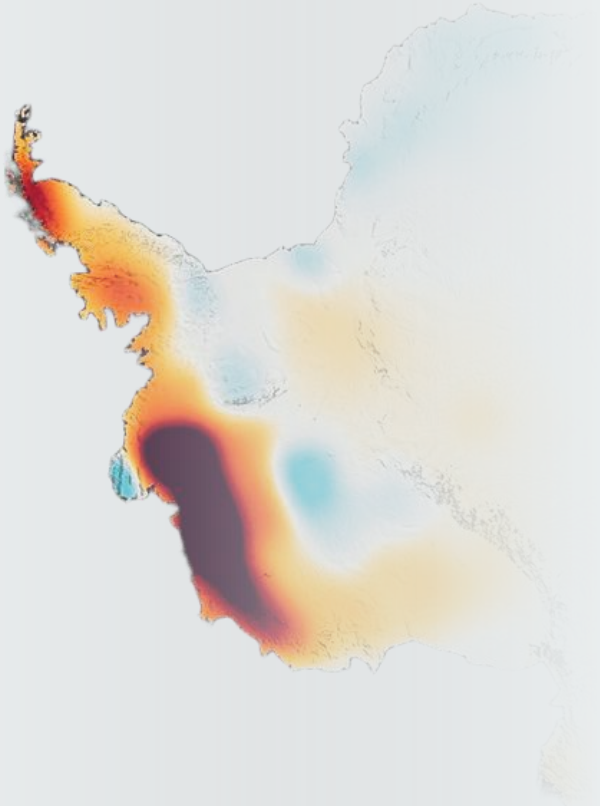


Data Story: AWI Radar Data Viewer

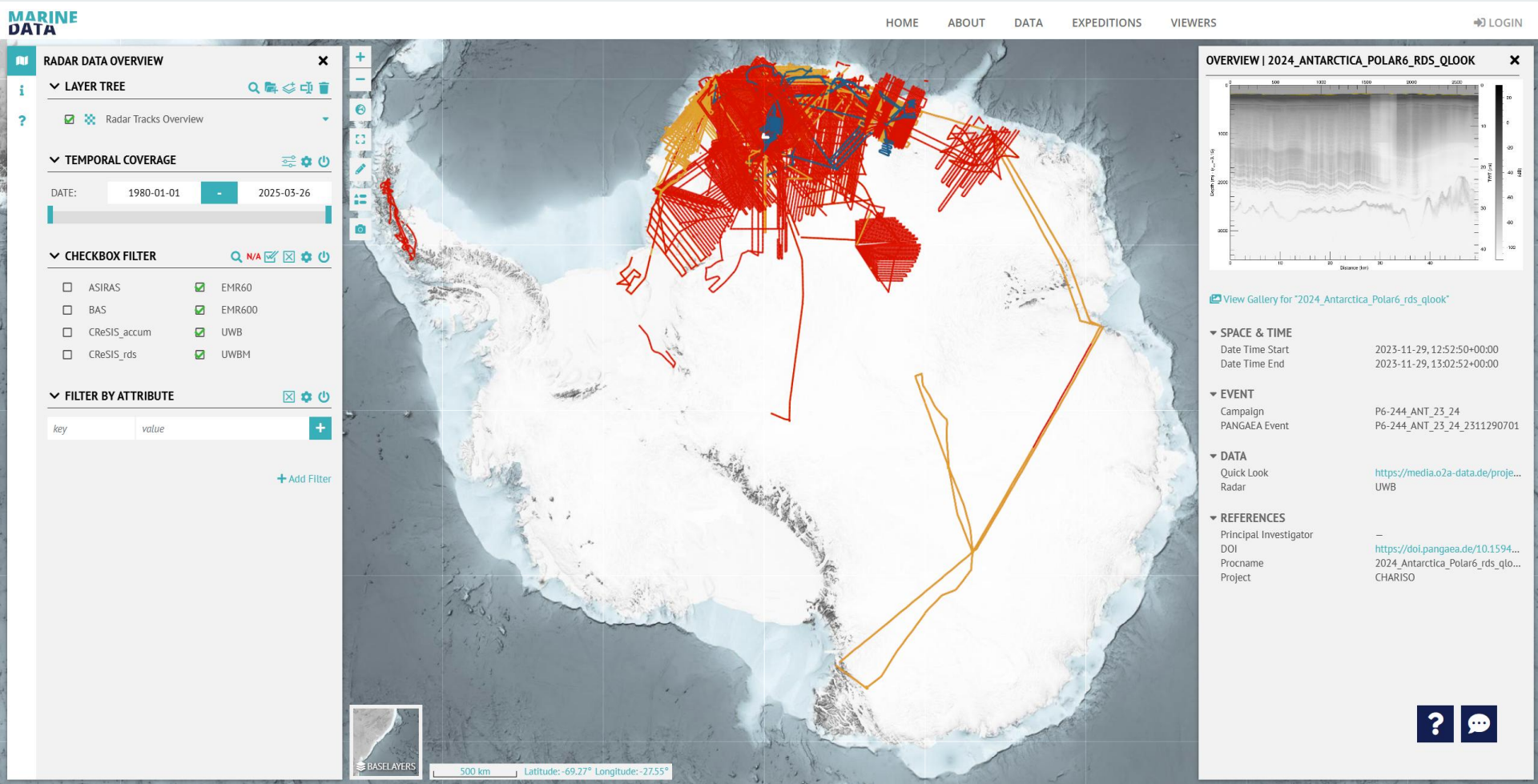
Legacy and open access of 30 years of airborne radar surveys of the Antarctic and Greenland Ice Sheet by the Alfred Wegener Institute

