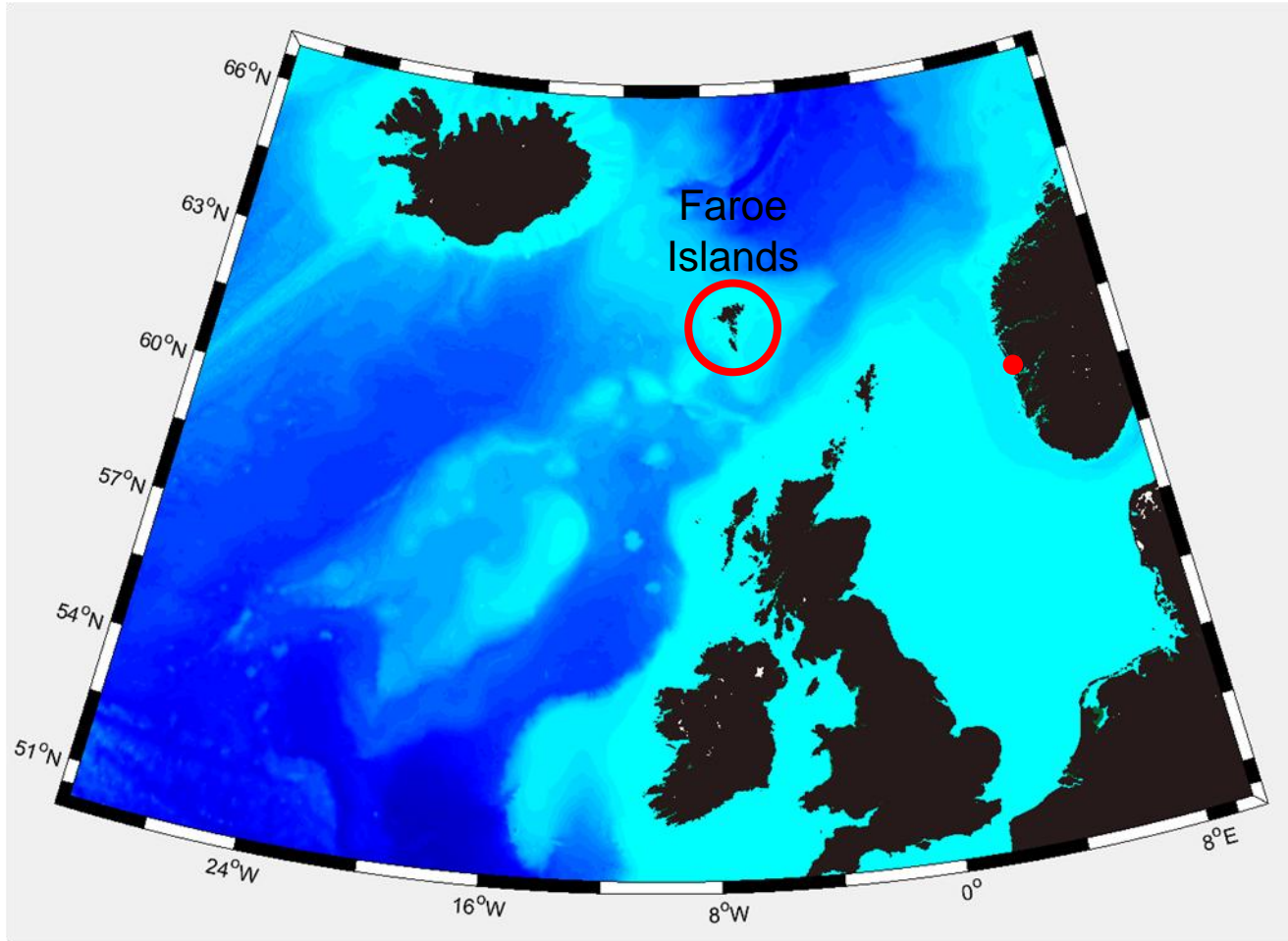


Zooplankton community structure and size spectra linked to phytoplankton and hydrographic features on the Faroe Shelf in spring

Sólvá Jacobsen, Eilif Gaard,
Karin M. H. Larsen, Sólvá K. Eliassen

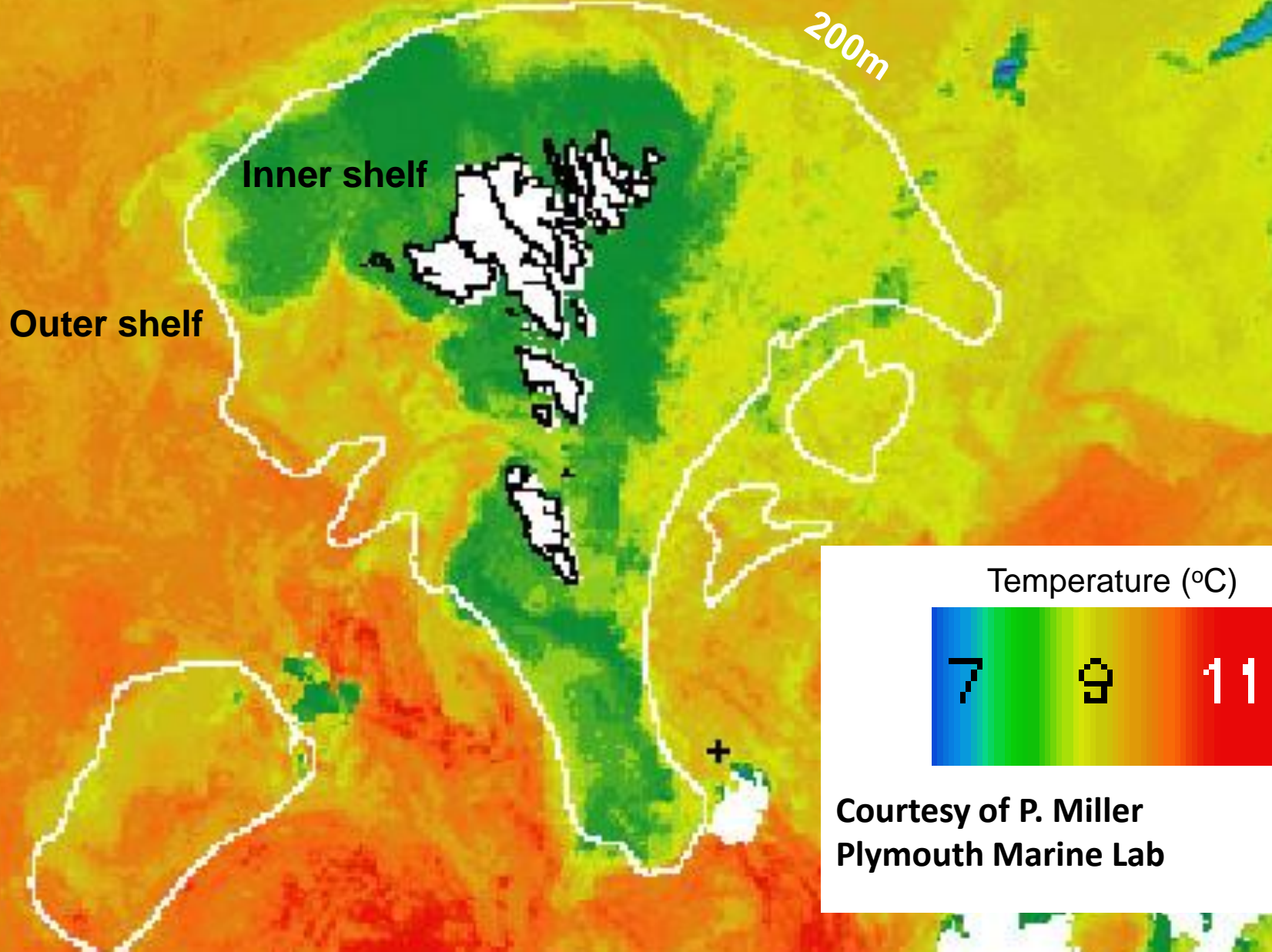


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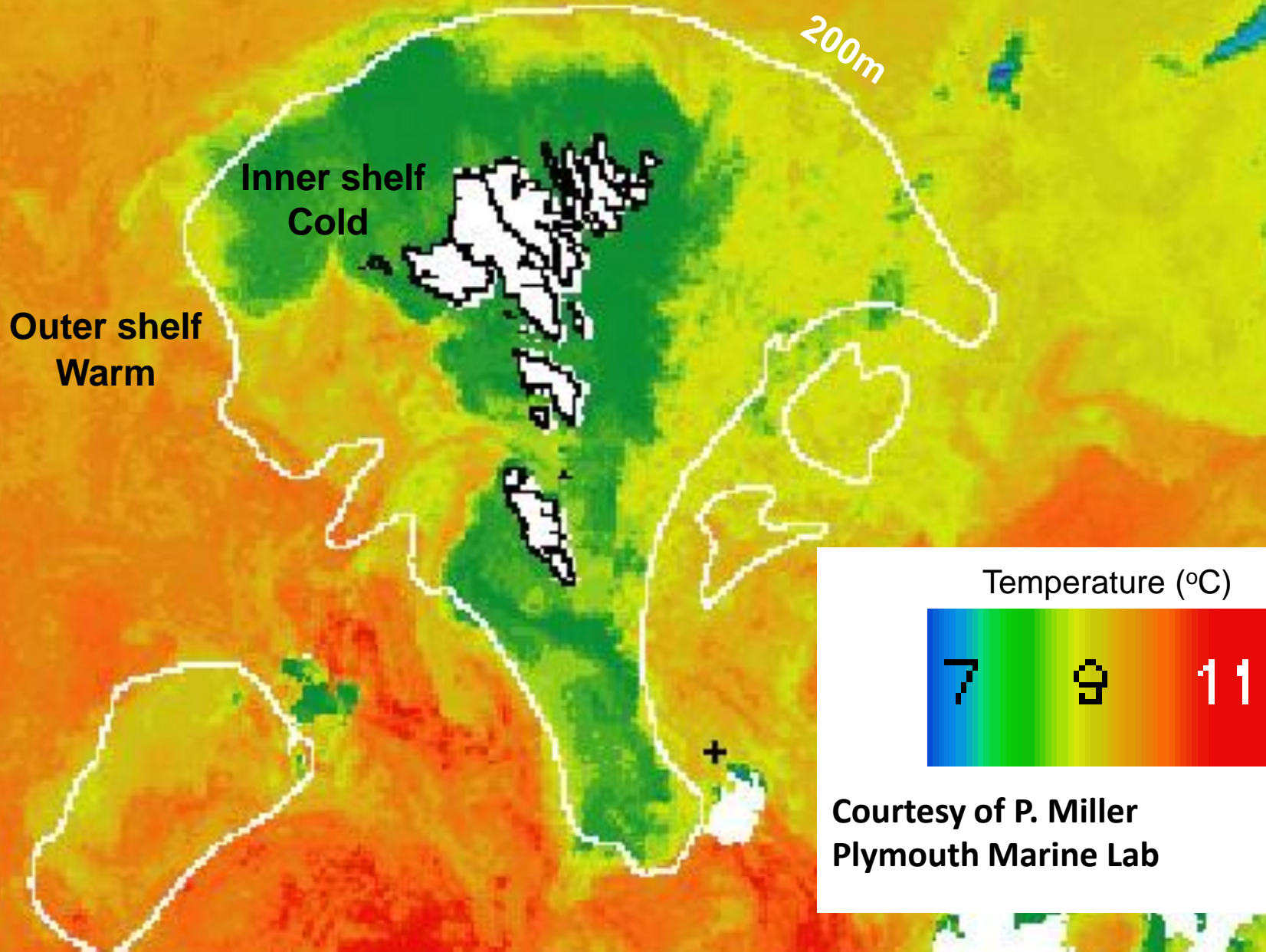


