SCAR Expert Group on IBCSO
Report to HCA-9

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2. Framework
3. Objectives
4. Report on IBCSO Progress
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6. Deliverables/Outreach/Meetings
7. Next Actions
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Retrospect

- Ad-hoc GEBCO-Meeting in Durham, May 2002
- IBCAO-Meeting in Hawaii, November 2002
- IOC-CGOM @ GEBCO Centenary Conference 2003

- Adoption: XXXVII IOC EC (Res. EC-XXXVII.5), 2004
- Kick-Off Meeting XXVIII SCAR, 2004
  - > SCAR GSSG Expert Group
- Implementation of the IBCSO EG Infrastructure

IBCSO is supported by:

SCAR Standing Scientific Group on GeoSciences (SSG-GS)

Intergovernmental Oceanographic Commission (IOC)

Hydrographic Commission on Antarctica (HCA) of IHO

General Bathymetric Chart of the Oceans (GEBCO)

Primary Goal:

Production of a high quality bathymetric chart of the SO

Marine geodata base for Antarctic sciences

&

Secondary Goal:

combine this DB with existing spatial geophysical, geological, glaciological, oceanographic data sets, etc., forming the Southern Ocean Geographic Information System

Network of institutions & data centers:

AAD: Australian Antarctic Database

AWI: Alfred Wegener Institute & PANGAEA

BAS: Antarctic Digital Database (ADD)

BODC: GEBCO Digital Atlas (GDA)

LDEO: GeoMapApp / AMBS

NGDC: IHO Data Center for Digital Bathymetry

NOAA: National Geophysical Data Center

etc.

Recent data contributions:

Australia (Macquarie Island, Kerguelen Plateau)

Germany (Weddell Sea, Cooperation Sea)

Japan (Cosmonaut Sea)

New Zealand (Ross Sea)

United Kingdom (Scotia Sea, Bellinghausen Sea)

United States (BS, Amundsen Sea)

Ukraine (Antarctic Peninsula)

etc.

Integration with existing products:

Antarctic Digital Database (ADD)

Landsat Image Mosaic of Antarctica (LIMA)

Radarsat Antarctic Mapping Program (RAMP)

Antarctic Bedrock Topography (BEDMAP2)

Antarctic Digital Magnetic Anomaly Project (ADMAP)

Earth Topography (ETOPO2v2)

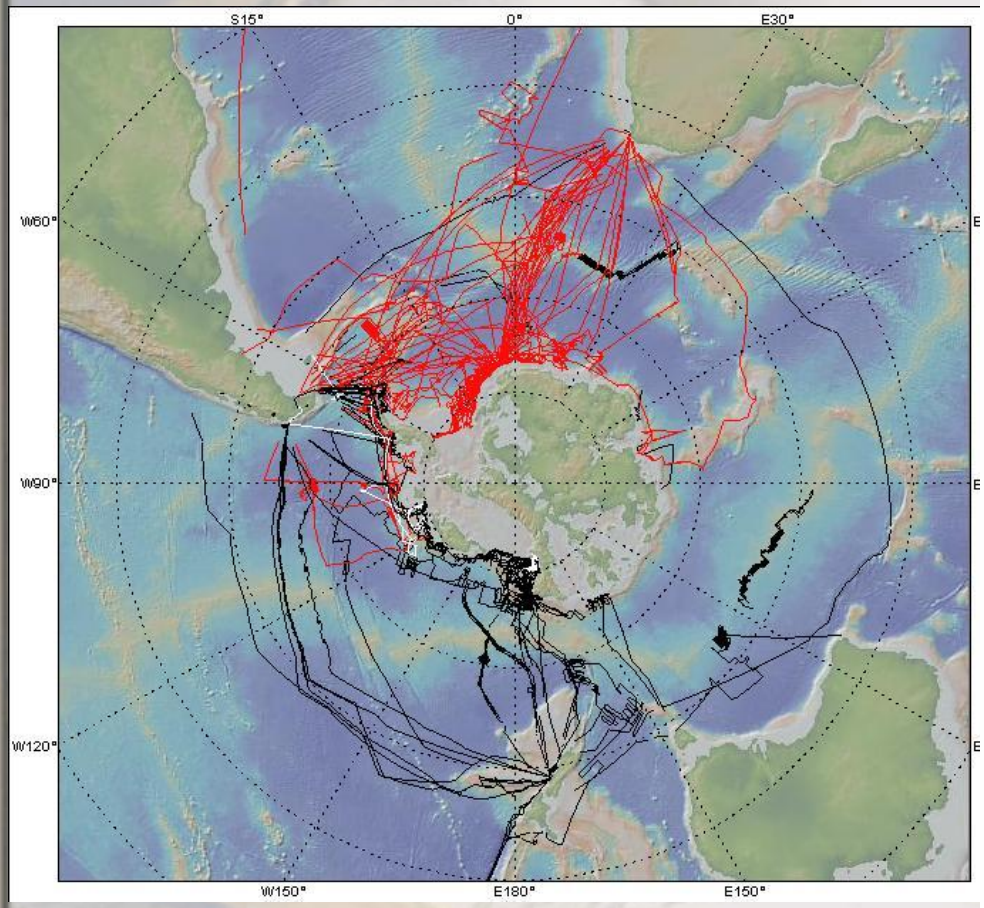
General Bathymetric Chart of the Oceans (GEBCO)

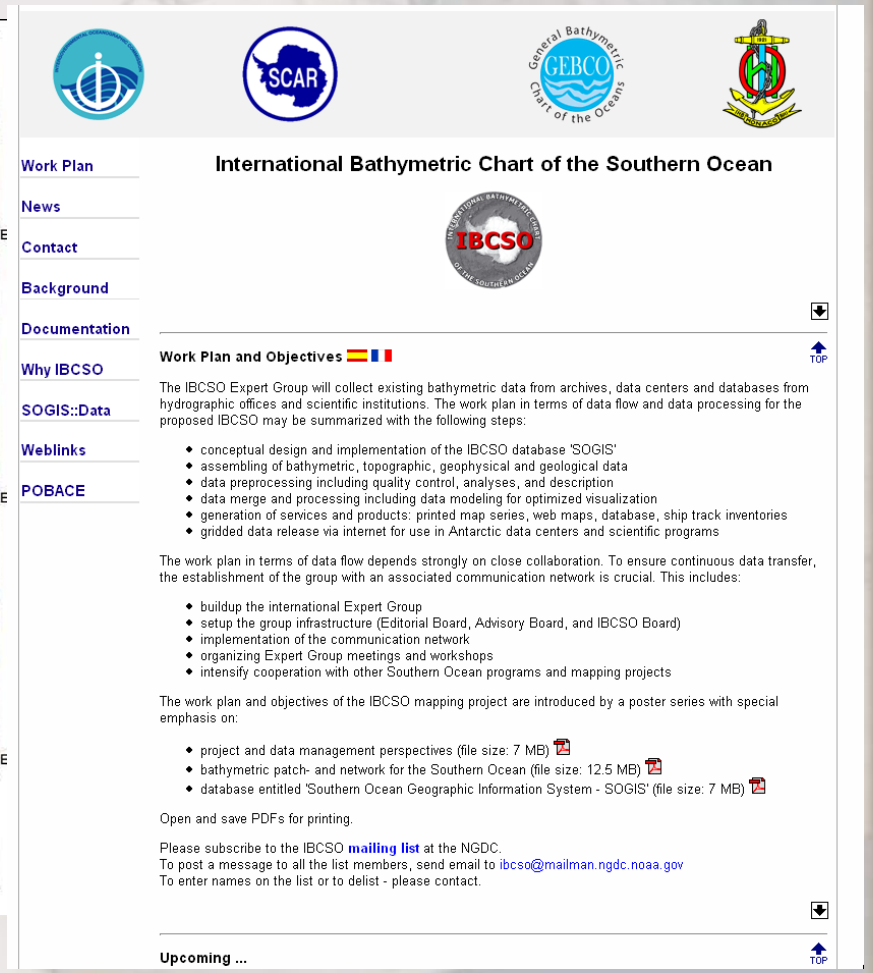
Sea and land nomenclature (SCUFN – CGA)

