

RAPID 26°N

Achievements and Outlook

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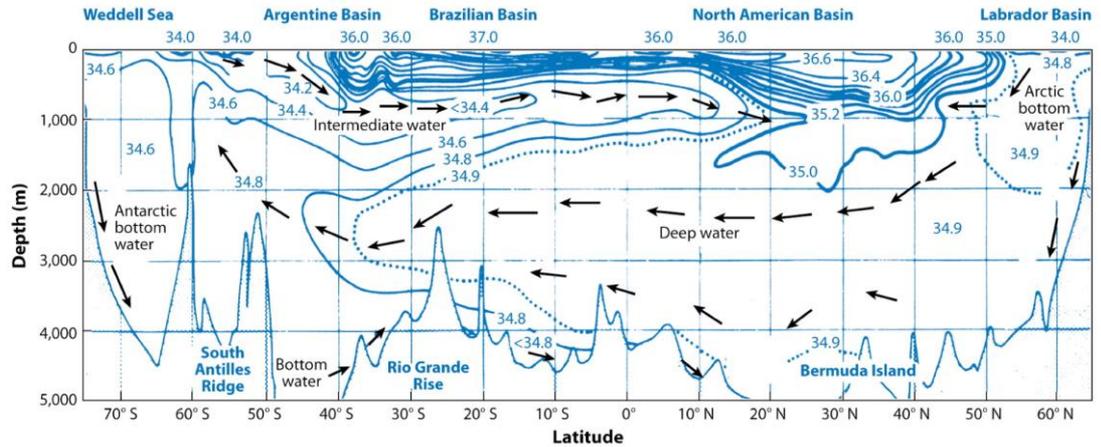


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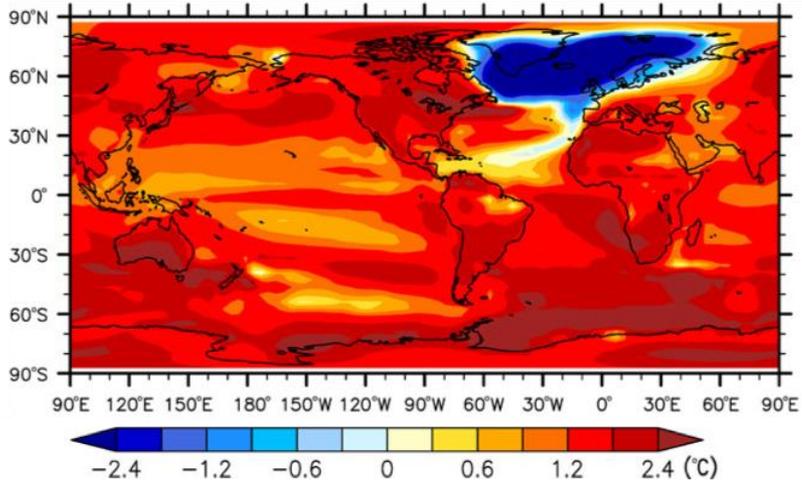
The Atlantic Meridional Overturning Circulation (AMOC)



Lozier (2012)

The Atlantic Meridional Overturning Circulation (AMOC)

