Influence of the ocean initial state on the weather anomalies simulation for 2019/2020 winter in the INMCM5 seasonal hindcasts

Maria Tarasevich[1,2], Vasilisa Vorobyeva[1,2], Alexey Chernenkov[1], Mikhail Gasanov[3], Danila Bardashov[4], and Evgeny Volodin[2]

[1]Moscow Institute of Physics and Technology (MIPT)

[2]Marchuk Institute of Numerical Mathematics of the Russian Academy of Sciences

[3]Skolkovo Institute of Science and Technology

[4]Lomonosov Moscow State University

mashatarasevich@gmail.com

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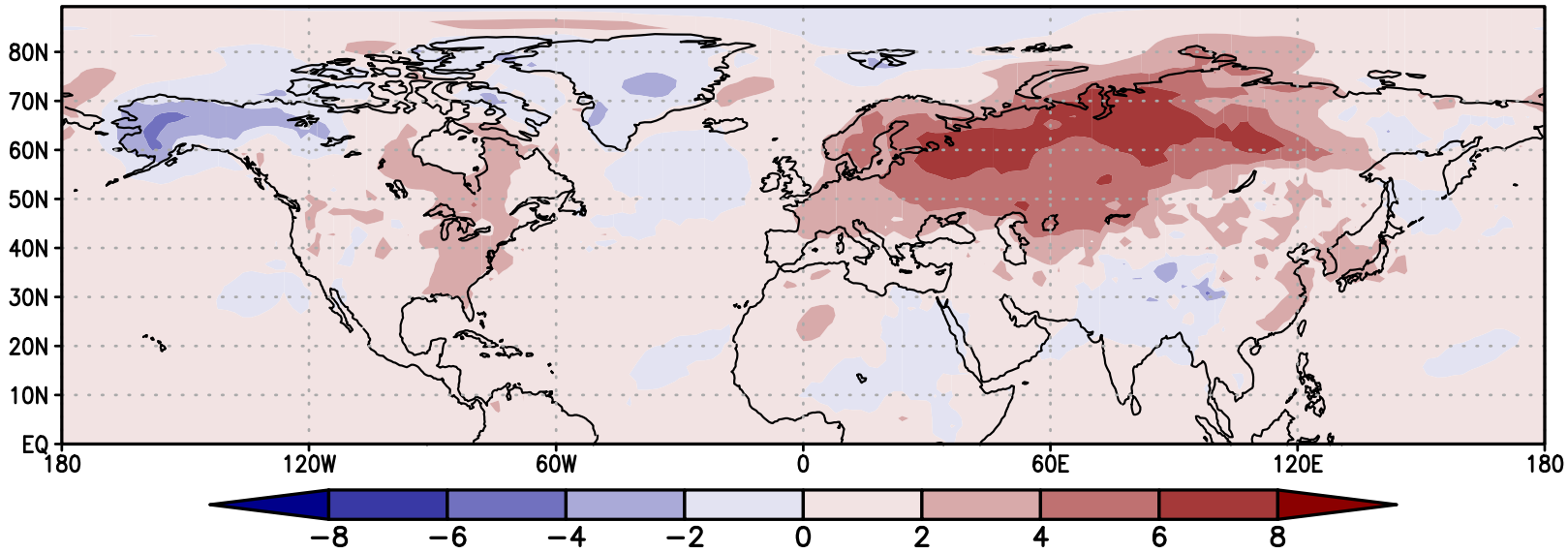
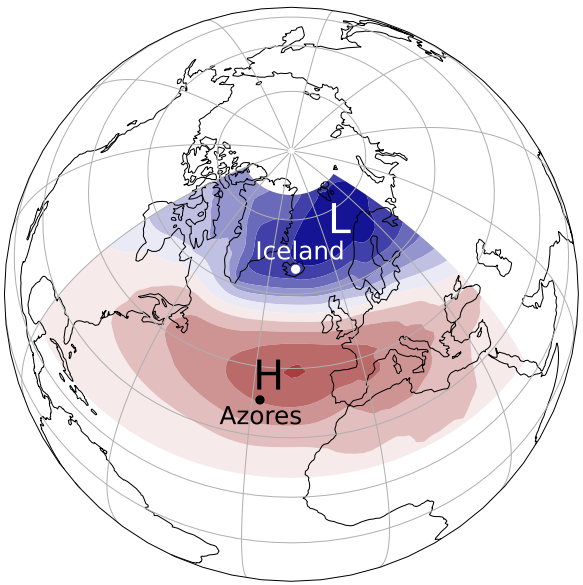
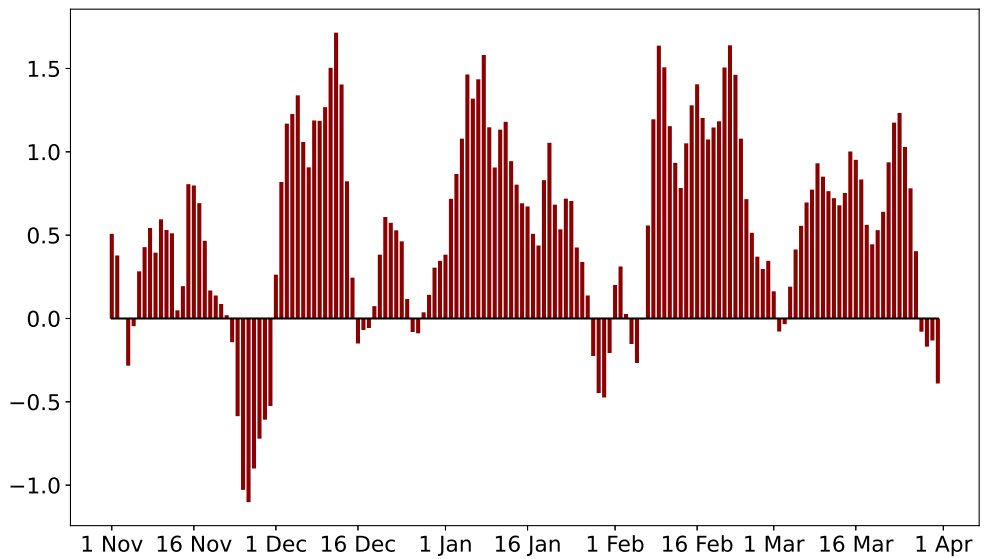
2019/2020 winter season



