GIS Tools for Accessing Arctic Bathymetry: International Bathymetric Chart of the Arctic Ocean (IBCAO) 

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1. The IBCAO bathymetry model

2. Users of IBCAO

3. GIS tools for accessing the IBCAO grid model

4. Future IBCAO GIS products (Error estimation of the IBCAO bathymetry, vector contours)
IBCAO

Grid model representing Arctic Ocean bathymetry and topography

Grid cell spacing: 2.5 x 2.5 km

Projection: Polar stereographic

True scale: 75° N

Datum: WGS 84

Soundings collected by nuclear submarines during the SCICEX program (1993-1999)

Soundings collected by surface vessels primarily obtained from four archives:

(1) the US National Geophysical Data Center (NGDC)
(2) the US Naval Research Laboratory (NRL)
(3) the Canadian Hydrographic Service (CHS)
(4) the Royal Danish Administration of Navigation and Hydrography (RDANH)

Recent acquisitions provided by agencies that mobilized missions aboard the Swedish icebreaker Oden (1991, 1996) and the German research vessel Polarstern (1990, 1994, 1995, 1997) are also marked in blue.
Contours drawn during this present work in order to facilitate the computer gridding.

Navigational charts published by the Russian Federation's Head Department of Navigation and Oceanography (HDNO).

Newly-published Russian map (Head Dep. of Navigation and Oceanography et al., 1999).

Bathymetry in the Gulf of Bothnia was derived from a digital grid compiled by Seifert and Kavser (1995).

Charts published by the US Naval Research Laboratory (Perry et al., 1985; Cherkis et al., 1991; Matishov et al., 1995).

Contours retrieved from GEBCO Digital Atlas.

Greenland DTM developed by KMS, the Danish Cadaster and Mapping Agency (Ekholm, 1996).

GRID COMPILATION

Data gathering (MGE)

Data cleaning & mining (MGE)

Gridding using continuous curvature splines in tension (Smith & Wessel, 1990)

Block median filtering
IBCAO web site:
http://www.ngdc.noaa.gov/mgg/bathymetry/arctic/arctic.html
**USERS OF THE IBCAO BATHYMETRY GRID**

**Oceanography modeling** (e.g. Arctic ice-ocean model for the Polar Ice prediction System (PIPS), US Naval Postgraduate School; ARCICE, Southampton Oceanography Centre, UK)

**Geophysical modeling**

**Ice sheet modeling**

**Cartographic applications**

**IBCAO web site news:**
February, 26 652 accesses and 99297 hits
GIS Tools for accessing the IBCAO model

ESRI: ArcView, ArcInfo (Spatial Analyst, Arc Grid)

Intergraph: MGE (Terrain Analyst)

Geomedia (MFworks from ThinkSpace Inc.)

Clarks Labs: Idrisi32

Caris: HIPS
Geophysical and Mapping softwares

IVS: Fledermaus

Public domain: Generic Mapping Tools

Web GIS tools

Intergraph: Geomedia Web Map

ESRI: ArcIMS3
Regional grid models representing bathymetry/topography are often used as a base for oceanographic/climate/geophysical/ice sheet modeling. The modeling results are often interpreted without knowledge of the spatial differences in reliability of the underlying bathymetry/topography model. The idea is to create a grid with the same structure as the bathymetry/topography grid containing an estimate of the standard deviation of the errors of the bathymetry/topography.
USING THE MONTE CARLO METHOD FOR ERROR ESTIMATION

1. Randomly vary the source data within constraints determined by meta data (navigation, echo sounder etc)

2. Go through the process with which the bathymetry grid is compiled (block median filtering + continuous curvature splines in tension)

This processes are continued until........
Standard deviation of estimated error
(% of block median depth)
IBCAO contours in Geomedia