# Deep Argo Accurately Measures Antarctic Bottom Water Warming

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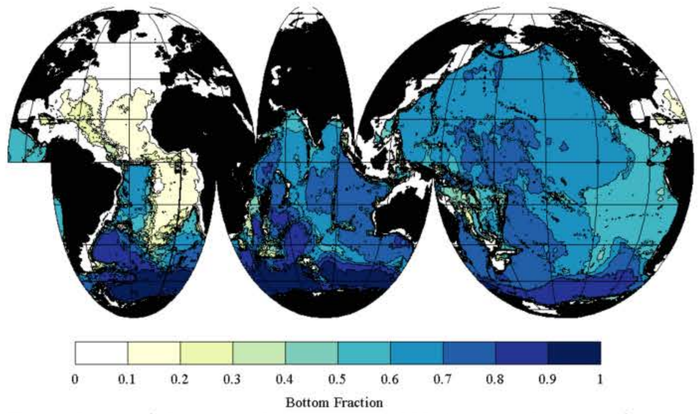
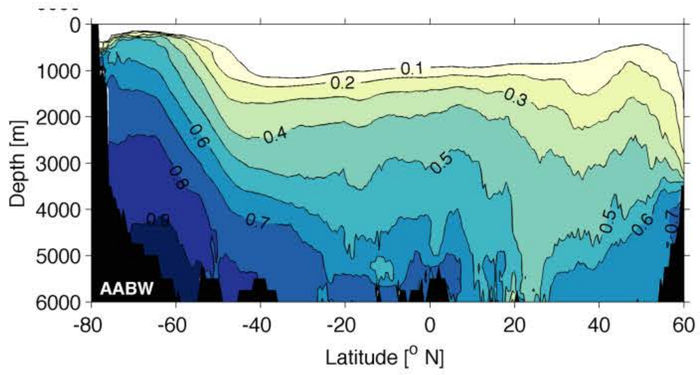
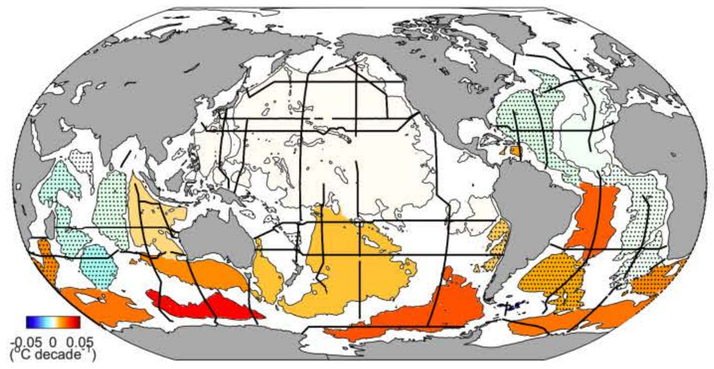


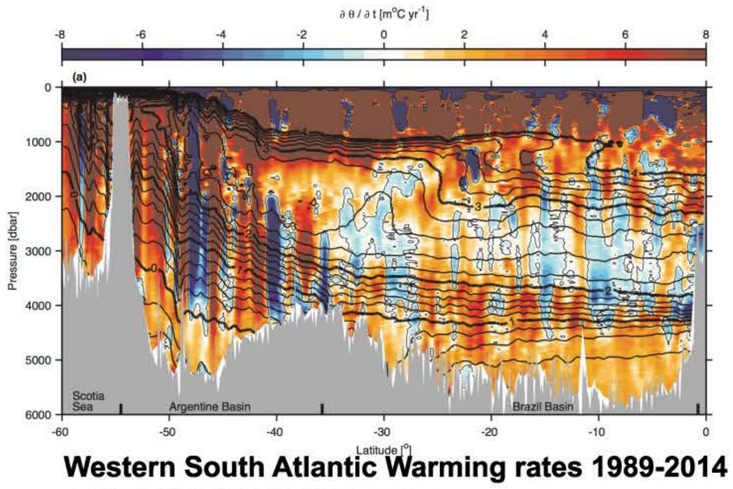

**Fraction of Antarctic Bottom Water at the seafloor**
AABW spreads northward from its southern source




**Zonally Averaged Antarctic Bottom Water fraction**
Dominant water mass globally below 3000-4000 dbar



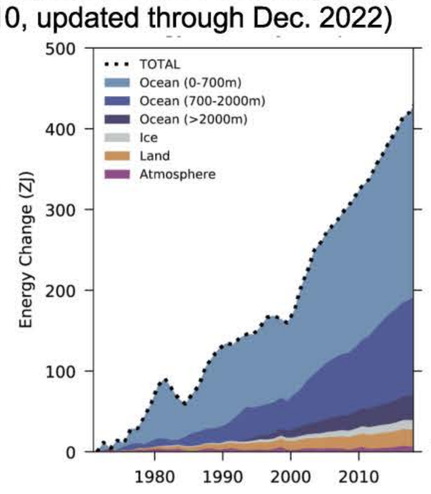

**Basin-averaged warming rates below 4000 m**
Cruise data (black lines) show AABW warming since 1990s (after P&J 2010, updated through Dec. 2022)

