



POTSDAM INSTITUTE FOR
CLIMATE IMPACT RESEARCH



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The Atlantic Overturning Circulation: At its Weakest in a Millennium?



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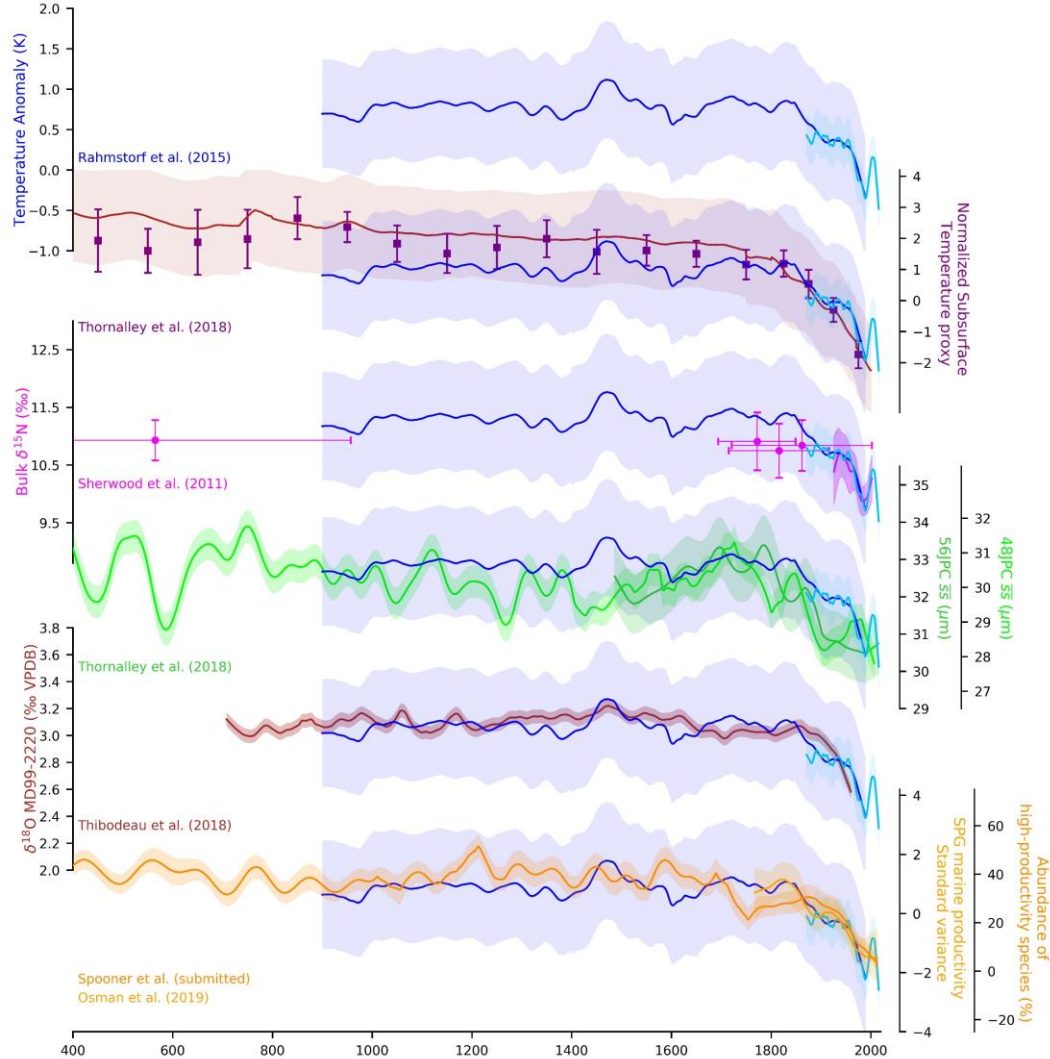
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Millennial AMOC evolution



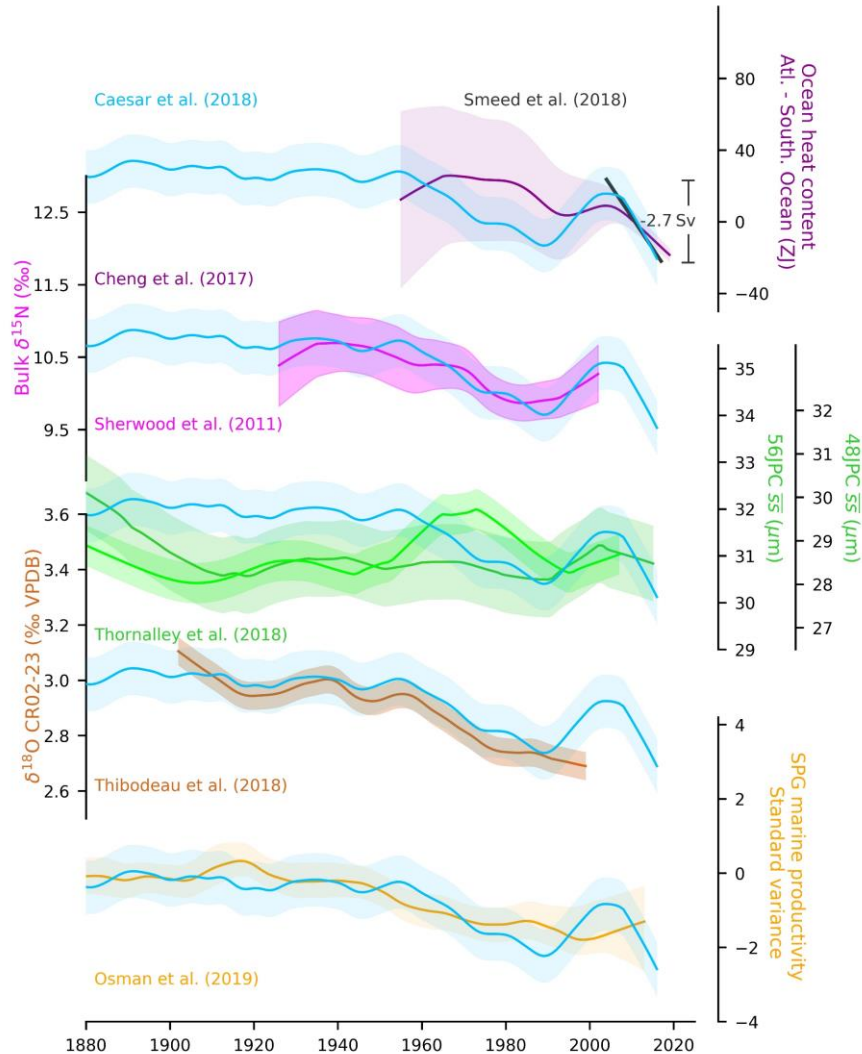
SST-based AMOC reconstructions (light and dark blue) compared to various proxy reconstructions including:

- land and sea surface temperature reconstructions
- sortable silt data
- $\delta^{18}\text{O}$ in benthic foraminifera
- $\delta^{15}\text{N}$ of deep-sea gorgonian corals
- relative abundance of *Turborotalita quinqueloba*

show consistent picture of the AMOC evolution over the last millennium:

Since at least 400 AD relatively stable, the AMOC began to decline during the 19th Century which is evident in all proxy records.

Centennial AMOC evolution



- Around 1950 a phase of particularly rapid decline started that is found in several, largely independent proxies.
- A short-lived recovery is evident in the 1990s before a return to decline from the mid-2000s.

Together these data consistently show that the modern AMOC slowdown is unprecedented in over a thousand years.