Background

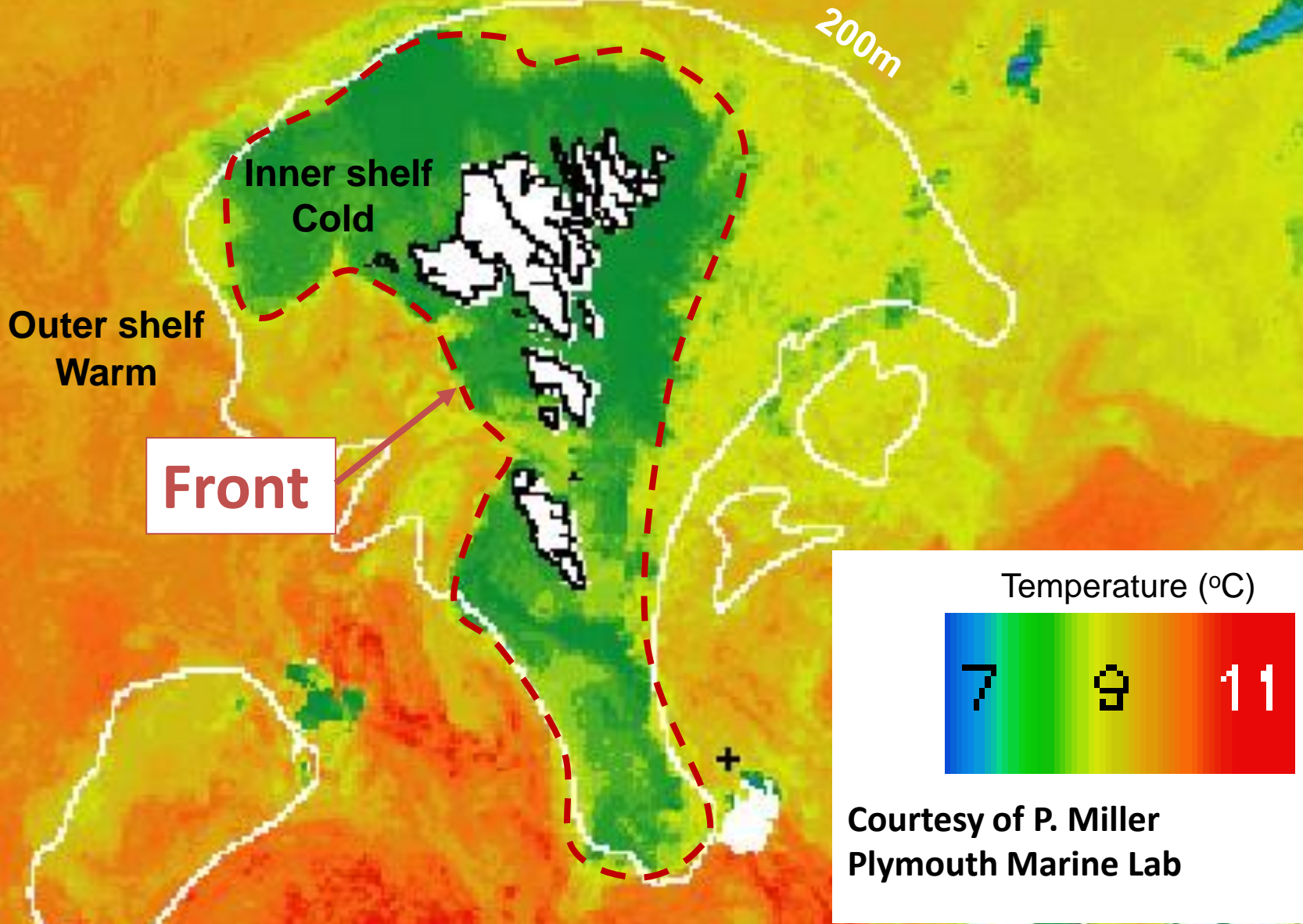
Sea surface temperature 18. April 2003



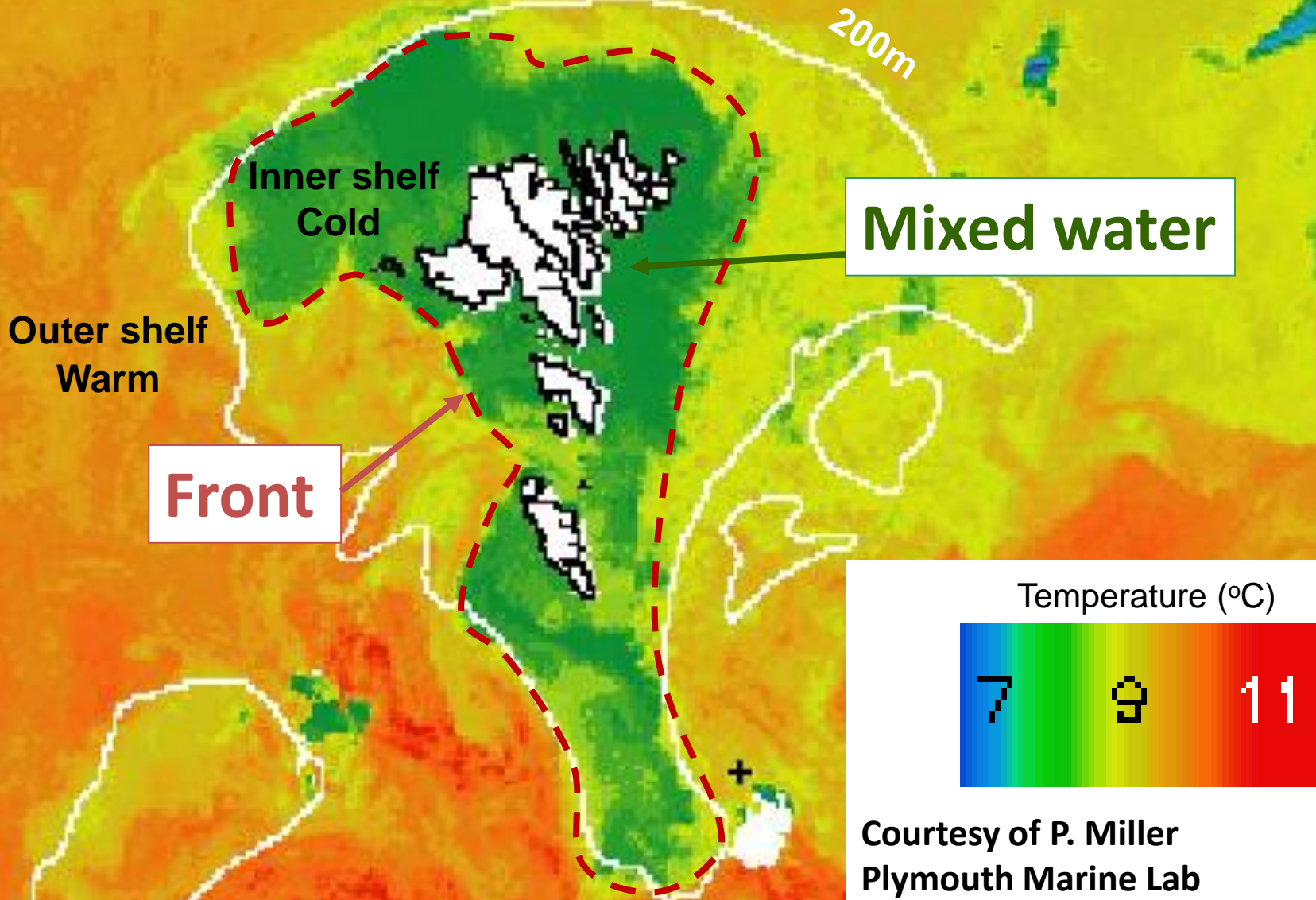
Sea surface temperature 18. April 2003



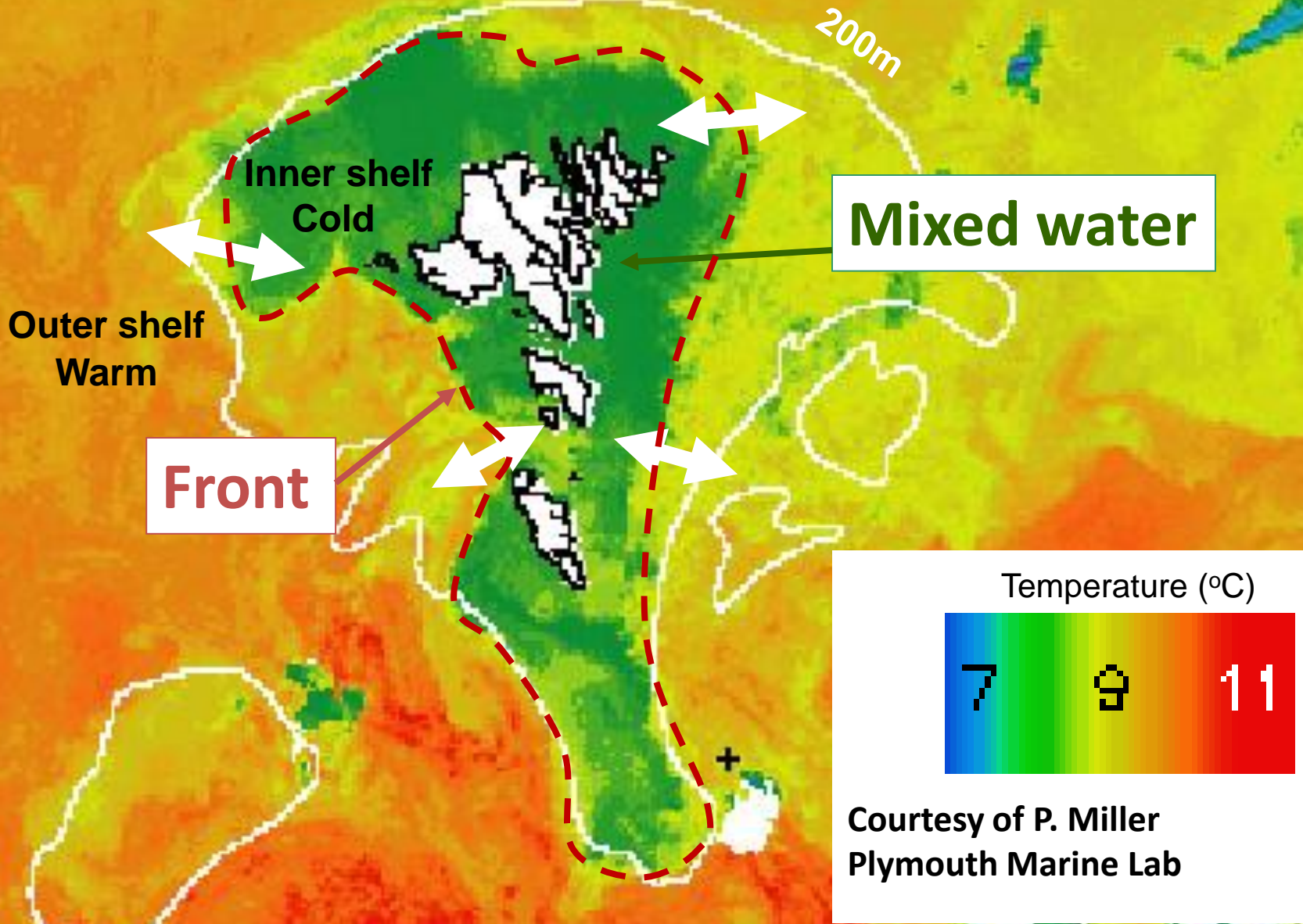
Sea surface temperature 18. April 2003



Sea surface temperature 18. April 2003

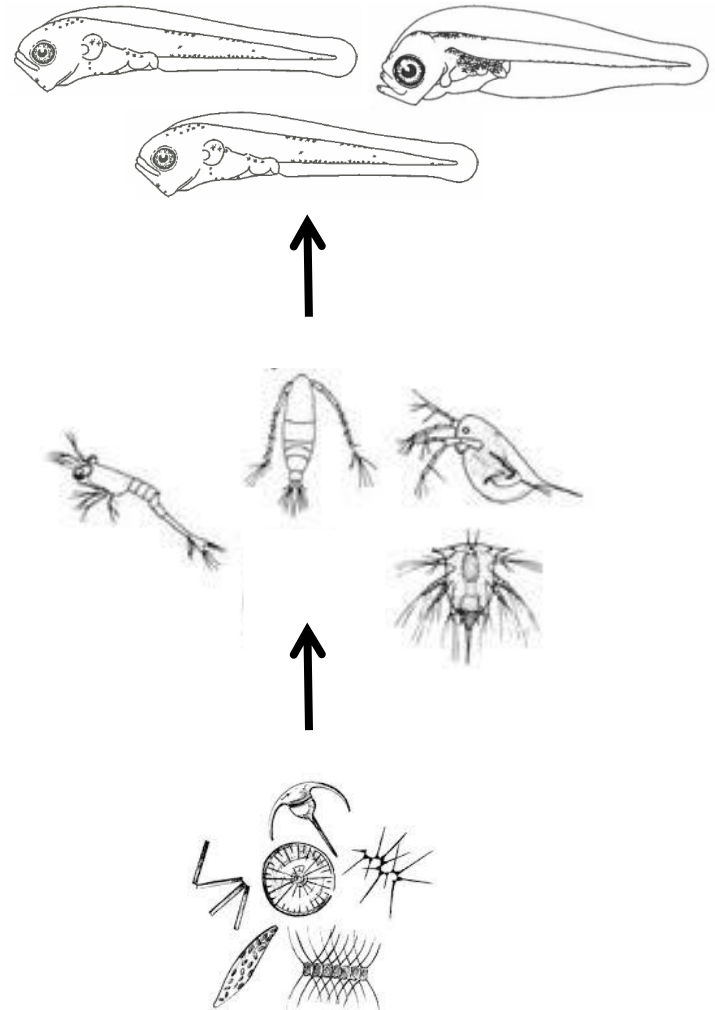


Sea surface temperature 18. April 2003



Inner shelf in late April

- Inner Faroe shelf ecosystem is bottom-up controlled
- First-feeding fish larvae feed on zooplankton



Aim

- What controls the zooplankton community and size structure on the inner Faroe shelf in late April?

Sampling

- Annual cruise in late April 1997-2015 (except 2002 and 2010)
- Temperature and salinity (CTD)
- Phytoplankton (fluorometer)
- Zooplankton (Bongo 100 μm)
- Total: 508 hydrographic stations and 238 zooplankton stations

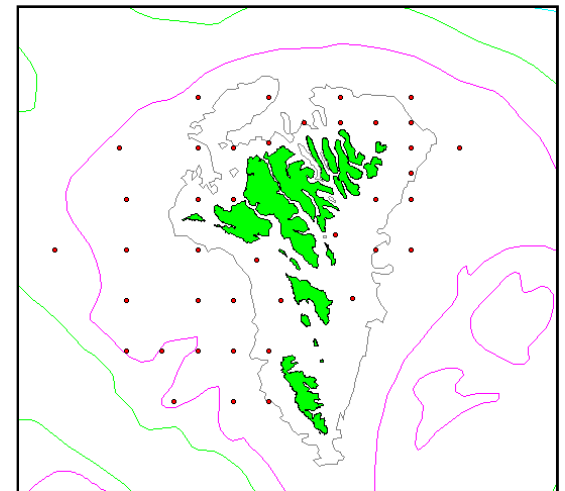
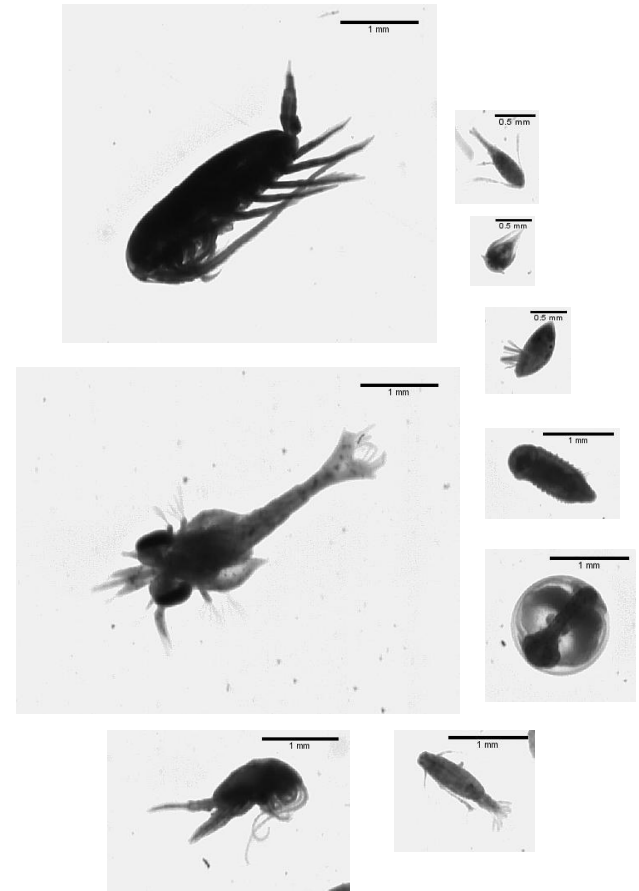
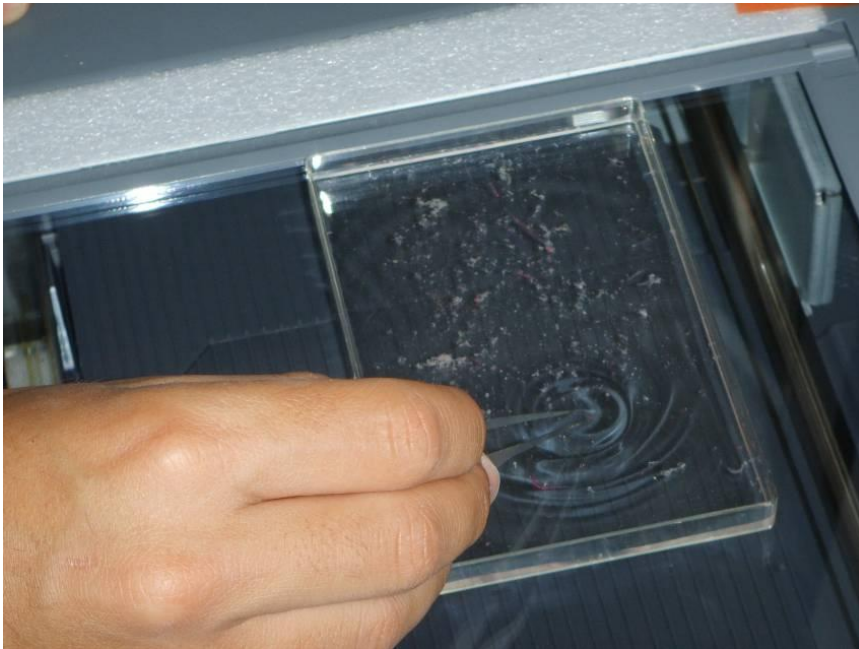


