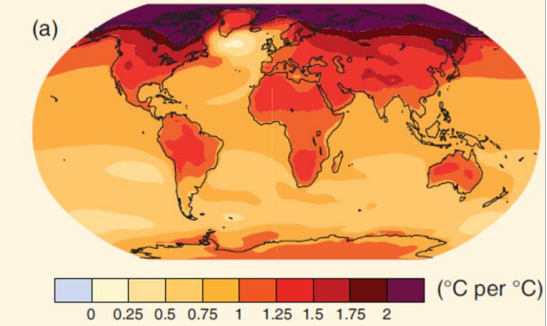
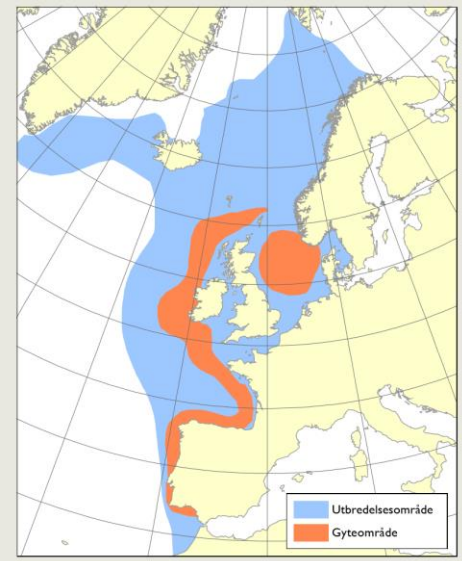
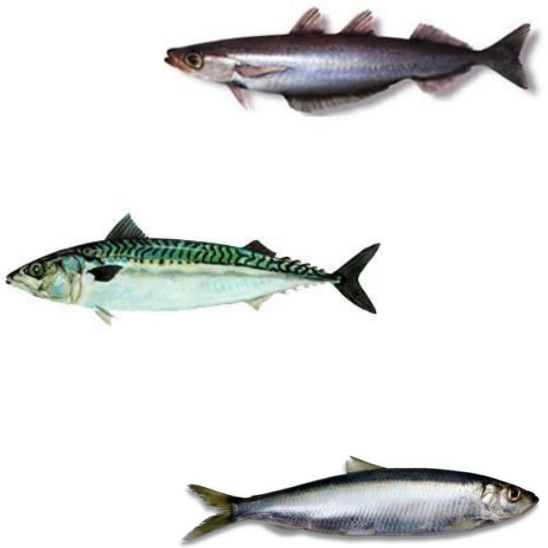
The Northeast Atlantic pelagic fisheries case study in Climefish







Kjell Rong Utne – Erik Mousing – Solfrid Hjøllo - Morten Skogen
IMR

Eufishmeal, Copenhagen 11 okt 2018

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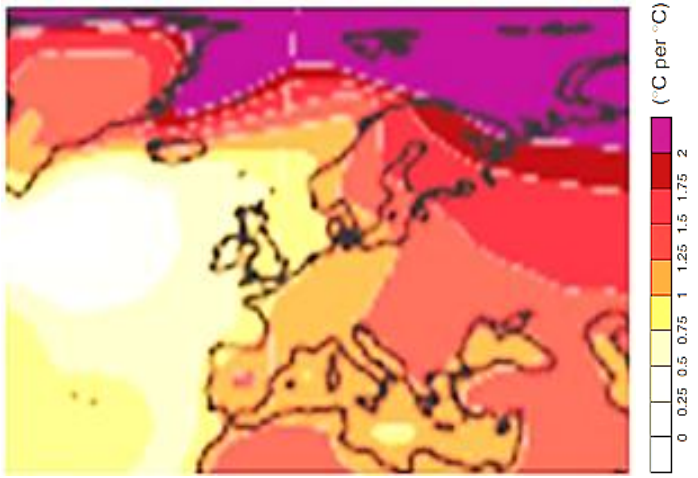
CLIMEFISH:

Climate change → how it affects aquaculture and fisheries



- Understand risk and opportunities
- Develop strategies to handle the effect of climate change
- Develop decision support framework for management

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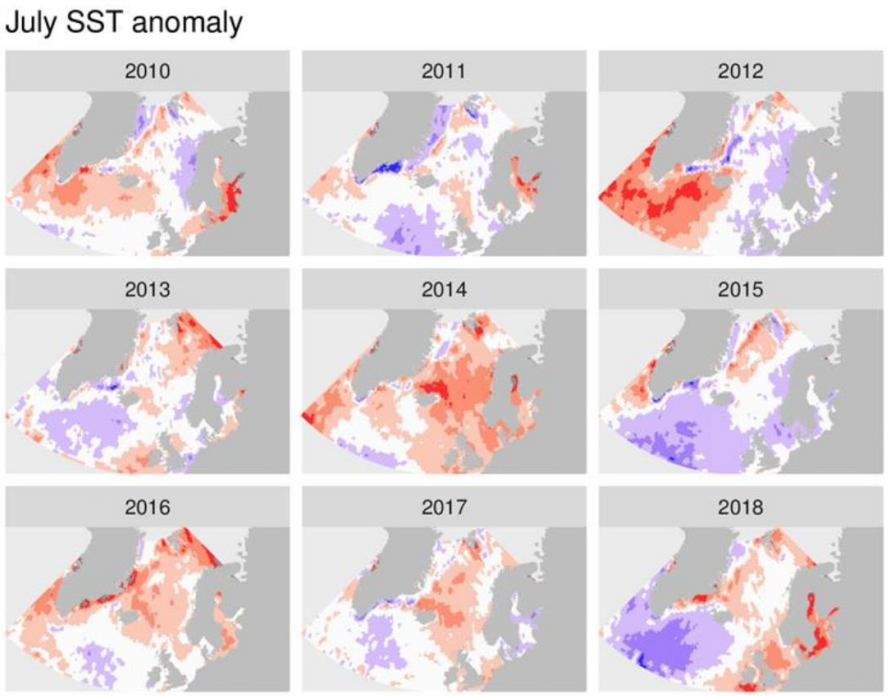
Sea surface temperature anomaly in comparison to the average for July 1990-2009.



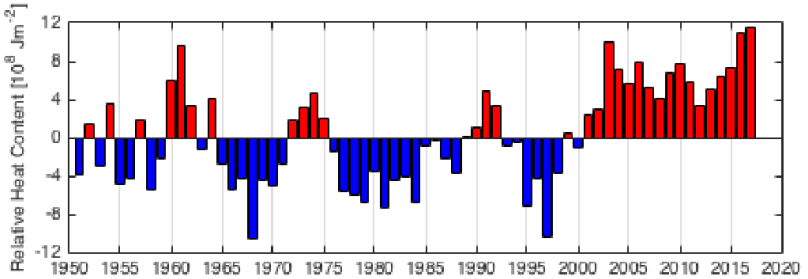


Figure 6.1. Time-series of anomalies of heat content of the Atlantic waters in Norwegian Sea (source: http://www.imr.no/temasider/klima/klimastatus/norskehavet/norskehavet_2/nb-no).