Gravity data from Satellite missions, etc.

will lead to SOGIS

Review of completed actions:





Work Plan
News
Contact
Background
Documentation
Why IBCSO
SOGIS::Data
Weblinks
POBACE

International Bathymetric Chart of the Southern Ocean

Work Plan and Objectives

The IBCSO Expert Group will collect existing bathymetric data from archives, data centers and databases from hydrographic offices and scientific institutions. The work plan in terms of data flow and data processing for the proposed IBCSO may be summarized with the following steps:

- conceptual design and implementation of the IBCSO database 'SOGIS'
- assembling of bathymetric, topographic, geophysical and geological data
- data preprocessing including quality control, analyses, and description
- data merge and processing including data modeling for optimized visualization
- generation of services and products: printed map series, web maps, database, ship track inventories
- gridded data release via internet for use in Antarctic data centers and scientific programs

The work plan in terms of data flow depends strongly on close collaboration. To ensure continuous data transfer, the establishment of the group with an associated communication network is crucial. This includes:

- buildup the international Expert Group
- setup the group infrastructure (Editorial Board, Advisory Board, and IBCSO Board)
- implementation of the communication network
- organizing Expert Group meetings and workshops
- intensify cooperation with other Southern Ocean programs and mapping projects

The work plan and objectives of the IBCSO mapping project are introduced by a poster series with special emphasis on:

- project and data management perspectives (file size: 7 MB)
- bathymetric patch- and network for the Southern Ocean (file size: 12.5 MB)
- database entitled 'Southern Ocean Geographic Information System - SOGIS' (file size: 7 MB)

Open and save PDFs for printing.

Please subscribe to the IBCSO **mailing list** at the NGDC.
To post a message to all the list members, send email to ibcso@mailman.ngdc.noaa.gov
To enter names on the list or to delist - please contact.

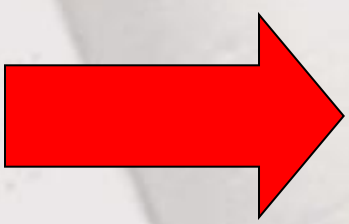
Upcoming ...

Joint SCAR / IBCSO / IHO actions

- **SCAR/SCOR Circular 768 calling international support for IBCSO**
- **SCAR Circular 770 requesting nominations for natl. representatives to IBCSO**
- **Resolution 5 of XXXI ATCM in Kiev: requesting to improve OM in Antarctic waters**

Deliverables

- Grids
- Contours
- DTM
- Shape files
- Meta data



SCAR/ADD
GEBCO GDA
BEDMAP
SOOS

from future IBCSO/SOGIS web portal

Meetings/Outreach

IBCSO discussed/presented at Meetings:

1st IBCSO Business Meeting at the IAESC
GEBCO/SCDB/GC Meetings (4)
IHO/HCA Meetings (4)
SCAR SC-AGI (1)

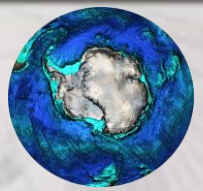
IBCSO Publications and reports:

EOS Transactions (1)
Hydro International (2)
Posters (3)
Talks (3)

Next Actions

1. Strengthen/enlarge the IBCSO EG
2. Activate the IBCSO infrastructure (EB/AB/IB)
3. Implement a SOGIS communication network
4. Organise intersessional EB-Meetings
5. Cooperation with other SO mapping programs

The IBCSO Network



Southern Ocean
Geographic Information System

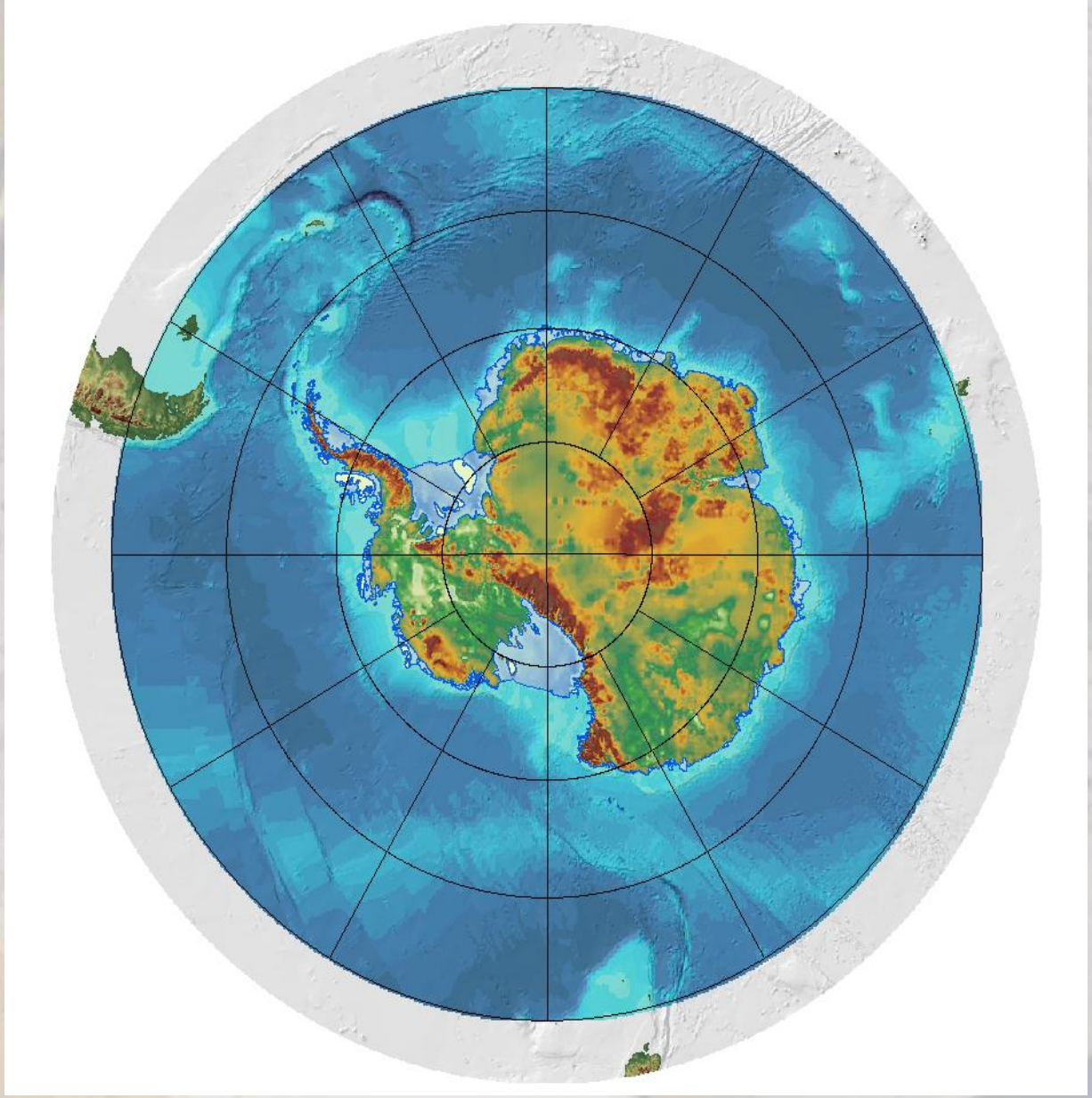
- International Hydrographic Organization / HCA
- Intergovernmental Oceanographic Commission
- Scientific Committee on Antarctic Research
- General Bathymetric Chart of the Oceans
- IBC of the Southern Ocean
- and SCAR Member institutions