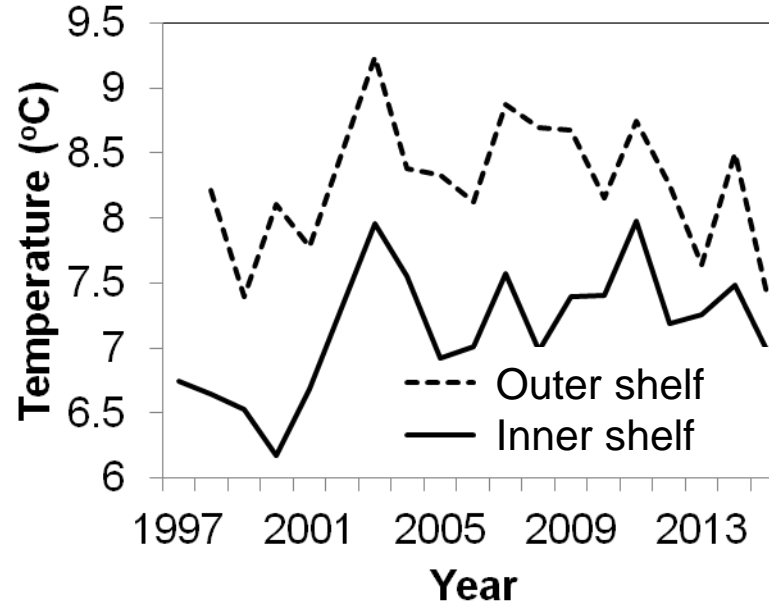
Image analysis

- Taxonomic classification
- Community size spectra



Temperature April 1997-2015

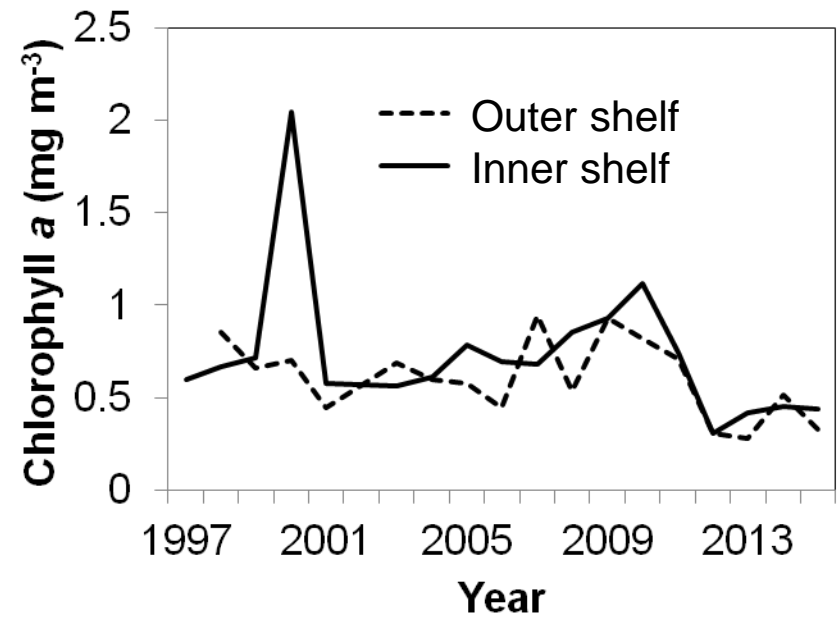
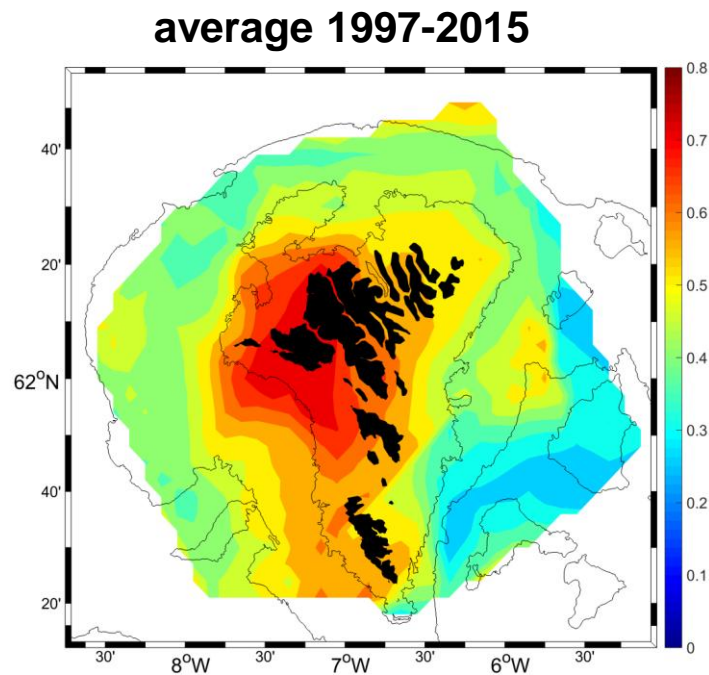
- Average 0-50 m



Chlorophyll *a*

April 1997-2015

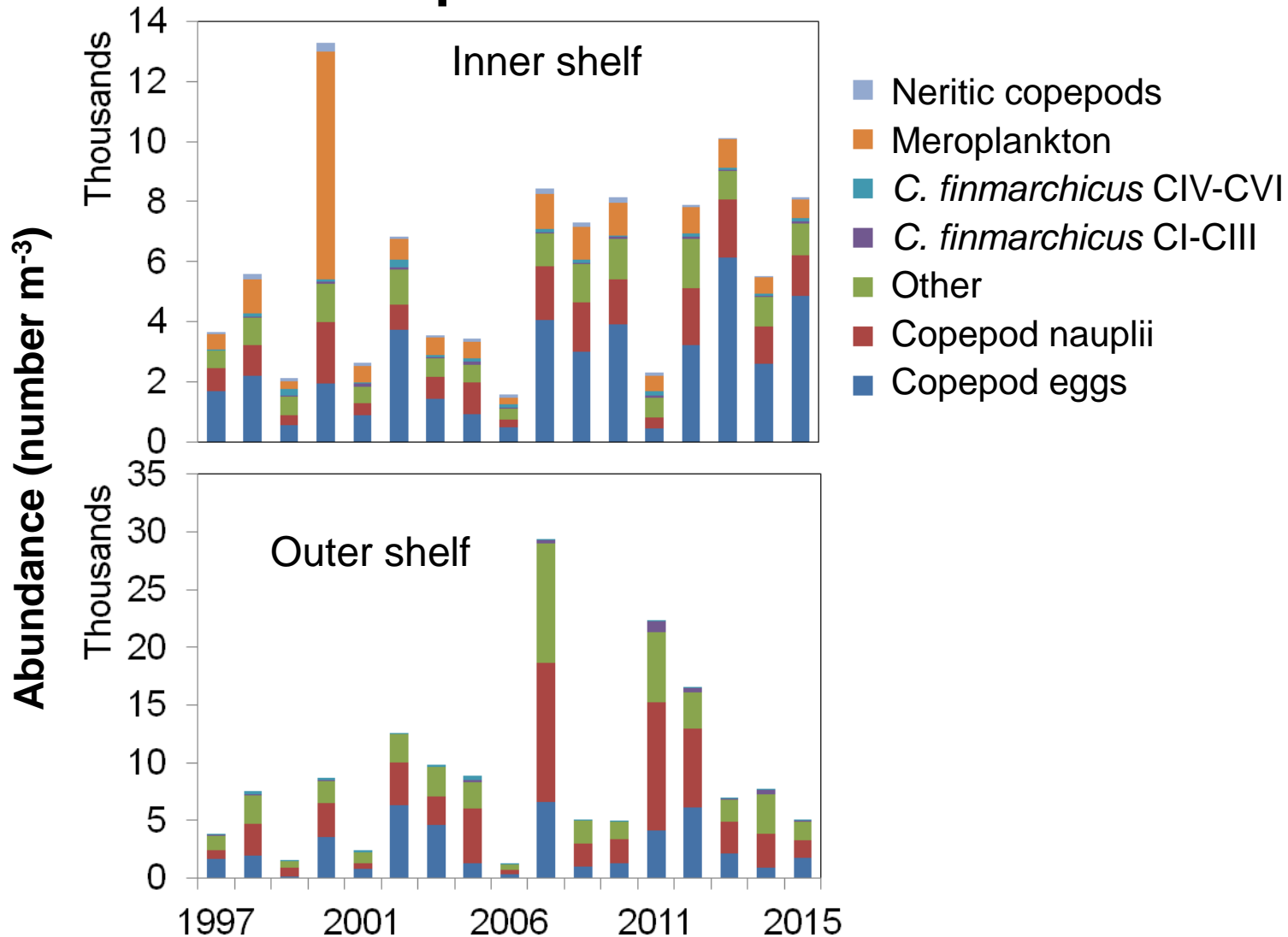
- Average chlorophyll *a* 0-50 m



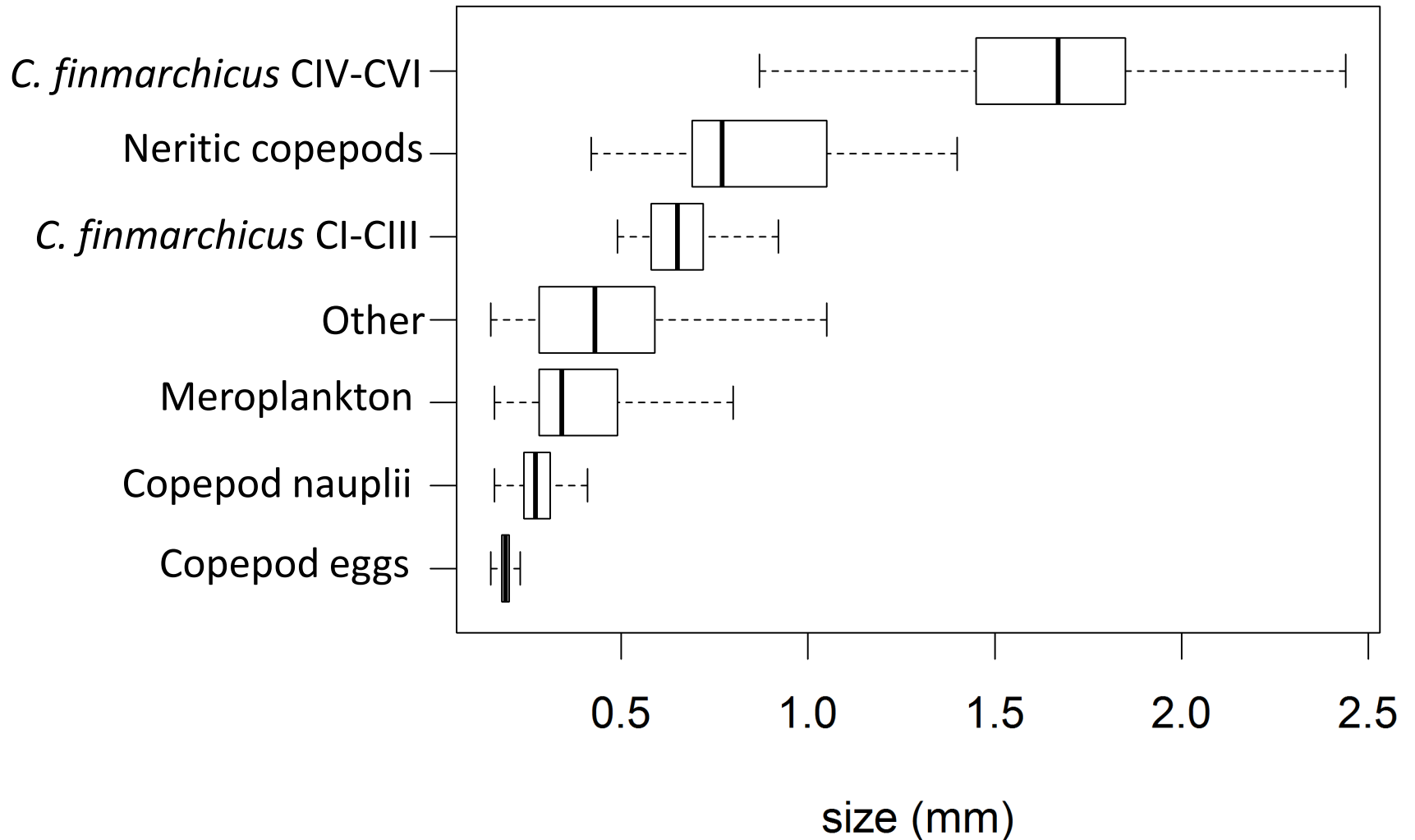
Results

Zooplankton

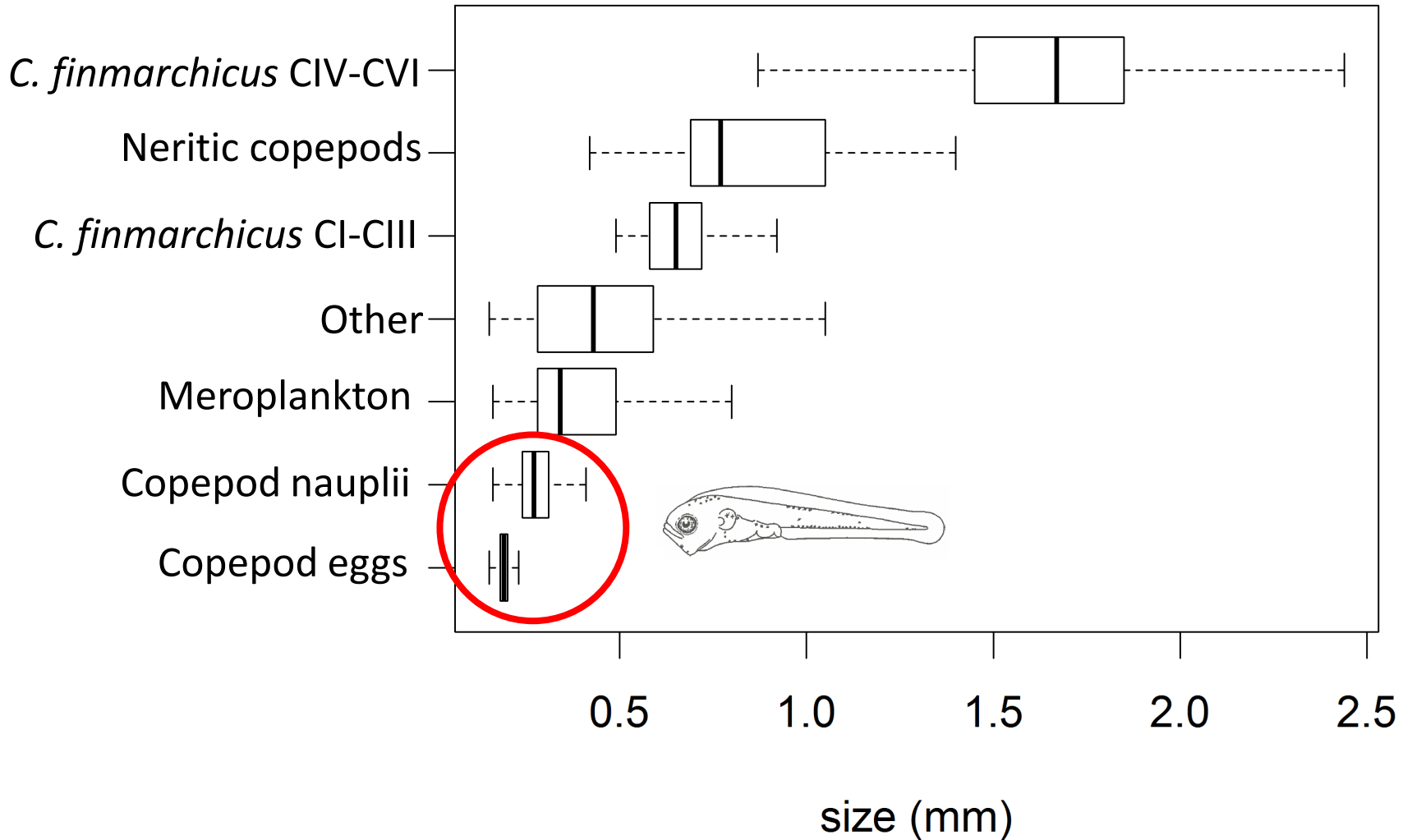
April 1997-2015



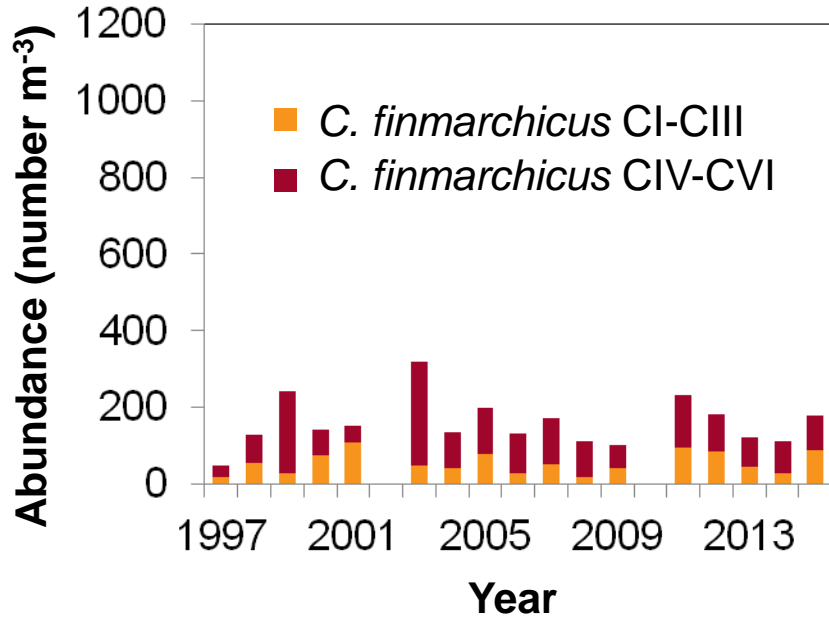
Zooplankton groups on inner shelf plotted by size April 1997-2015



