Enhanced meltwater discharge and water mass evolution in Southwest Greenland since the end of the Little Ice Age

Yun-Ju (Lorena) Sun, Laura Robinson, Ian Parkinson, Joseph Stewart, Maria Luiza de Carvalho Ferreira, and Katharine Hendry

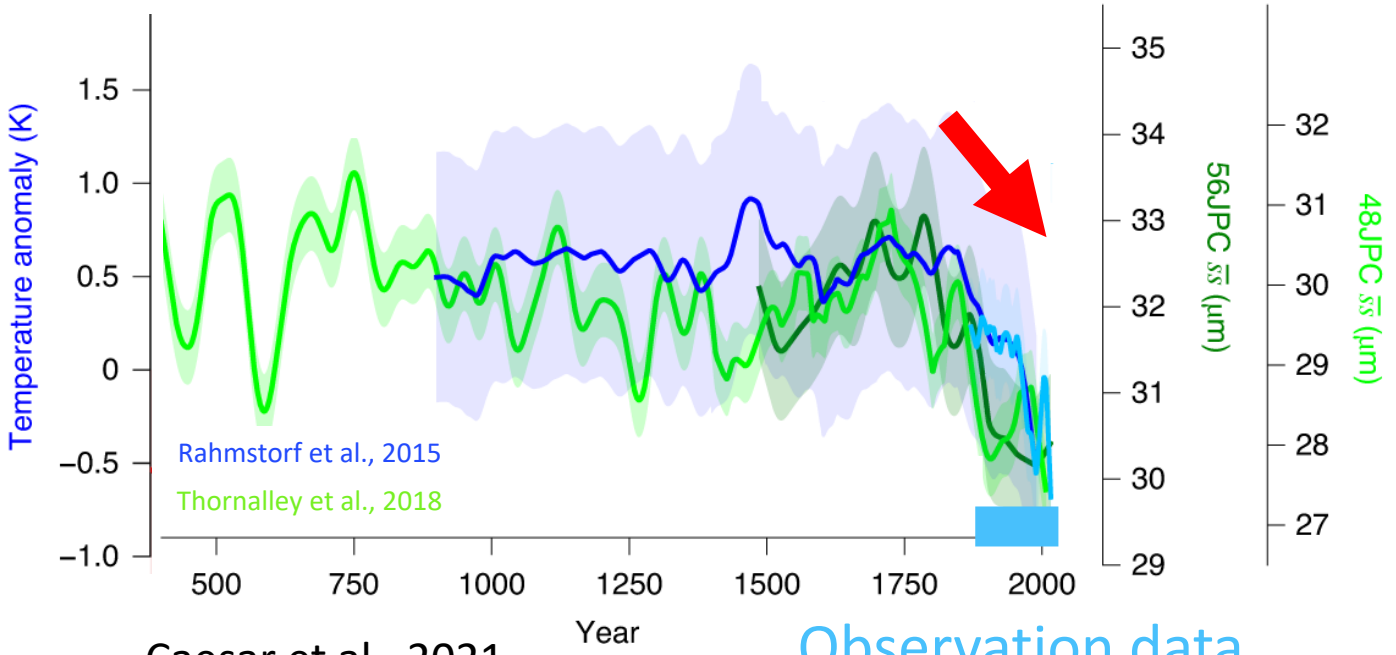
University of Bristol, Earth Sciences, United Kingdom

This presentation participates in OSPP

Outstanding Student & PhD candidate Presentation contest

ABSTRACT
EGU22-12598

Atlantic Meridional Overturning Circulation (AMOC)



Caesar et al., 2021

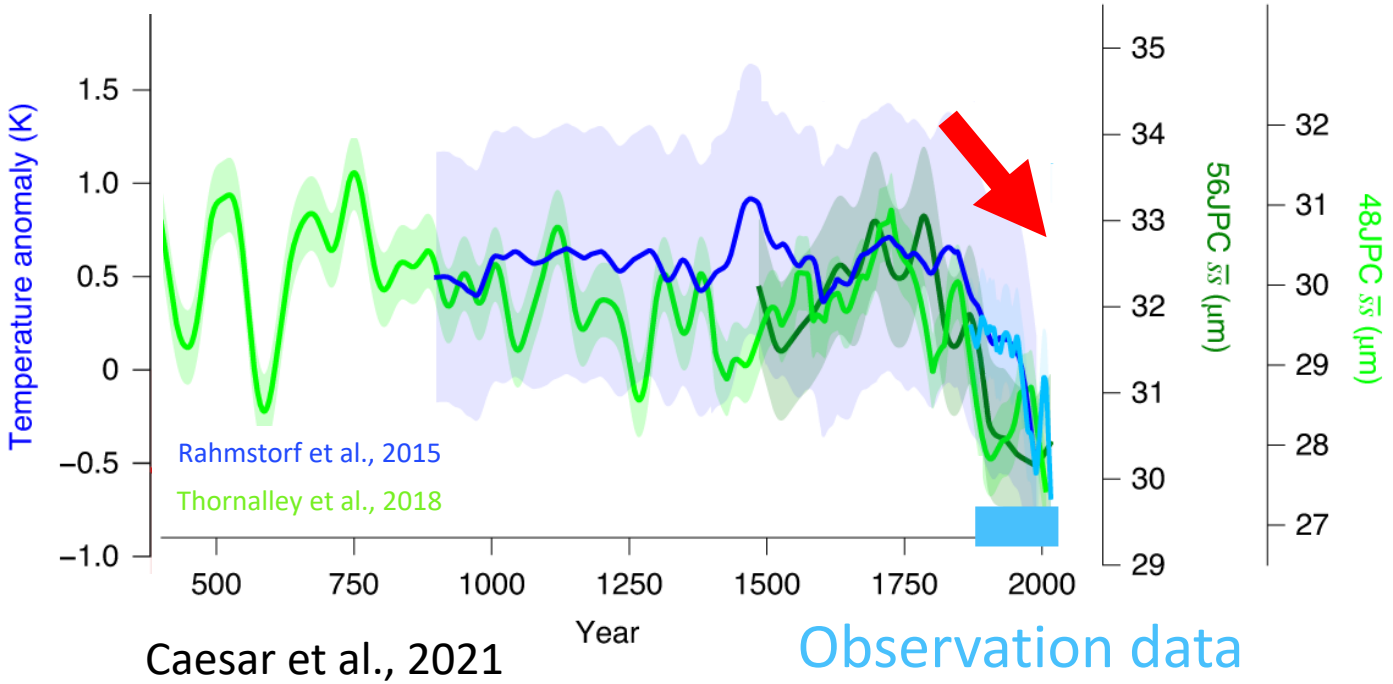
Observation data

Caesar et al., 2018

AMOC is in a weakening state

yj.sun@bristol.ac.uk

Atlantic Meridional Overturning Circulation (AMOC)