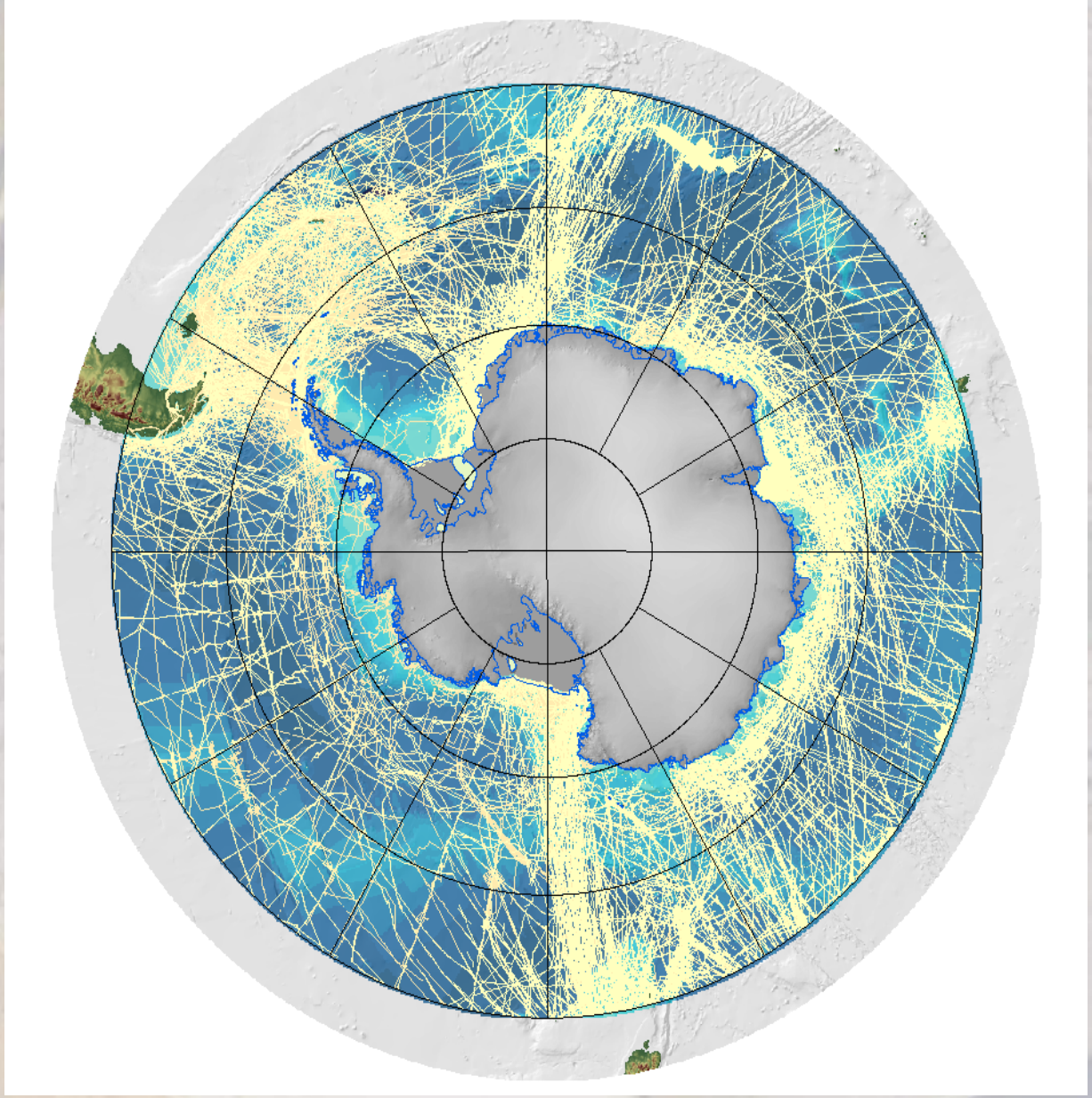
AWI

Upcoming

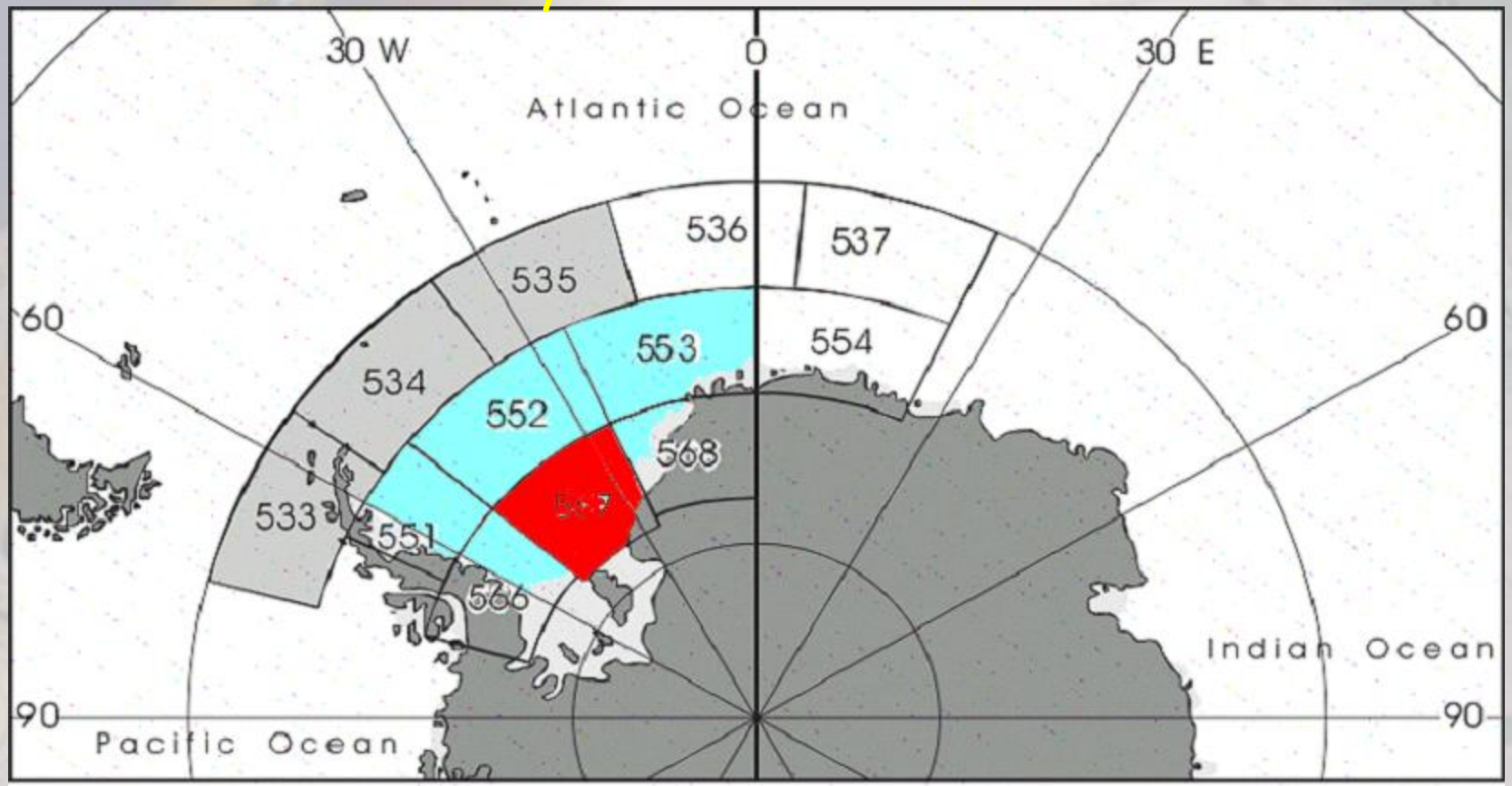
- Scheduled 3rd IBCSO Meeting to be held in Bremerhaven, 30 November 2009
- Consistent bathymetric database to be prepared in the 4th quarter 2009
- Digital elevation model to be prepared in the 2nd and 3rd quarter 2010
- Printed maps to be prepared in the 3rd quarter 2010
- Publication of the compiled IBCSO dataset in Pangaea
- Submission of IBCSO publications to relevant geoscientific journals

Realization



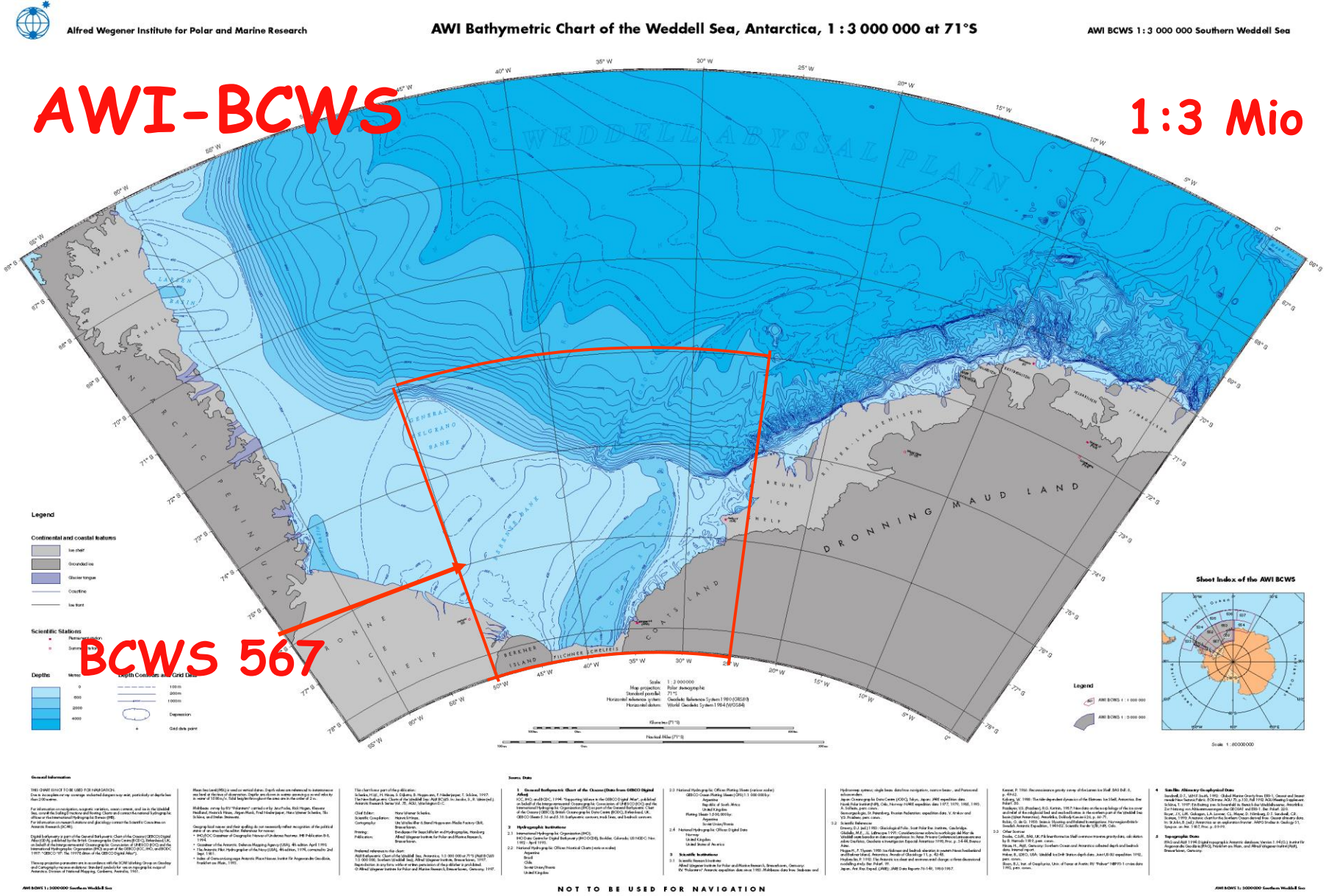


Index of the Bathymetric Chart of the Weddell Sea



AWI-BCWS 1:1 Mio — 50/100 m contour interval, 9 sheets

AWI-BCWS 1:3 Mio — 200 m contours

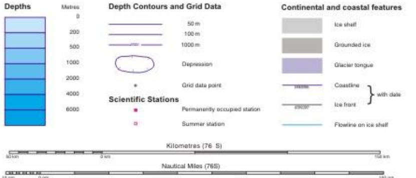

Alfred Wegener Institute for Polar and Marine Research
AWI Bathymetric Chart of the Weddell Sea, Antarctica, 1 : 3 000 000 at 71°S
AWI BCWS 1 : 3 000 000 Southern Weddell Sea
AWI-BCWS
1:3 Mio
BCWS 567
WEDDELL ABYSSAL PLAIN
DRONNING MAUD LAND
ANTARCTIC PENINSULA
Legend
Continental and coastal features
Scientific Stations
Depths
Depth Contours and Grid Data
Shoot Index of the AWI BCWS
NOT TO BE USED FOR NAVIGATION

