

The International Bathymetric Chart of the Arctic Ocean (IBCAO) *A New Direction for Ocean Mapmaking*

Ron Macnab

*Geological Survey
of Canada (Retired)*

Martin Jakobsson

*University of New
Hampshire*

Herman Varma

*Canadian Hydrographic
Service*

Project sponsors

International Arctic Science Committee (IASC)

International Hydrographic Organization (IHO)

Intergovernmental Oceanographic Commission (IOC)



Other funders: US Office of Naval Research, Swedish Polar Secretariat

Organization of this presentation

- **Part I. Ron Macnab: How we built IBCAO and what we learned**
- **Part II. Martin Jakobsson: Looking beneath the ice - views of a digital dataset**

IBCAO: project objectives

- **Create a coherent digital database of depth values north of 64°N**
- **Develop an accurate numerical model of the seabed**
- **Construct realistic portrayals of bathymetry and morphology**

IBCAO participants and their affiliations



Geological Survey of Canada
Canadian Hydrographic Service



Royal Danish Administration of Navigation and Hydrography



Alfred Wegener Institute



Icelandic Hydrographic Service



Norwegian Petroleum Directorate



Head Department of Navigation and Oceanography
VNIIOkeangeologia



Stockholm University



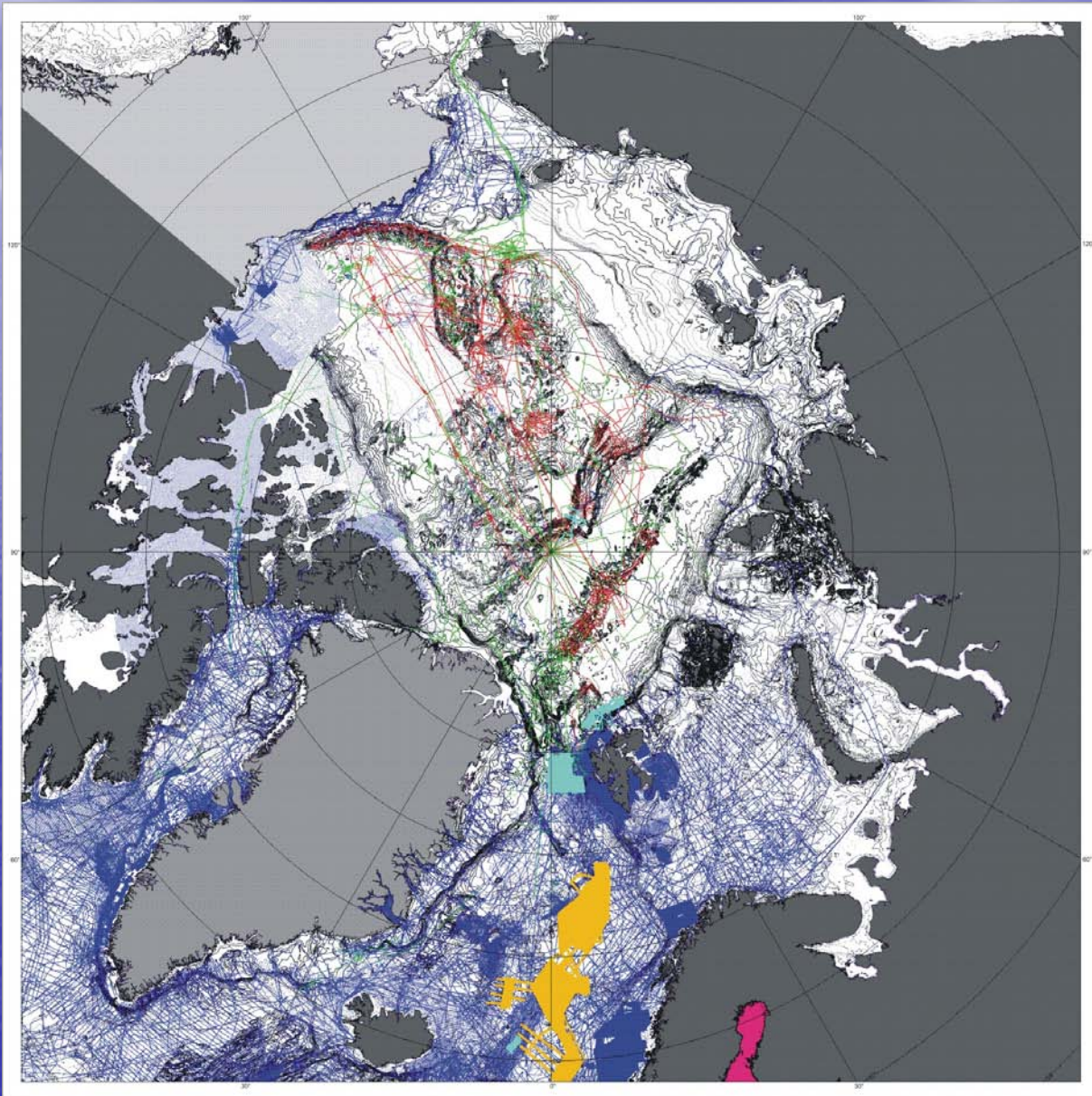
Five Oceans Consulting; NGDC; Arctic Submarine Laboratory;
Tulane University; University of New Hampshire