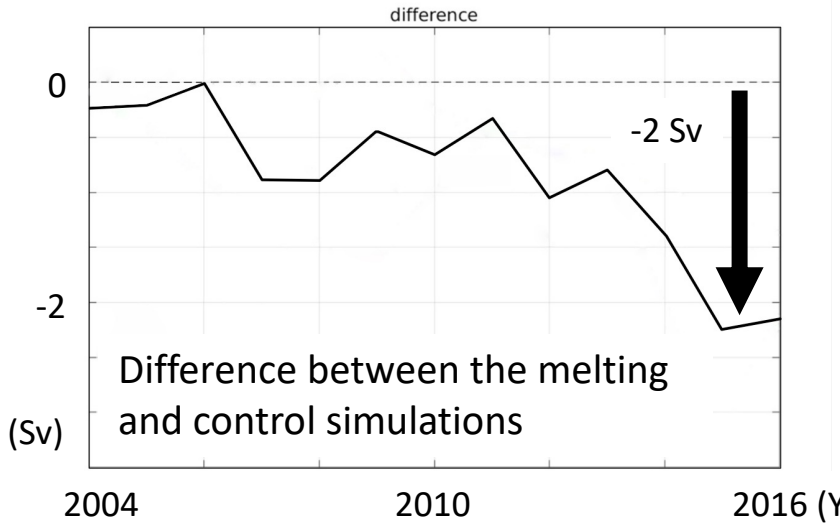
Caesar et al., 2021

Observation data

Caesar et al., 2018

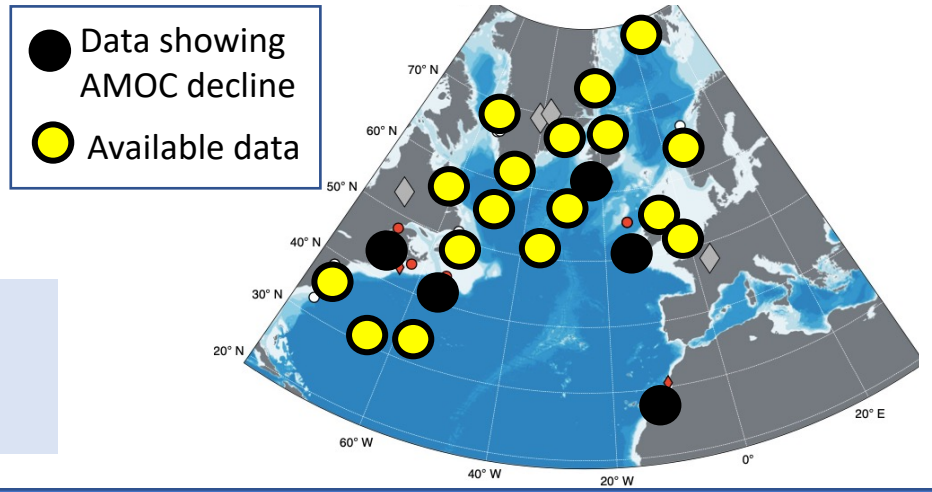
Room for discussion…

1. Model with Greenland melting



Swingedouw et al., 2022

2. More available records of the North Atlantic



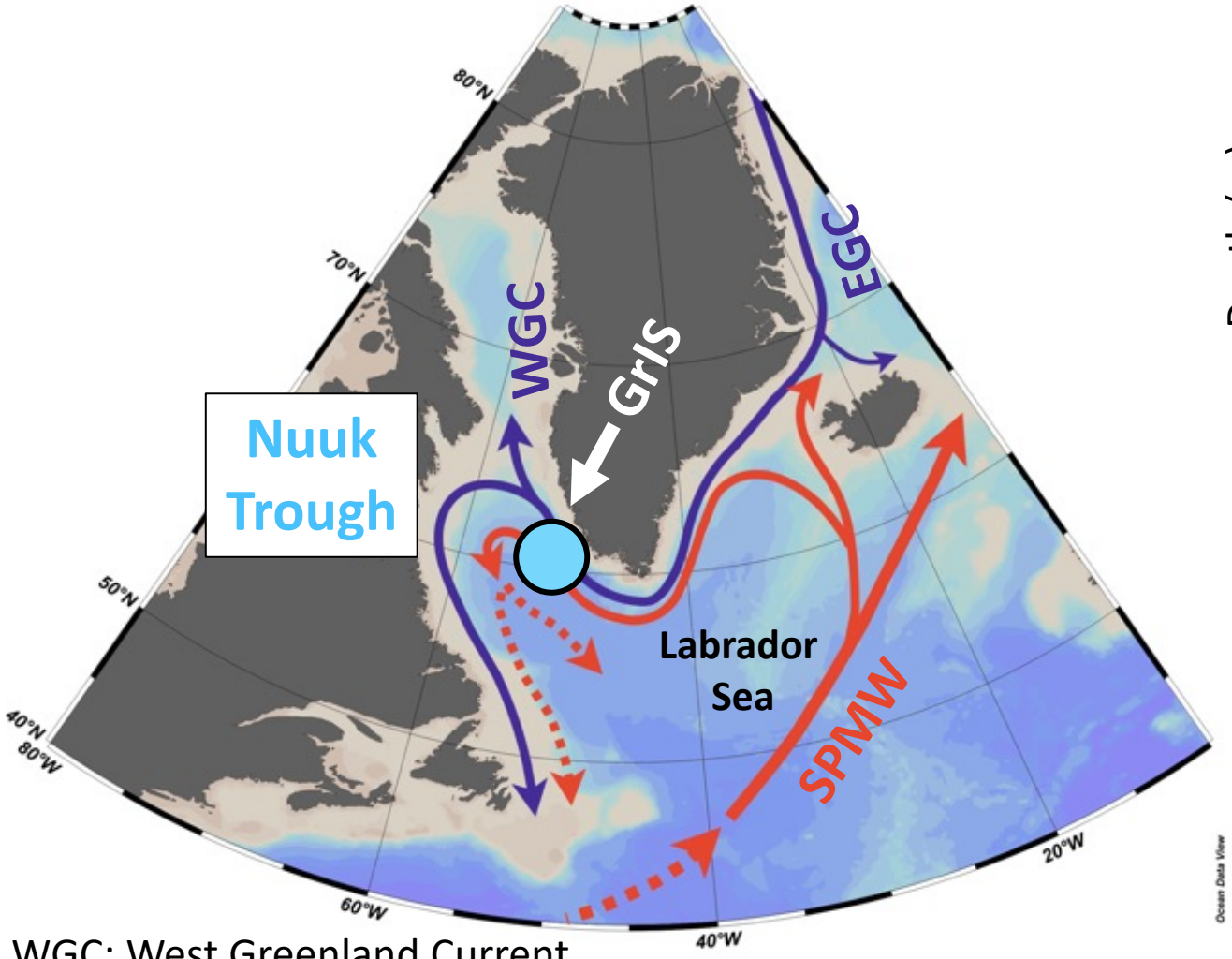
