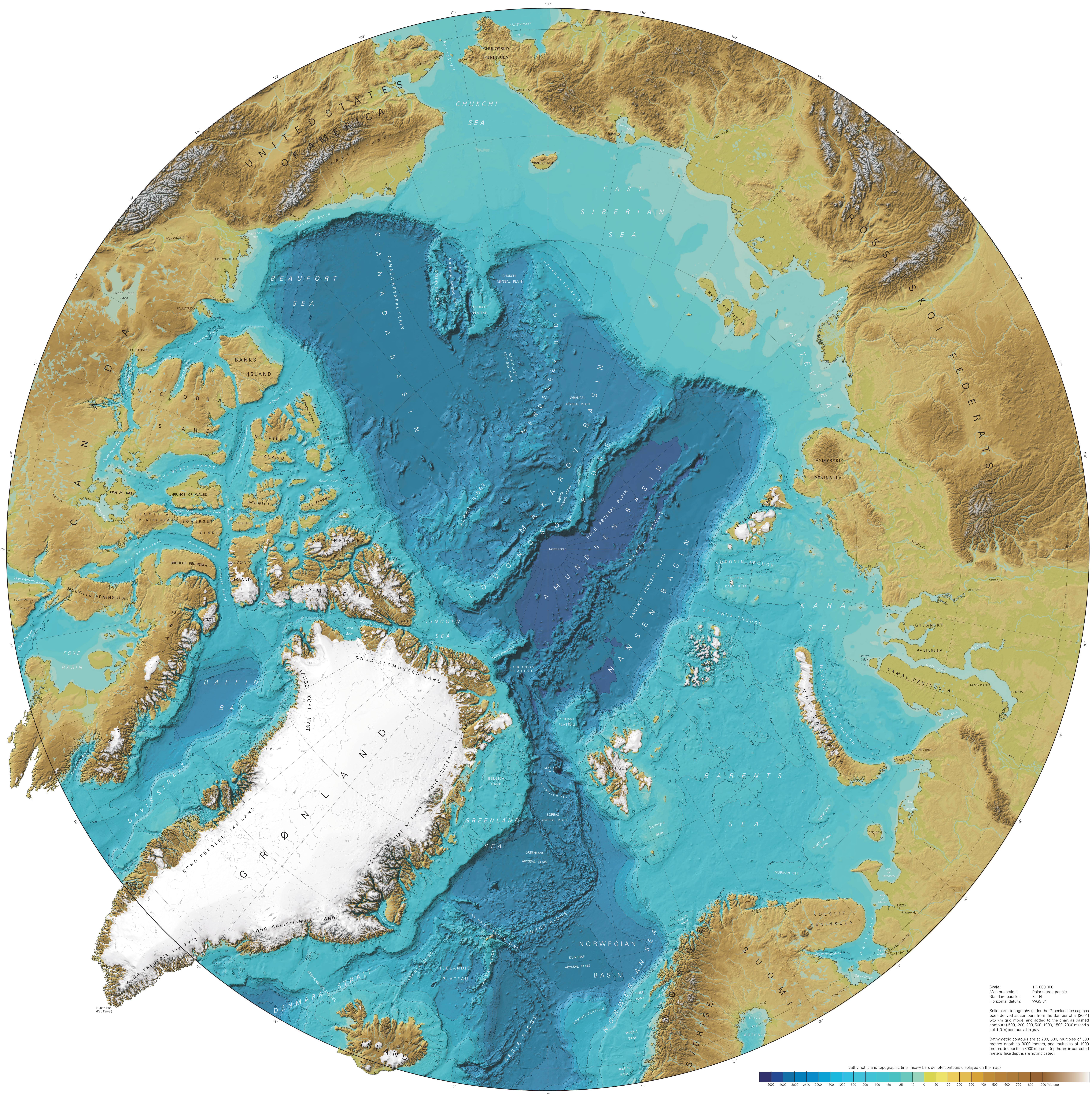

Scale: 1:6 000 000
Map projection: Polar stereographic
Standard parallel: 75° N
Horizontal datum: WGS 84

Solid earth topography under the Greenland ice cap has been derived as contours from the Bamber et al [2001] 5x5 km grid model and added to the chart as dashed contours (-500, -200, 200, 500, 1000, 1500, 2000 m) and a solid (0 m) contour, all in gray.

Bathymetric contours are at 200, 500, multiples of 500 meters depth to 3000 meters, and multiples of 1000 meters deeper than 3000 meters. Depths are in corrected meters (lake depths are not indicated).

Bathymetric and topographic tints (heavy bars denote contours displayed on the map)

-5000 -4000 -3000 -2500 -2000 -1500 -1000 -500 -200 -100 -50 -25 -10 0 50 100 200 300 400 500 600 700 800 1000 (Meters)

THE INTERNATIONAL BATHYMETRIC CHART OF THE ARCTIC OCEAN (IBCAO)

Map Production

Constructed from an assemblage of digital and analog information, this map is a modern version of Sheet 5.17 of the General Bathymetric Chart of the Oceans (GEBCO) [Canadian Hydrographic Service, 1979].

Bathymetric and other information

The information used in the construction of this map consisted of: historic and recent under-ice soundings collected by submarines of the United States and the United Kingdom; historic and recent observations collected by icebreakers and drifting ice stations; and information portrayed in published navigation and compilation charts. The locations of these data sets are shown in separate source distribution maps, while data contributors and relevant references are listed in this legend under "Data Contributions".