Alfred Wegener Institute for Polar and Marine Research

AWI Bathymetric Chart of the Weddell Sea, Antarctica, 1 : 1 000 000 at 76 S

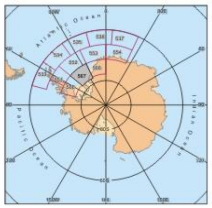
AWI BCWS 567 Filchner Trough

Legend



Scale: 1 : 1 000 000
Map projection: Mercator
Standard parallel: 76 S
Horizontal reference system: Geodetic Reference System 1980 (GRS80)
Horizontal datum: World Geodetic System 1984 (WGS84)

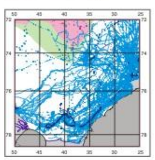
Sheet Index of the AWI BCWS



Scale 1 : 80 000 000

Sheet Index of the AWI Bathymetric Chart of the Weddell Sea, Antarctica (AWI BCWS)

Source Data Diagram

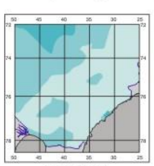


Scale 1 : 10 000 000

Data from	Area	Track Line	Spot Data
GEBCO			
Hydrographic Institutions			
Scientific Institutions			
Satellite Altimetry			

Original and interpreted data, digital data and digitized data

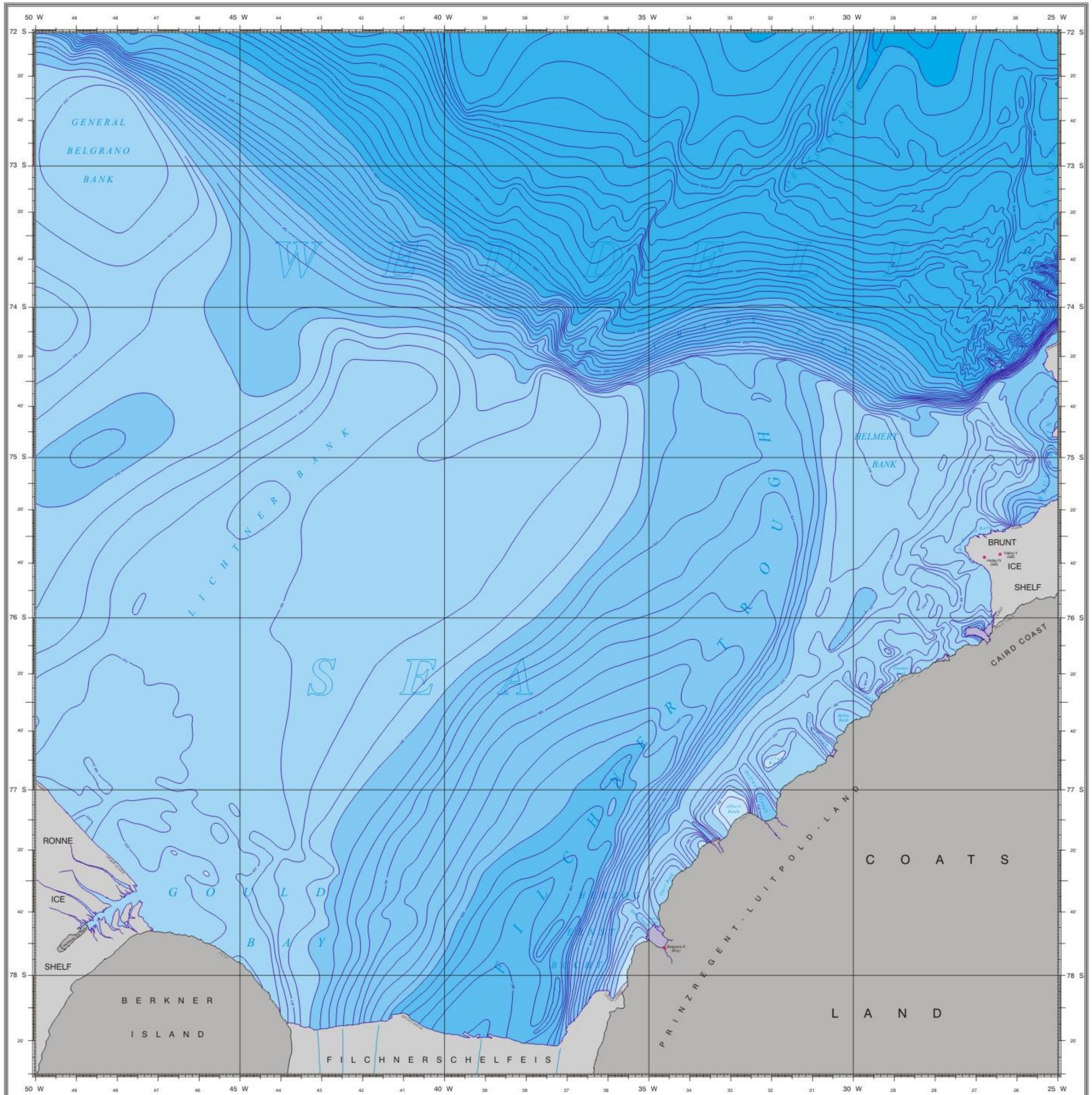
Accuracy of Bathymetric Depths



Scale 1 : 10 000 000

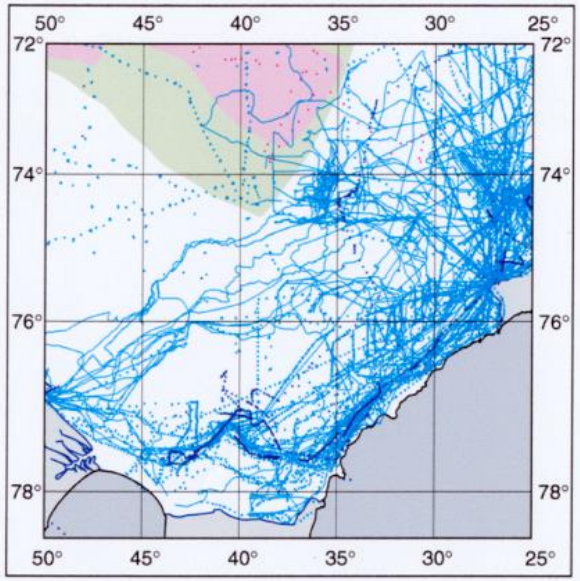
Accuracy

- 50 m
- 100 m
- 200 m
- Worse than 200 m



AWI BCWS 567

Source Data Diagram



Scale 1 : 10 000 000

Data from	Area	Track Line	Spot Data
GEBCO			
Hydrographic Institutions			
Scientific Institutions			
Satellite Altimetry			

Contours/soundings from GDA

Hydrographic Organisations

2.2 National Hydrographic Offices: Nautical Charts (various scales):
Argentina
Soviet Union / Russia
United Kingdom

2.3 National Hydrographic Offices: Plotting Sheets (various scales)
- GEBCO Ocean Plotting Sheets (OPS) 1:1 000 000 by:
  Argentina
  Republic of South Africa
  United Kingdom
- Plotting Sheets 1:500 000 by:
  Soviet Union / Russia

Scientific Institutions

- Alfred-Wegener-Institut für Polar- und Meeresforschung, Germany:
  RV "Polarstern" Antarctic expeditions ANT (since 1983):
  Multibeam data from SeaBeam and Hydrosweep system, single beam data from navigation echo sounder, narrow beam echo sounder, and Parasound sediment echo sounder.
- Norsk polar institutt, Oslo, Norway:
  NARE expedition data 1977, 1979, 1985. A. Solheim, pers. comm.
- Sevmorgeologia, St. Petersburg, Russian Federation:
  V. Krukov and V.S. Pozdeev, digital data, pers. comm.

