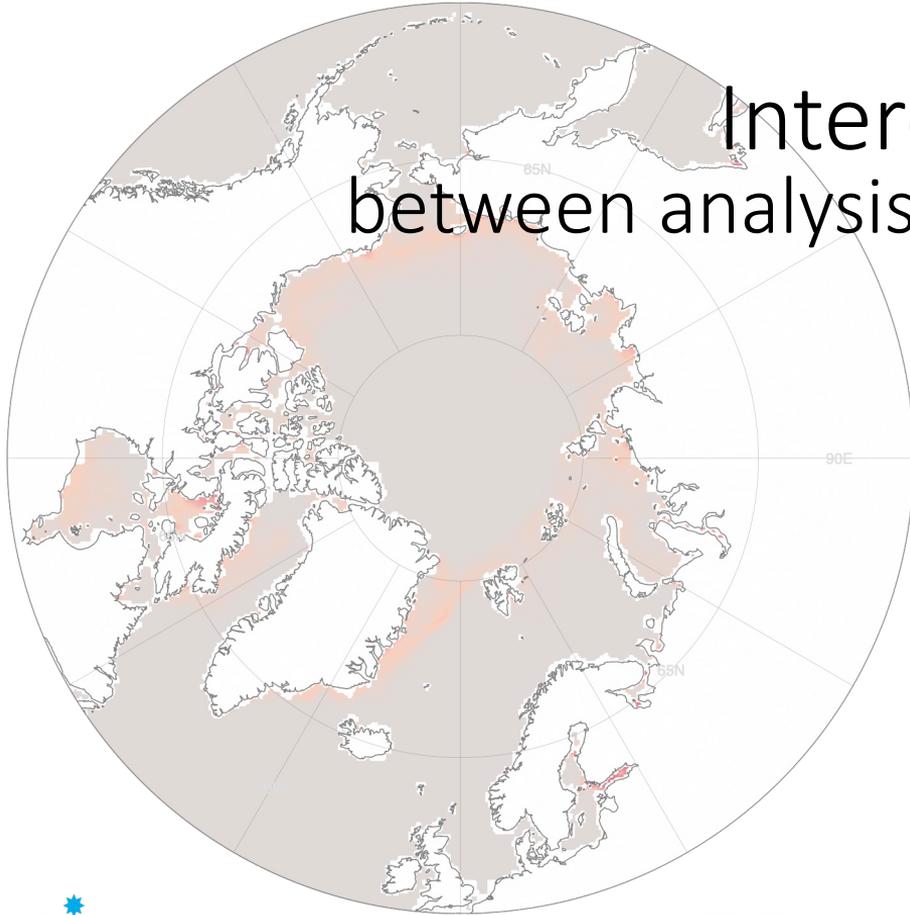


# Intercomparison of Ice Edge between analysis and observational datasets

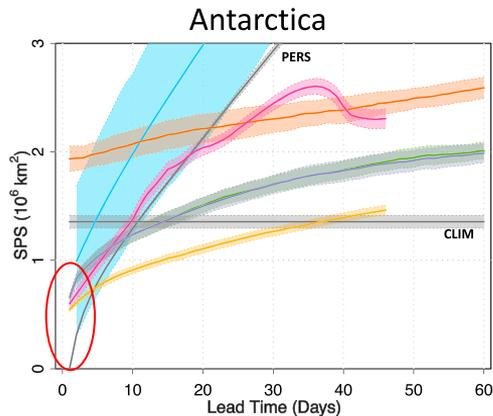


**Bimochan Niraula, Helge Goessling**

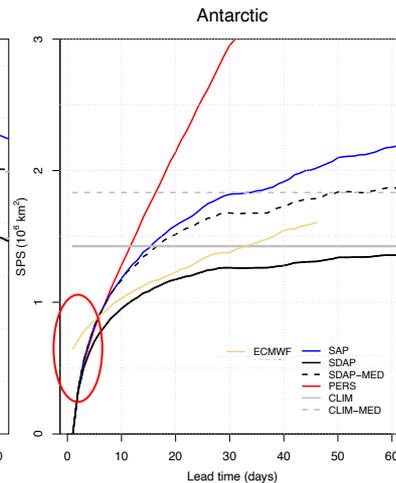
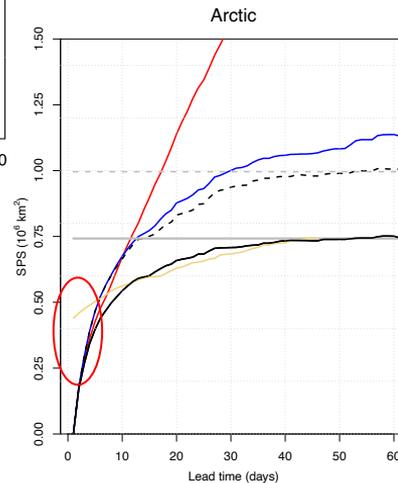
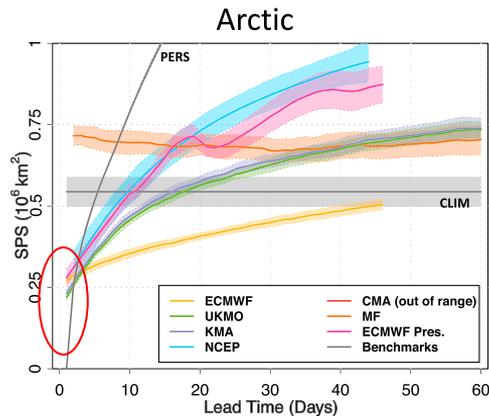
YOPP Final Summit  
Montreal , Sep 2022



