

# Southern Ocean observation for a changing climate

Andrew Meijers, British Antarctic Survey, Cambridge, UK  
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Ocean Data Week  
NAUTILOS Policy Round Table - Supporting Ocean Observations



**British  
Antarctic Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

<https://www.bas.ac.uk/>



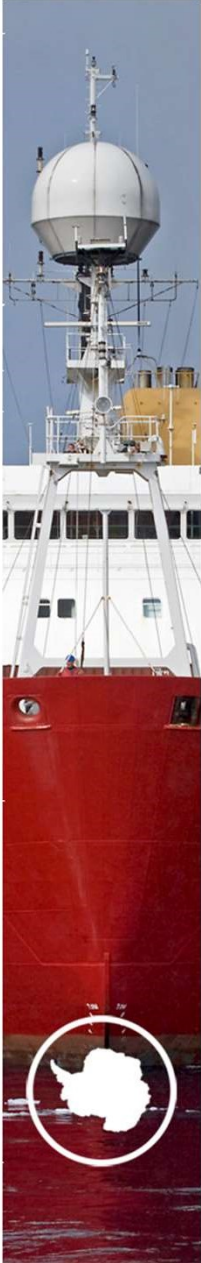
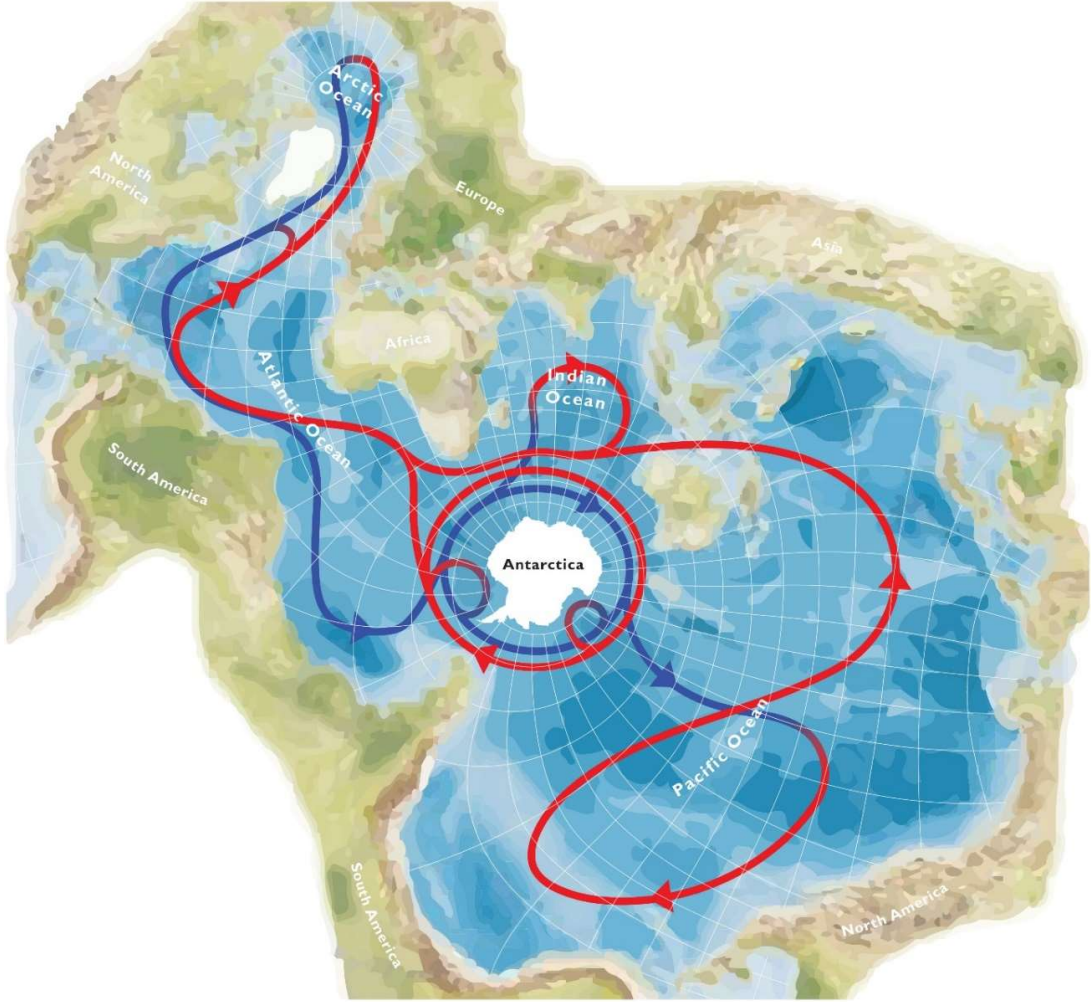
# The Ocean Driving the Climate



