

Managing Geophysics Datasets:

Challenges and perspectives from the UK Polar Data Centre

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Outline

- Introduction to the UK Polar Data Centre
 - Data handled by the PDC
 - What do we do?
 - Why is it important?
- Management of geophysics data
 - Publishing bathymetry and aerogeophysics data
 - Re-use of bathymetry data
 - BEDMAP3
- Challenges and perspectives

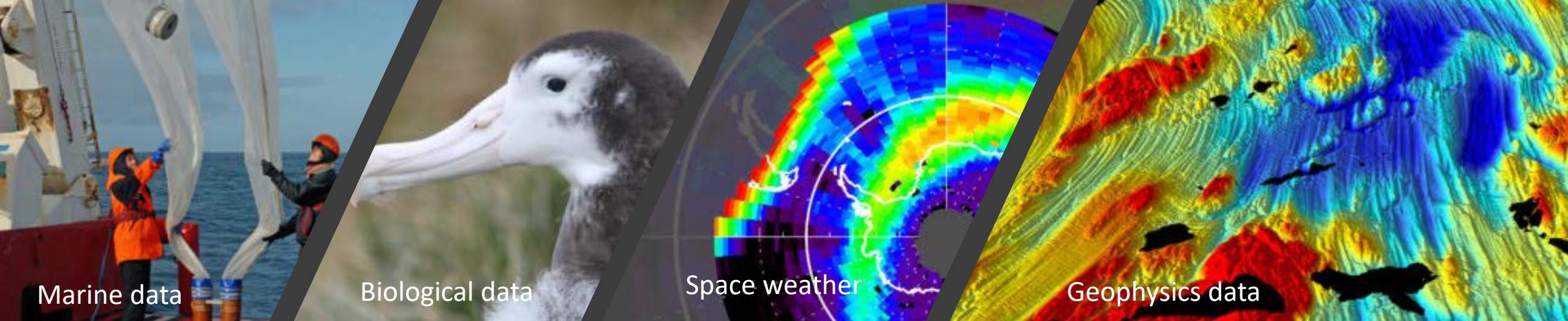


UK Polar Data Centre (PDC)



- Long-term repository for polar and cryospheric data.
- Part of the NERC Environmental Data Service (EDS)
- Based at the British Antarctic Survey
- **PDC coordinates the management of polar data from UK-funded research and support researchers in complying with national and international data legislation and policy.**
- Helps the UK to meet article III 1c of the Antarctic Treaty: “scientific observations and results from Antarctica shall be exchanged and made freely available”.