# Background

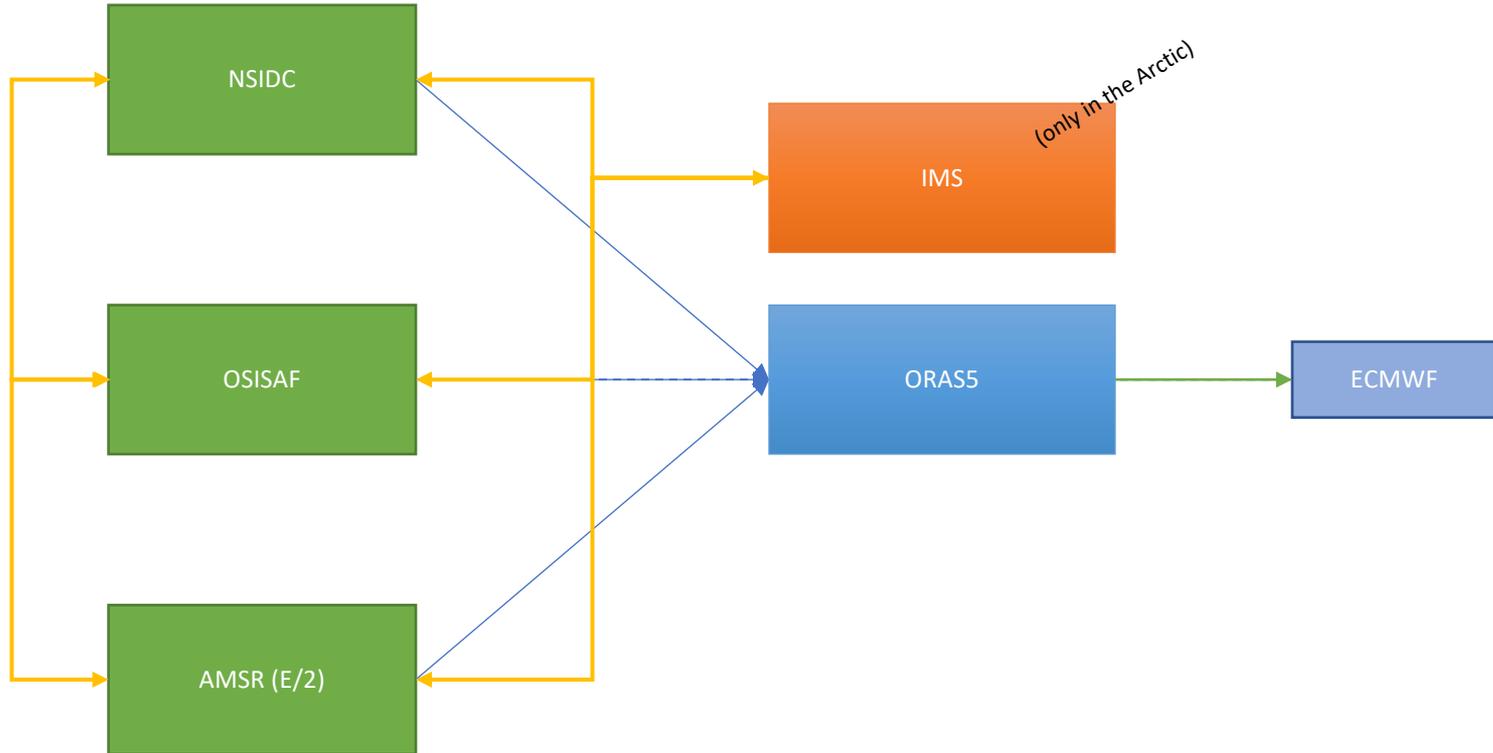


Zampieri et al. 2018,  
2019



Niraula et Goessling, 2021

# Datasets



# Methodology

- All data remapped to common grid (25 km EASE-2) and land mask for equal coverage.
- Ice presence using 15% SIC threshold (except IMS)
- Measure Integrated Ice Edge Error (IIEE) for each pair at each date



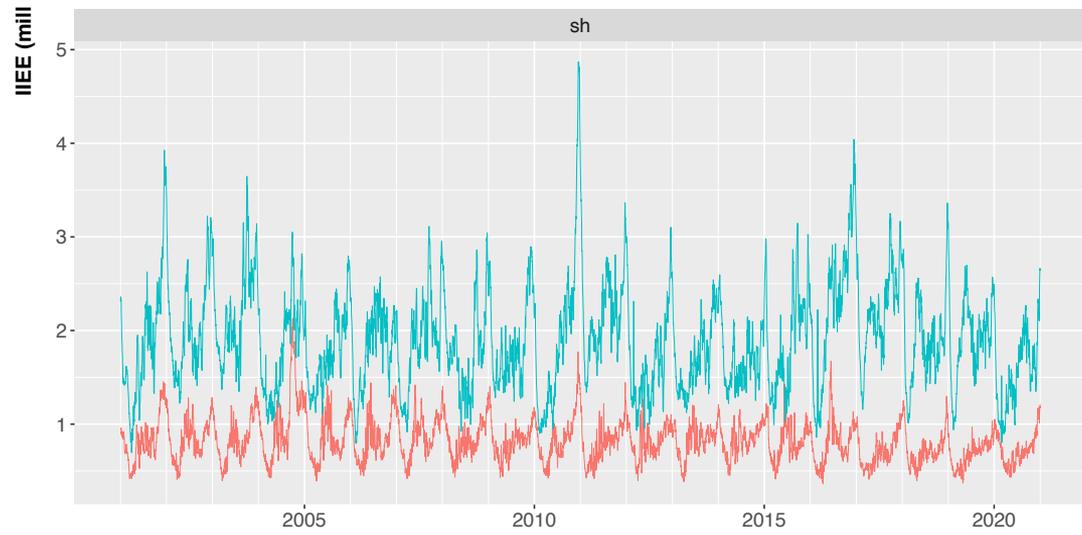
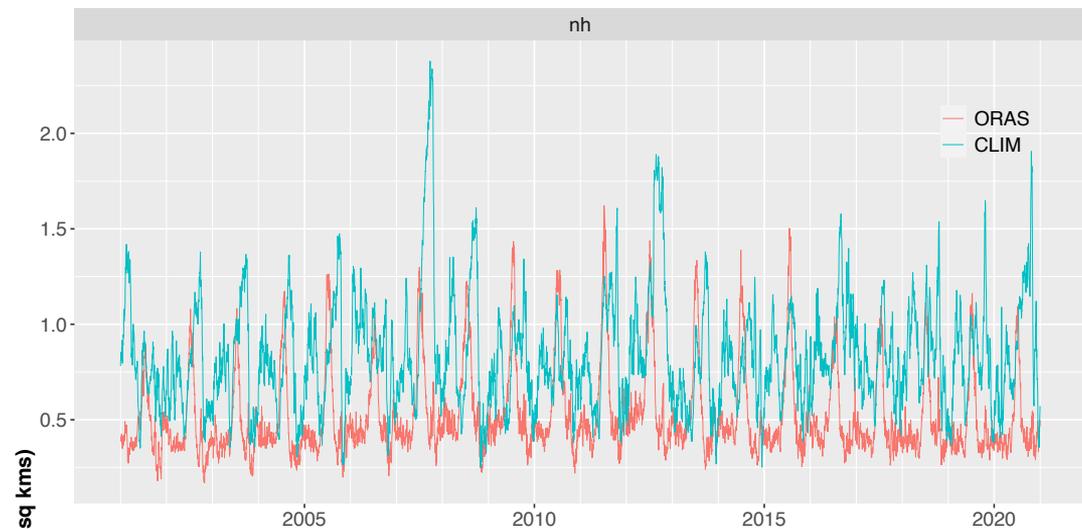
$$\text{IIEE} = O + U$$