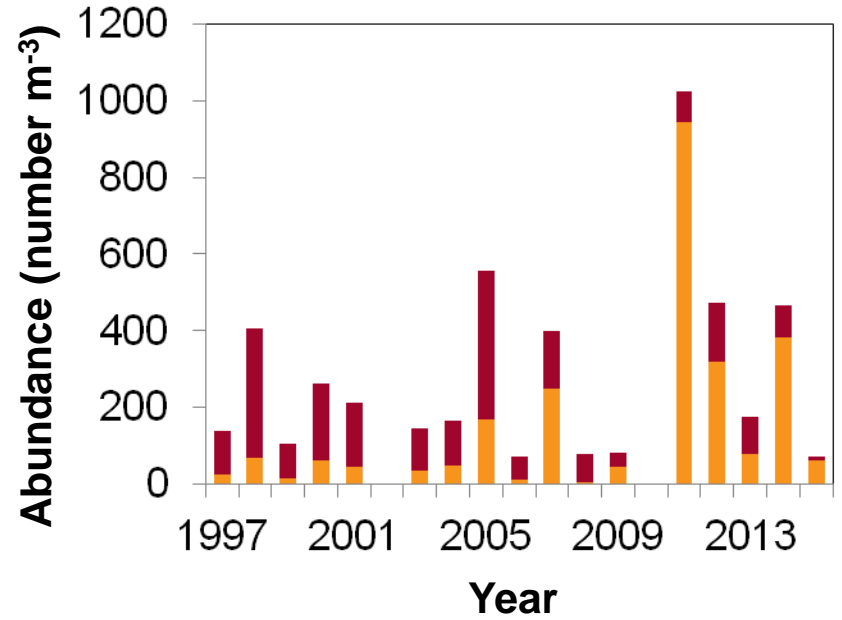
Zooplankton groups on inner shelf plotted by size April 1997-2015



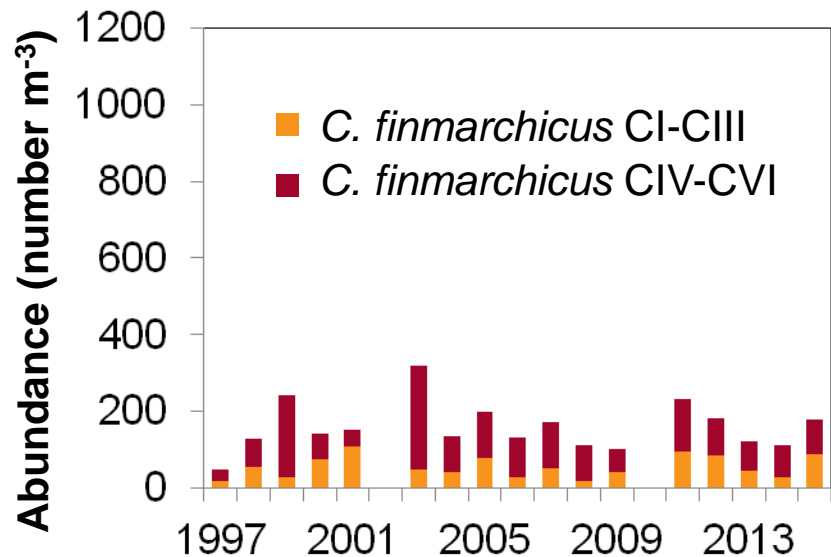
Inner shelf



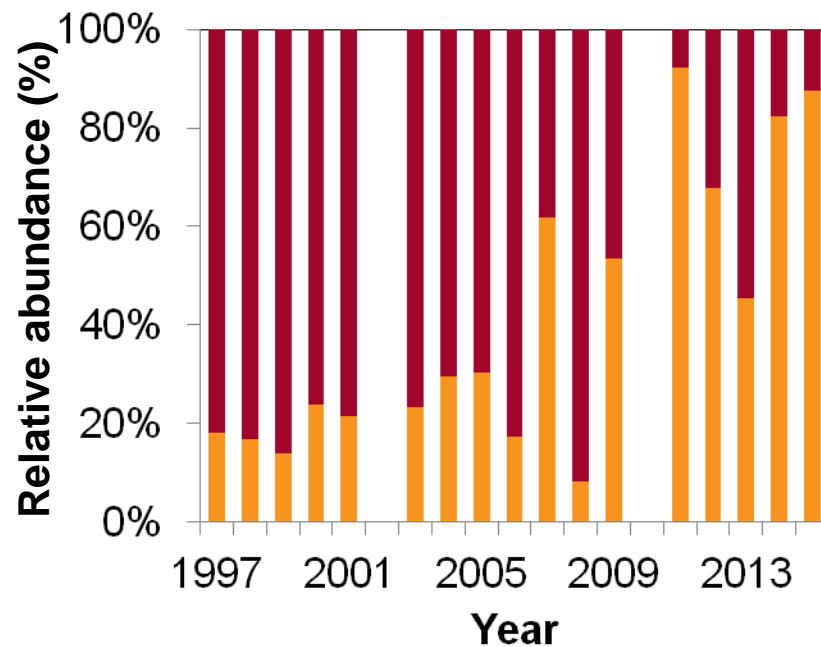
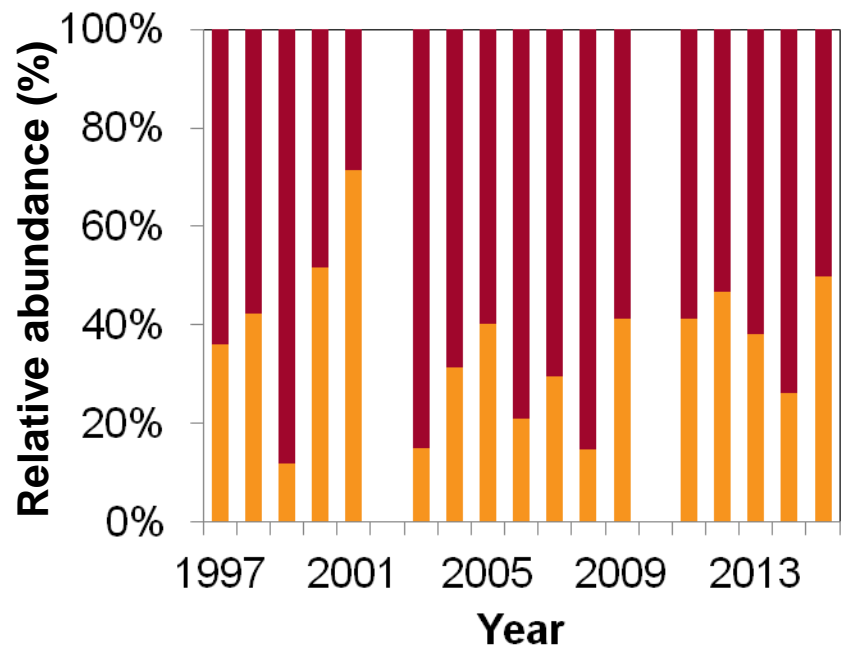
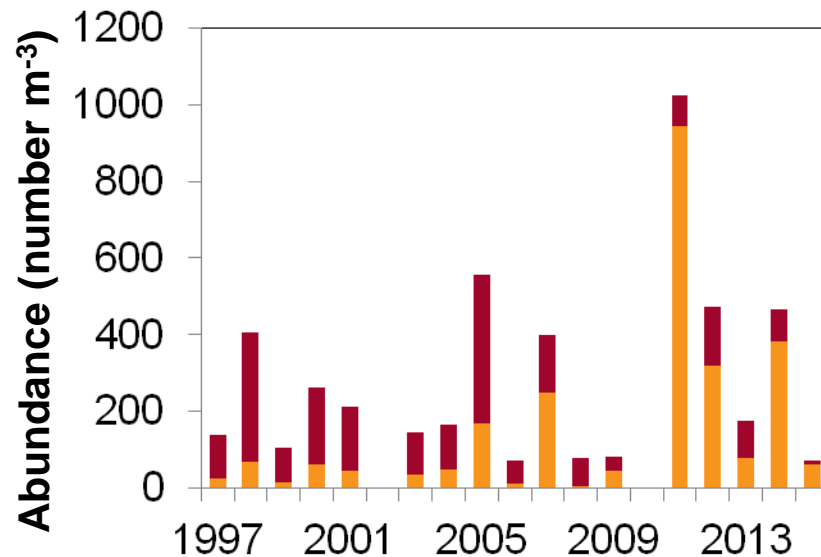
Outer shelf



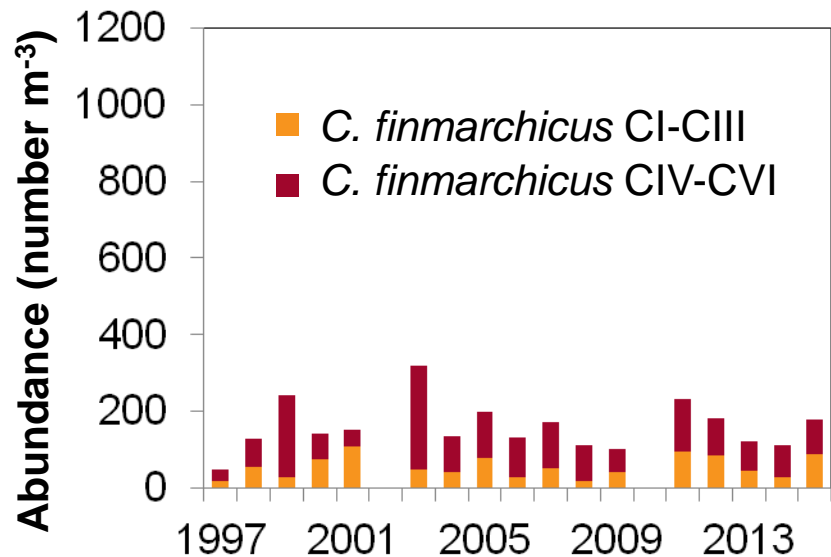
Inner shelf



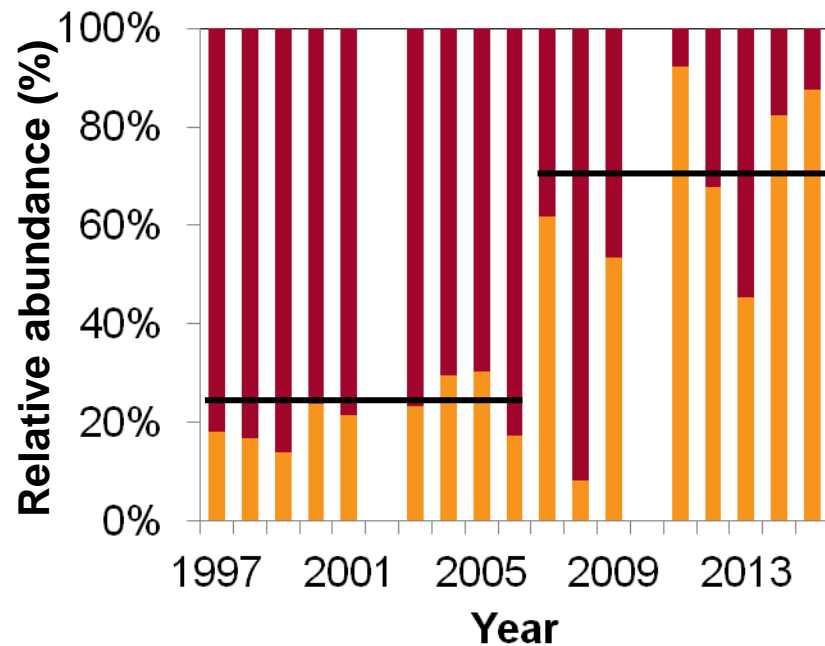
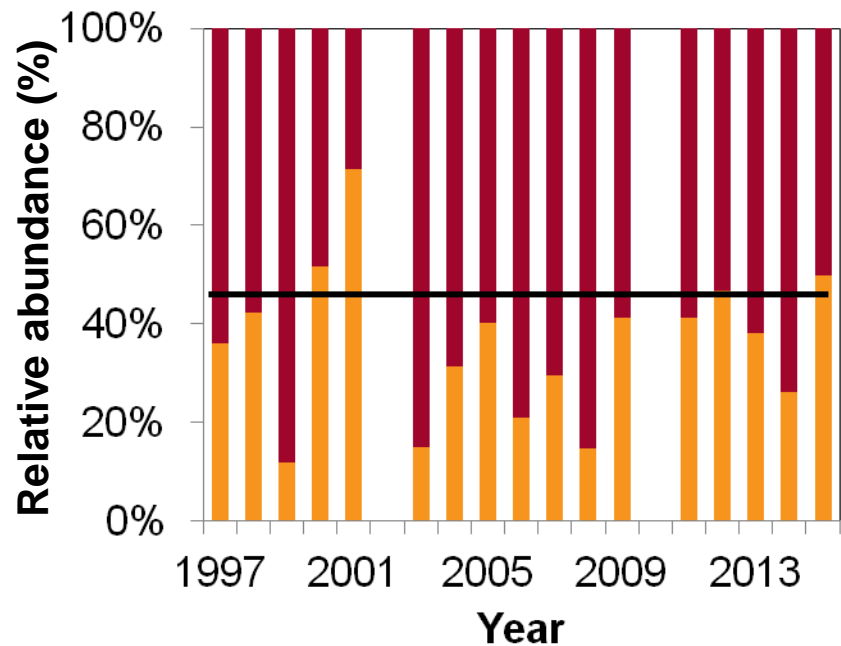
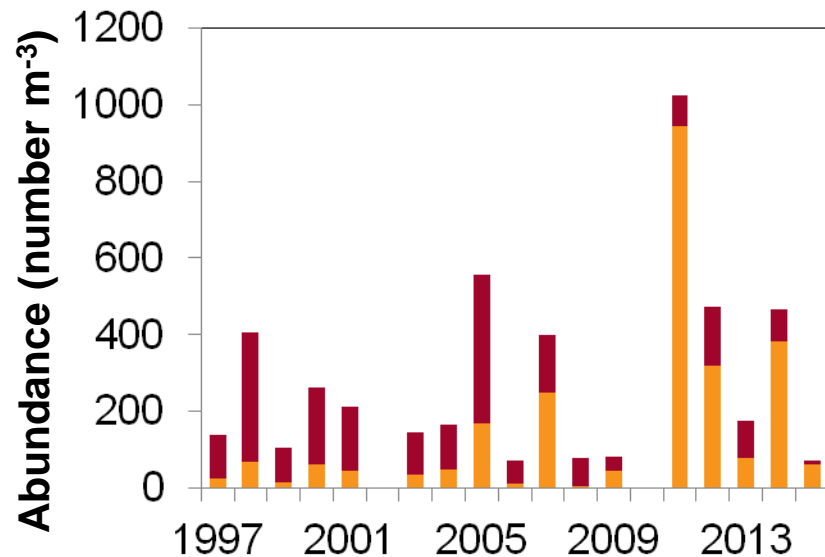
Outer shelf



