ASP annual meeting 2020

zoom

ARC activities in 2020

WP1.

- EU proposal on air-sea-ocean interactions (ASP institutions involved)
- Laboratory work on sea spray and greenhouse gases
- St North publication of 10 years of cloud monitoring

AIR - SEA ICE - OCEAN INTERACTIONS IN POLAR SYSTEMS

(ASIOPOLAR)

asiopolar

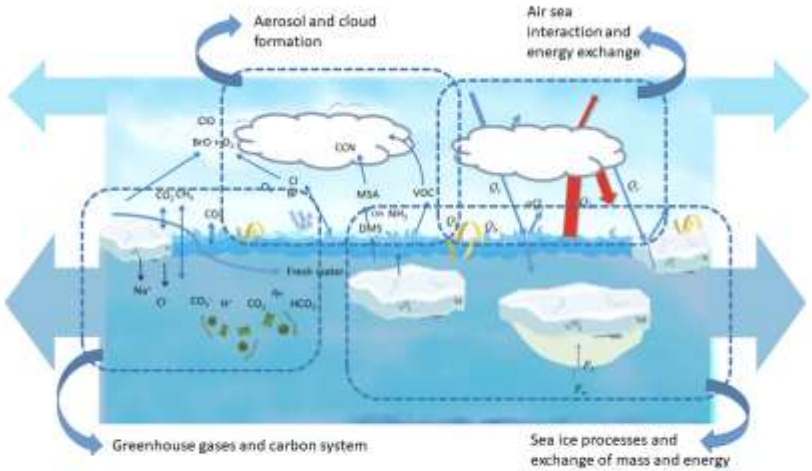


Fig 1.3 Illustration of the coupled polar system, the linkage to lower latitudes and the processes essential to the energy budget and warming in the polar system, which will be explored and assessed in ASIOPolar. Q_s: Shortwave radiative flux; Q_l: longwave radiative flux; Q_{hs}: sensible heat: Q_{hl}: latent heat; F_c: heat conductive flux; F_w: Oceanic heat flux; CCN: cloud condensation nuclei

ARC activities in 2020

WP2.

- Field work Ella Ø, Illulisat fjord
- COP development & test
- Royal Greenland Trawler project
- Uummannaq/Disko Bay moorings retrieved (ASP- ones)
- New papers on water masses

ARC activities in 2020

WP3.

- Field work Zack completed
- 3-4 other field campaigns cancelled
- Writing up data (small til large scale)
- Submitted several proposals (also ASP involvement)
- Equipment development, camera systems, image analysis, insect sorting etc.
- Machine learning paper on insect sorting and identification

ARC WP4 : Contaminant and sediments

Pollution

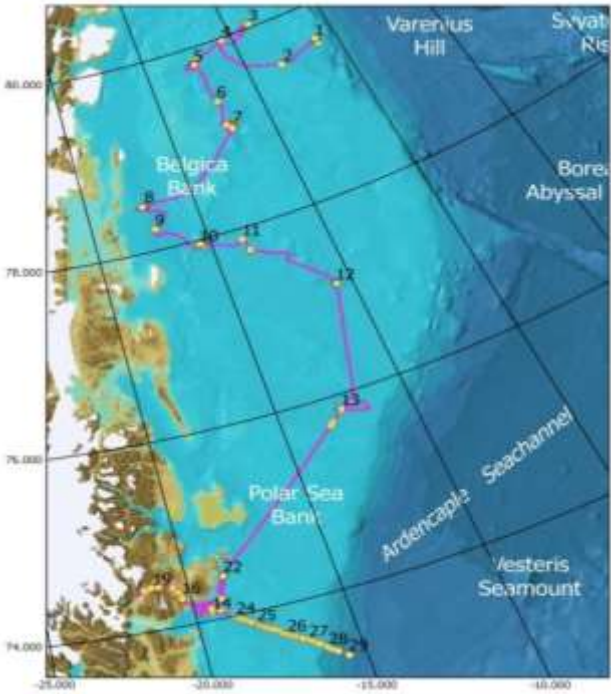
Pathways of contaminants in seabirds and food webs (Mosbech, Eulaers, Dietz)
Ecotoxology; Impact of shipping on the Arctic environment (Bach, Wegeberg)