(area units)

$$O = \int_A \max(c_f - c_t, 0) dA$$

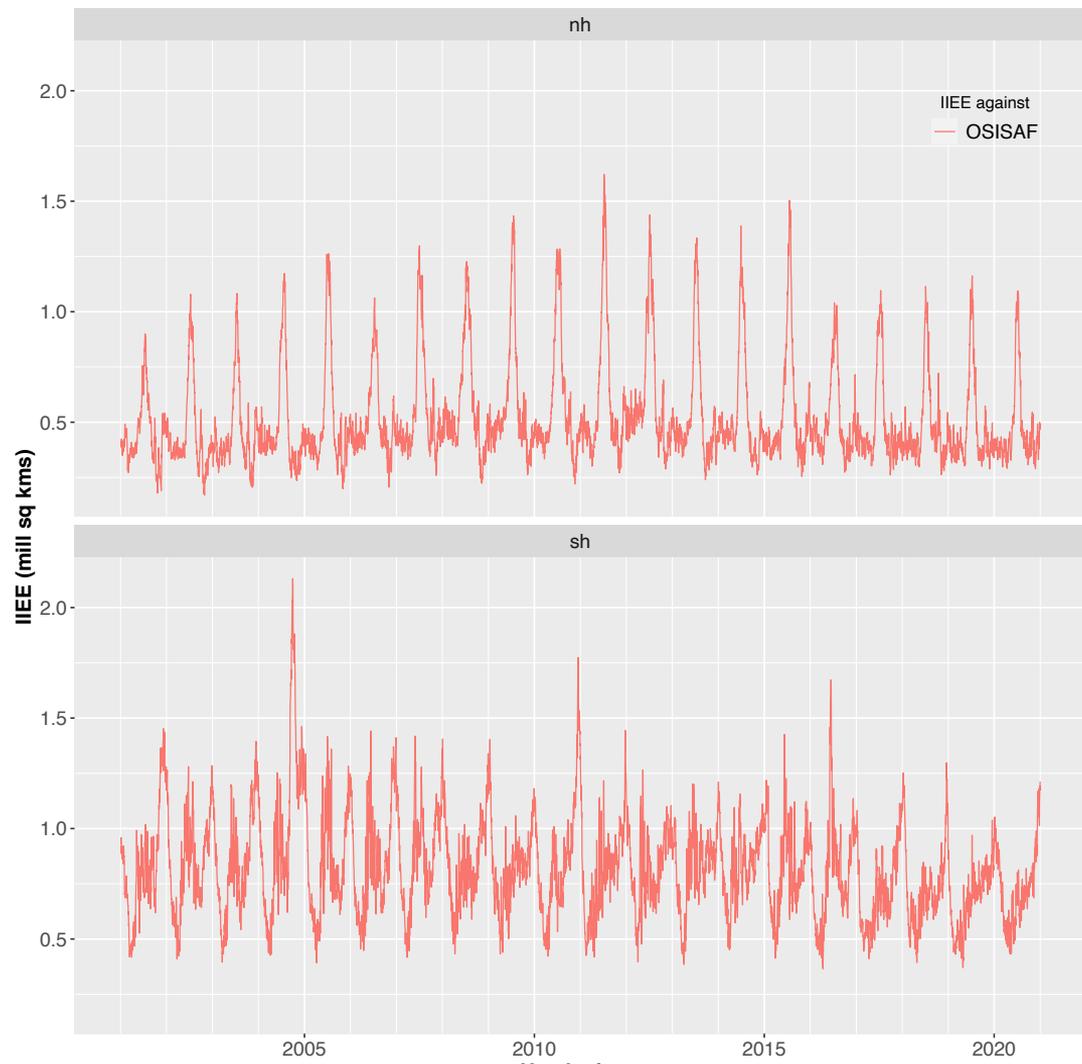
$$U = \int_A \max(c_t - c_f, 0) dA$$

# IIEE of **ORAS\*** against observation (OSISAF)



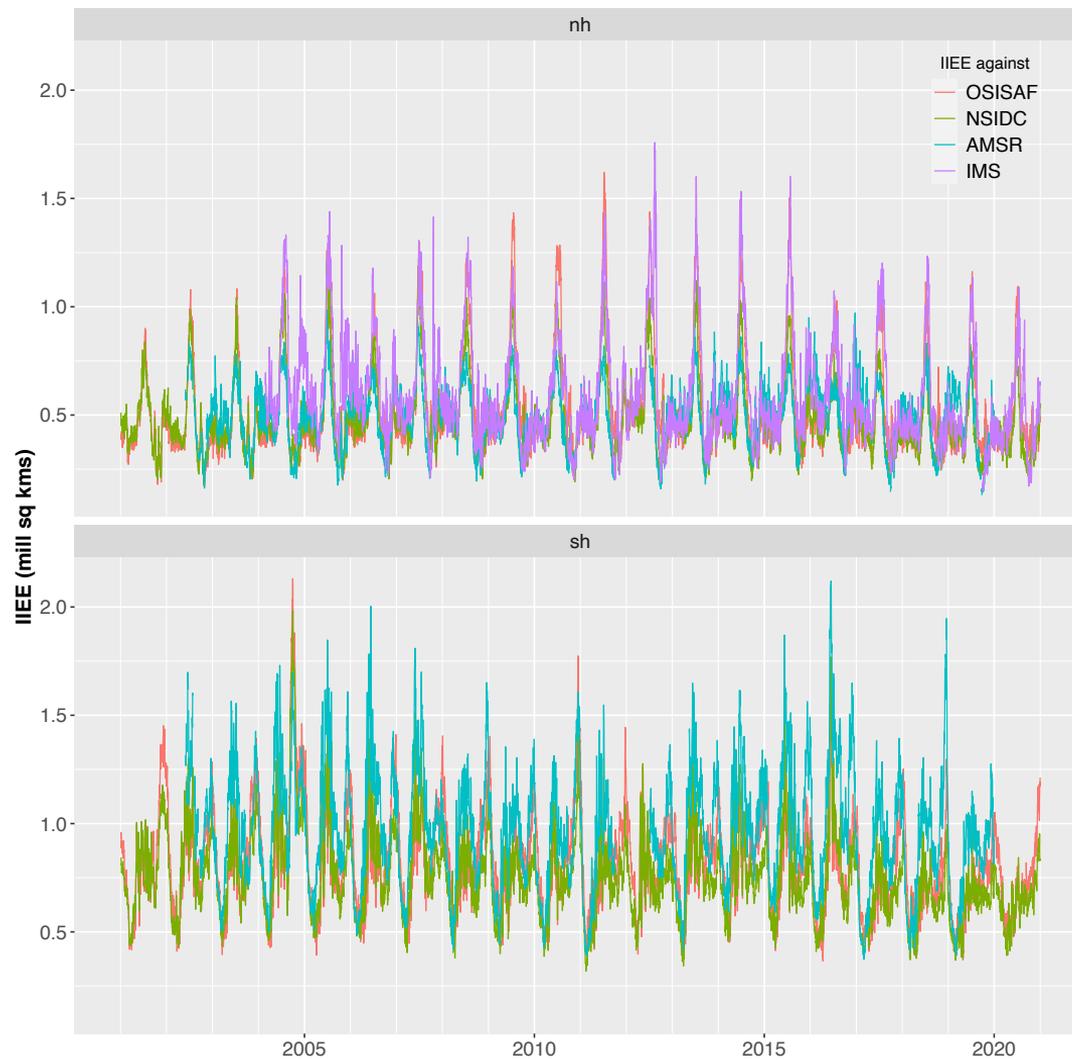
\*control run from ORAS5

# IIEE of ORAS\* against observation (OSISAF)

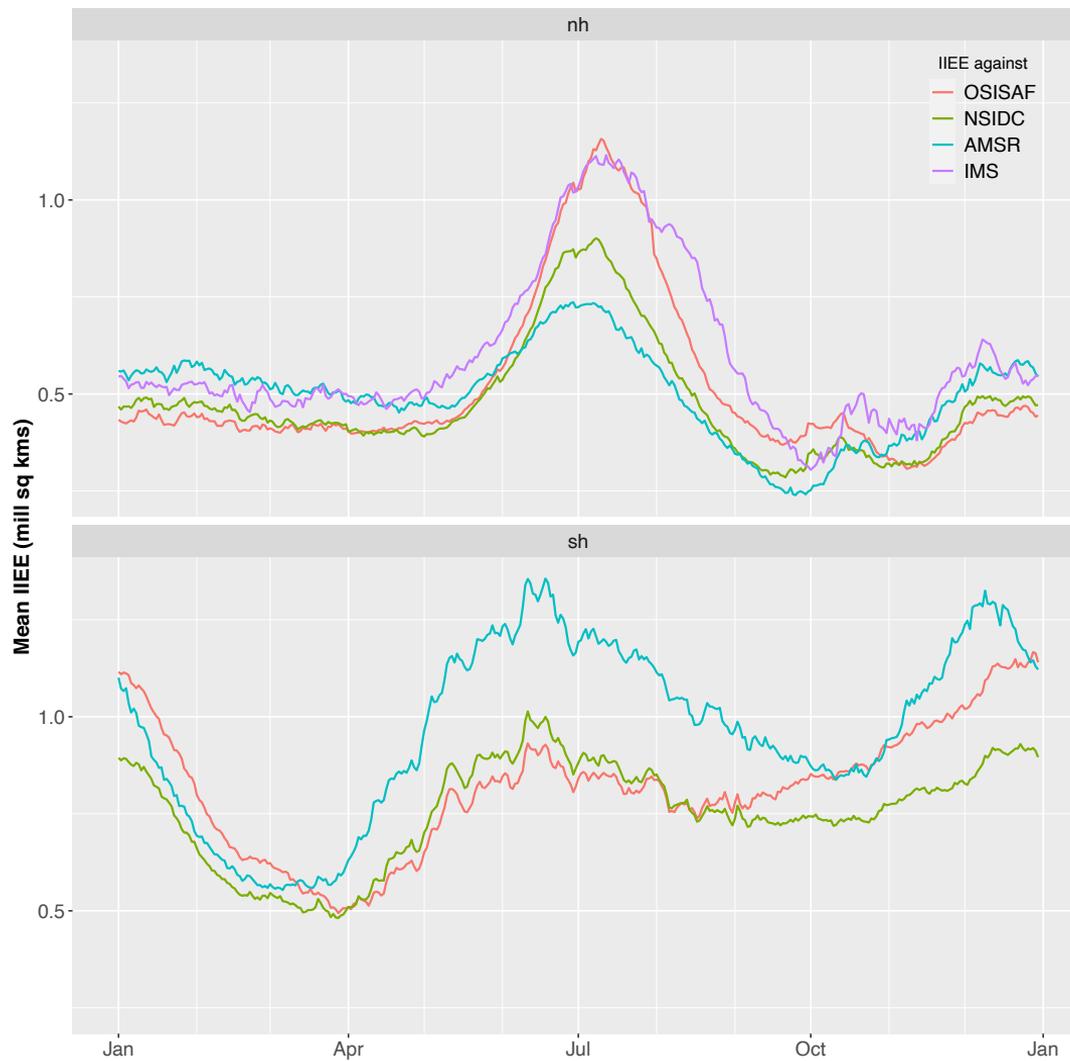


