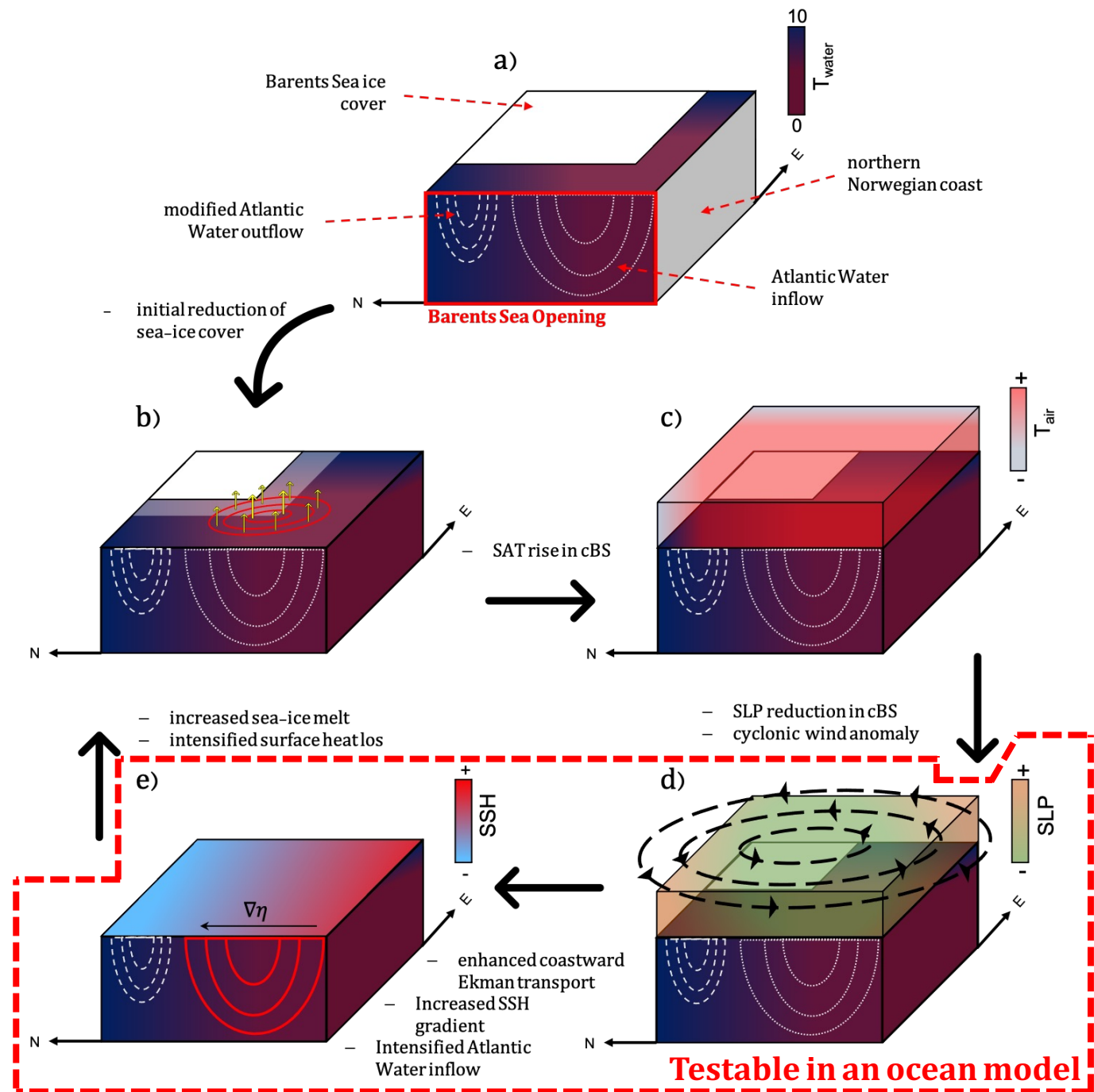


Investigations on the coupling of the Barents Sea sea-ice Retreat on the Atlantic Water inflow via an ocean-ice-wind feedback

