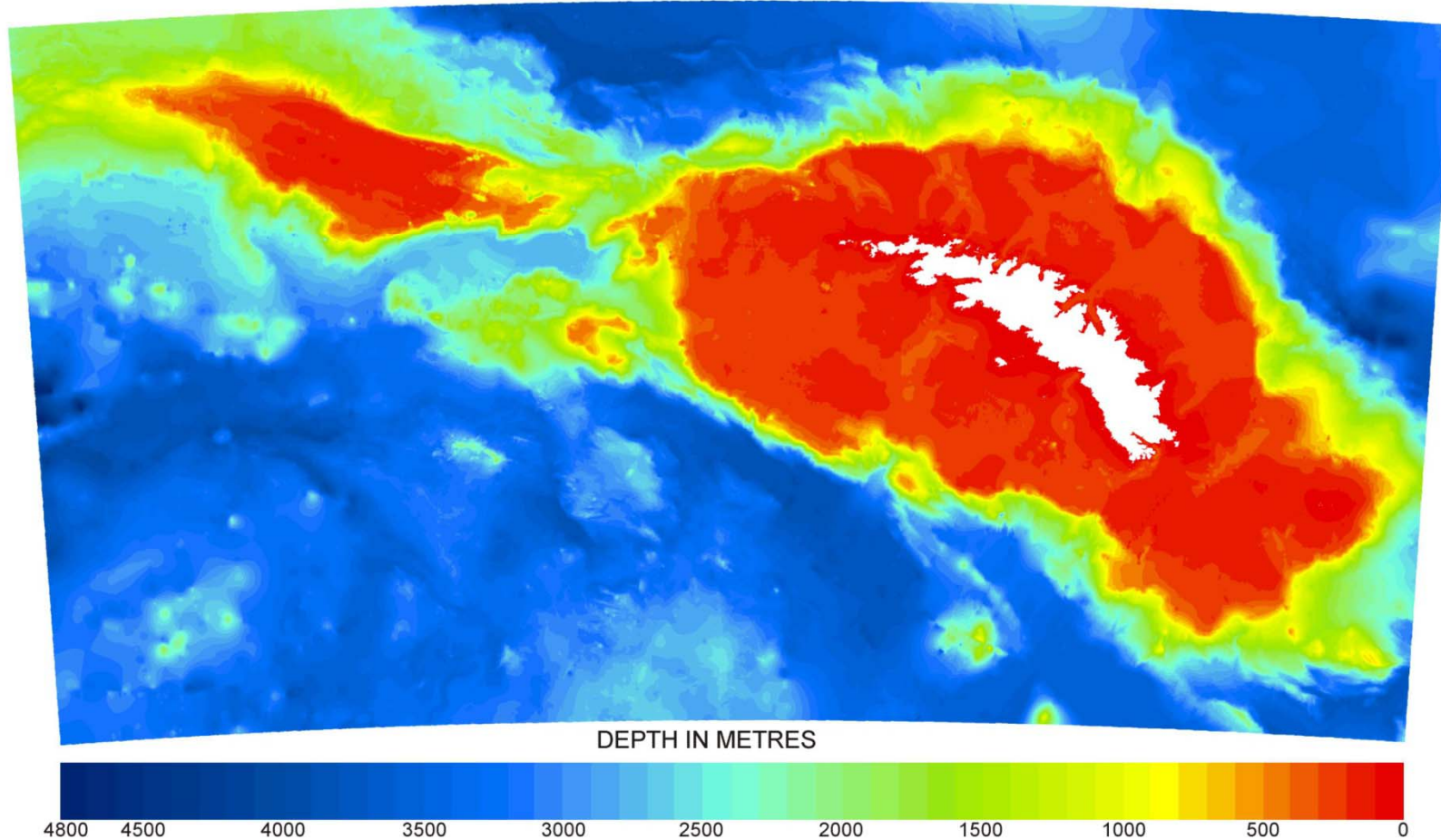


Data coverage

- Multibeam
- Singlebeam
- Gebco 2003
- HO Soundings and coast data
- data interpolation

SGBD result

150m resolution grid published in 2008



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- 3 Scientific publications,

Antarctic Science page 1 of 4 (2008) © Antarctic Science Ltd 2008

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Compilation of a new bathymetric dataset of South Georgia

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Abstract: We introduce a new bathymetric compilation of the area around South Georgia in the Southern Ocean. Using a variety of data sources including multi and single-beam swath bathymetry we have constructed a gridded bathymetric dataset of the shelf and near-shelf sea-floor areas. The grid has been constructed using a layered hierarchy dependent upon accuracy of each dataset. The spikes and errors have been checked both manually and with a novel semi-automated process. We discuss the resulting bathymetry and the potential uses of the new dataset.