\*control run from ORAS5

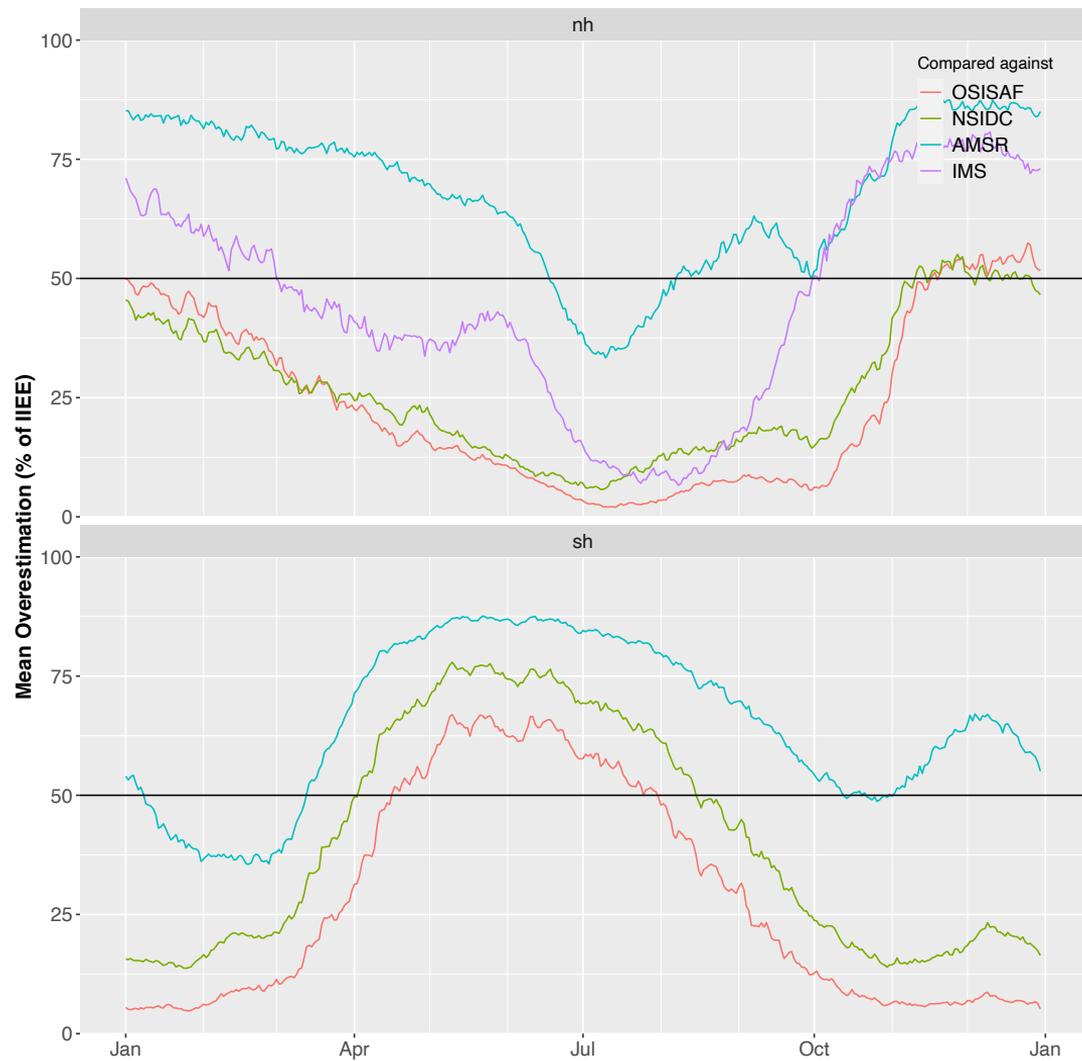
# IIEE of ORAS against observations



# IIEE of ORAS against observations

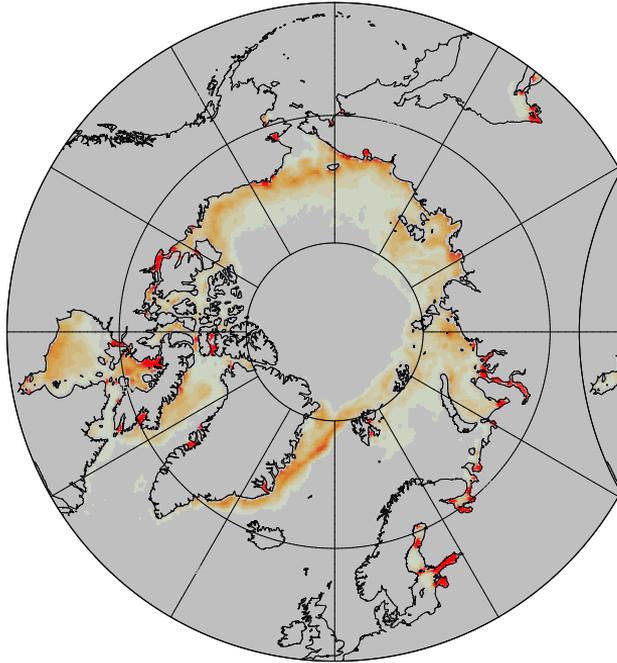


# IIEE of ORAS against observations

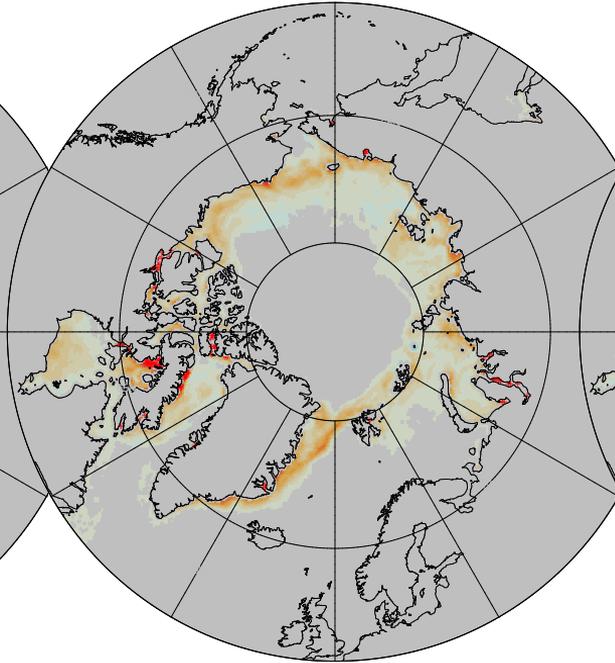