Marine data

Biological data

Space weather

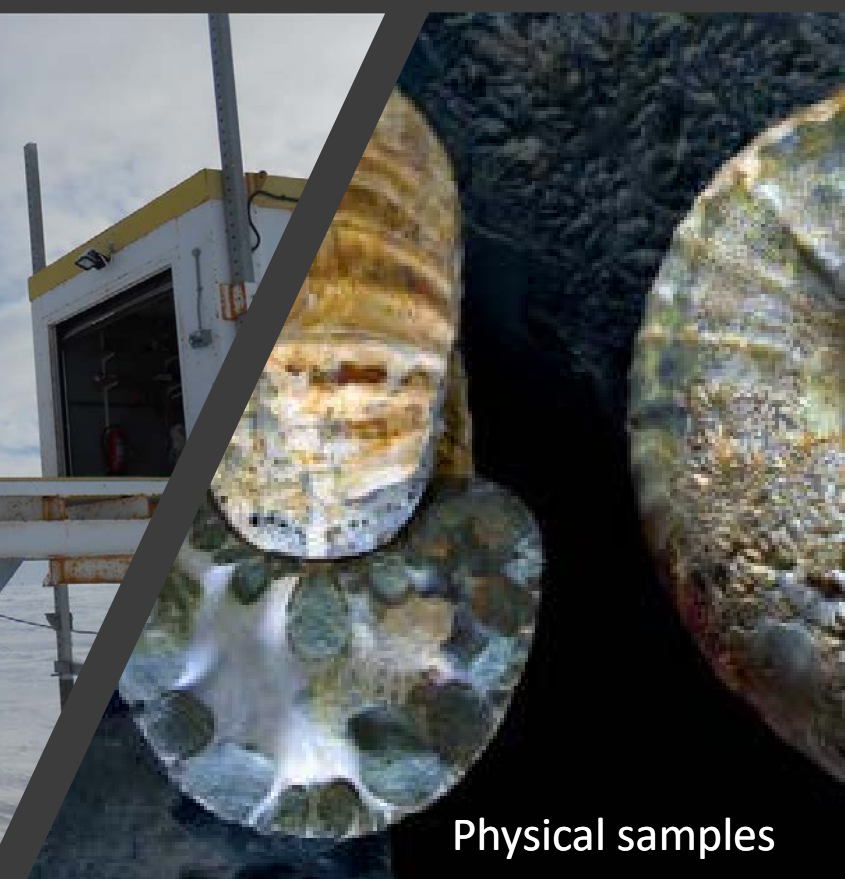
Geophysics data

Data handled at the UK PDC

- Reflecting the multidisciplinary nature of polar science, the datasets handled by the data centre are extremely diverse.



Ozone and
meteorological data



Physical samples

What do we do?



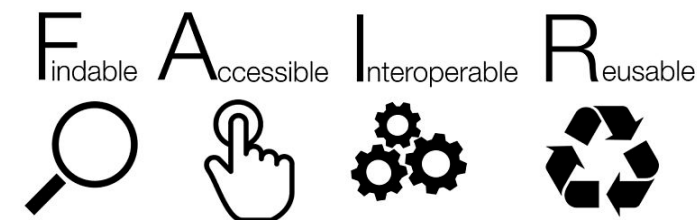
We help at every stage of the data life cycle: from writing a Data Management Plan (DMP) to storing the data for long-term use



The data and metadata are checked thoroughly by a specialist in the relevant domain to ensure it abides by the FAIR principles



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Why is it important?

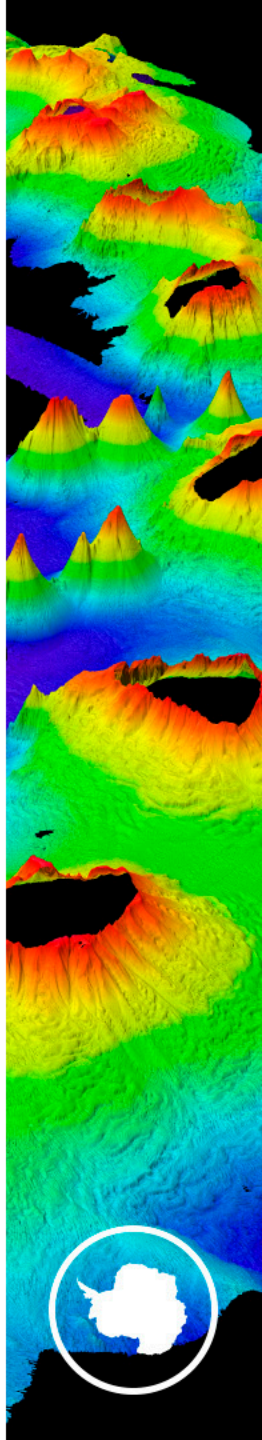
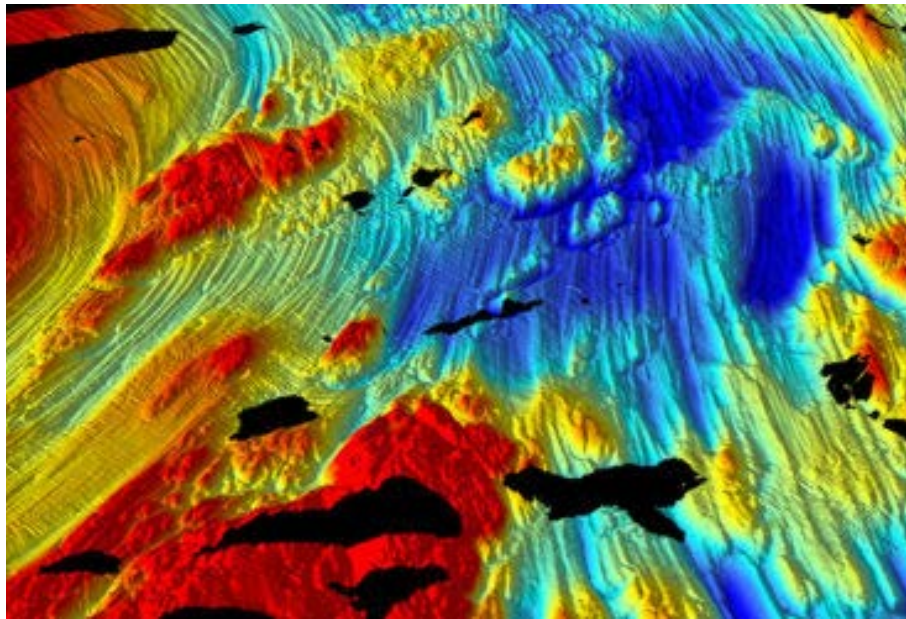
- NERC requires that all environmental data of long-term value generated through NERC-funded activities be submitted and provided a DOI from a NERC data centre.
- Sharing your data is now required by most publishers and is a key requirement from government funding agencies including NERC. Additionally, sharing your data openly is one of the requirement of conducting science in Antarctica.
- Long-term legacy of data: storage beyond the life of the project so that the data can be reused in the future.
- By providing a DOI to your data, you ensure better citation of your data and your research over the long term.
- **It's good for Science!** Sharing your data makes your research more open and allows its reuse to answer new questions.