3.2 Scientific Publications
- Hoppe, H., F. Thyssen 1988: Ice thickness and bedrock elevation in Western Neuschwabenland and Berkner Island, Antarctica. Annals of Glaciology, vol.11, 42-45, 1988.
- Huybrechts, P. 1992:
  The Antarctic ice sheet and environmental change: a three-dimensional modelling study. Berichte zur Polarforschung 99, 1992
- Pozdeyev, V.S., R.G. Kurinin 1987: Nowyje dannyje o morfologii ledowoj tolschtschi i reljefe podlednogo losha i morskogo dna w jushnoj tschasti bassejna Morja Ueddella (Sapadnaja Antarktika). Antarktika, Doklady Komissii, 26, 66-71, 1987.

3.3 Other Sources
- Doake, C.S.M., BAS, UK:
  Filchner-Ronne Ice Shelf oversnow traverse gravity data, calculation by B. Harrods, pers. comm.
- Hinze, H., AWI, Germany:

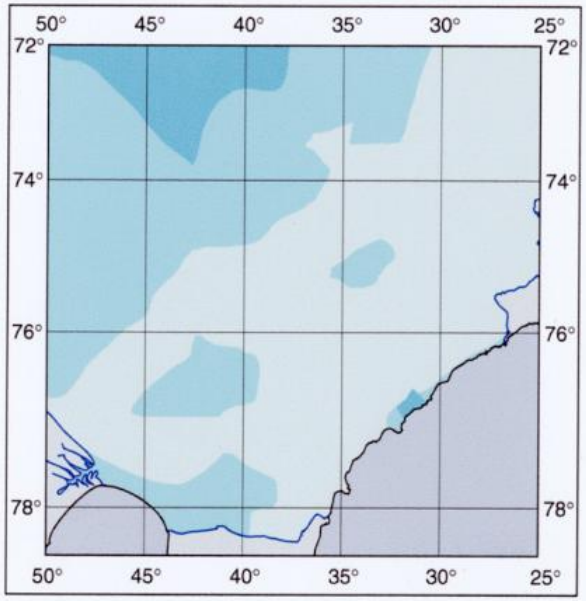
Satellite Altimetry Data

Ein Beitrag zum Schwerefeld im Bereich des Weddellmeers, Antarktis. Nutzung von Altimetermessungen

Topographic Data

Geodäsie, Frankfurt am Main,

Accuracy of Bathymetric Depths



Scale 1 : 10 000 000

Accuracy

- ± 50 m
- ± 100 m
- ± 200 m
- Worse than ± 200 m

The bathymetry contained in this chart is evaluated from various data sets of different quality, and is therefore of varying accuracy. Compilation and contouring are in accordance with the IHO standards (IHB S-44), applied to Antarctic waters.
Reported but unconfirmed or suspect depths were omitted if they conflicted with morphologic evidence from other sources.
Reference: Hinze, H., 1994: Charting the Bathymetry of Weddell Sea, Antarctica. Marine Geodesy, vol.17, 139-145.

The positional accuracy of bathymetric data, contour lines and features in relation to the graticule is approximately 1 mm (or 1 kilometre on the Earth).
Mean positional error: horizontal accuracy e_h for contour lines of the given scale may be estimated by Koppe's empirical formula, which depends on the terrain slope α (a=50 m, b=2000 m):

$$e_h = b + a \cdot \cot \alpha;$$

A vertical accuracy of better than 2% of depth was achieved with the compilation from heterogeneous depth data. However, some suspect data still may be present within the map.
Mean depth error: accuracy e_d of a contour or interpolated depth value from the map may be estimated by

$$e_d = a + b \cdot \tan \alpha;$$

a=50 m and b=500 m.
In areas with slopes greater than 20° the error may exceed 200 m due to generalisation effects.

Despite an automatic accuracy estimation, a classification may reflect how closely the ideal has been approached under the existing constraints, e.g. inhomogeneous data and seabed roughness. Thus, categories for the accuracy of bathymetric depths were chosen. The 1 : 10 000 000 inset map of bathymetric accuracy gives an overview of accuracies, but it does not reflect special features, e. g. canyons or seamounts. Areas with depths estimated worse accurate than 200 m, better than 200 m, better than 100 m, and better than 50 m are given.

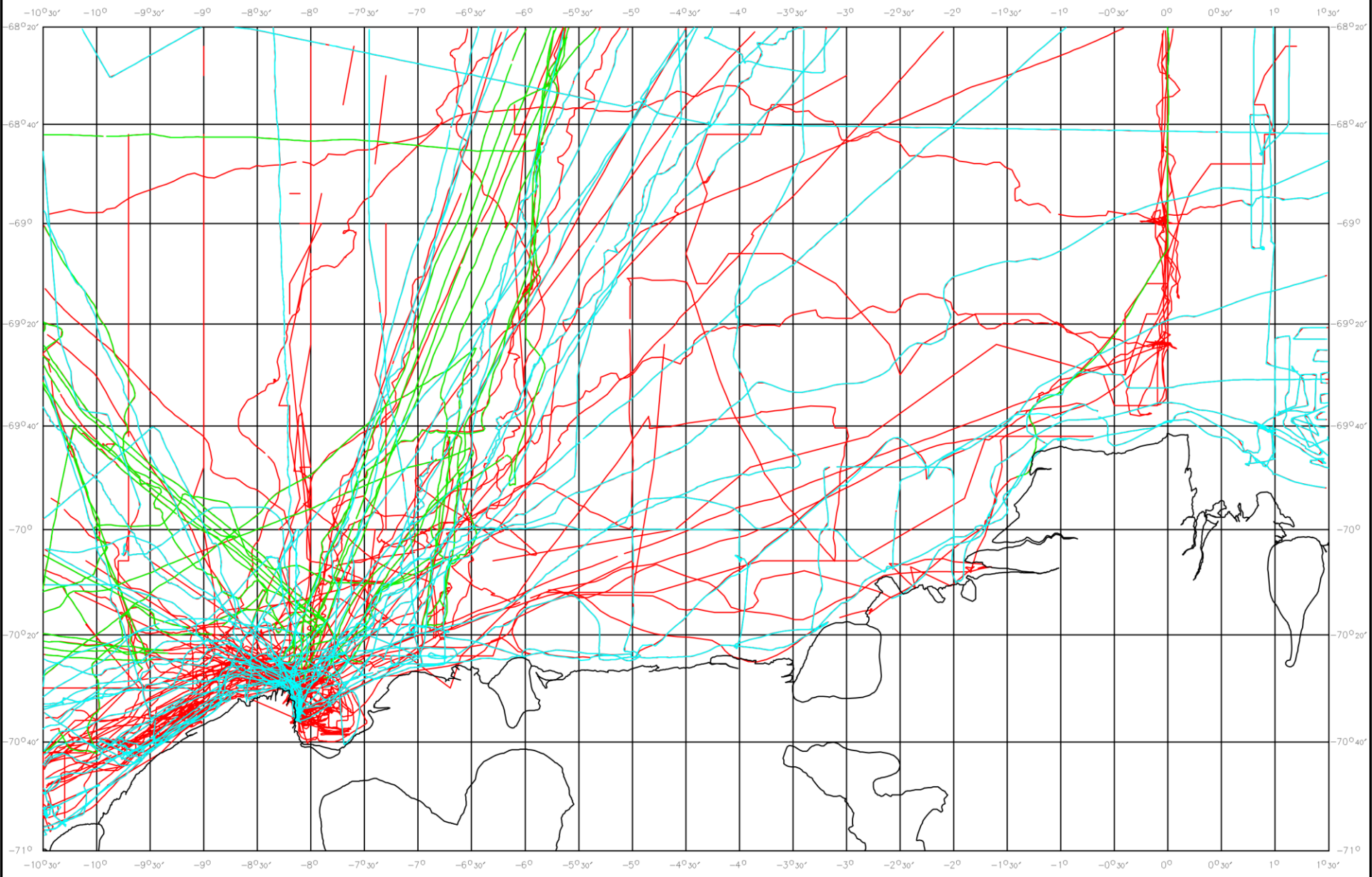
Caution.
Due to incomplete survey coverage dangers may exist, particularly within the 200 metre depth contour. Vessels should therefore navigate with due caution.
For further information on navigation, magnetic variation, ocean currents, and ice in the area of this map see Sailing Directions and Routing Charts and contact the Hydrographic Offices or IHB. For further information on research stations and glaciology contact the SCAR. For further informations on bathymetry contact the IHB-IOC GEBCO Committee or AWI.