# Mean Ice Presence bias (ORAS minus observations) for July

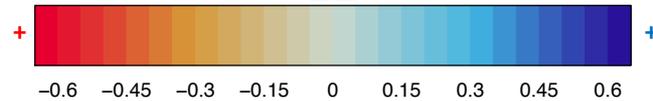
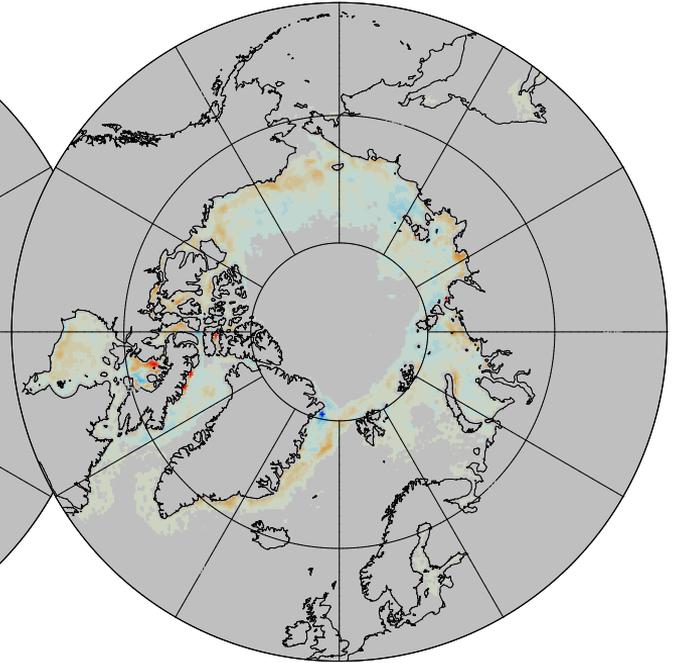
a) ORAS minus OSISAF



b) ORAS minus NSIDC



c) ORAS minus AMSR

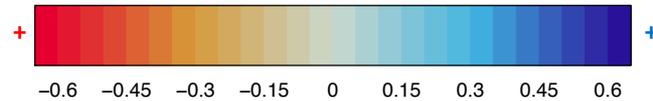
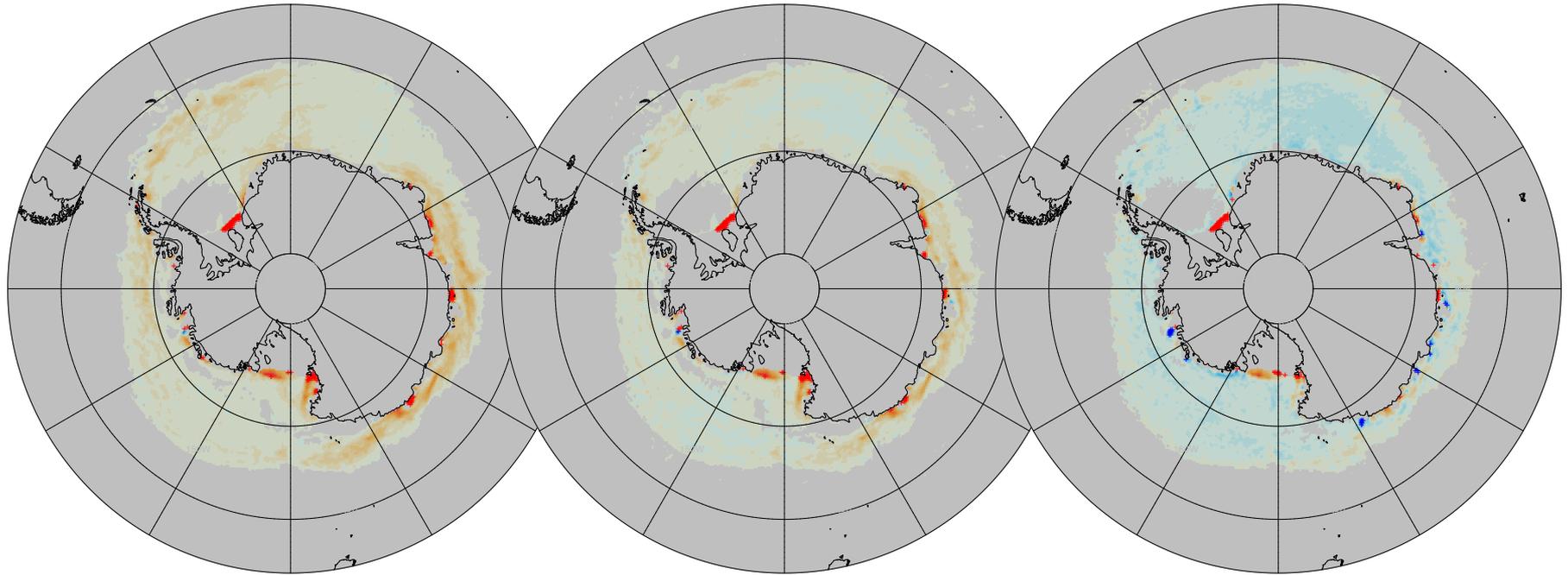