AMOC collapse leads to cooling in NW Europe

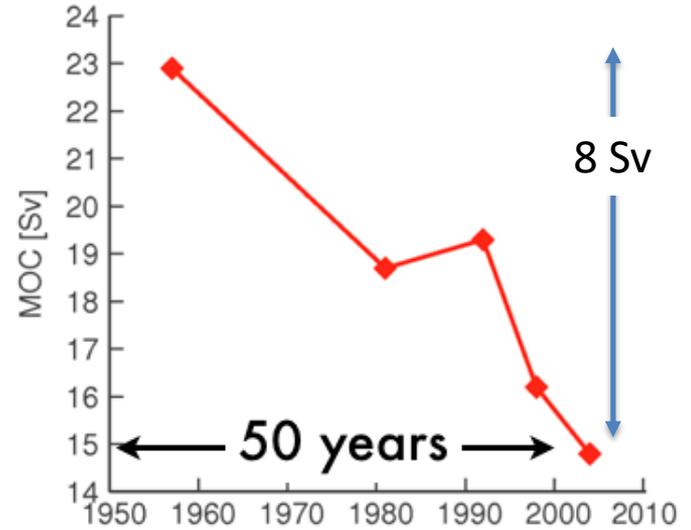
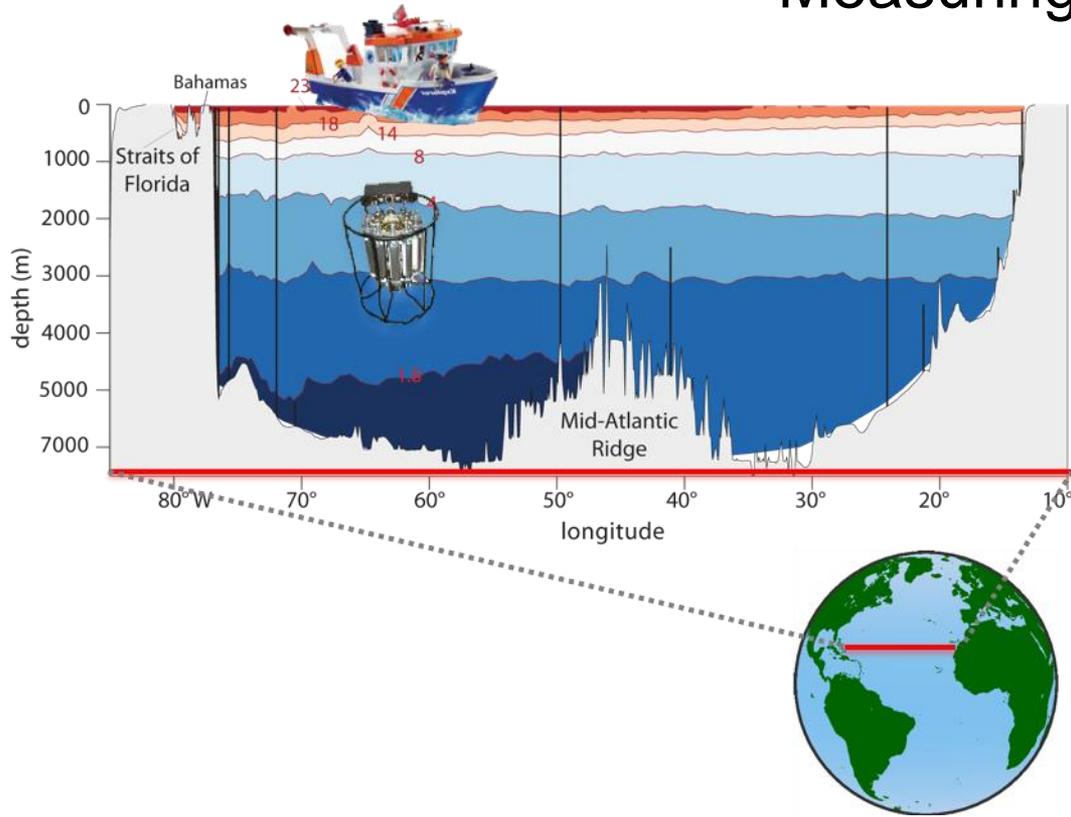


Liu et al. (2016) Science Advances

AMOC variations linked to climate variability



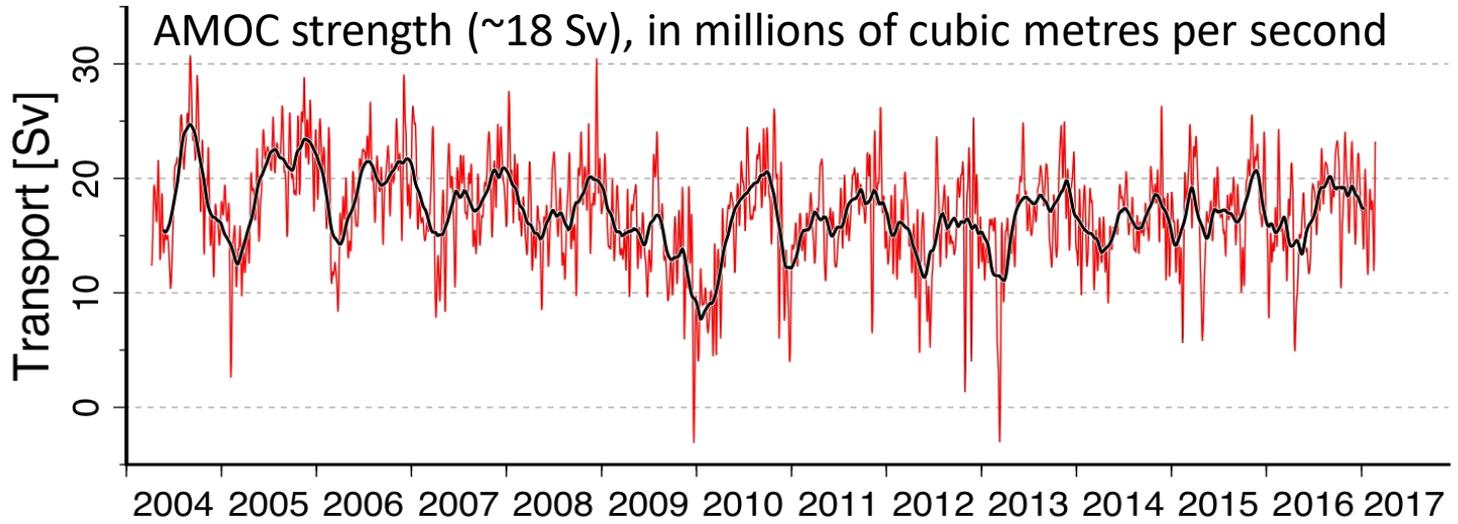
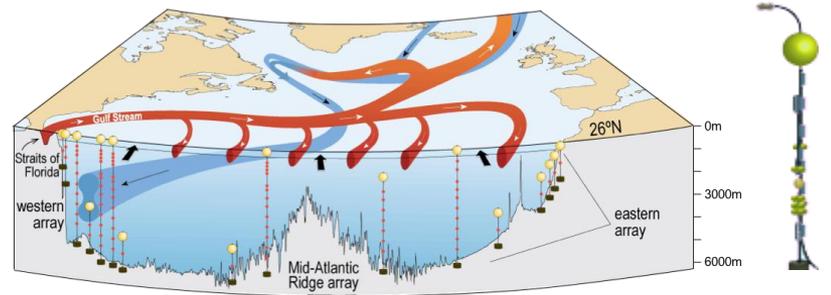
Measuring the AMOC (before RAPID)