Data Management of Geophysics data

Geophysics datasets

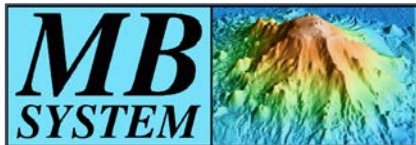
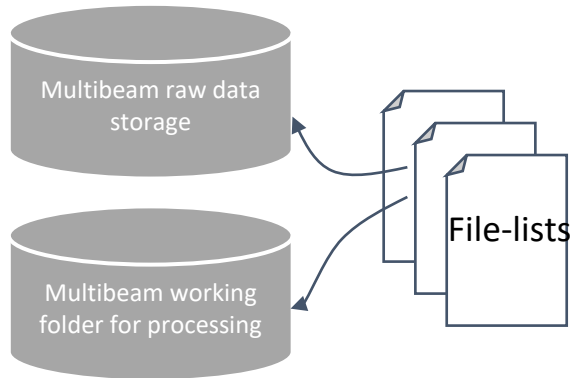
- **Bathymetry:** Provide information about the seabed topography.
- **Aero-geophysics** (includes aerogravity, aeromagnetics, airborne radar depth sounding): Provide information about the Earth's geological structure and ice thickness, amongst others.



Publishing bathymetry data

Work in progress

INTERNAL MANAGEMENT OF MULTIBEAM DATA



Activities: Data processing, creation of grids, collaborations

INTERNAL MANAGEMENT OF MULTIBEAM METADATA

Geophysics Metadata Portal

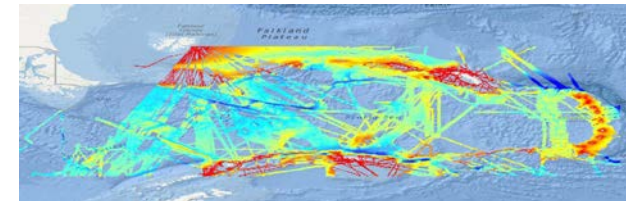
- All metadata kept in an Oracle database
- Metadata information are automatically derived from mbinfo files
- Other information that cannot be derived automatically such as the acquisition team is filled in in an APEX interface
- Information from cruises are derived from our internal marine metadata portal
- Tool has been developed to automatically create ISO19115 metadata

