

Climate Change Response in a Sub-Arctic Fjord: Fishes and Invertebrates Respond Differently



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The Porsangerfjord in Northern Norway is a sub-arctic fjord with an inner arctic part and face an invasion by the red king crab *Paralithodes camtschaticus* since the end of the 1990's. This offers the opportunity to study the dynamics of an Arctic ecosystem facing multiple stressors, i.e., climate change and invasive species.

The Inner Fjord as a Refugium

The main environmental changes in the fjord were:

- freshening of the water
- increase of the seabed current
- decrease of the maximum sea ice extent.

Species richness and diversity of fishes significantly increased into the fjord, due to the arrival of warm-water species over time that overlapped with cold-water species that have seen their biomass significantly reduced.

No significant decrease in the biomass of the cold-water benthic (= sea floor associated) species was visible, which could indicate an efficient refugee effect of the inner fjord.

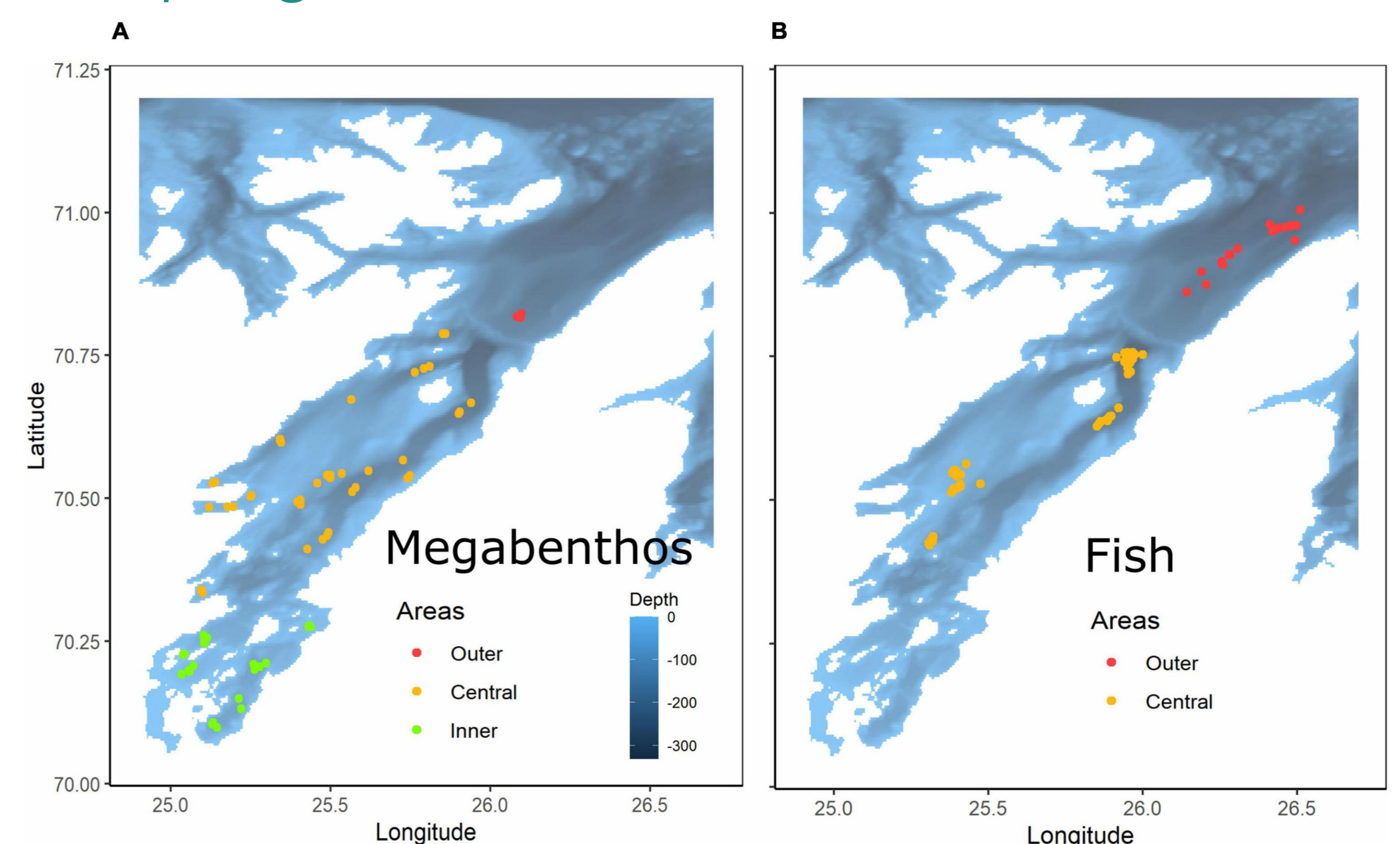
Examples of bottom-living invertebrates



Red King Crab *Paralithodes camtschaticus*



Sampling areas between 2007 and 2019



In the Porsangerfjord, fish species respond to climate change while bottom-living (= benthic) invertebrates are more threatened by invasive species such as the king crab.

Fish diversity increases towards the inner fjord due to Arctic cold-adapted assemblages overlapping with newly arriving warm-adapted species. This effect was not observed in bottom-living invertebrates, yet the refuge function of the inner fjord might be unbalanced due to the red king crab's predation on Arctic species.



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