International Icebreaker Research Operations

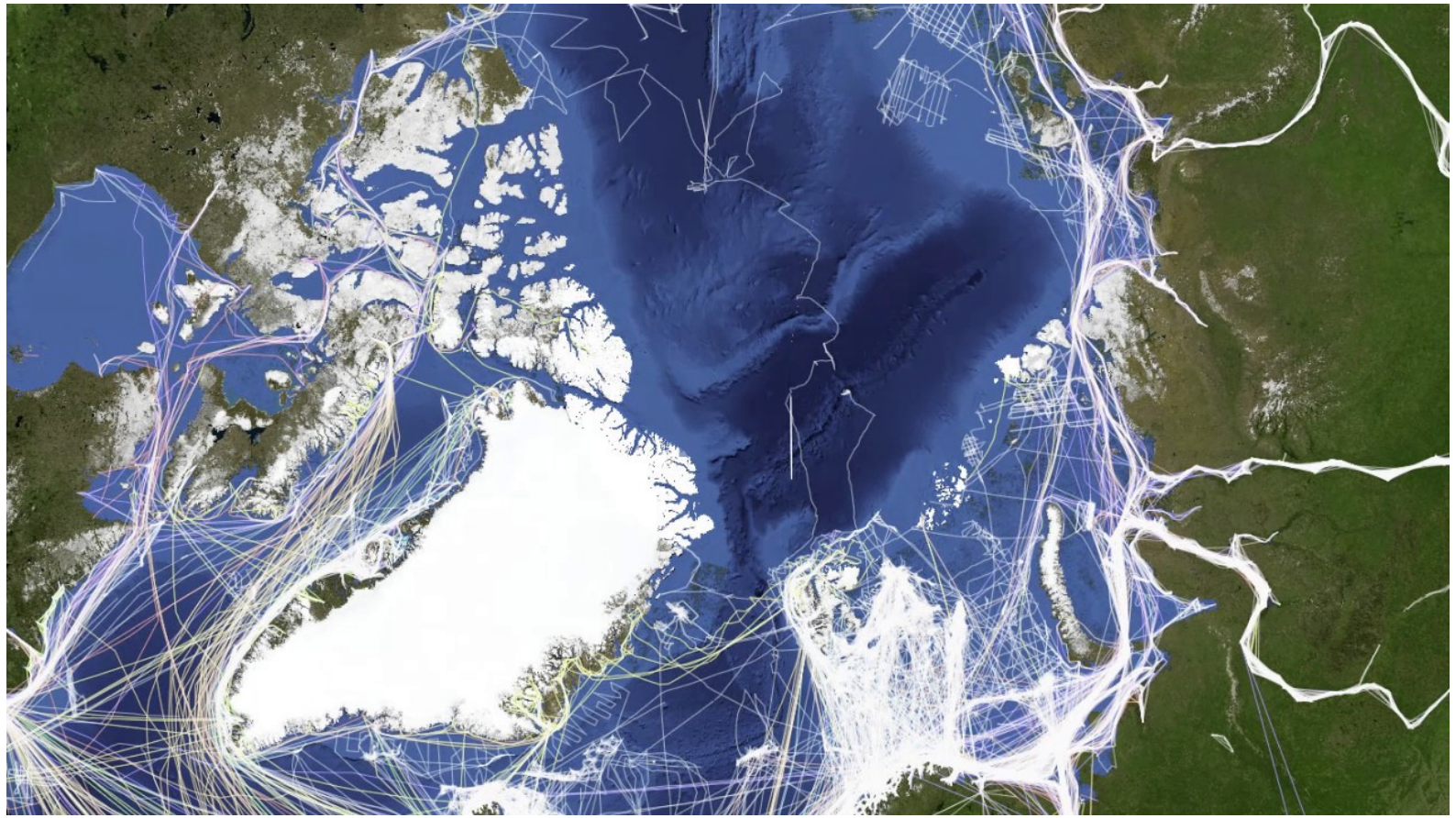
Well developed but increasing:

- Surveys
- Autonomous deployments

Developing and Future:

- Drifting stations
- Bases for survey activities

Surveys and autonomous deployments



Kronprince Haakon (Norway)
Xuelong (China)
Xuelong II (China)
Aaron (Korea)
Polarstern (German)
Amundsen (Canada)
Oden (Sweden)
Federov (Russian)

Many others.

