CUSTARD

Carbon Uptake & Seasonal Traits of Antarctic Remineralisation Depth

WorkPackage 4

How does seasonality in remineralisation depth affect C storage?

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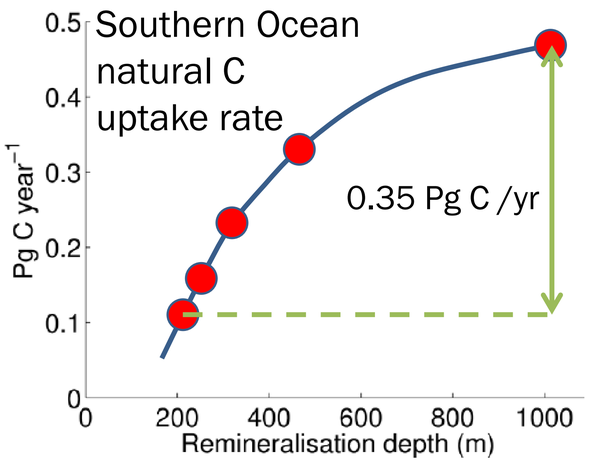
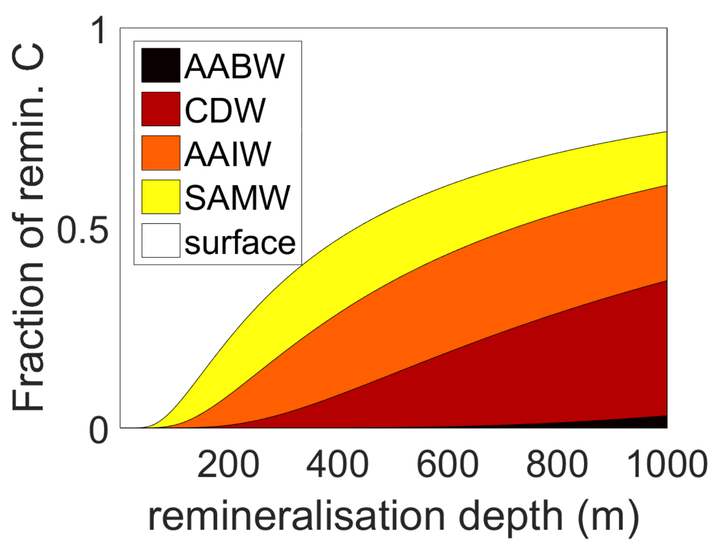
Preliminary modelling suggests that carbon uptake is sensitive to remineralisation depth, but the latter is uncertain with observations varying from 200-1000m. This uncertainty may contain a significant seasonal element.



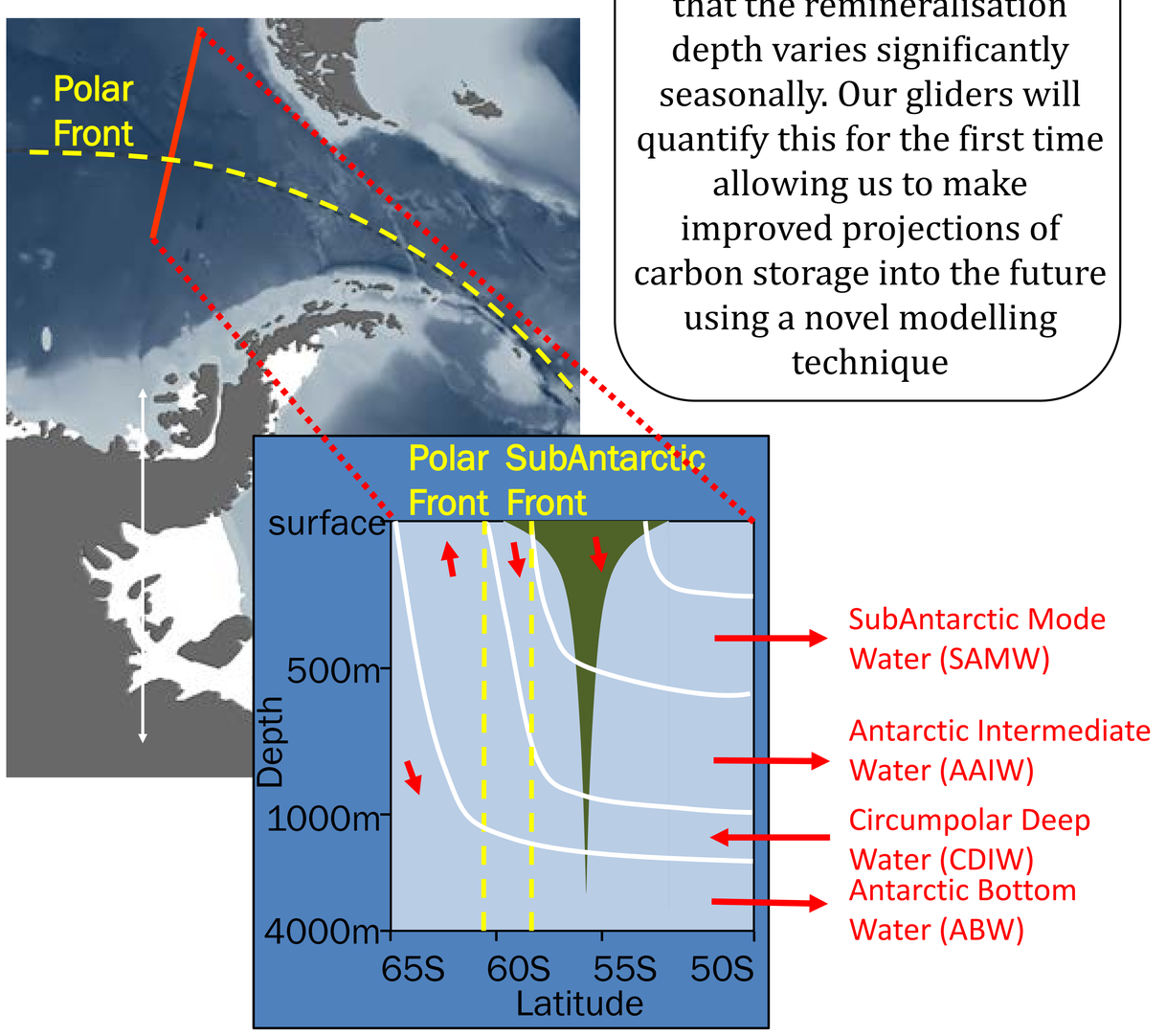
Integrated over the industrial period the uncertainty exceeds the current uncertainty in anthropogenic carbon uptake for the Southern Ocean. Constraining the remineralisation depth will reduce uncertainty in natural C uptake

	Uncertainty 1861-2005
Anthropogenic	20 Pg C [a]
Natural	>50 Pg C [b]

[a] Frölicher et al (2015) J.Clim
[b] CUSTARD preliminary modelling



As the remineralisation depth changes, so the fraction of organic carbon respired in each of the water masses found at this ocean junction varies. The water mass in which organic carbon is respired affects how long it remains out of the atmosphere



There is evidence to suspect that the remineralisation depth varies significantly seasonally. Our gliders will quantify this for the first time allowing us to make improved projections of carbon storage into the future using a novel modelling technique

Aims:

1) Provide a synthesised analysis of the seasonal variability and phase in CO2 surface flux, surface biogeochemistry, phytoplankton physiology and remineralisation depth
2) Delineate trajectories of C taken up in key areas of the upper limb and how they vary seasonally

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