Arctic Cross-Copernicus forecast products for sea Ice and iceBERGs

https://acciberg.nersc.no

ACCIBERG Project Newsletter

No. 1

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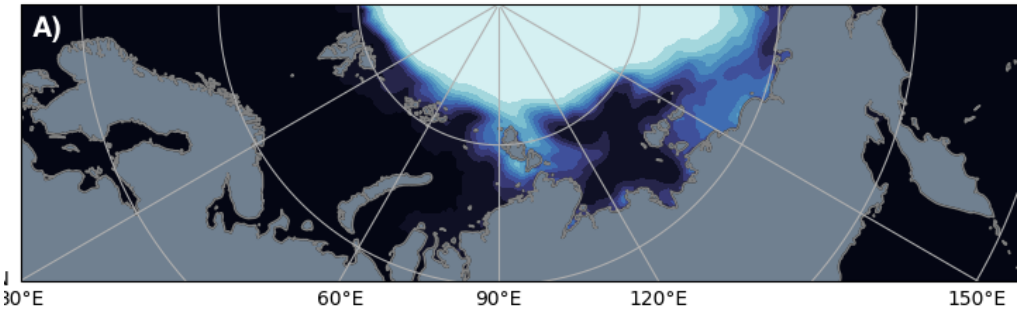
The ACCIBERG project kicked off in January 2023 with a project meeting in Bergen. We gathered researchers providing Arctic products from the Copernicus Services, European Ice Services and a few practical users. Work has begun in all the main technical work packages and the latest progress was reported at the ACCIBERG General Assembly meeting, held online from 22-23 June 2023. Highlights from the meeting are reported here.

Initial results from ICECAP

Work Package 2 of ACCIBERG aims to address some of the reasons for the poor uptake of sea ice properties in the Copernicus services, which are partly due to low confidence in the forecast quality but also how the uncertainties are presented to the end user. Daniel Befort (ECMWF) presented the development of the sea-ice Calibration, vErifiCAtion and Products software (ICECAP), aimed at evaluating sea ice forecasts from the short-term to the seasonal range and developing user products that are calibrated and include uncertainty estimates.

An ideal case study for this work is from 2021, when the ice grew rapidly at the end of October/early November, taking the shipping industry by surprise, leading to more than 20 ships getting stuck in sea ice. Figure 1, below, shows the promising preliminary results from ICECAP, which looked at the impact of calibration for this period of late autumn/early winter 2021, using a simple calibration technique.



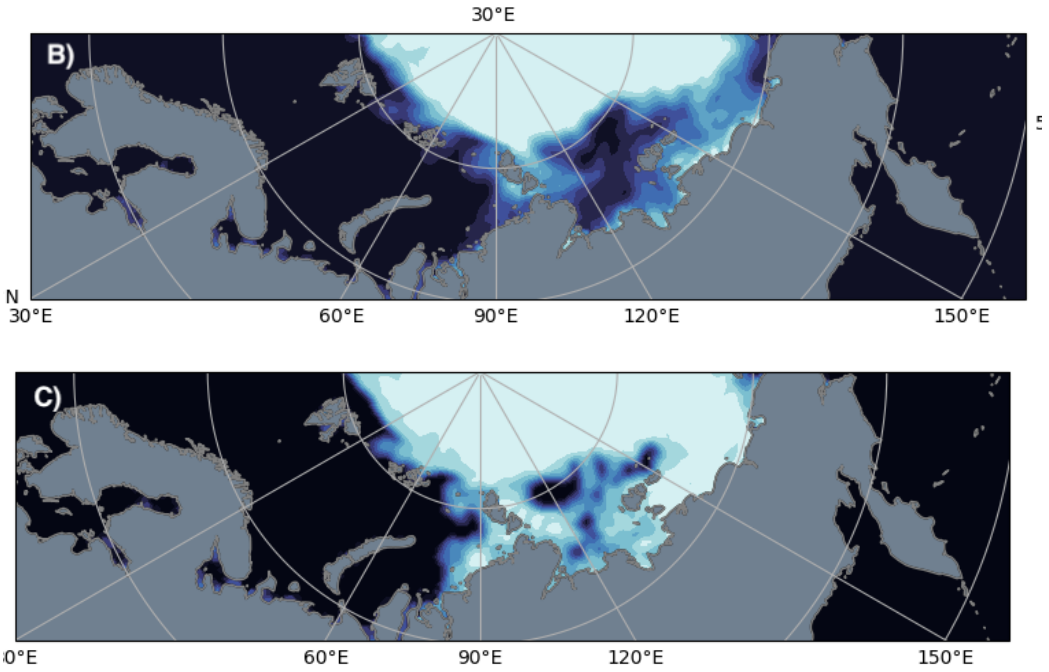


Figure 1: The graphs above show the raw ECMWF 16-days forecast for sea ice concentration on 22.10.2021 (A) compared with the calibrated forecast (B) that shows an earlier freeze-up over some regions. (C) is the satellite observations, not used by the forecast.