DJF-averaged T2m anomaly from ERA5 data

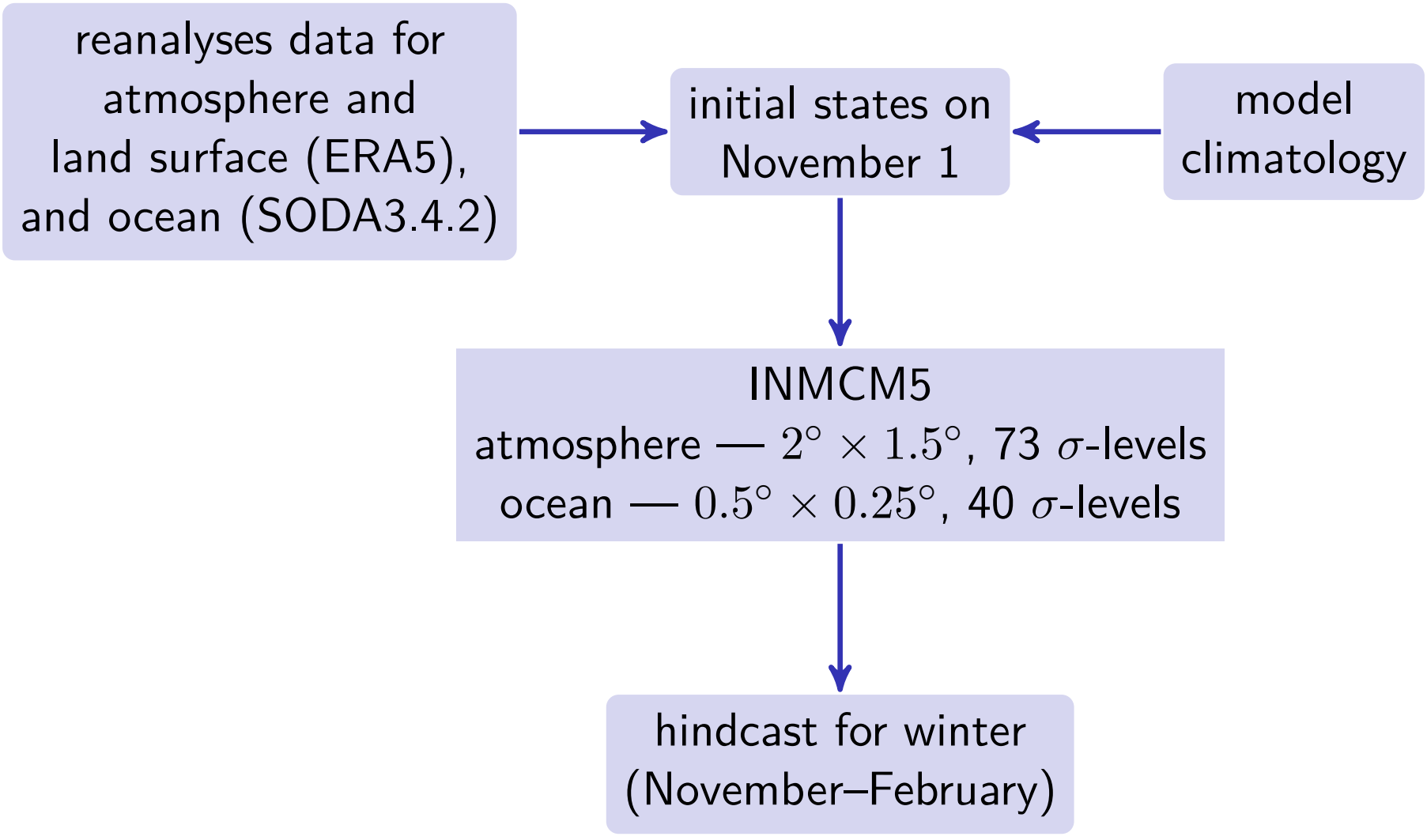


1st EOF SLP (ERA5)