Bryden et al. (2005) Nature

Measuring the AMOC (RAPID 26°N)

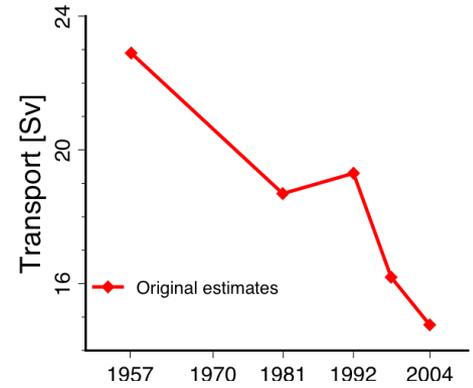
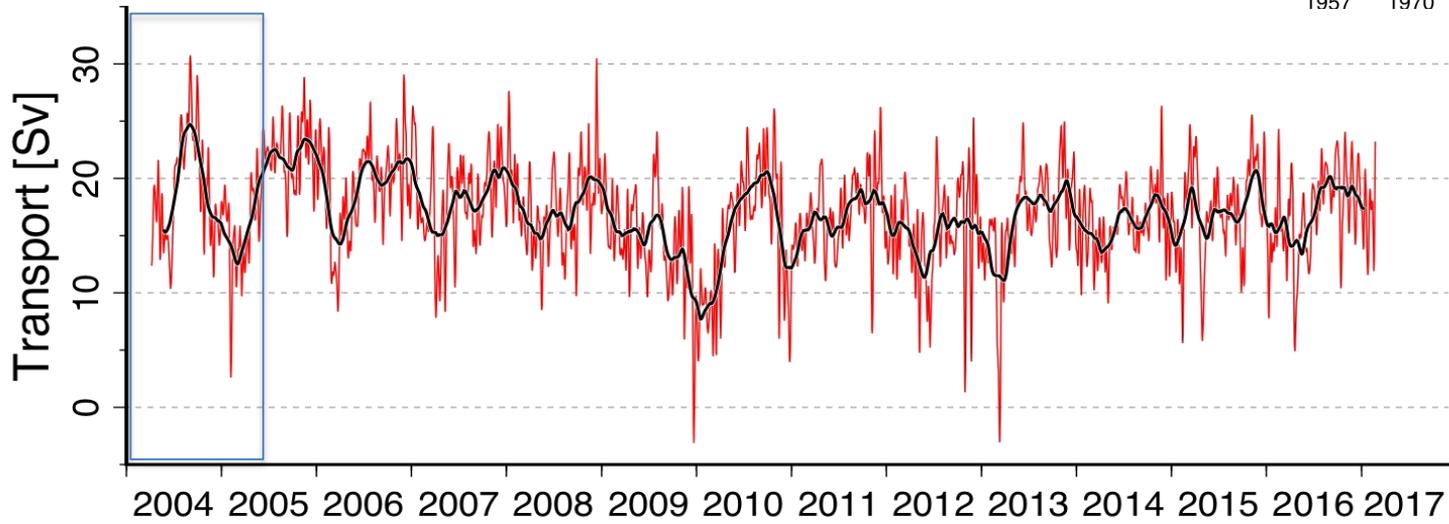
NERC, NSF & NOAA funded