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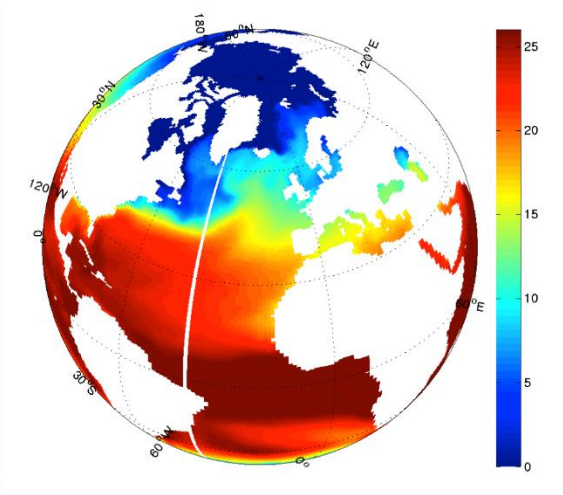
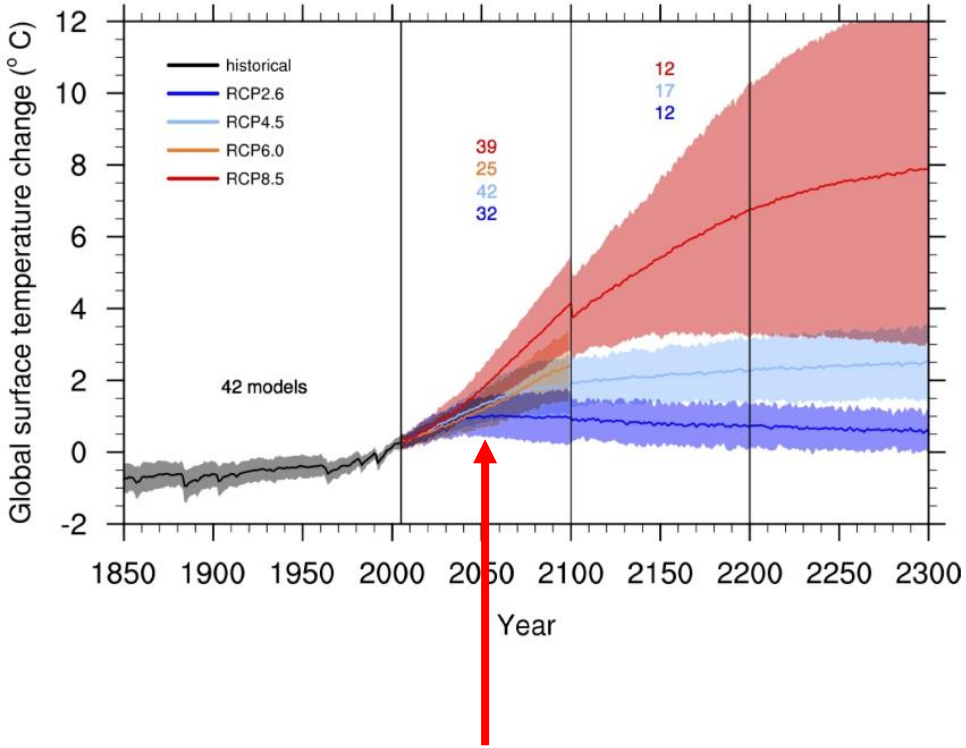
Climate models

- IPCC have global scenarios for the future state of the ocean





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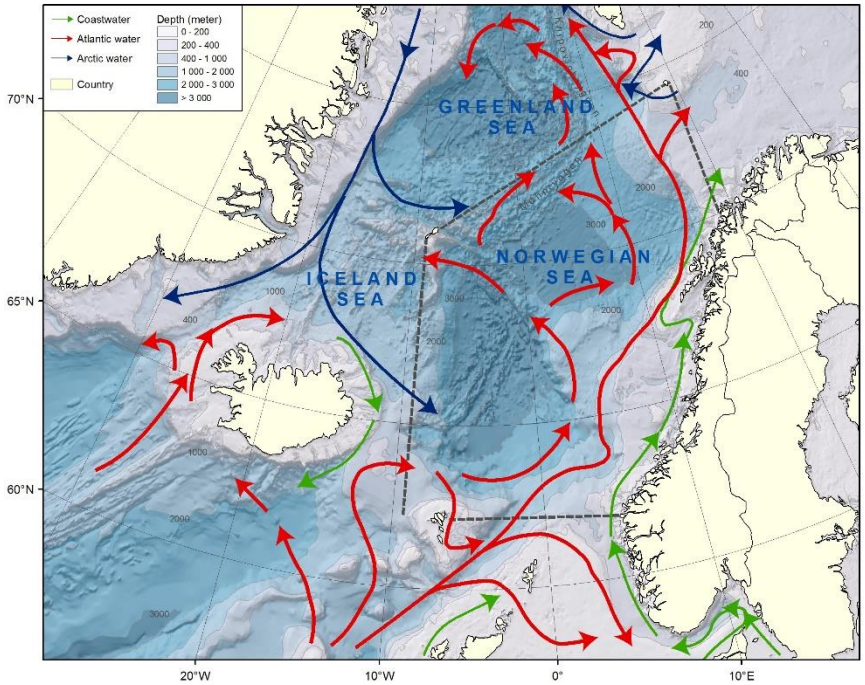
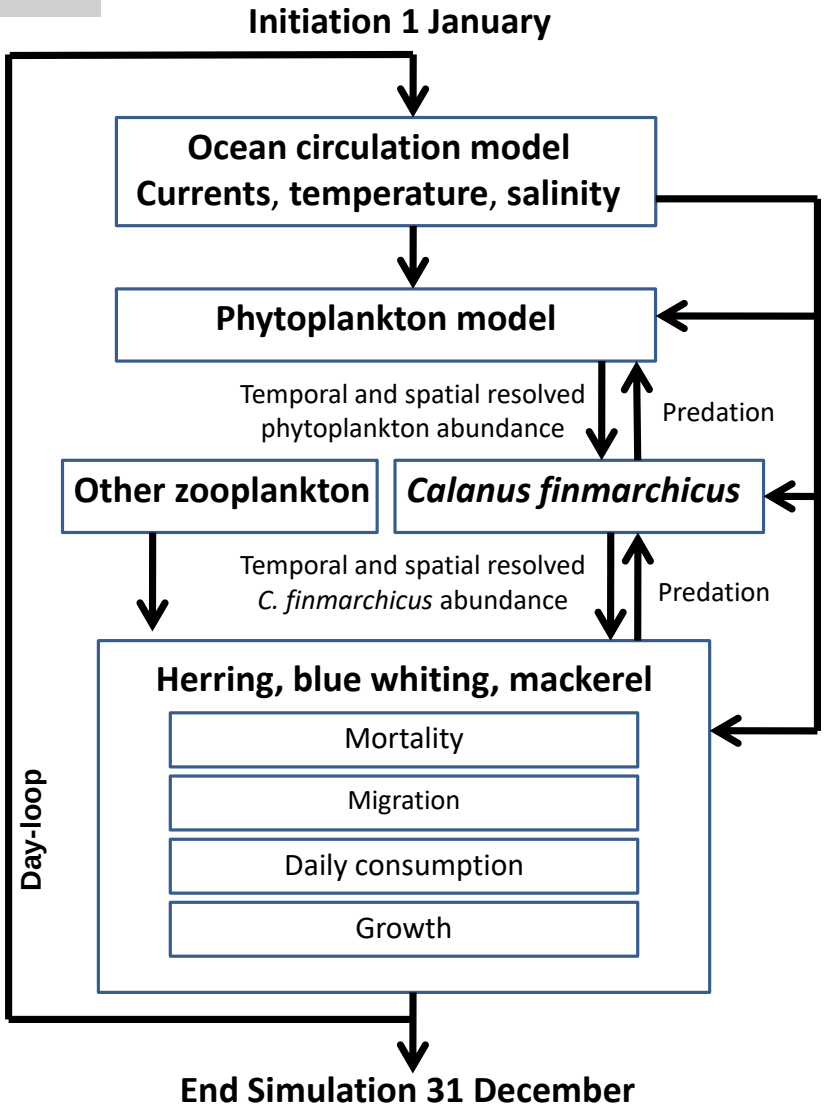
NORWECOM – ECOSYSTEM MODEL





