Regional forecast of the minimum sea ice extent: a Lagrangian approach

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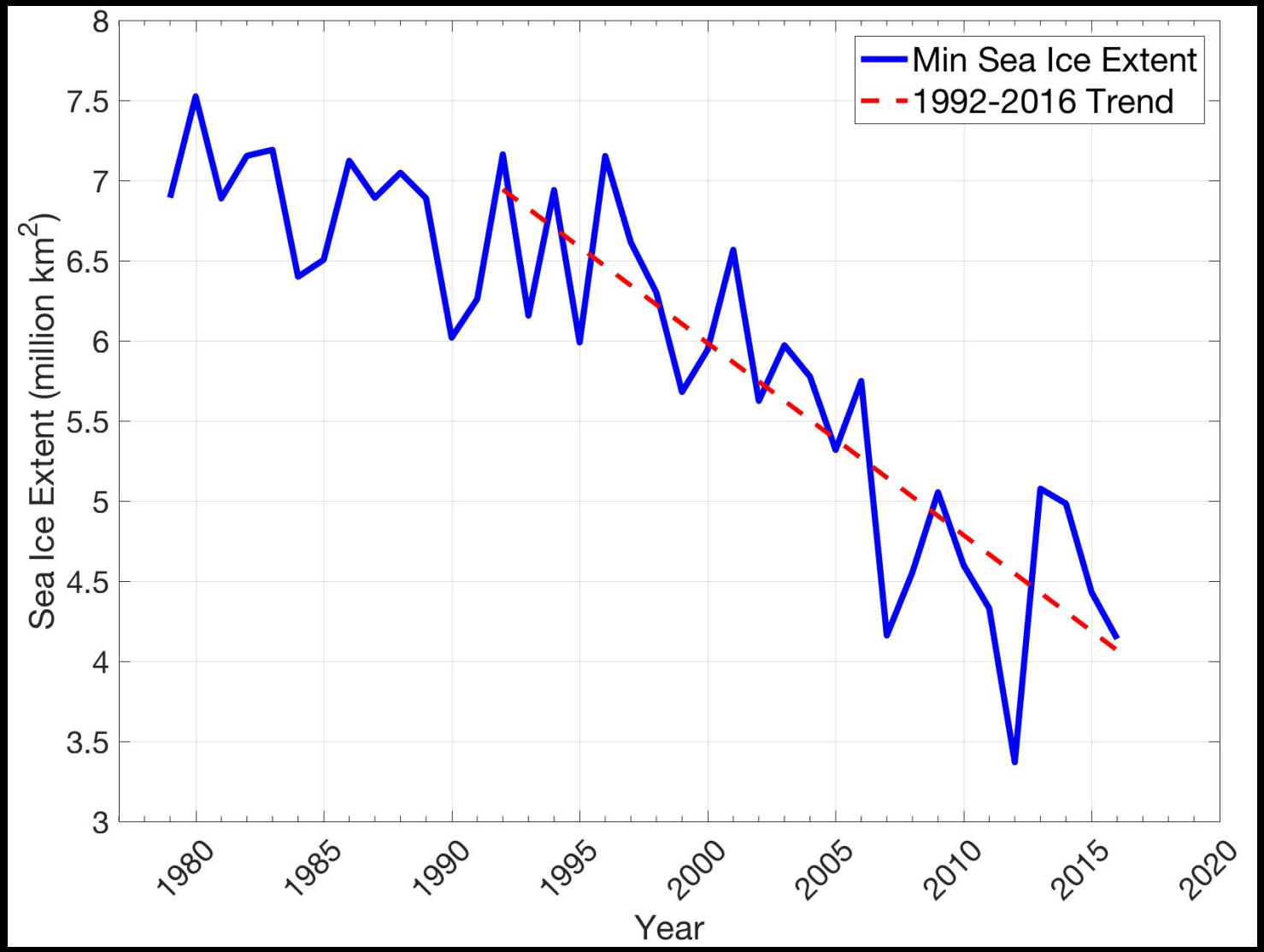
Williams et al., 2016

Minimum Sea Ice Extent



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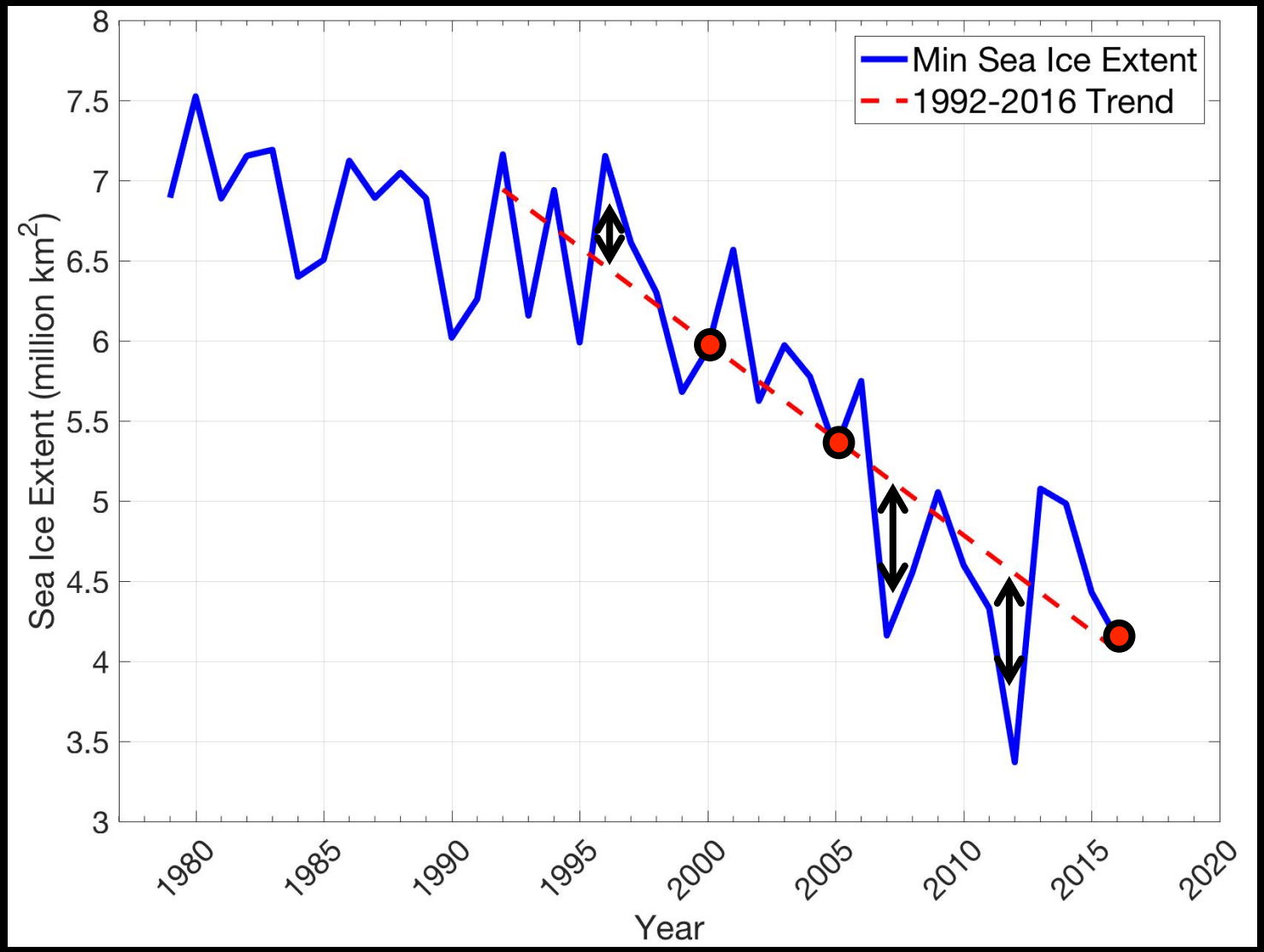
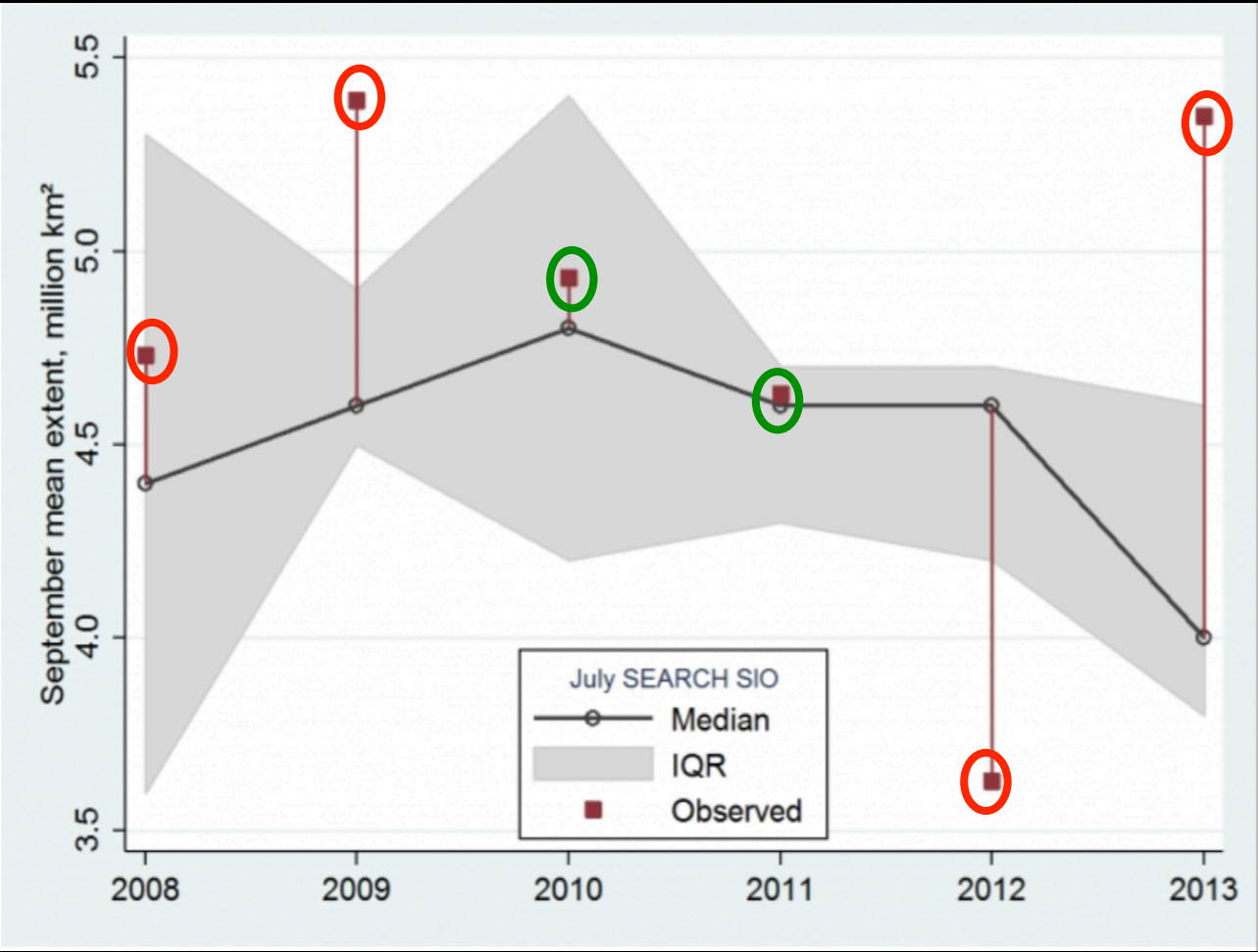