Daniel Steinhage (AWI Glaciology)
Veit Helm (AWI Glaciology)
Steven Franke (Uni Tübingen, AWI Glaciology)

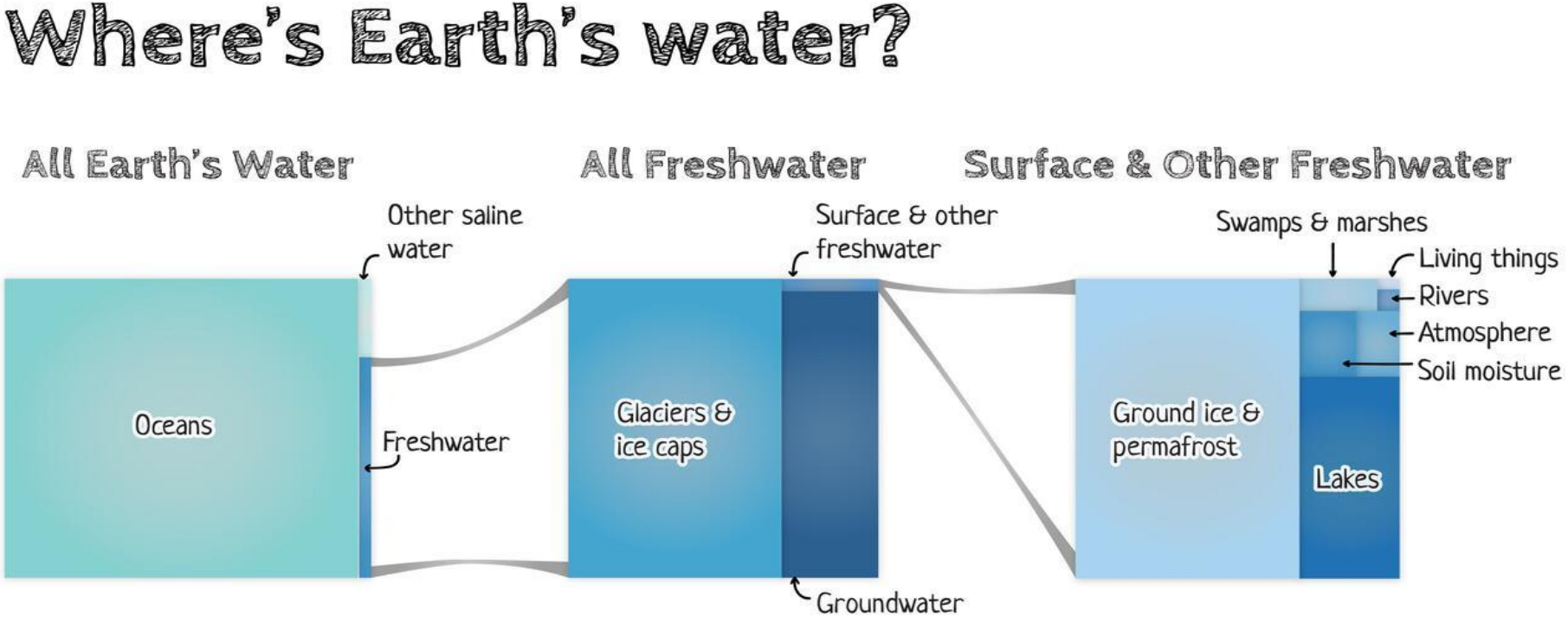
Olaf Eisen (AWI Glaciology, Uni Bremen)
Amelie Driemel (PANGAEA)
Andreas Walter, Peter Konopatzky, Robin Hess, Antonie Haas, Roland Koppe (AWI, Marine Data Portal support)

Why fair data sharing matters in German polar science

Radar Data Viewer



Why study Ice Sheets?