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NORWECOM – ECOSYSTEM MODEL

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MODEL RESULTS – YEAR 2010-2020 and 2050-2060
RCP 4.5 (RCP 8.5)

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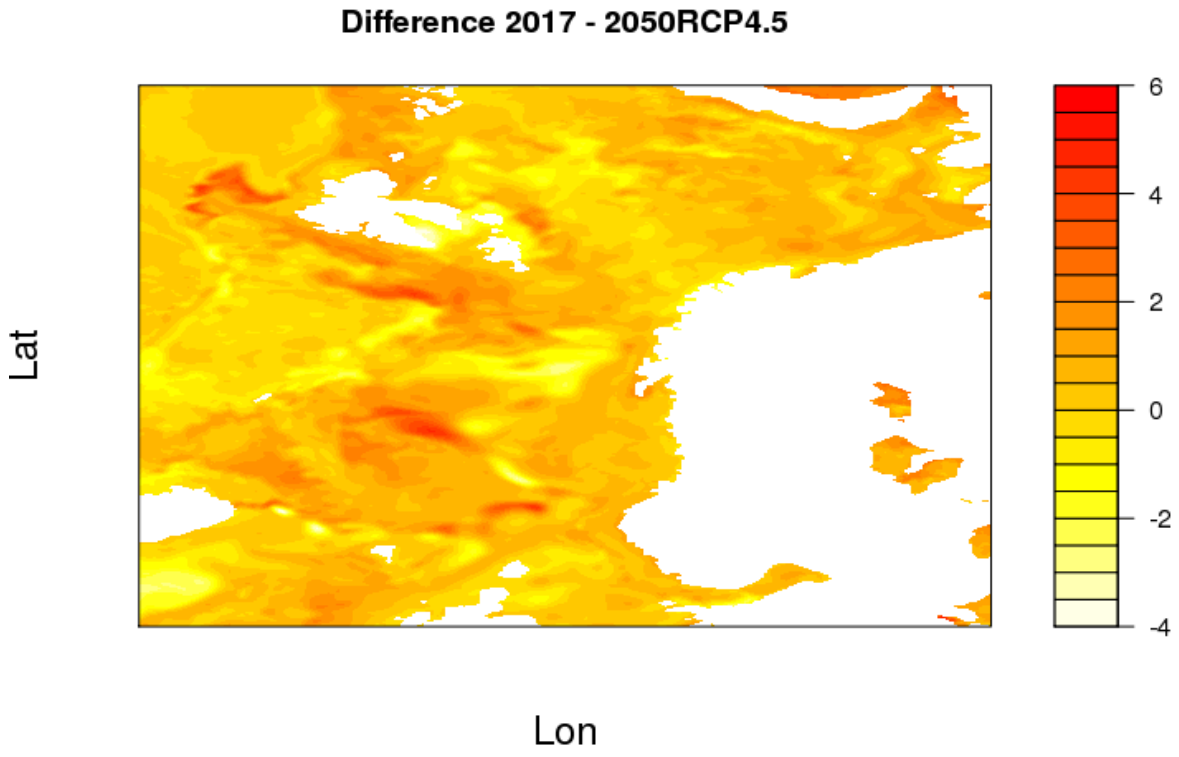
Water temperature

~0.5 ºC

But with large spatial and interannual variation!



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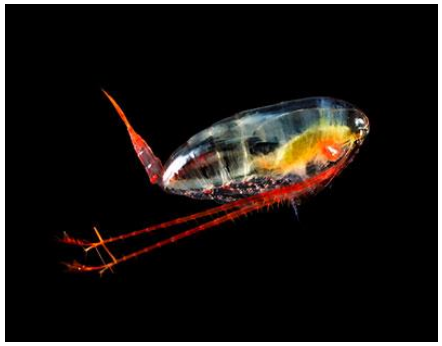