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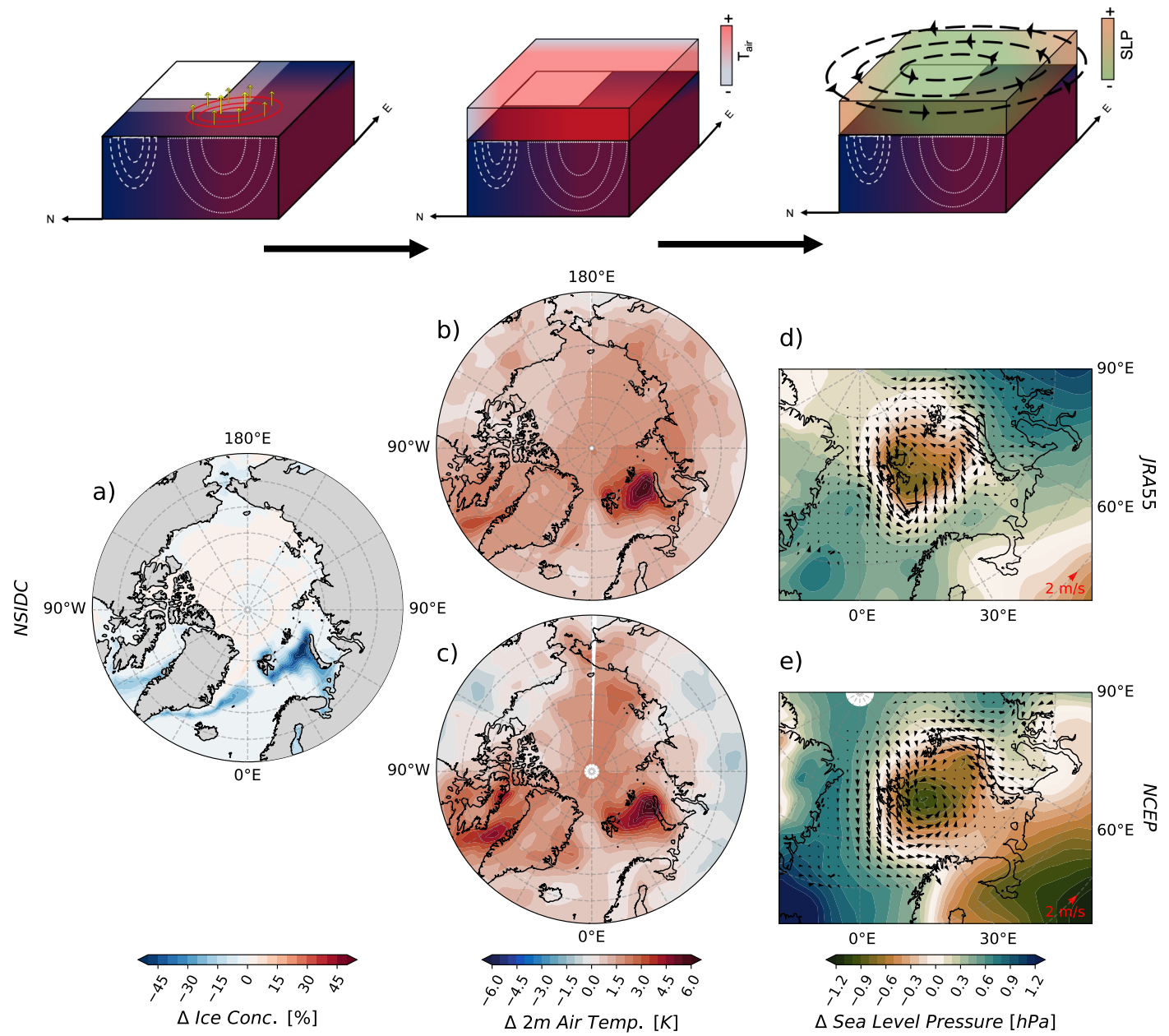