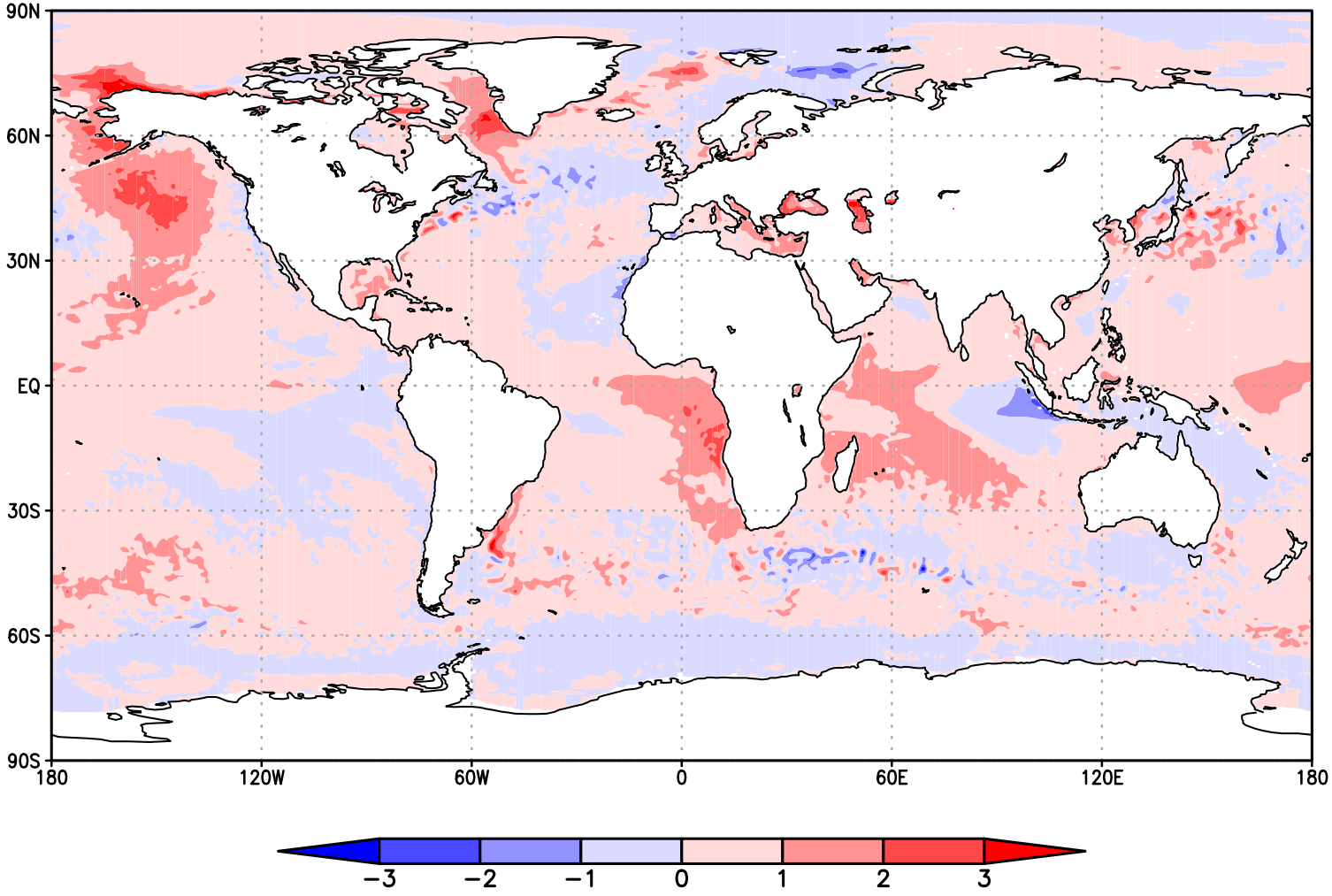


Daily NAO index from the NOAA data

INMCM5 climate model seasonal hindcasts



Initial SST anomaly on November 1, 2019



- Positive anomalies are in the tropics and in the Pacific ocean
- Negative anomalies are in Arctic and in the North Atlantic
- Positive phase of IOD is in the Indian ocean

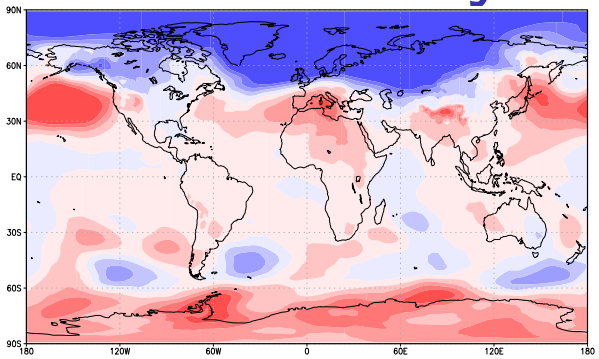
Experiments design

Atmosphere initial state is set as on November 1, 2019 in all experiments. Ocean initial state is set as:

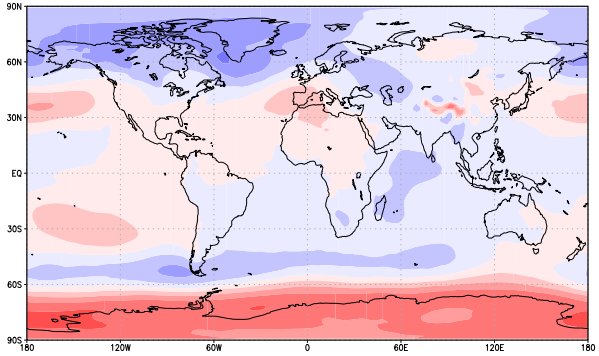
- ATMOC — observed on November 1, 2019;
- ATM — INMCM5 climate averaged;
- ATLOC — observed on November 1, 2019, but only in the North Atlantic and the Arctic;
- PACOC — observed on November 1, 2019, but only in the in the Pacific ocean' northern extratropics;
- INDOC — observed on November 1, 2019, but only in the Indian ocean;
- TROPOC — observed on November 1, 2019, but only in the tropics (20S–20N);
- ATLTROPOC — observed on November 1, 2019, but only in the tropics (20S–20N) and in the North Atlantic.

Each experiment lasts for 4 months (November–February) and consists of an ensemble of 30 hindcasts for the considered season.