USGS science for a changing world

Created by Mandie Carr, USGS

Data: Shiklomanov, I. 1993. "World fresh water resources," in Gleick, P.H. (Ed.), Water in crisis: A guide to the world's fresh water resources. Oxford University Press. ISBN 9780195076288

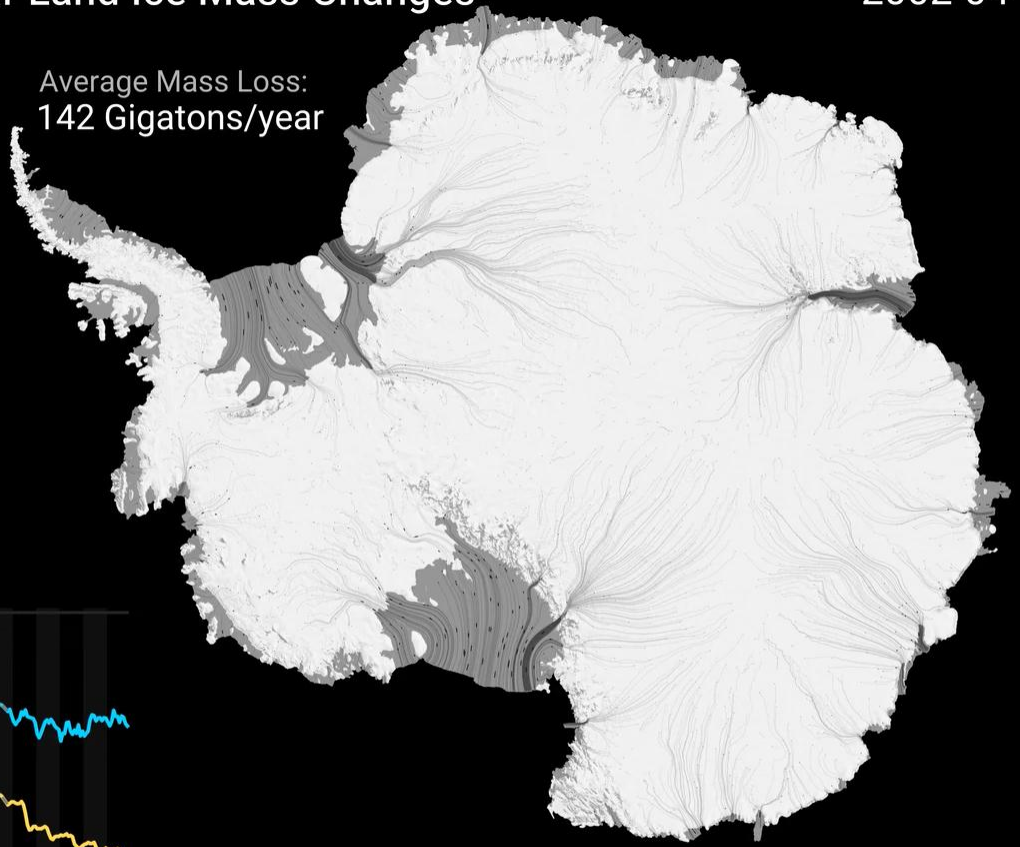
Why study Ice Sheets?