# Mean Ice Presence bias (**ORAS** minus observations) for December

a) ORAS minus OSISAF

b) ORAS minus NSIDC

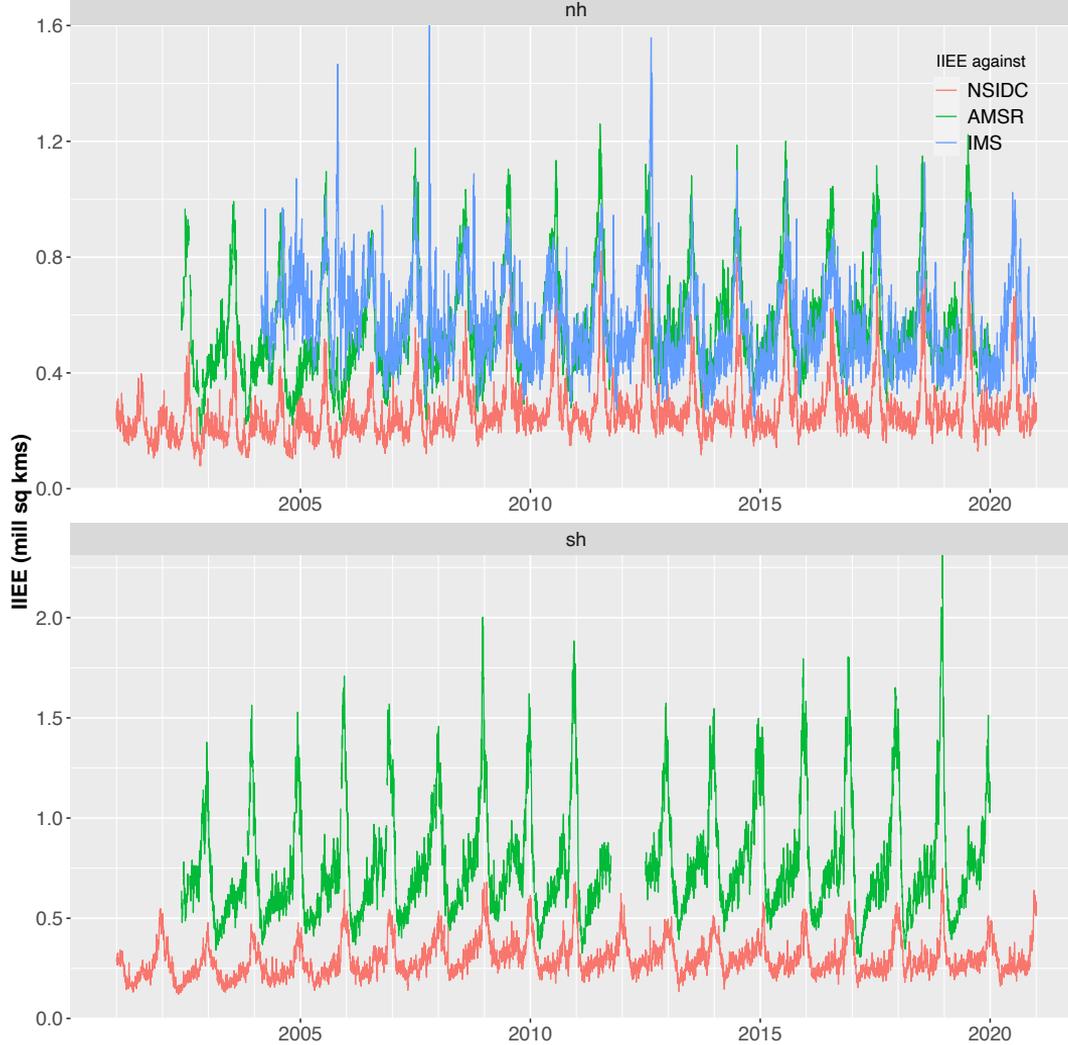
c) ORAS minus AMSR



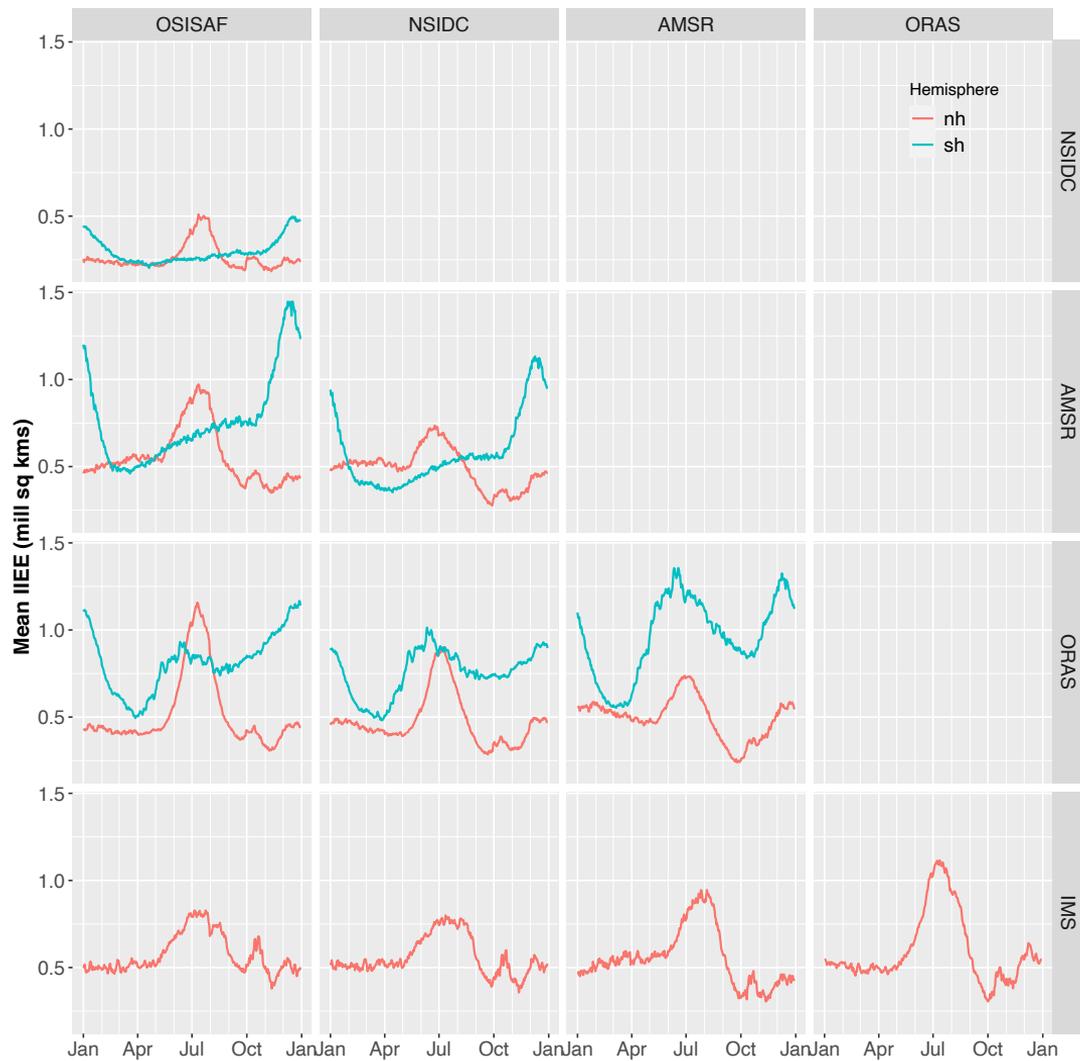
# (Halfway) Summary

- Daily analysis from ORAS5 shows considerable ice edge error against several observations