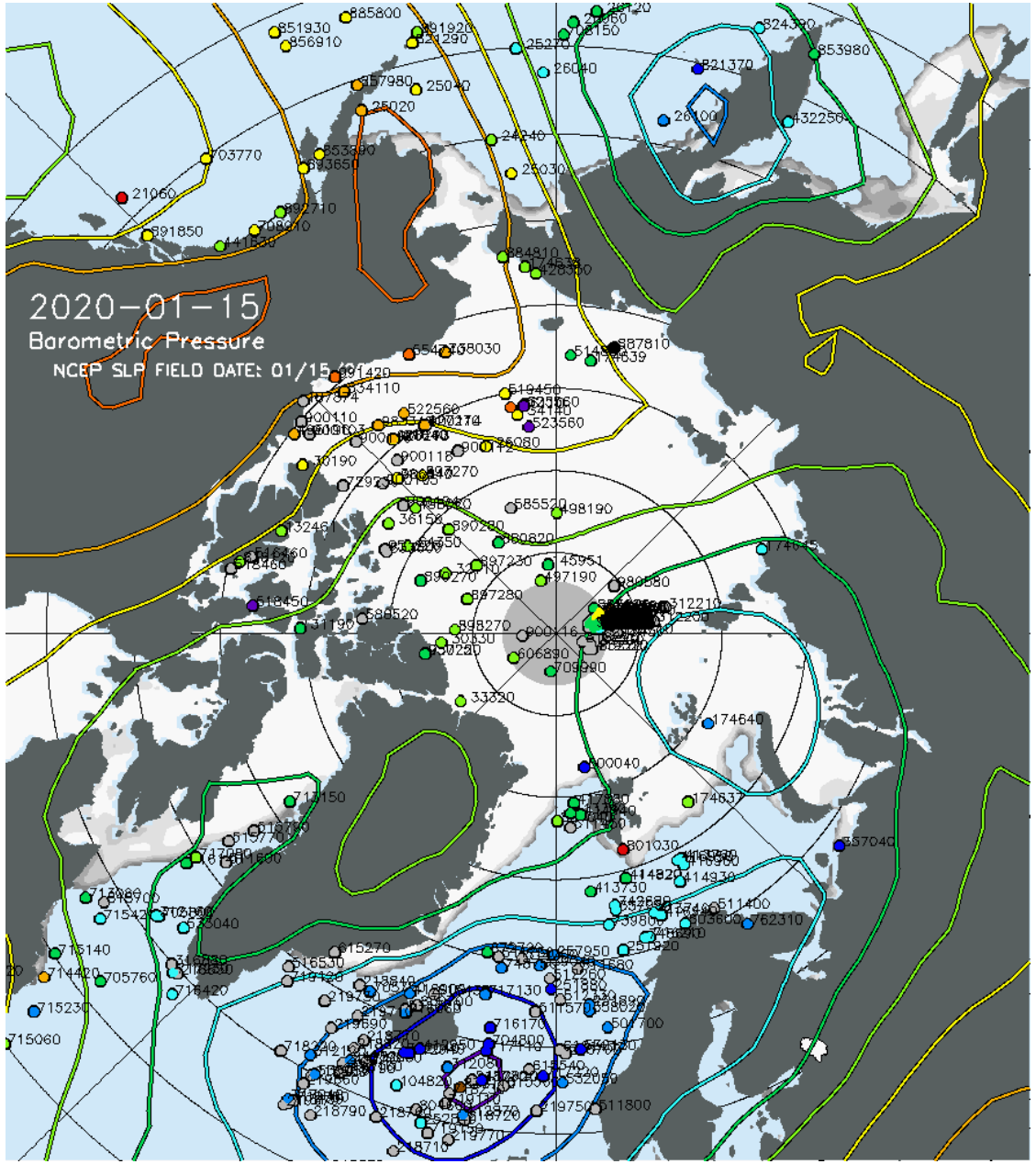
Surveys for LOS, minerals
Spatial variability in properties

Survey operations are the most developed international activity, serving to project national interest into the region in addition to science.

Primarily in summer. Increasingly to high latitudes.

Autonomous Deployments

- Increasing demand to fill in situ observing arrays.
  - Canadian and Danish air deployments really filling in networks
- Air deployment will not be possible for many types of desired observations.
- Expect increasing demand for grid-filling in high Arctic