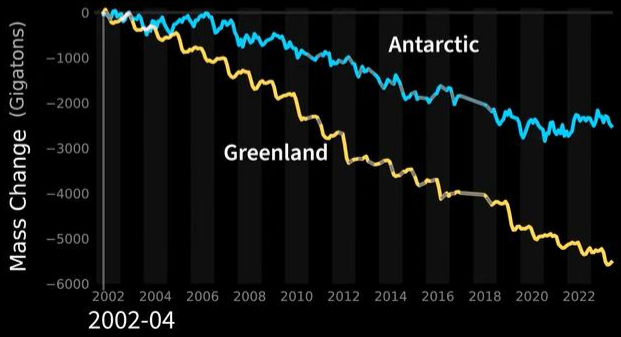
GRACE and GRACE-FO Observations of Polar Land Ice Mass Changes

2002-04

Average Mass Loss:
269 Gigatons/year

Average Mass Loss:
142 Gigatons/year

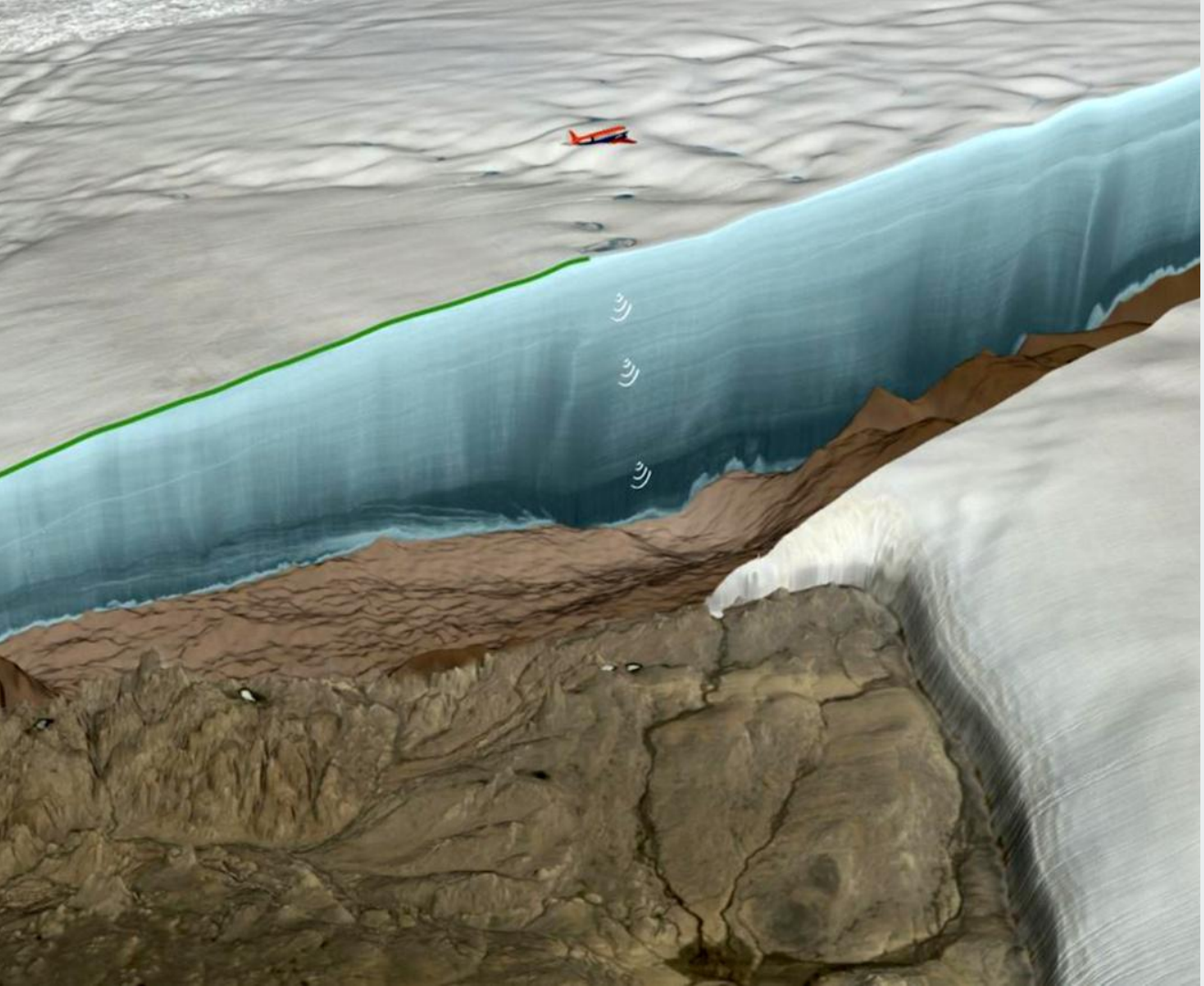


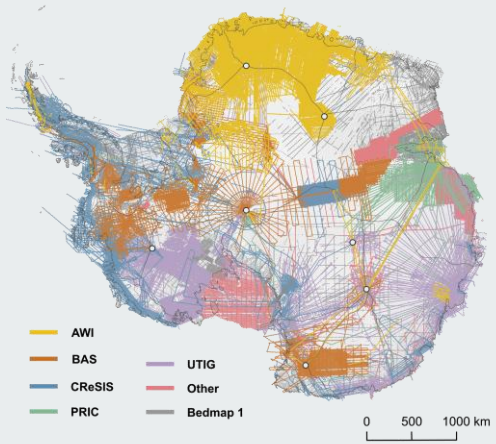


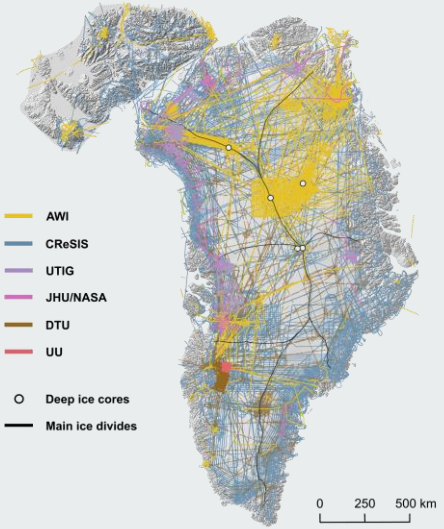
2002-04

Ice Mass Change
(meters water equivalent relative to 2002)

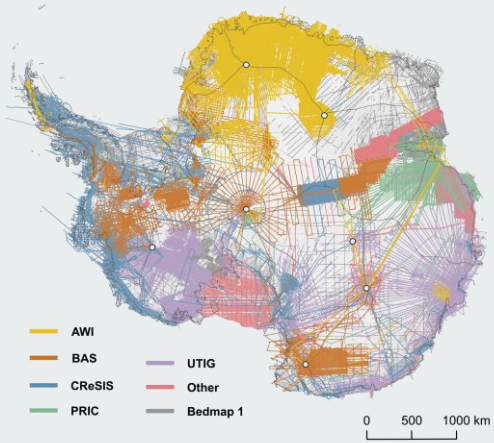
-6 -4 -2 0 2




AWI
BAS
CReSIS
PRIC
UTIG
Other
Bedmap 1
0
500
1000 km


AWI
CReSIS