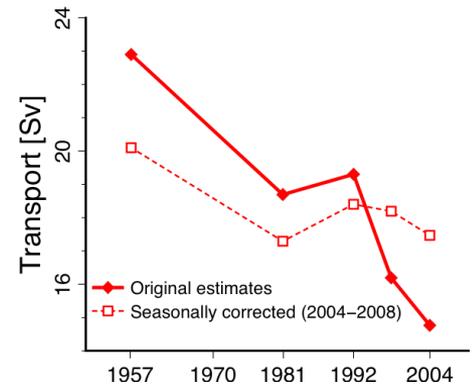
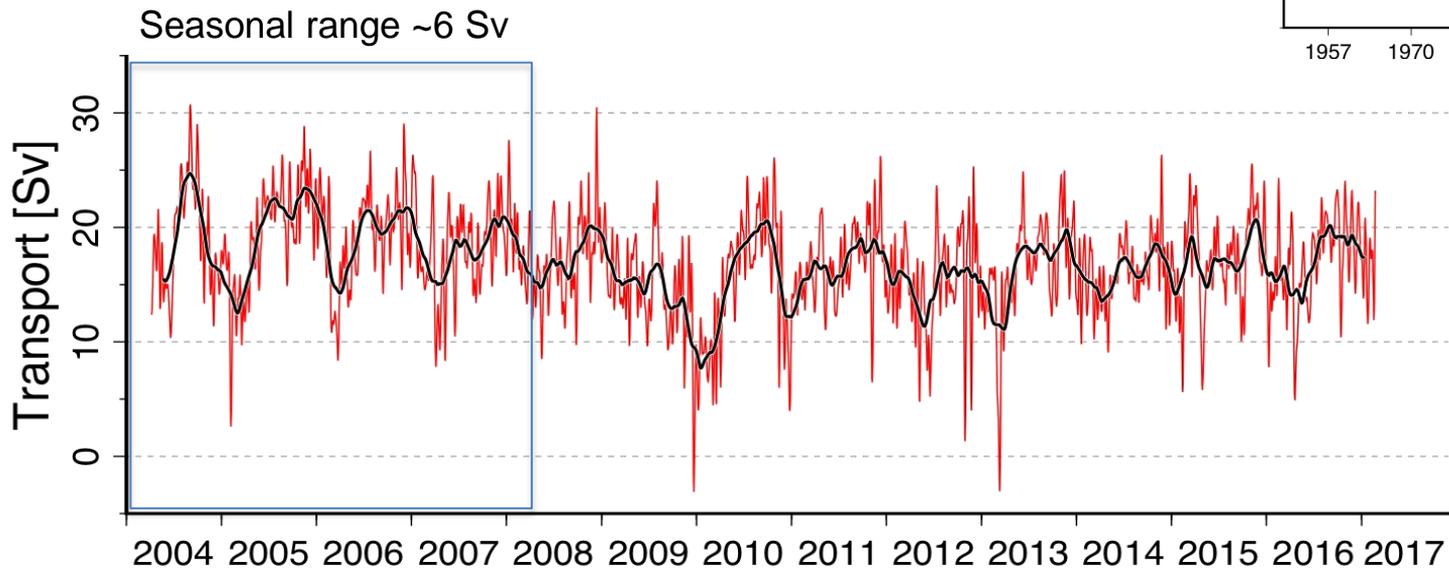
*For comparison, the Amazon river transports 0.2 Sv