Received 5 June 2008, accepted 17 October 2008

Key words: grid, oceanography, Scotia Sea, Southern Ocean

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REVISED ESTIMATES OF THE AREA OF THE SOUTH GEORGIA AND SHAG ROCKS SHELF (CCAMLR SUBAREA 48.3)

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Abstract

A new South Georgia Bathymetric Dataset (SGDB) was compiled from a variety of primary sources including multi-beam swath bathymetry. Sea floor area (km² <500 m depth) within CCAMLR Subarea 48.3 was calculated using this new dataset. Total sea floor area within the region closely matched existing estimates derived from nautical charts (and single-point sounding data). However, the reliability of existing sea floor area estimates was found to vary spatially and between different depth strata. The new dataset is considered the most accurate and reliable currently available and should be used for future assessments and for assisting with the stratification of surveys.



A new bathymetric compilation highlighting extensive paleo-ice sheet drainage on the continental shelf, South Georgia, sub-Antarctica

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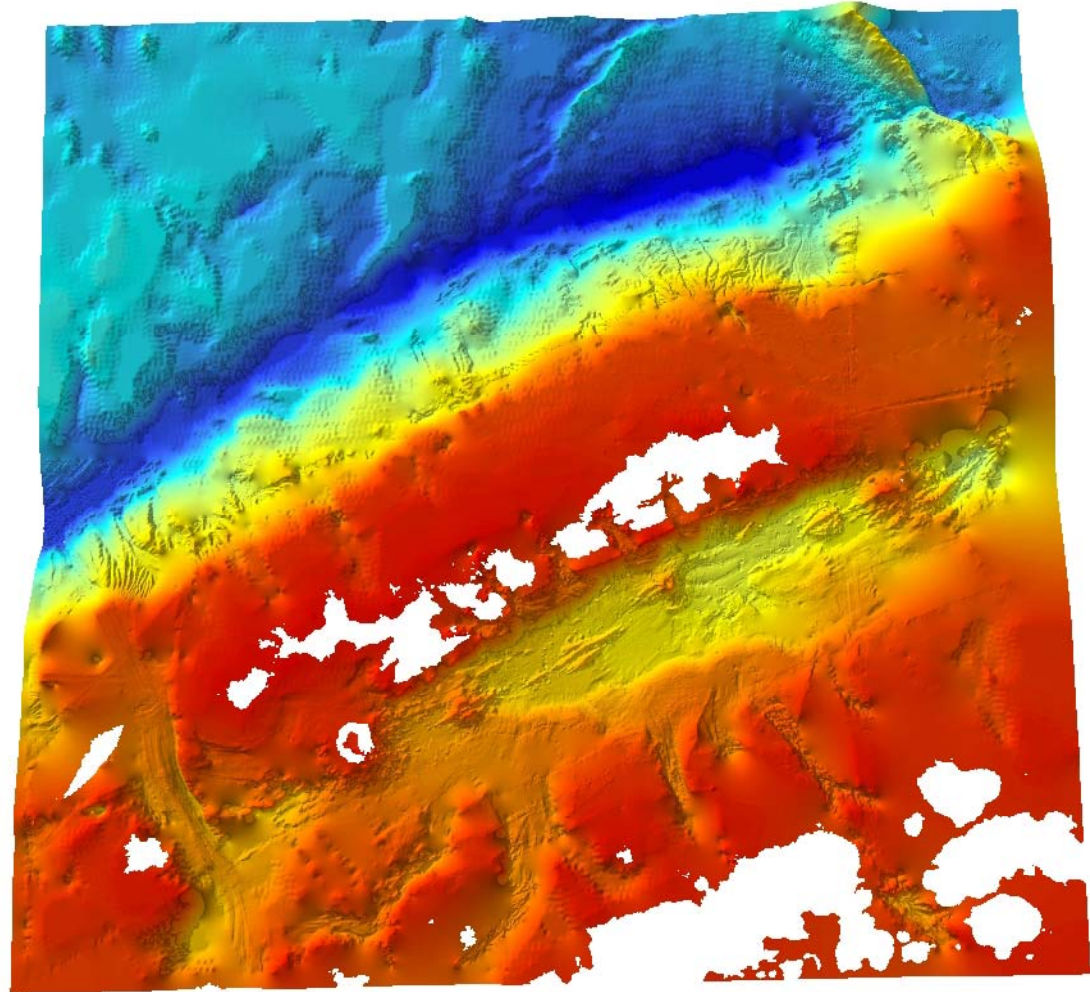
[1] A grid derived from a new compilation of marine echo-sounding data sets has allowed us to visualize and map the geomorphology of the entire continental shelf around South Georgia at an unprecedented level of detail. The grid is the first continuous bathymetric data set covering South Georgia to include multibeam swath bathymetry and represent them at a subkilometer resolution. Large and previously undescribed glacially eroded troughs, linked to South Georgia's modern-day fjords, radiate from the island, marking the former pathways of large outlet glaciers and ice streams. A tectonic or geological influence is apparent for the major troughs, where glaciers have exploited structural weaknesses on the continental block. Bed forms lining the troughs give some first insights into glacial dynamics within the troughs, suggesting arteries of fast flowing ice occupied these topographic depressions in the past and operated over both bedrock and sedimentary substrates. On the outer shelf and within the troughs, large ridges and banks are also common, interpreted as terminal, lateral, and recessional moraines marking former positions of ice sheets on the shelf and their subsequent reorganization during deglaciation. A small trough mouth fan has developed at the mouth of at least one of the cross-shelf troughs, demonstrating a focused sediment delivery to the margin. Slides and slide scars are also present on parts of the margin, showing that margin stability, perhaps also related to glaciation, has been an important factor in depositional processes on the continental slope.