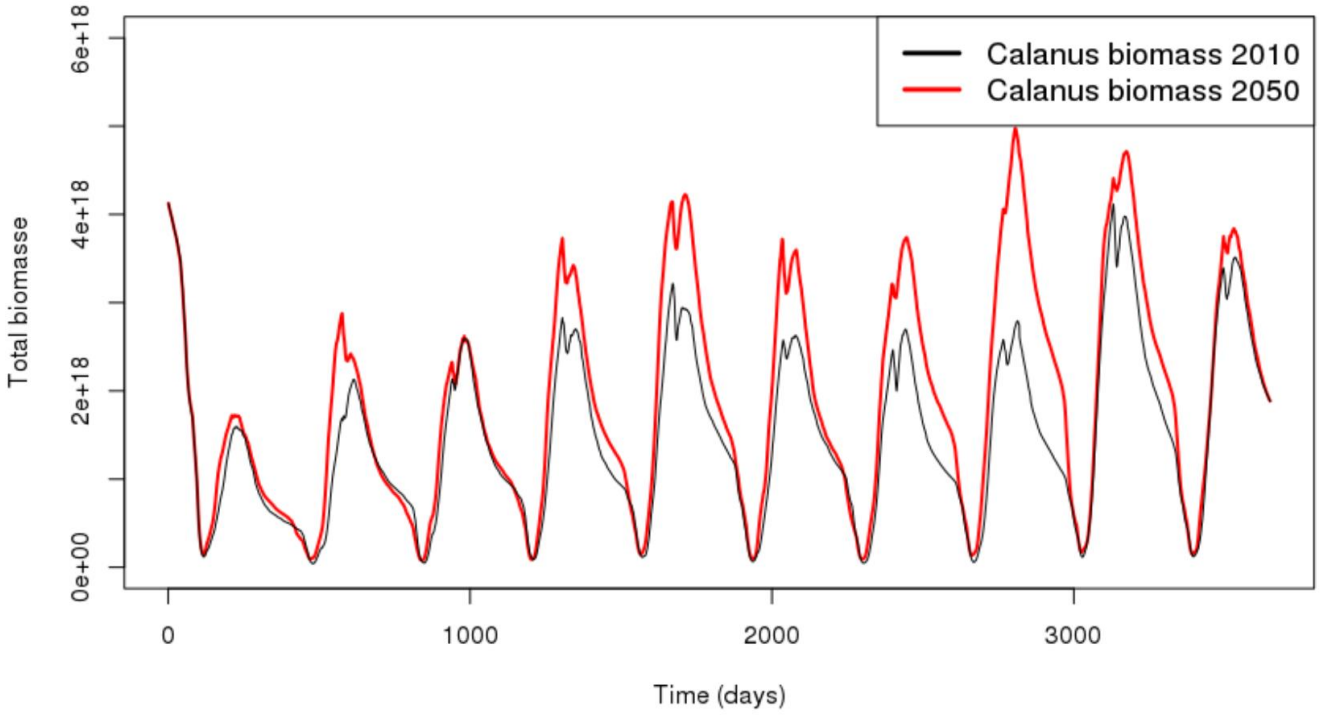

~ 27 % increase in calanus finmarchicus

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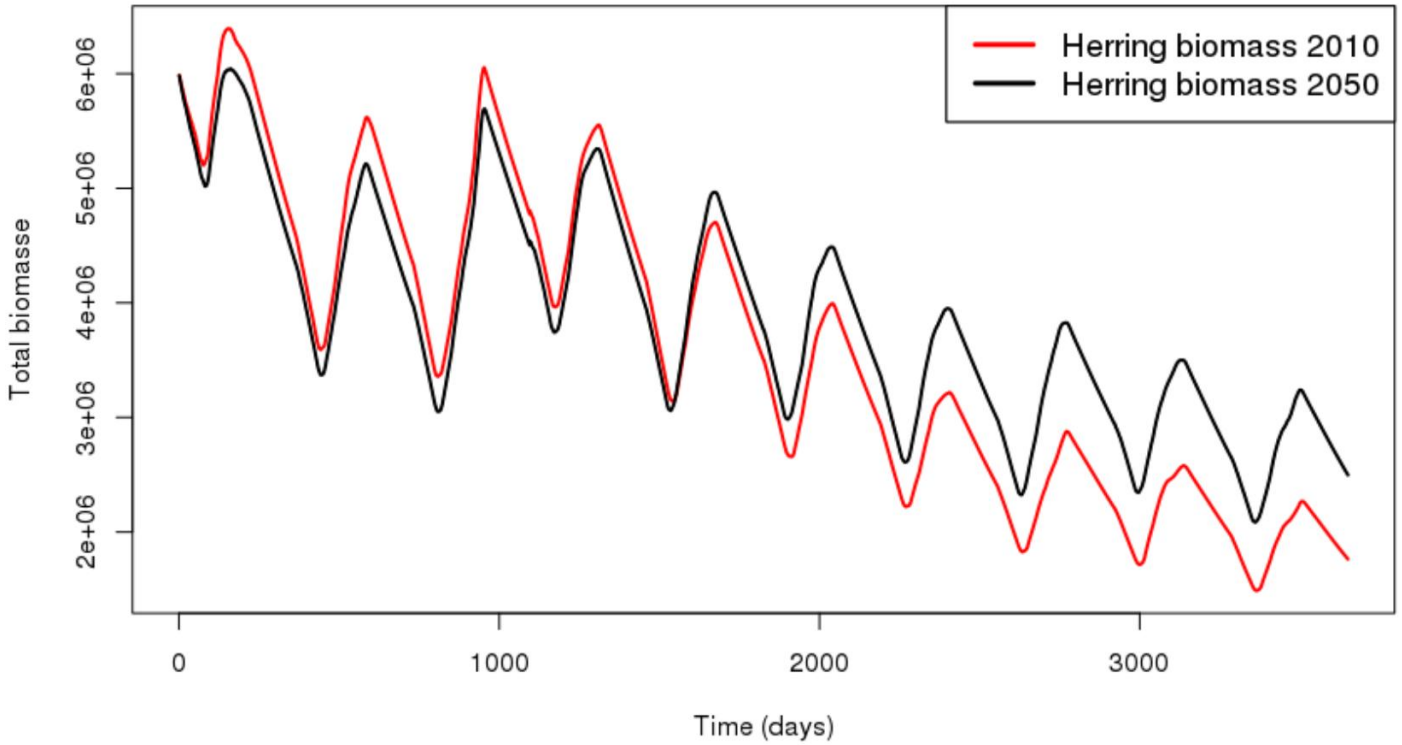

~ 6 % increase for herring

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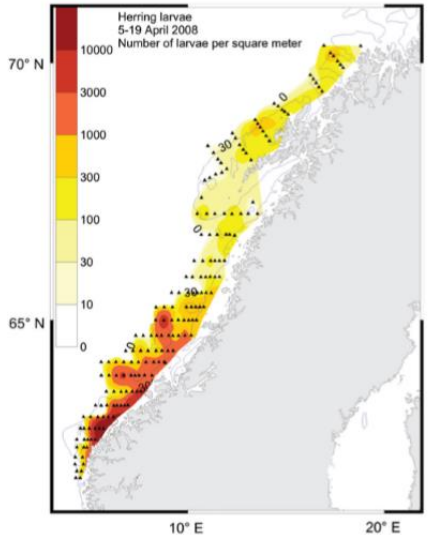
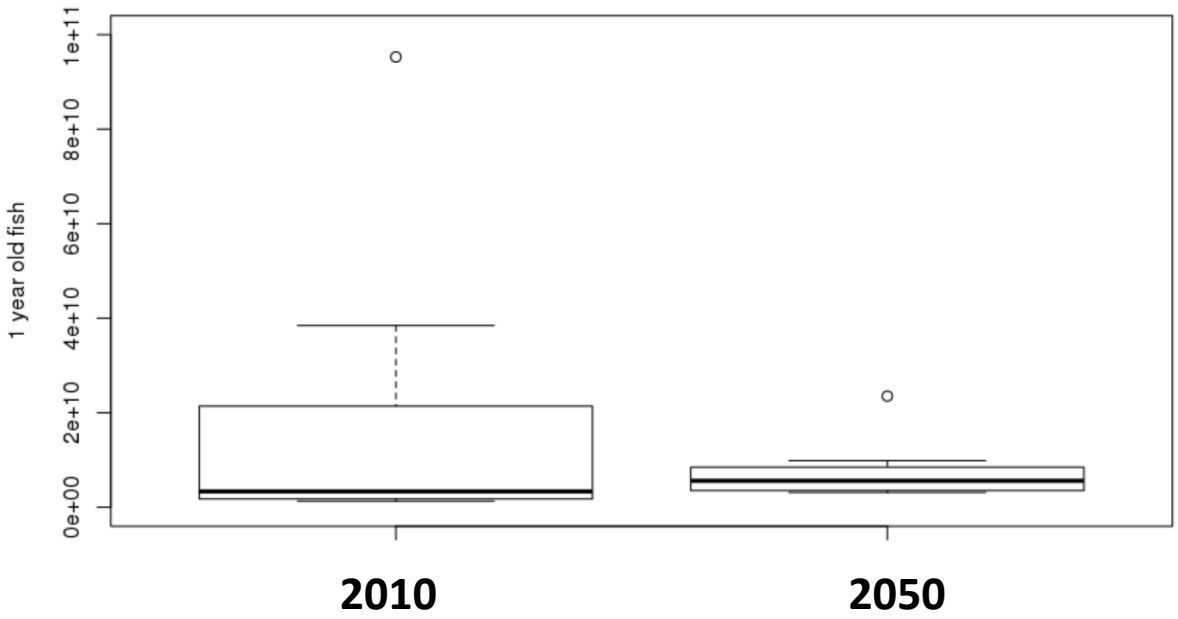
Recruitment



- **Highly variable recruitment**

Model predictions:



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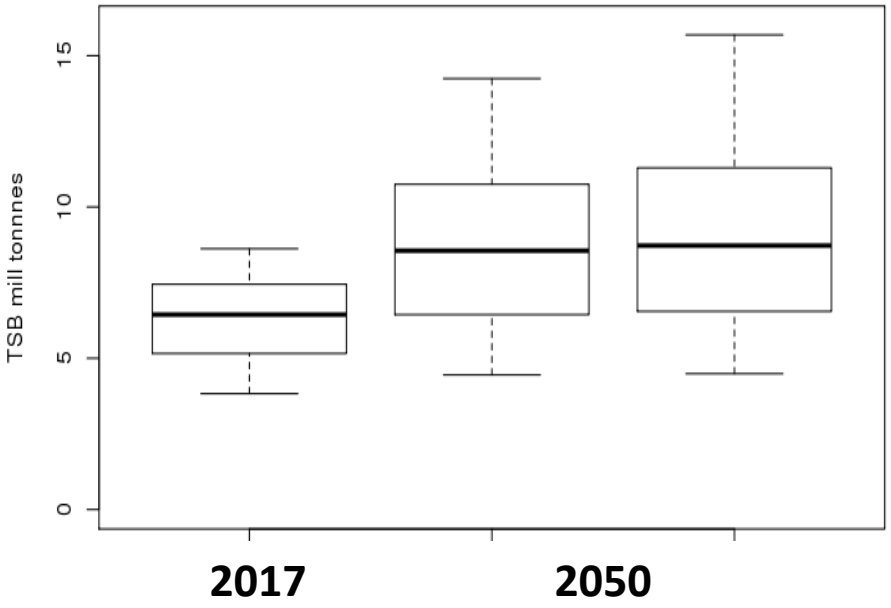
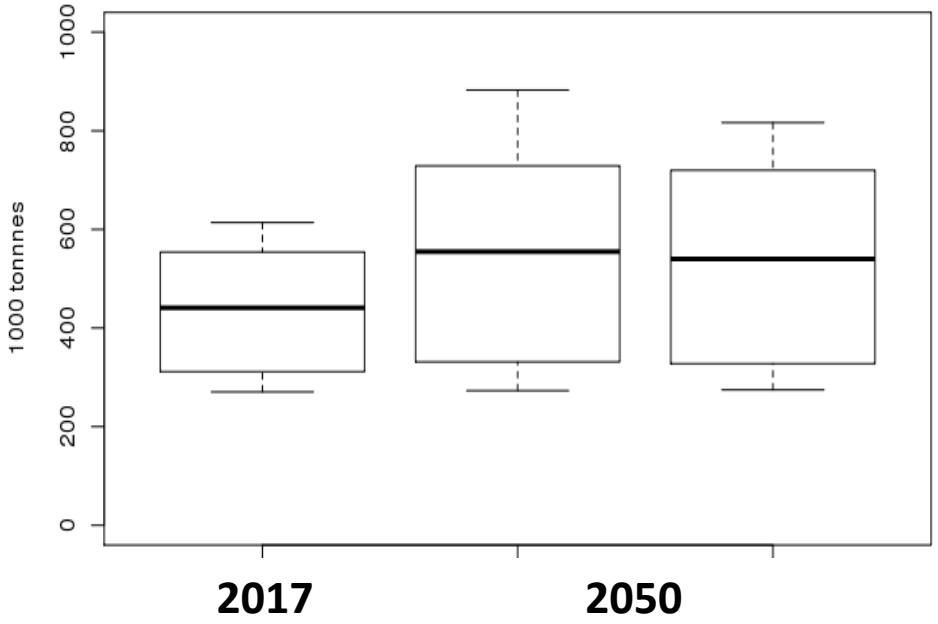
Stock biomass



Landings



Increase 41-48 %

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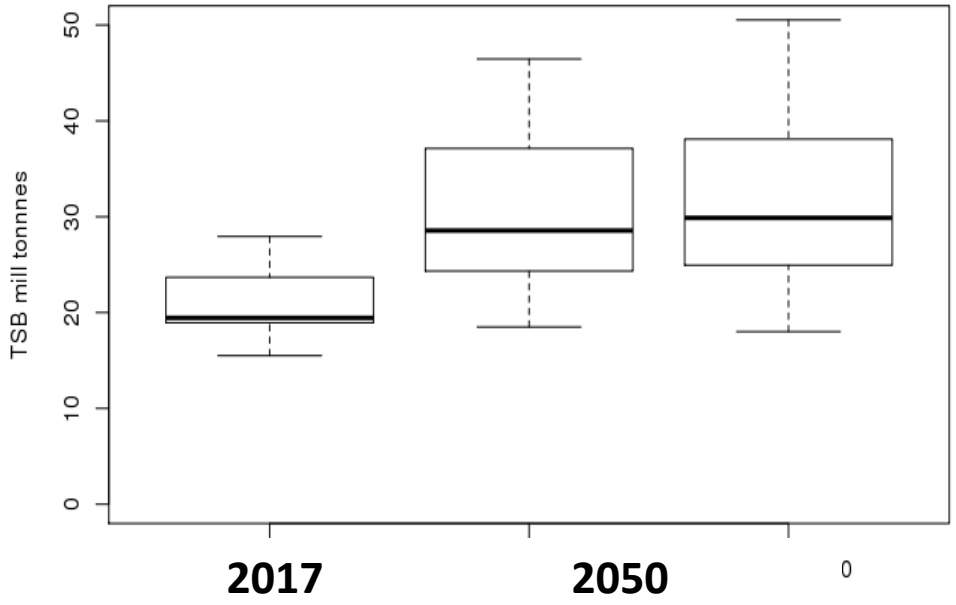
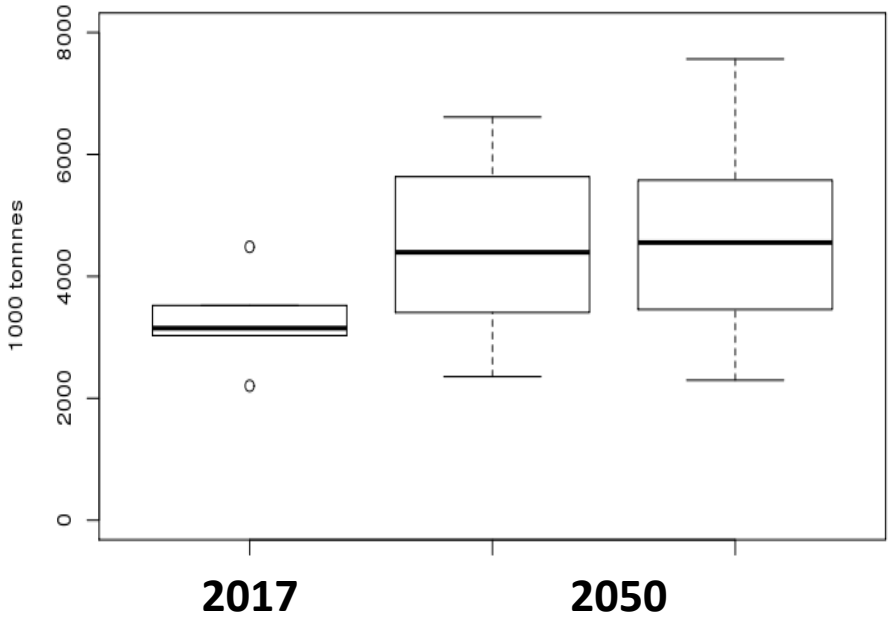
Stock biomass



