International Conference on

Seafloor Landforms, Processes and Evolution

Lipari, Italia

1–3 July 2024

The ISOBATA Project: A FAIR-Compliant Approach to Bathymetric Data Collection for Seabed Coverage in the Antarctic Region

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The ISOBatA project, funded by the Italian National Antarctic Research Program (PNRA), aims to optimize underway bathymetric data collection in the Antarctic region. This initiative supports the Seabed2030 and the International Bathymetric Chart of the Southern Ocean (IBCSO) projects by allocating dedicated ship time of the R/V Laura Bassi to navigate (1) along designated corridors in uncharted regions of the Southern Ocean, including the Emerald Fracture Zone and the Macquarie Triple Junction, and (2) among yearly monitored locations of the Ross Sea.

ISOBatA emphasizes the reuse of existing datasets using the IBCSO coverage map and metadata from prior PNRA expeditions. It also aims to establish best practices and workflows for high-quality bathymetric data acquisition, processing, analysis, and archiving.

Bathymetric data collected over the last three PNRA expeditions were integrated with other datasets (e.g., magnetometric, sub-bottom profiling, and oceanographic data) to create maps and validate the approach. Significant discrepancies (up to 1200 meters) were found along the Emerald Fracture Zone in an area where the IBCSO contains only predicted satellite bathymetry, highlighting gaps in our understanding of geodynamic processes. In the Ross Sea, various submarine landforms were detected, revealing the extent of processes shaping the recent evolution of the Antarctic margin (from bottom currents to ice retreat during the last deglaciation).

The ISOBatA experience, dataset and findings underscore the importance of collaboration among institutions and research groups to share data and resources and how the application of FAIR principles and practices to underway data collection is critical to expand seafloor coverage, especially in remote areas like the Antarctic region.

Keywords: Seafloor mapping, Southern Ocean, Submarine landforms, Open Sciences practices