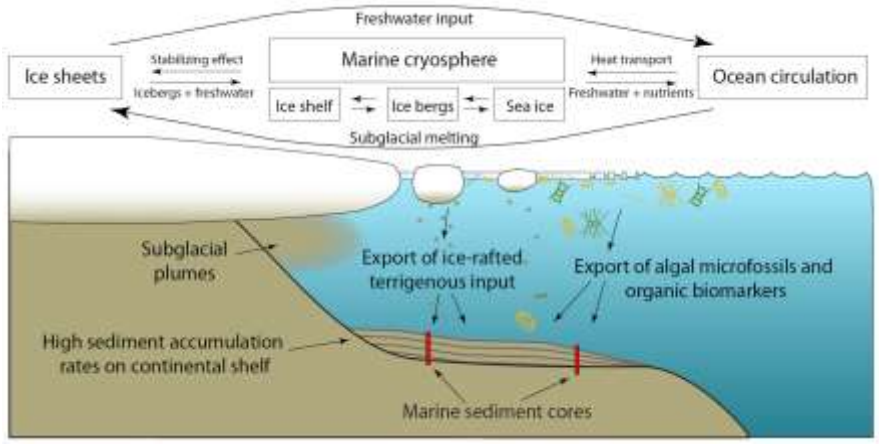
Geomicrobiology

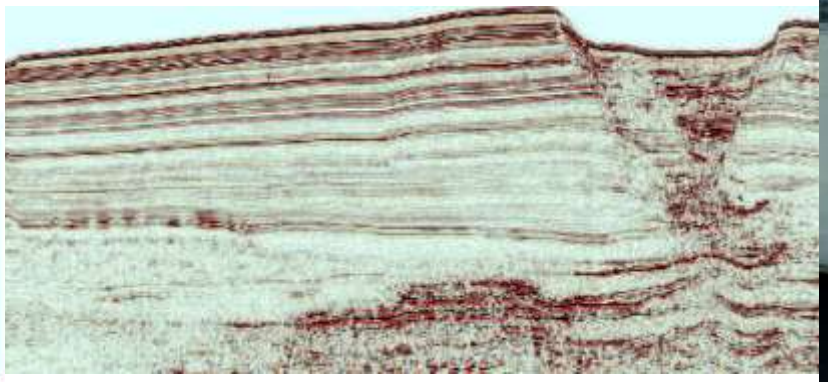
Microbial turnover, sulfate and nitrate reduction
Biodegradation of oil spills (Vergeynt, Wegenberg)

Paleoceanography and paleoclimate

AUFF Starting grant, Pearce): Arctic climate and sea ice; 2018-21.
CLAMS (DFF 1; Pearce): 14C reservoir ages in the Arctic; 2018-20.
G-Ice (DFF 2; Seidenkrantz): long-term sea ice variability, Greenland; 2017-21.
Contribution to CARMA project (DFF 2; Krause-Jensen), 2018-22.
GreenShelf (DFF 2; Seidenkrantz): NE Greenland shelf ocean and glacier history







ARC activities in 2020

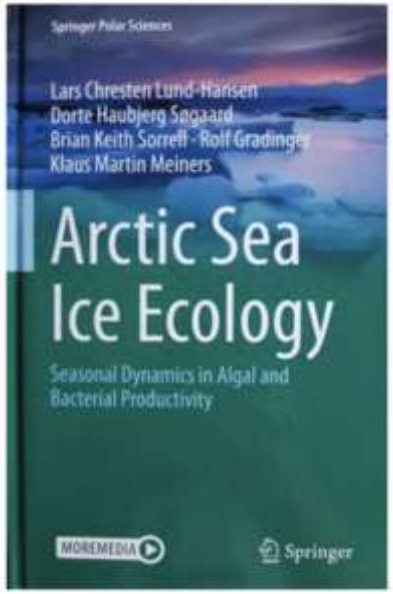
WP5.

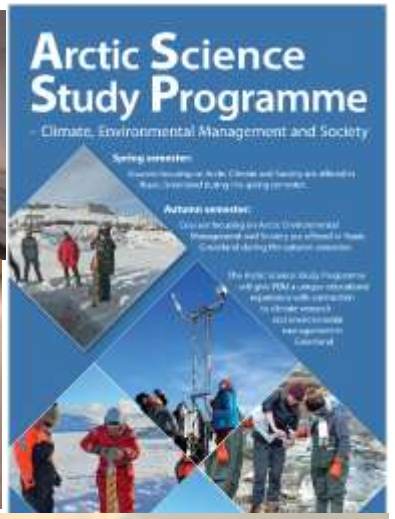
- New Novo funded project on bioaerosols - Building chamber to study areosols
- Insect sorting
- UAV for bathymerty, currents and CTD mapping
- AUV cheap development (to 2 km)
- Profilers – CTDs –cheap
- Ice drones
- Ice rovers