Sea Ice Outlook

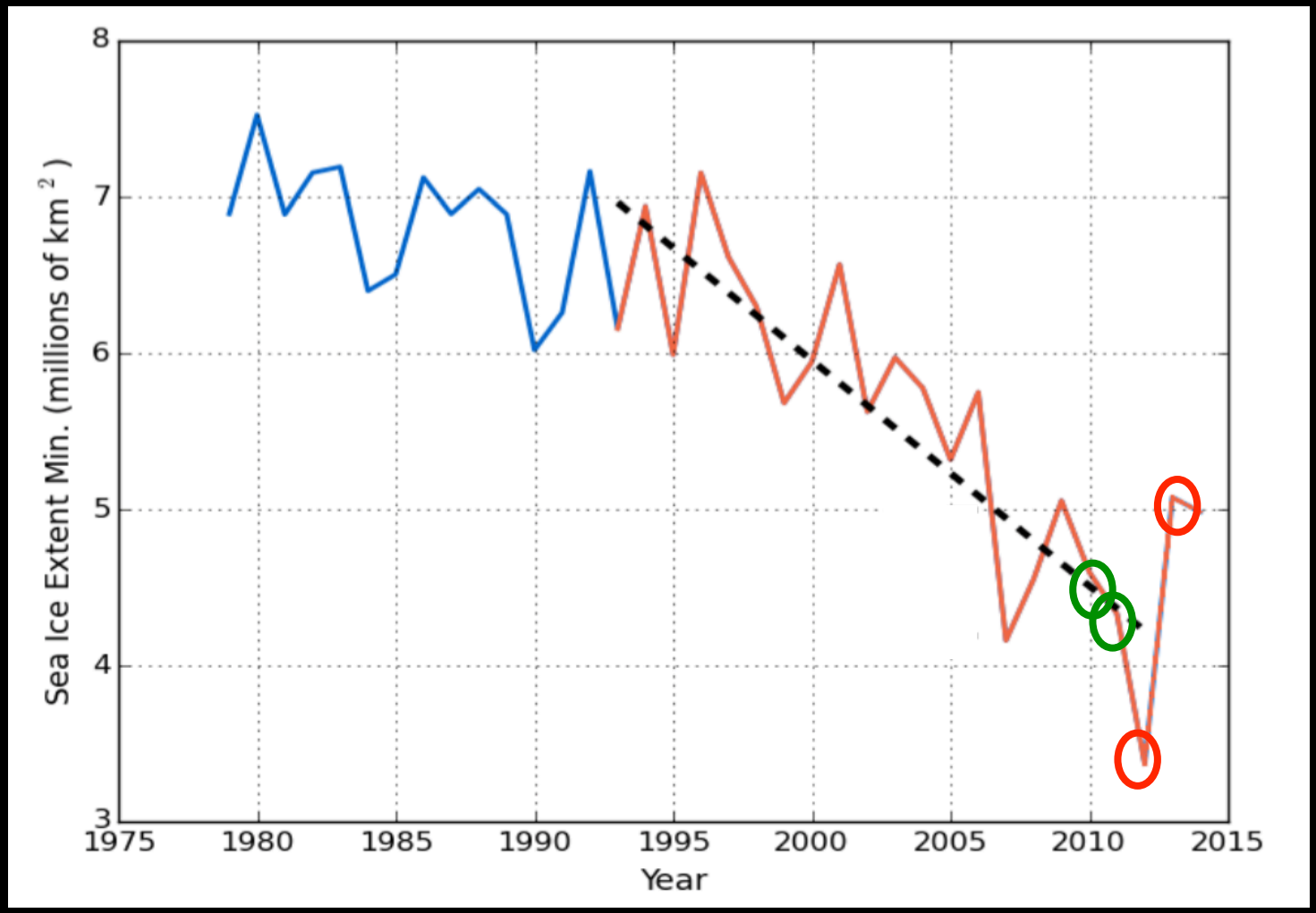
Motivation

The forecast is only skillful for years when the Min SIE follow the longterm trend.