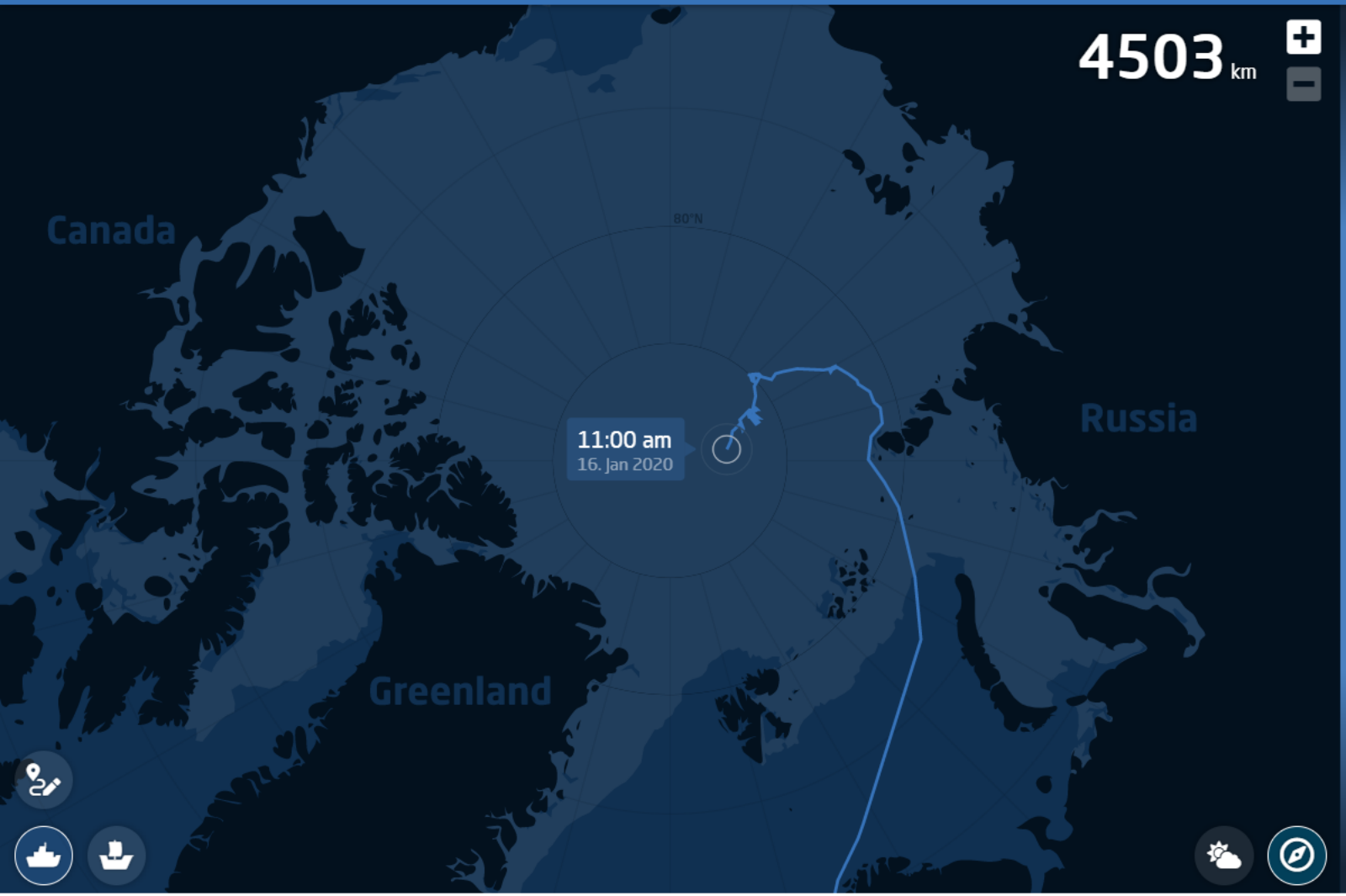


Drifting Camps

- N-ICE 2015 (6 months)
- MOSAiC (13 months)
- Russian “North Pole” camps
- Chinese, Korean, Norwegian, German, Canadian weeks to month camps.

Process understanding and prediction requires long term process studies
Forward Operating Base Model

MOSAiC



19. January 2020

SATURDAY
18. January
2020

FRIDAY
17. January
2020

THURSDAY
16. January
2020

WEDNESDAY
15. January
2020

TUESDAY
14. January
2020

MONDAY
13. January

16. January 2020

Benjamin Rabe

In the past few days we have set up a station that has been missing so far from Leg 1: the ridge observatory, which we call 'Fort Ridge' as it includes parts of the area initially called the Fortress. It is approximately 100 metres long and 15 to 20 metres wide and located 400 to 500 metres northwest of Polarstern and can be reached by the ROV. The ridge is partly formed by first-year ice on its eastern side, while there might be some older components on the western side. It has likely formed in a deformation event in October 2019, when the first-year ice plate slipped on probably older chunks. In any case, drilling and coring indicates that the ridge is not fully consolidated as it has several soft layers and wet cavities instead of only compact ice. In a common effort, teams Ice, Ocean and Eco installed several instruments to study the processes, fluxes and biota on, in and