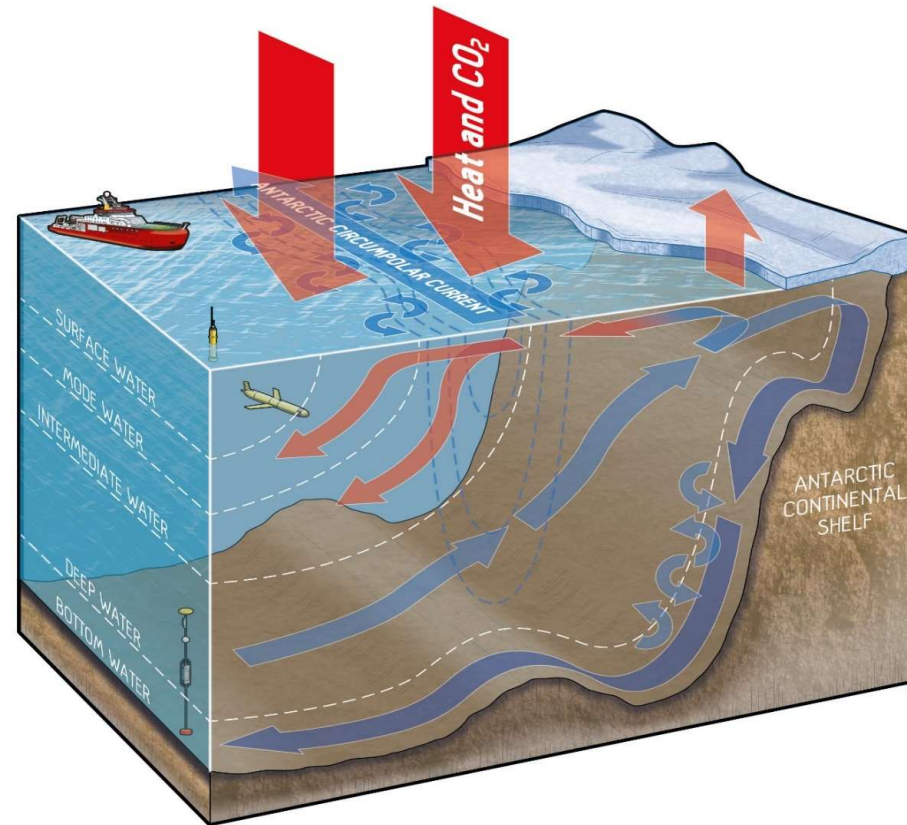
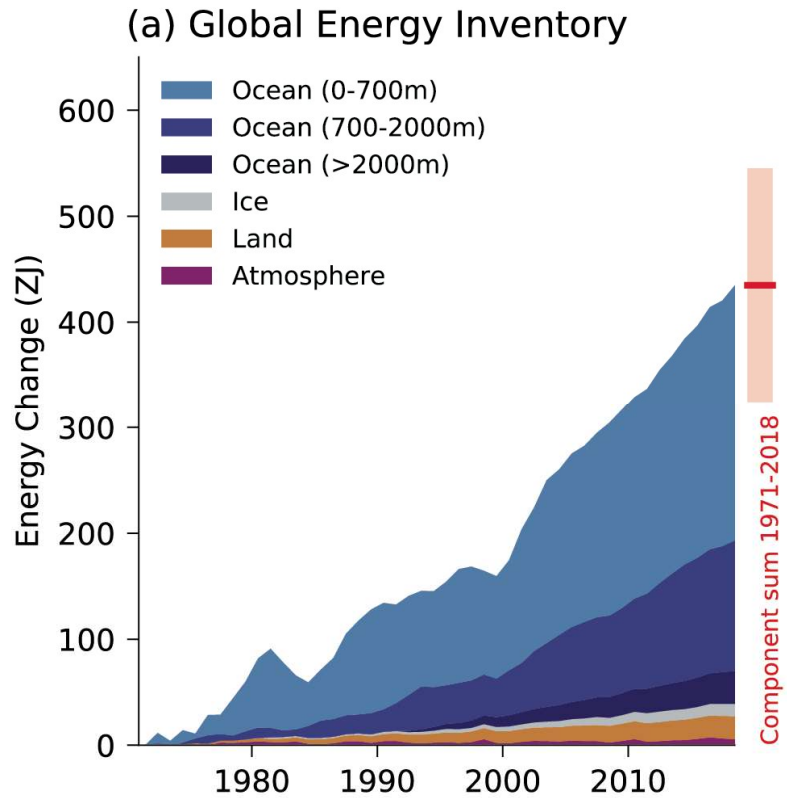
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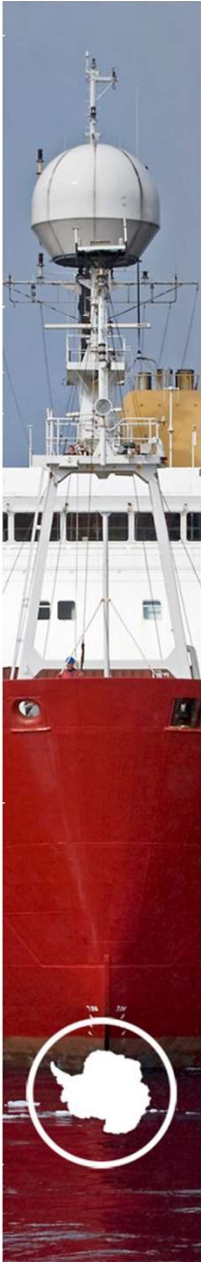
# The ocean at the center of the world