Stroeve et al., 2014

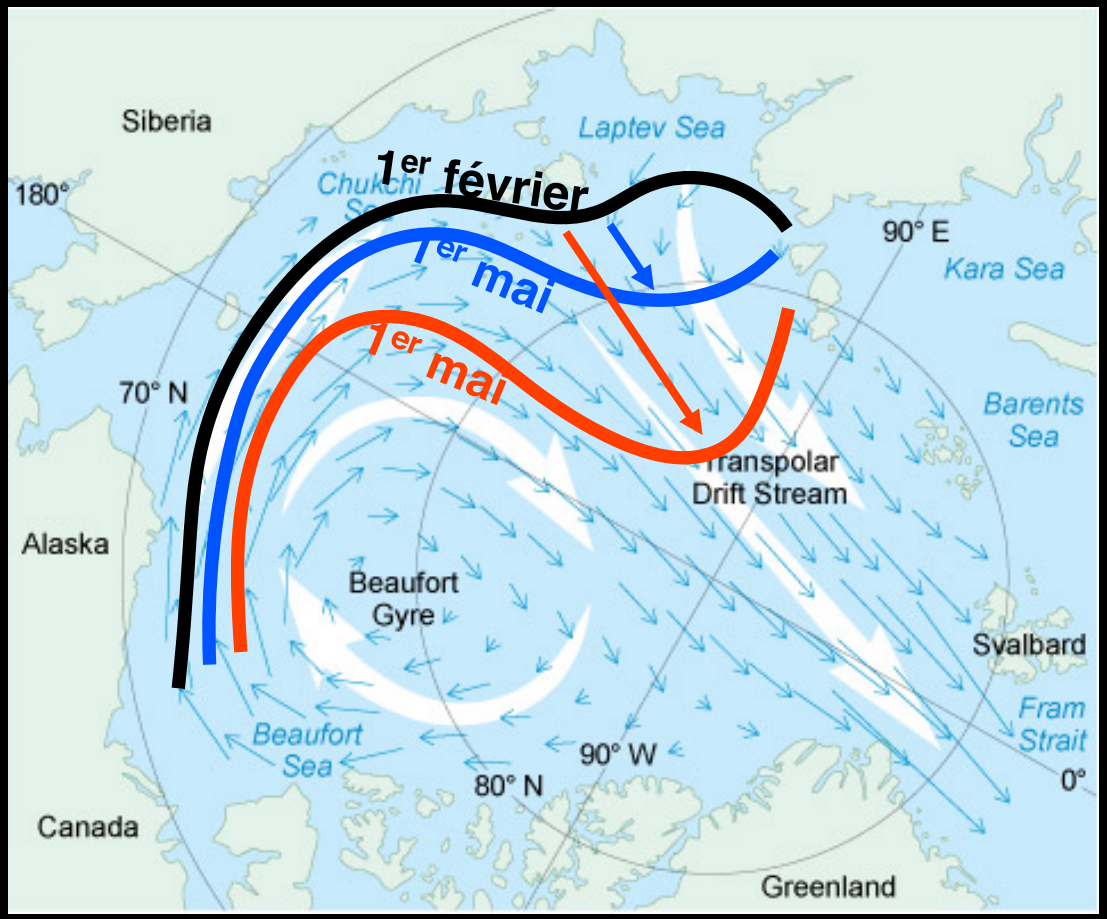
Minimum Sea Ice Extent



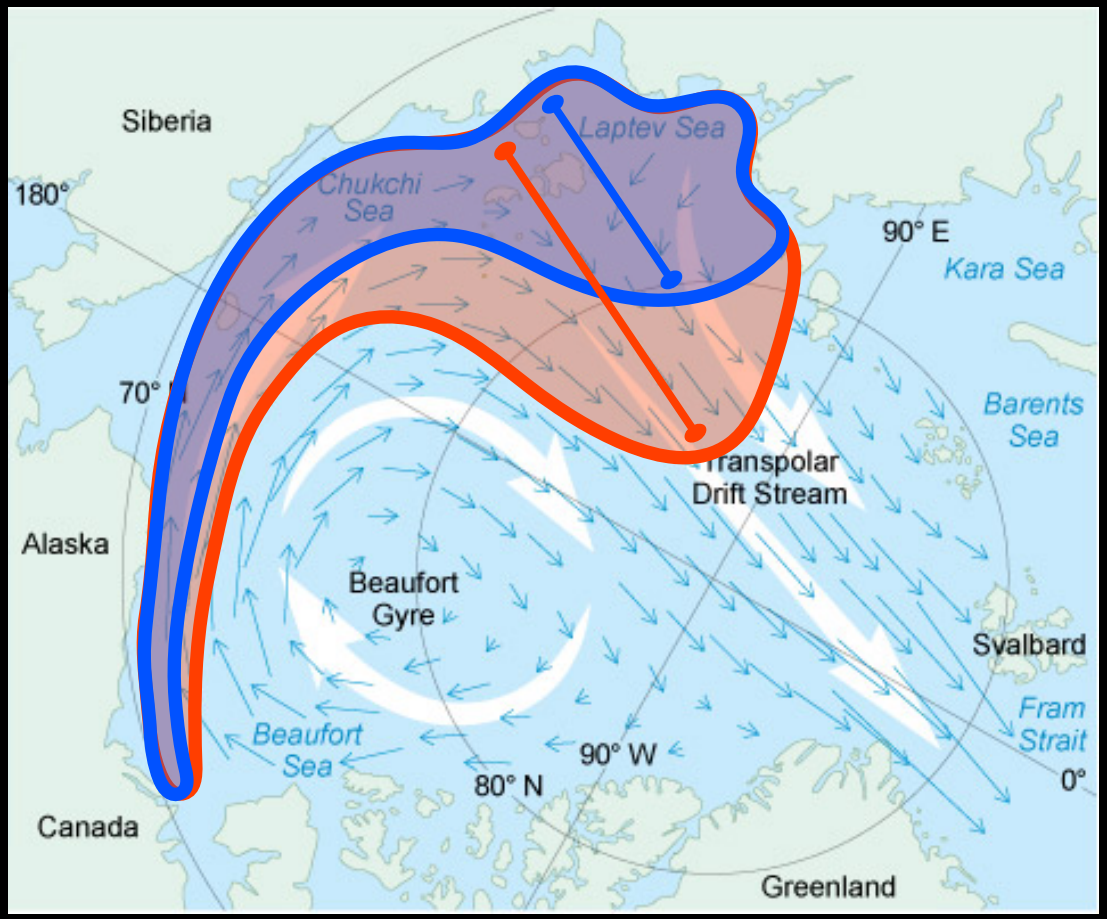
Mean Ice Drift

Coastal divergence

Coastal Divergence

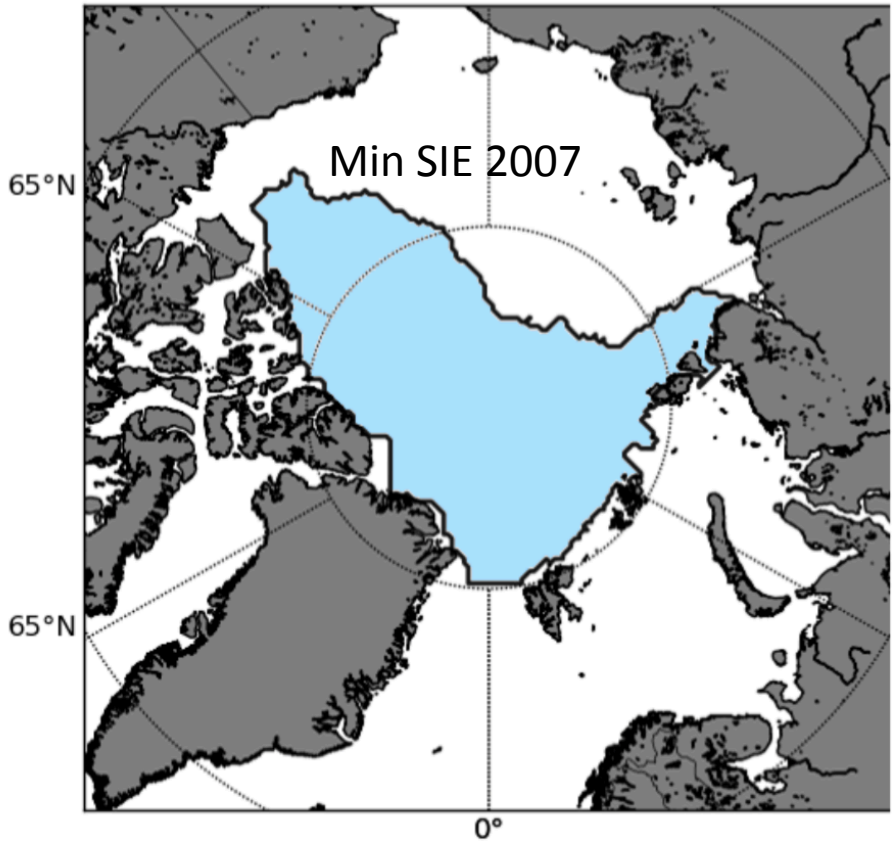


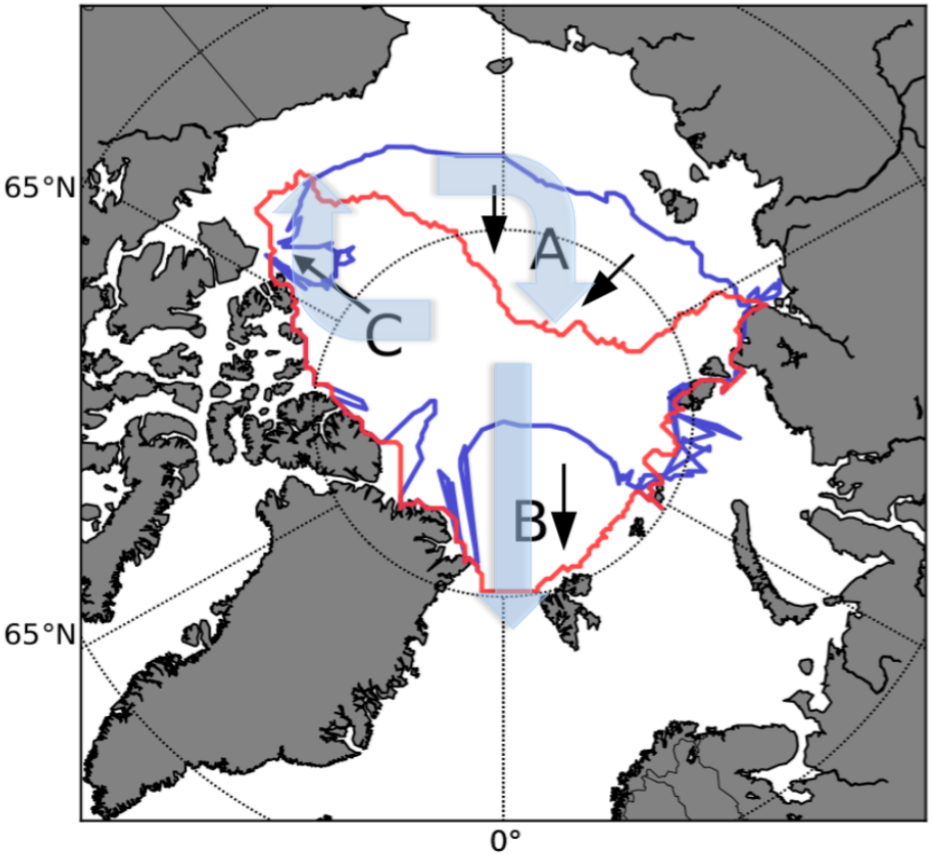
Coastal Divergence



Lagrangian Model

Polar Pathfinder – 25km resolution





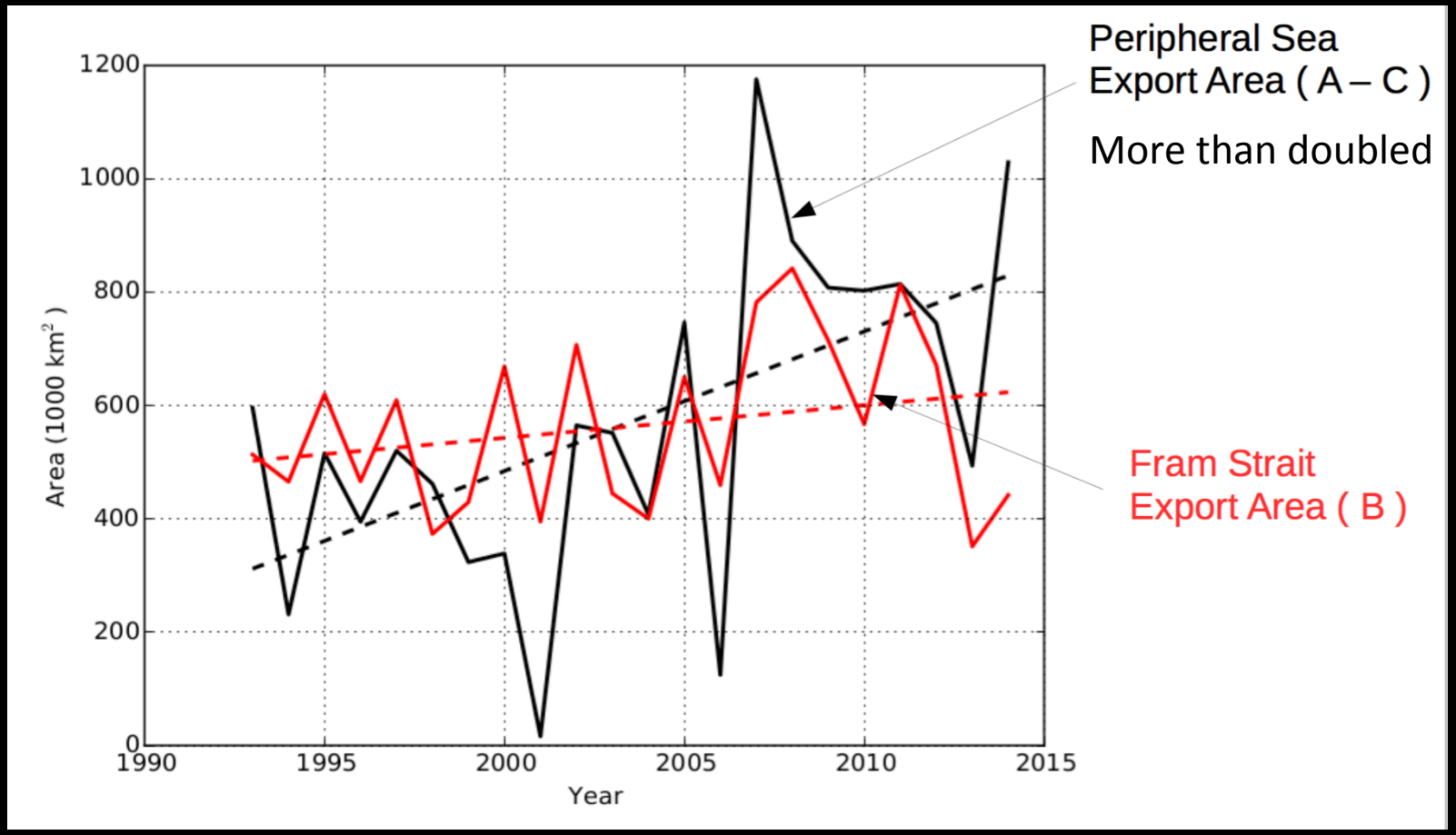
January Position of the 2007 Minimum SIE

Williams et al., 2016

DPA and FSIEA

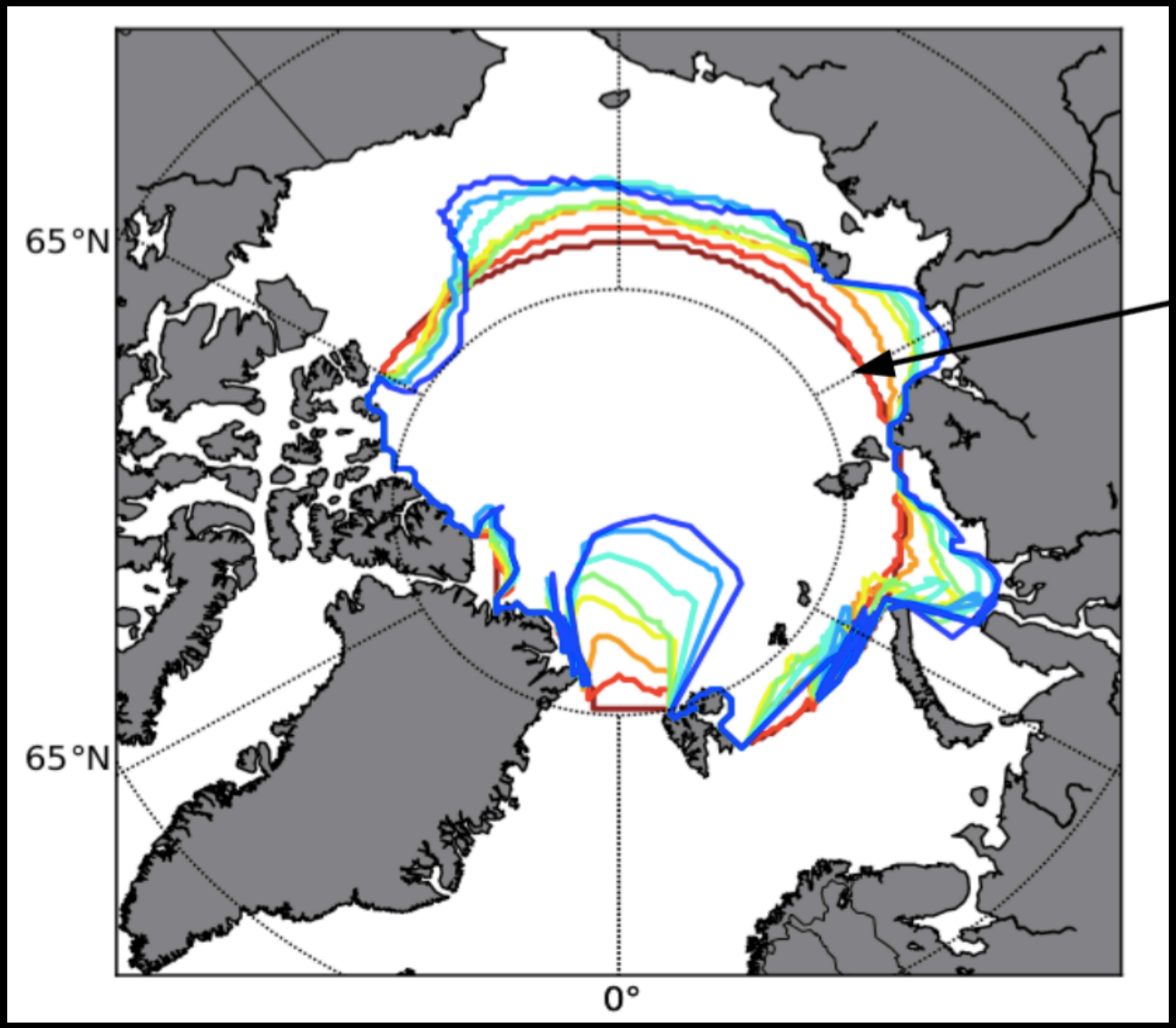
November ← September

Area (km2)