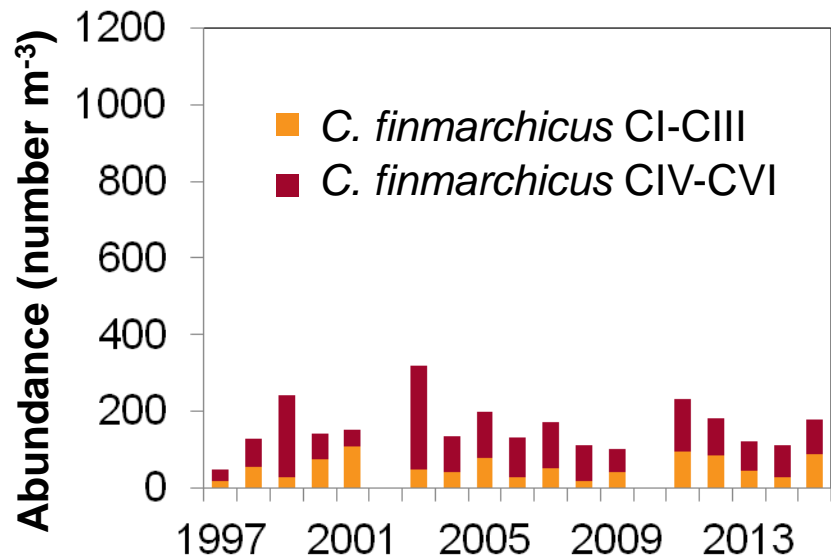
Inner shelf



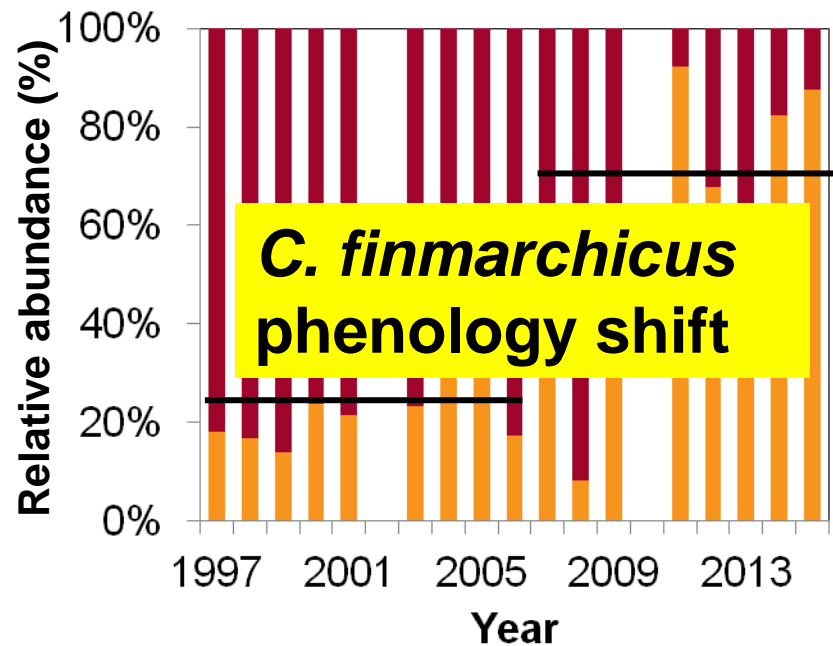
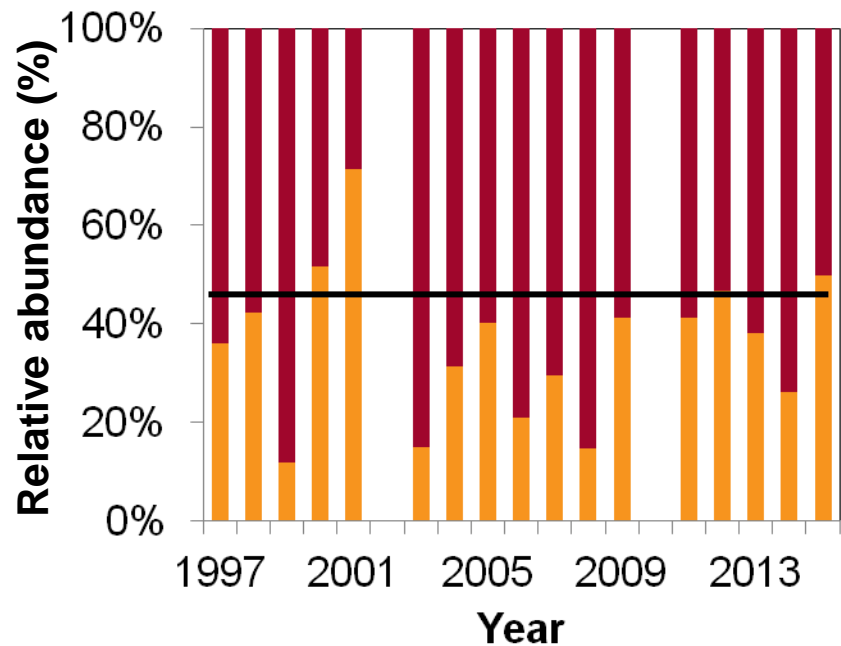
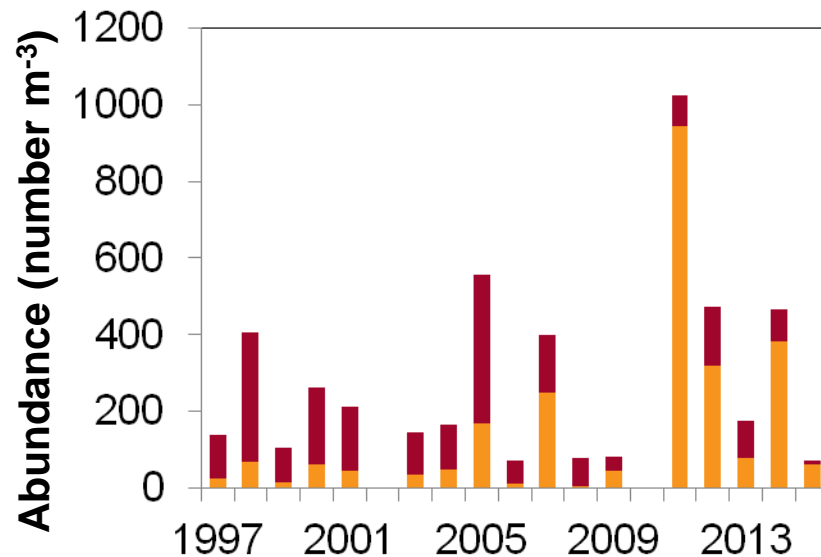
Outer shelf



Inner shelf

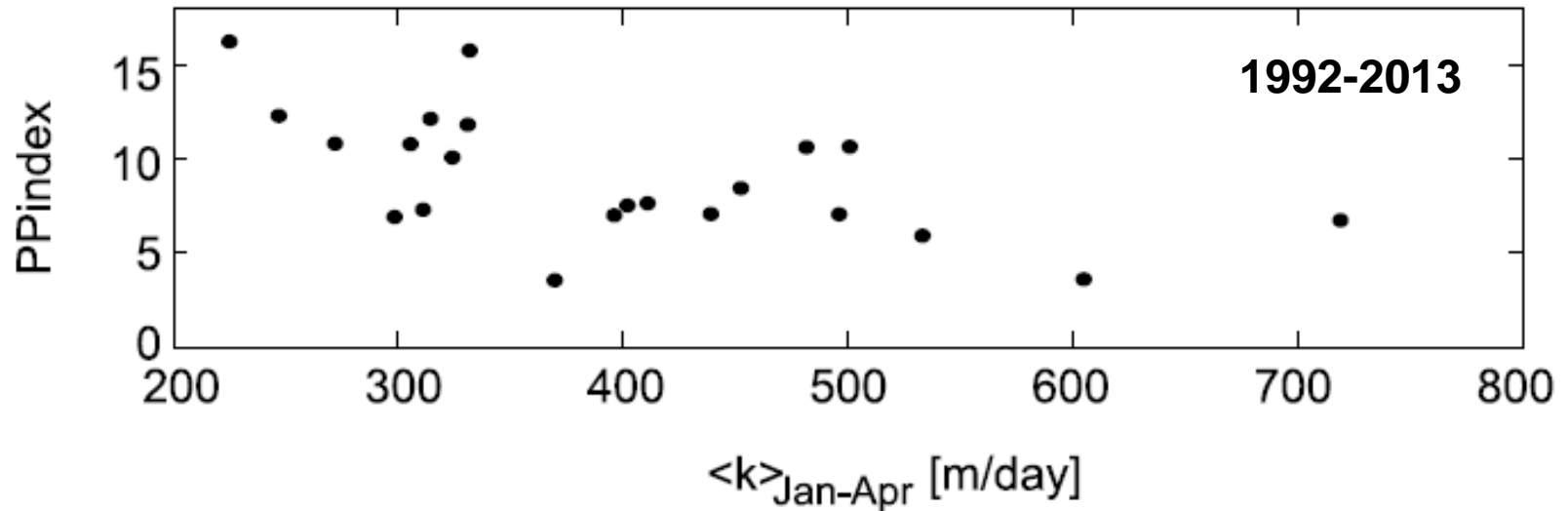


Outer shelf

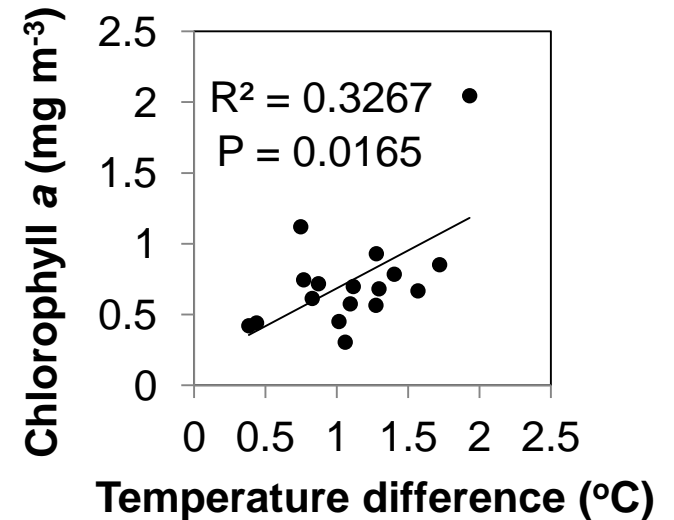
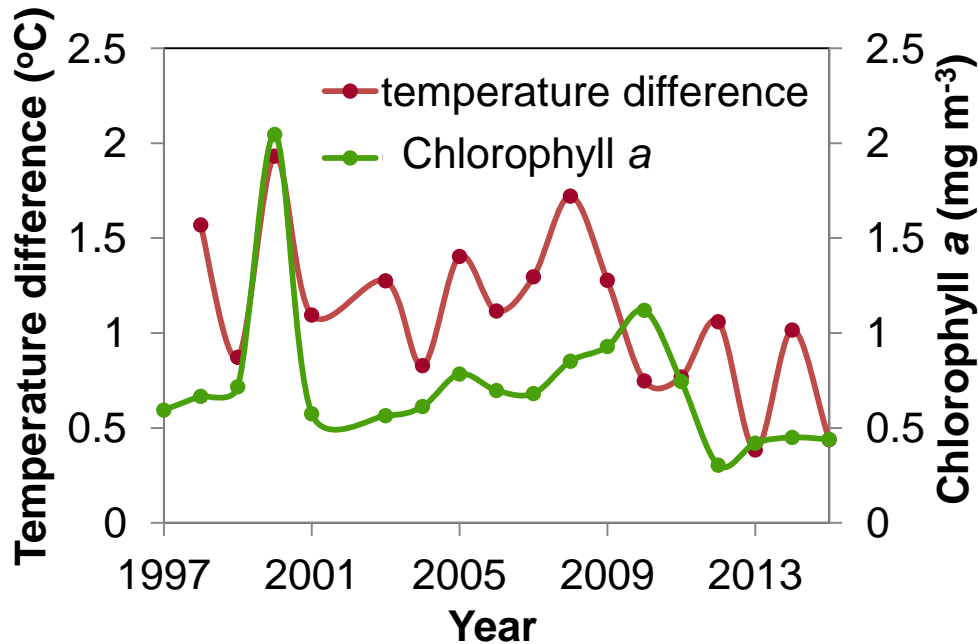


Relationship between PP-index and modelled exchange rate between the inner and outer shelf water masses

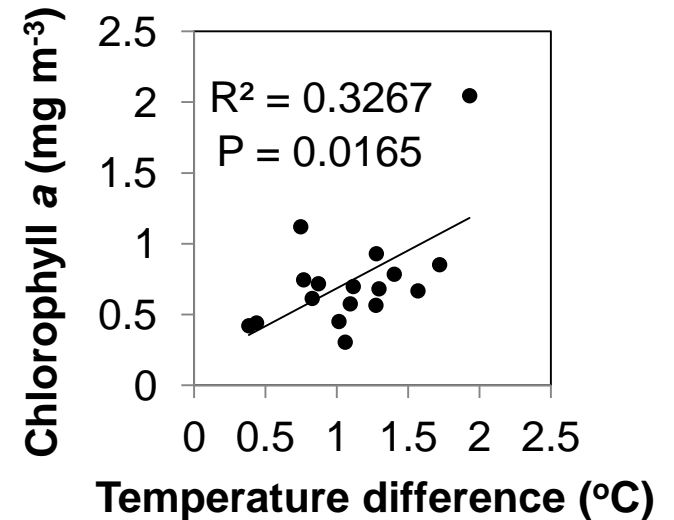
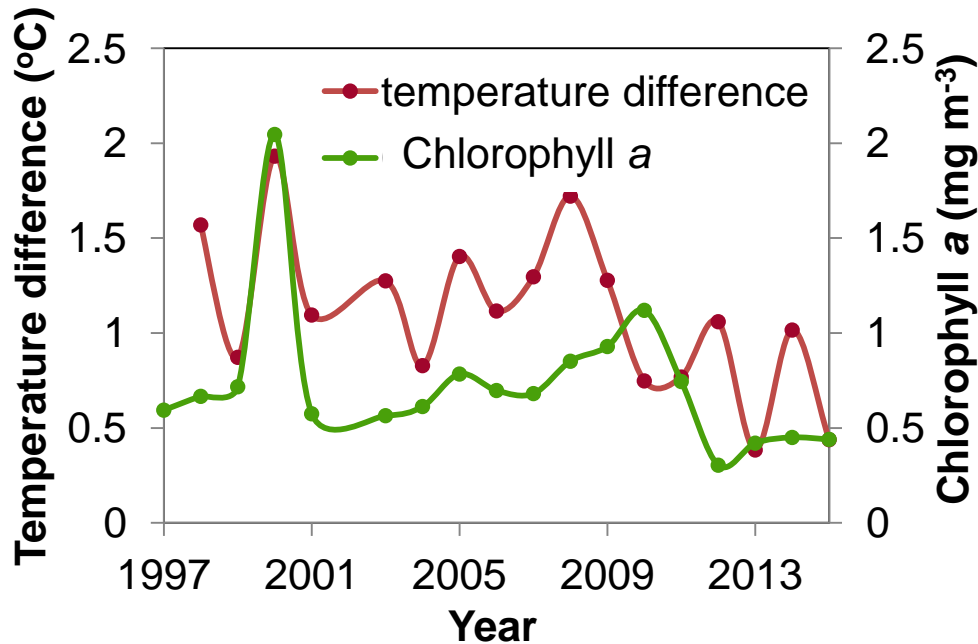
Eliassen *et al.* 2015



