

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

MARINE
DATA

HOME ABOUT DATA EXPEDITIONS VIEWERS

LOGIN

RADAR DATA OVERVIEW

LAYER TREE

- Radar Tracks Overview

TEMPORAL COVERAGE

DATE: 1980-01-01 - 2025-03-26

CHECKBOX FILTER

- ASIRAS
- BAS
- CReSIS_accum
- CReSIS_rds
- EMR60
- EMR600
- UWB
- UWBM

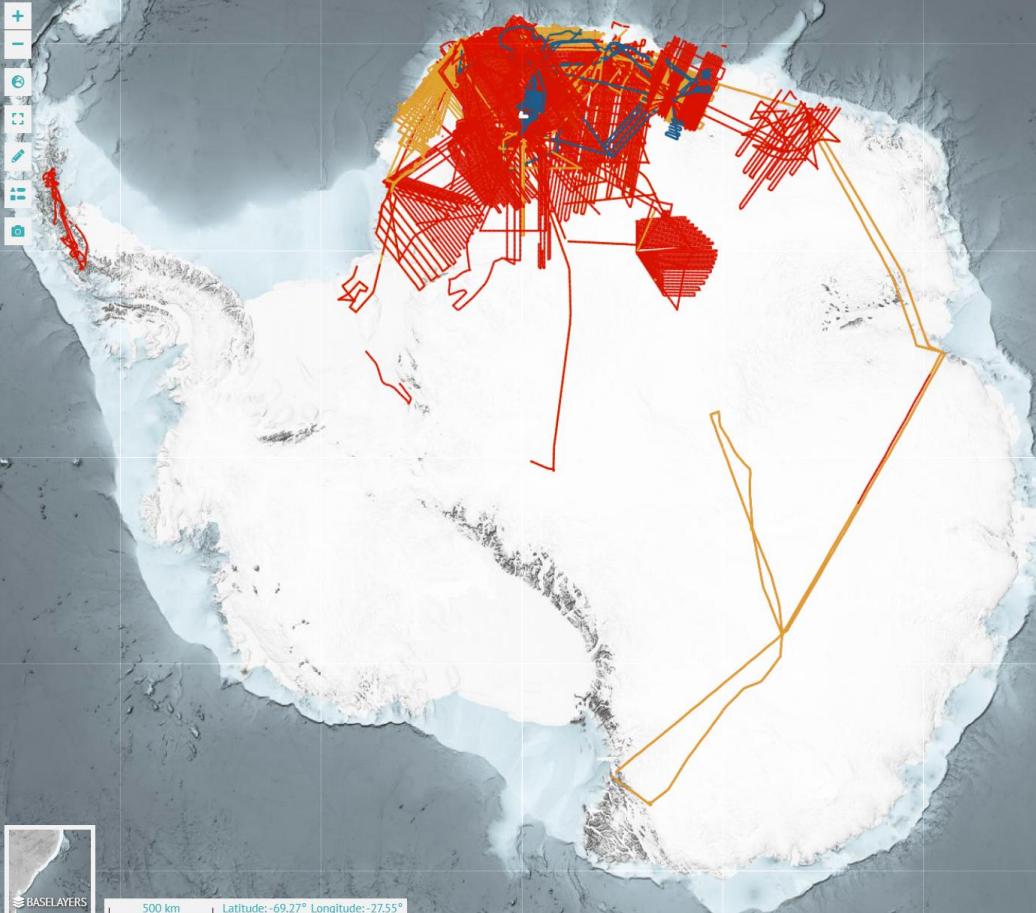
FILTER BY ATTRIBUTE

key	value

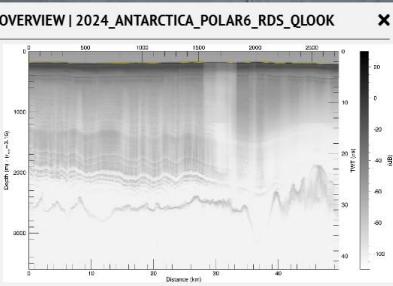
+ Add Filter

BASELAYERS

500 km Latitude: -69.27° Longitude: -27.55°



OVERVIEW | 2024_ANTARCTICA_POLAR6_RDS_QLOOK



View Gallery for "2024_Antarctica_Polar6_rds_qlook"