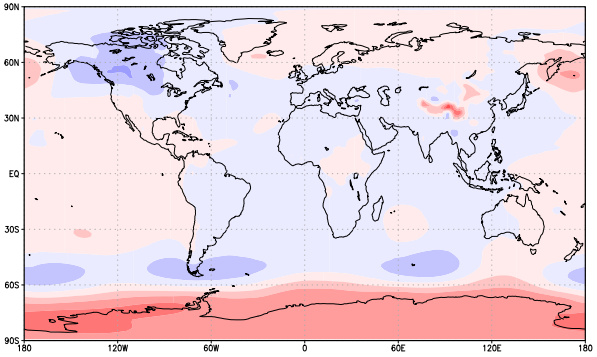
December–February SLP anomalies, hPa



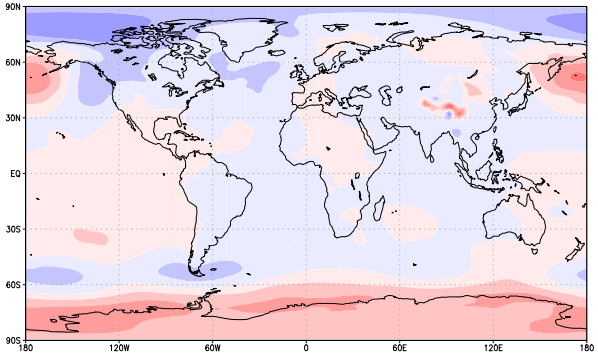
ERA5



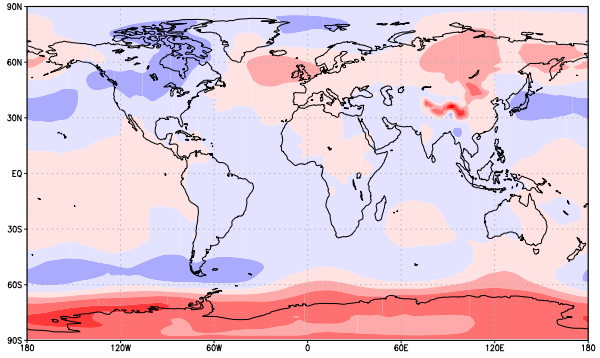
ATMOC



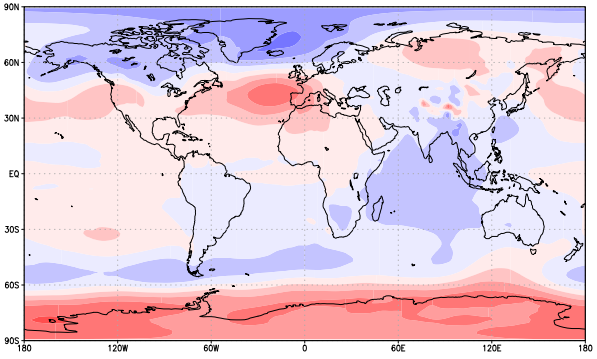
ATM



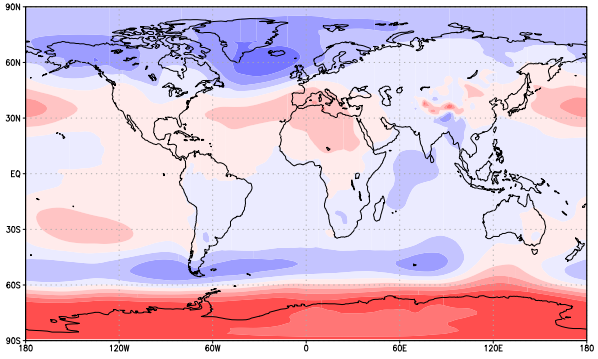
ATLOC



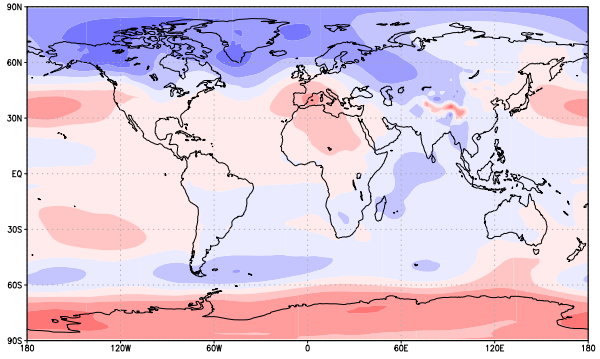
PACOC



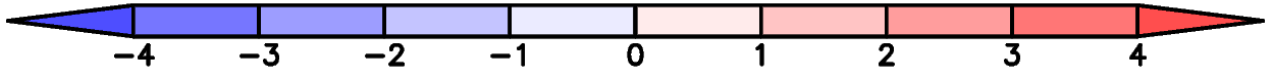