Although extensive, in some areas the database of digital trackline and spot observations contained critical gaps that had to be augmented with information that was only available on paper maps and charts. In the central Arctic Ocean, original observations were augmented with contour information derived from a map published by the Russian Federation Navy [Head Department of Navigation and Oceanography et al., 1999]. Similarly, contours extracted from maps published by the Geological Society of America [Perry et al., 1986; Cherkis et al., 1991; Matishov et al., 1995] were used in Bering Strait and in the Barents and Kara Seas. On the continental shelf adjacent to Siberia, soundings were extracted from a suite of navigational charts published by the Russian Federation Navy, and used to develop contours. Bathymetry in the Gulf of Bothnia was derived from a compilation by Seifert and Kayser [1995]. Contours were extracted from the GEBCO Digital Atlas (GDA) [IOC, IHO, and BODC, 1997] to supplement the database in the southern Norwegian-Greenland Seas, in Baffin Bay, and in some areas of the Canadian Arctic.

Land relief was derived from the USGS GTOPO30 topographic model [U.S. Geological Survey, 1997], with the exception of Greenland, where the model developed by the Danish National Survey and Cadastre (KMS) was used [Ekholm, 1996], and Alaska, where release 1.1 of the GLOBE topographic model was used [GLOBE Task Team, 1999]. Coastline definition was provided by the World Vector Shoreline (WVS) in all areas except Greenland and northern Ellesmere Island, where an updated coastline was available from KMS.

Methods

Original soundings were corrected for sound velocity using Carter's Tables, or CTD (Conductivity, Temperature and Depth) profiles where available. Subsequently, all data (digitized isobaths; land and marine relief grids; point, profile and swath observations; and vector shorelines) were imported into Intergraph's Geomedia Professional, with projection parameters set to polar stereographic on the WGS 84 ellipsoid, and with true scale at 75° N. Outliers, cross-track errors, and the fit between isobaths and original observation data were checked. Suspicious soundings were removed and, where contours showed major discrepancies with soundings, the contours were adjusted manually to agree with trackline data.

After inspection all data sets were exported to an XYZ coordinate system for further manipulation with GMT (Generic Mapping Tools) public domain software [Wessel and Smith, 1995]. Initially, the data sets were pre-processed with the GMT block-median filter, after which they were gridded at a cell size of 2.5 x 2.5 km by fitting a surface of continuous curvature to all points with a tension parameter set to 0.35. The resulting grid was exported to Intergraph's MGE Terrain Analyst (MTA) for detailed inspection, and for the identification of discrepancies that had to be addressed in the input data set. The data were then regridded and reinspected for residual discrepancies. This process was repeated until the results were judged to be satisfactory.

Final visualization of the gridded data was performed by means of the Fledermaus software for three-dimensional visualization. Artificial illumination was applied to the grid in order to produce a realistic rendering of relief on the seafloor and on the surrounding land. This procedure also emphasized minor data problems that had escaped previous corrections, such as isolated observation errors and mis-levelled track segments. These were eliminated from the map image.

Grid Availability and Format

The grid that was used for the construction of this map can be obtained in two forms: Cartesian with a cell size of 2.5 x 2.5 km at 75°N, and Geographic with a cell size of one minute of latitude by one minute of longitude. These grids, along with detailed descriptions of their formats and the techniques employed in their preparation, can be downloaded at: http://www.ngdc.noaa.gov/mgg/bathymetry/arctic/arctic.html

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Data Contributions

The IBCAO compilation is based upon data sets that were acquired and/or provided by the organizations listed below, and which were made available through individuals whose names are shown. References are also listed for the published maps and digital compilations that were used. We thank the contributors of these data sets for their assistance in making this compilation possible.

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Head Department of Navigation and Oceanography, All-Russia Research Institute for Geology and Mineral Resources of the World Ocean (VNIIOkeangeologia), and Russian Academy of Sciences, 1999, Bottom relief of the Arctic Ocean: Head Department of Navigation and Oceanography, St. Petersburg, Russia, scale 1:5,000,000.

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Matishov, G. G., Cherkis, N. Z., Vermillion, M. S., and Forman, S. L., 1995, Bathymetry of the Franz Josef Land Area: Geological Society of America Map and Chart Series, MCH080, Boulder, Colorado, scale 1:500,000.

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U.S. National Geophysical Data Center, National Oceanic and Atmospheric Administration, Boulder, Colorado.

Contributing Organizations

Canada	Canadian Hydrographic Service
	Geological Survey of Canada
Denmark	Royal Danish Administration of Navigation and Hydrography: Nielsen, A.
Germany	Alfred Wegener Institute
Iceland	Icelandic Hydrographic Service
Norway	Norwegian Petroleum Directorate
Russia	Head Department of Navigation and Oceanography
	VNIIOkeangeologia
Sweden	Stockholm University
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	Swedish Polar Secretariat: Karlqvist, A.
United Kingdom	Royal Navy Submarine Force
United States	Lamont-Doherty Earth Observatory: Hunkins, K., Coakley, B., Langseth, M., and Hall, J.K.
	National Geophysical Data Center: Sharman, G. and Loughridge, M.S.
	Naval Research Laboratory: Crane, K., Fleming, H. S., Cherkis, N.Z., and Kovacs, L. C.
	U.S. Geological Survey: Grantz, A.
	U.S. Navy Submarine Force

Key Software Applications

GMT (Generic Mapping Tools):	Wessel, P., and W. H. F. Smith, 1995, New Version of the Generic Mapping Tools Released, EOS Trans. AGU, 76, 329.
IVS (Interactive Visualization Systems):	Fledermaus 3D visualization and analysis software
Intergraph:	Geomedia Professional, MGE Terrain Analyst (MTA)