Year

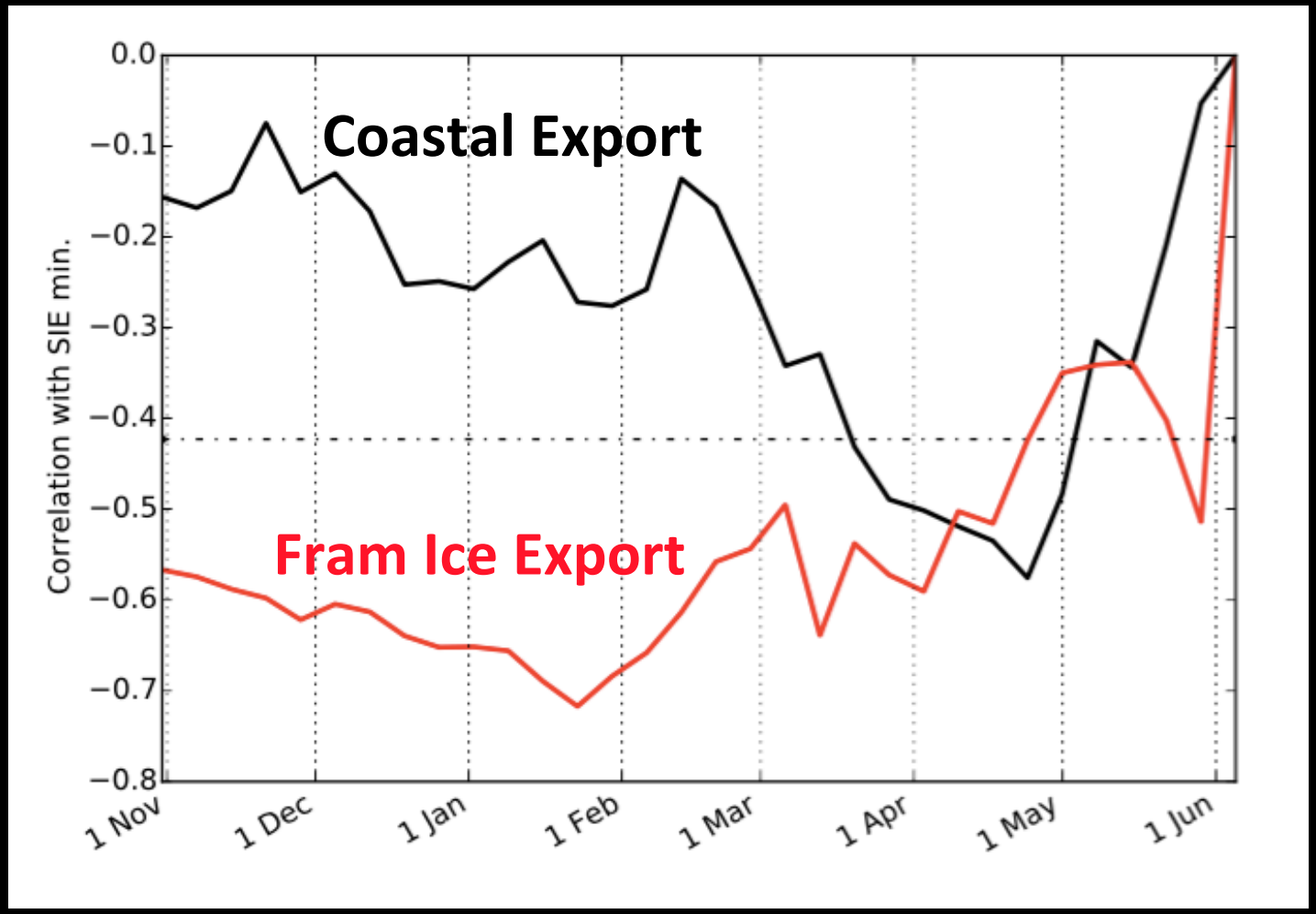
Synthetic Ice Edge



Coastal and Fram Ice Export

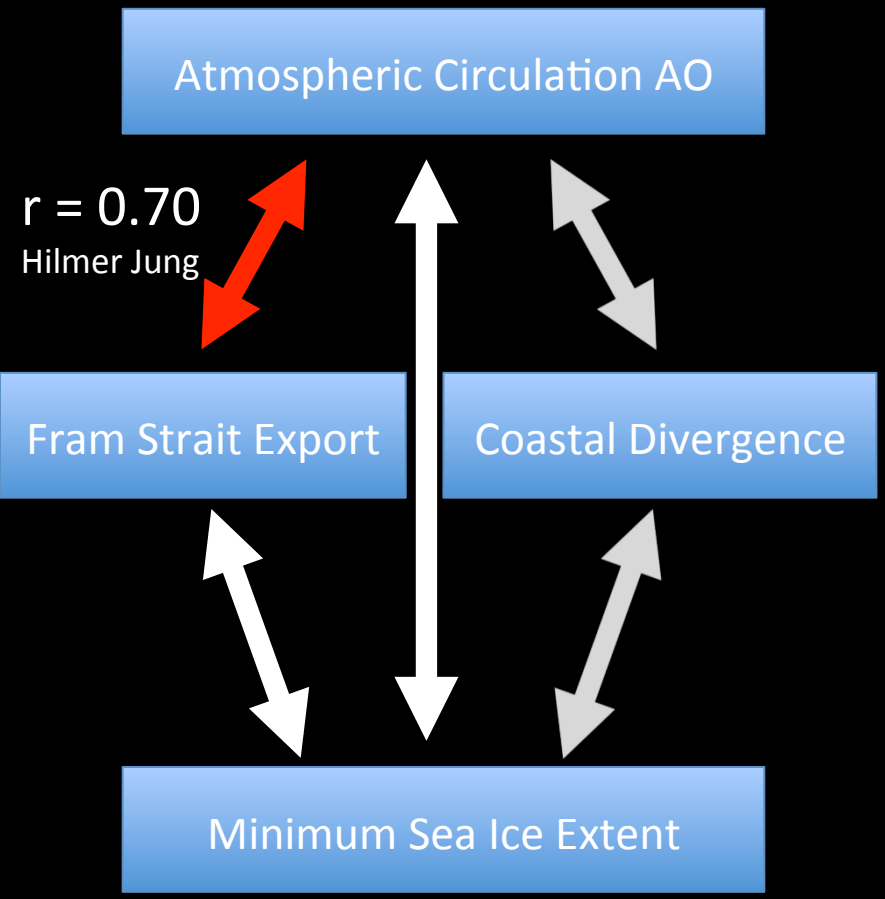
Synthetic Ice Edge

Correlation
Min SIE



Williams et al. (2016)

Seasonal Forecast of the Min SIE



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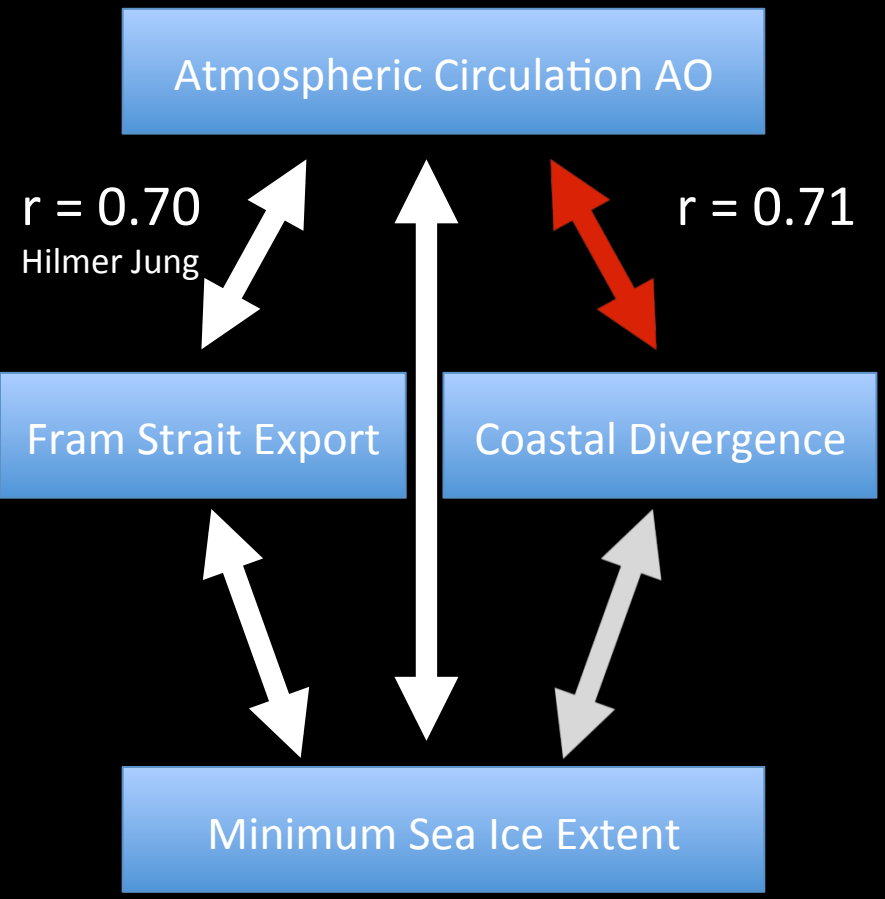

