

The Biogeography of Primary Producers in the Sub-Polar North Atlantic

Ben Ward

Andrew Barton

Oliver Jahn

Stephanie Dutkiewicz

Mick Follows

Diatoms

Fast growing

Fast sinking

Grazer resistance

Dinoflagellates

Slow growing

Mixotrophic?

Motile

Toxic

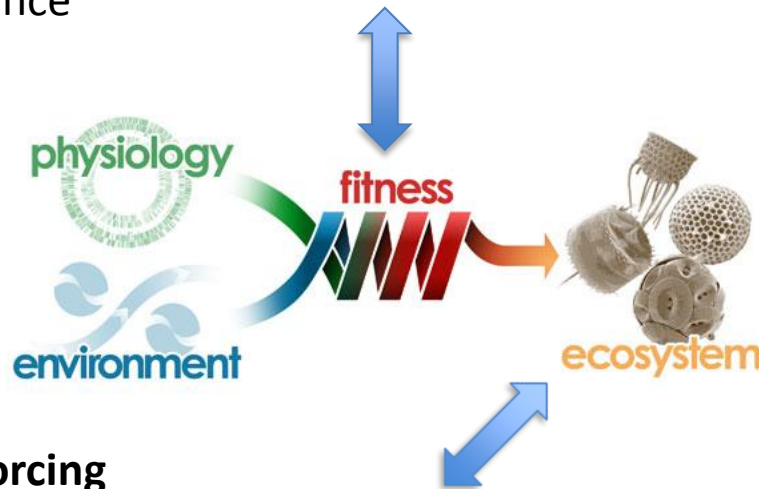
Physical forcing

0D

1D

3D } MIT-GCM

Hypotheses



Observations

-

Continuous

Plankton

Recorder

Diatoms

Bloom specialists

High export

Dinoflagellates

Post bloom generalists

Ecosystem stability?

Data

Biogeography

Questions

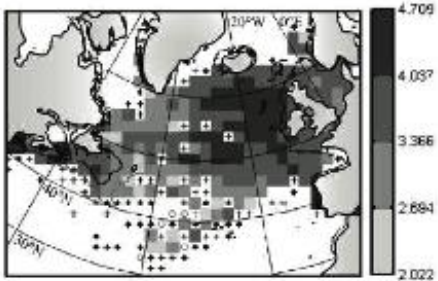


Fig. 57. *Thalassionema nitacchioides*

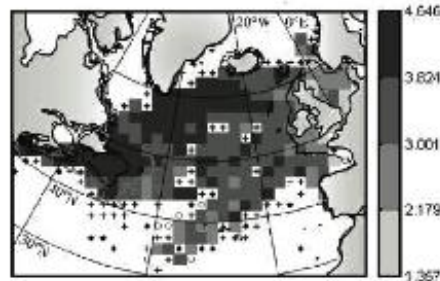


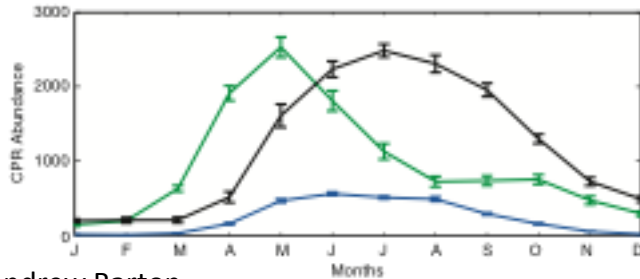
Fig. 59. *Thalassiothrix longissima*

CPR Survey Team (2004)

Biogeography of diatoms and dinoflagellates using simple ecological trade-offs?

Niche separation of individual taxa?

Seasonal succession



Succession of diatoms and dinoflagellates using simple ecological trade-offs?

How does mixotrophy affect primary production and chlorophyll biomass?

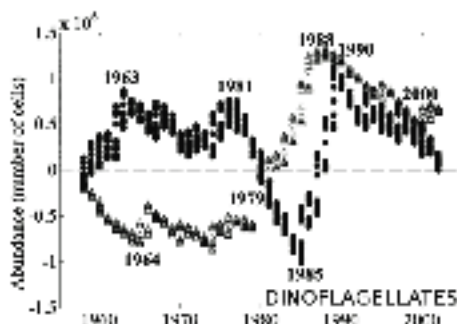
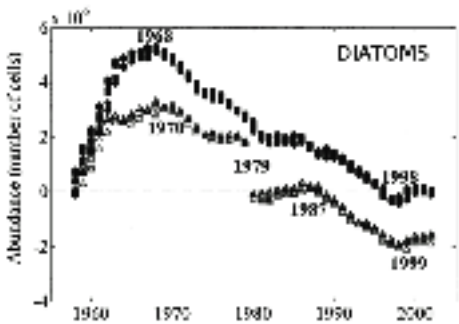
Figure by Andrew Barton