AMOC Variability

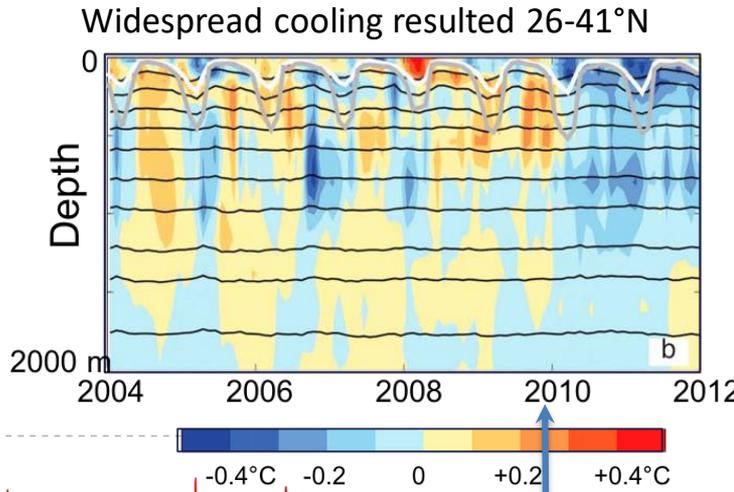
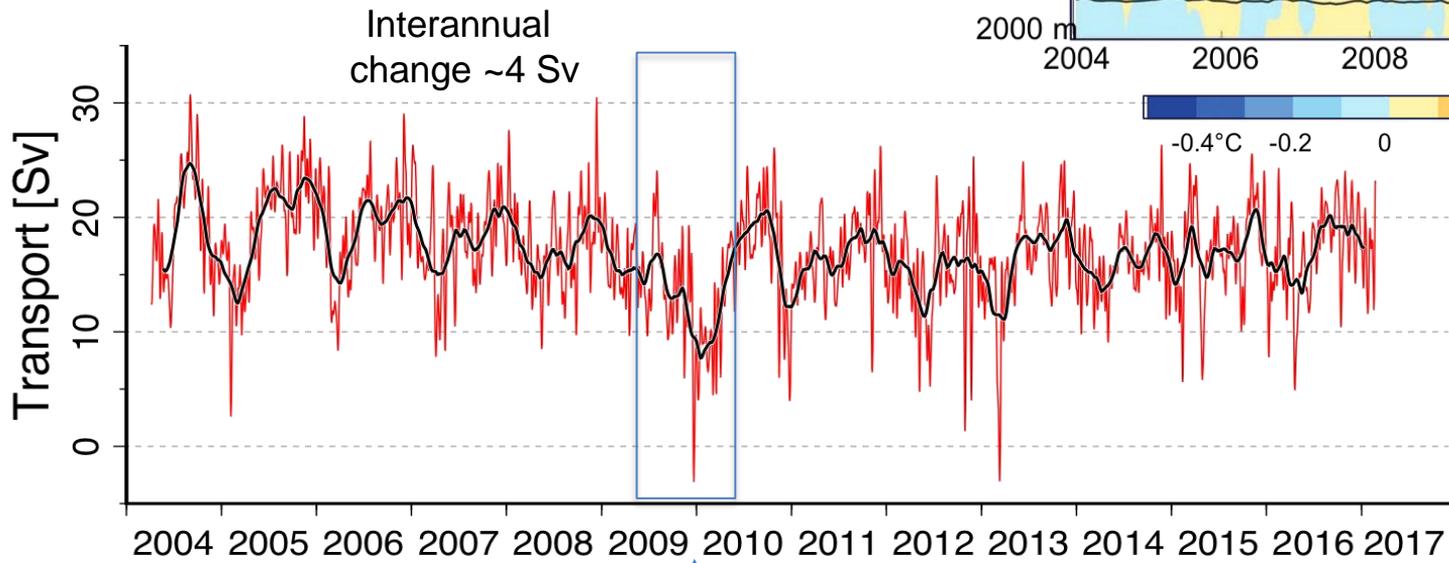
>25 Sv



