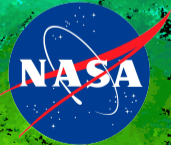


The AMOC at 35N

from deep moorings, floats, and satellite altimeter

Isabela Le Bras¹, Josh Willis², Ian Fenty²

¹Woods Hole Oceanographic Institution, ²Jet Propulsion Laboratory, Caltech



Motivation

- ▶ AMOC is expected to weaken - some suggest this is already underway

e.g. Caesar et al. 2021

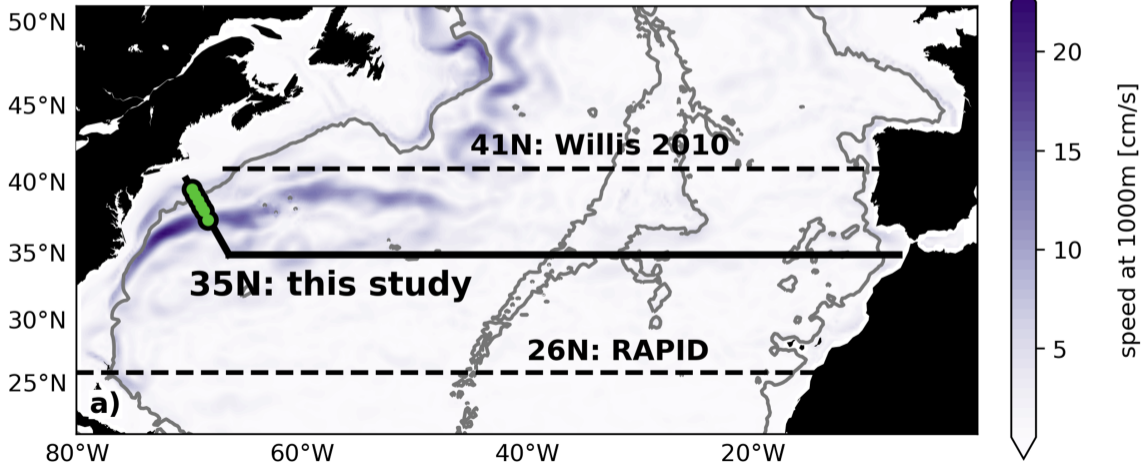
- ▶ Subtropical Deep Western Boundary Current decline from 2004-2014 measured by the Line W moorings

Toole et al. 2017

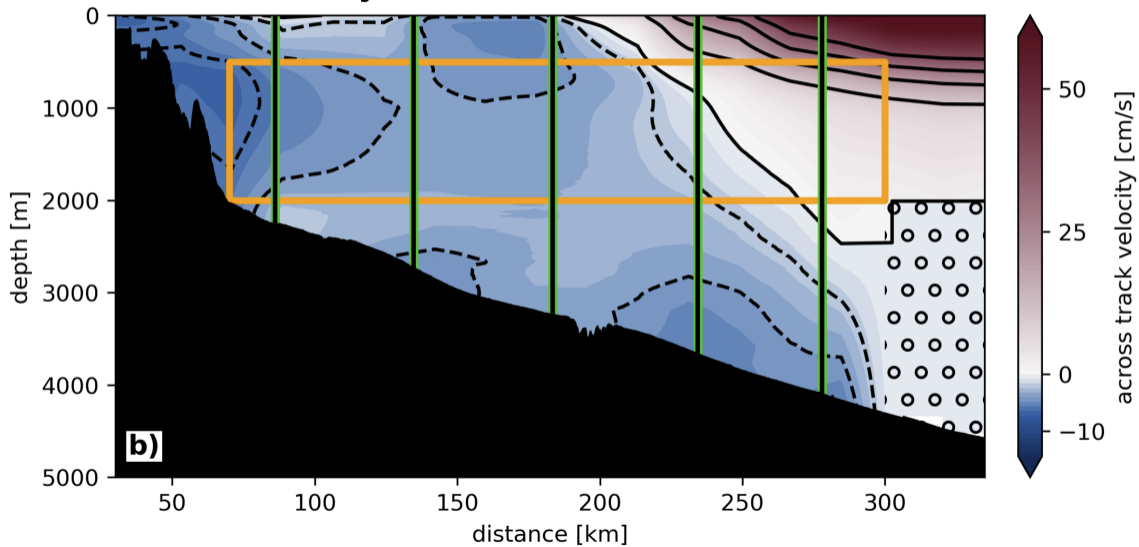
→ Was there a corresponding AMOC decline?