ARC activities in 2020

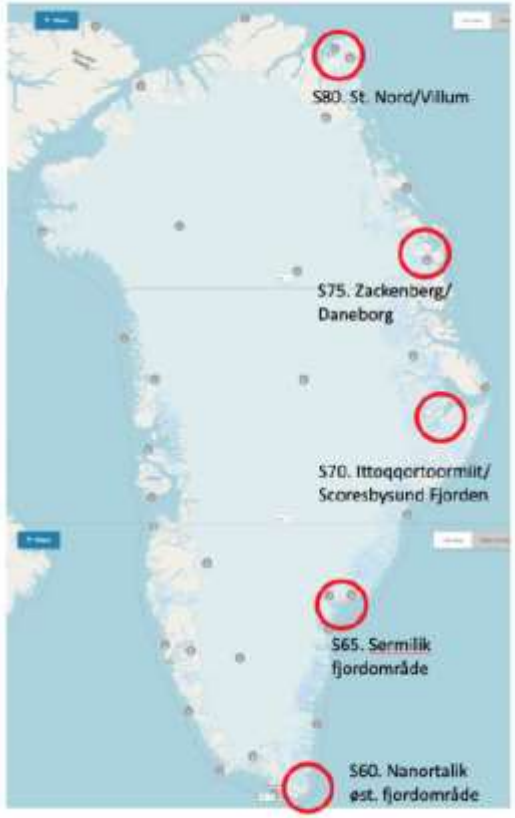
WP6.

- Arctic Science Study Programme (ASSP) year-round teaching activities
- Summer (UArctic) school: Climate change Effects on Nature and Society in the Arctic
- First e-learning course including field school in Greenland and Iceland





Greenland gradient



Greenland gradients

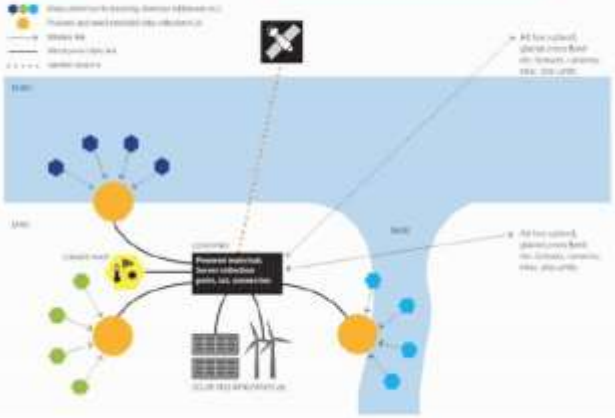
Step 1: Establishment of distributed powered autonomous observatory
- Renewable solutions
- Key parameters (seasonal/annual) to be measured for shared use
- Realtime data transfer, access points