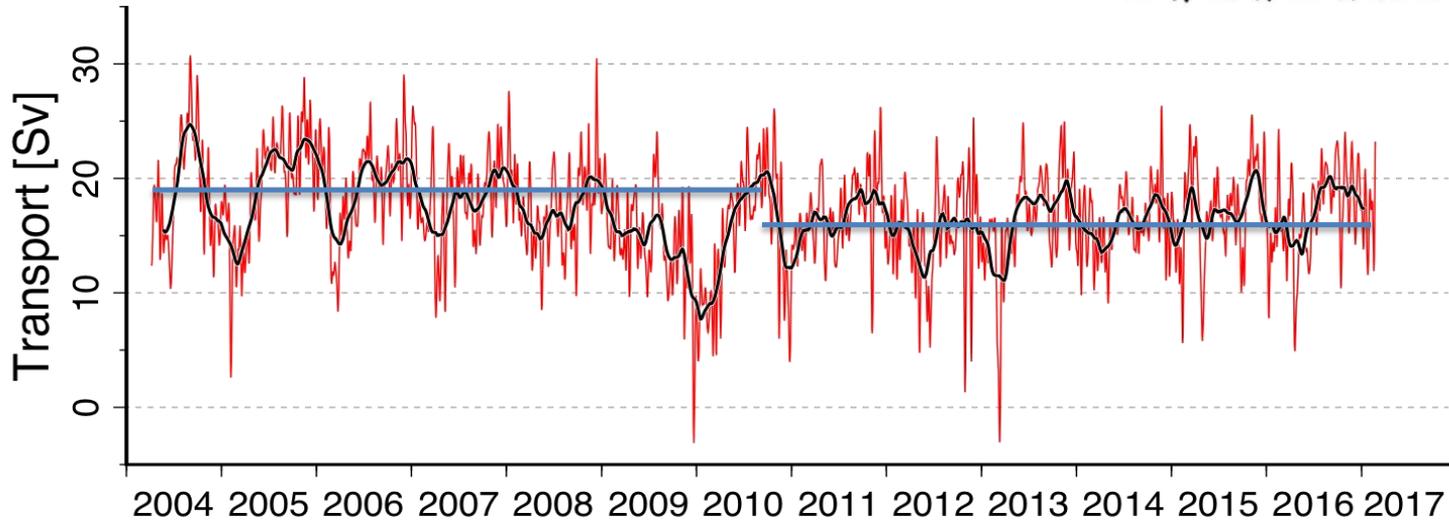
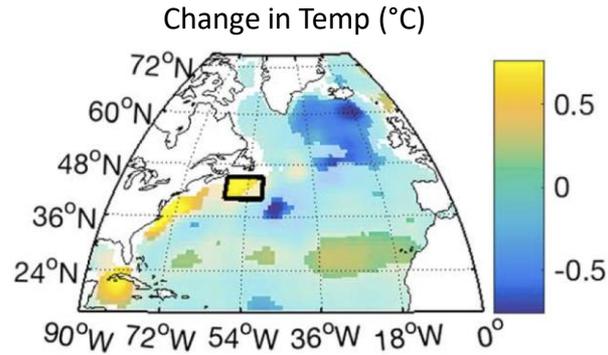
AMOC Variability



AMOC Variability



AMOC Variability

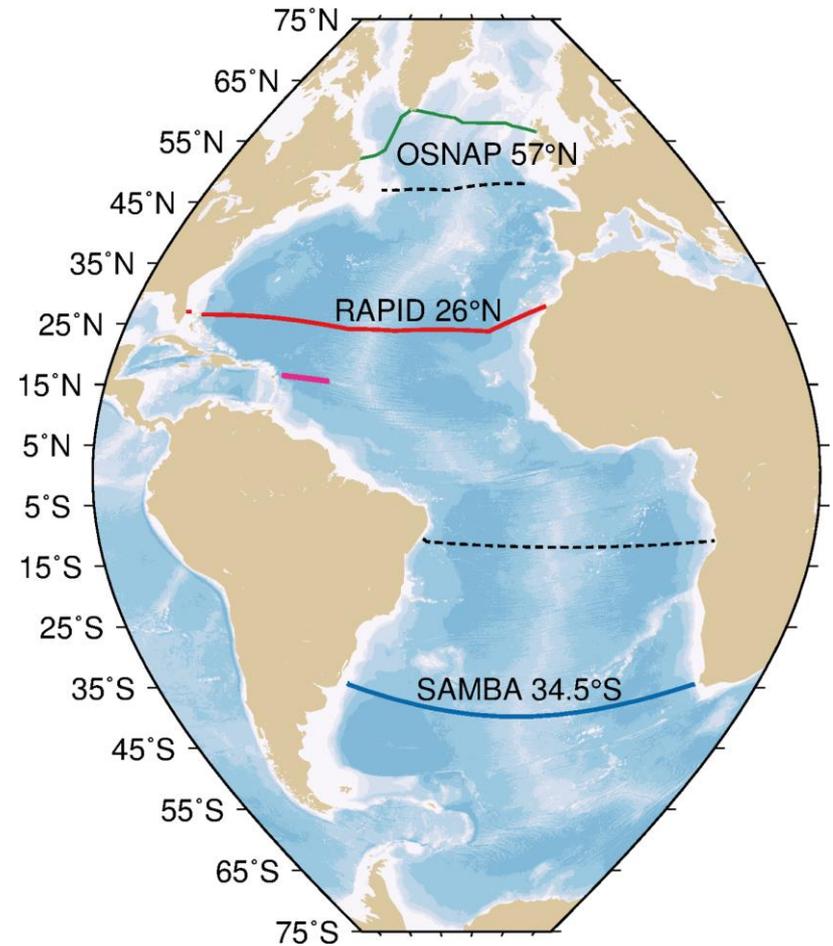


Changing the way we observe ocean circulation

AMOC has substantial fluctuations on sub-decadal timescales with important consequences (heat content change).