Merge Line W mooring data with float and altimeter

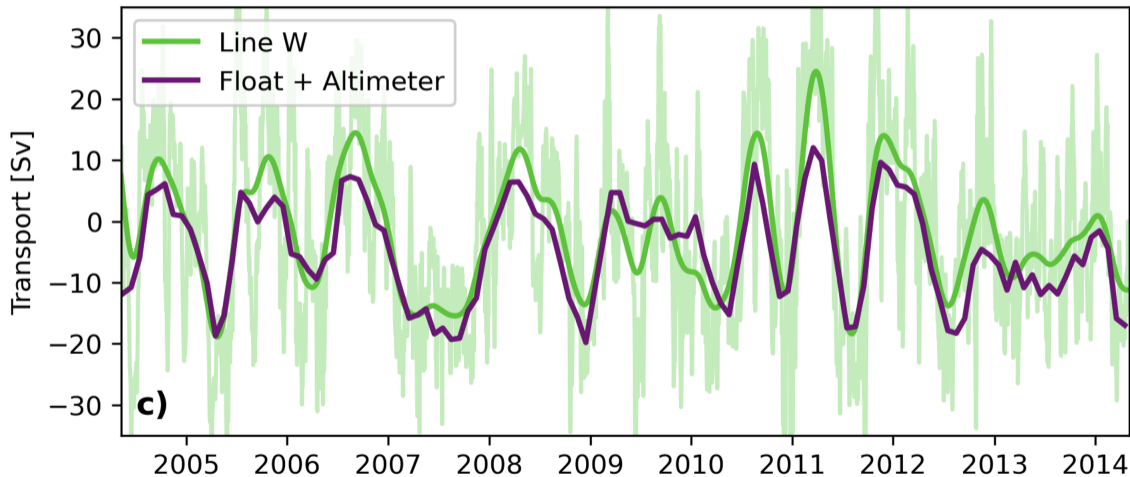
Green points below
Willis and Fu 2008 method

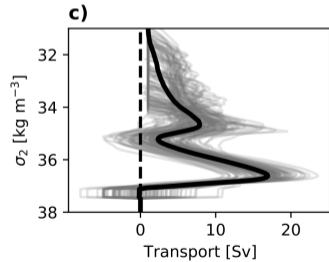
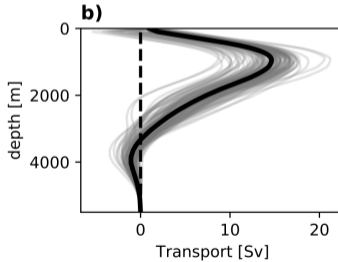
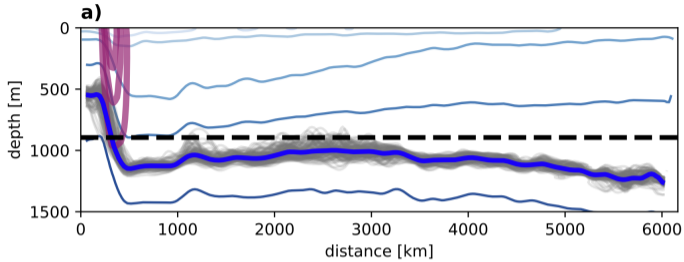