Relationship between chl. a and temperature difference between the inner and outer shelf water masses

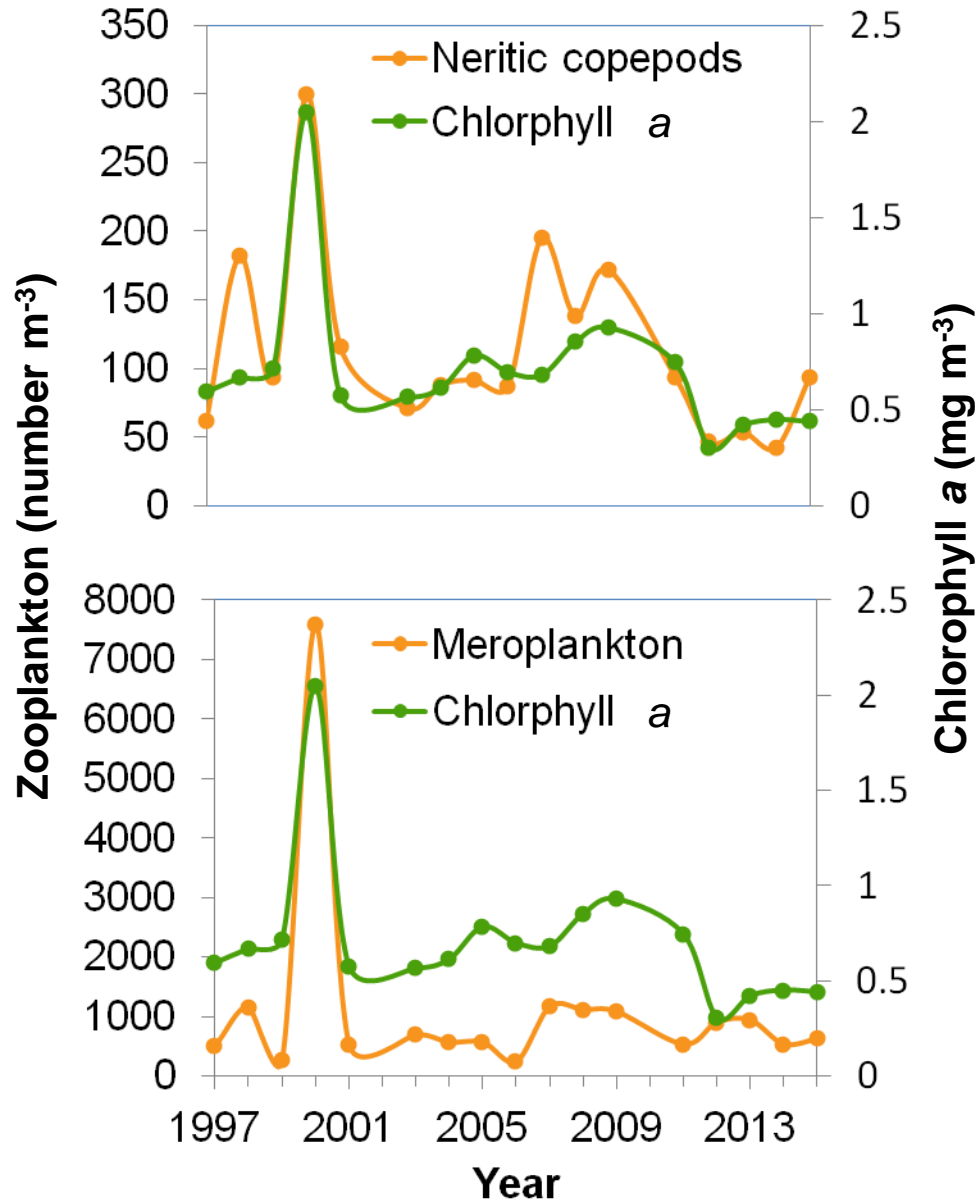


Relationship between chl. a and temperature difference between the inner and outer shelf water masses

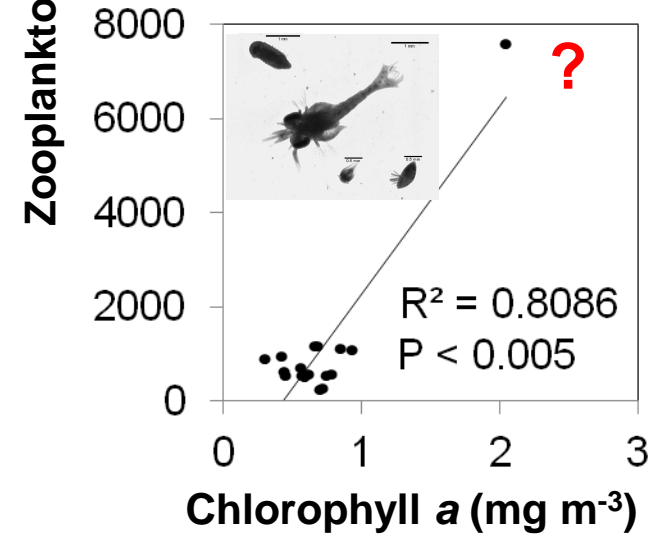
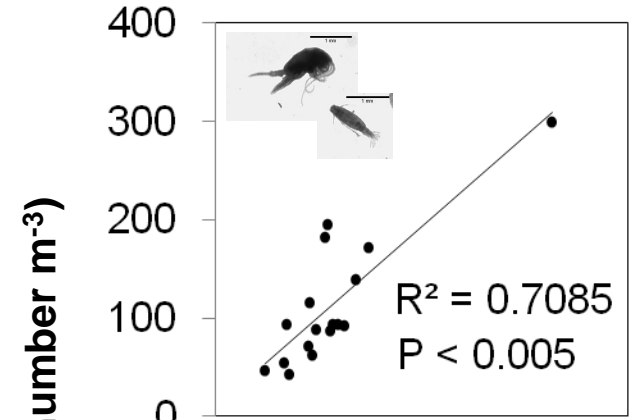
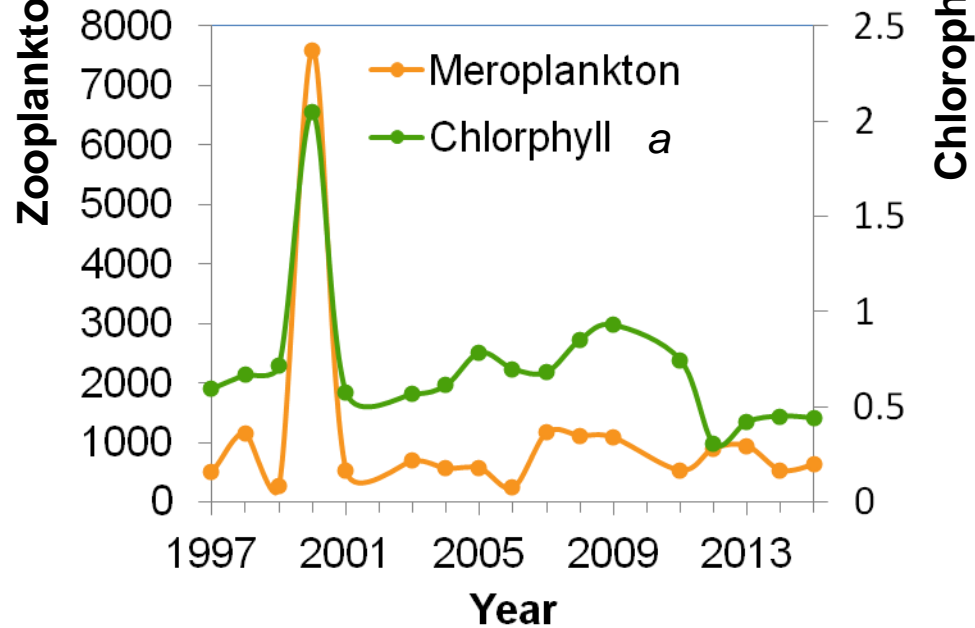
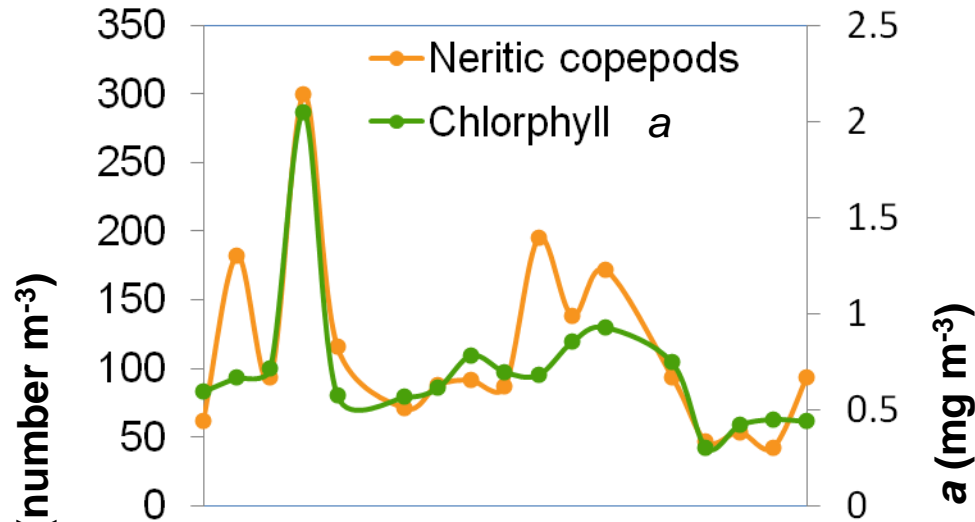


Positive relationship between chl. a concentration and temperature difference between inner and outer shelf

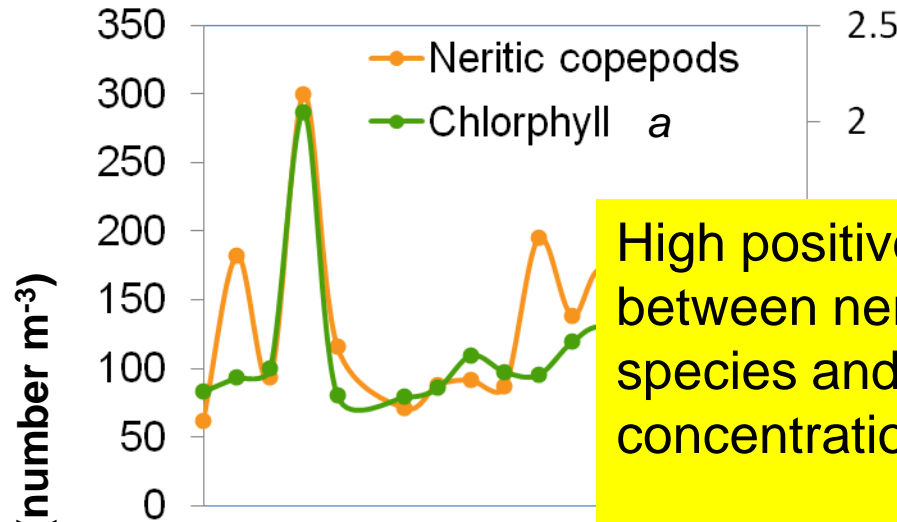
Relationship between local zooplankton groups and chlorophyll *a* on inner shelf



Relationship between local zooplankton groups and chlorophyll a on inner shelf



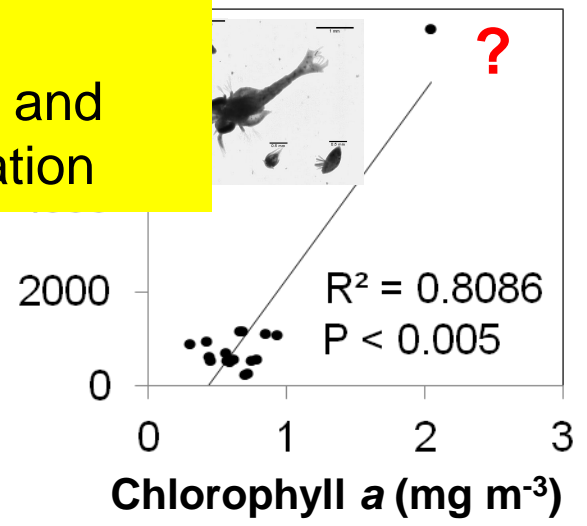
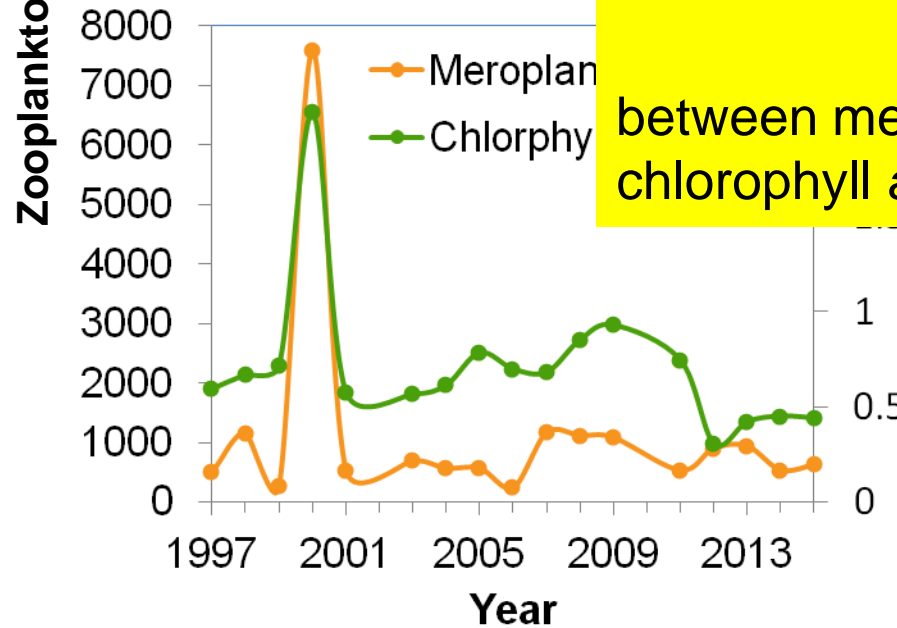
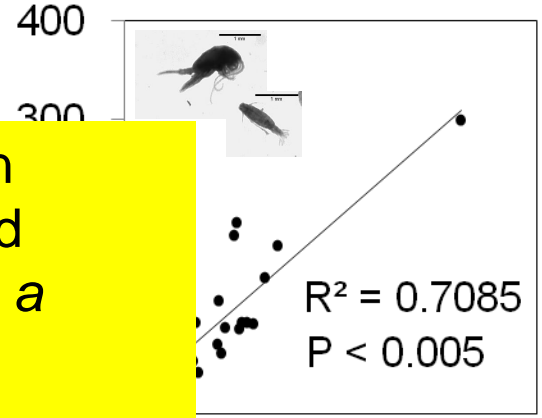
Relationship between local zooplankton groups and chlorophyll a on inner shelf