New standard approach:

- Continuous moored observations, spanning basin width

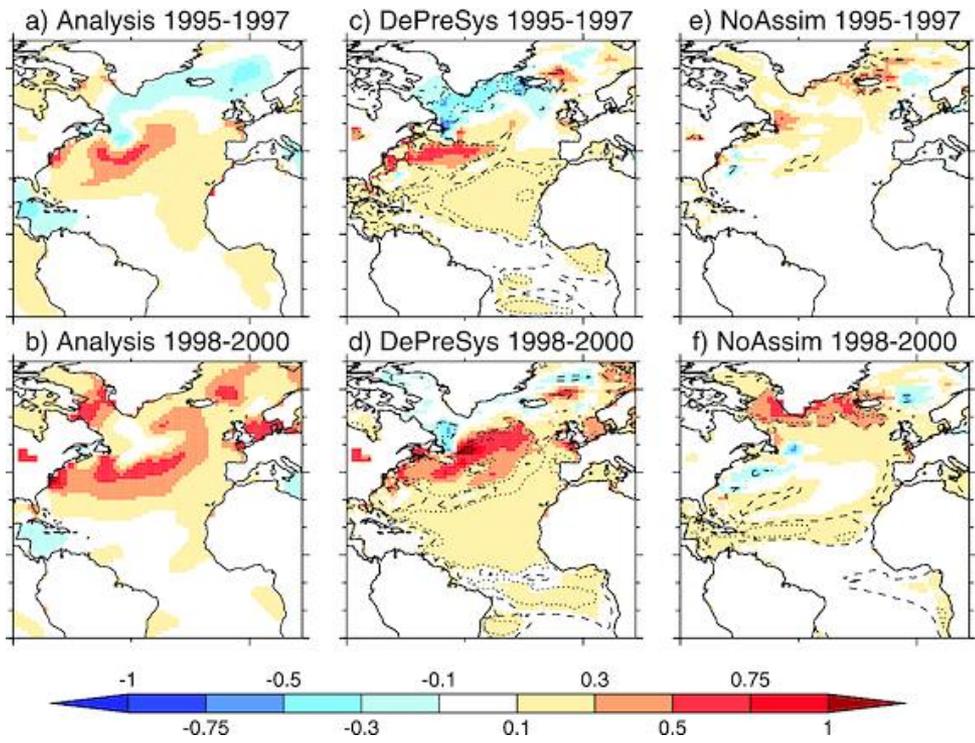


Underpinning decadal predictions

AMOC initialisation is key to predictive skill on decadal timescales

- Warming transition (from cold-to-warm AMO state) captured by models when initialised with a strong AMOC

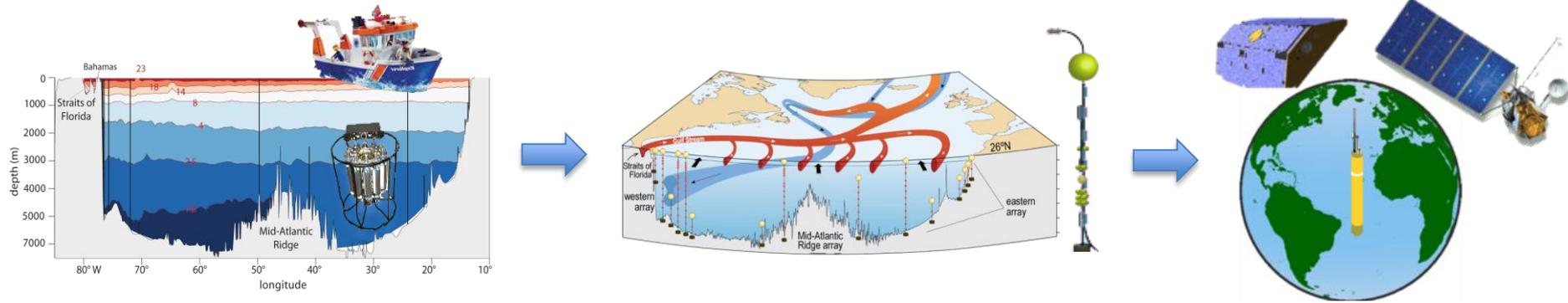
VALOR



Wider community: Meehl et al. (2014) review highlights the AMOC for decadal skill