UTIG
JHU/NASA
DTU
UU
Deep ice cores
Main ice divides
0
250
500 km


ICELAND
NORWAY
SWEDEN
FINLAND
RUSSIA
ESTONIA
LATVIA
LITHUANIA
(RUSSIA)
DENMARK
IRELAND
UNITED KINGDOM
NETHERLANDS
BELGIUM
GERMANY
POLAND
BELARUS
CZECH REPUBLIC
SLOVAKIA
UKRAINE
FRANCE
SWITZERLAND
HUNGARY
SLOVENIA
CROATIA
ROMANIA
SERBIA
BOSNIA HERZEG.
BULGARIA
ITALY
SPAIN
PORTUGAL
ALBANIA
GREECE


AWI
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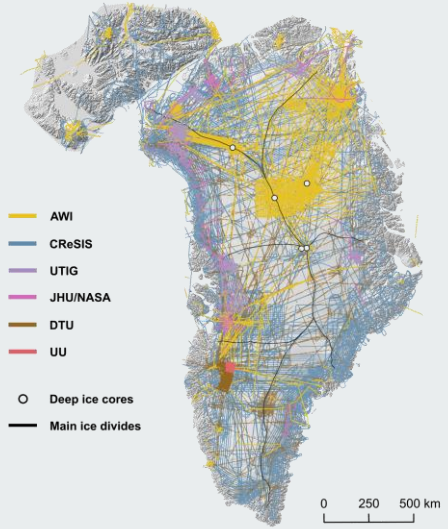
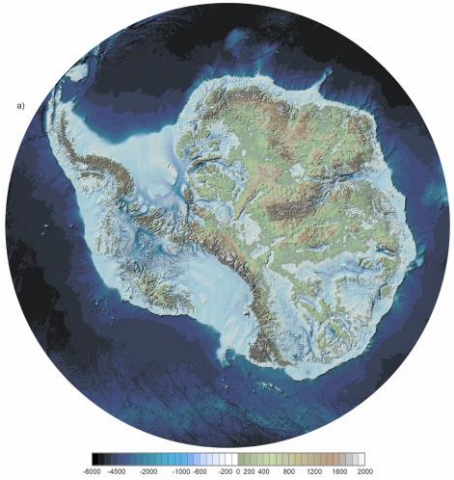

