

# Links between the freshwater budget of the Arctic Ocean and the subpolar North Atlantic

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*RACE!*



REGIONAL ATLANTIC CIRCULATION  
AND  
GLOBAL CHANGE



# Why do we care about freshwater?

Salinity changes only due to the addition or removal of freshwater by

- Precipitation/evaporation
- Continental run-off
- Sea ice melting/formation

## **Arctic Ocean**

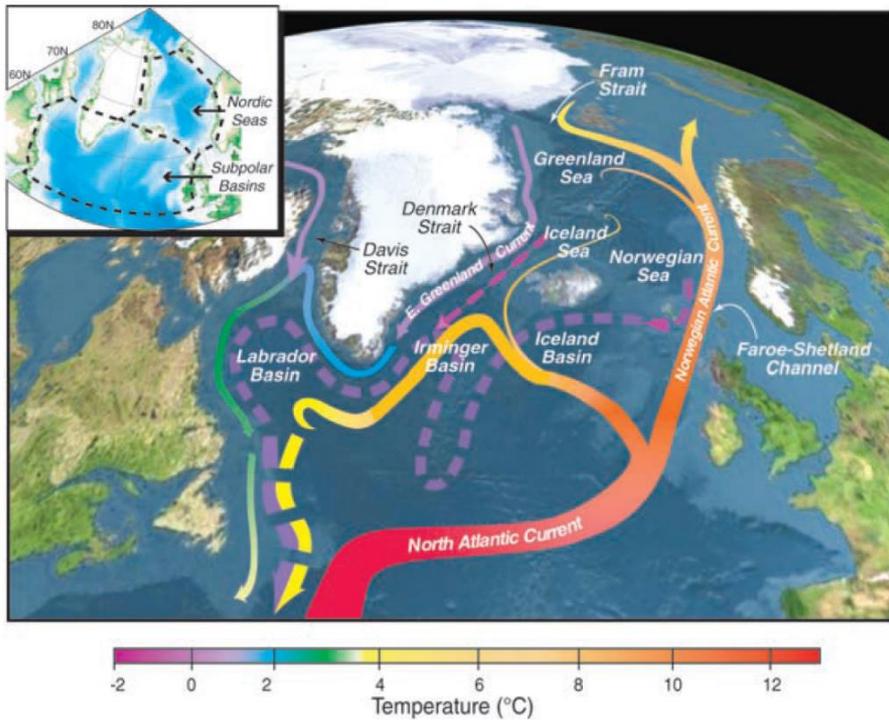
- Insulation effect of the fresh surface layer
- High albedo of sea ice

## **Subpolar North Atlantic**

- Deep water formation (Meridional Overturning Circulation)

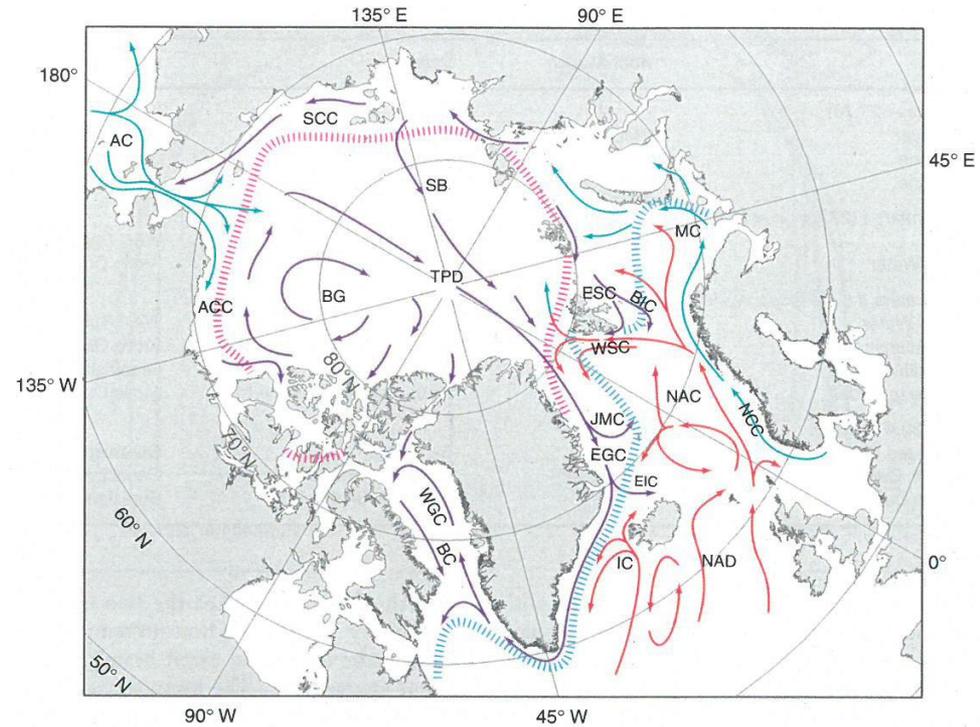
# Circulation

## Subpolar North Atlantic



Curry and Mauritzen (2005)