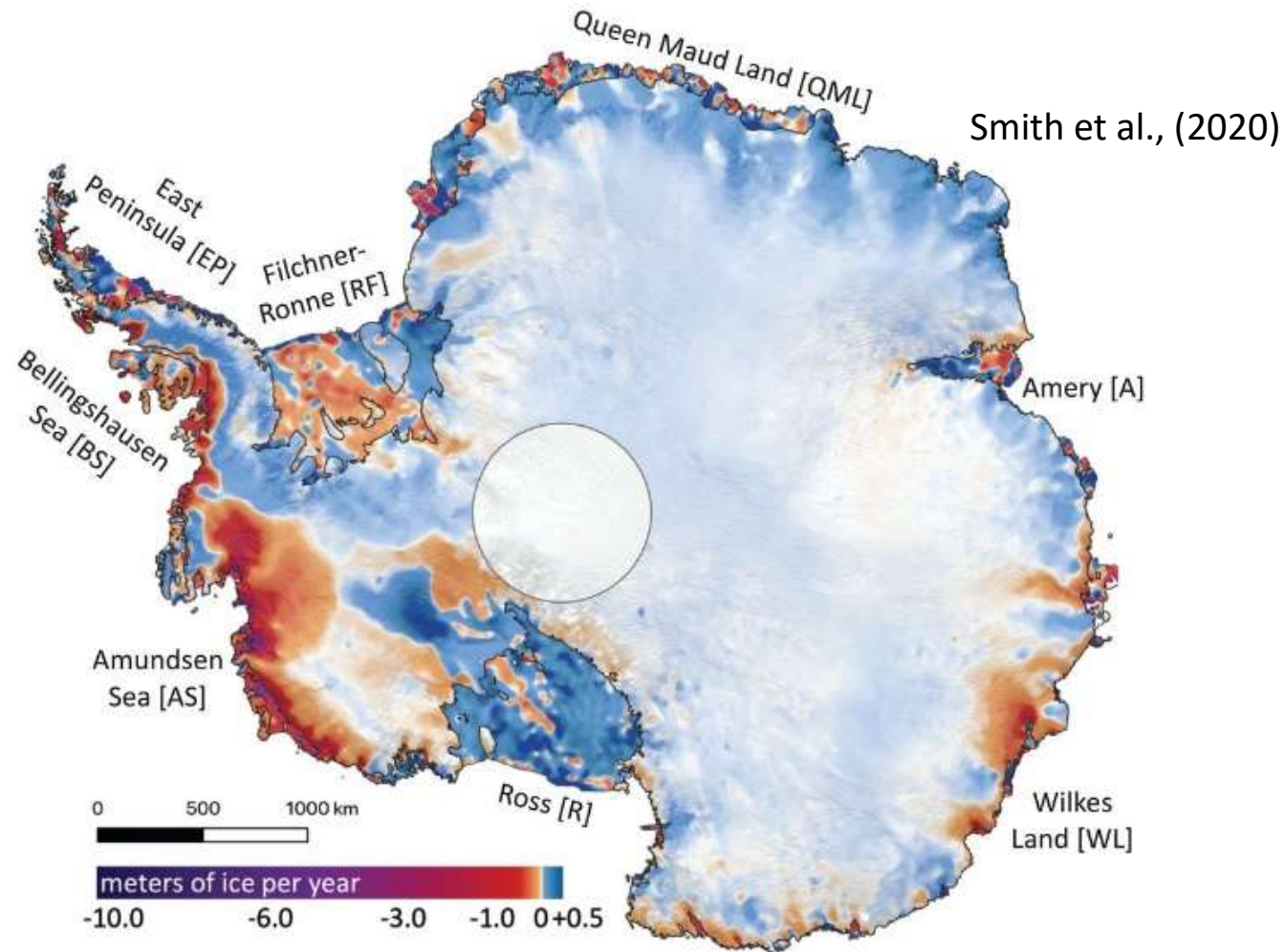
# Where does the heat from global warming go? How will this change?