Landings



Increase 47-53 %

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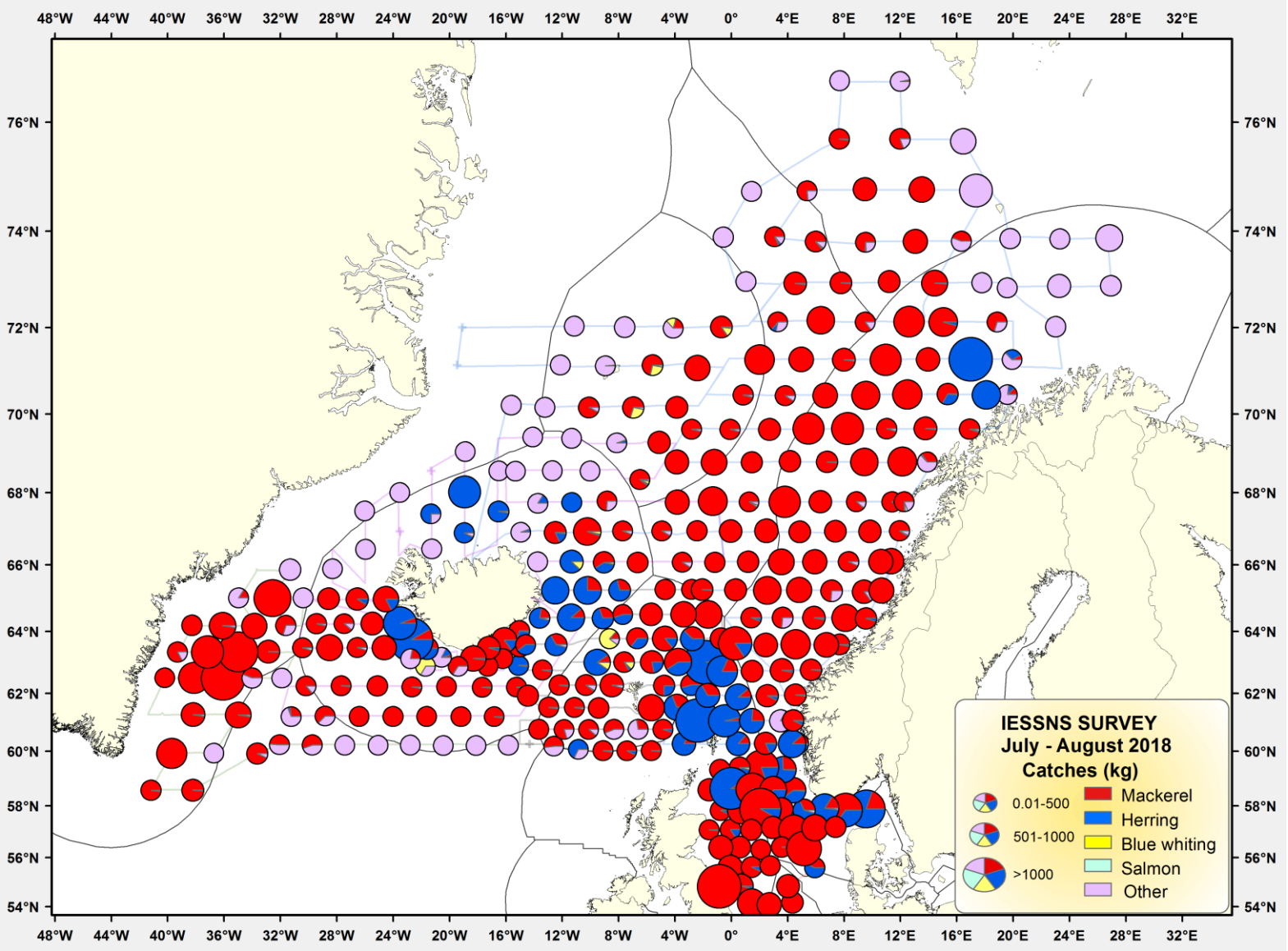
What about migrations and spatial distribution?



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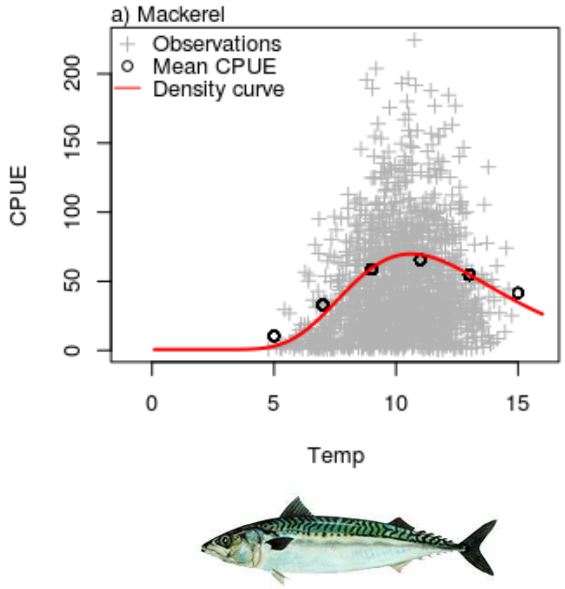
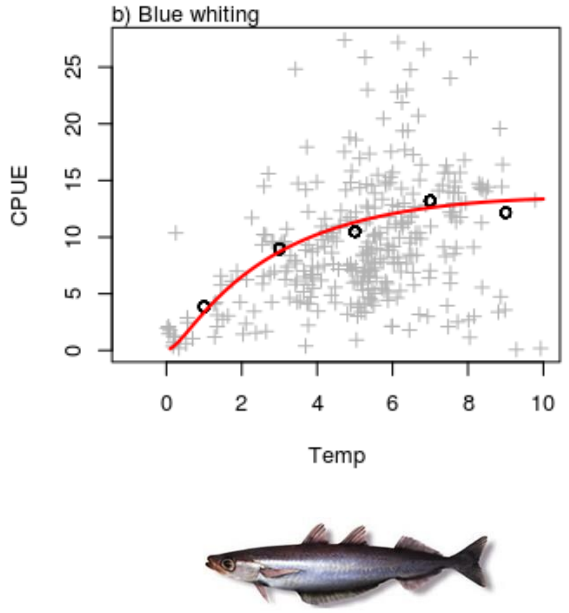
Modelling fish migration

Simple rules based on observations

- Temperature
- Prey
- Depth





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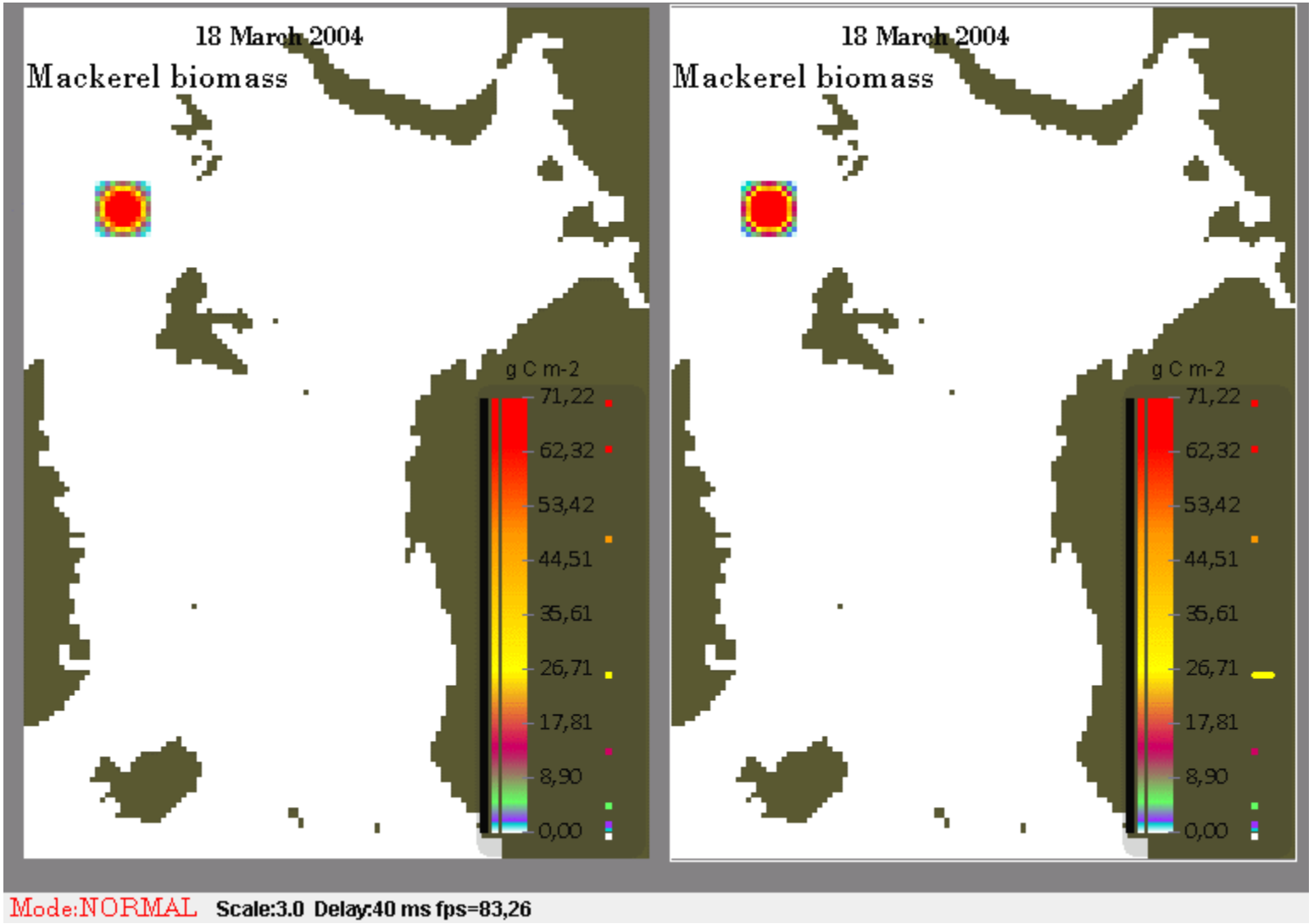
Example of habitat dependent migration