AWI
CReSIS
UTIG
JHU/NASA
DTU
UU
Deep ice cores
Main ice divides
0
250
500 km

- First radar campaigns started 1994
- Six different radar systems
- Two polar aircrafts (Polar 5 & 6)
- Radar campaigns last 1-2 month
- In total 1.377.395 km of radar profiles were collected (~ 35 times around Earth)

Main findings using airborne radar data

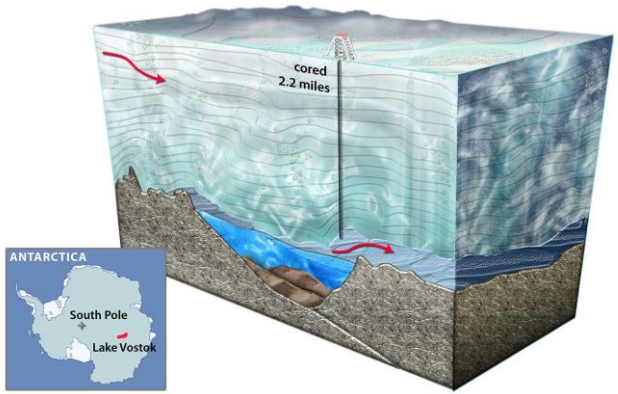
Ice thickness & bed topography

- Ice thickness up to 4 km
- 60 m sea level rise if the Antarctic ice sheet melts
- ~ 7.5 m for the Greenland ice sheet



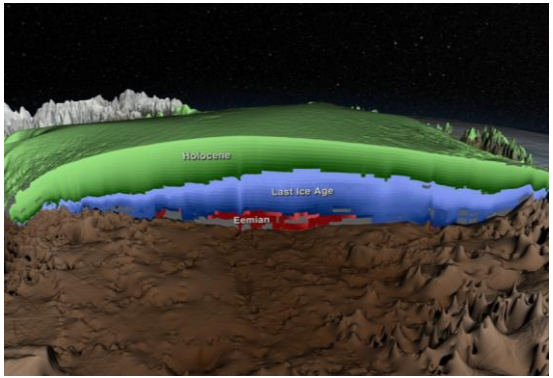
Subglacial lakes & water systems

- ~ 750 subglacial lakes
- Are isolated ecological systems for milions of years
- Seasonal water transport influences ice flow velocity

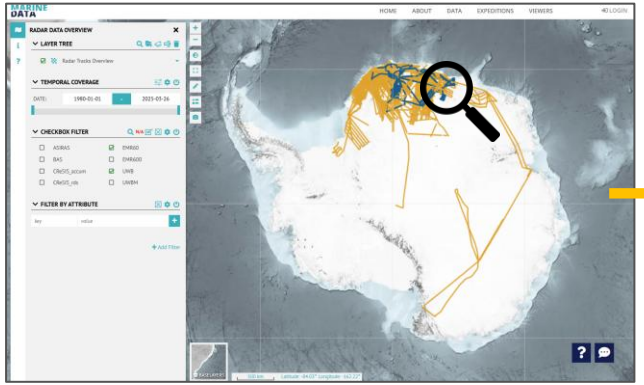


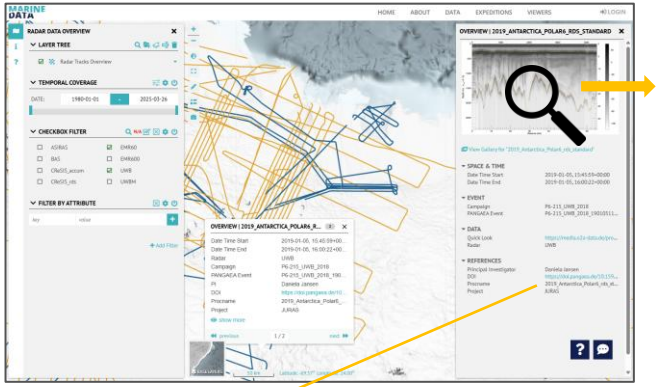
Ice-internal structure

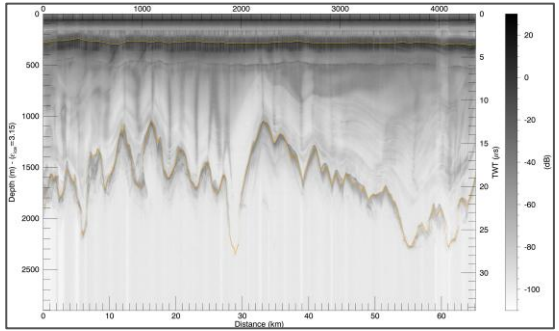
- Reconstruct climate history
- Where to drill for a new ice core?
- Knowledge about ice-internal deformation