Processes: $A \rightarrow B \rightarrow C \rightarrow D$

- Massive sea ice retreat in the Barents Sea
- Increased ocean-atmosphere winter heat loss
- Strong local warming in SAT
- Local reduction in SLP, cyclonic wind anomaly
- Westerly winds in the Barents Sea Opening

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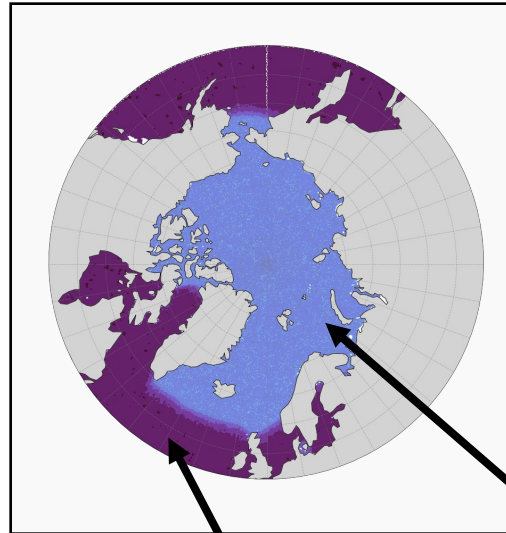
Winter difference in SIC, SAT, and SLP in reanalysis data
mean(2000 to 2018) minus mean(1979 to 1999)

FESOM

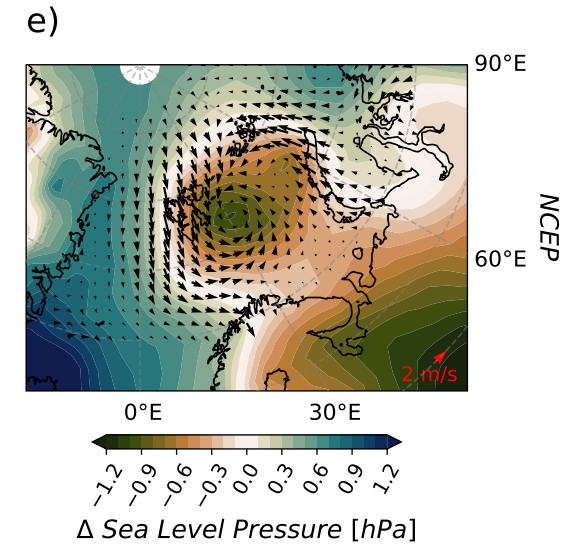
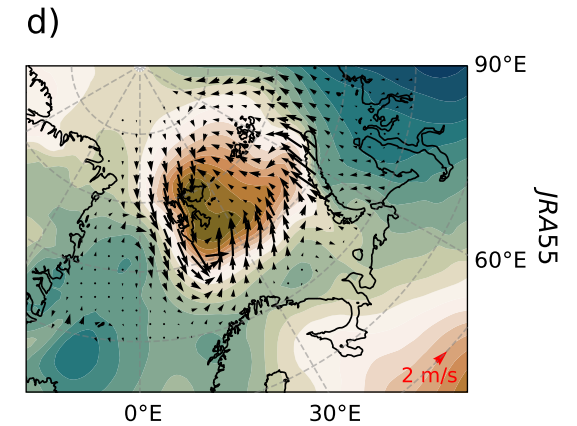
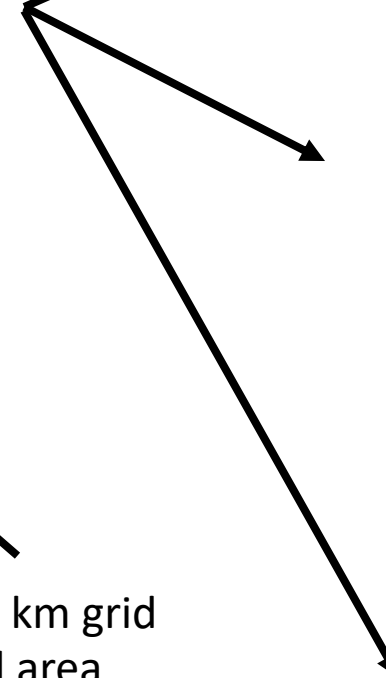
- triangular mesh structure
- 4.5 km grid cell area in Arctic and Nordic Seas
- 35km elsewhere
- 46 vertical levels