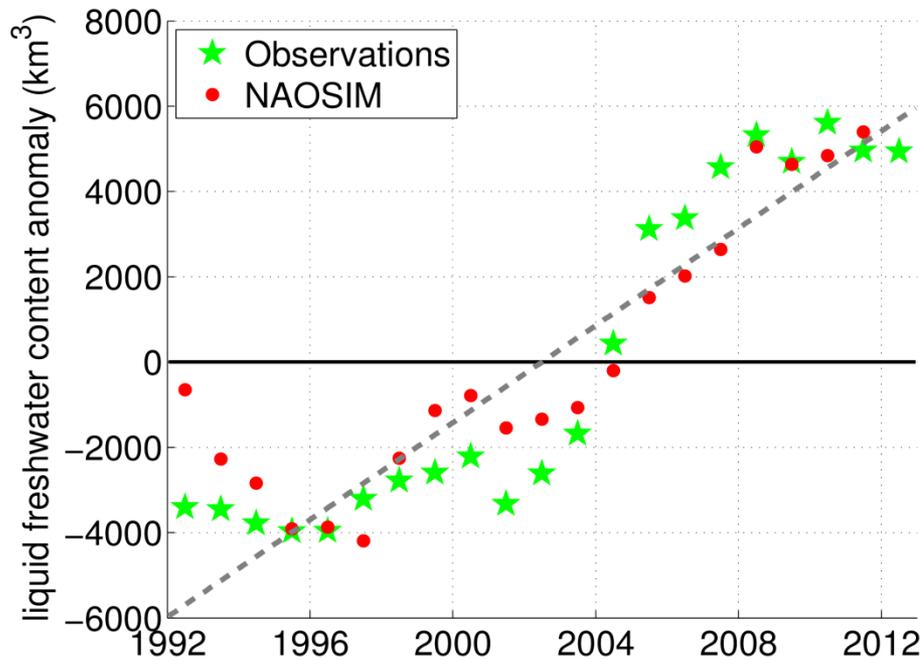
## Arctic Ocean



Rudels (2009)