SPACE & TIME

Date Time Start: 2023-11-29, 12:52:50+00:00
Date Time End: 2023-11-29, 13:02:52+00:00

EVENT

Campaign: PANGAEA Event
Polar6_24

DATA

Quick Look Radar: <https://media.o2a-data.de/projekte/UWB>

REFERENCES

Principal Investigator: <https://doi.pangaea.de/10.1594...>
DOI: 2024_Antarctica_Polar6_rds_qlo...
Proname: CHARISO

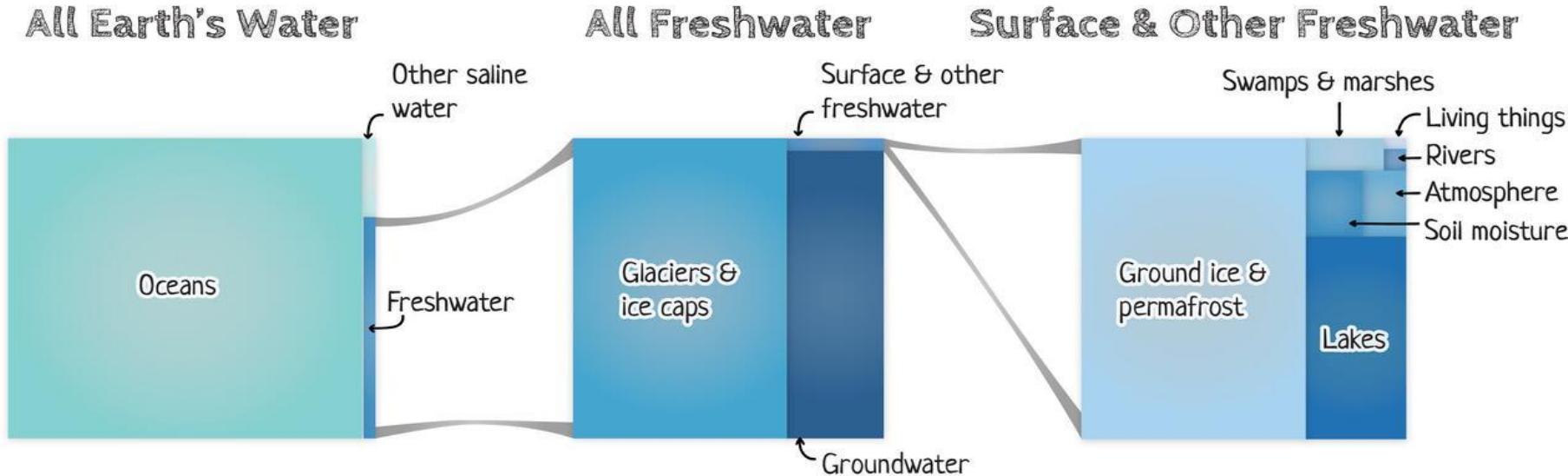
?

?

?

Why study Ice Sheets?

Where's Earth's water?



Why study Ice Sheets?