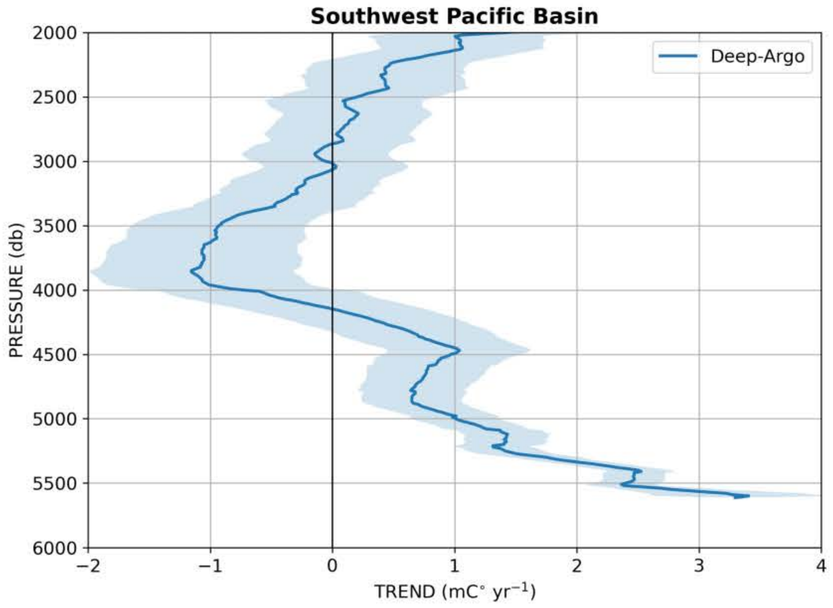



**Western South Atlantic Warming rates 1989-2014**
AABW (P > 3500) dbar warms

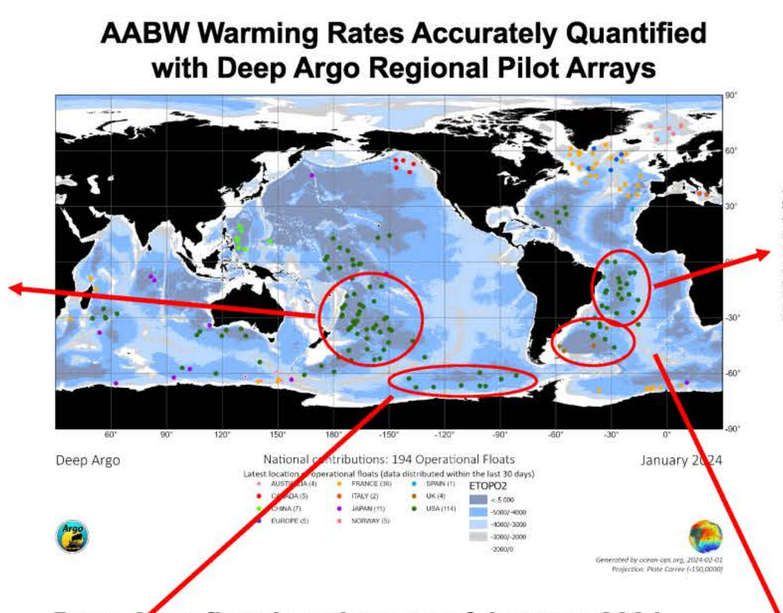

**Deep Argo floats for accurate, full-depth profiling**
**Deep Argo data can:**

- Assess deep ocean warming (~10% of total ) ->
- Close sea level budgets
- Monitor Meridional Overturning Circulation
- Initialize decadal climate prediction models