Step 2: Synoptic transect from south to north, snapshot conditions

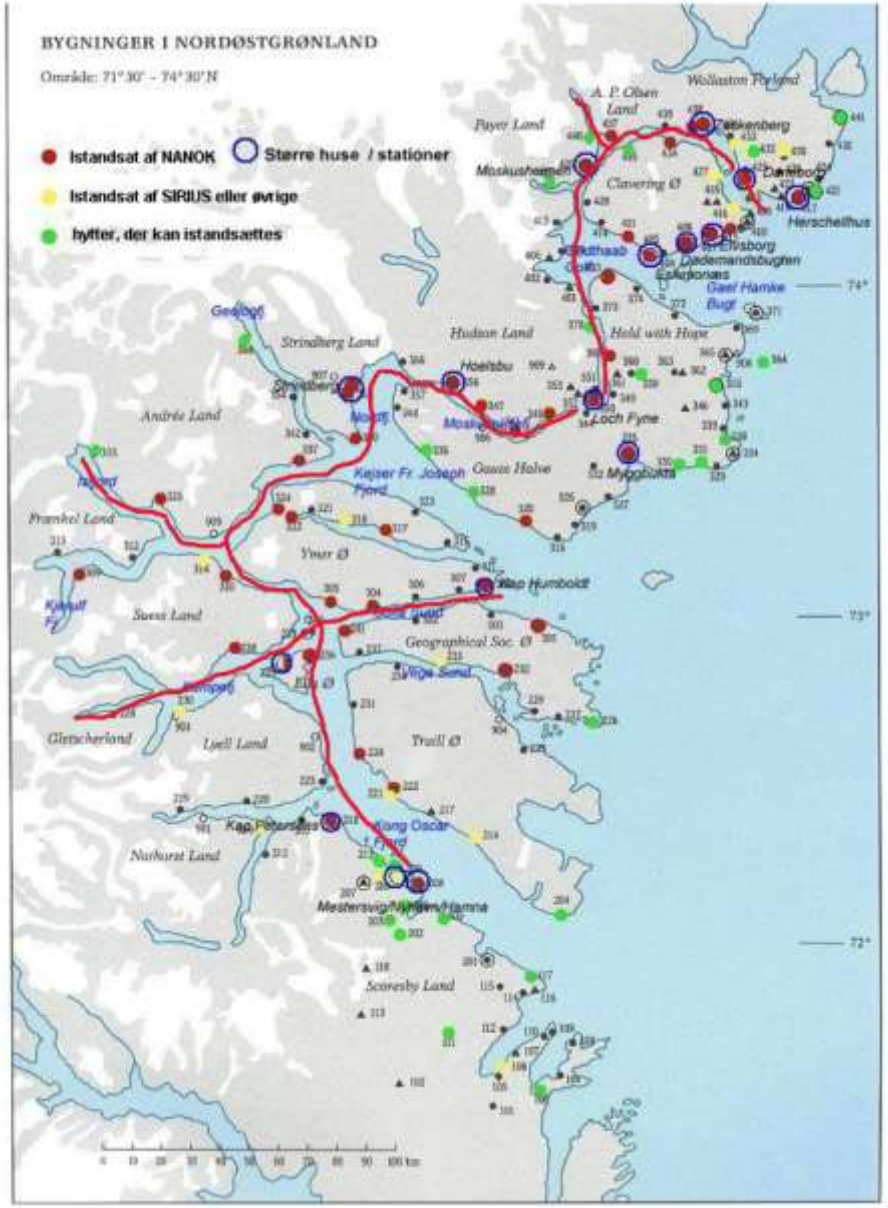
Step 3: Capability for supporting west-east transects

Step 4: Synthesis and extrapolation to the Greenland scale and beyond
- Data-model fusion

Schematic illustration of each distributed observatory



Greenland gradient phase 2



Greenland Integrated Observing System (GIOS)

- Greenland plays a unique and central role in the global climate system. The purpose GIOS is to resolve and understand the mechanisms behind climate and environmental change in Greenland and beyond.
- GIOS is a new coordinated long-term network of sustainable long-term research infrastructures in and around Greenland observing the changing air, ice, land, and ocean conditions representing not only the entire Greenland but a climate gradient representing the Arctic as a whole.
- GIOS will provide a much-needed data foundation for international remote sensing calibration and modelling efforts that are focused on understanding how changes within and around Greenland will influence global climate, sea level rise and living conditions for both Arctic communities and the population of the Northern Hemisphere and for future sustainable growth.
- At the same time, GIOS aim to reduce its carbon footprint by implementation of renewable energy systems in camps and observatories, and to reduce fossil fuel emissions and costs by optimizing shared logistics between institutions
- The proposed infrastructures will enable coming innovative and state-of-the-art research and allow the Danish Realm to have a leading role in Arctic research.

Greenland Integrated Observing System (GIOS)

Scientific quality and impact

GIOS will resolve the underlying mechanisms driving environmental change in Greenland and beyond. It will encompass all components of the natural system and provide holistic scientific understanding of the drivers behind variability in the climate system. The Arctic research infrastructure consists of components to monitor atmosphere, ocean, fjords, sea ice, glacier ice and fishery in a time where severe warming occurs in the Arctic.

National added value

The infrastructure is expected to contribute to tackling societal challenges on local, regional and global scales, including those defined by the United Nations as the UN Sustainable Development Goals. GIOS will represent a major contribution from the Danish Realm towards the Arctic Council's goals of a sustained Arctic observation program.