Western boundary section



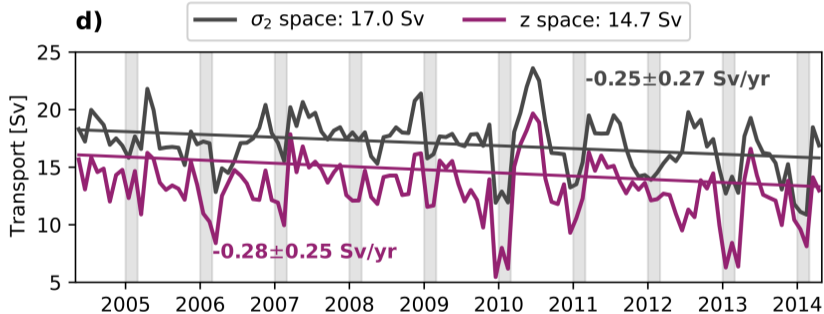
Encouraging correspondence for merging products





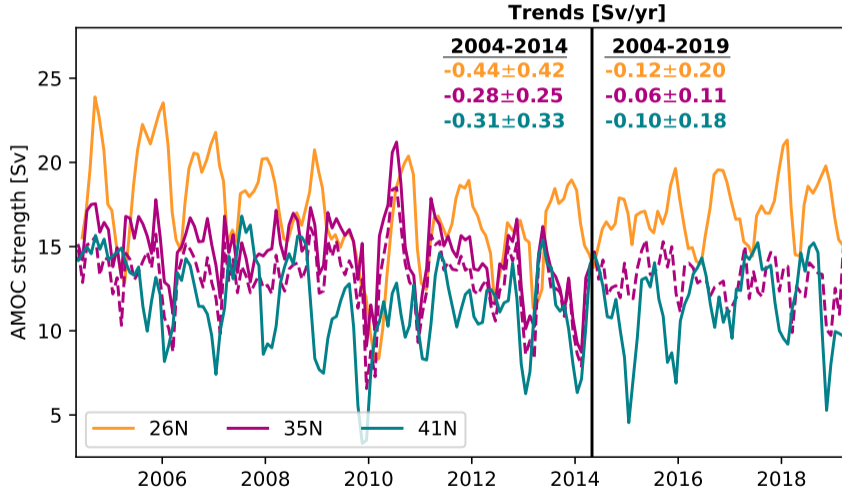
Density space AMOC has double cell structure - mode water

AMOC in depth vs density space similar (not identical!)



Compare to 0.7 Sv/yr DWBC decline

Comparing with other AMOC time series

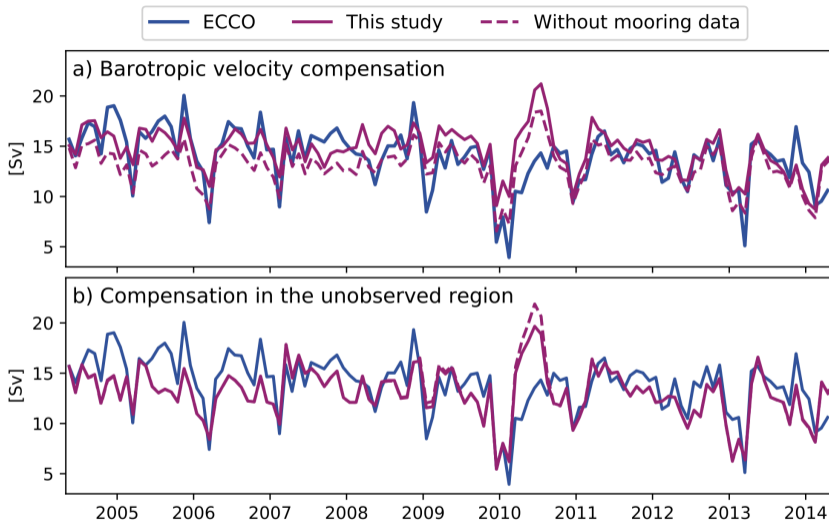


Note: Caesar et al. (2021) estimate about 0.04 Sv/yr from 1950-present

Conclusions

- ▶ AMOC decline of 0.3 Sv/yr associated with 0.7 Sv/yr DWBC slowdown at Line W/35N
- ▶ Similar decadal variability observed across AMOC datasets
- linked to subpolar water mass formation?
- ▶ Long-term AMOC decline is not detectable

Extra slides



Best correspondence with moorings and barotropic velocity compensation