An entire year trapped in the Arctic ice

The largest Central Arctic expedition ever

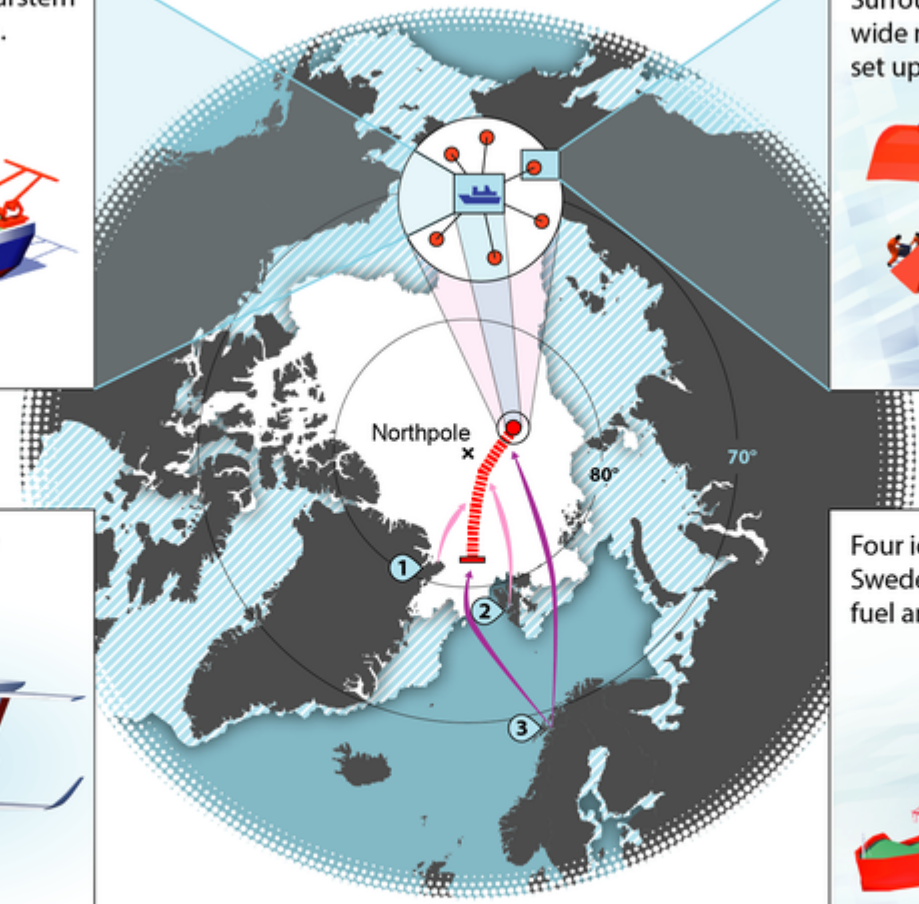
In September 2019 the German research icebreaker Polarstern will depart from Tromsø, Norway and, once it has reached its destination, will spend the next year drifting through the Arctic Ocean, trapped in the ice. A total of 600 people from 17 countries, who will be supplied by other icebreakers and aircraft, will participate in the expedition – and several times that number of researchers will subsequently use the data gathered to take climate and ecosystem research to

The Expedition ›
Science ›
Team ›

September 2019 — Drift — September 2020

The German research icebreaker Polarstern will be at the heart of the expedition.

Surrounding Polarstern, a several-kilometre-wide network of monitoring stations will be set up



During the expedition, at least three research aircraft will be deployed.

Four icebreakers from Russia, China and Sweden will resupply the expedition with fuel and exchange personnel.

Ice expanse:
- Summer
- Winter

Contact routes:
- Aeroplanes
- Icebreakers

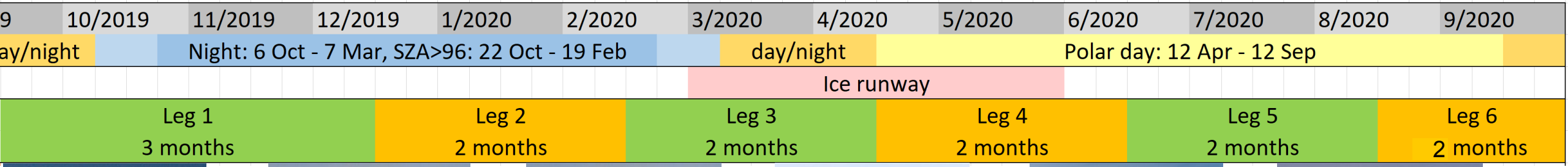
Harbours / Airports:
1. Station Nord, Greenland
2. Longyearbyen, Svalbard
3. Tromsø, Norway