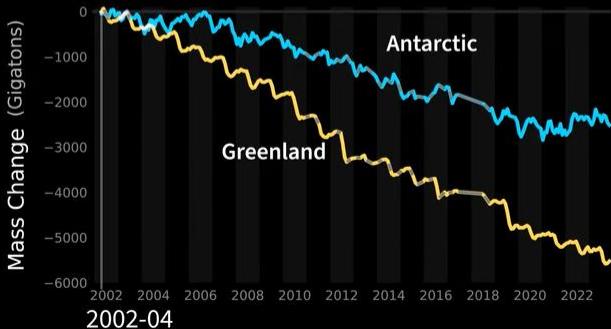
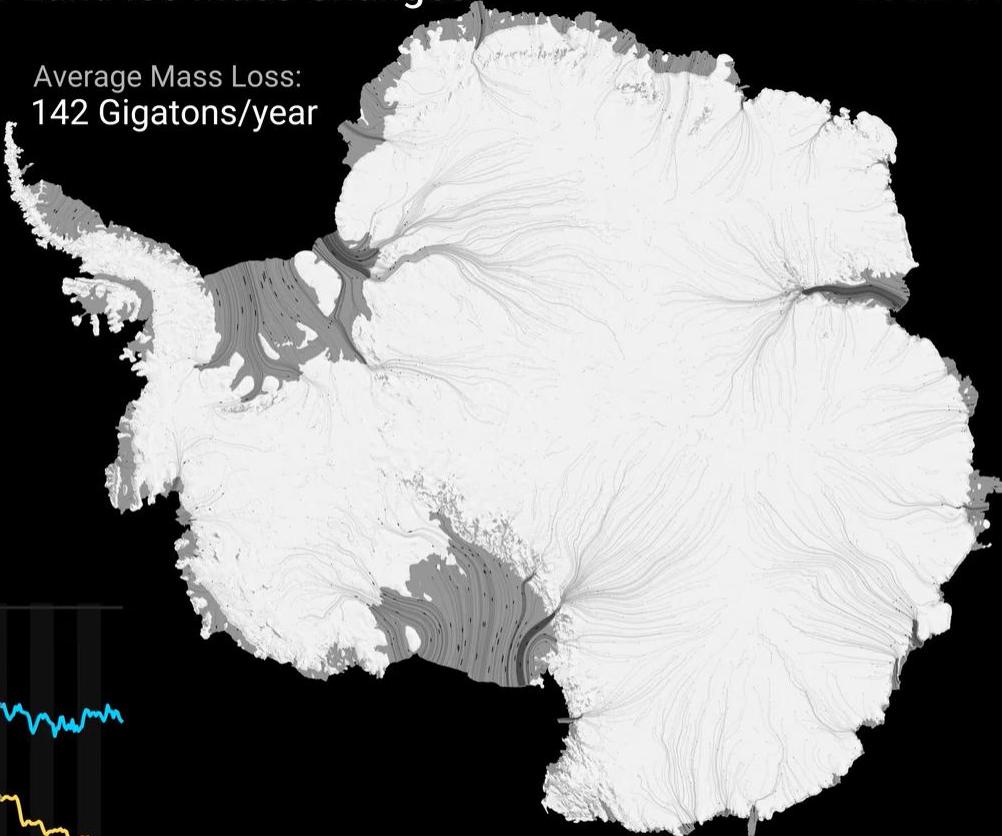
GRACE AND GRACE-FO Observations OF Polar Land Ice Mass Changes