- Mismatch (measured as IIEE) is highest during the summer in both hemispheres, led by underestimation of ice (negative bias).
- Some regions have consistent issues (e.g. Ross and Weddell Sea).
- ..but some observations showed more error than others.. Do they actually agree?
- 🤔

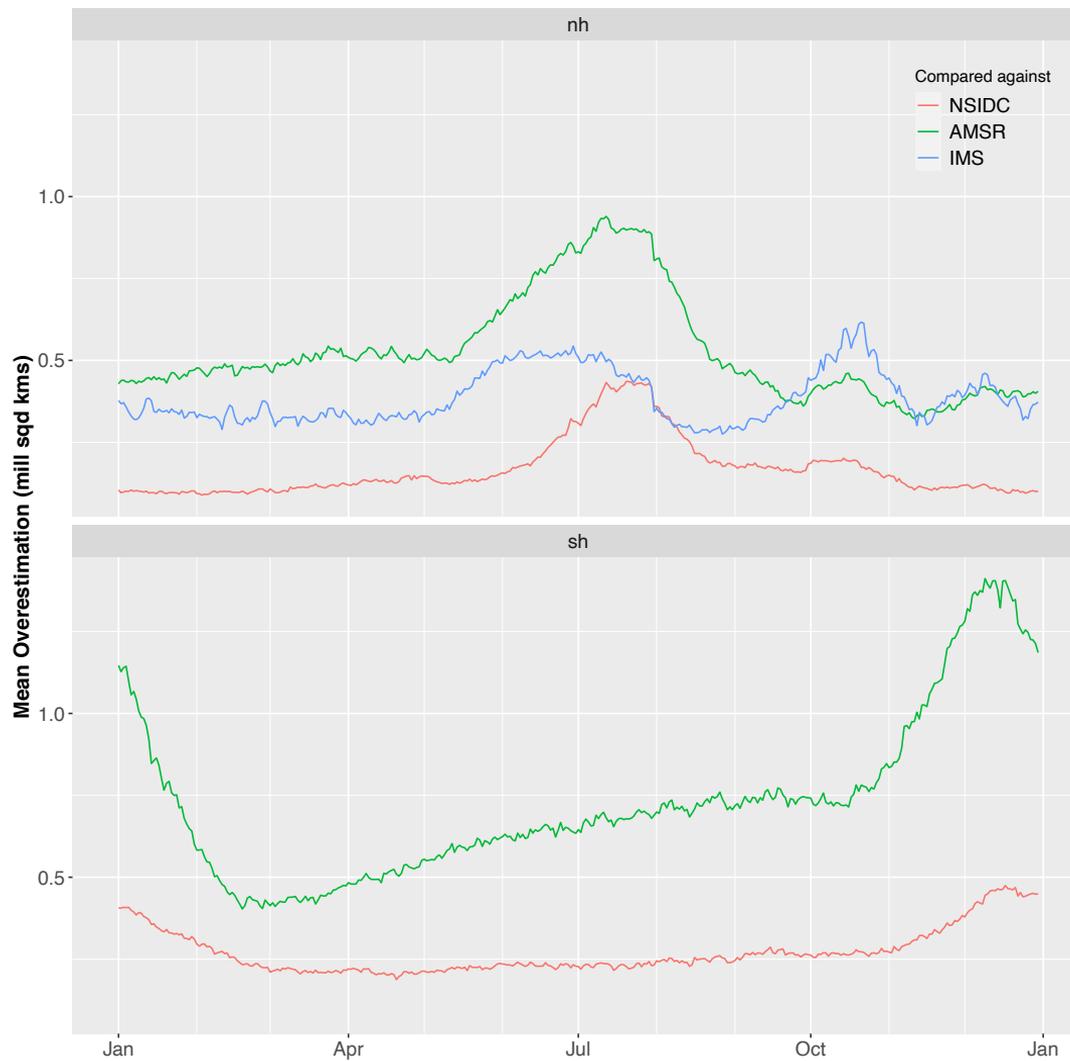
# IIEE of OSISAF against other observations