- >90% into the ocean, and mostly via the Southern Ocean.
- ~ 40% of all ocean uptake of human produced CO<sub>2</sub> is via the Southern Ocean.
- Providing climate service worth approximately **€50 BILLION** per annum.



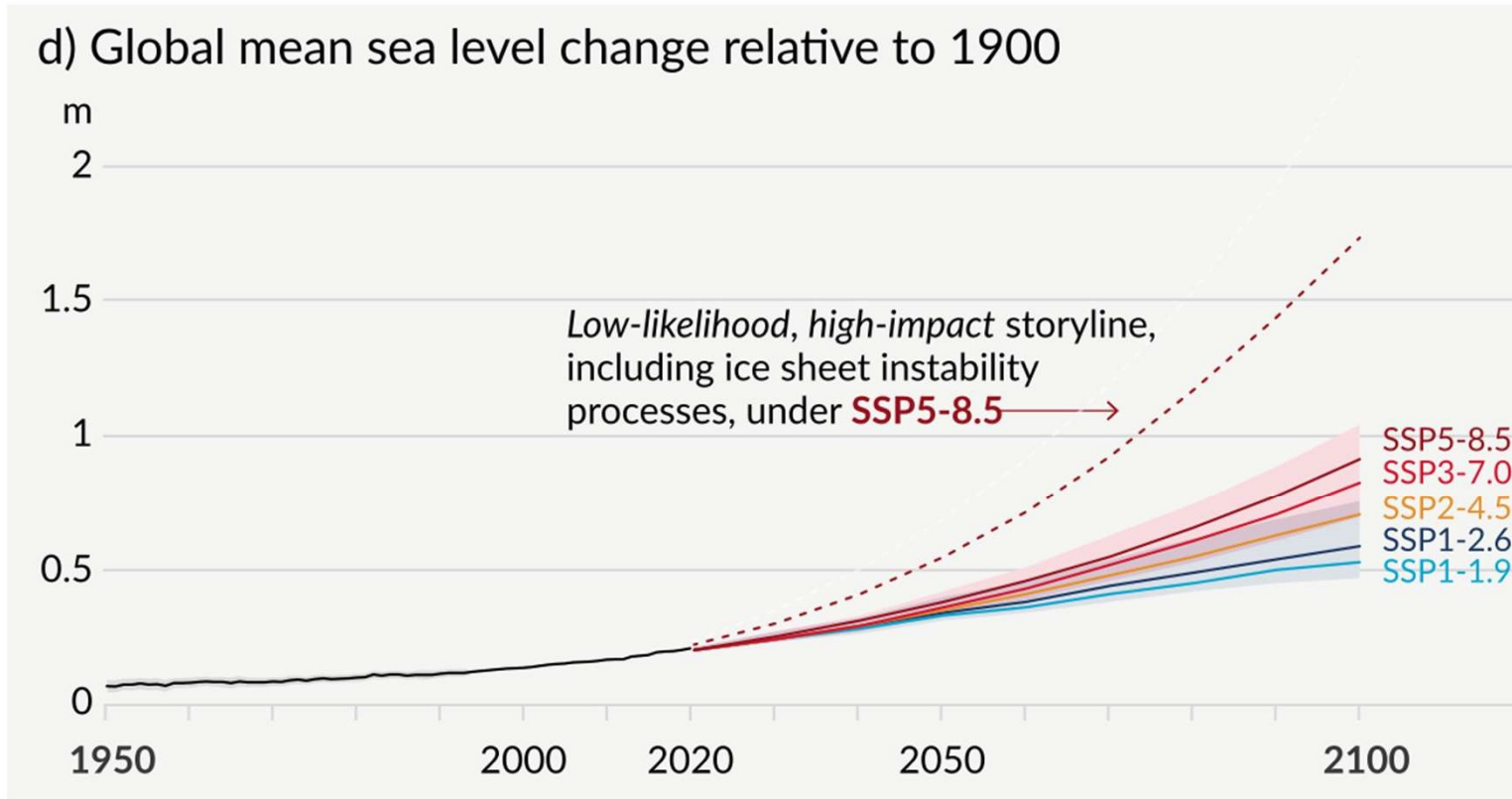
## The Southern Ocean is the major driver of ice sheet melt



IceSat(-2) ice sheet thickness loss (2003-19)