2002-04

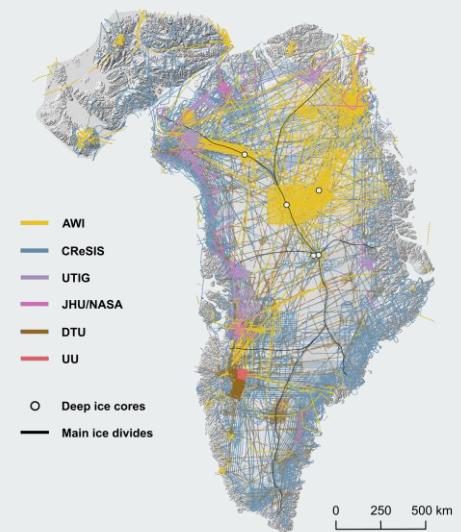
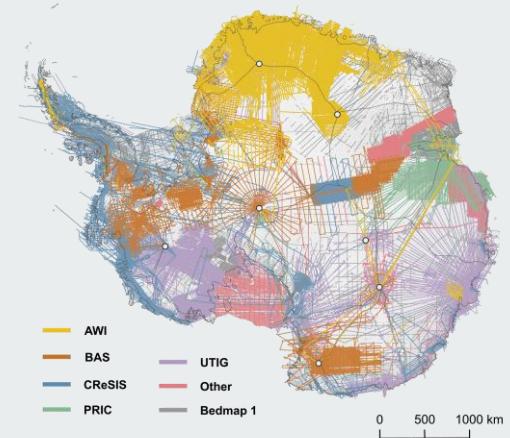
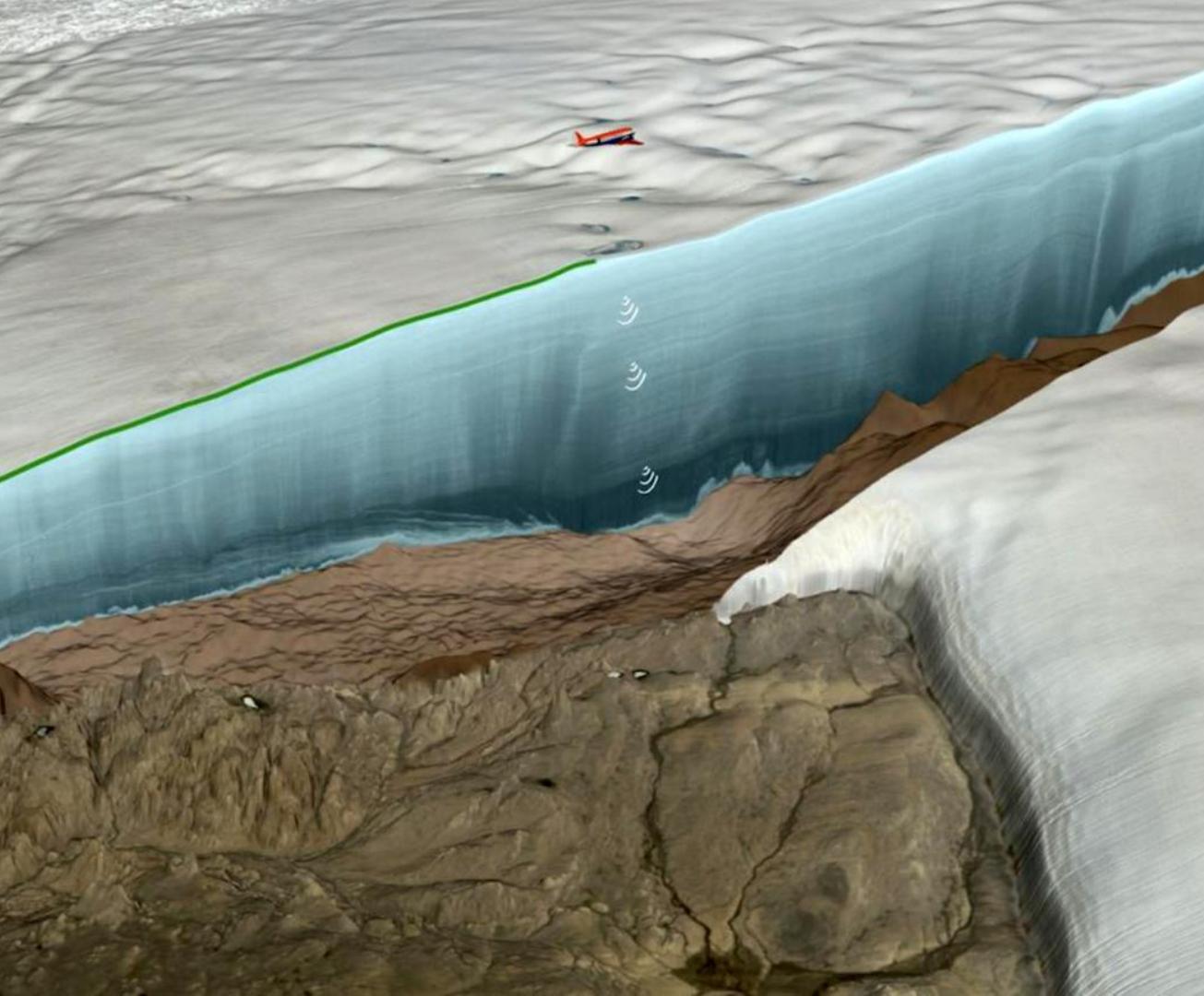
Average Mass Loss:
269 Gigatons/year