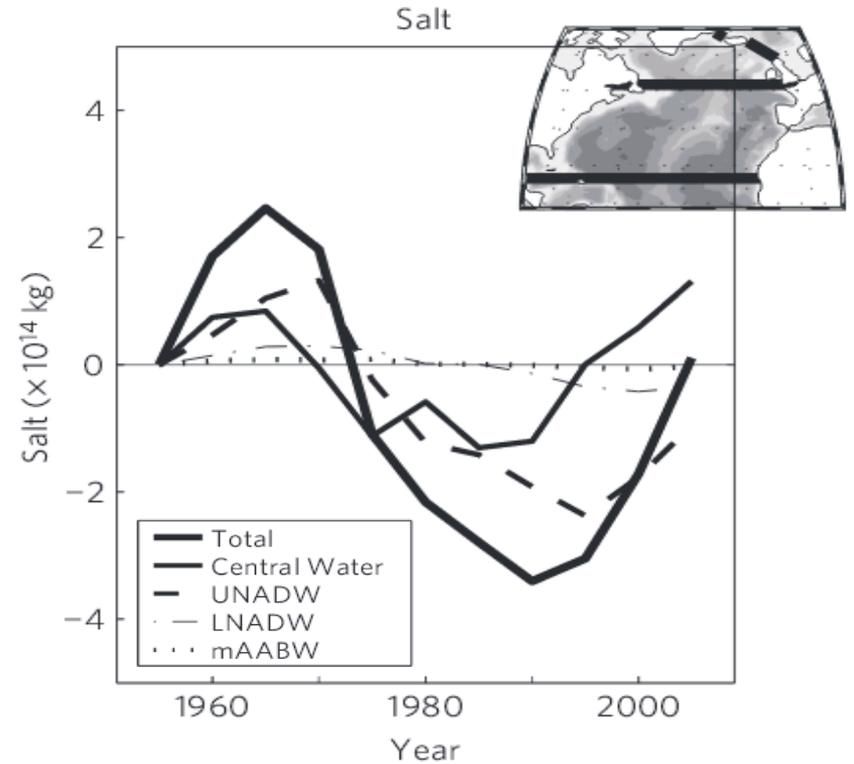
# Recent freshwater changes

## Arctic Ocean



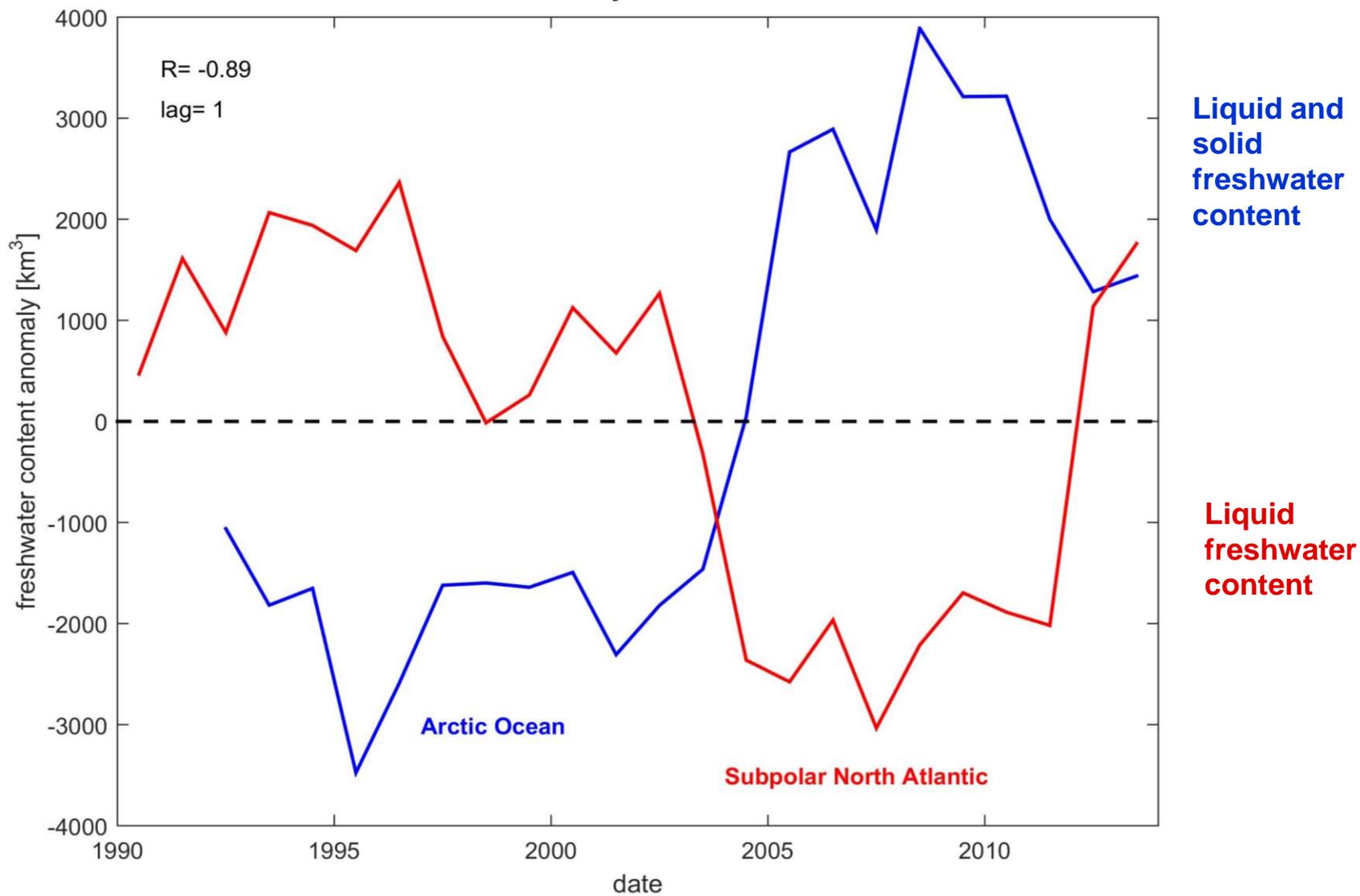
Rabe et al. (2014)