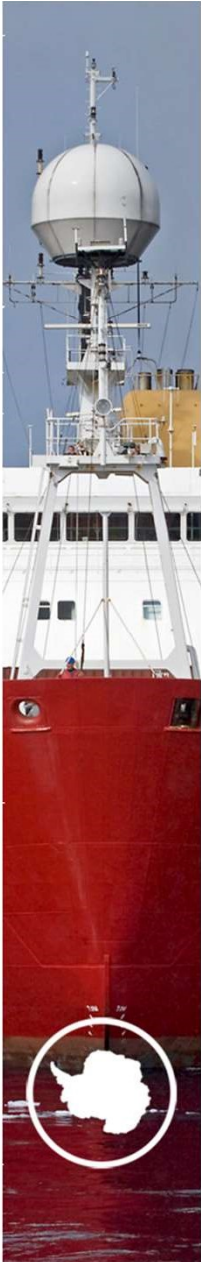


## Leading to dangerous uncertainty in future sea level rise predictions



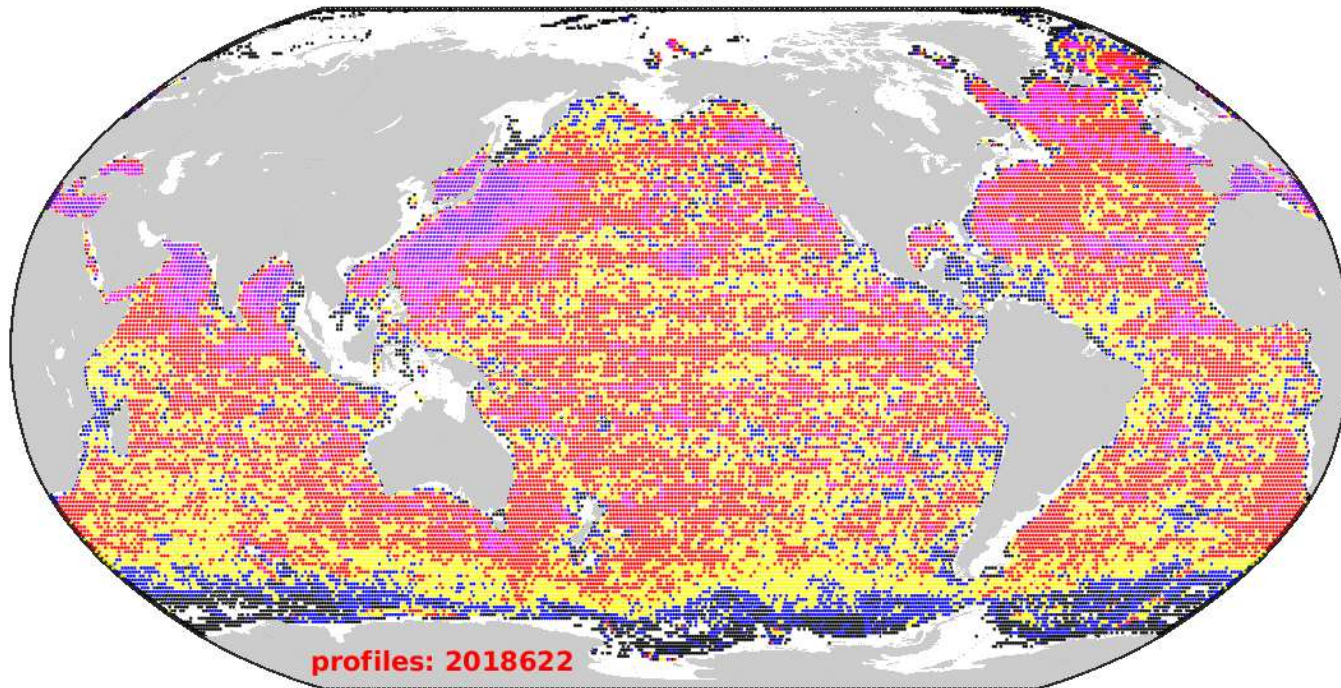
IPCC AR6 (2021), Summary for policy makers high impact storyline from an expert survey and structured expert judgement (i.e. not modelled)