PUBLICATION OF MULTIBEAM DATA



ISO19139 metadata published in our data catalogue. DOI minted for each dataset

VISUALISATION AND SELECTION TOOL

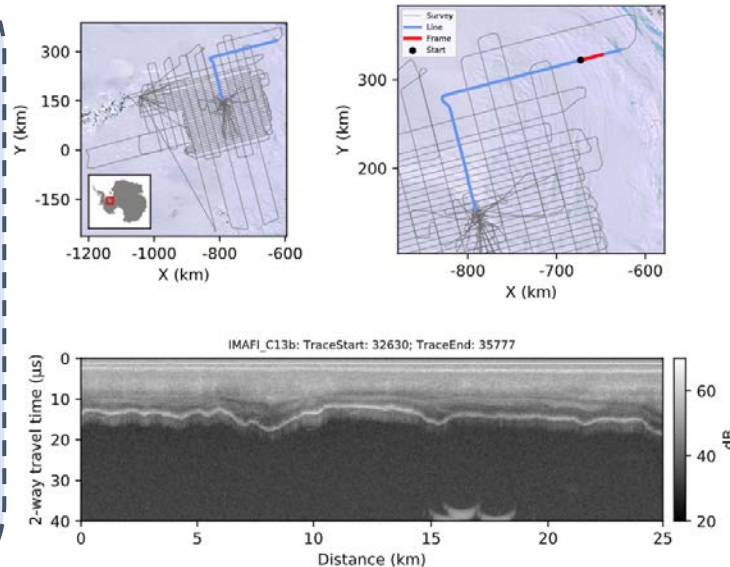


Publishing aerogeophysics data

Work in progress
45 datasets
already published

INTERNAL MANAGEMENT OF AEROGEOPHYSICS DATA AND METADATA

- Data organised per campaigns
- Aerogeomagnetic, aerogravity and bed elevation picks stored as csv files
- Radar data stored as both SEGY and NetCDF
- Localisation information added to each SEGY
- Enriched metadata added to NetCDF
- Quick-look images created for each file



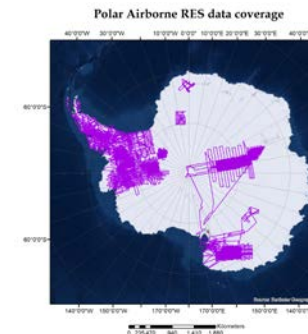
Activities: Data standardisation and processing