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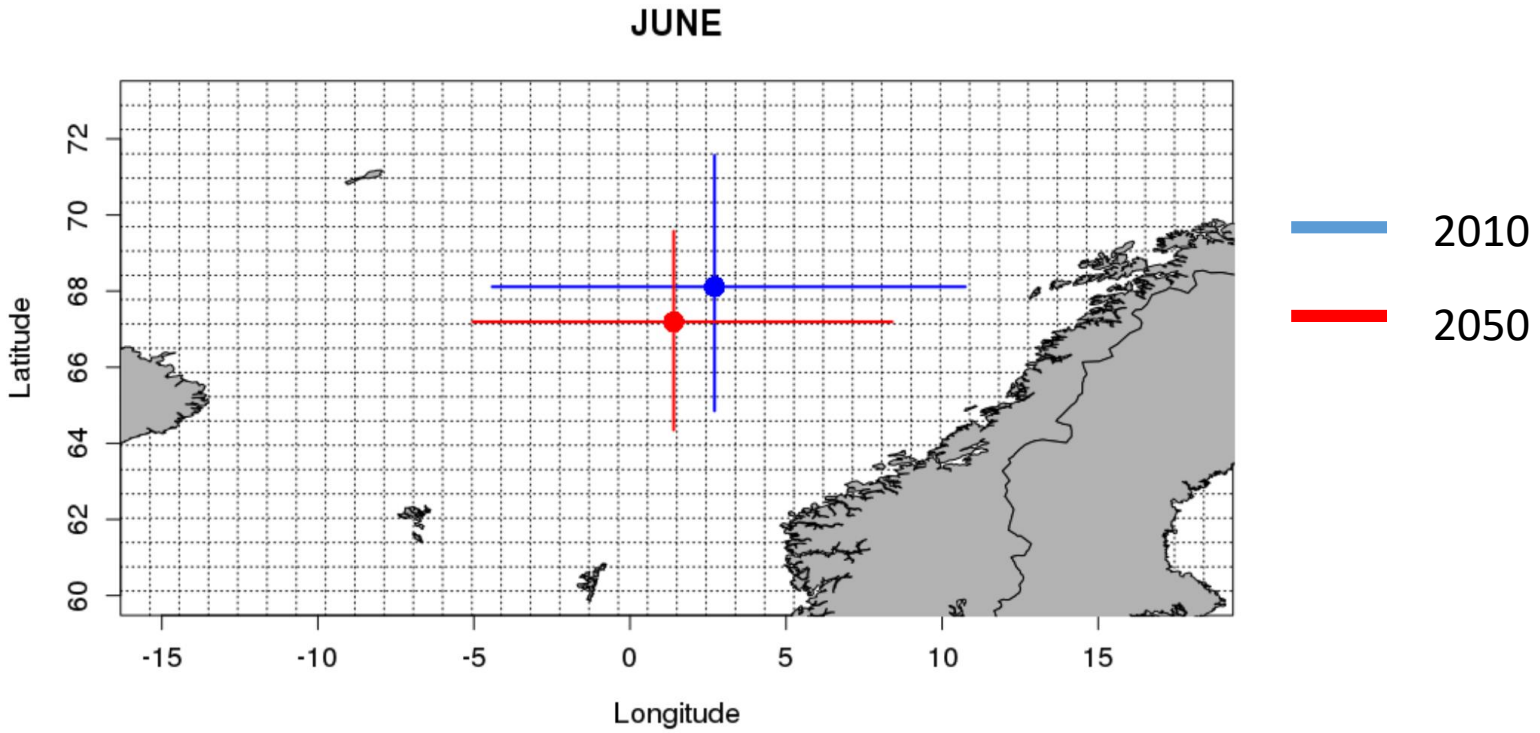
Centre of gravity – geographic distribution



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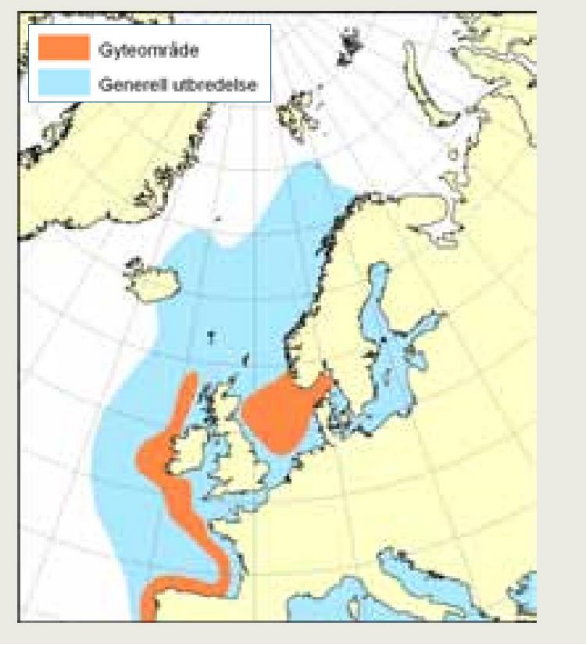
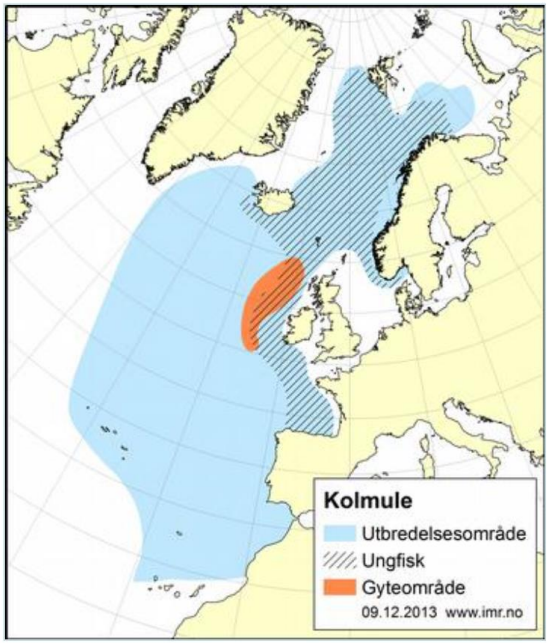
- More zooplankton == more pelagic fish ?
- Recruitment is a key issue!





