ROAM

Regional Ecosystem & Biogeochemical Impacts of Ocean Acidification – a Modelling Study.

2nd Annual Science Meeting, Exeter, 16-18th April 2012

PML PLYMOUTH MARINE LABORATORY

National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

Met Office Hadley Centre

Jerry Blackford
Yuri Artioli
Momme Butenschon

Tom Anderson
Katya Popova
Andrew Yool

Jason Holt
Maria Luneva
Sarah Wakelin

Dan Bernie
Paul Halloran
Ian Totterdell

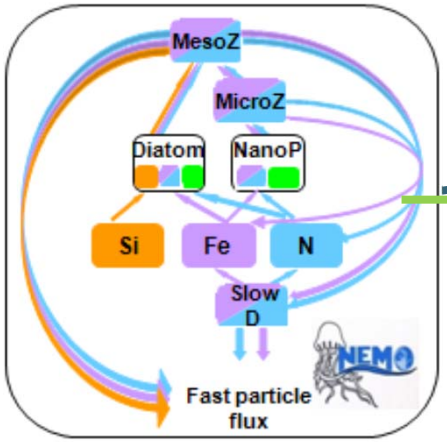
Arctic regional ¼° Global

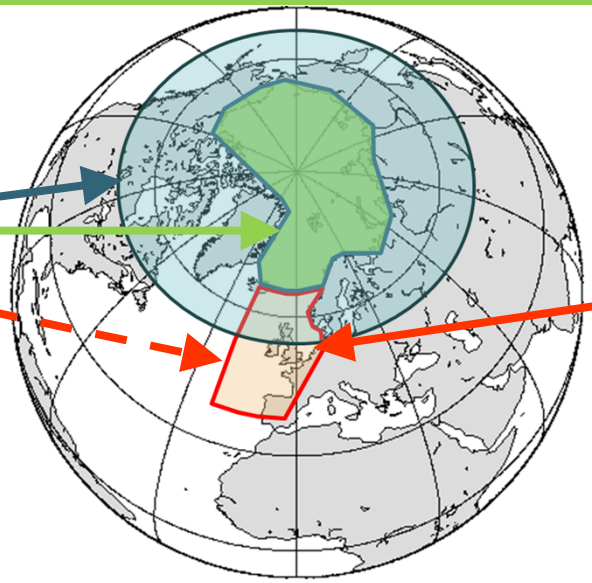
3 Model Systems

NW European Shelf 7km shelf

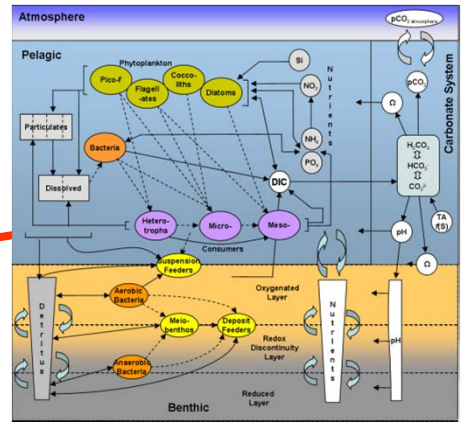
Arctic high res shelf (7-3.5km)

Medusa





ERSEM



Reanalysis-forced

Climate forecasts (AR5)

1960 1990 2010 2040 2100

Climate forcing from the AR5 simulations. Three emissions scenarios will be considered; relating to changes in radiative forcing of 2.6, 4.5 and 8.5 W/m2 by 2100.

Key science questions:

1. How will forecast CO_2 emission scenarios impact on the spatial and seasonal patterns of carbonate chemistry (pH, , etc.) and other key niche defining parameters (T, O_2) via the processes of ocean acidification, climate moderated hydrodynamics, modified fluvial inputs and biological feedbacks.

2. How will the modified physical controls, biological moderators and atmospheric & terrestrial drivers combine to impact carbon pumping and ocean – shelf coupling from a perspective of both regional carbon cycling and impacts on earth system cycles.

3. How will predicted changes in processes that control, for example, carbon-nutrient stoichiometry, calcification and the microbial – classical food web dynamic impact on the functionality and productivity of the target ecosystems.

Ecosystem impacts consensus remains elusive:

Fewer ecosystem impacts in the main production runs

Calcification

Nitrification inhibition

Address this with focussed sensitivity studies

Air – sea flux parameterisations

C fixation, increased rate or better efficiency?

Export / TEP production,

Bioturbation / bioirrigation rates

Nitrification , impact of inc NH_4^+, less NO_3

Nitrogen fixation enhanced

C:N stoichiometry and grazing

:

:

Your input is very welcome!