Koppe's Formula:

$$e_h = b + a * \cot \alpha$$

$$e_d = a + b * \tan \alpha$$

a=50m
b=2000m
a=50m
b=500m

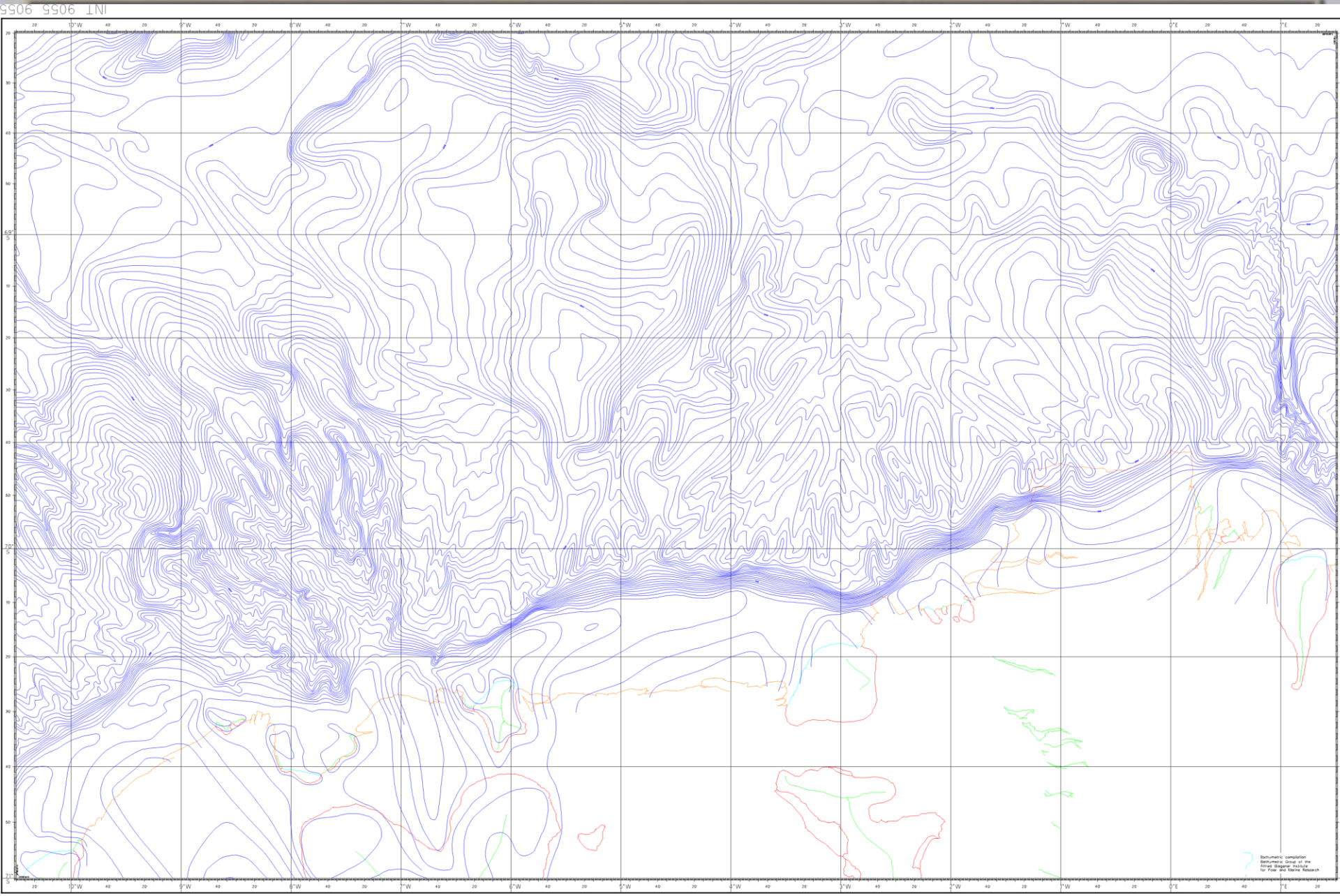


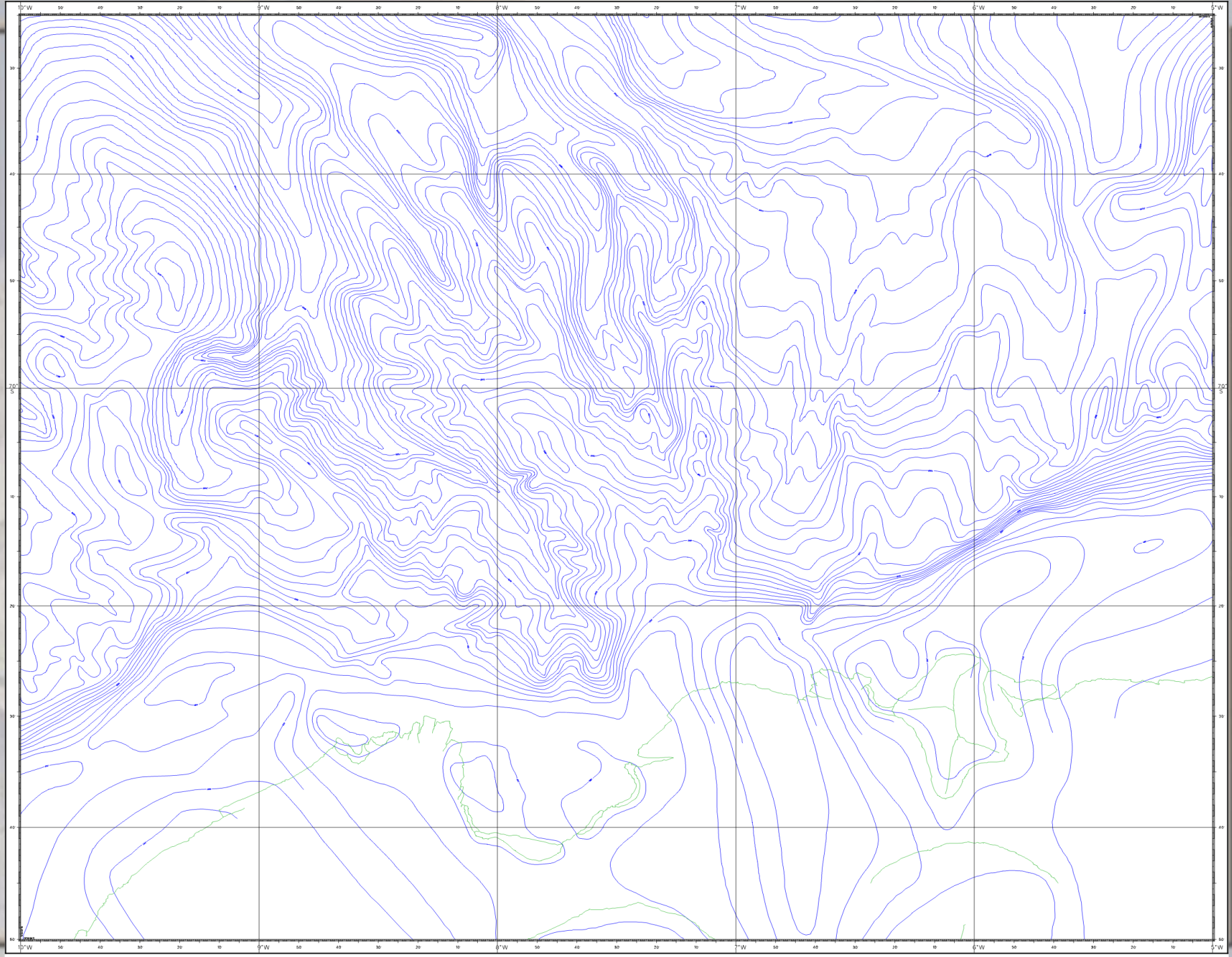
Polarstern 1984 – 2003

red = NBS
green = Seabeam, cyan = Hydrosweep

Mercator Projection
Scale: 1 : 2000000
Standard Parallel: 66°S
World Geodetic System 1984 (WGS 84)

Bathymetric Group