INDOC



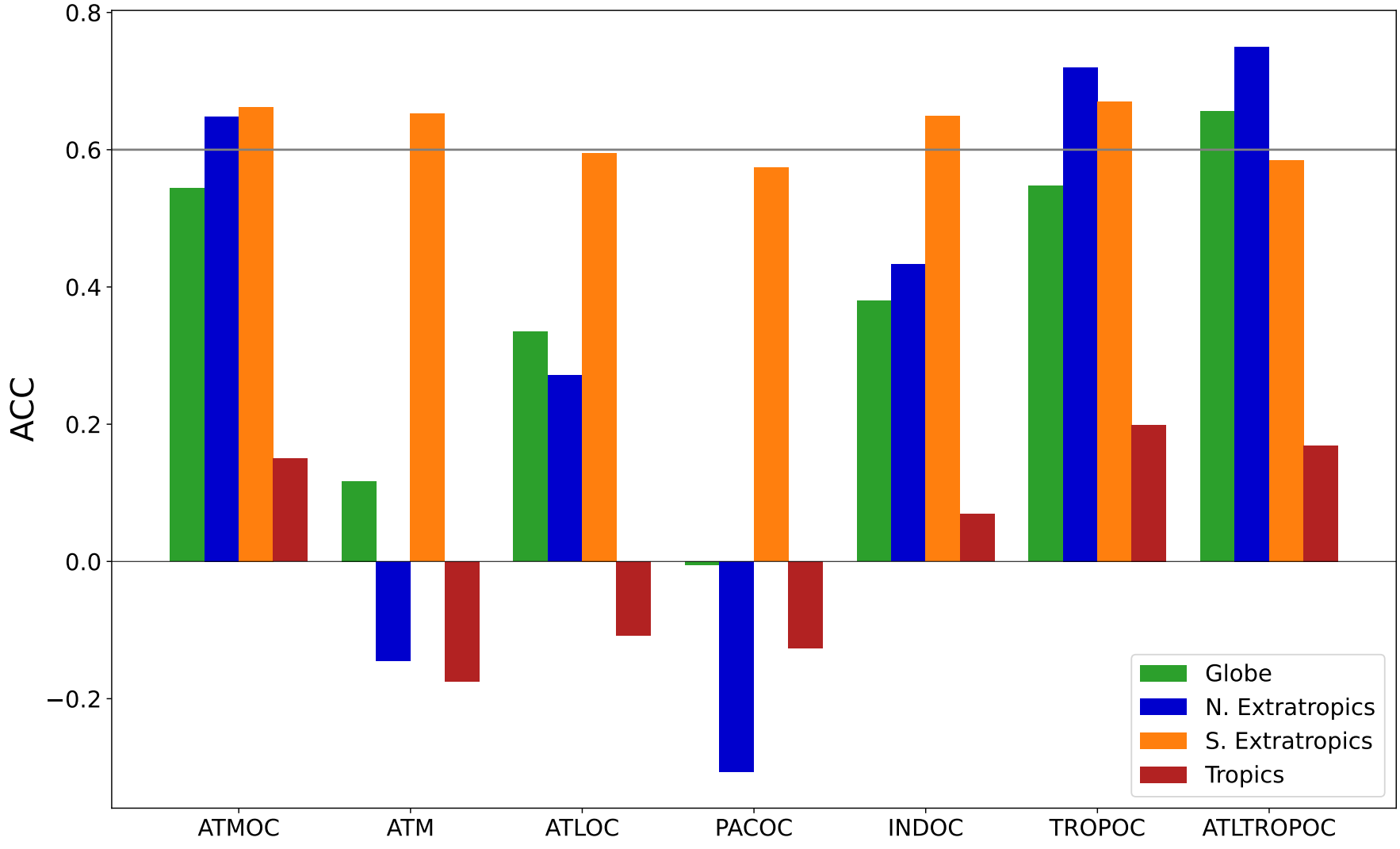
TROPOC



ATLTROPOC

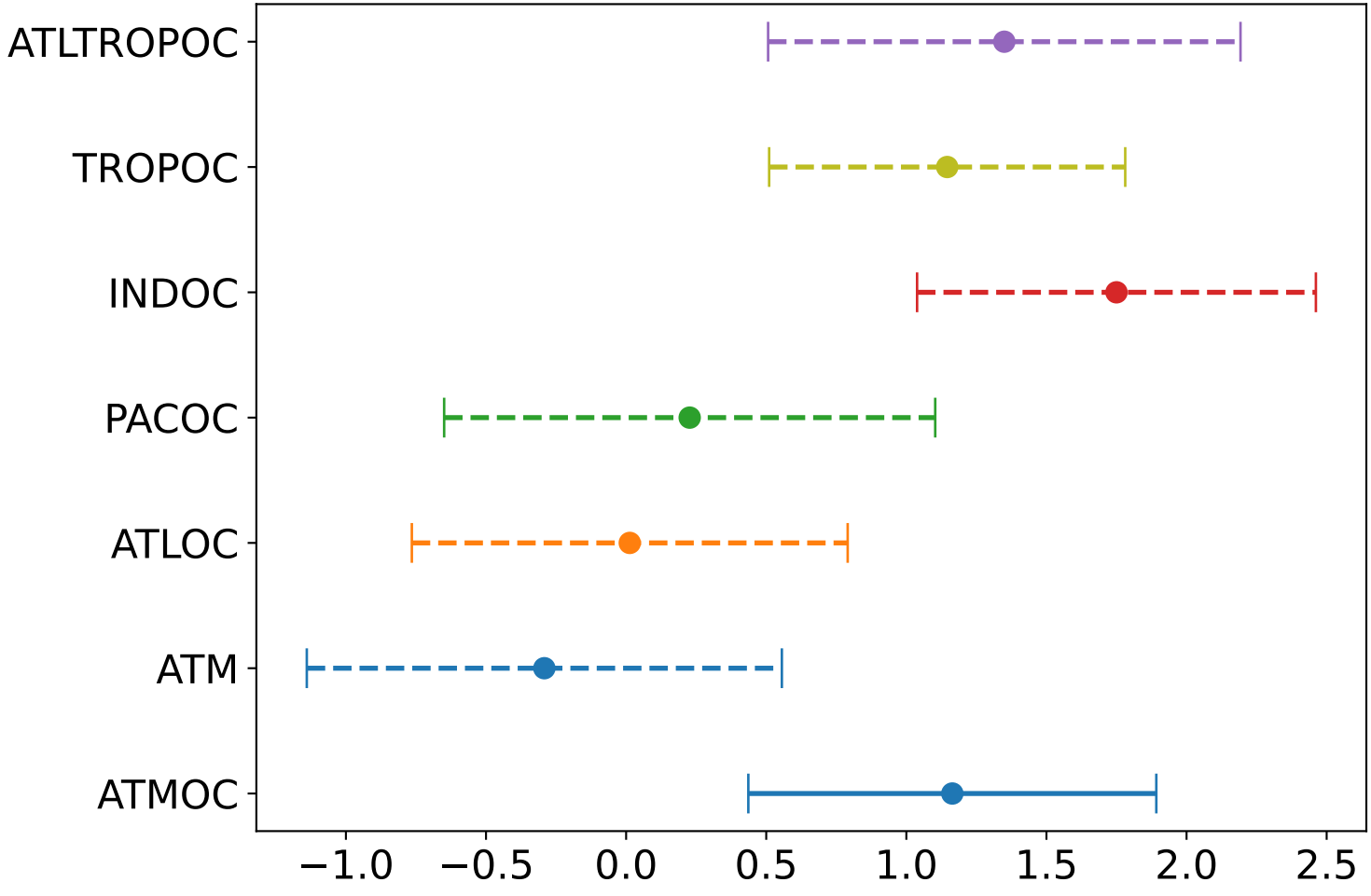


December–February sea level pressure ACC



Sea level pressure ACC between the INMCM5 experiments and the ERA5 data

December–February NAO index



95% confidence intervals for INMCM5 ensemble mean DJF NAO index values

Conclusion[1]

- Ocean initial state is the main source of NAO predictability
- IOD is the key driver of positive NAO in 2019/2020 winter
- Ocean initial state in tropics plays the most significant role for weather simulation in Northern Hemisphere high latitudes

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Thank you for attention!

Questions?

mashatarasevich@gmail.com