## Subpolar North Atlantic

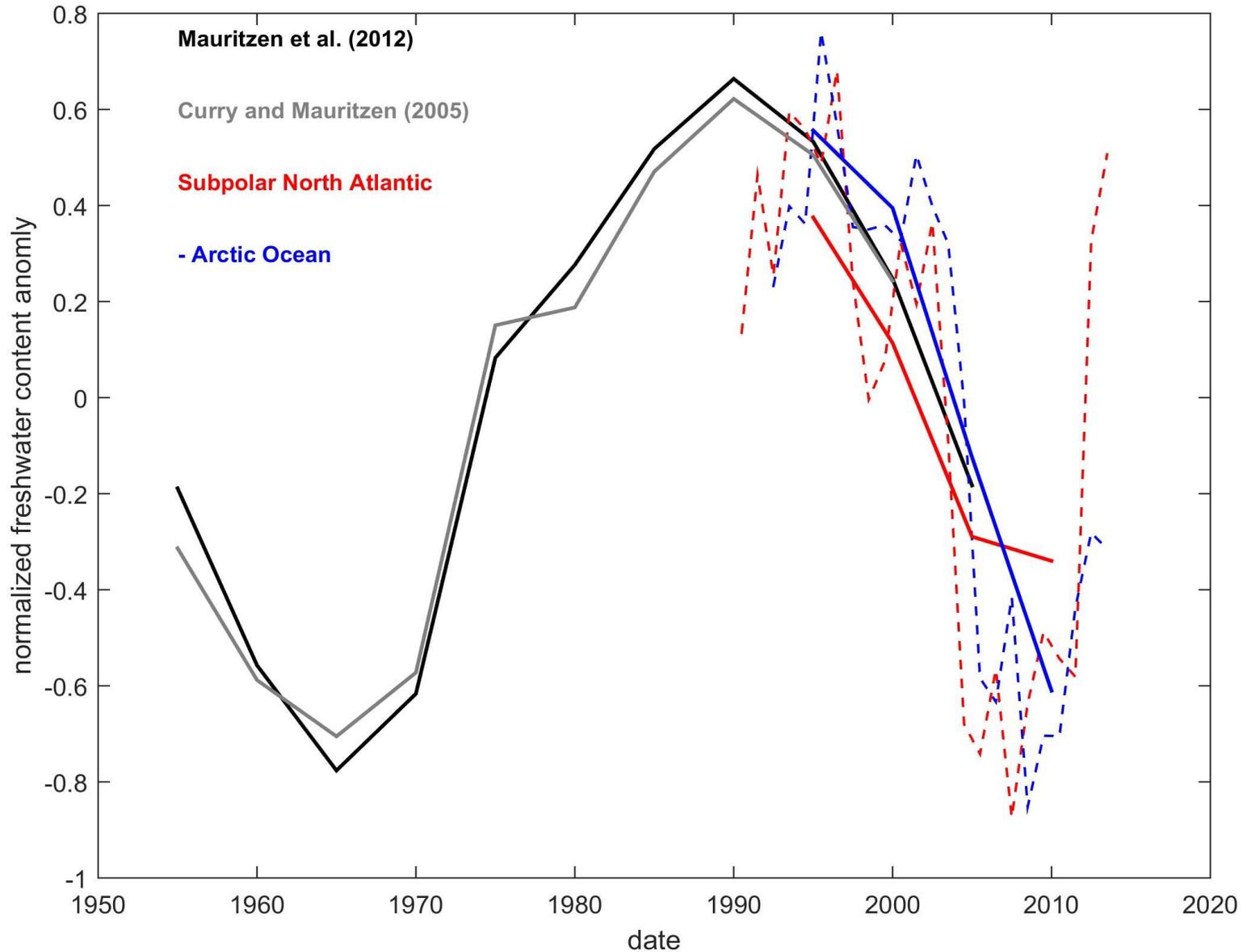


Mauritzen et al. (2012)