Kilbourne et al., 2022

AMOC is in a weakening state *?*

→ Require meltwater and intermediate water indicators

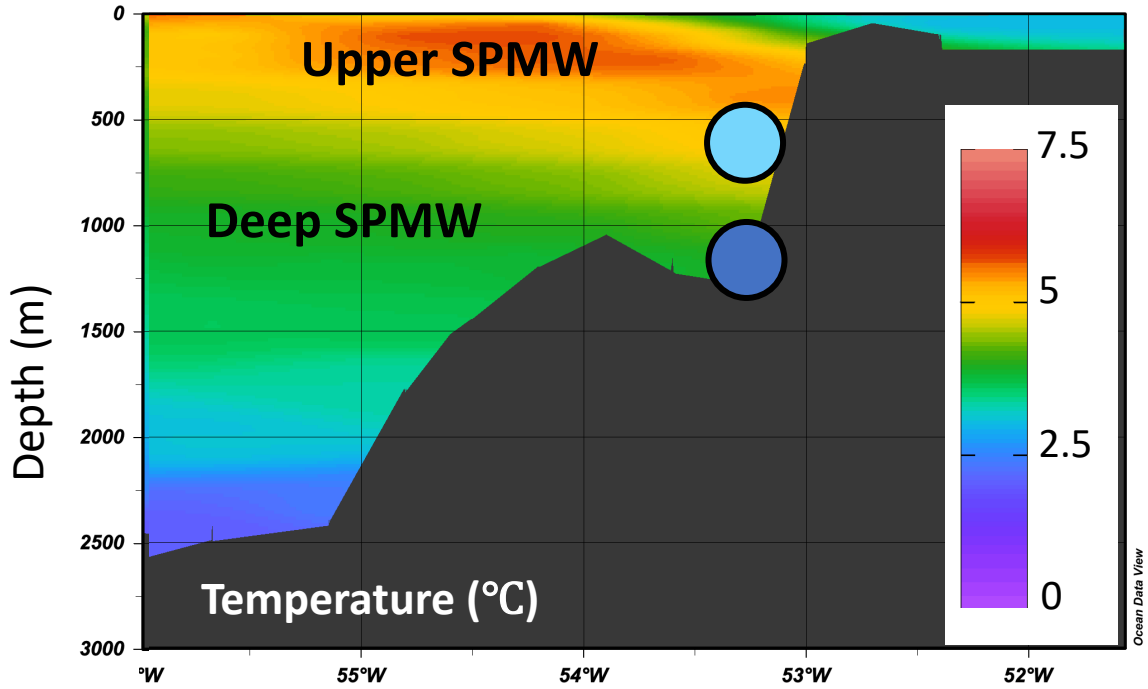
yj.sun@bristol.ac.uk

Deep-Sea Corals in SW Greenland



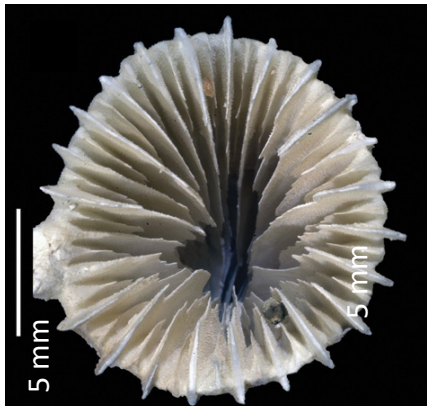
WGC: West Greenland Current
SPMW: Subpolar mode water
GrIS: Greenland Ice Sheet