IBCAO: project milestones

- **1997** (St. Petersburg): Appointment of IBCAO Editorial Board
- **1999** (Stockholm): Creation of first grid and map
- **2000**: Publication of Provisional Map and release of Beta Grid via Internet
- **2002** (Durham): Construction of proposed GEBCO Prototype
- **2003** (Nice and Monaco): Public unveiling of proposed GEBCO Prototype

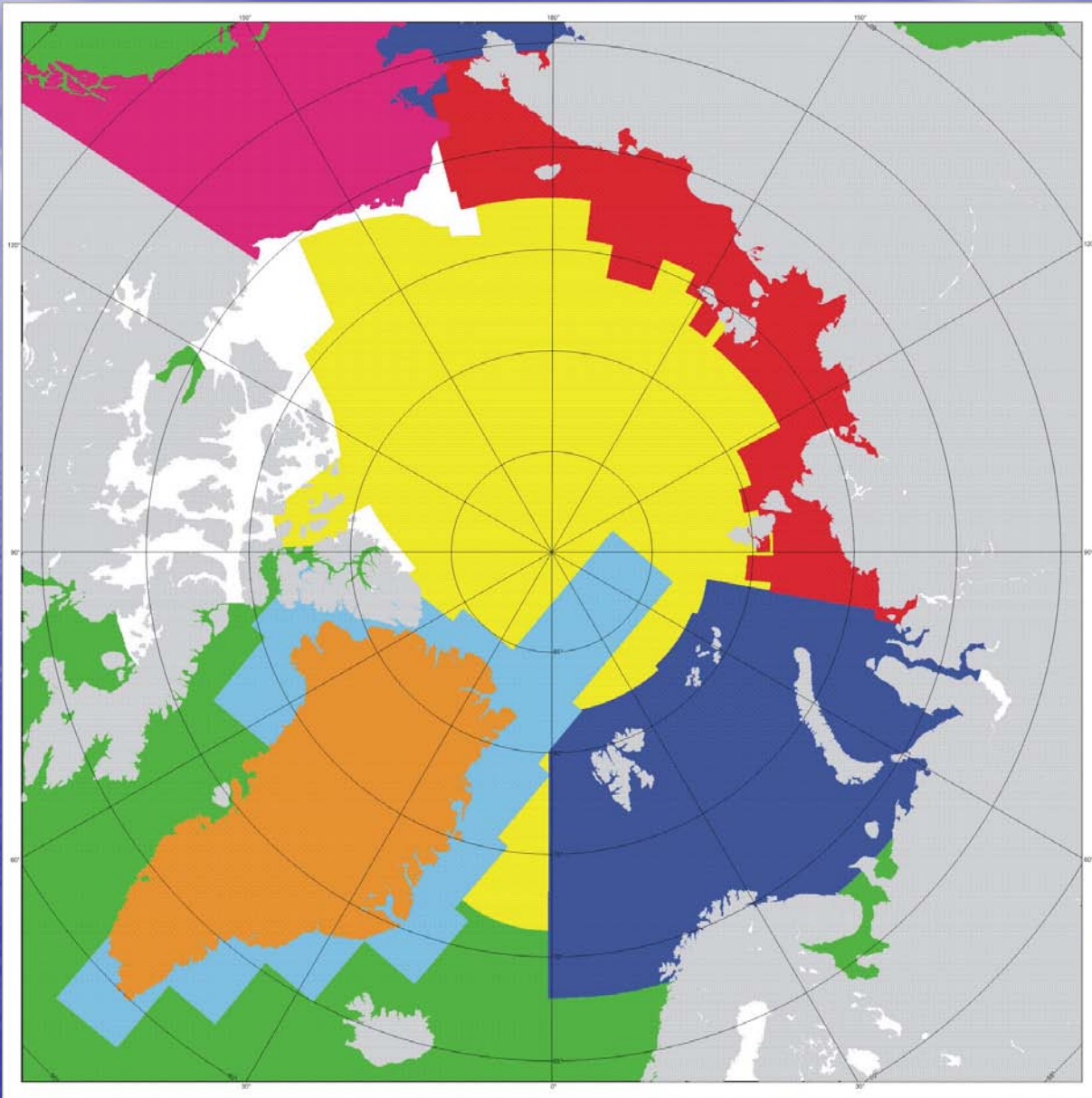
IBCAO: distribution of data points

1.7 million original soundings (excluding multibeam), 2 million isobath nodes

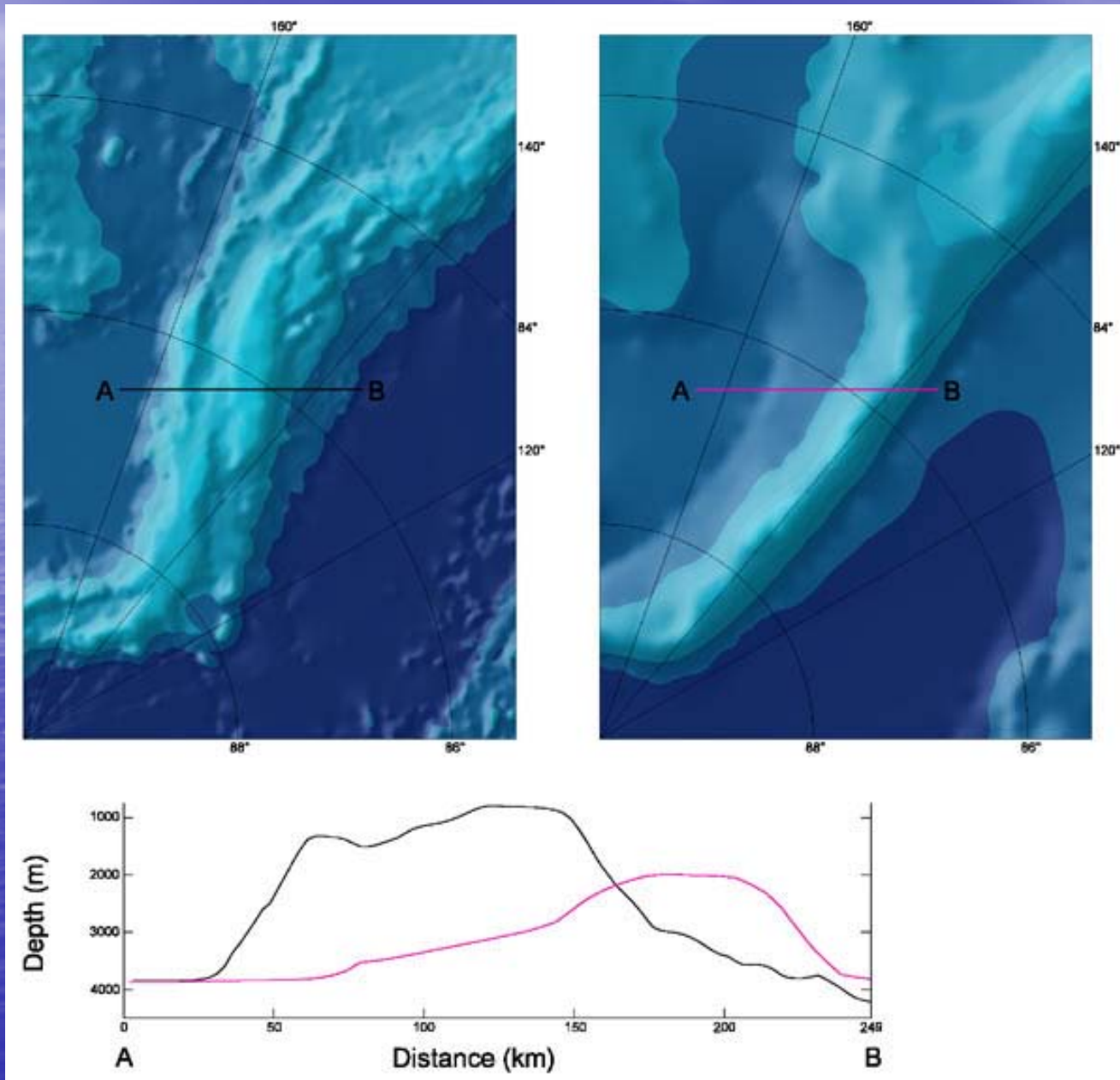


IBCAO: source contour maps

Providing isobaths to complement original soundings in critical areas