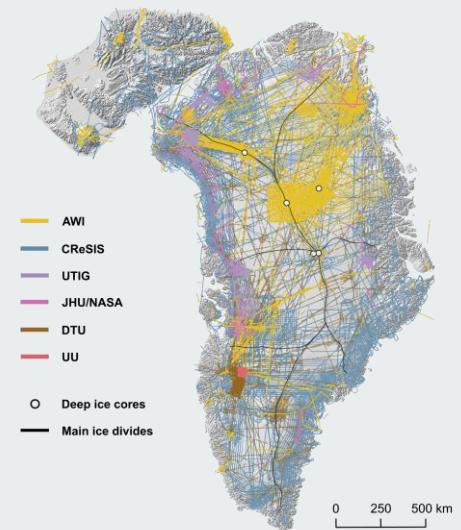
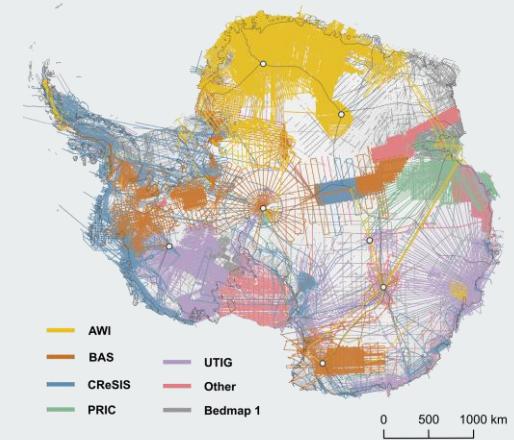