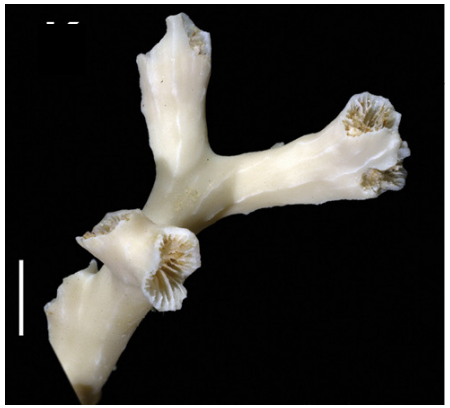
ICY-LAB project
Expedition DY081



Depth: 750 m 1200 m

Species: *Lophelia pertusa* *Solenosmillia variablis*





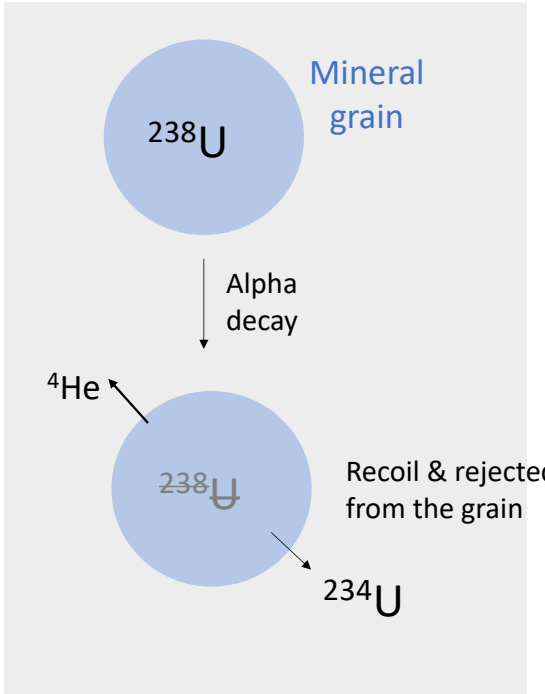
Cairns & Kitahara, 2012

yj.sun@bristol.ac.uk

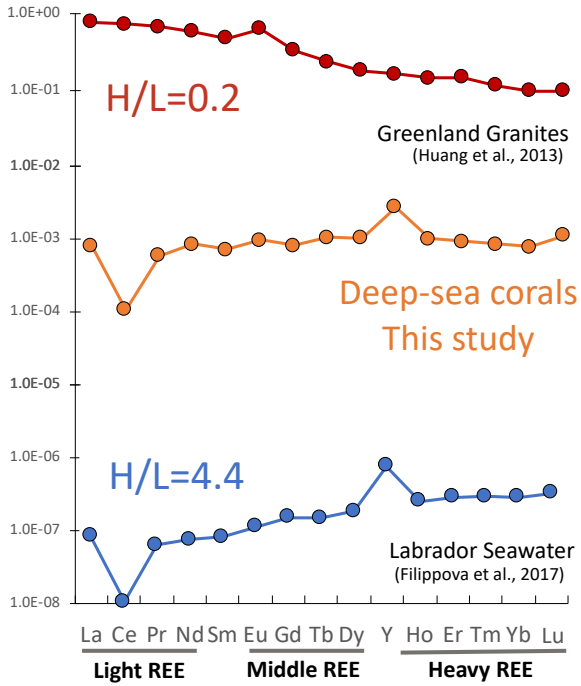
Meltwater discharge

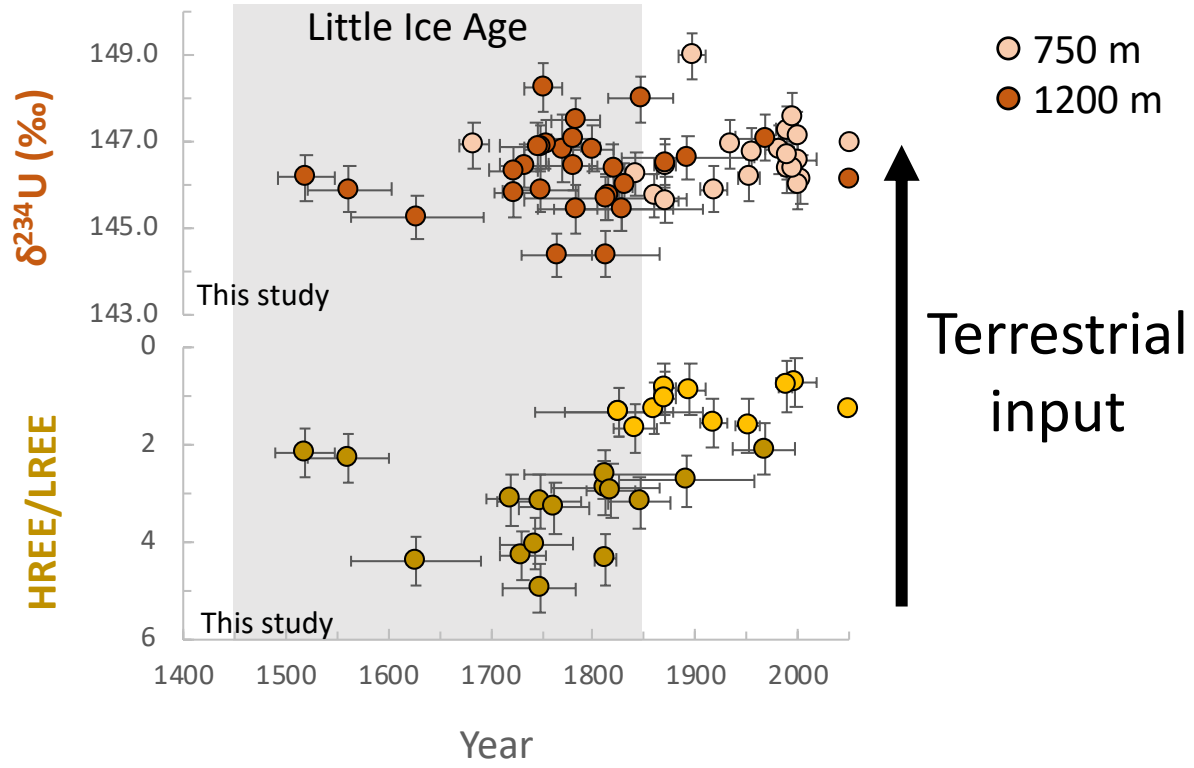
Weathering proxy

$\delta^{234}U$ ($^{234}U/^{238}U$)



Rare Earth Elements and Yttrium (REY)





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Meltwater discharge

Weathering proxy

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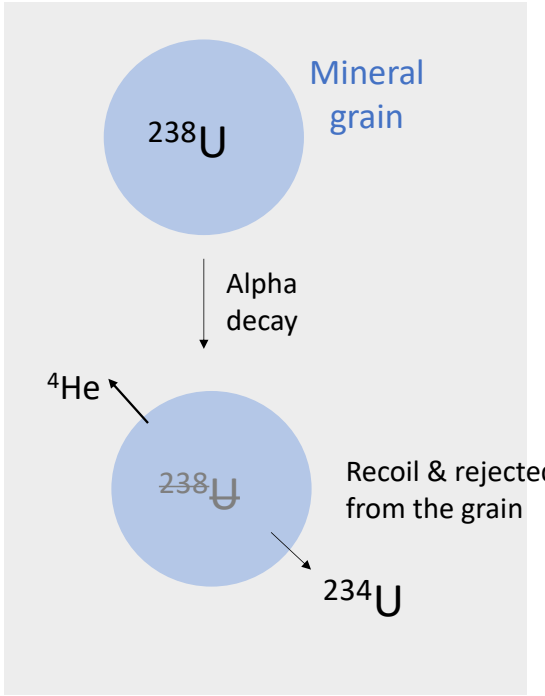