Interannual variability

Interannual variability of diatoms and dinoflagellates

Decline in diatoms and an increase in dinoflagellates with increasing chlorophyll

(1958-2002, Eastern basin only)



Leterme et al (2005)

Data

Biogeography

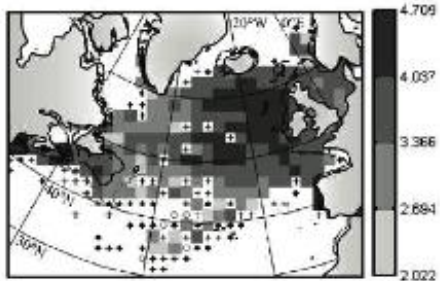


Fig. 57. *Thalassionema nitachtioides*
CPR Survey Team (2004)

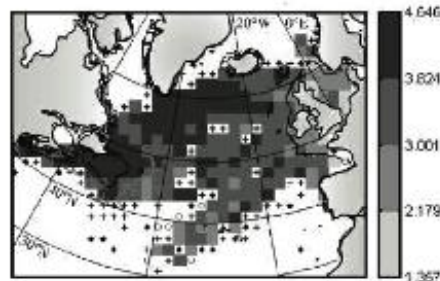


Fig. 59. *Thalassiothrix longissima*

Models

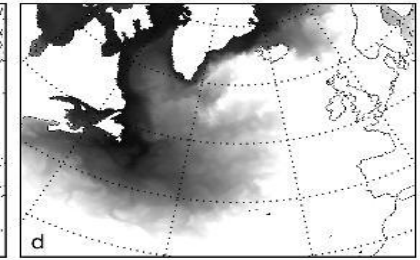
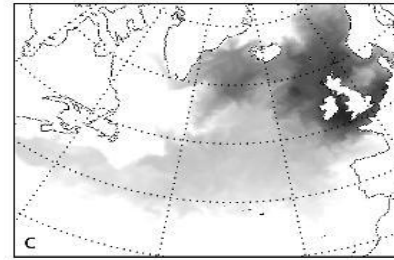


Figure by Oliver Jahn

Seasonal succession

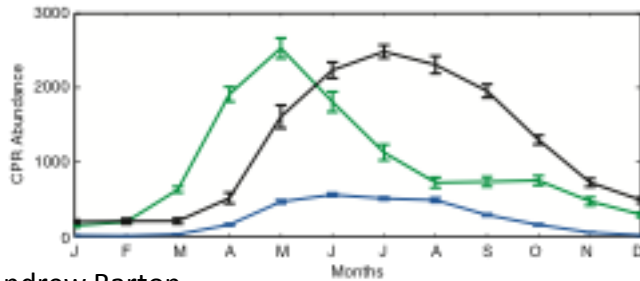
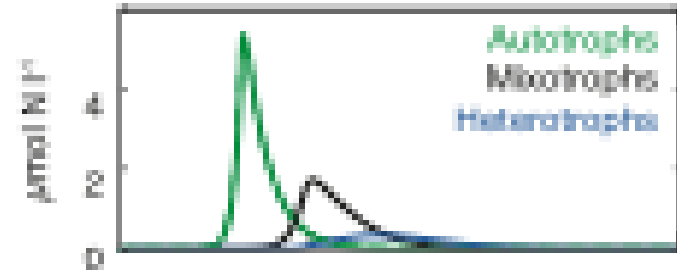
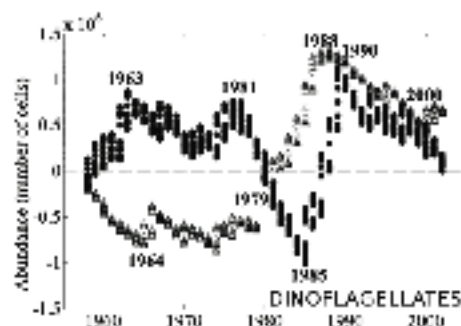
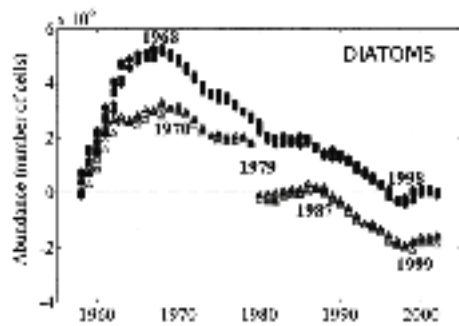


Figure by Andrew Barton



Interannual variability



???

Leterme et al (2005)