- **CORE1** normal year forcing
- 40 year spinup



Superimpose **constant cyclonic wind anomalies** from reanalysis for 8 years

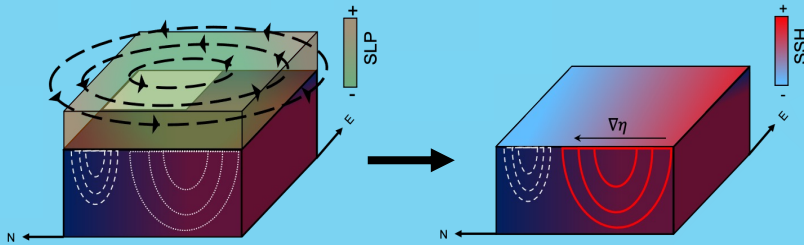


unperturbed 8 year CTRL simulation

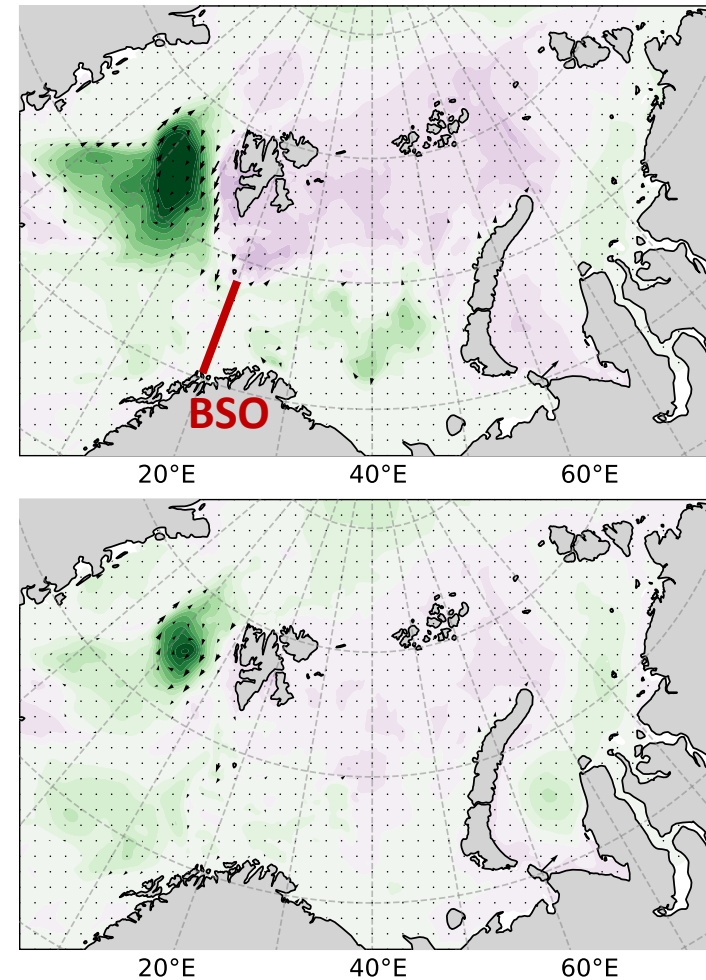
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Processes: D → E



- **Decrease in SSH in the northern Barents Sea (2–3 cm)**
 - **Increase in SSH in the southern Barents Sea**
- Increased Inflow?**