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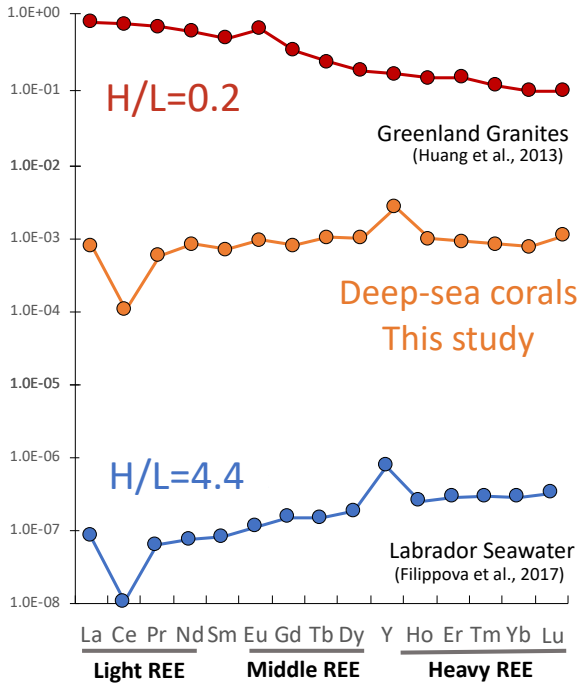
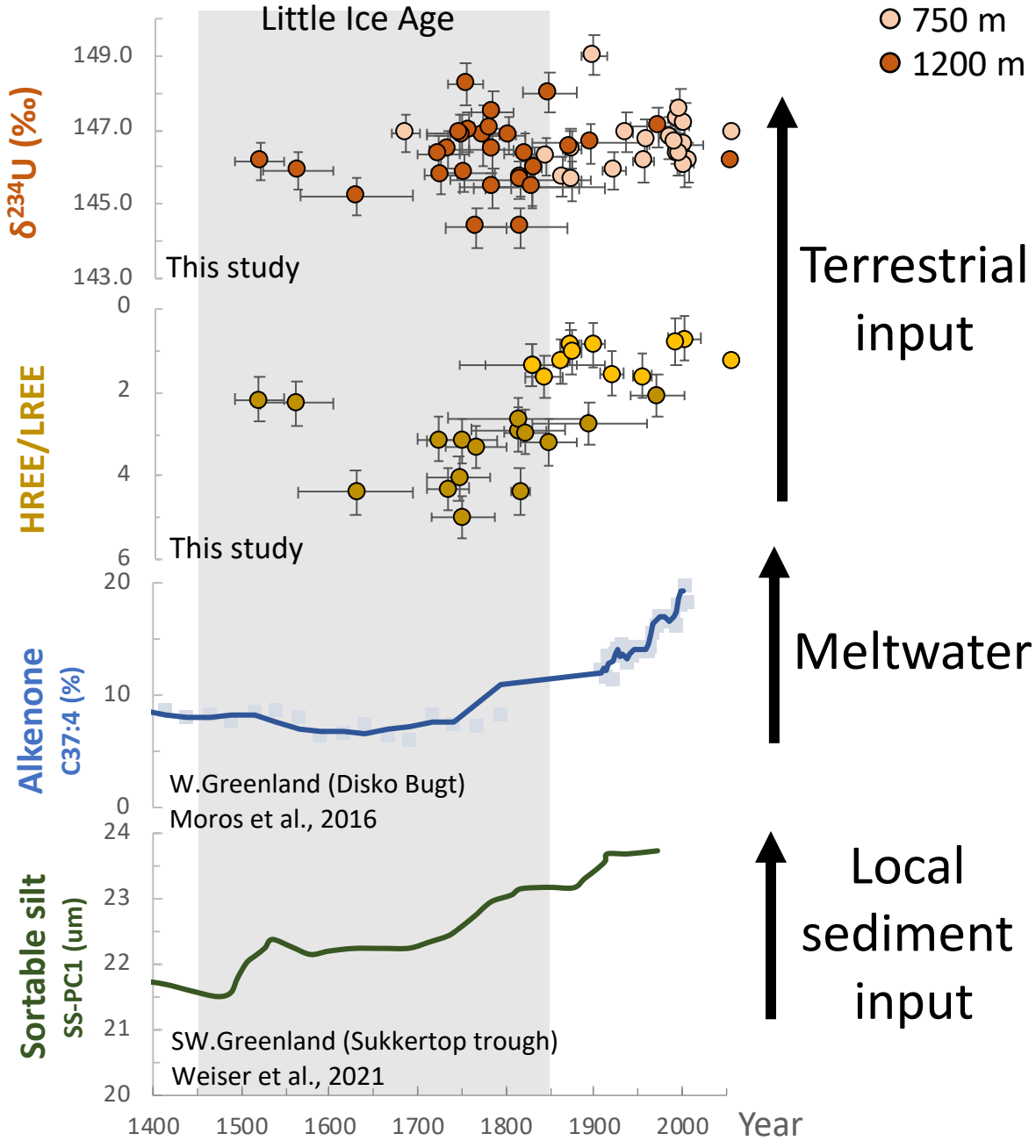
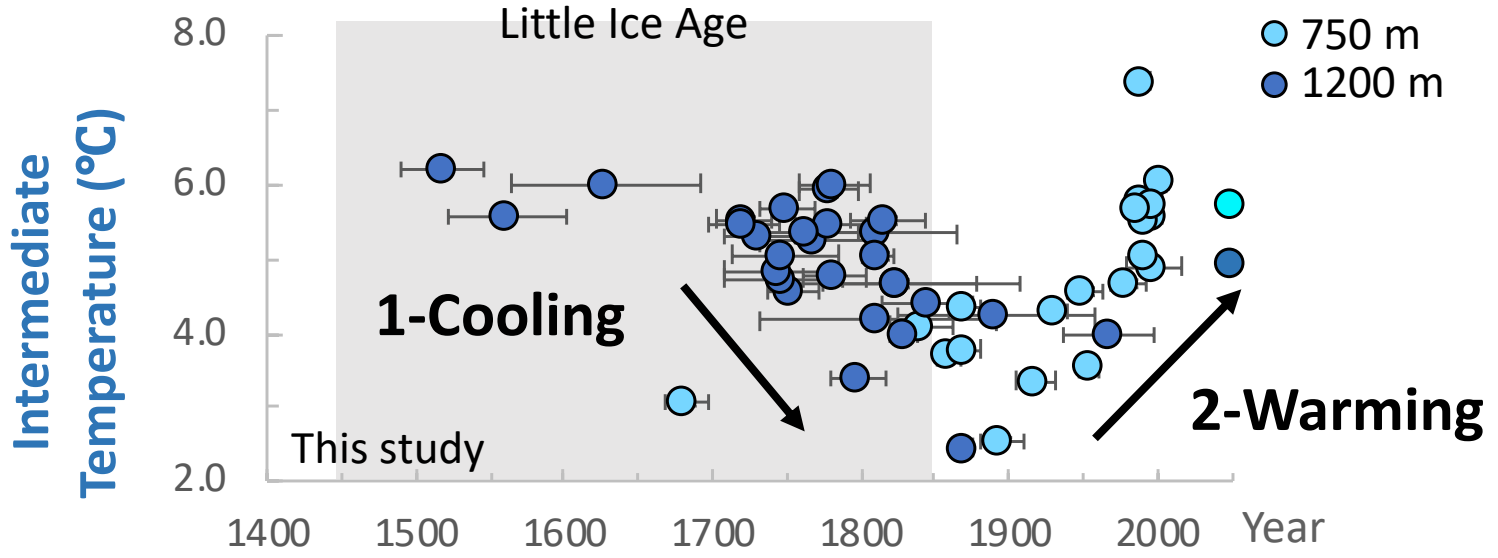