AWI GRAPHIC

Expedition timeline

Start: 20 September 2019

End: 14 October2020

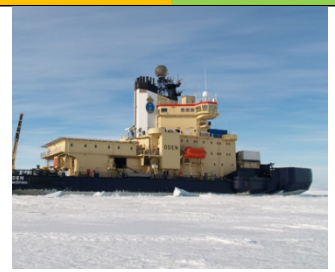


Until mid Oct
Fedorov

Mid December
Makarov

Mid February
Makarov

Mid April
Antonov AN-74
=> Ice runway

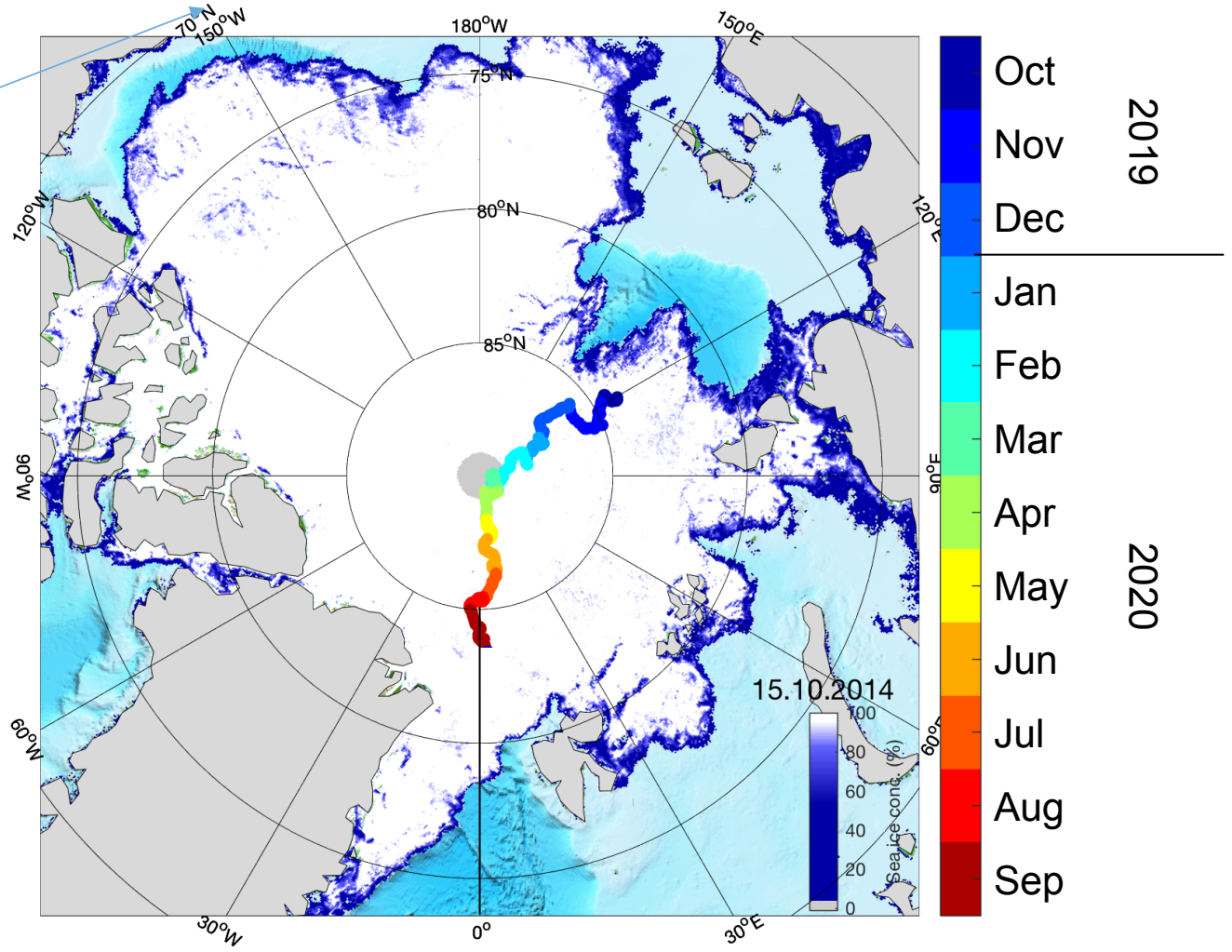


Mid June – mid Jluy
2 x Oden

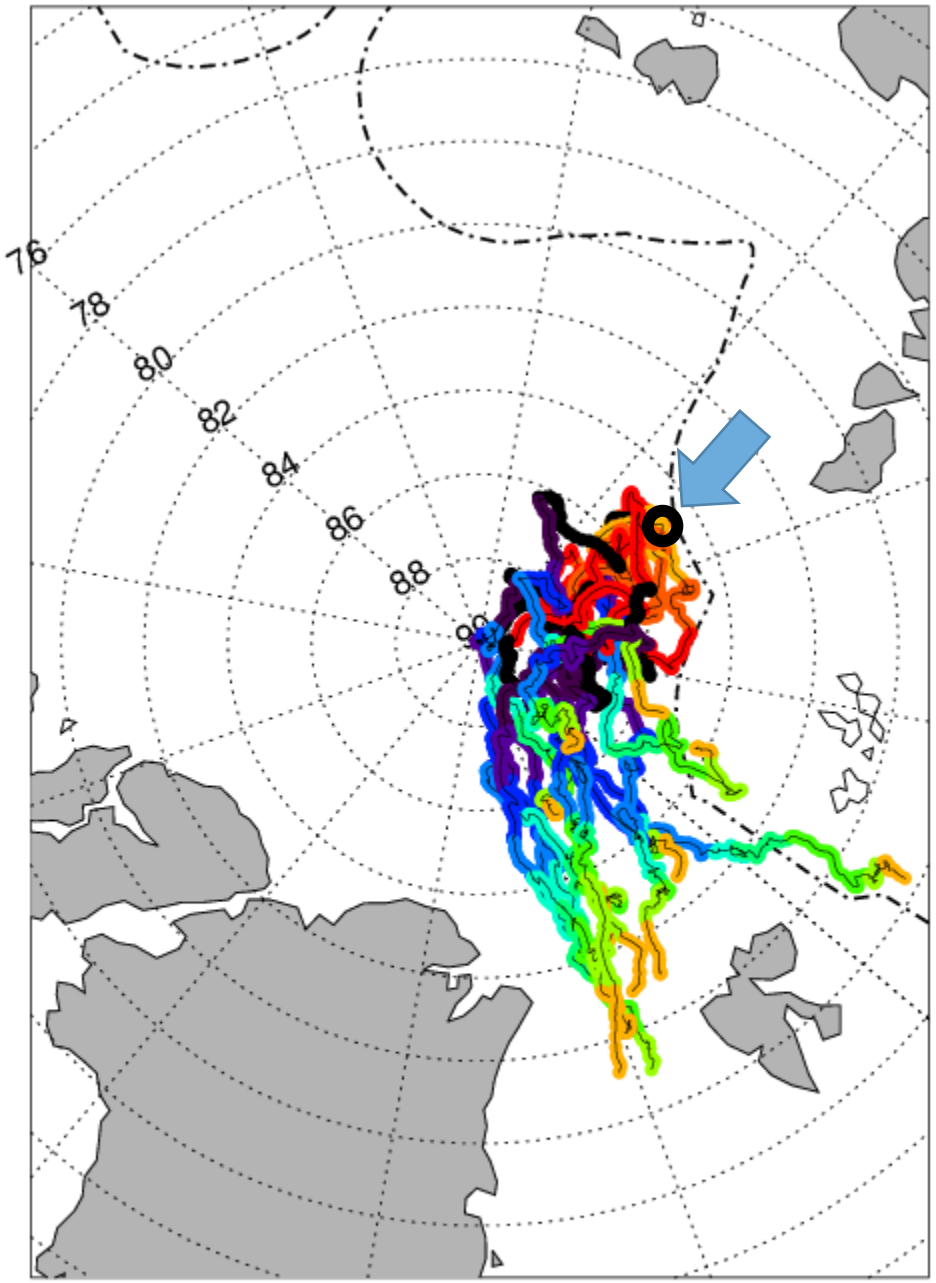
Mid August
Xuelong or
Xuelong II

Example Drift Trajectory
85N / 120E

Utqiagvik

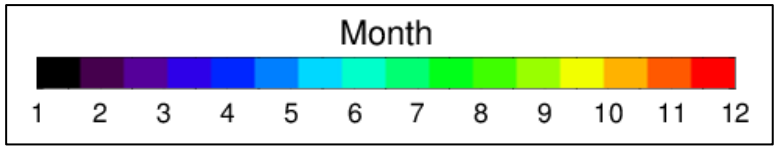


MOSAiC
International