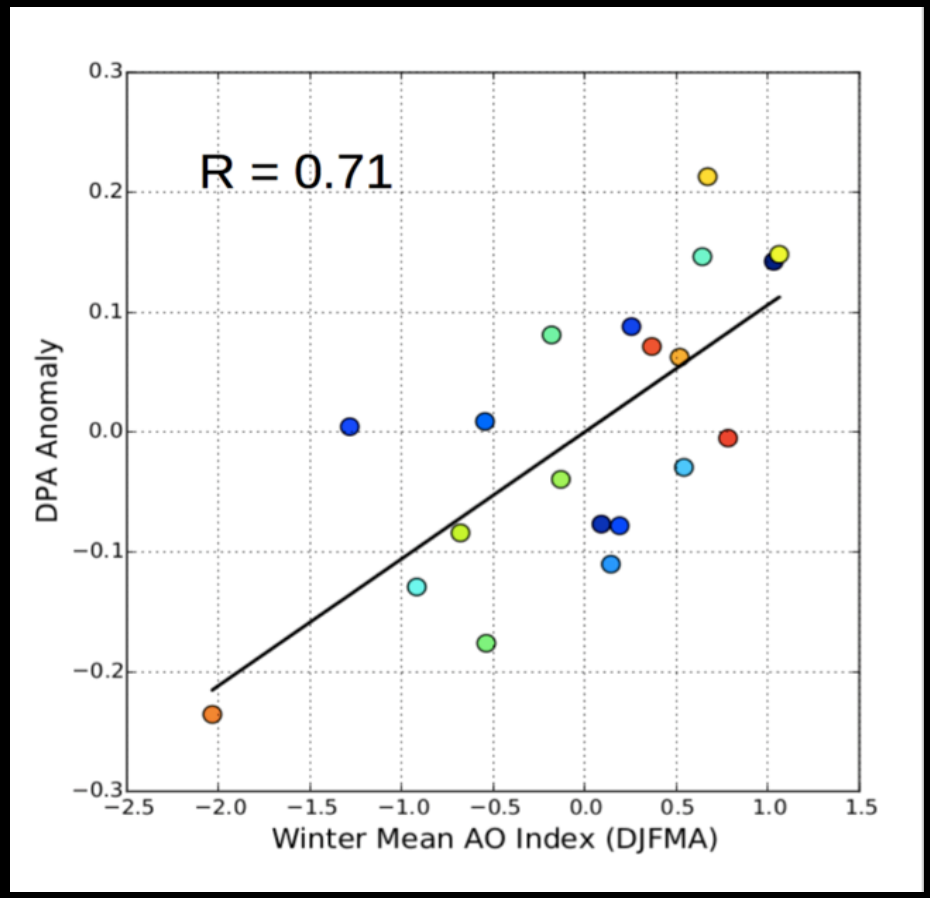

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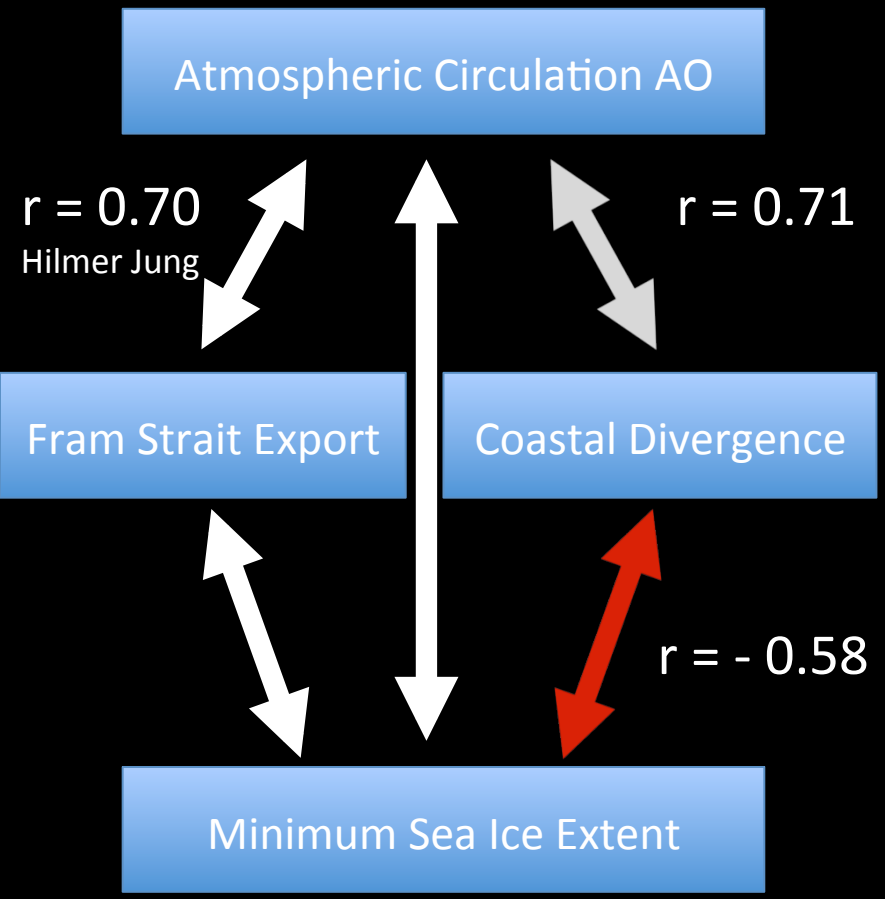

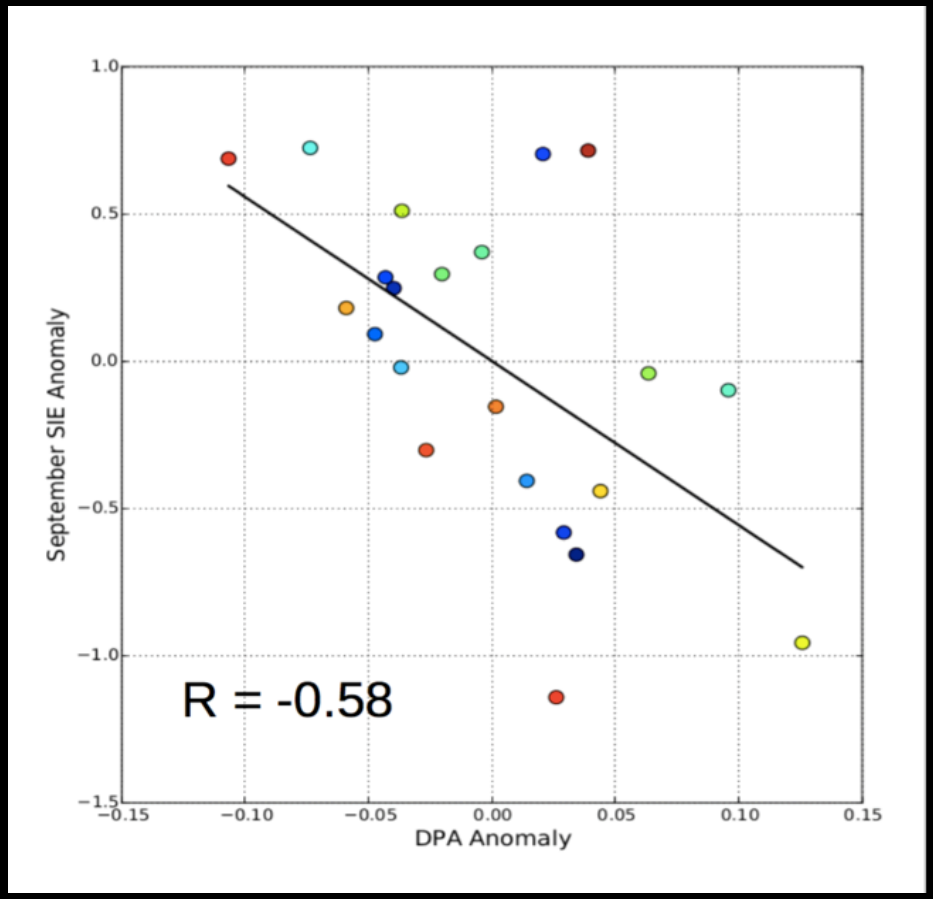

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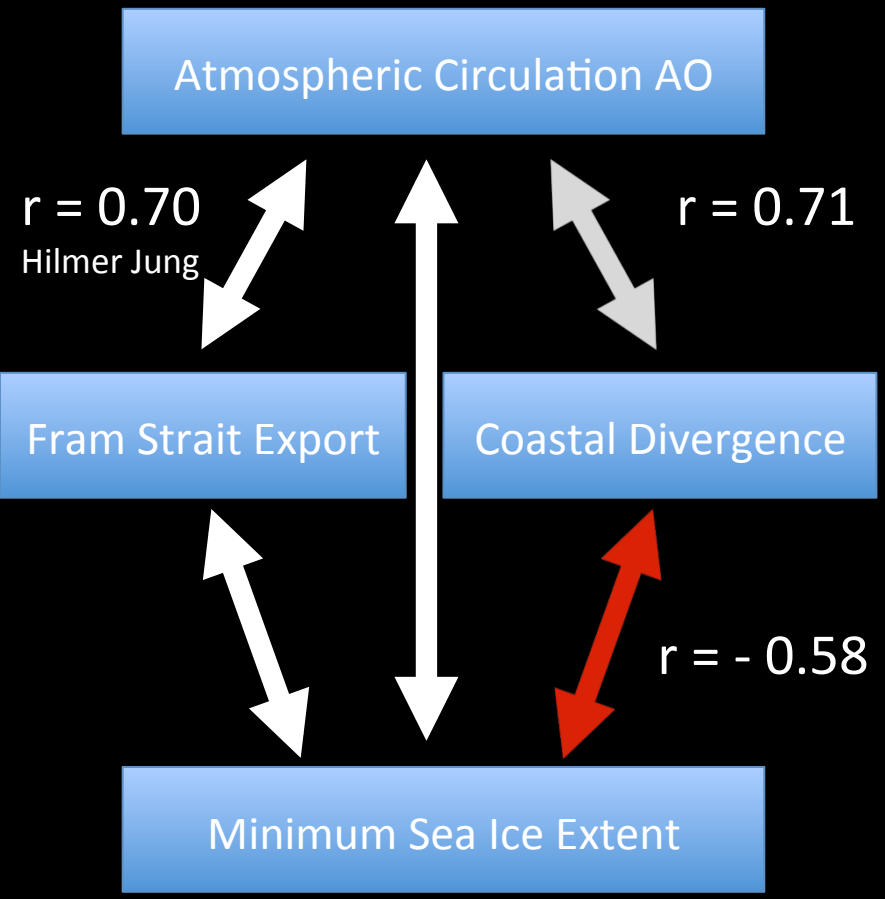

