

Environment induced changes in krill abundance in the North Atlantic Ocean

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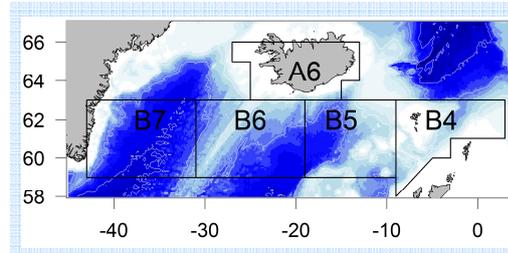
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Background

Krill is a key zooplankton group in the North Atlantic Ocean, serving as a food source for several exploited fish stocks, like cod.

The rise in seawater temperature during recent decade appears to have altered the phenology, abundance and diversity of plankton in the North Atlantic Ocean, and consequently altered higher trophic levels.

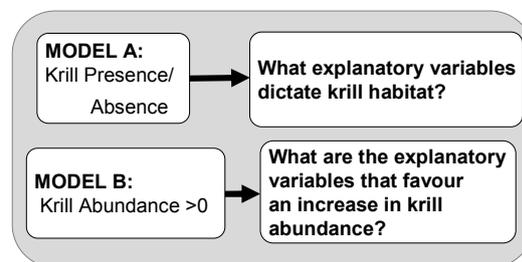
The aim of this study is to examine spatial and long-term variability of krill in the North Atlantic in relation to environmental variables.



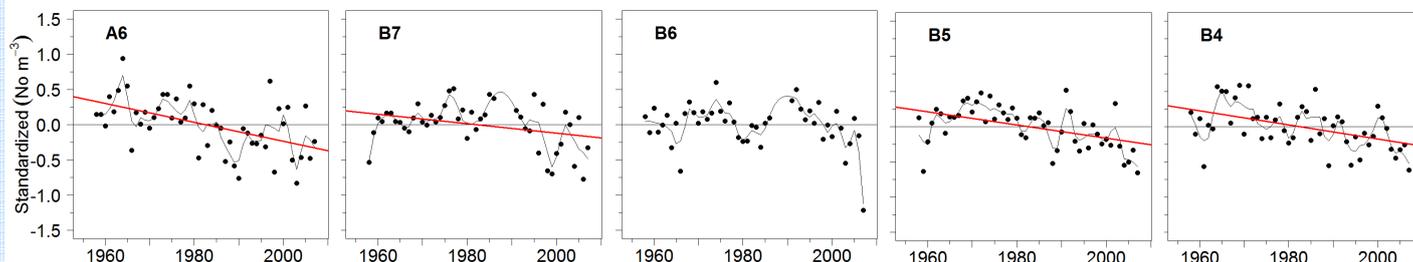
Methods

Abbreviations	Variable	Units	Time span
Krill	Krill total numbers	ind m ⁻³	1958-2007
SST	Sea surface temperature	°C	1958-2007
SSS	Sea surface salinity	psu	1980-2007
NAO	North Atlantic Oscillation		1958-2007
Chl a	Surface Chlorophyll a	mg m ⁻³	1998-2007
TSB	Phytoplankton spring bloom initiation	Weeks	1998-2007

Two Generalized Additive Models were used to analyze long-term changes of krill abundance as function of hydrographic and biological variables.

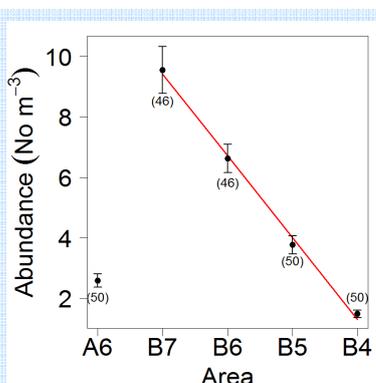


Results



Temporal variability

Krill abundance declined in most CPR areas from 1958 to 2007 (when significant, a long-term trend is superimposed in red). Also a general shift in numbers was observed in ~1980.



Spatial variability

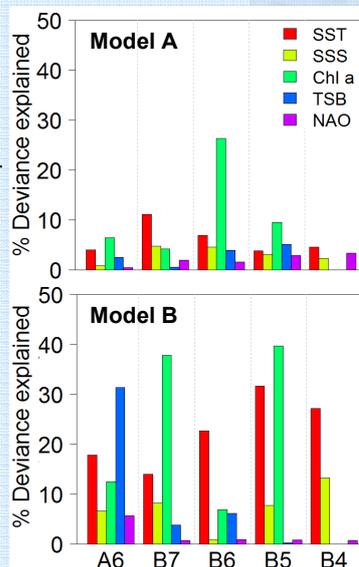
Annual mean numbers of krill generally decreased from the east coast of Greenland to the Faroe Islands.

What determines krill habitat:

- Temperature (B7 and B4);
- Chl a concentration (A6, B6 and B5).

What drives krill high abundance:

- Phytoplankton spring bloom initiation (A6);
- Chl a concentration (B7 and B5);
- Temperature (B6 and B4).



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