Arctic Drift
Expedition



Drift Statistics

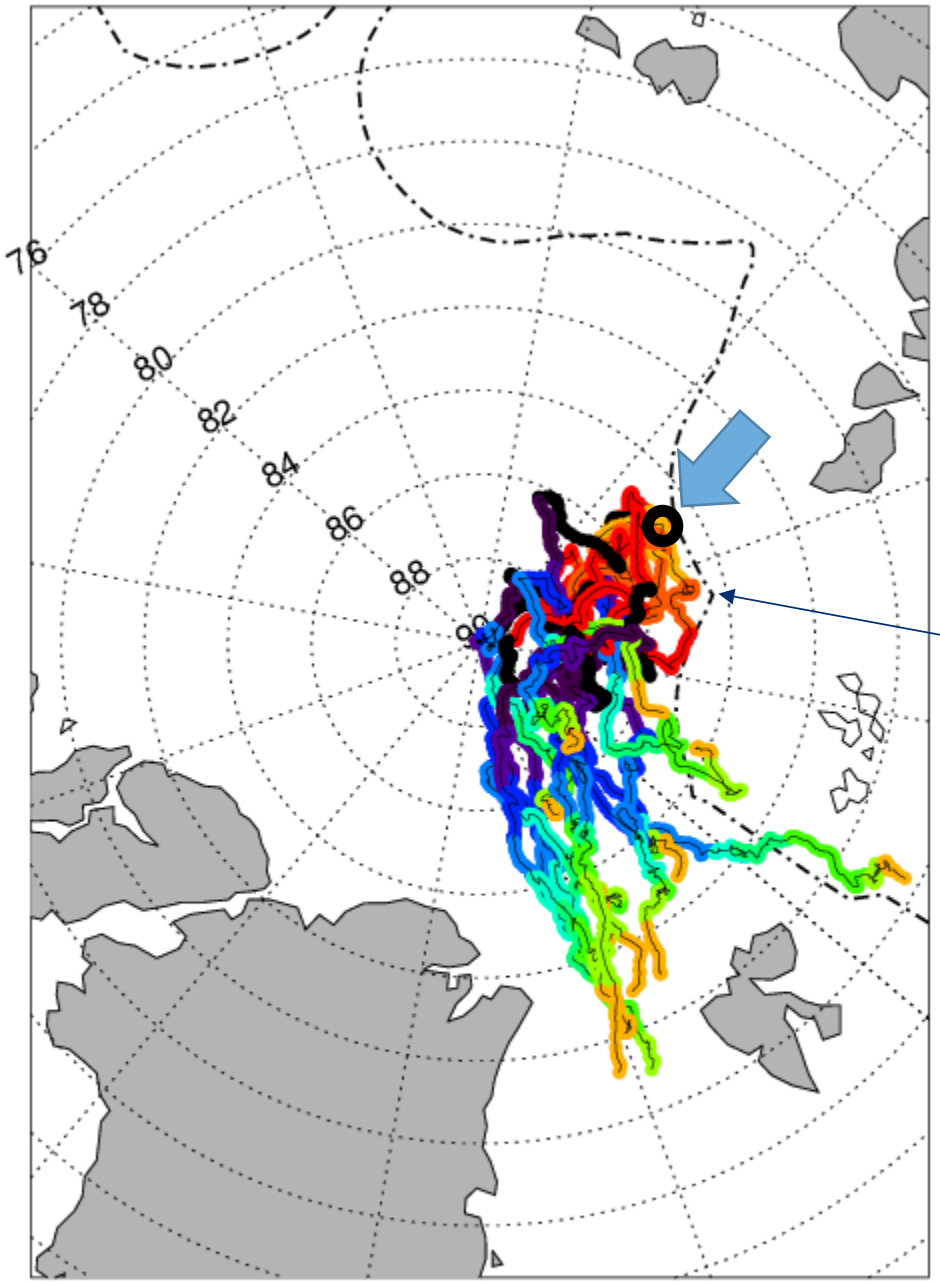
Start point: 85°N/105°E



Thomas Krumpen

AWI

HELMHOLTZ



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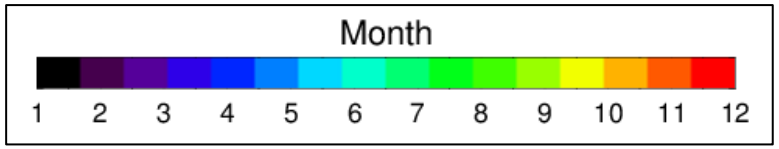