**Huge uncertainty in future projections!**

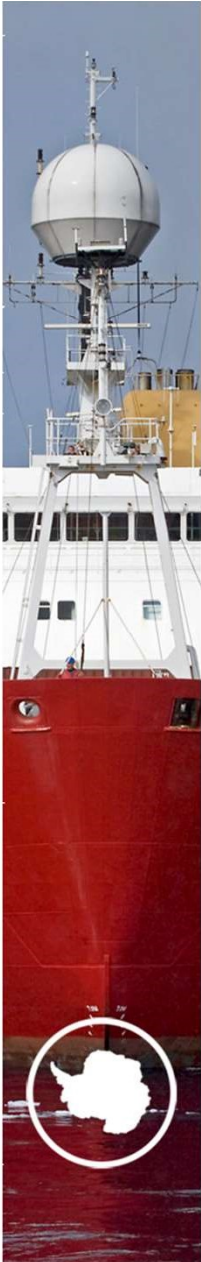


## The Southern Ocean is (still) a huge hole in our observing network

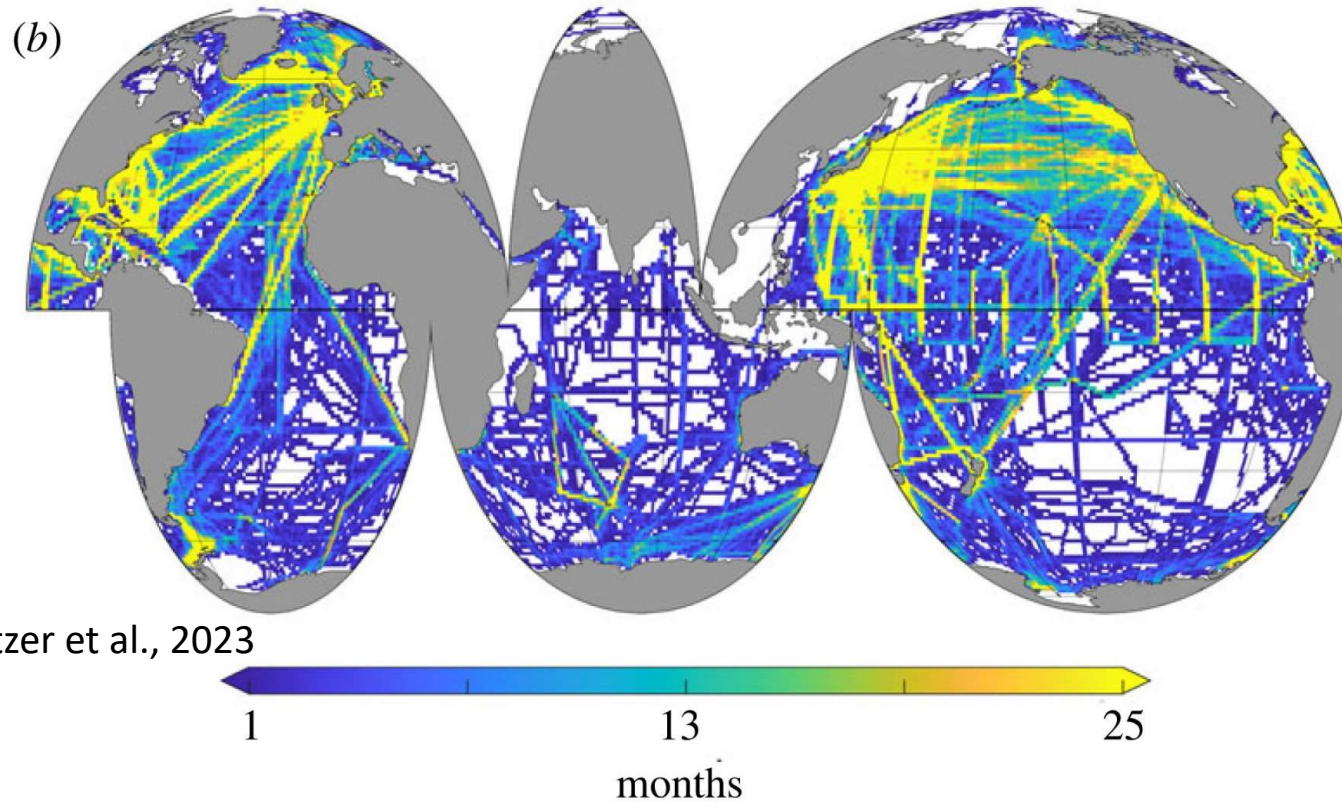
Argo observation density  
in profiles per 1 degree box  
10/31/2018