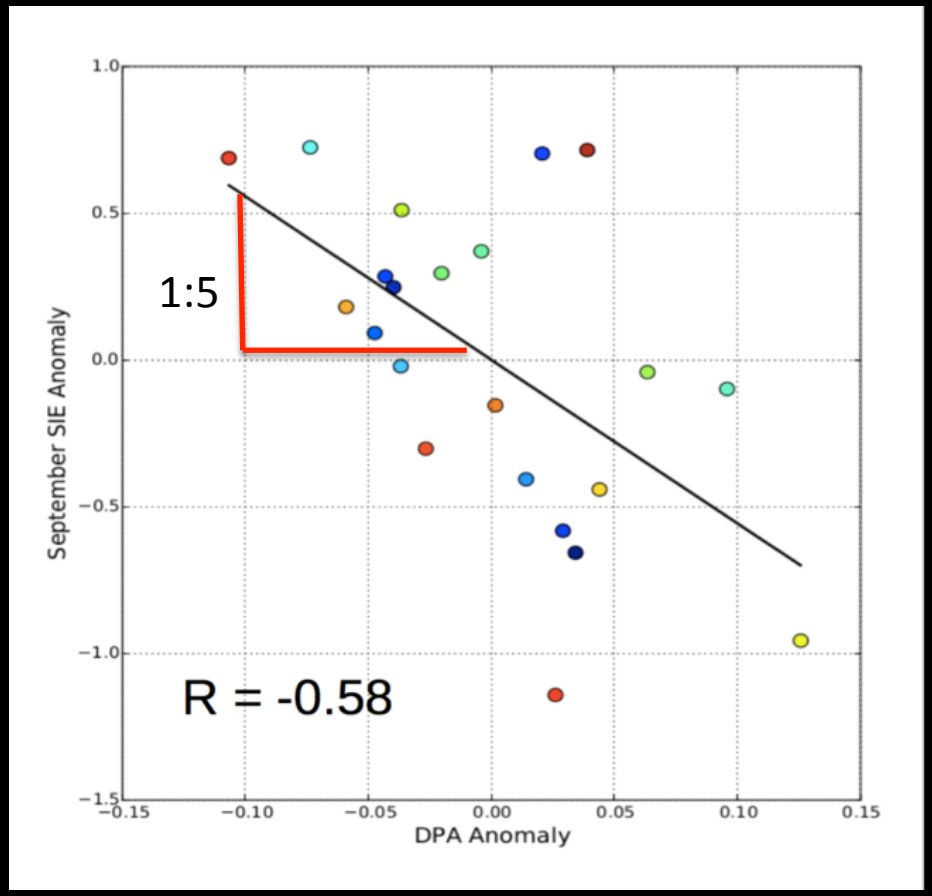

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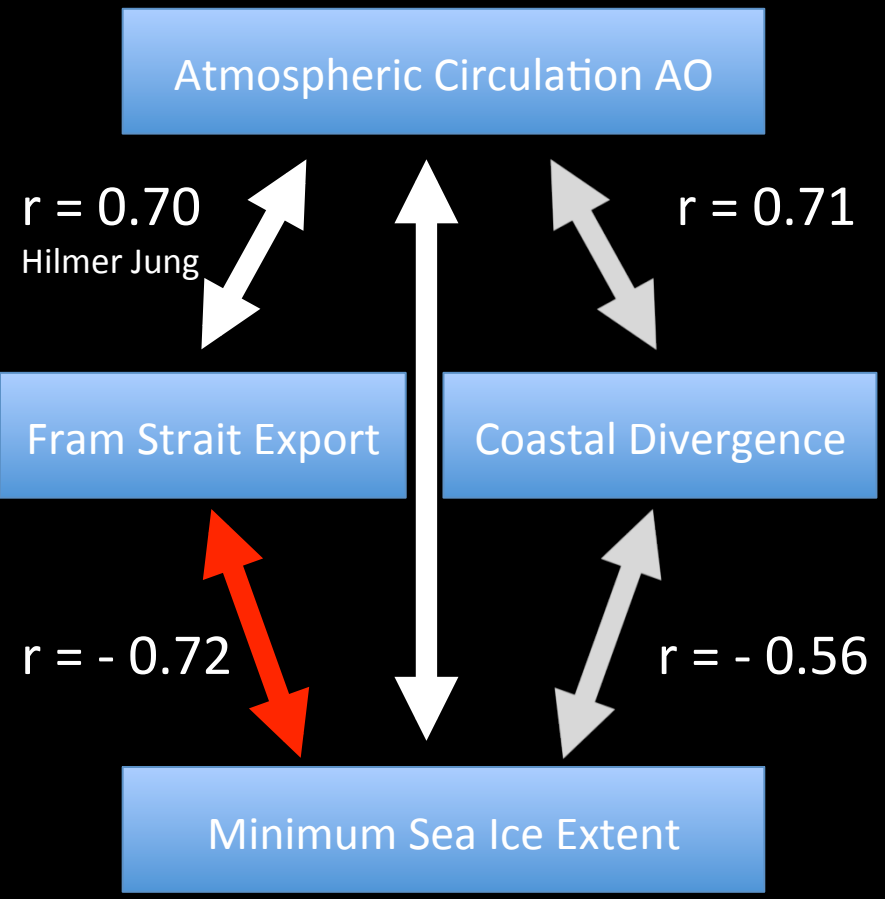

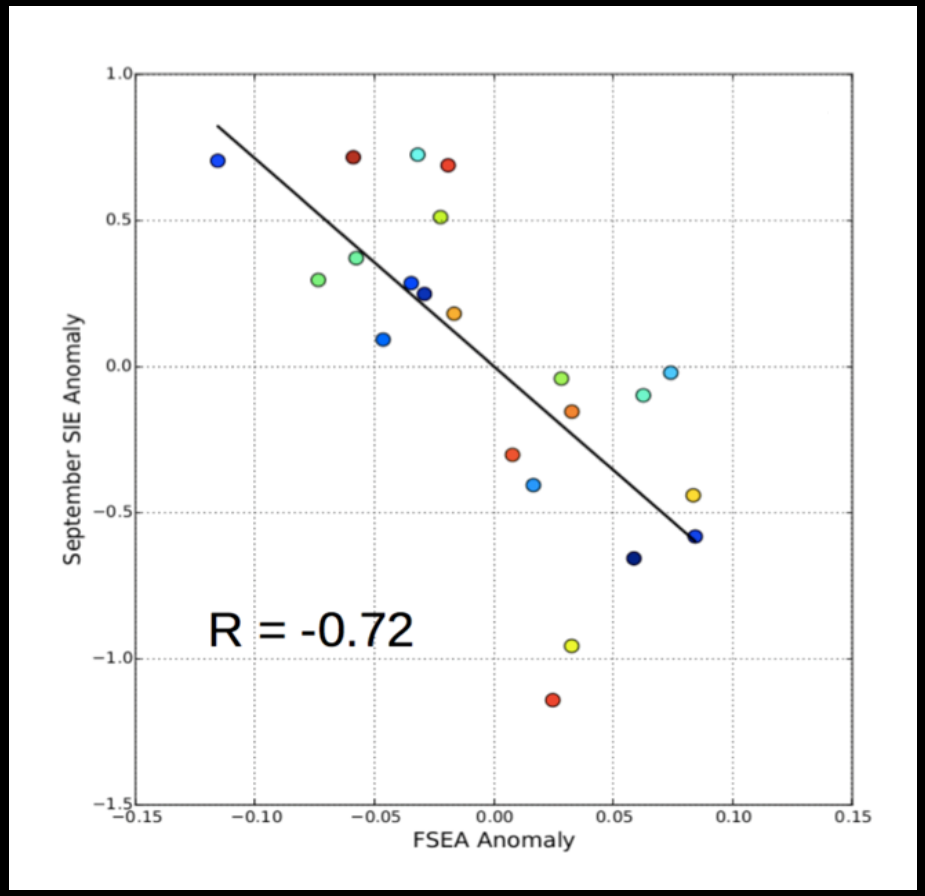

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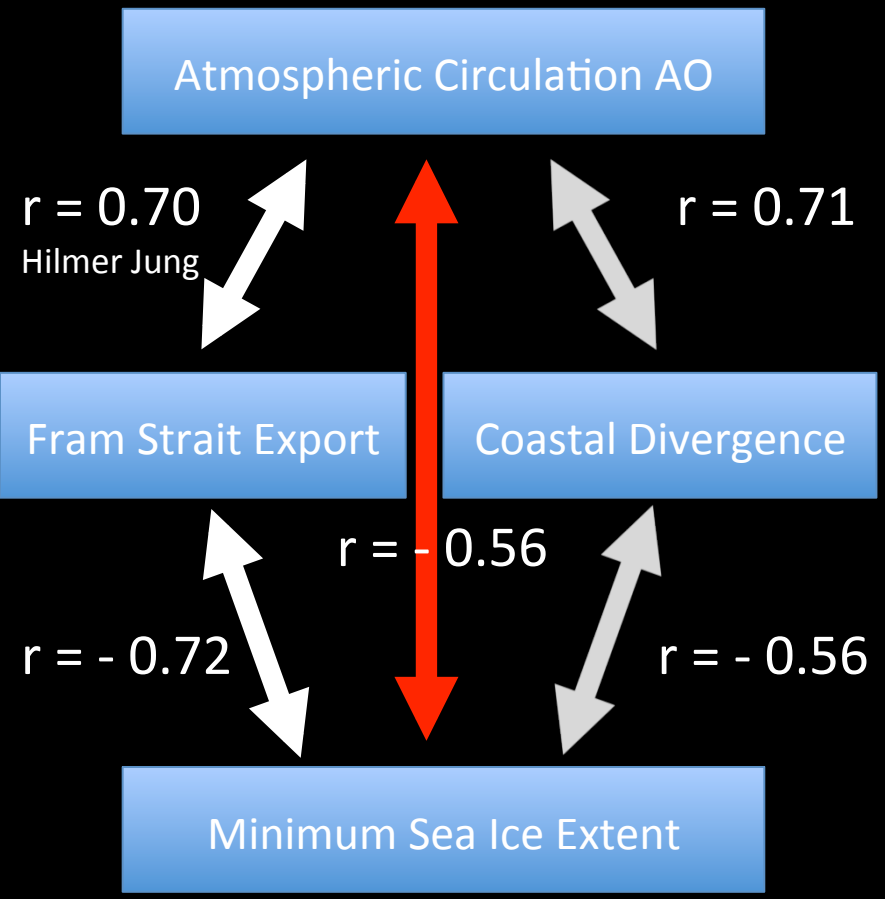
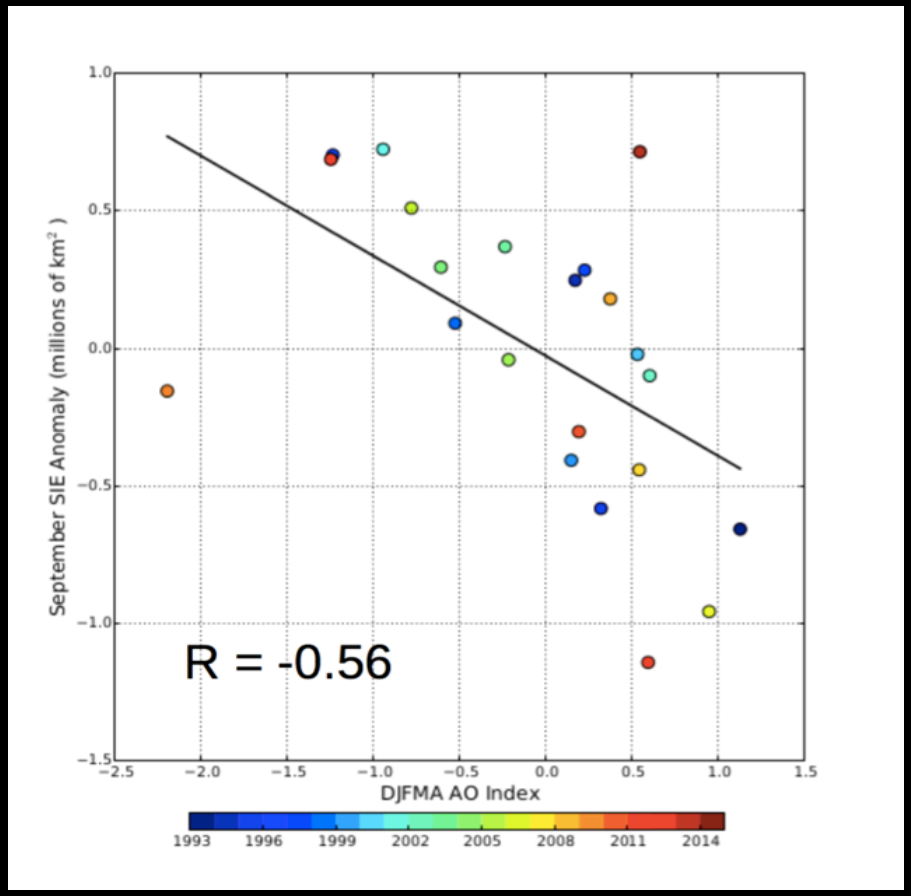
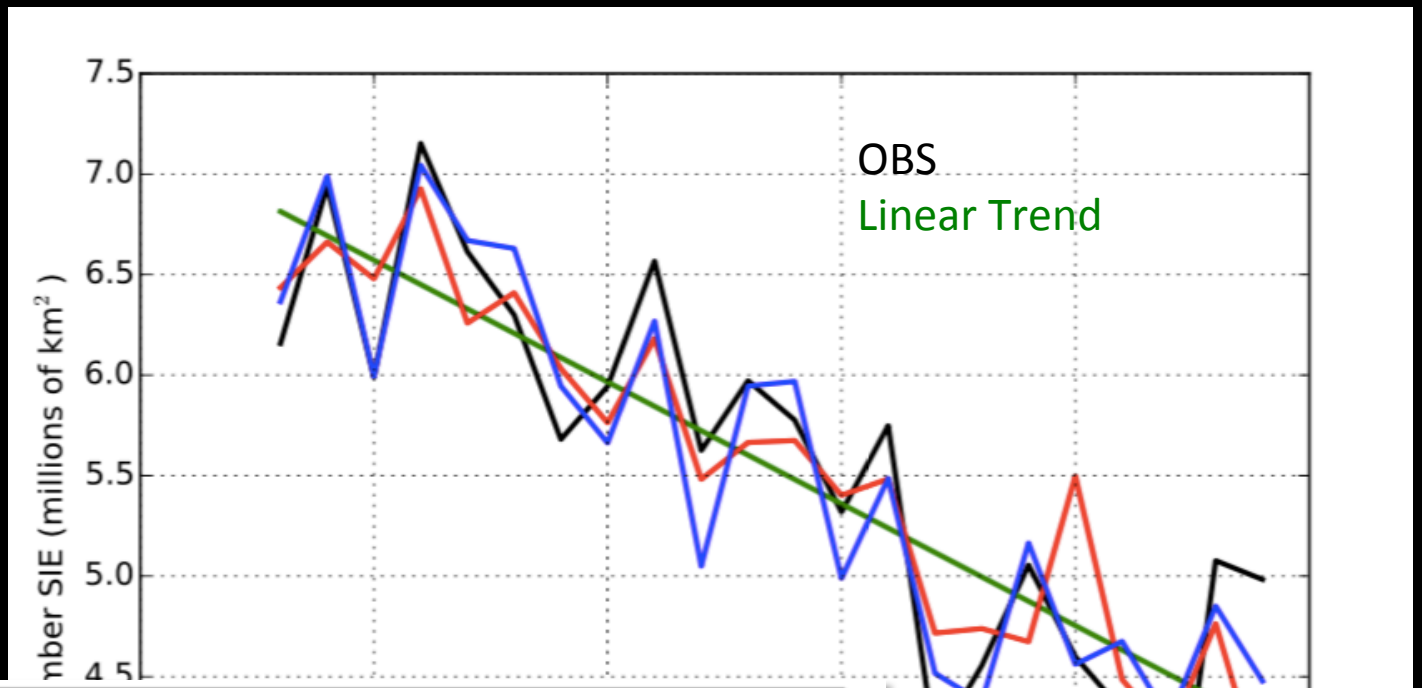