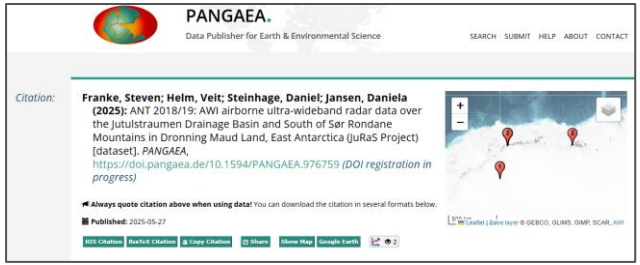


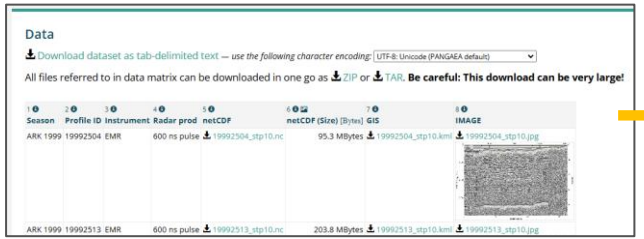
Radar Data Viewer - Usage







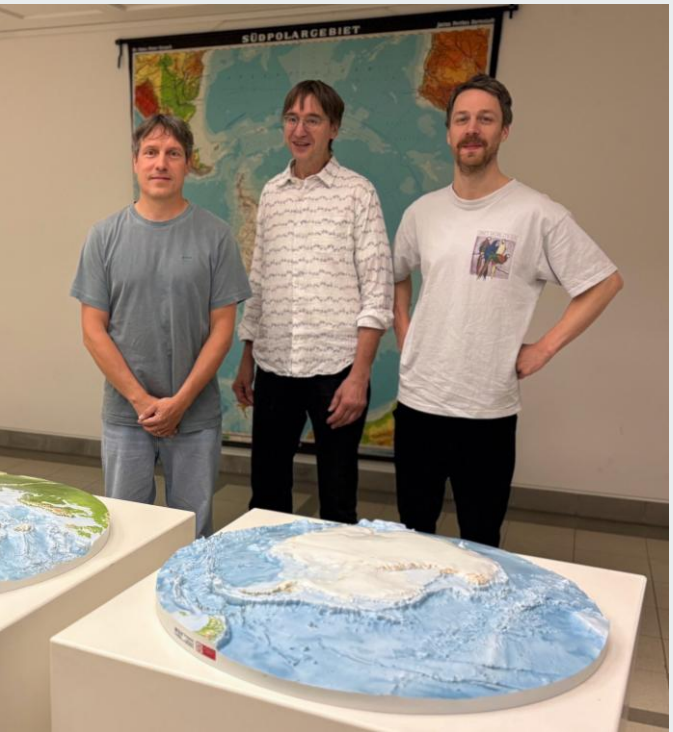




File format	Content
netCDF	Radar data + metadata
KML	Profile location (GIS file)
JPG	Quicklook of the radargram

Radar Data Viewer – Contributions & Challenges

AWI Glaciology (Field Glaciology)
AWI Logistics
Uni Tübingen (Dep. Geosciences)



- Revisiting the 30-year data archive
- Reprocessing large amounts of data
- Retrieving metadata
- Data conversion
- Workflow for the Marine Data Portal
- Data submission to Pangaea
- Quality checks and fixing bugs

Amelie Driemel

PANGAEA
Data Publisher for Earth & Environmental Science

Andreas Walter, Peter Konopatzky, Robin Hess, Antonie Haas, Roland Koppe

MARINE DATA PORTAL
The central access point to research data from the German marine research community

Data Story Summary

- Radar data is important to study polar ice sheets
- AWI has a lot of it
- Radar data acquired over the last 30 years are now available and updated
- AWI‘s Radar Data Viewer allows to explore the data archive and download the data (PANGAEA)