Whereas a simple calibration improves the forecast for this case study, a more thorough assessment is needed to objectively quantify the impact of calibration on a forecast system. Furthermore, more advanced calibration techniques will be implemented and tested in ICECAP.

The next steps are to present the calibrated forecasts from the point of view of a ship in the open ocean: forecasting the probability of the area becoming frozen over the coming weeks.

Another step will be the juxtaposition of short-term and extended range forecasts from different Copernicus Services that would allow the users to consult the forecasts continuously from days to months.

Iceberg tagging

Keld Qvistgård (DMI) gave an overview of the deployment of GPS tags on icebergs in Disko Bay, West Greenland over August 2021. This is the largest collection of high accuracy drift data for icebergs, to be used in the development of iceberg models and understanding of how icebergs decay in open sea. Tags were dropped by drones onto 47 icebergs, which were documented and tracked over the next few months.

Some of the largest icebergs were tagged for several months while they were drifting, at times grounded, and slowly melting. Unfortunately only a few icebergs drifted far out of Disko Bay, but to obtain a representative model calibration, ACCIBERG will gather data from previous iceberg tagging campaigns in conjunction with this data.

In addition, the team were able to compare the satellite-based iceberg size estimates with the icebergs that they tagged and measured and found that the satellite data tends to overestimate the size of the icebergs.

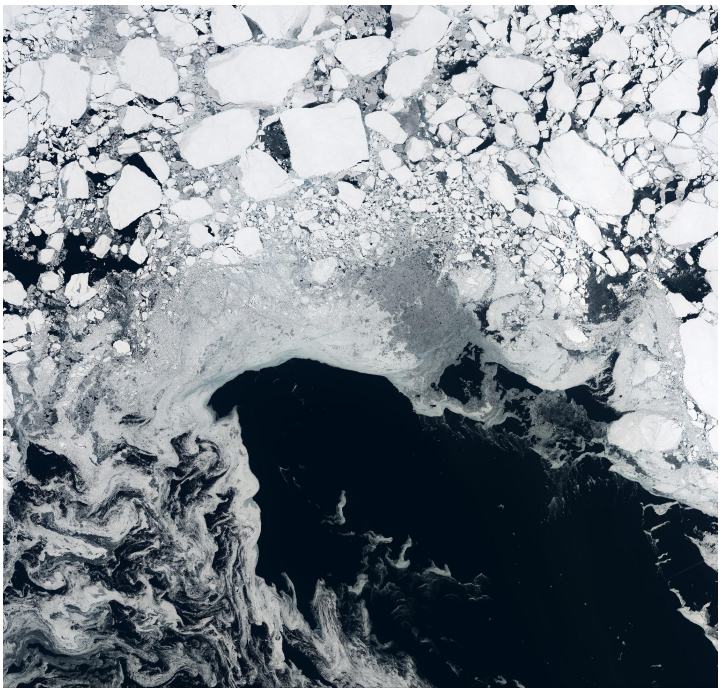
In the coming year, ACCIBERG will set up an iceberg drift model in the open-source OpenDrift package and in the summer of 2024, we will start the demonstration of individual iceberg forecasts with ships-of-opportunity. ACCIBERG will also provide 16 GPS-tags to volunteers able to deploy them on icebergs of interest. The European Ice Services have also released security protocols and a simple sheet for reporting icebergs. So let us know if you are interested in tagging icebergs!

Other news

ACCIBERG is now part of the EU Polar Cluster of projects. We are in very good company there: https://www.polarcluster.eu/members/arctic

Keld Qvistgård presented ACCIBERG at the ICE-PPR Environment Working Group in Annapolis, Maryland on April 25th, to facilitate the collaboration with the sea ice and iceberg activities common to several national defense departments.

The ACCIBERG newsletter will be published every six months and the website will be kept up to date with relevant information in the meantime but feel free to use the contact information on the website to get in touch with the project for any updates or further information: https://acciberg.nersc.no/



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