Hindcast Models of Min SIE



Label	Predictors	r^2	$\bar{r}^2$	σ_{err}
H1	Year	0.680	0.663	0.528
H2	Year, DPA	0.785	0.763	0.432
H3	Year, FSEA	0.844	0.828	0.367
H4	Year, AO	0.779	0.755	0.439
H5	Year, DPA, FSEA	0.875	0.854	0.330

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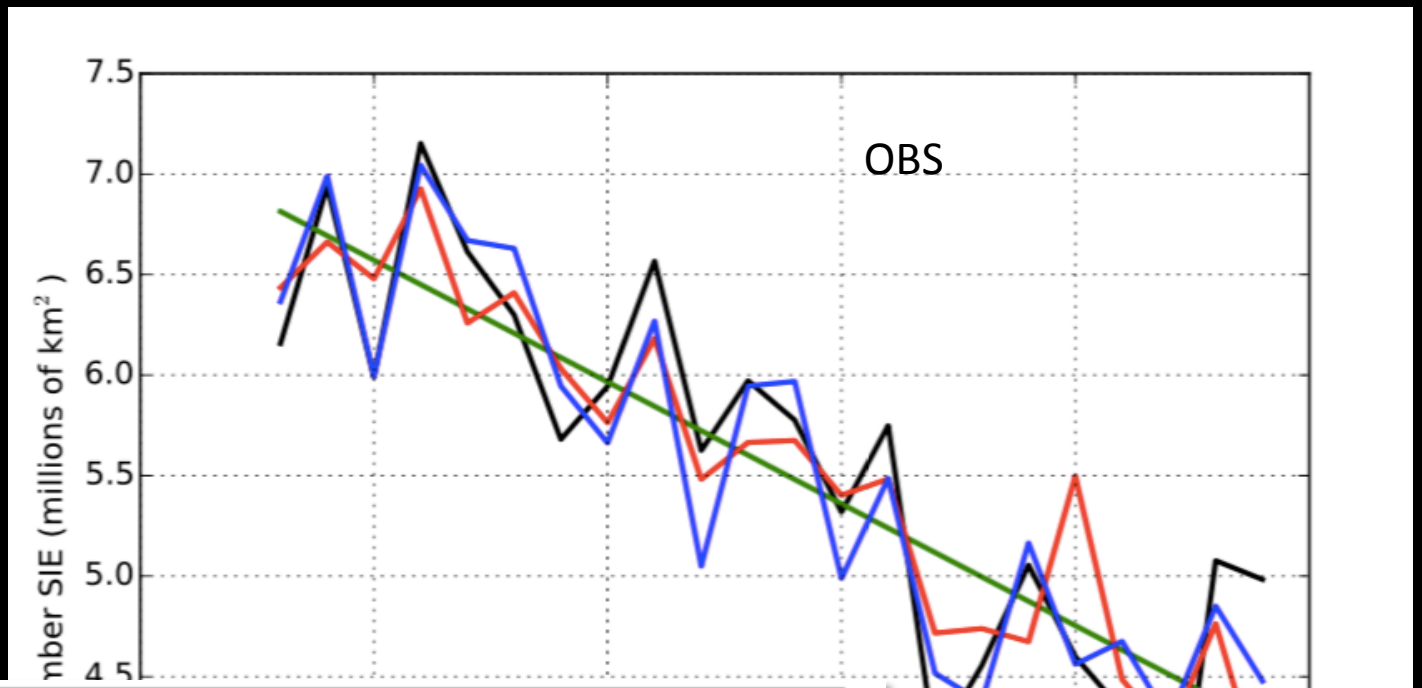

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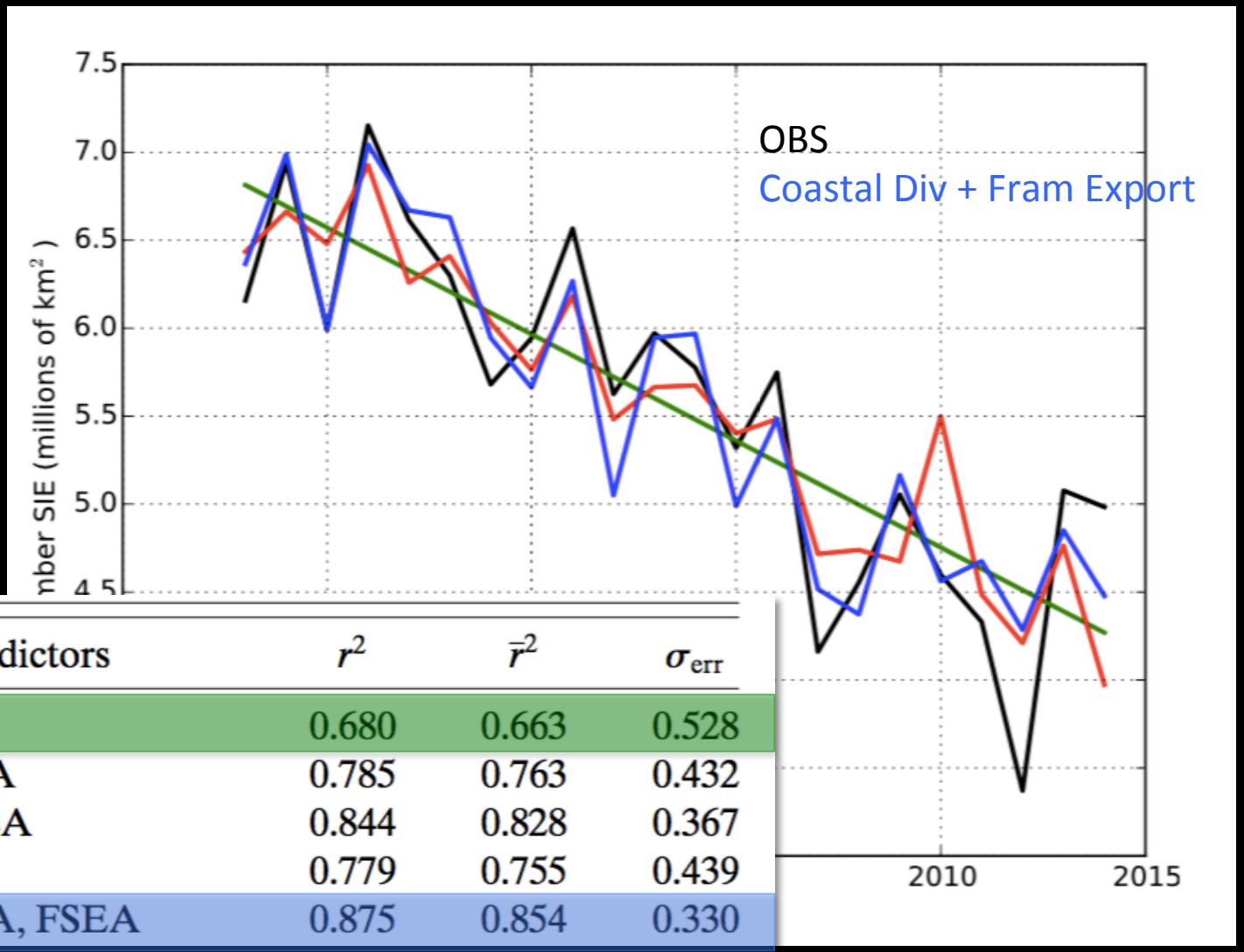

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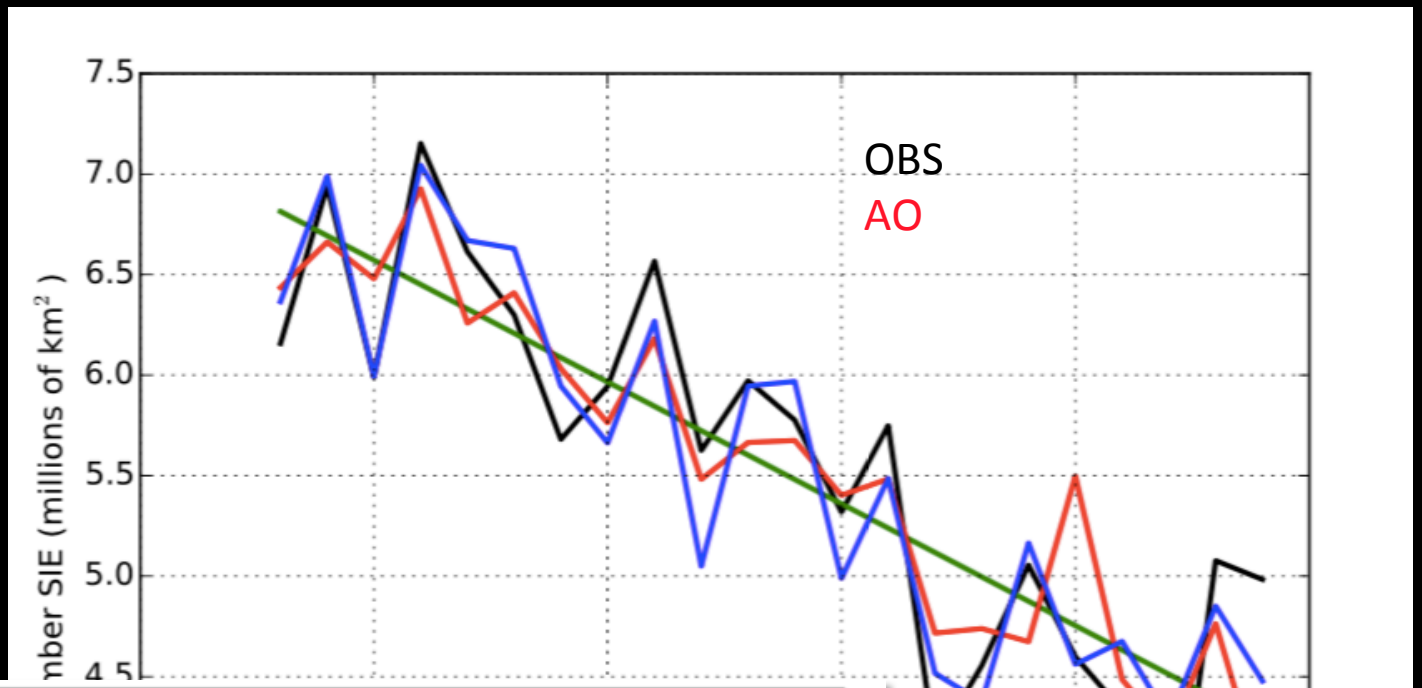