IIEE computed  
pairwise  
between all  
datasets



# Seasonality of Overestimation of ice by OSISAF

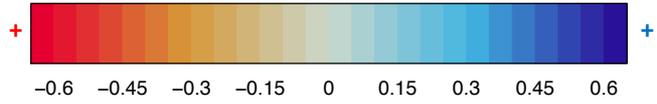
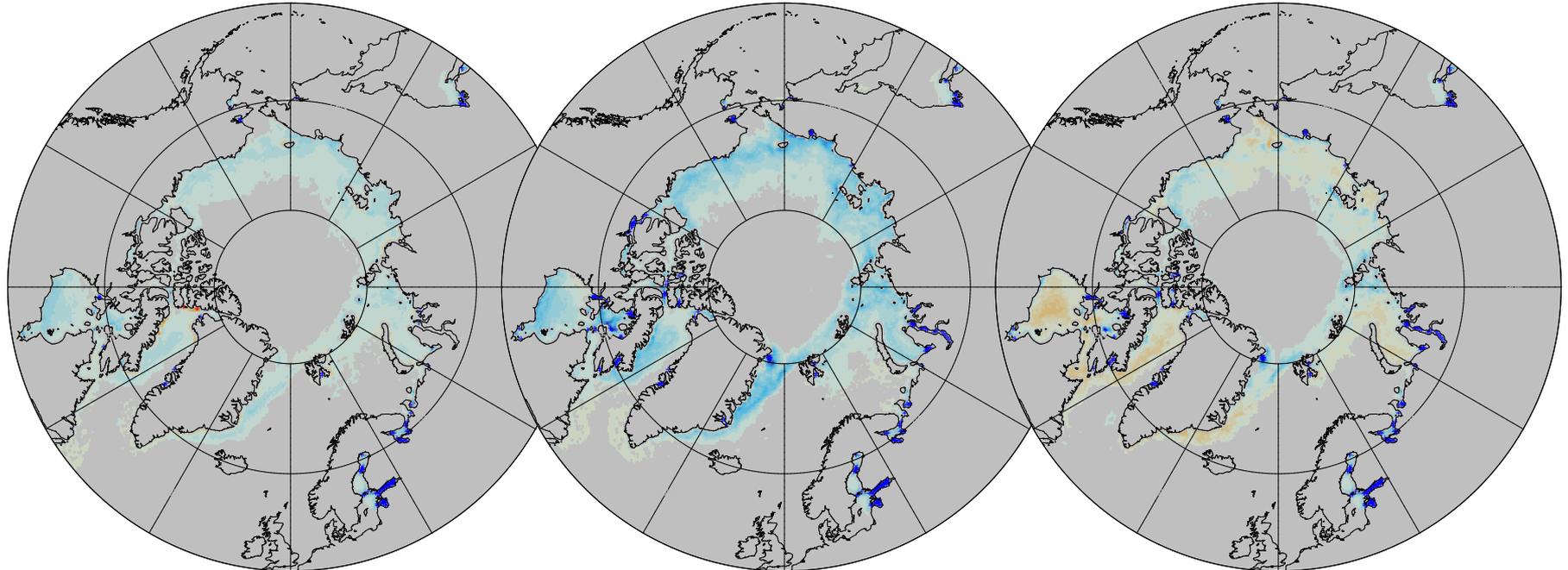


# Mean Ice Presence bias for July

a) OSISAF minus NSIDC

b) OSISAF minus AMSR

c) OSISAF minus IMS

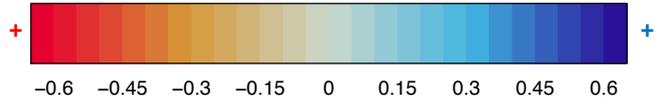
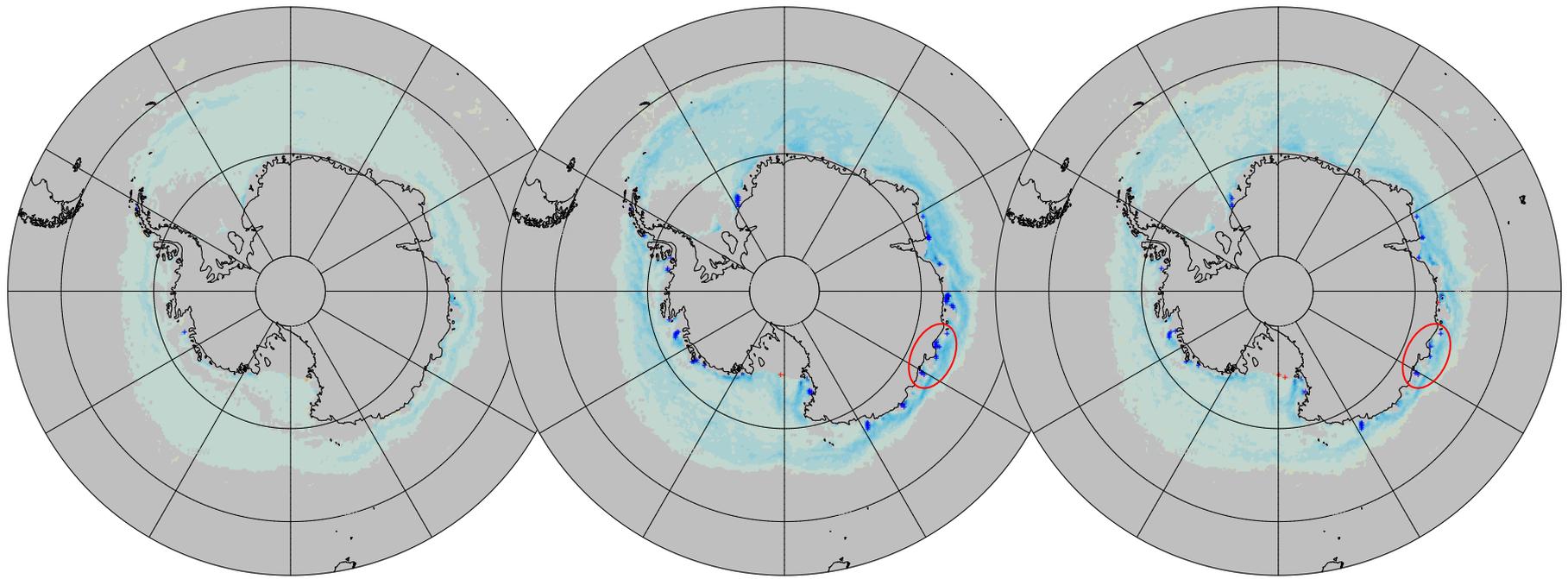


# Mean Ice Presence bias for Dec

a) OSISAF minus NSIDC

b) OSISAF minus AMSR

c) NSIDC minus AMSR



# Summary

- There are considerable differences in sea ice presence between different observational datasets, highest in the summer.
- Comparing the mean bias maps between different pairs suggests where certain datasets have issues (e.g. overestimation by OSISAF in the Gulf of Finland, Underestimation by AMSR in Cape Poinsett/West Antarctica)
- It is likely that disagreement and errors in observations persist as disagreement with analysis and eventually forecasts. Addressing these differences will most likely improve forecast performance, in this case for ECMWF.

# Summary

Sea ice presence and ice edge between different observational datasets have considerable differences.

Mean bias maps suggest issues in particular location for some datasets.

Forecast skills might improve if observational biases are accounted for.

Thank you for your attention 😊

[bimochan.niraula@awi.de](mailto:bimochan.niraula@awi.de)



# Fin

Thank you for your attention 😊

[bimochan.niraula@awi.de](mailto:bimochan.niraula@awi.de)