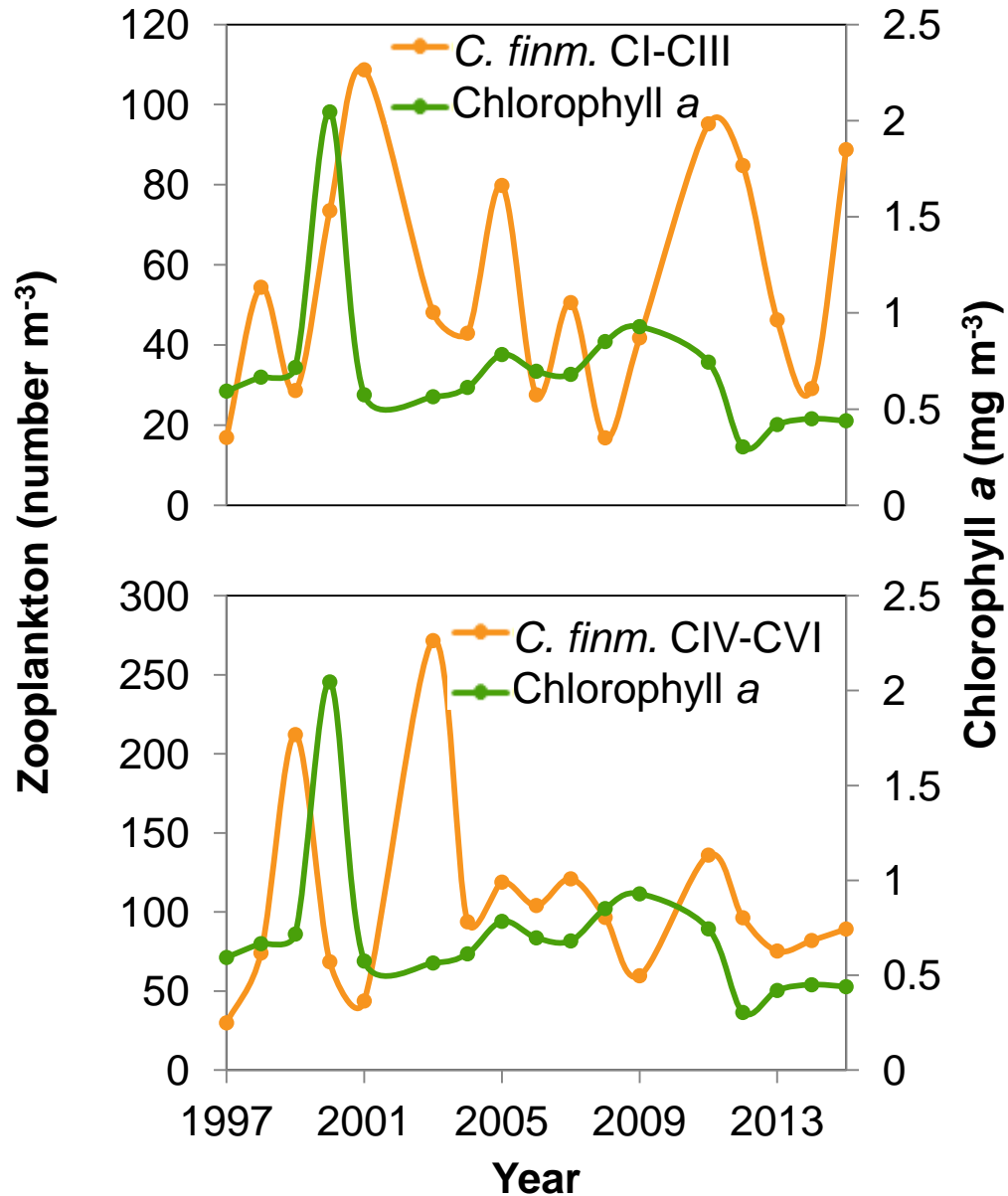
High positive correlation between neritic copepod species and chlorophyll a concentration

and

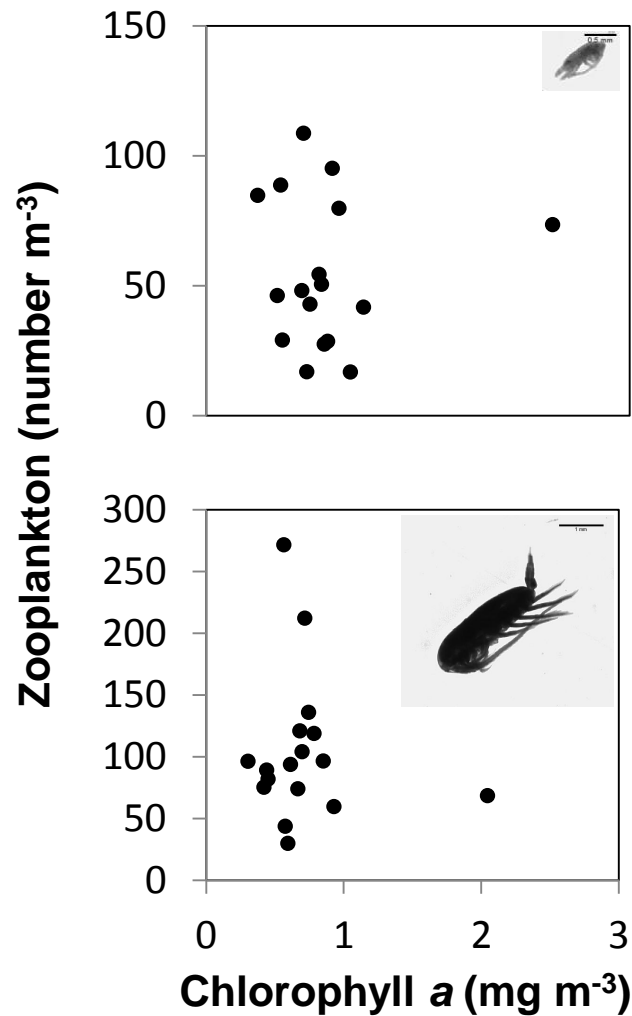
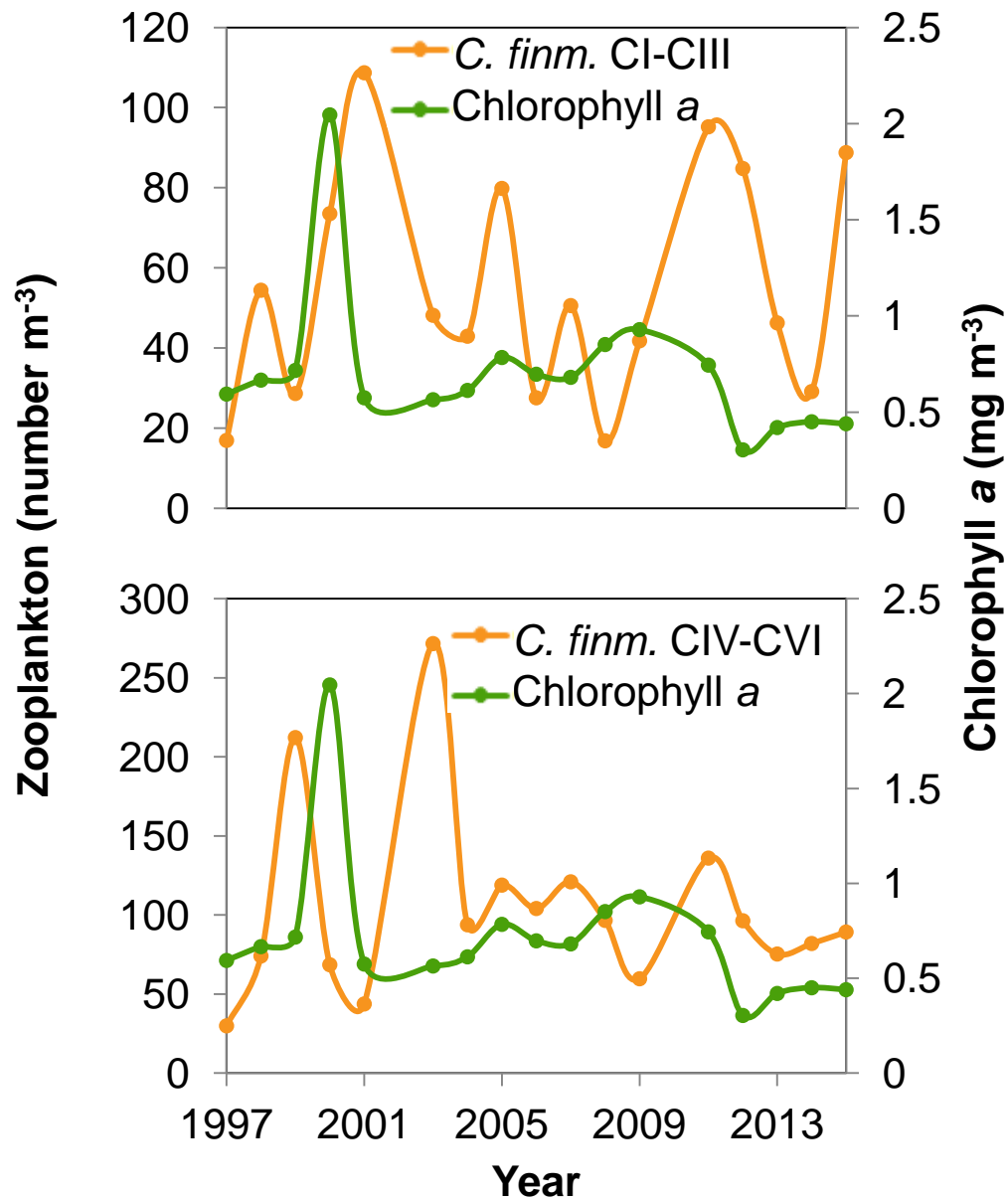
between meroplankton and chlorophyll a concentration



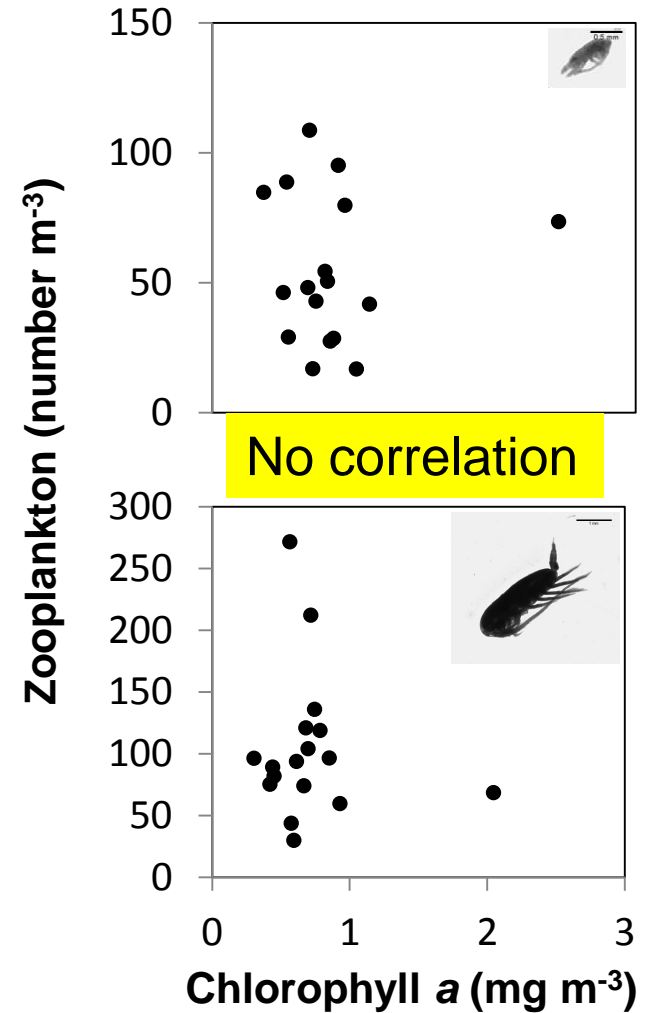
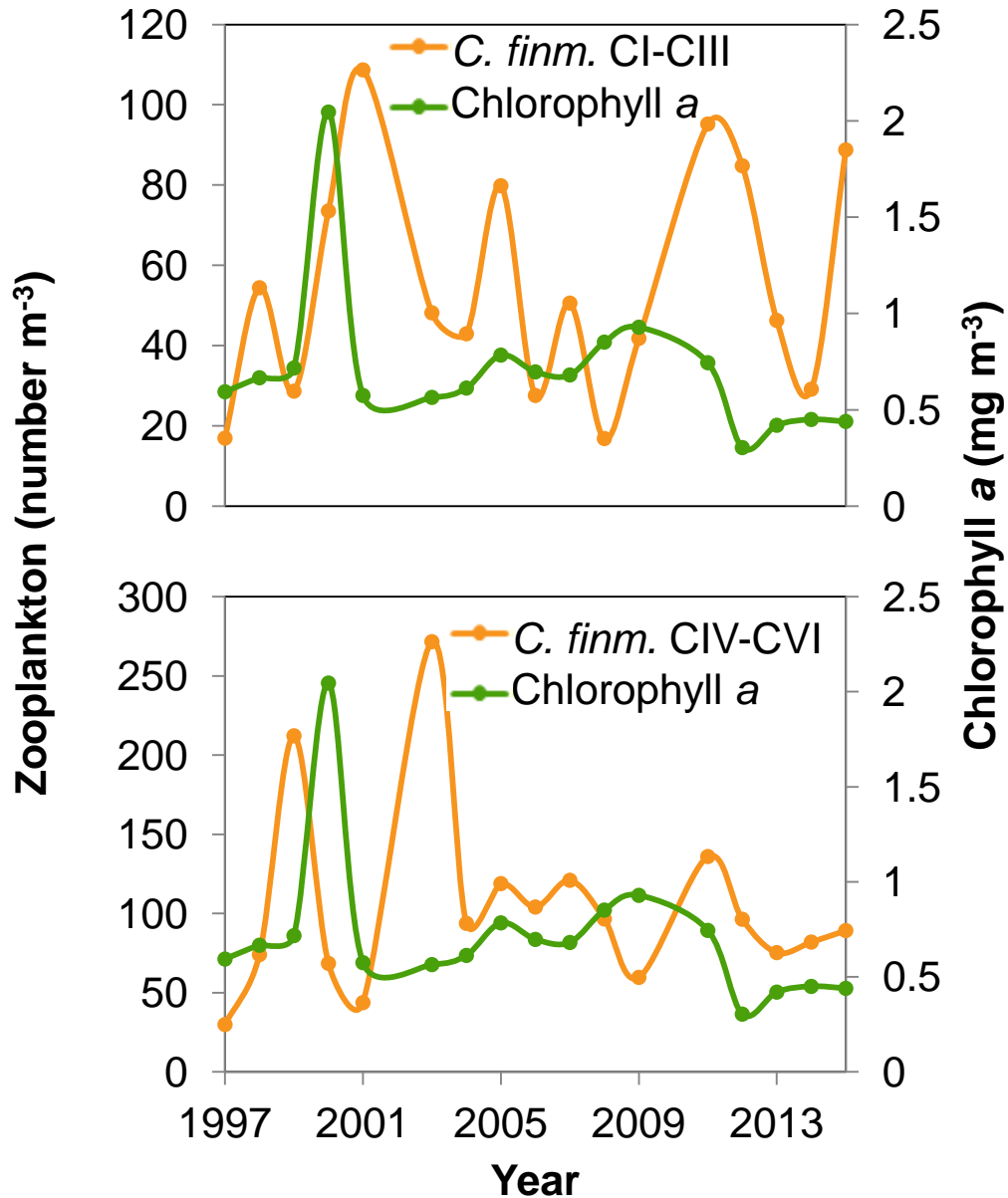
Relationship between *C. finmarchicus* and chlorophyll *a* on inner shelf