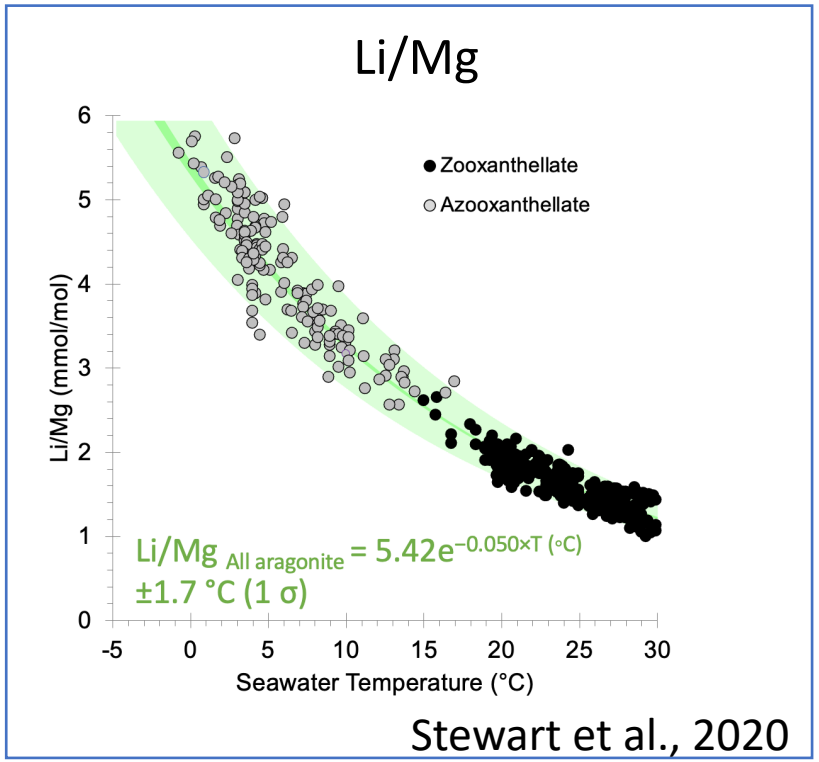


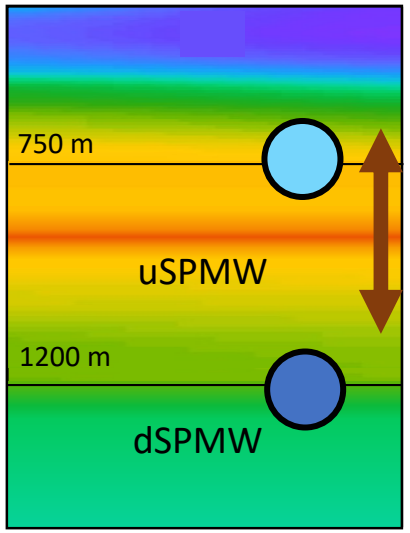
yj.sun@bristol.ac.uk

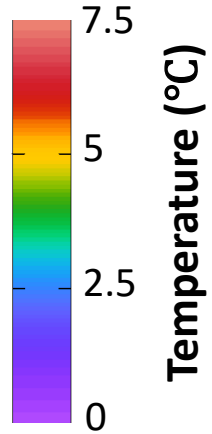
Intermediate water mass evolution



Temperature proxy





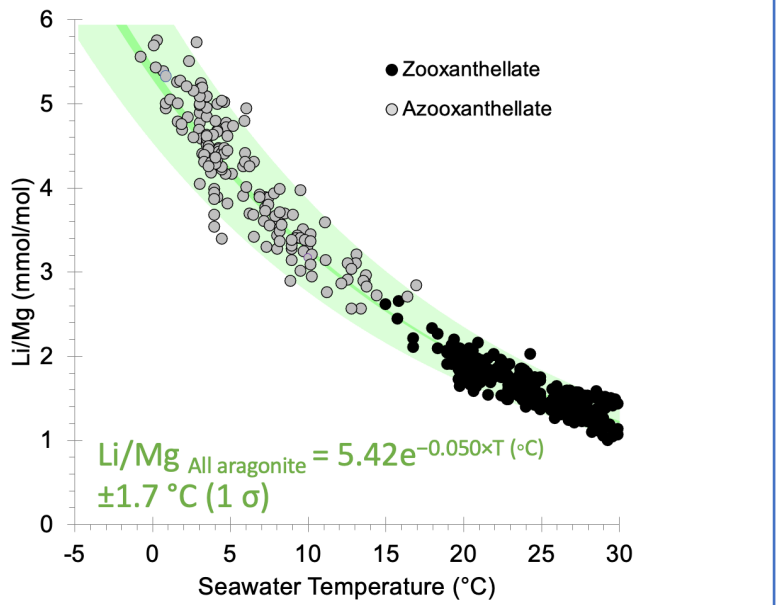


yj.sun@bristol.ac.uk

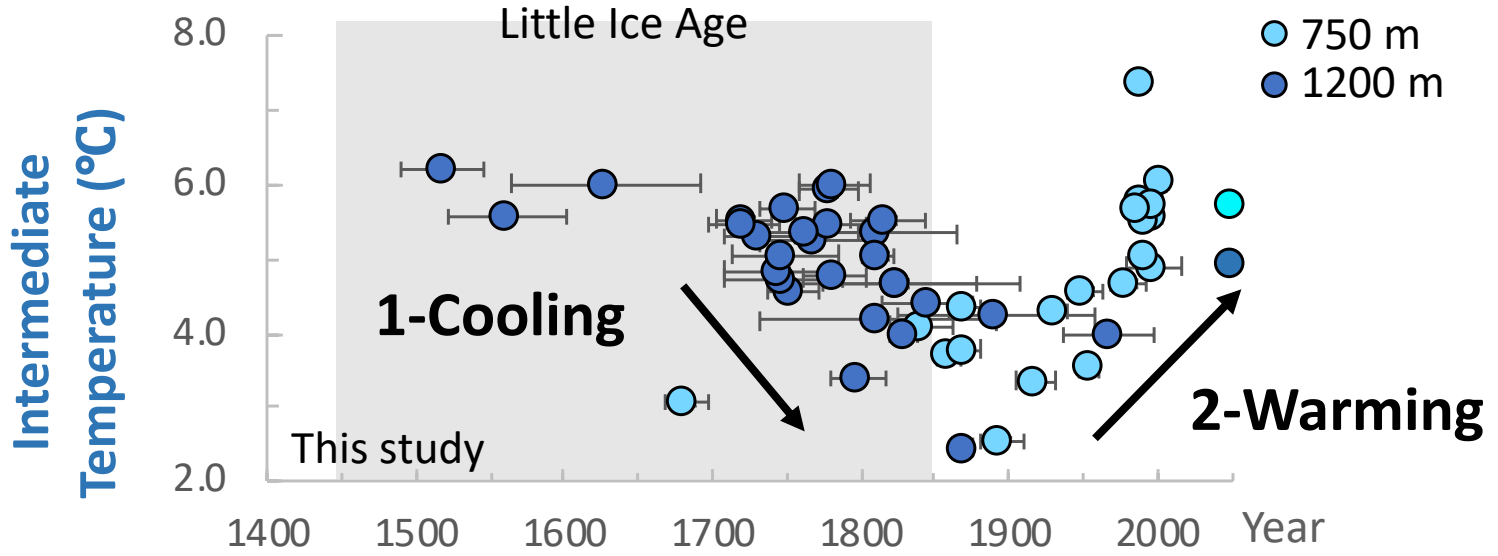
Intermediate water mass evolution

Temperature proxy

