GLACE
GREENLAND
CIRCumnavigation
EXpedition

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MLOST 1901-2012

GISS 1901-2012

Trend (°C over period)

IPCC, AR5, 2015
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Cumulative ice loss 1972-2018

Flow speed

Mouginot et al., 19
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Mouginot et al., 19
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Multiyear ice at End of Summer Since 1985

Year


Extent ($10^6$ km$^2$)

0 1 2 3 4 5 6 7

Age (years)

5+ 4 3 2 1

M. Tschudi, S. Stewart, University of Colorado, Boulder, and W. Meier, J. Stroeve, NSIDC

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Ocean Heat Content

Timmermans et al., 18
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**VESSEL TIME LINE 2019**

**LEG 0**
- 30 JULY
  - Departure in Kiel (to Reykjavik)

**LEG 1**
- 4 AUGUST
  - Circumnavigation starts in Reykjavik
- **CA. 19 AUG.**
  - Arrival in Ilulissat
- **CA. 20 AUG.**
  - Departure in Ilulissat

**LEG 2**
- **CA. 24 SEPT.**
  - Circumnavigation ends in Reykjavik

**LEG 3**
- 29 SEPT.
  - Arrival in Kiel
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3 Super Sites
Southern Greenland — Leg 1

SG1
Kangerlussuaq Fjord & Gunnbjorn Feld
68°55 N, 29°47 W

SG2
Helheim Fjord & Schweizerland
65°56 N, 36°47 W

SG3
Prince Christian Sund
60°9 N, 43°53 W
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3 SUPER SITES
NORTHERN GREENLAND
– LEG 2

NG1
RYDER & OSTENFELD
GLACIER
68°58’38” N, 32°39’ W
82°15’ N, 47°5’ W

NG2
CAPE MORRIS JESSUP
& MORRIS JESSUP RISE
83°38’ N, 32°39’ W
38°45’ N, 20° W

NG3
INDEPENDENCE FJORD
82°08’ N, 28°00’ W
(NG4, BACKUP)
ZACHARIAE GLACIER
78°00’ N, 30°00’ W
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RESEARCH VESSEL AND ICEBREAKER

AKADEMIK TRYOSHNIKOV

- Itinerary: Kiel to Kiel
- Type: Russian scientific diesel-electric research vessel
- Length: 133.6 m
- Breadth: 23.25 m
- Built in: 2012

50 LET POBEDY

- Itinerary: Northern Greenland only
- Type: Russian Arktika-class nuclear-powered icebreaker designed to break through ice up to 5 metres (16 ft) thick
- Length: 159.6 m
- Breadth: 30 m
- Built in: 2007
15 international scientific consortia selected by evaluation panel, among them 6 projects lead by Swiss PIs. Scientists from EPFL, ETHZ, UNIL, UniBe, UniBasel, PSI, WSL involved.

Scientific objectives (1/2) -

(i) investigate the consequences of ice loss/global warming on:

- atmospheric- and ocean circulation dynamics
- cloud formation
- marine biological production/nutrient inventories and air-sea CO₂ exchange
- terrestrial biome evolution, habitat loss, biodiversity
Scientific objectives (2/2) -

(ii) generate benchmark observations

• (micro)plastic, atmospheric pollution
• fish/zooplankton stocks
• sea-ice thickness/volume
• continental ice loss/glacier dynamics

(iii) generate paleo/historical-timeseries to document environmental change
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Projects lead by Swiss PIs

• **BioShrubGreenLand (Beat Frey, WSL)** – plant biodiversity

• **GRIST (Frédéric Herman, UNIL)** – glacial erosion/sedimentary budgets

• **INIGMA (Zamin Kanji, ETHZ)** – arctic cloud nucleation

• **GreenMelt (Moritz Lehmann, UniBasel)** – meltwater flux/nutrient budget/ocean productivity

• **SPAARC (Athanasios Nenes, EPFL)** – aerosols

• **DAWATEC (Hieni Wernli, ETHZ)** – water and trace elements in water, snow and ice
Data Management Plan/integrated data platform

• Comprehensive data management plan to ensure scientific synergies and data sharing

• Data and samples will be made publicly available after 2 year moratorium

• Open access publication strongly encouraged

• Collaboration with Swiss Data Center under discussion
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