Alfred Wegener Institute for


Bathymetric compilation
Bathymetric Group of the
Alfred Wegener Institute
for Polar and Marine Research



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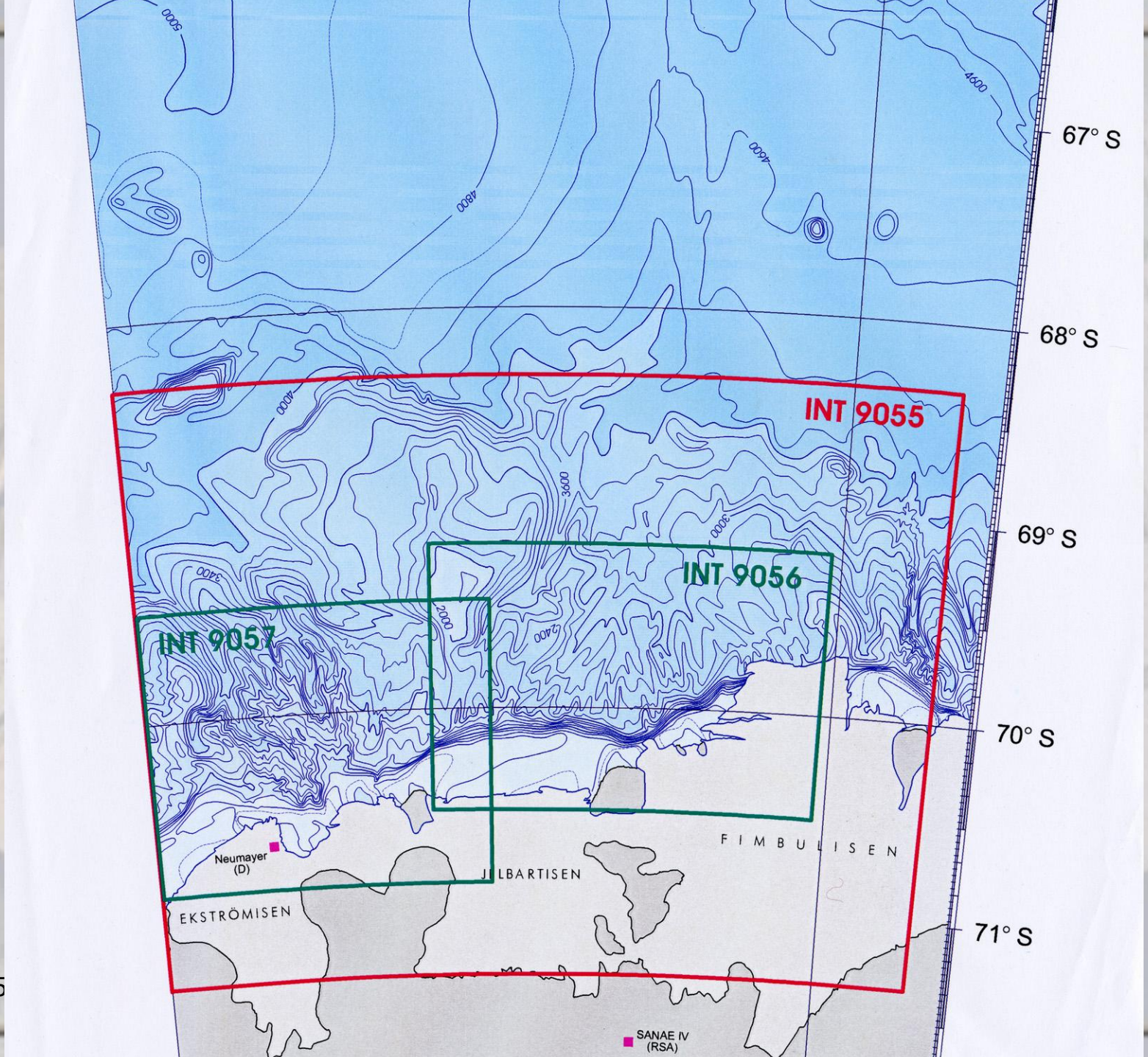
INT 9055
INT 9056
INT 9057
67° S
68° S
69° S
70° S
71° S
Neumayer
(D)
EKSTRÖMISEN
JELBARTISEN
FIMBULISEN
SANAE IV
(RSA)

Thank you!