PUBLICATION OF AEROGEOPHYSICS DATA



ISO19139 metadata published in our data catalogue. DOI minted for each dataset

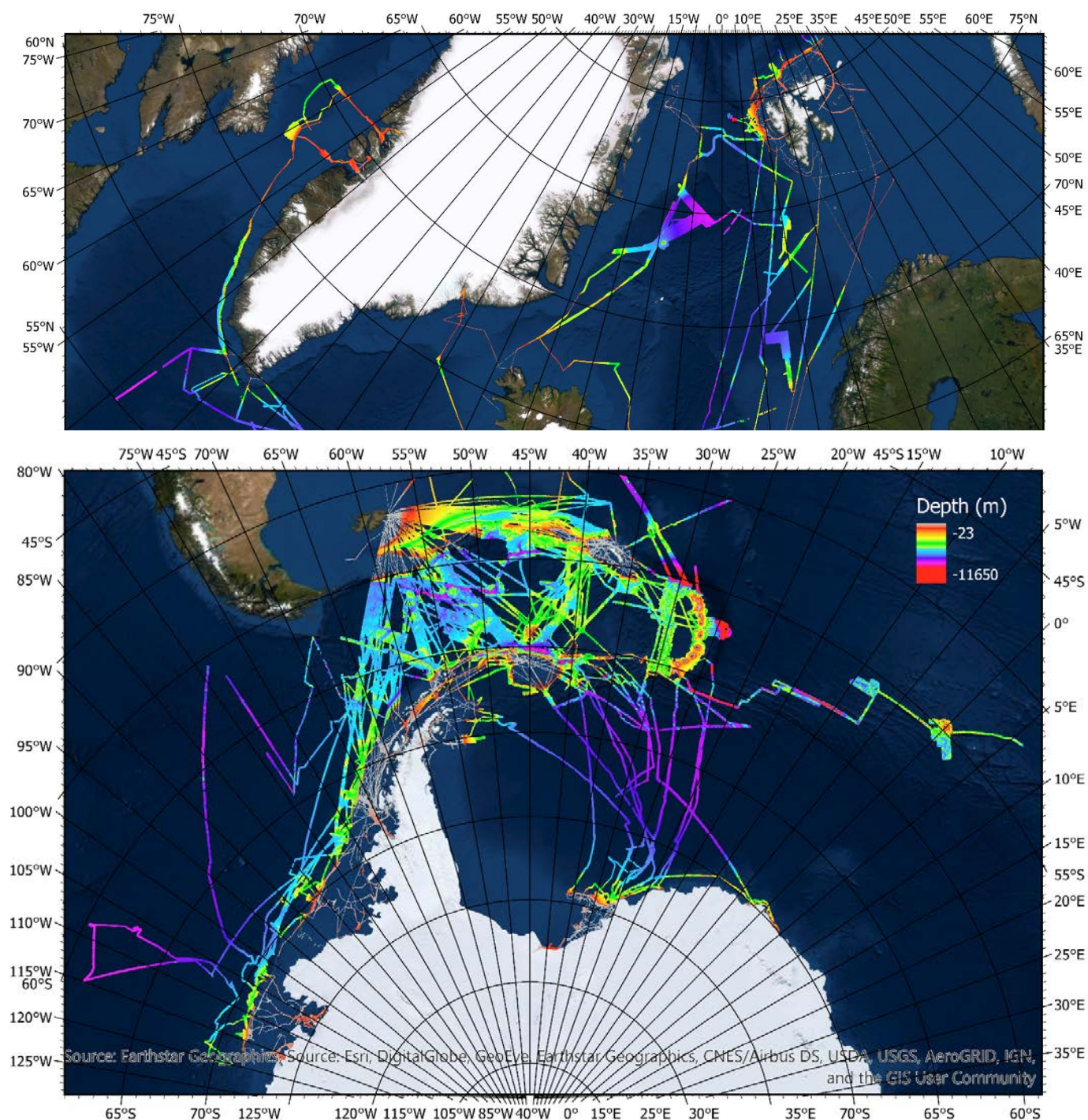
VISUALISATION AND SELECTION TOOL