IBCAO and GEBCO: Lomonosov Ridge



The IBCAO project website

<http://www.ngdc.noaa.gov/mgg/bathymetry/arctic/arctic.html>

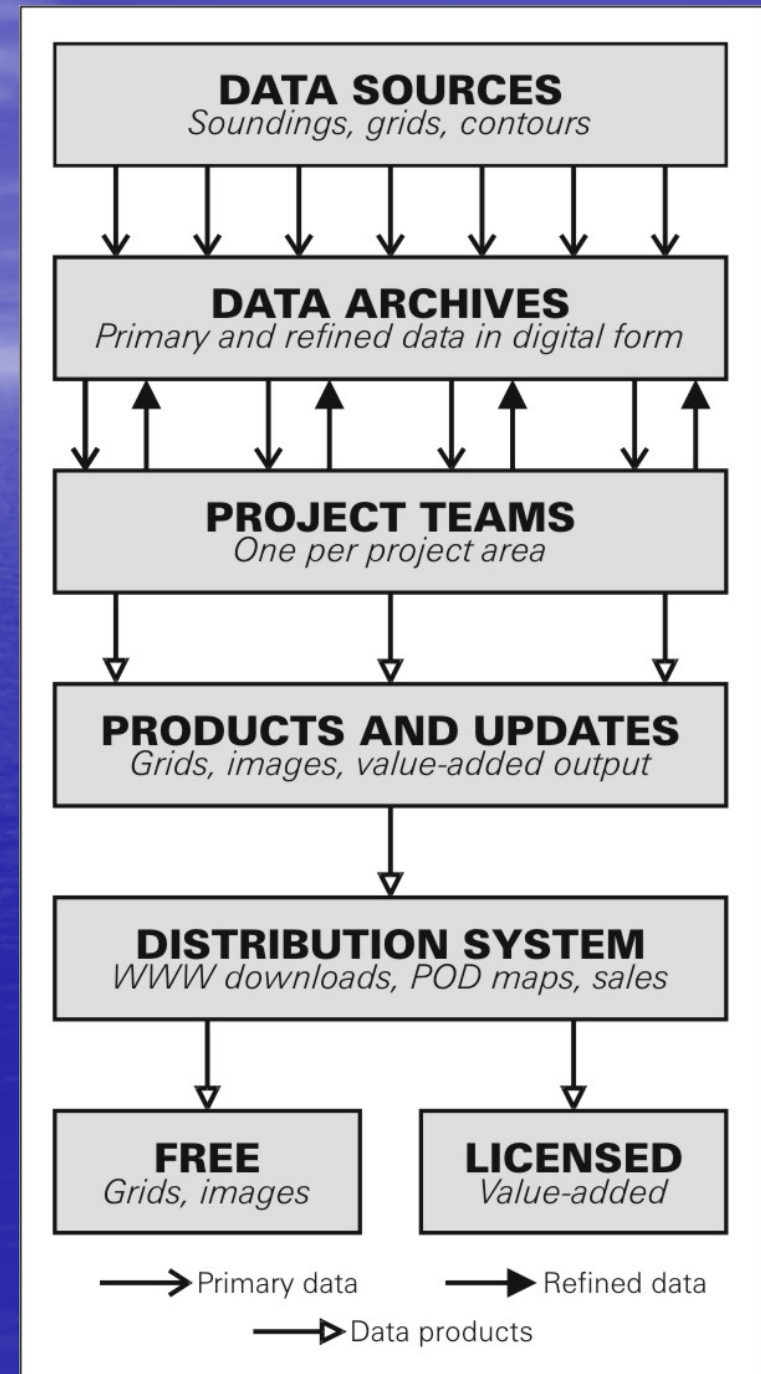
- Technical and organizational documentation
- Grids
- Selected images
- Links to related sites
- **100,000 visitors in 2002, 50 gigabytes downloaded**