Average Mass Loss:
142 Gigatons/year











- 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

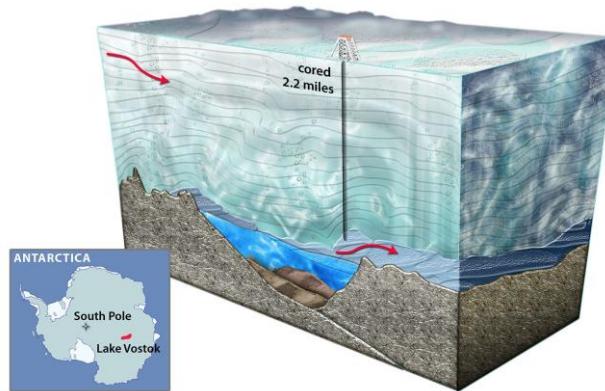
Ice thickness & bed topography

- 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



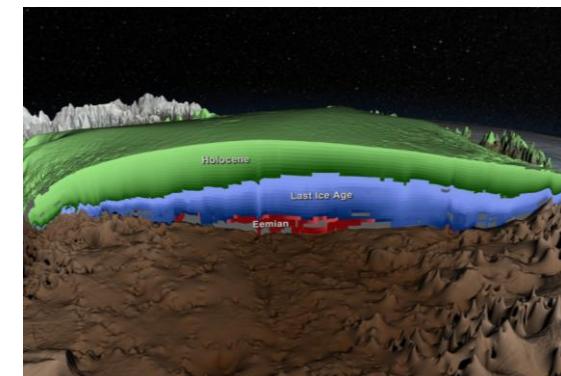
Subglacial lakes & water systems

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



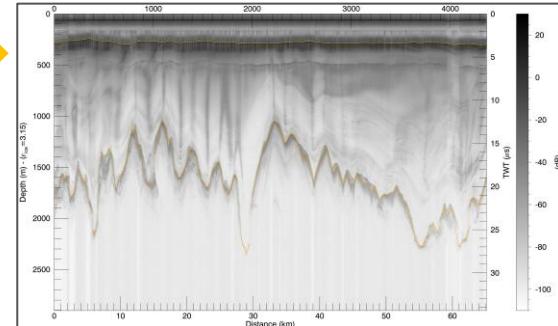
Ice-internal structure

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



Radar Data Viewer - Usage

The screenshot displays a complex scientific visualization interface for marine data. On the left, a sidebar includes sections for 'RADAR DATA OVERVIEW', 'LAYER TREE', 'TEMPORAL COVERAGE' (set to 1980-01-01 to 2010-03-26), 'CHECKBOX FILTER' (with options for OBSID, BIS, CNGS, USTEN, and UMB), and 'FILTER BY ATTRIBUTE' (with a dropdown for 'key' and 'value' and an 'Add Filter' button). The main area features a map of the Southern Ocean with numerous blue and yellow lines representing research tracks. A detailed view of the 'OVERVIEW (2019_ANTARCTICA_POLAR_R_05)' dataset is shown in the bottom right, containing a map, a table of data, and a histogram. The histogram has a yellow magnifying glass over it, and a yellow arrow points from the magnifying glass to the 'OVERVIEW' section of the sidebar. The top right corner shows a 'VIEWERS' section with a list of users and their status. The bottom right corner has a help icon and a 'Feedback' button.

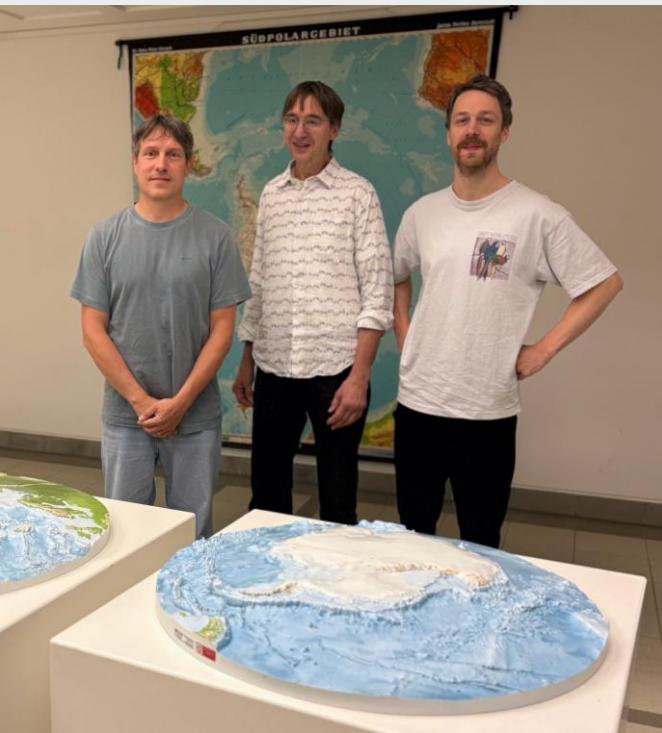


Data	
Download dataset as tab-delimited text — use the following character encoding:	UTF-8: Unicode (PANGAEA default) <input checked="" type="checkbox"/>
All files referred to in data matrix can be downloaded in one go as ZIP or TAR . Be careful: This download can be very large!	
1 2 3 4 5 6 7 8	Season Profile ID Instrument Radar prod netCDF netCDF (Size) [976KB] GIS IMAGE
ARK 1999 19992504 EMR	600 ns pulse 19992504_stp10.nc 95.3 Mbytes 19992504_stp10.0.kmz 19992504_stp10.jpg
	
ARK 1999 19992513 EMR	600 ns pulse 19992513_stp10.nc 203.8 Mbytes 19992513_stp10.kmz 19992513_stp10.jpg

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)



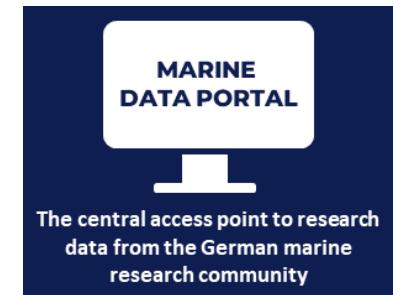
- Revisiting the 30-year data archive
- Reprocessing large amounts of data
- Retrieving metadata
- Data conversion
- Workflow for the Marine Data Portal
- Data submission to Pangaea
- Quality checks and fixing bugs

Amelie Driemel



PANGAEA
Data Publisher for Earth & Environmental Science.

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



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)