Drift into Russian waters = bad

Thomas Krumpen

MOSAiC
International Arctic Drift Expedition

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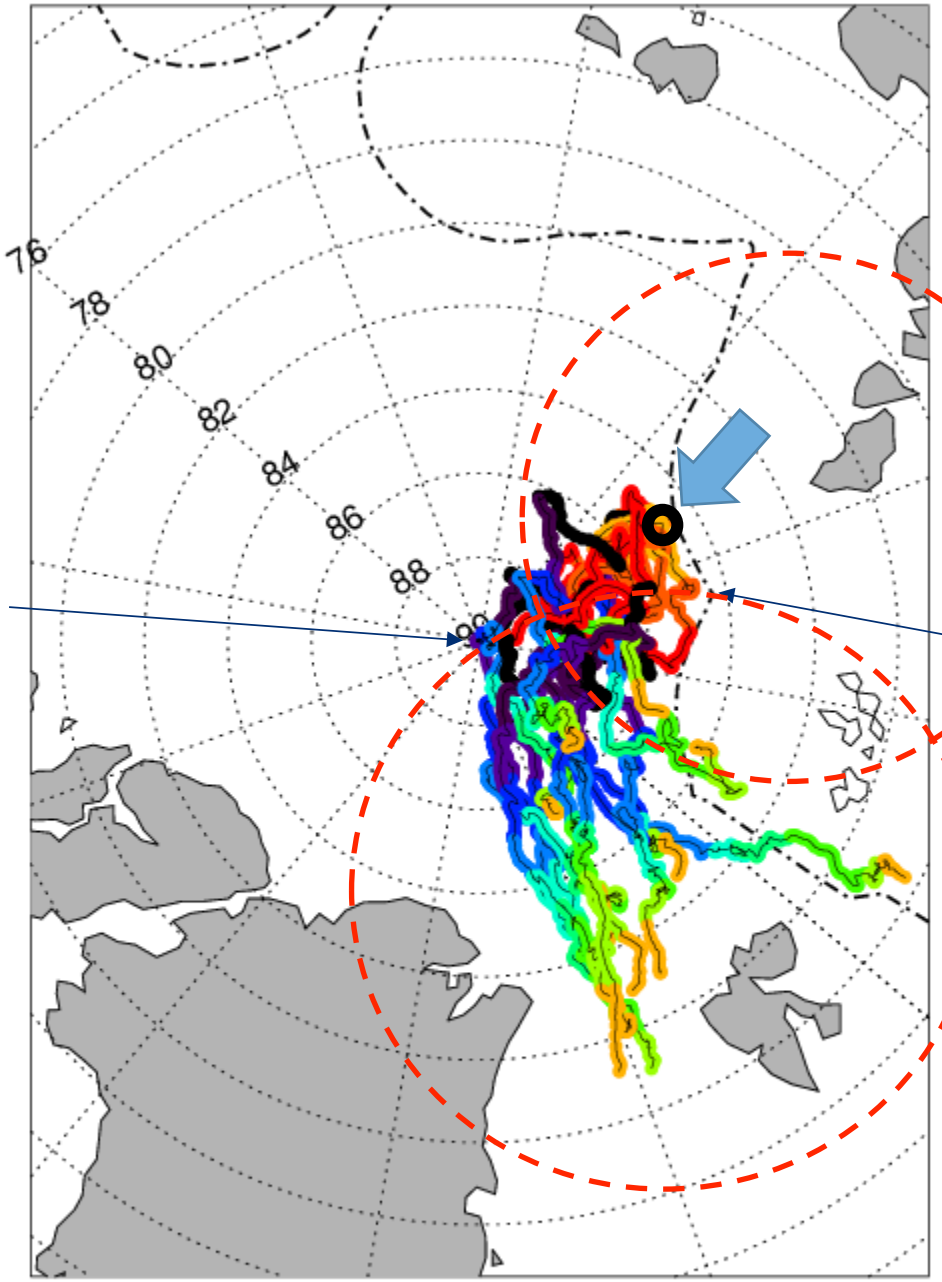
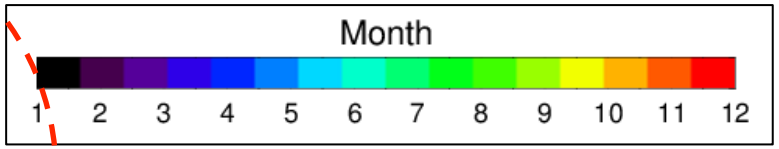
Drift Statistics
Start point: 85°N/105°E





Drift out of rescue range = bad

Drift into Russian waters = bad

Thomas Krumpen

HELMHOLTZ

Real estate zoning in the Central Arctic

Ice near to the ship is a scare resource