CUSTARD

Carbon Uptake & Seasonal Traits of Antarctic Remineralisation Depth

WorkPackage 2

Phytoplankton ecology and physiology: linking iron, silicon and carbon cycling

Mark Moore[1] (Lead), Tom Bibby[1], Heather Bouman[2], Angie Milne[3], Simon Ussher[3]
(1. University of Southampton, 2. University of Oxford, 3. University of Plymouth)

Context:

The production, ecosystem re-packaging, sinking and remineralisation of organic material in the upper ocean drives the so-called 'Biological Carbon Pump' (BCP). The overall productivity, community structure and physiology of phytoplankton communities influences all these processes and hence consequently the net storage of carbon by the BCP. The overall objective of *CUSTARD WP2* is thus to:

'Identify drivers of seasonality of production and establish the extent to which iron (Fe) availability influences the generation and stoichiometric composition (C:N:P:Si) of organic material in the upper ocean'

Deliverables:

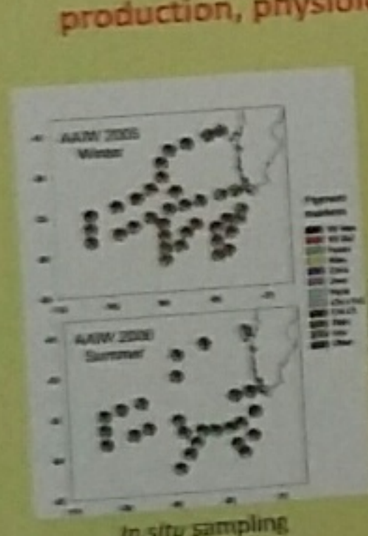
1) Annually resolved time series of phytoplankton productivity and community structure during key transition periods from a highly undersampled region of the Southern Ocean

2) Unique timeseries resolving Fe stress development in a critical biogeochemical region

3) Highly resolved iron dynamics during a key biogeochemical transition period

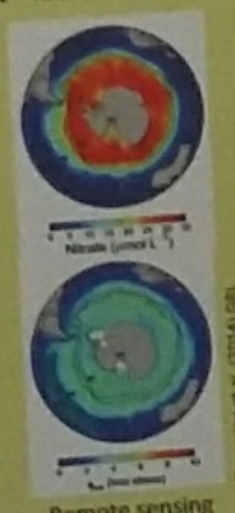
4) Synthesised insights into the controls on upper ocean productivity and organic matter stoichiometry.

WP 2.1: Phytoplankton biomass, composition, production, physiology and iron stress



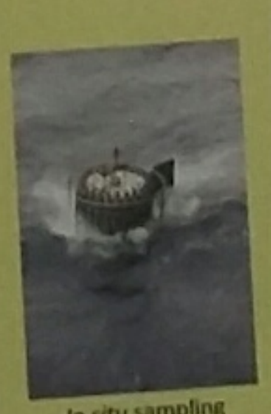
In situ sampling (primary production, particulate (C, N, Si) standing stocks, community structure)

Experimentation (C, N, Si dynamics & community responses to Fe availability)

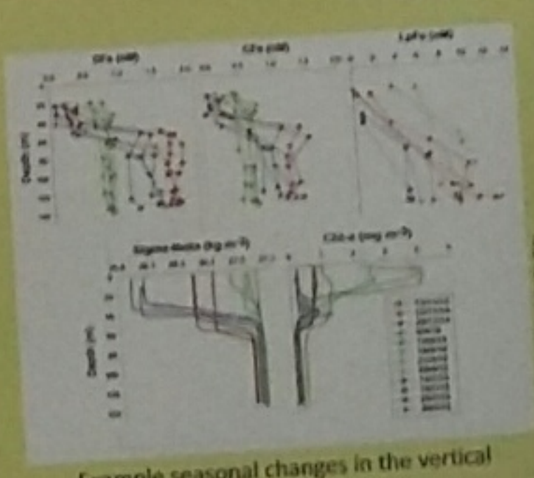


Remote sensing (satellites, gliders and moorings, productivity and Fe stress)

WP 2.2: Iron dynamics during spring-summer transition



In situ sampling (multi-phase and multi-element data provides information on sources and processes)



Example seasonal changes in the vertical distributions of Fe fractions (time-resolved dissolved, colloidal and labile particulate Fe in the Celtic Sea)

Partners

National Oceanography Centre, Natural Environment Research Council

University of Southampton

Max-Planck-Institut für Meteorologie

NSF

British Antarctic Survey, Natural Environment Research Council

UEA, University of East Anglia

In partnership with Plymouth University

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