

DMI Report 22-26

Sea and sea ice – climate time series and climate indicators

**Final scientific report of the 2021 National Centre for Climate Research Work Package
WP3.3 Climate time series**

Jacob L. Høyer, Wiebke M. Kolbe, Pia Nielsen-Englyst, Gorm Dybkjær, Sotirios Skarpalezos, Thomas Lavergne, and Ioanna Karagali.

Kolofon

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1. Scientific summary

Short description

Sea and sea ice are affected by climate change while also playing an active role in the global changes as well. In National Center for Klimaforskning (NCKF) we work on the extension and improvement of current sea and sea ice time series'. Analyzing the resulting climate indicators of sea and sea ice surface temperatures (SST/IST), leads to a better understanding of the past's climate and helps us to put the present and future climate into perspective.

Overall results

In this work package we:

- Created the first gap-free level 4 (L4) sea and sea ice dataset covering the period 1982-2021. Validation of this L4 dataset against different in situ data yielded good, consistent results. Climate indicators of the L4 SST/IST were calculated and analysed as well. The results have been documented in a scientific draft paper to be submitted.
- Developed and tested a method to calculate the 2-meter air temperature from ice surface temperatures, showing a large improvement on the bias of several degrees during validation, compared to the original IST in situ validation. E.g. from -4.03°C for IST to -0.46°C for T2m against drifting buoys of ECMWF.

Next steps

The work on the L4 sea and sea ice dataset will be published in a scientific paper, including process descriptions, validation of the dataset, as well as a presentation of the trends and climate indicators.

The developed algorithm for converting surface temperatures to 2-meter air temperature yields good first results and will be improved further to produce a climate data set of 2 meter air temperatures.

To extend the current sea ice time-series back in time, a PhD project has been started in collaboration with DTU Space, where historical satellite data from before the 1980's will be further investigated.

2. Scientific publication

A combined sea and sea-ice surface temperature climate dataset of the Arctic 1982-2021
(tentative title)

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