Observations of top 2km of ocean by Argo floats since 2004 (>2 million)



And even worse for measurements of CO<sub>2</sub> and other properties



Number of months with at least one ocean CO<sub>2</sub> measurement since 1957

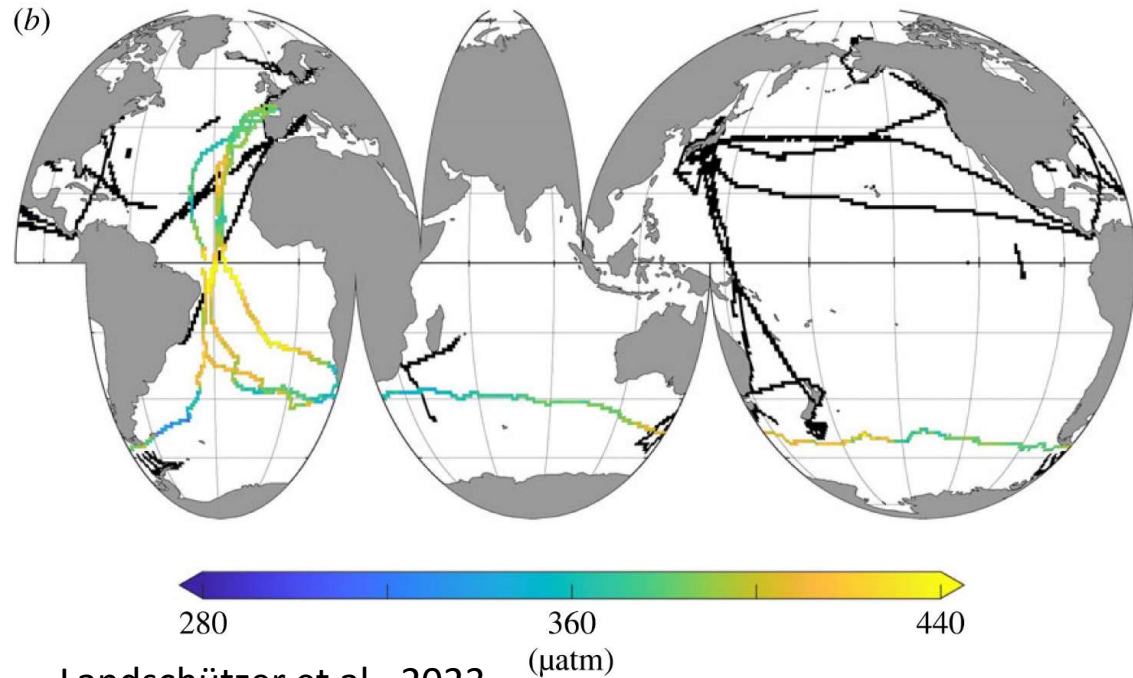




## Citizen science contributions



Argo deployment from *Malizia* –  
*Seaexplorer*, 4<sup>th</sup> Feb 2023



Landschützer et al., 2023

Ocean CO<sub>2</sub> measurements for Nov 2020 – Jan 2021: Colour is from *Seaexplorer* and *Newrest* in the Vendée Globe race (>350 000 measurements)



## Find out more!

- Horizon Europe **OCEAN:ICE** – The Southern Ocean and Antarctic impacts on global climate <https://ocean-ice.eu/>
- H2020 **SO-CHIC** – Heat and carbon uptake by the Southern Ocean <https://sochic-h2020.eu/>
- **Marine Data, Information and Knowledge for EU Green Deal and Climate Change 16:00-16:20, Today!**



Saildrone being deployed off Cape Town as part of SO-CHIC, 2022



# Thank you



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