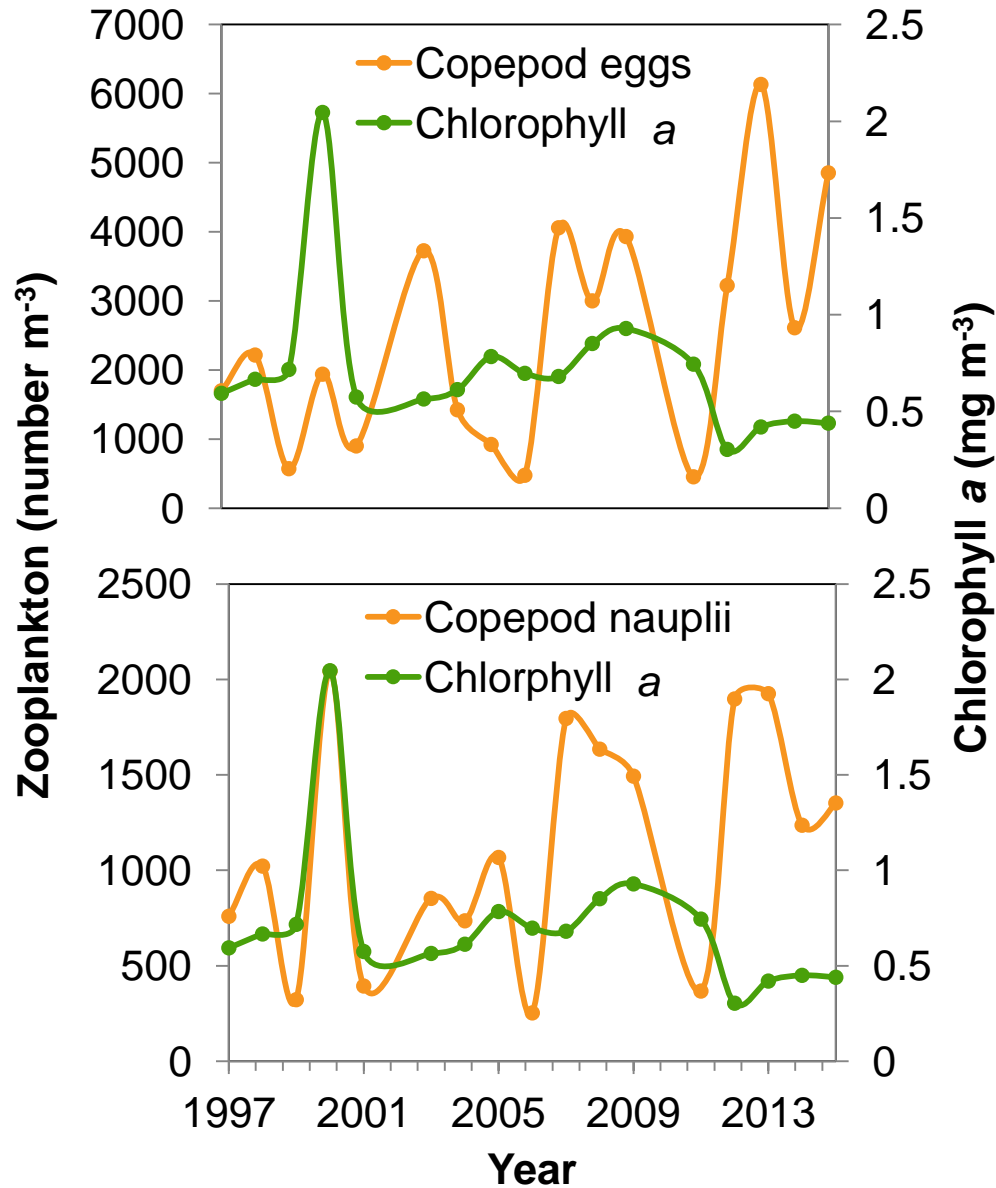
Relationship between *C. finmarchicus* and chlorophyll *a* on inner shelf



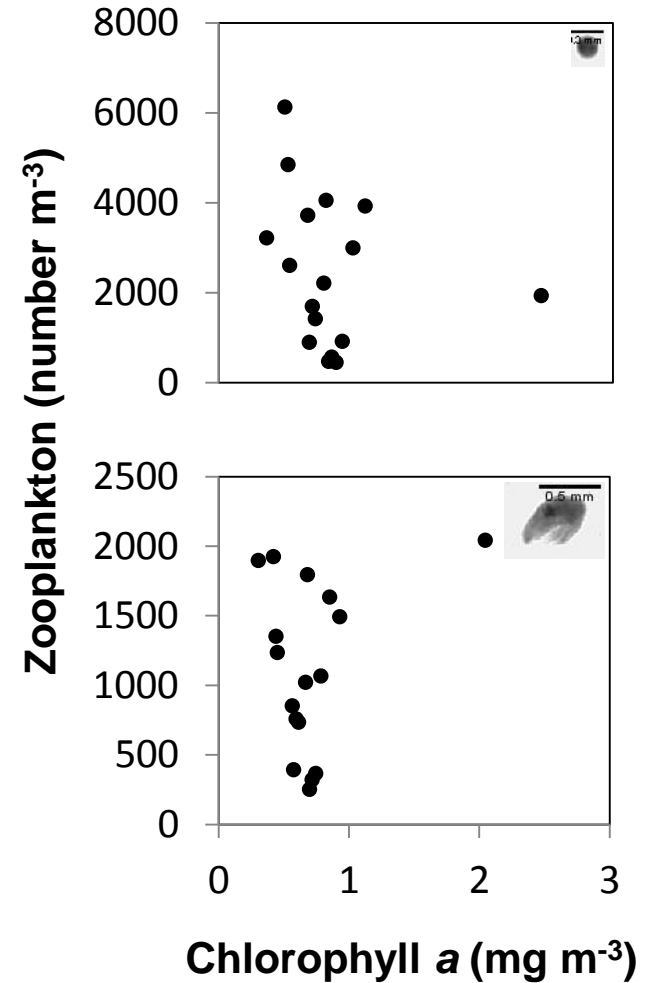
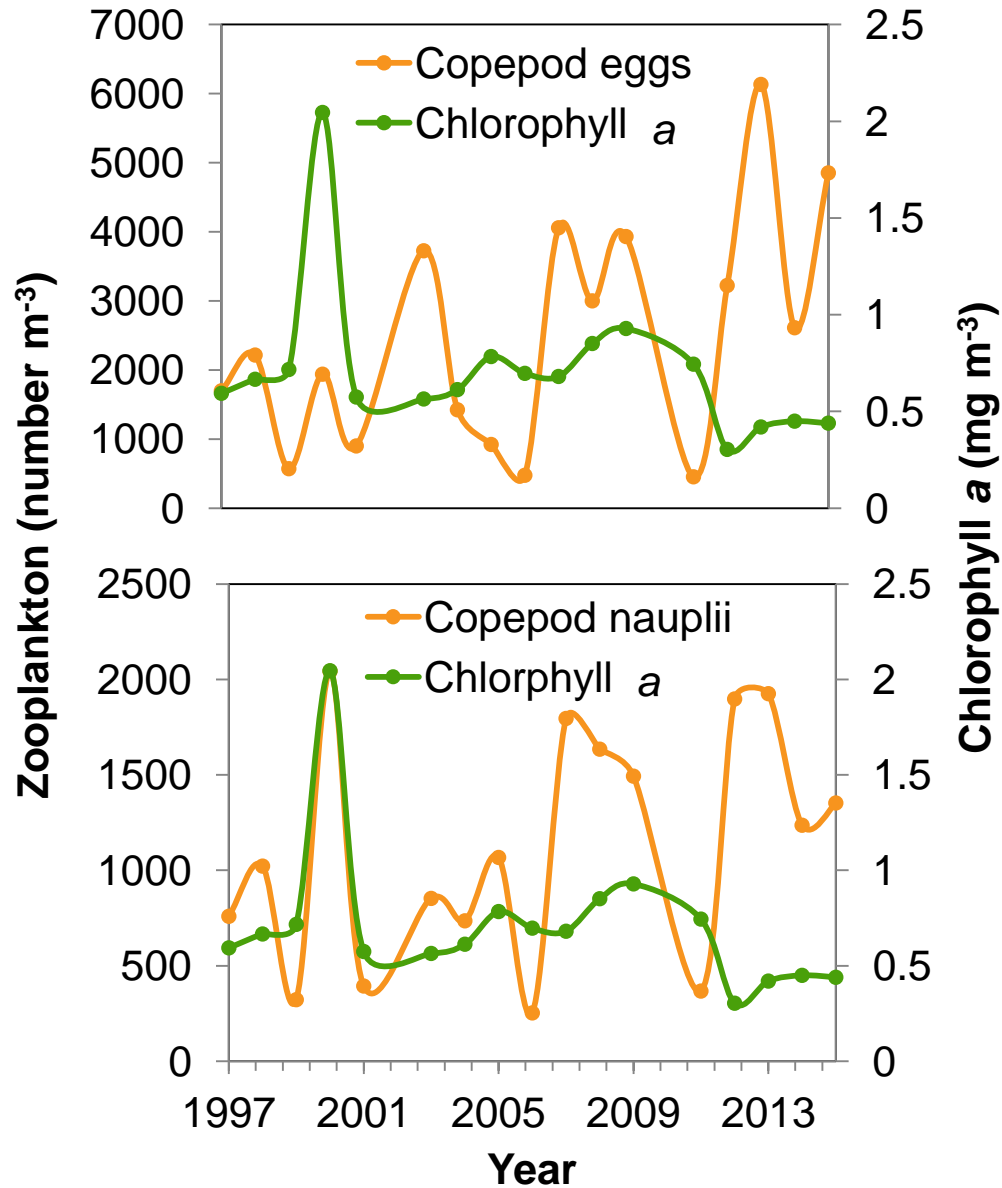
Relationship between *C. finmarchicus* and chlorophyll *a* on inner shelf



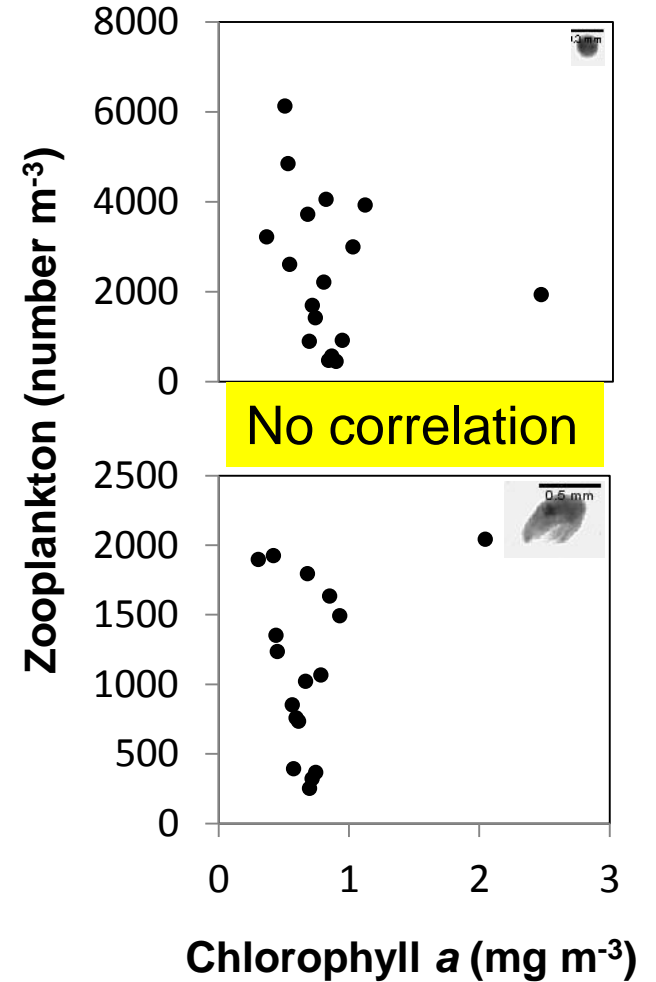
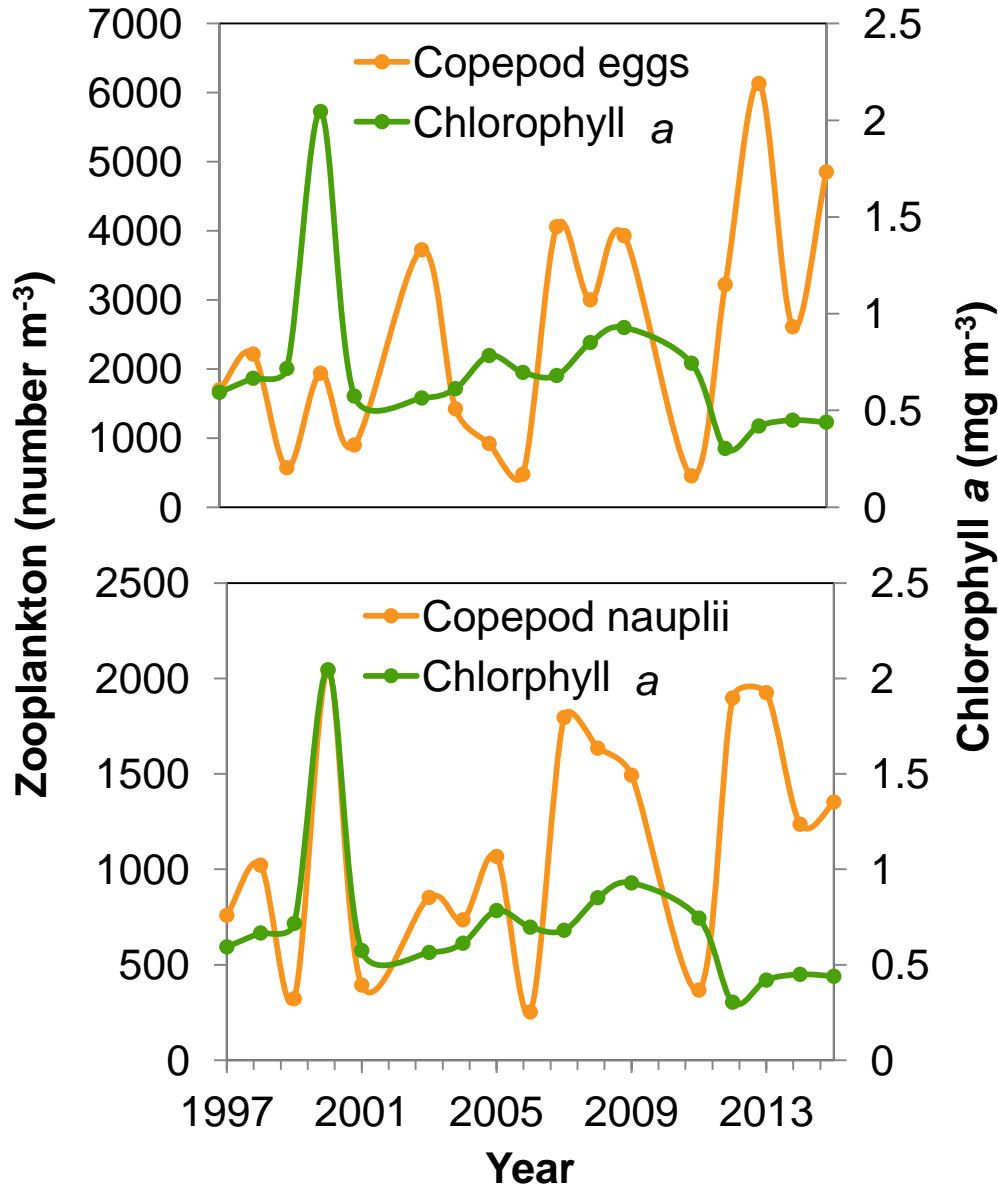
Relationship between eggs and nauplii and chlorophyll *a* on inner shelf



Relationship between eggs and nauplii and chlorophyll *a* on inner shelf



Relationship between eggs and nauplii and chlorophyll a on inner shelf



Conclusions

- Phytoplankton concentration strongly affects the abundance of neritic copepod species (and meroplankton) in the inner shelf ecosystem during spring
- *C. finmarchicus* phenology shift in outer shelf since 2007

Inner Faroe shelf ecosystem

Suggested mechanism:
water exchange rate between
the inner and outer Faroe shelf

Low exchange

Phytoplankton biomass ↑

Neritic copepod species
and meroplankton
(small to medium
sized zooplankton) ↑

High exchange

Phytoplankton biomass ↓

Neritic copepod species
and meroplankton
(small to medium sized
zooplankton) ↓

Acknowledgements