Robson et al. (2012) GRL

Enabling new approaches

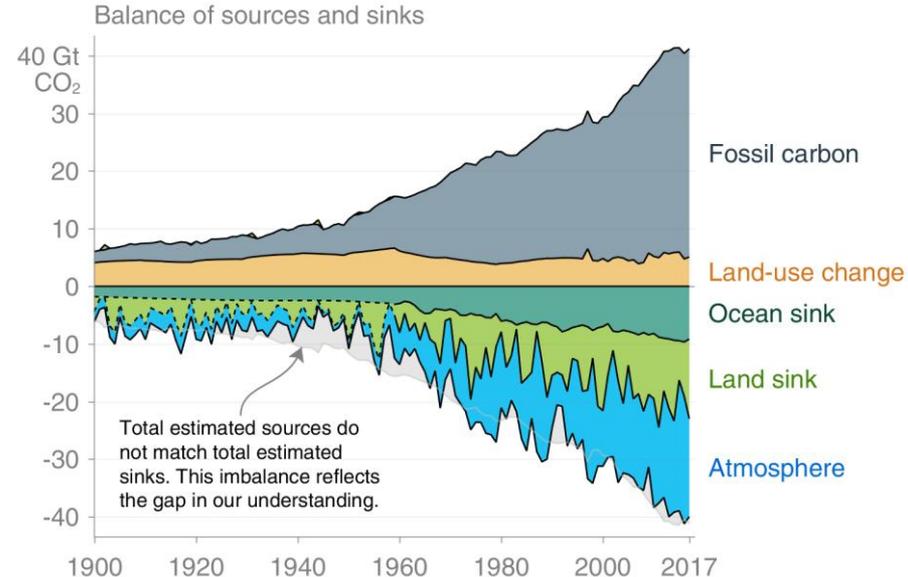
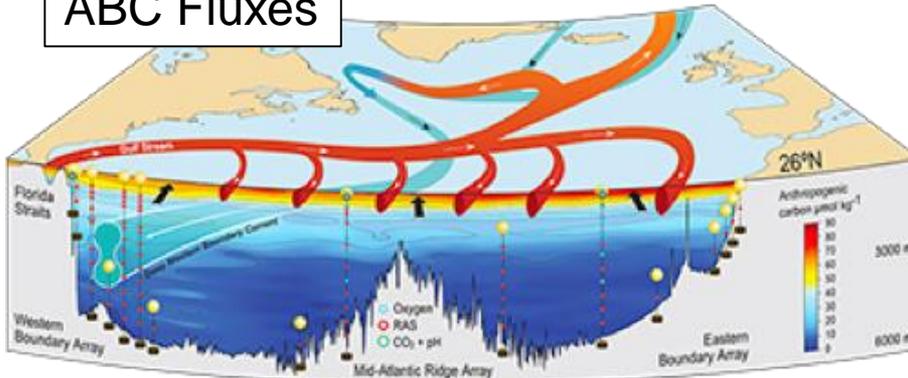


- *Some aspects* of AMOC variability are captured in satellite sea surface height and bottom pressure (altimetry and gravimetry).
 - Can alternate data sources replace some moorings?
 - Can we expand our field-of-view beyond 26°N?

Addressing key climate questions

- How does ocean circulation influence carbon storage?
- Transport of nutrients and replenishment of undersaturated waters influences **rate of carbon uptake**

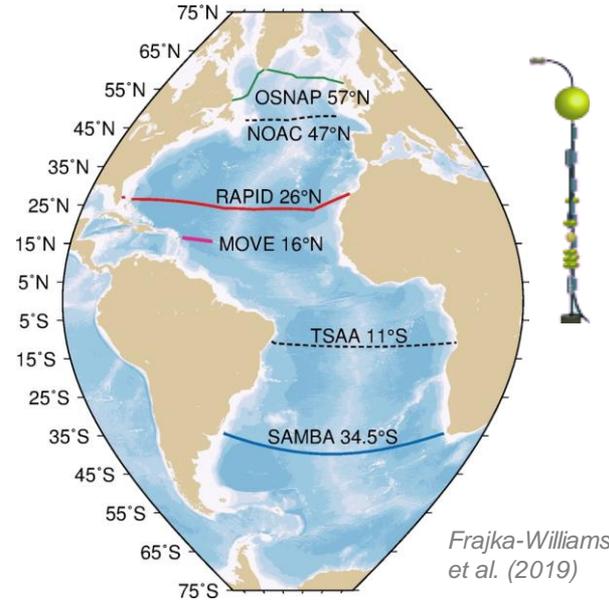
ABC Fluxes



© Global Carbon Project • Data: CDIAC/GCP/NOAA-ESRL/UNFCCC/BP/USGS

Conclusions

- We know the AMOC plays a key role in climate.
- The RAPID array has changed the way we observe ocean circulation.
- *Observing arrays* underpin evolving understanding of ocean circulation and climate.
- *New approaches* may enable alternate observing methods using satellites/Argo.



Frajka-Williams et al. (2019)