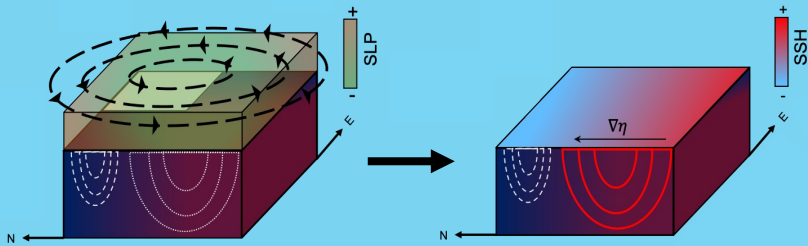


Mean winter sea surface height anomalies during the perturbation runs

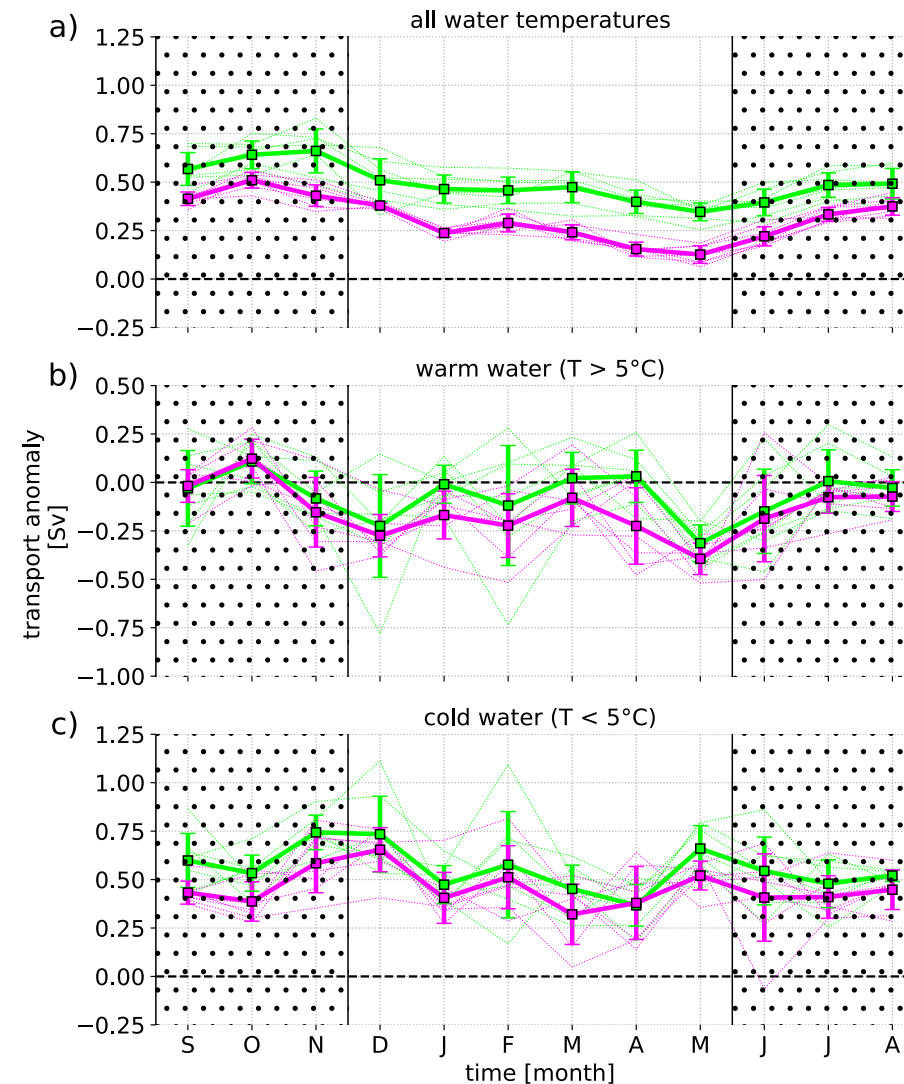
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Processes: D → E



- Increased net volume transport into the Barents Sea
- Warm Atlantic Water ($T > 5^{\circ}\text{C}$) transport slightly reduced
- Modified Atlantic water ($T < 5^{\circ}\text{C}$) outflow reduced



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