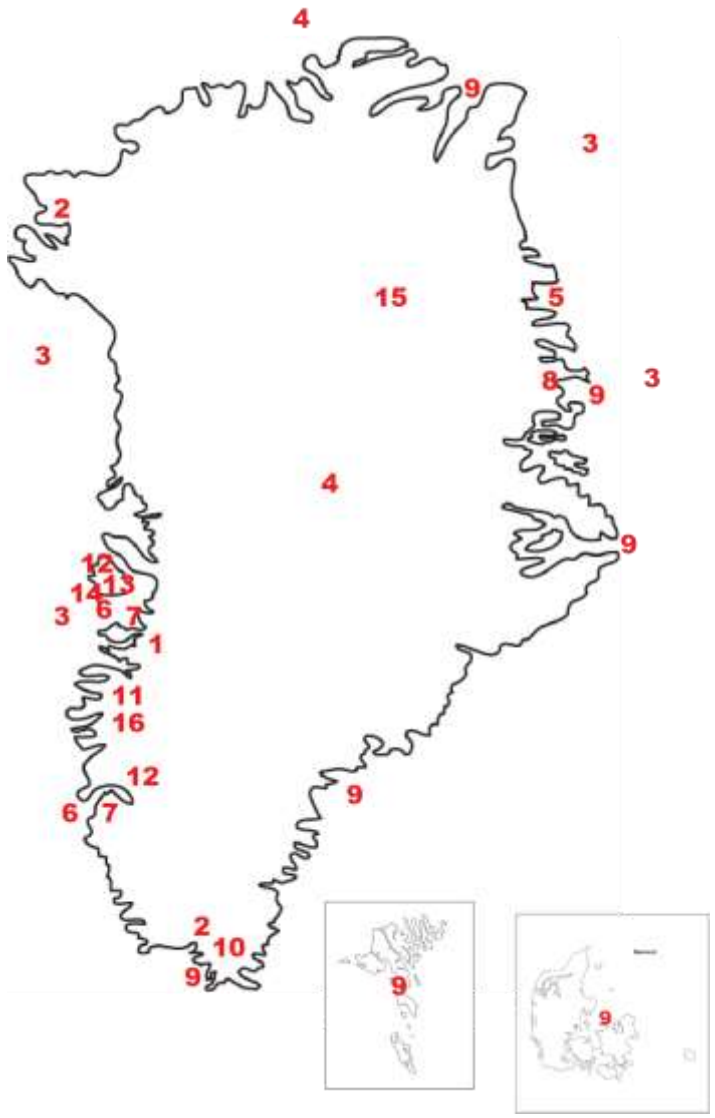
Socio-economic impact

The research infrastructure will have an important national impact not only for research within the Danish Realm but also more broadly for society and locally for the Inuit population. Researchers from the Danish Realm have a longer tradition than researchers from any other nations in conducting science and research in Greenland. It is our goal to maintain and strengthen this position.

Feasibility

GIOS builds on a close collaboration between applicants and regular meetings over the past five years with the aim of strengthening collaboration between institutions within the Danish Realm on observations, research, education, infrastructure and logistics in Greenland. It has resulted in the internet portal – the Arctic gateway. During the last years this homepage has become so popular that several other nations have asked if they can join.

Greenland Integrated Observing System (GIOS)



O#	Element in GIOS	Responsible partner
1	Permafrost 20 m - Kangerlussuaq/Sisimiut	DTU
2	Geomagnification - net - 17 stations /(Qaaanaq & Nassasuaq)	DTU
3	Oceanographic moorings - 4 localities	DTU
4	Cryo - snow radar to airplane	DTU
5	Water level indicator Danmarkshavn	DTU
6	Acoustic and oceanographic moorings :marine mammals, plankton, fish and oceanographic	GINR
7	Moorings - real time temperature,	GINR
8	Zack/DNB solar panels/Wind mills, DNB pier, Argo, boats	AU
9	Greenland gradient Kap Farvel to St Nord instrument - atmosphere - lake - river - fjord (3 units)	AU
10	Climate incubators, weather stations, fluxes above and below ground	AAU
11	Promise stations 20 stations - rain gauges, runoff, real time Kangerlussuaq, Qaanaq	GEUS
12	New snow water equivalent meter for glacier station in Kobbefjord and Improved data connection for realtime	Asiaq
13	Upgrade climate stattion and calibration system for Humidity Air-temperature Profiler at Qeqertarsuaq	Asiaq
14	Arktisk station - storage facility of science equipment	KU
15	Solar panels on mobile dome - pistenbully, sledges, 5 skidoos	KU
16	Coordination of GIOS	All