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South Shetland Island Grid

- Compiled from a mix of freely available swath
- Includes new data from HMS Scott
- No single beam
- Coverage good in Bransfield Strait but poor on the northern shelf



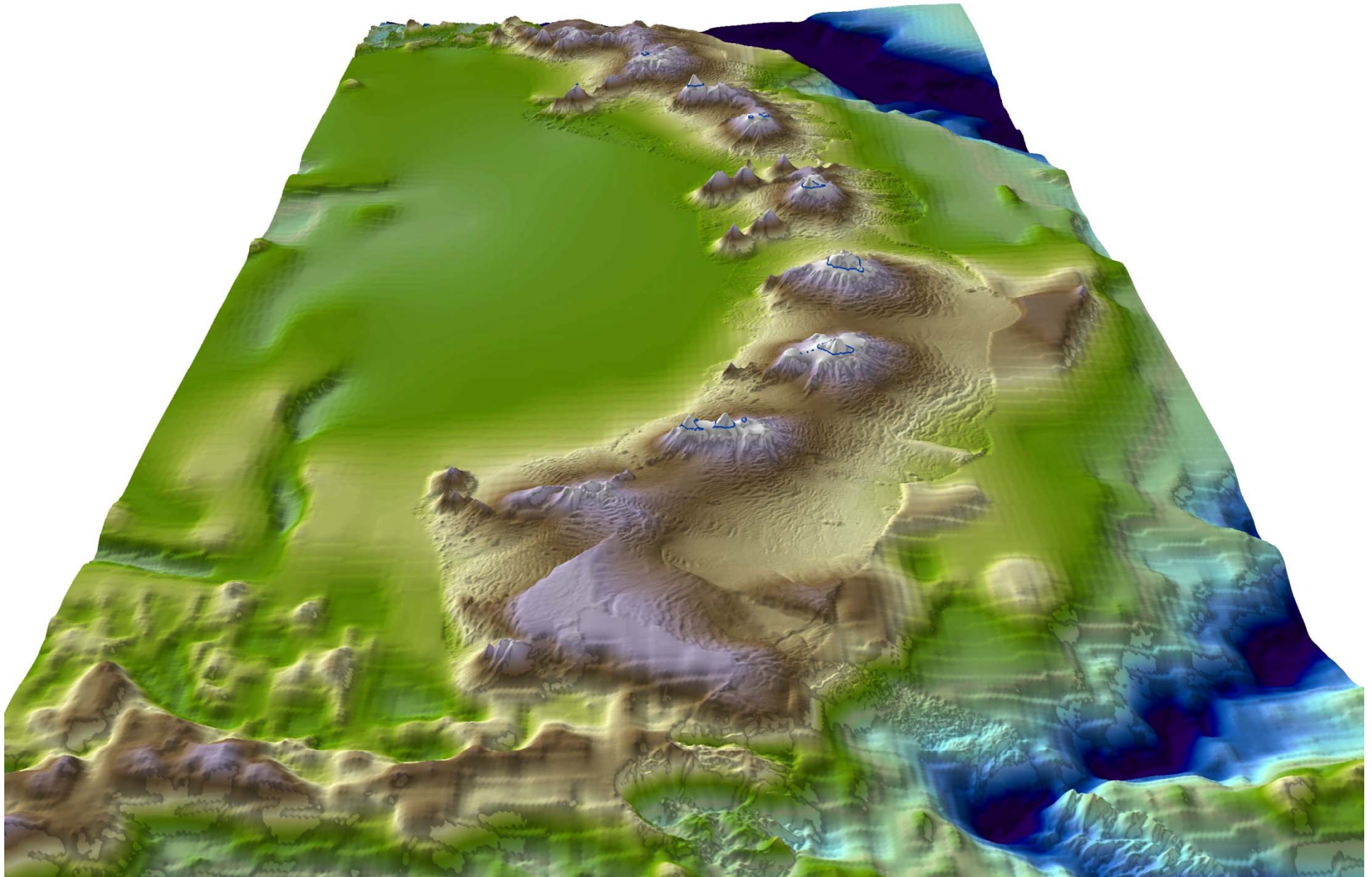
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South Sandwich Island Grid



Other possible areas?

- Scotia Sea map
- South Orkney Island Marine Protected Area?
- Antarctic Peninsula?



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