Winter surface heat flux and SST analysis in the Nordic Seas and Arctic Ocean in the Norwegian Climate Prediction Model

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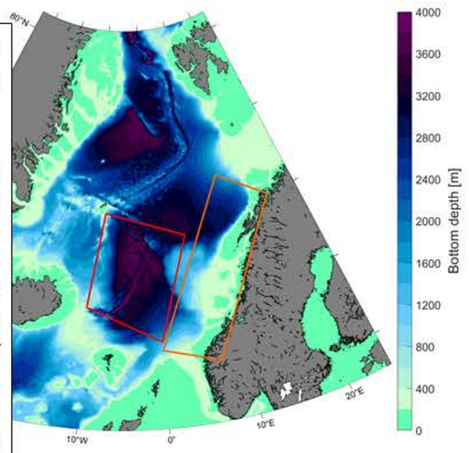
Introduction

- Winter prediction skill analysis in **NorCPM** (Langehaug et al., 2017).
- Comparing the **ensemble mean** hindcasts from NorCPM with NorCPM reanalysis dataset.
- **Winter** months are the ones representative of the Atlantic water layer in terms of SST (Asbjørnsen et al., 2019).
- Detect heat **anomalies** that enter and propagate within the Nordic Seas (Årthun et al., (2017).



Data and Methods

NorCPM-DCPP-CMIP6

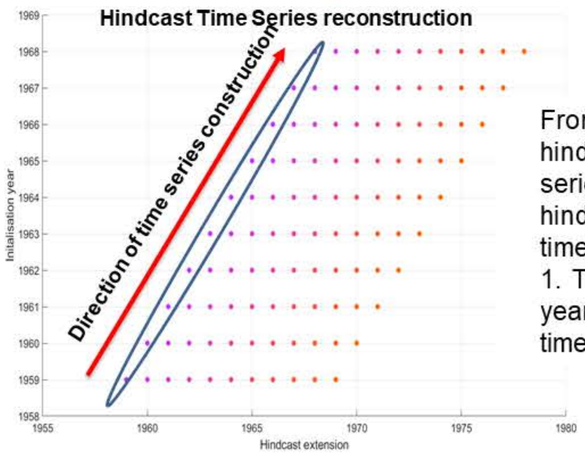
Variables:

- SST
- HFDS
- SICONC

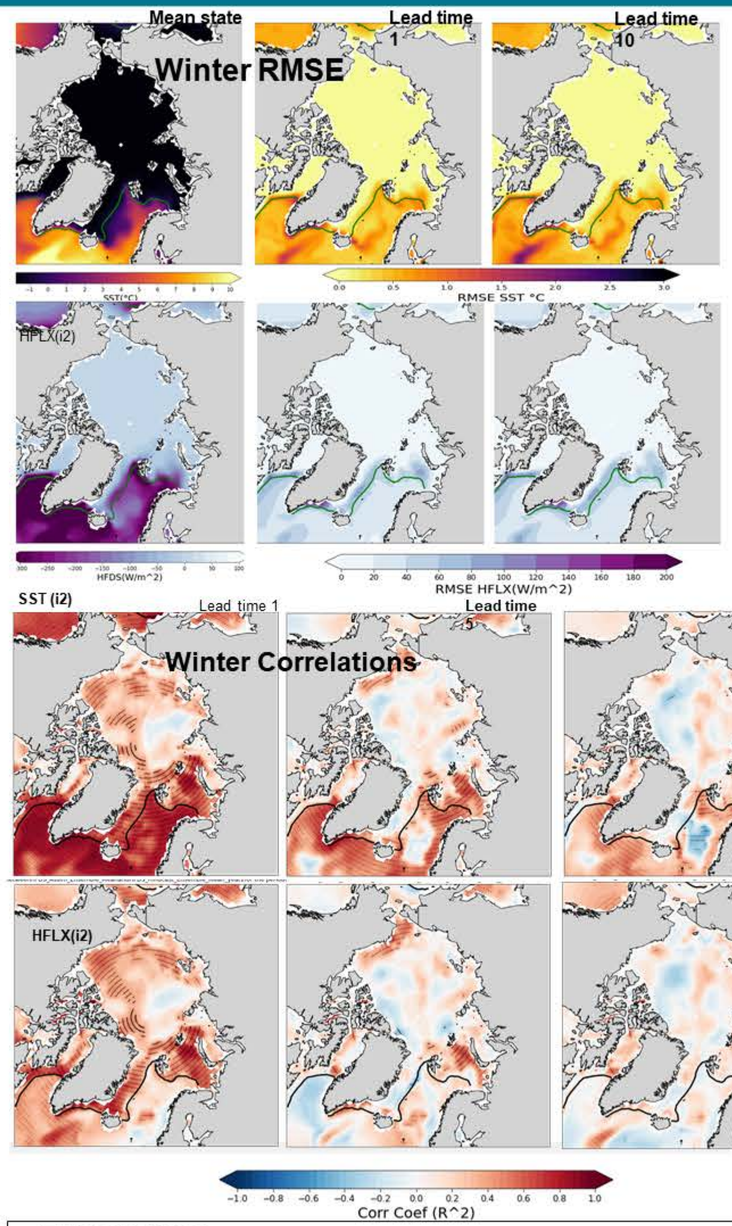
Hindcast-(1960-2018)-r[1-10] i2

Reanalysis-(1960-2018)-r[1-30] i2

Anomalies → Time Correlation ← Anomalies

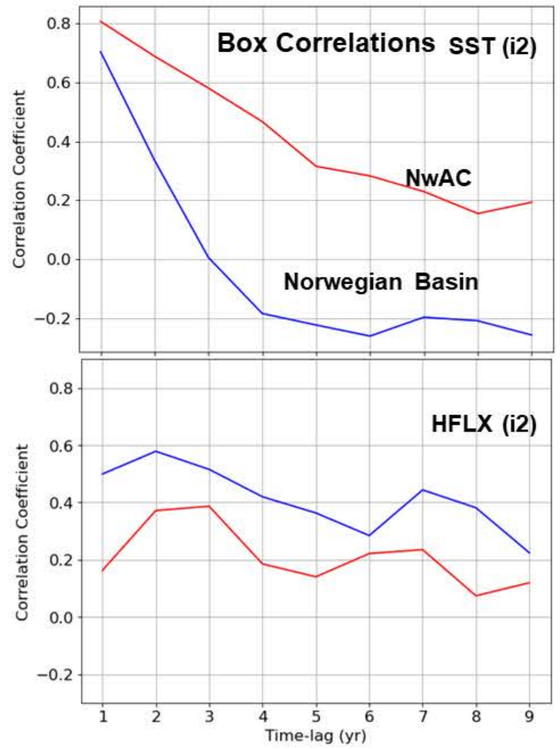


From each year of the hindcasts we create a time serie. All first years of each hindcast constitute one time series, the lead time 1. This is applied to all 10 years, resulting in 10 lead time series.



Results

- Maximum SST RMSE in the Norwegian Basin
- Maximum HFLX RMSE close to the ice edge
- SST correlations:
  - **+ SST correlations in the NwAC (close to Norway)**
  - **- SST correlation in the Norwegian Basin**
- HFLX correlation: Opposite to SST but with weaker correlations



Further steps:

- Compare NorCPM SST with independent data set (HadISST).
- Follow induvidual temperature anomalies in NorCPM as they propagate through the Nordic Seas (e.g., Hovmöller diagram).

Asbjørnsen et al., (2019). Mechanisms of Ocean Heat Anomalies in the Norwegian Sea. *Journal of Geophysical Research: Oceans*, *124*(4), 2908–2923. https://doi.org/10.1029/2018JC014649
Årthun et al.,(2017). Skillful prediction of northern climate provided by the ocean. *Nature Communications*, 8(May 2017), 1–9. https://doi.org/10.1038/ncomms15875
Langehaug et al., (2017). On model differences and skill in predicting sea surface temperature in the Nordic and Barents Seas. Climate Dynamics, 48(3–4), 913–933. https://doi.org/10.1007/s00382-016-3118-3

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