

AMOC and North Atlantic warming hole responses to Arctic Sea Ice decline

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(B) The decline and recovery of AMOC

- Weakening of AMOC attributed to the southeastward shift of the atmospheric westerlies and decreased dense water formations in the eastern Subpolar region
- Recovery due to the retreat of sea ice in the Labrador and Irminger Seas and increased dense water formation in the western Subpolar region (See C)



- subsequent recovery
- to sea ice decline



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(C, D, E) The response to Sea Ice **Decline and the Warming Hole**

- (C) Increase of mixed layer depth within Subpolar and decrease in the Iceland basin
- (D) Enhancement and southeastward shift of the Subpolar gyre
- -2 -1.6-1.2-0.8-0.4 0 0.4 0.8 1.2 1.6 2 Anomaly Years 151-200 (°C)

Annual SST

• (E) Anomalous Ekman pumping and southward shift of surface currents to create the North Atlantic warming hole, despite the eventual recovery of AMOC

C, D, E) 0.15 JFM concentration of control (black) and experiment (magenta); stippling represents 95% significance.

SUMMARY

1. Compensating deep convection changes in response to sea ice retreat in the eastern (decrease) and the western (increase) Subpolar region could drive AMOC decrease and

2. Insight into the importance of the background state in interpreting the response of AMOC

3. Response of the westerlies and Subpolar gyre result in the North Atlantic warming hole formation, independent of AMOC recovery