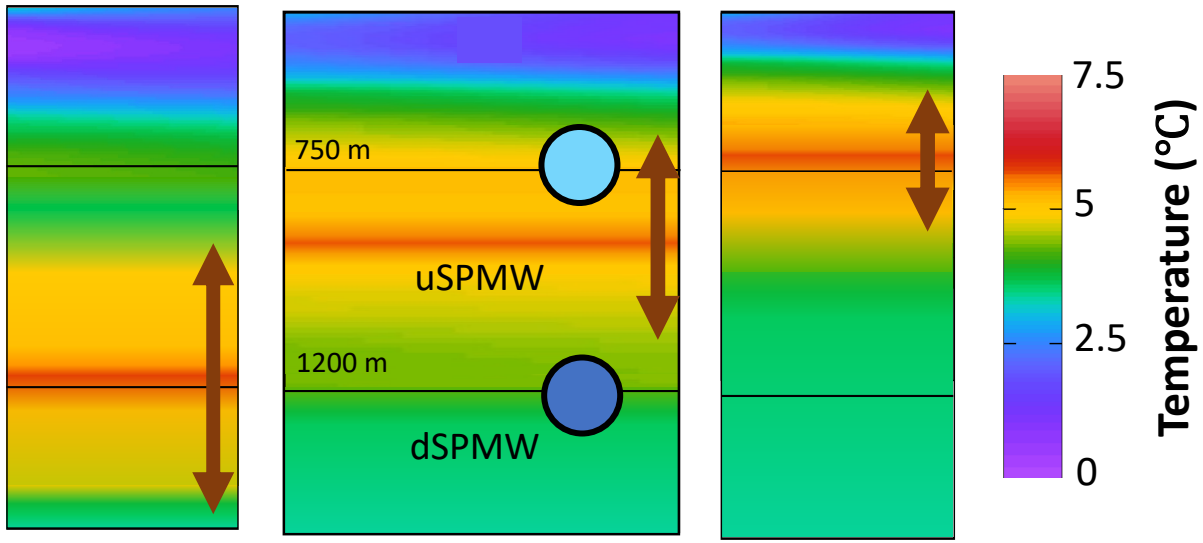
Li/Mg



Stewart et al., 2020



End of Little Ice Age → Present

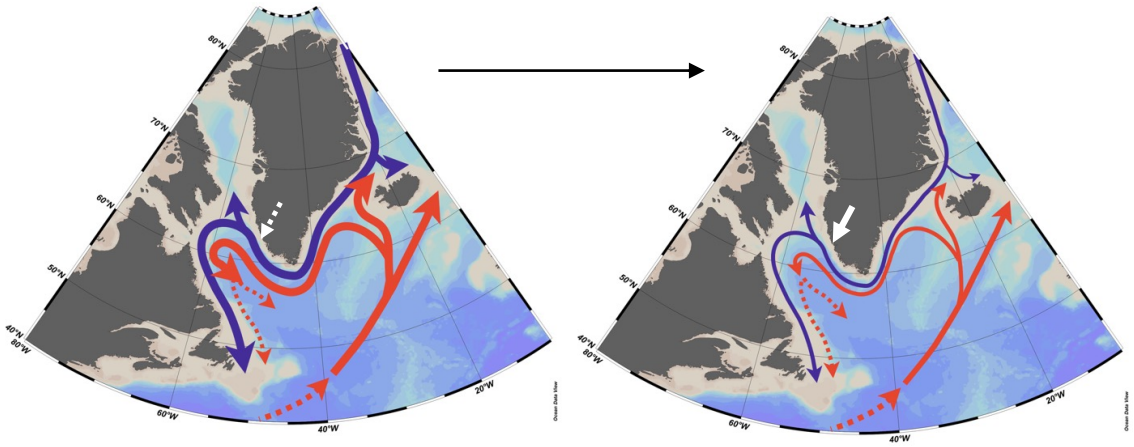


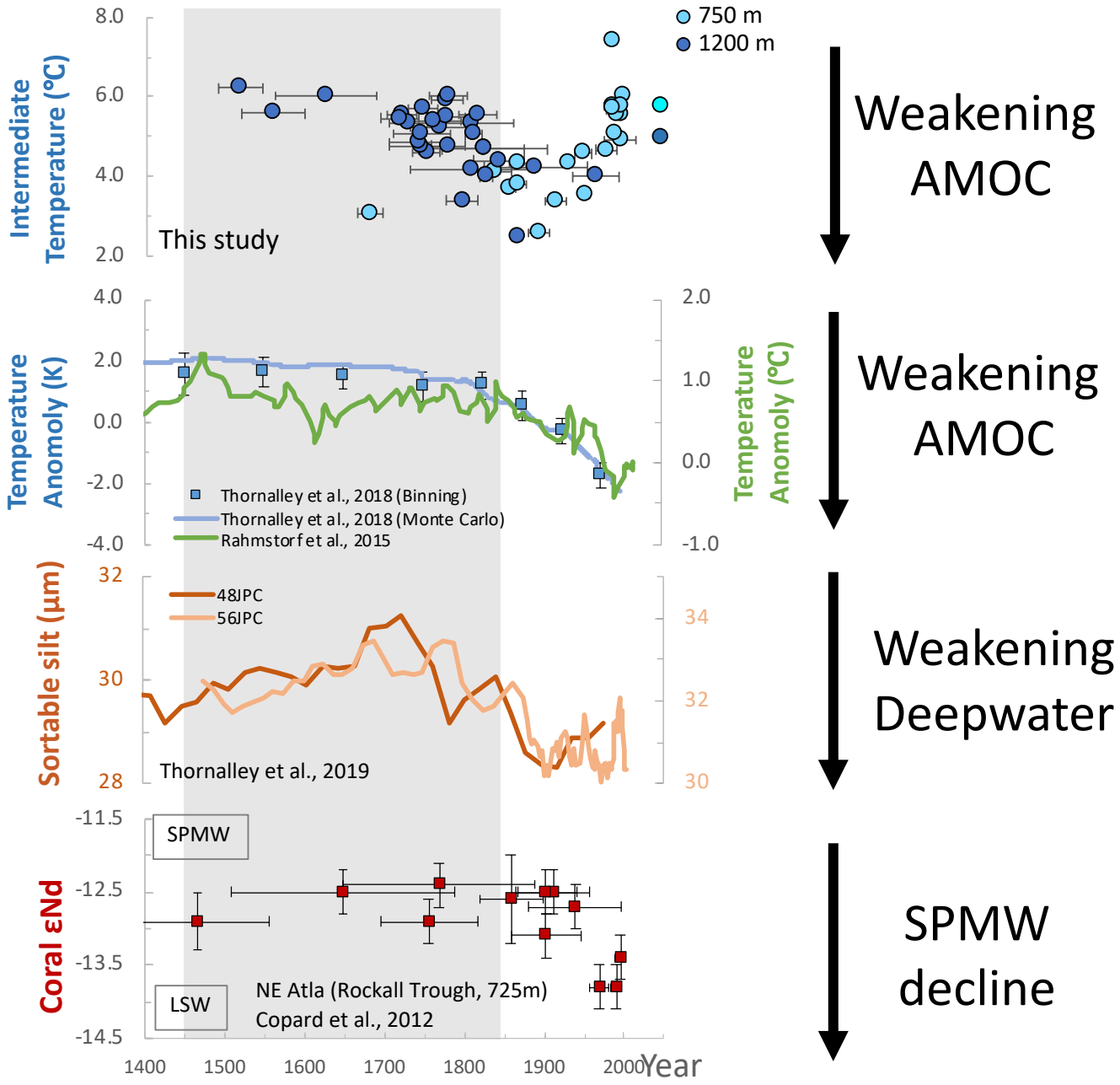
yj.sun@bristol.ac.uk

Intermediate water mass evolution

End of Little Ice Age

Present

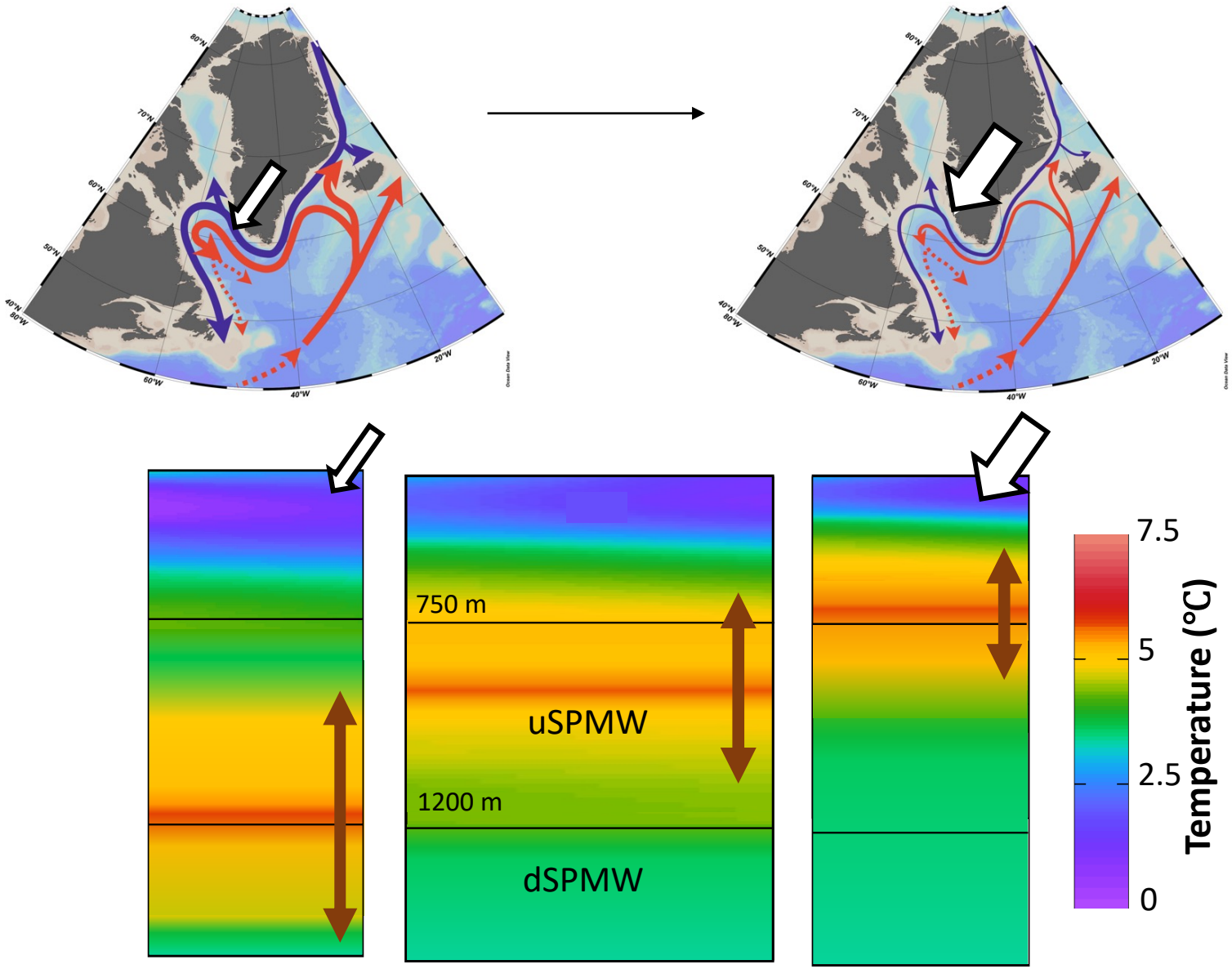




yj.sun@bristol.ac.uk

End of Little Ice Age

Present



Summary

1. Deep-sea coral $\delta^{234}U$ and REY are sensitive terrestrial input proxies.

2. Increased meltwater discharge and weakened SPMW were found starting at the end of the Little Ice Age.

3. Such regional-scale hydrological variabilities can be linked to AMOC fluctuations.

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