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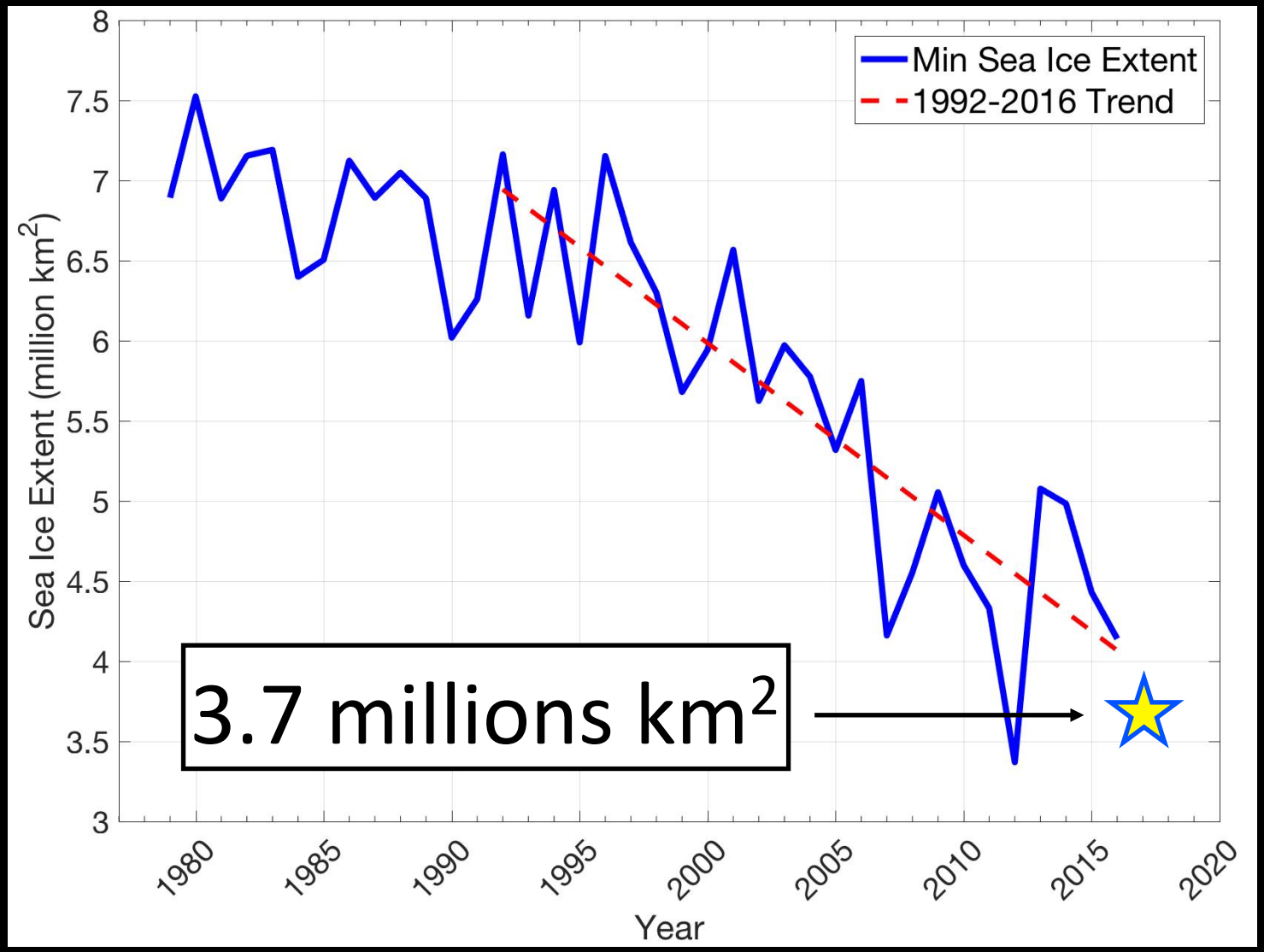
Forecast

2017

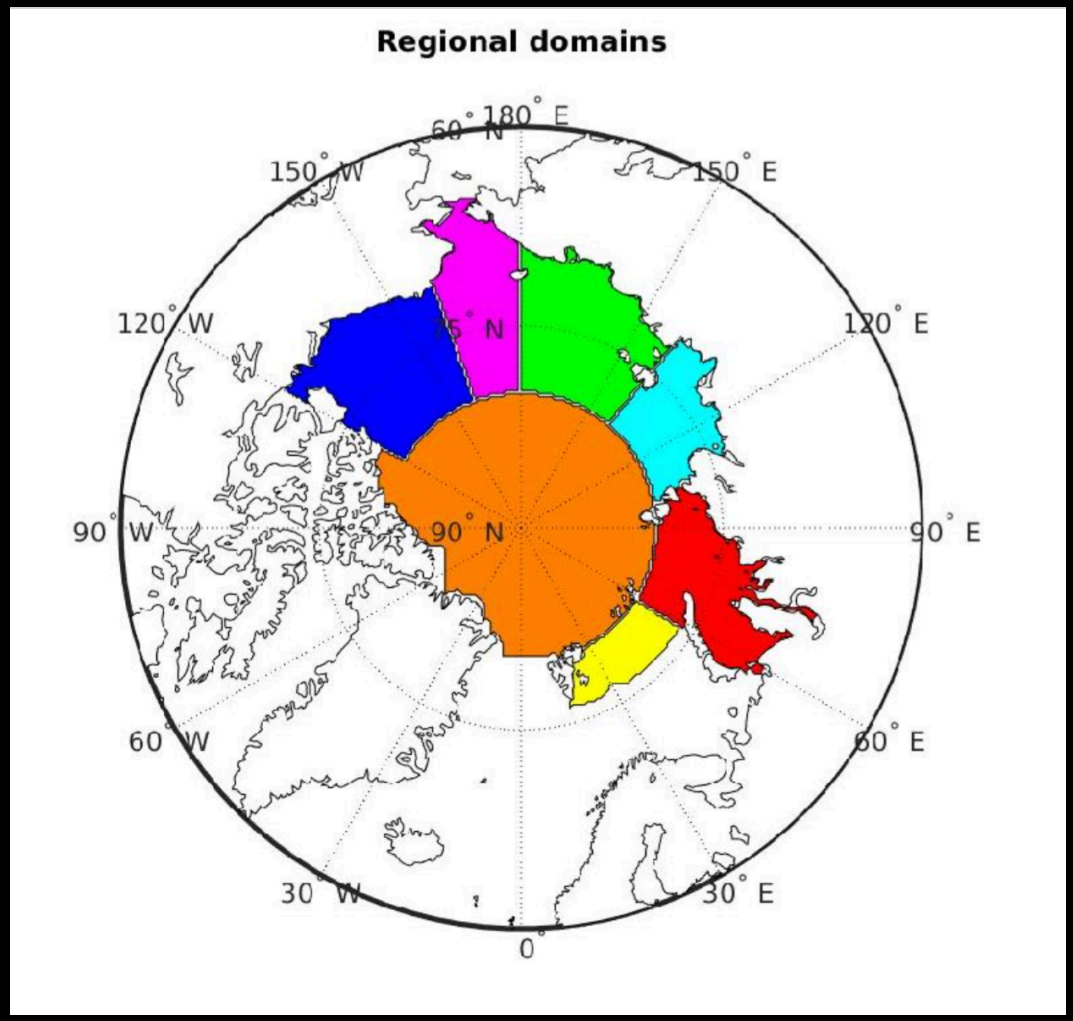


Conclusions

- Coastal sea-ice divergence and Fram Strait Export estimated from the Lagrangian model is skillful for the panArctic seasonal forecast.
- The skill is present after 1993 when the sea ice is thin and responds more readily to changes in wind forcing
- Real time sea ice drift estimate from satellite would allow for a real-time operational forecast of the minimum sea ice extent.

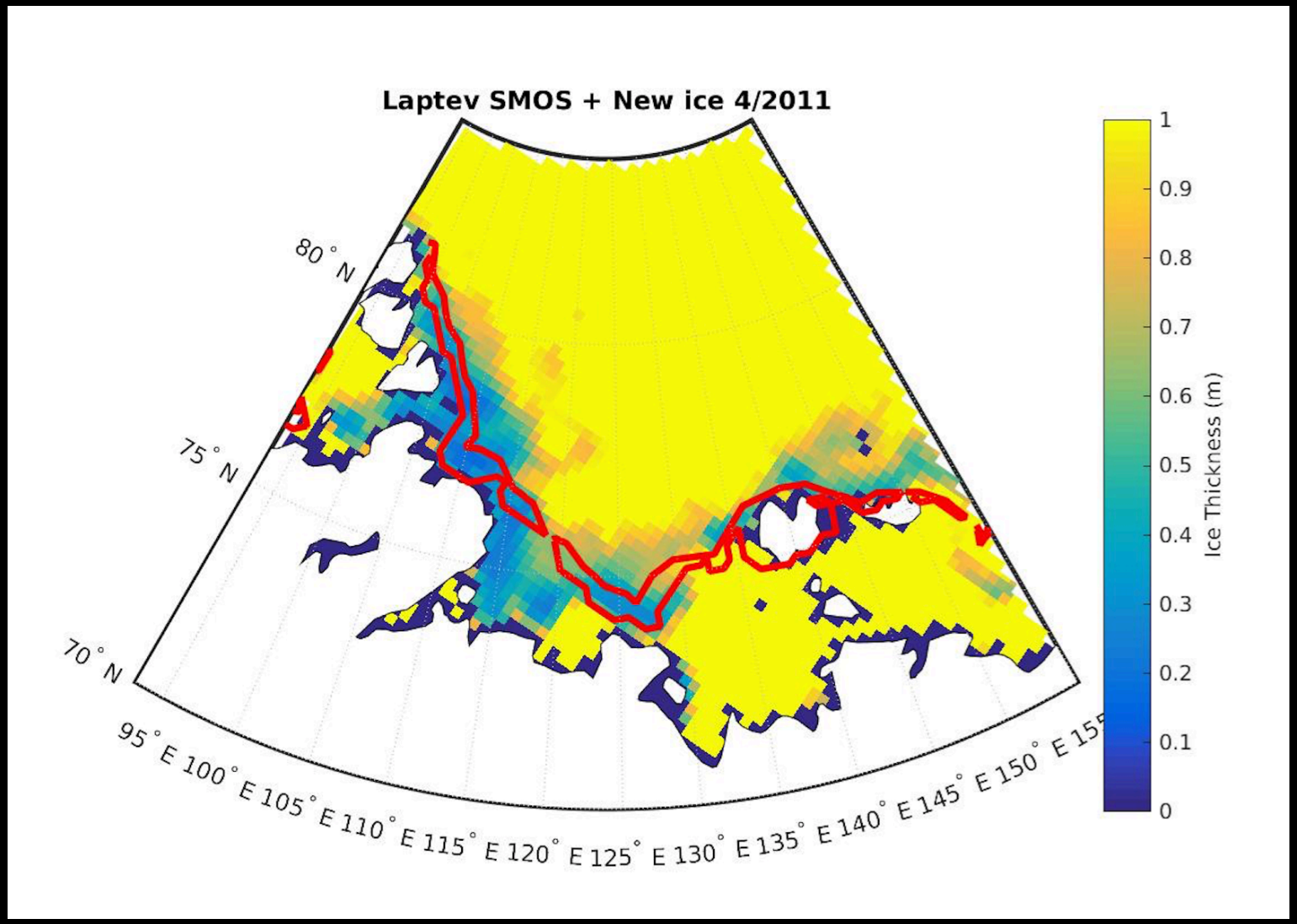
Future Work

Regional Seasonal Forecasting Model



SMOS Data

Thin Ice Thickness



Future Work

- Repeat the analysis advecting the ice edge (Nikolaeva and Sesterikov, 1974)

- Use OSI SAF near-real time sea ice drift