IBCAO: some useful considerations for future compilation and mapmaking

- **Use digital data and methodologies at all stages**
- **Integrate with other initiatives (IBCs, RHCs)**
- **Adopt larger, self-contained project areas**
- **Develop Value-Added Products (VAPs)**
- **Pursue innovative approaches to product distribution**

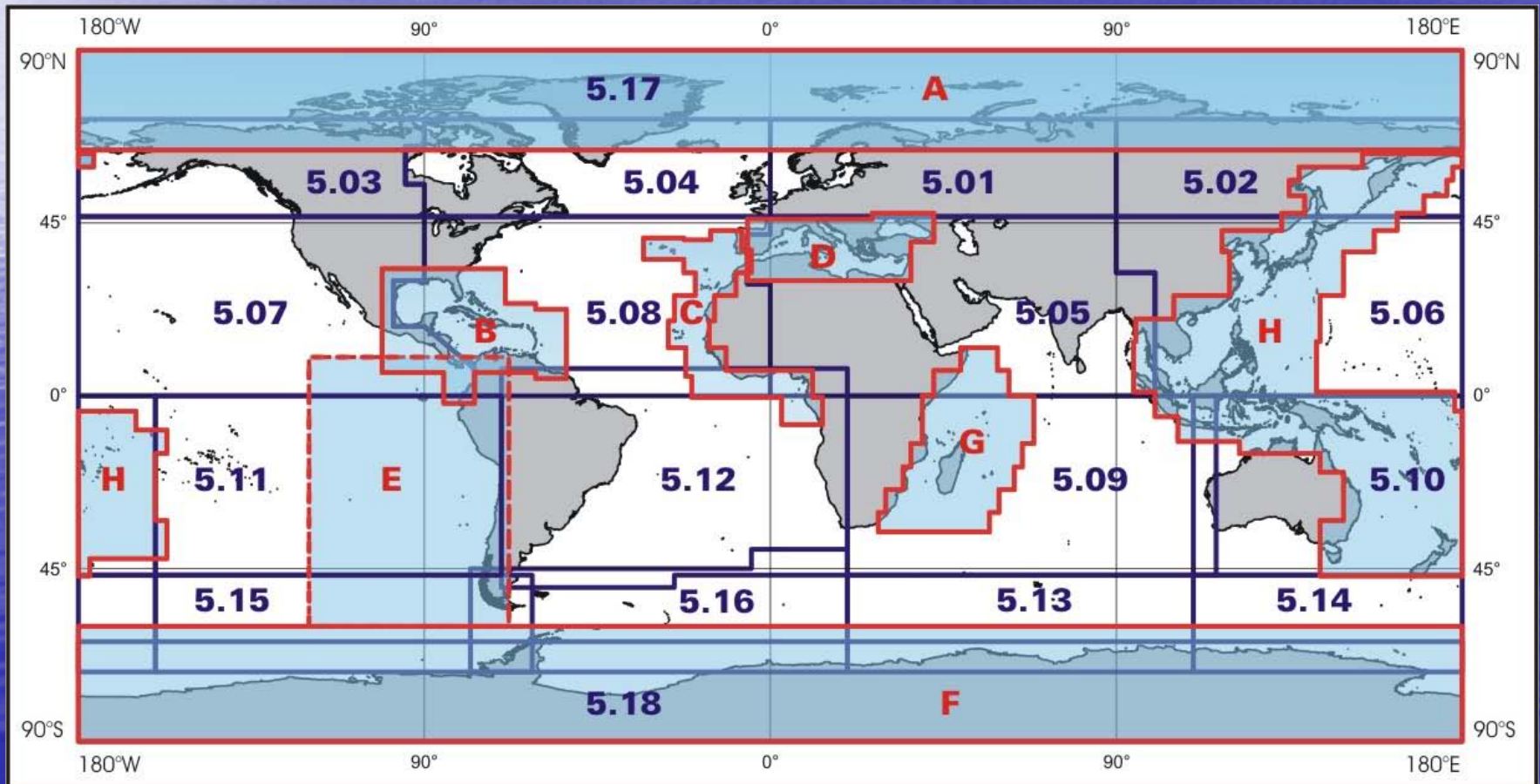
IBCAO: useful consideration # 1

- Use digital data and methodologies at all stages
 - Unmatched flexibility in data handling and maintenance
 - Free of scale and presentation constraints
 - Primary objective: build accurate mathematical model of seabed
 - Byproducts: contour lines, printed maps
 - Suggested flow of data and data products → → → → →



IBCAO: useful consideration # 2

- Integrate with other initiatives (IBCs, RHCs)
 - Minimize duplication
 - Maximize compatibility of outputs
 - Merge project teams and areas to reduce overhead



IBCAO: useful consideration # 3

- **Adopt larger, self-contained project areas**
 - Arctic Ocean
 - Indian Ocean
 - Mediterranean and Black Seas
 - North Atlantic Ocean
 - South Atlantic Ocean
 - North Pacific Ocean
 - South Pacific Ocean
 - Southern (circum-Antarctic) Ocean
- **Consistent data treatment over large areas**

IBCAO: useful consideration # 4

- **Develop Value-Added Products (VAPs)**
 - Print On Demand (POD) maps, standard and custom
 - Digital Bathymetric Chart (DBC)
 - Expansion of GDA
 - Fusion of bathymetry with other georeferenced information, e.g. IHO Gazetteer, Limits of Seas and Oceans, maritime boundaries, geological/geophysical parameters, etc, etc.
 - Bundled functionalities for innovative data manipulation and visualization

IBCAO: useful consideration # 5

- **Pursue innovative approaches to product distribution**
 - Exploit speed and ubiquity of the Internet
 - Free distribution for basic grids and selected imagery
 - Licensed distribution for Value-Added Products (VAPs) and updates
 - Goal: generate revenue to support ongoing operations
 - Marketing approach: promote volume sales by offering quality products at low prices
 - A suggested GEBCO business model for the 21st Century:
 - GEBCO - a specialized content provider
 - Commercial marketing and distribution handled through partnerships, franchising