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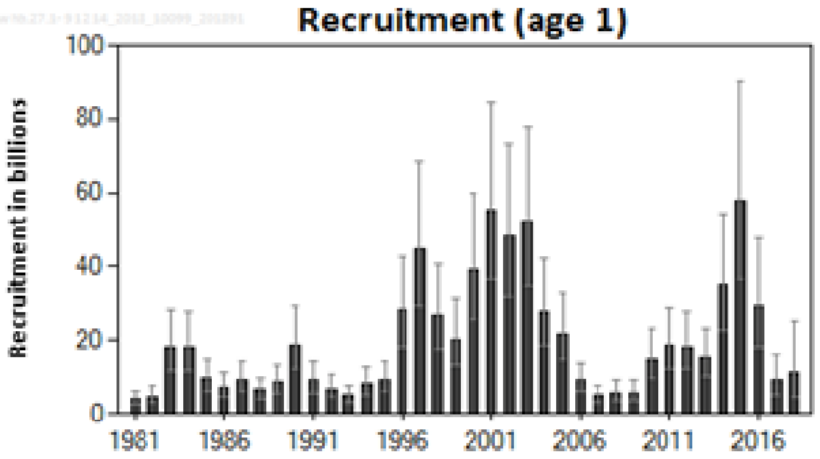
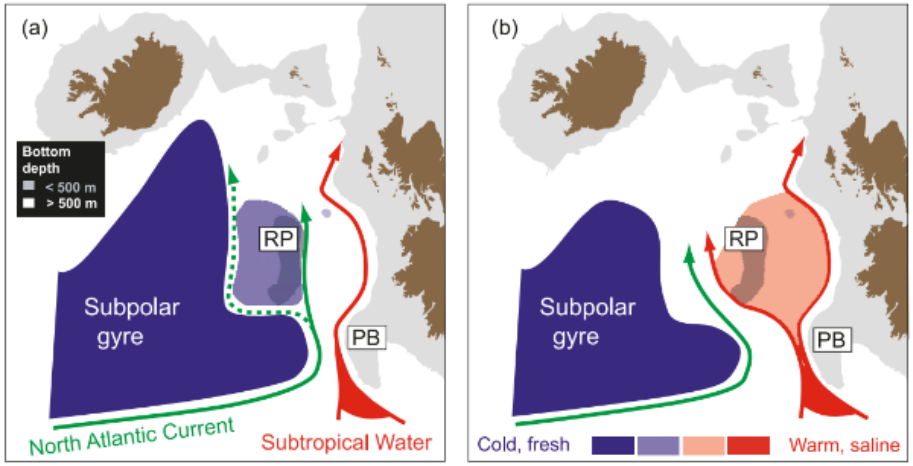
Recruitment





Spawning area is regulated by SPG (Hatun et al 2009)

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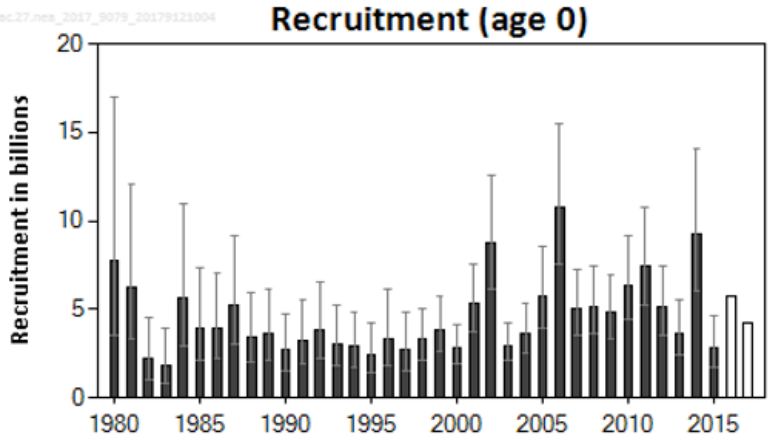

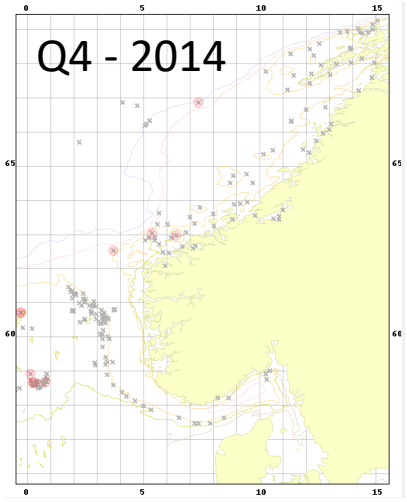

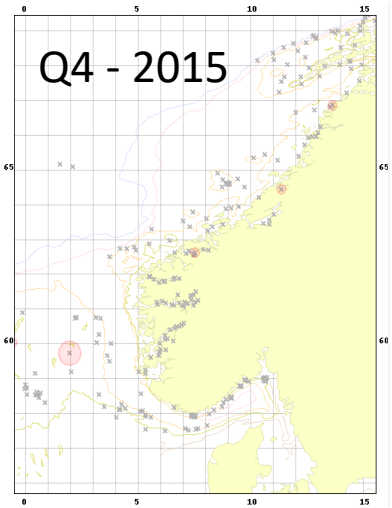

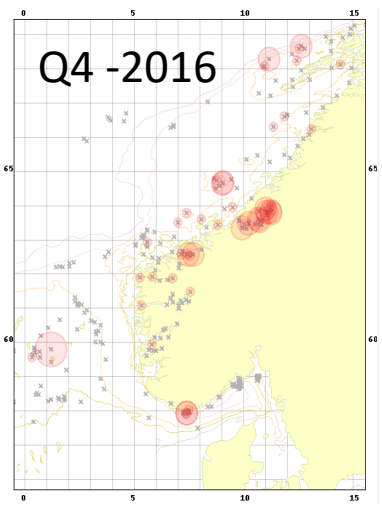

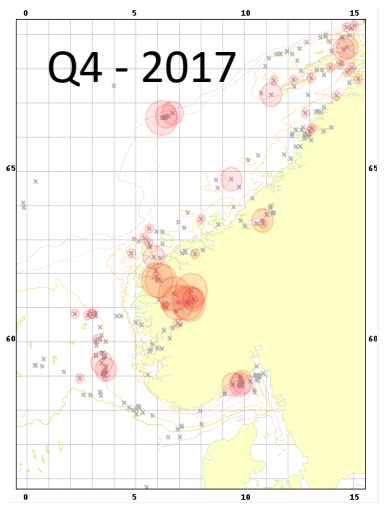

< 25 cm

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Summary

- **Climate changes -> vary between species, areas, processes etc**

Model simulations:

- **More zooplankton in the Norwegian Sea**
- **More pelagic fish in the Norwegian Sea**
- **Working on migration and the spatial distribution**

- **Recruitment is a key process only partly handled by the model**

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Thank you for the attention

- University of Tromsö, The Arctic University of Norway
- Federation of European Aquaculture producers
- Universidad de Concepción
- Biology Centre Czech Academy of Sciences
- International Council for the Exploration of the Sea
- Syntesa
- Brabdeburg University of Technology Cottbus-Senftenberg
- Hellenic Center for Marine Research
- National Agriculture Research abd Innovation Centre
- Matís Ltd
- The Food and Agriculture Organization of the United Nations
- University of Venice
- The Institute of Marine Research in Norway
- The Norwegian Institute of Food, Fisheries and Aquaculture Research
- Centro Tecnológico del Mar
- The Spanish National Research Council
- University of Stockholm
- University of Aberdeen
- University of Stirling
- Nanyang Technological University

More info: www.climefish.eu
Contact: climefish@uit.no

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