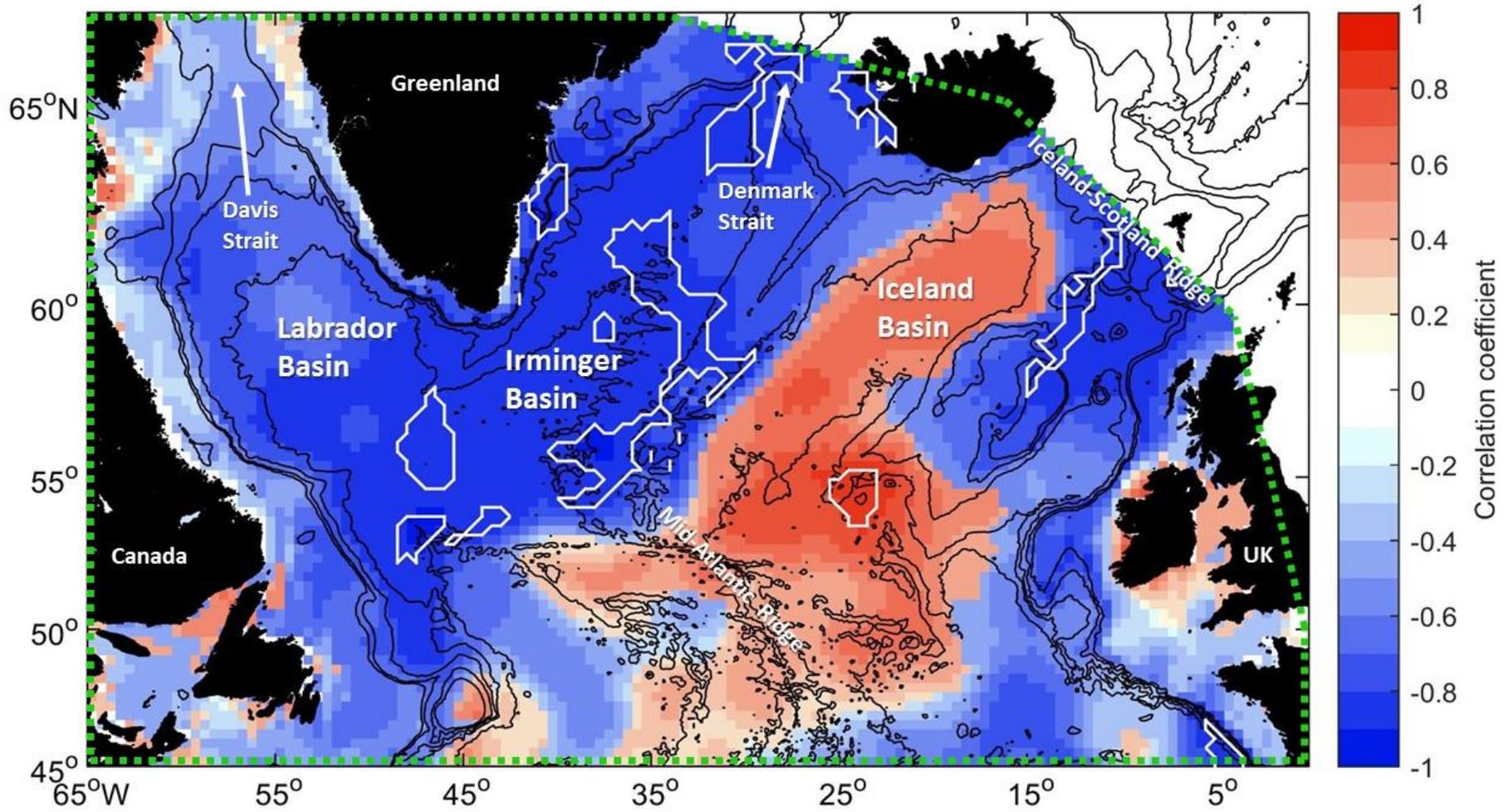
# FW variability of the AO and SPNA



# FW variability of the AO and the SPNA



# Cross correlation with the FWC of the Arctic Ocean



# Summary and Outlook

- Liquid freshwater content in the subpolar North Atlantic and total freshwater content in the Arctic Ocean are **significantly anti-correlated** ( $R=-0.89$ , lag=1)
- The amount of the **anomalies** are of the **same size**
- The time series hint at **multi-decadal oscillations**
- **Highest negative correlation** with the total freshwater content of the Arctic Ocean in the **Irminger and Labrador Seas**
- **Positive correlation** east of the Mid-Atlantic Ridge at the **path of the North Atlantic Current**
- Using data from **model simulations** in order to enlarge the time series
- Comparing the freshwater time series to **atmospheric circulation indices**



**Thanks for listening**

# References

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