Data Reuse

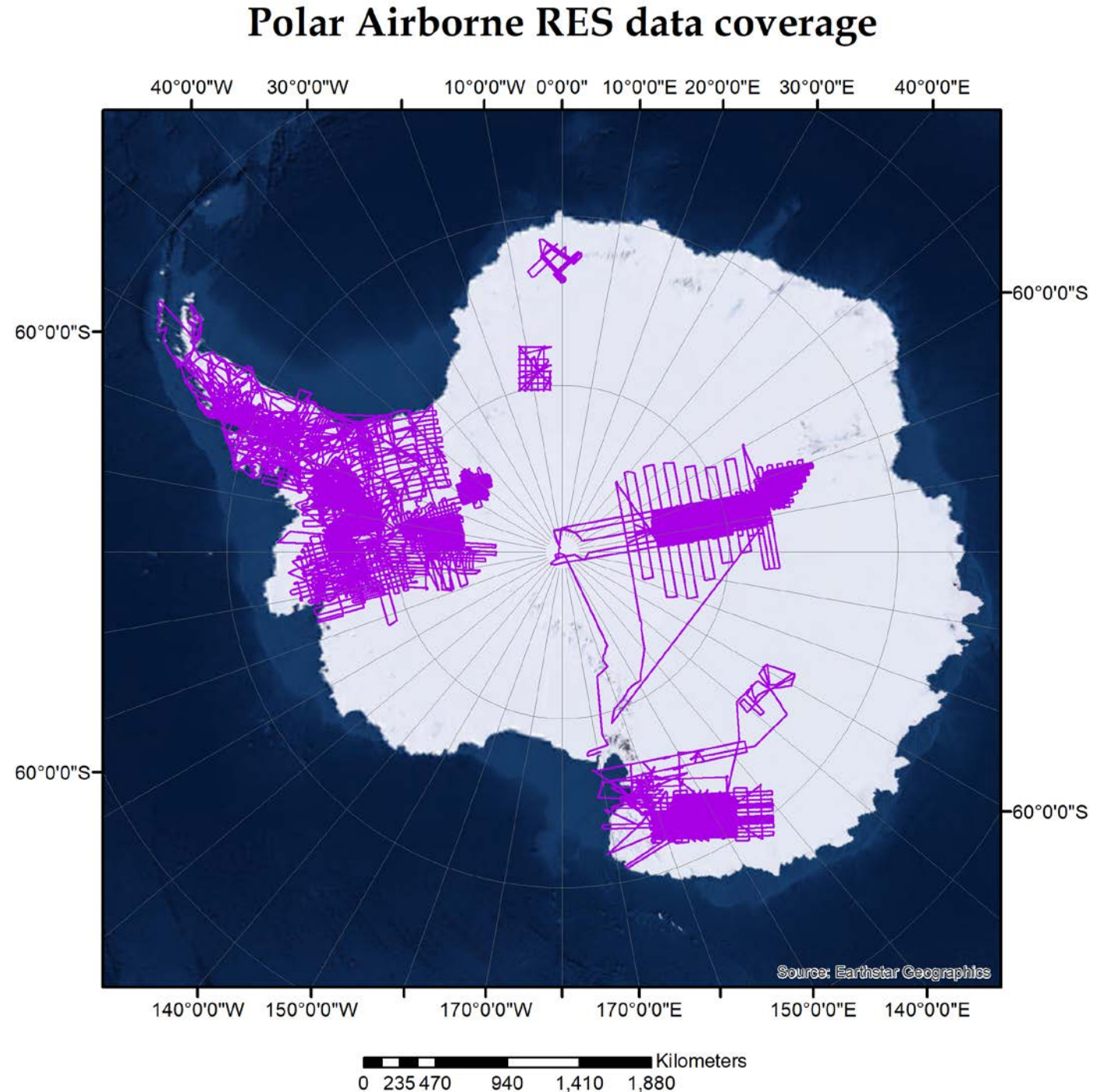
The data coverage of BAS multibeam data holding is significant in the Antarctic Polar region leading to participation in a number of collaborations:

- **IBCAO:** International Bathymetric Chart of the Arctic Ocean.
- **IBCSO:** International Bathymetric Chart of the Southern Ocean.
- **BatDrake:** multibeam bathymetry map of the Drake Passage. This is part of IBCSO under the SCAR umbrella.
- **SEABED30:** to map 100% of the ocean floor mapped by 2030.



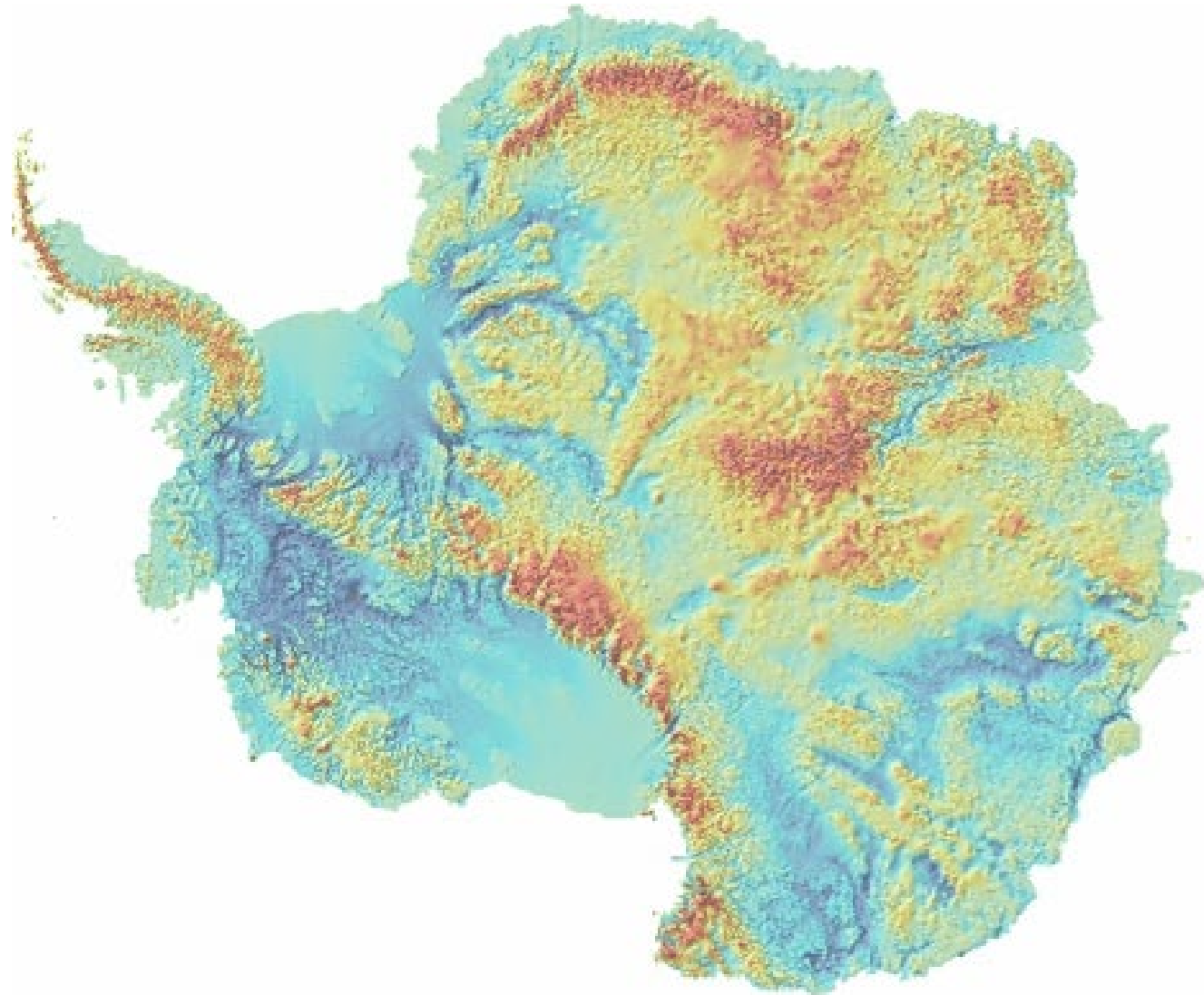
Data Reuse

- In 2020, we published bed elevation picks for 14 airborne radar surveys.
- This is in addition to >30 of airborne gravity and magnetics datasets over Antarctica.
- In 2021, we will publish ~15 airborne radar datasets (including all SEGY radar data), representing ~1.5 TB of newly-released data.
- These will include the large surveys over Institute and Moller Ice Stream and Pine Island Glacier, as well as over the Antarctic Peninsula and East Antarctica



BEDMAP3

- **Bedmap3** is a formal **SCAR Action Group** with a three-year timeline.
- **Aim:** To produce a new dataset of Antarctic ice thickness and bed topography for the international glaciology and geophysical community.
- This includes new grids of ice thickness and bed elevation at higher resolution than BEDMAP2, and the incorporation of new data.
- The role of the PDC is to:
 - Assist with checking the data
 - Provide DOIs
 - Assist with the online web browser and data repository
- Expected release date: Summer 2021





Challenges and perspectives

- We are currently developing a new data catalogue to facilitate metadata creation for data managers and scientists.
- We are looking for open-source technologies to develop new data portals for aerogeophysics and bathymetry data. Any suggestions are welcome.
- In order to comply with the different standards, we have reviewed all our workflows and procedures and are now accredited by the CoreTrustSeal certification.
- To keep our accreditation, we are always trying to follow best data management practices



DATA PROVIDERS

1

Grant application with description of the research project



2

Data Management Plan



3

Data acquisition

DATA PRESERVATION PLANNING

Assure preservation

Monitor new technology

Propose and maintain tools/software

5

PROCESSING + QC

Data processed within UK PDC

Scientists submit data processed to UK PDC

6

PUBLICATION

Published data server

RAMADDA



Metadata creation Tool

DOI

Data ready to be published (raw + processed)

4

Raw data/processed data

Descriptive information

Marine data manager

Marine metadata portal

Build on the Marine Metadata Portal structure

Geophysics metadata portal

ARCHIVAL STORAGE

Archival storage

7

ACCESS

Queries

Query responses

Data visualisation and Metadata catalogue

Negotiate submission agreements

Archive standard and policies

Customer support

ADMINISTRATION

DATA USERS

Antarctic/ Arctic/ Community

Data re-use and International collaborations

8

Discuss DMP

THANK YOU!

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More information:
[BAS website](#)