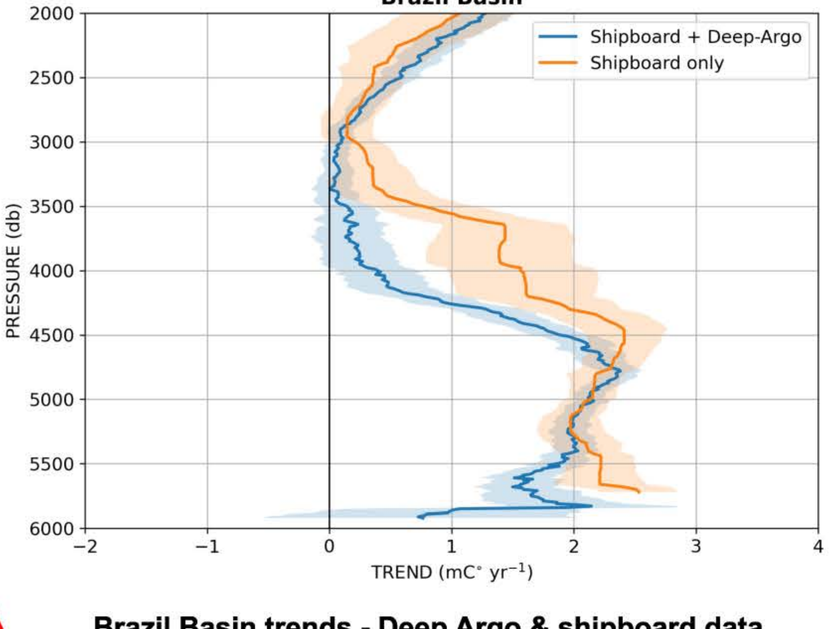


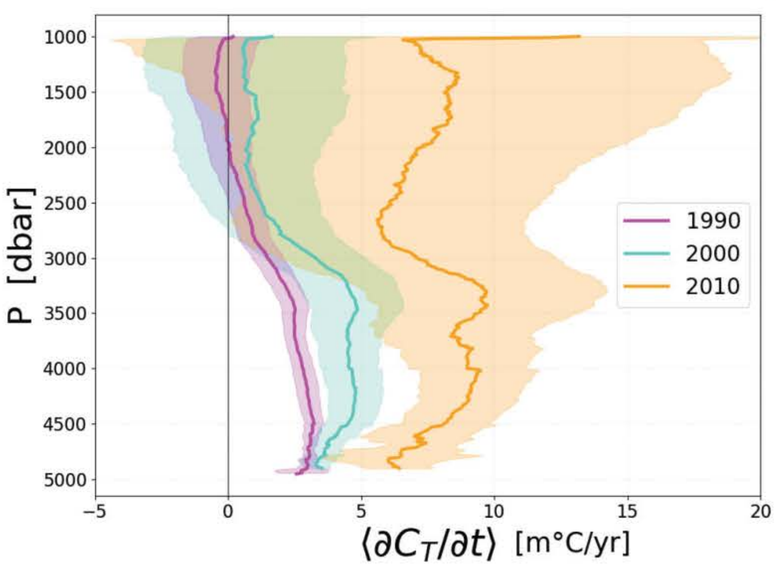

**Southwest Pacific Trends - Deep Argo data only**
June 2014-April 2023. Deep Argo only estimate possible with data from the oldest t regional pilot array



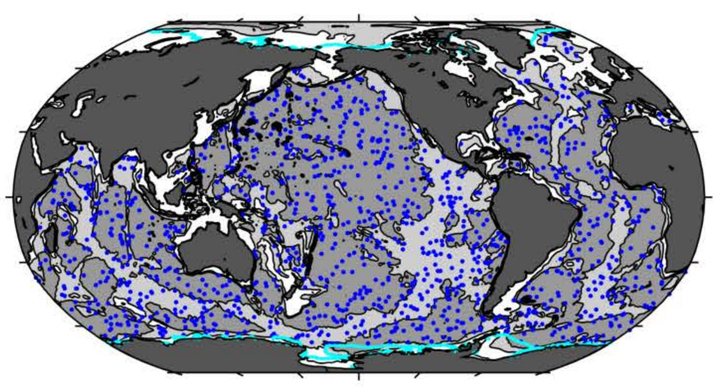

**Deep Argo float locations as of January 2024**
Set of regional pilot arrays downstream of deep and bottom water formation regions



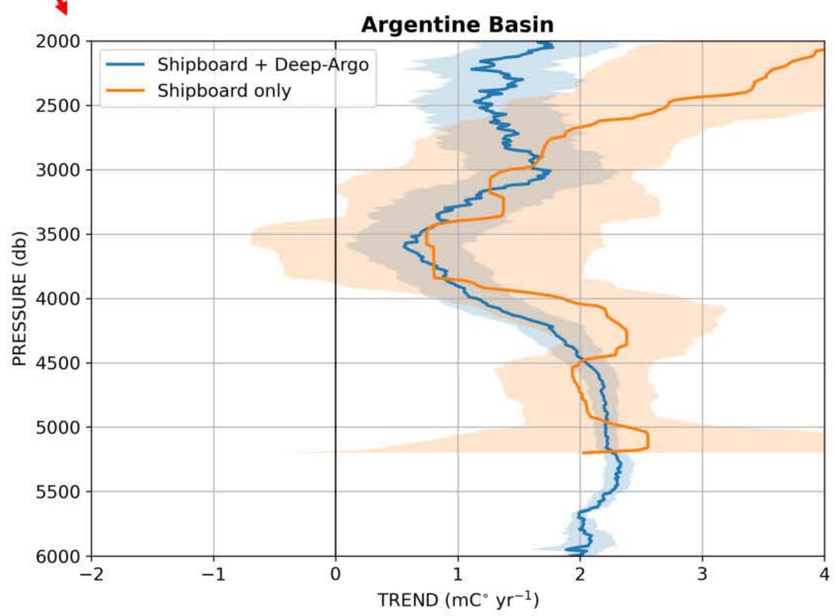

**Brazil Basin trends - Deep Argo & shipboard data**
Shipboard and float data (blue line) are more certain than shipboard alone (orange line)




**SE Pacific Southern Ocean Trends**
Deep Argo and three decades of shipboard data show recent acceleration of bottom water warming



**Proposed Global Deep Argo Array Design**
~1225 floats profiling to full depth at 5°x5° resolution in the seasonally ice-free ocean > 2000 m deep




**Argentine Basin trends = Deep Argo & shipboard**
Bottom water warming rate here is very consistent with Brazil Basin

## References

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