



**The GIS-based Bathymetric Data Compilation for the
International Bathymetric Chart of the Southern Ocean (IBCSO):
More than a Technical Report**

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on behalf of the IBCSO Editorial Board**

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Abstract

The objective of the regional ocean mapping program and Geosciences Expert Group on the International Bathymetric Chart of the Southern Ocean (IBCSO) is to gain better knowledge of the sea floor topography in the Southern Ocean by compiling available bathymetric data acquired during the past 40 years. Initiated by an ad-hoc working group in 2003 the IBCSO Group started in late 2006.

For the generation of the first International Bathymetric Chart of the Southern Ocean the IBCSO data manager collects and compiles bathymetric data, grids, and maps provided by hydrographic offices, scientific institutions and data centers. The IBCSO database comprises more than 1200 cruises with single-beam data (including 300 from fisheries without tracks), about 140 cruises with multibeam data, and 10 regional bathymetric grid compilations with an overall number of 2 billion data points over a distance of 2.2 million nautical miles. The area covered is the Southern Ocean south of 50°S latitude. In contrast to other proposed northern extends of the IBCSO, e.g. south of 60°S or the Antarctic Convergence, the IBCSO study area south of 50°S includes regions such as the Drake Passage, the Tasman Gateway, and the Kerguelen Plateau as important key regions for paleobathymetric modeling and oceanographic studies.

The workflow starts with the conceptual design and implementation of the IBCSO database entitled Southern Ocean Geographic Information System (SOGIS), followed by assembling of bathymetric, topographic, and related geoscientific data, and preprocessing with quality control. Finally, data merge and data modeling for optimized gridding and contouring lead to IBCSO products including GIS databases, ship track inventories, grids, and maps. The bathymetric data compilation consists of 36,000 files in 740 folders with an overall file size of 220 GB.

The IBCSO technical report lists contributions to the bathymetric and geoscientific database. Track plots and inventories show spatial distribution and variation of data points that went into the grid. The report does not reveal the data heterogeneity in terms of data type, data format, projection, datum, sensor, source, age, description. It describes the processing taken to assemble and implement the database and briefly explains steps taken in the grid optimization and contouring process such as deterministic and geostatistical interpolation methods, TIN construction, Voronoi diagrams and skeletonization. The complex data cleaning in CARIS HIPS and ArcGIS is crucial for a consistent bathymetric database. Tight time schedules associated with limited work force are major deficits in the current data homogenization process.

The IBCSO Version 1-2010 is a first and somehow preliminary result. The Expert Group needs combined efforts for a sustained data transfer and data cleaning process. Additionally advanced gridding and contouring techniques are tested for upcoming IBCSO data products that may have effect on other ocean mapping programs.