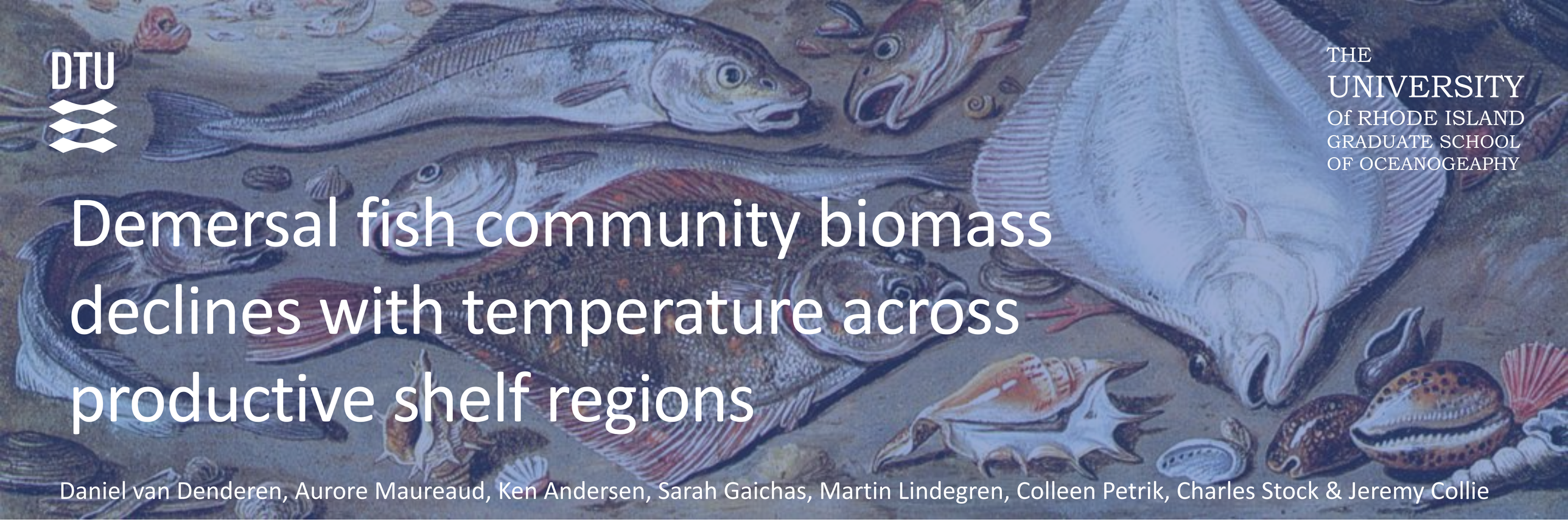
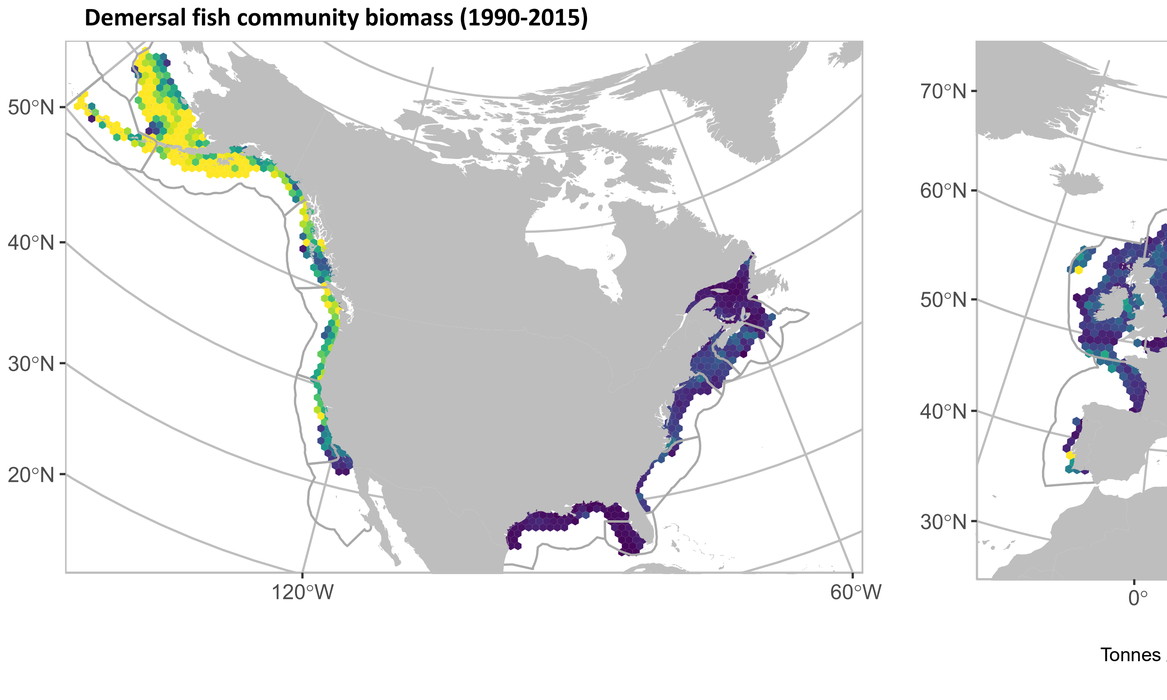


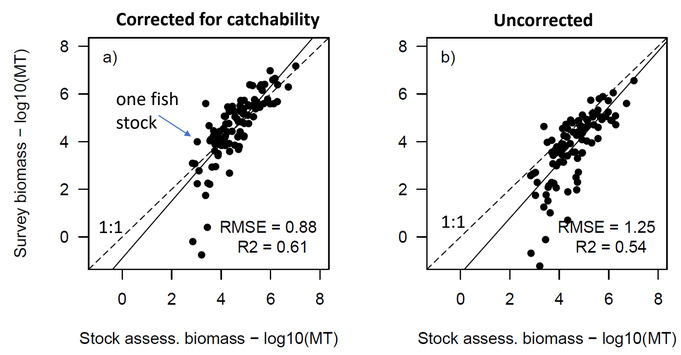
Demersal fish community biomass declines with temperature across productive shelf regions

Daniel van Denderen, Aurore Maureaud, Ken Andersen, Sarah Gaichas, Martin Lindegren, Colleen Petrik, Charles Stock & Jeremy Collie

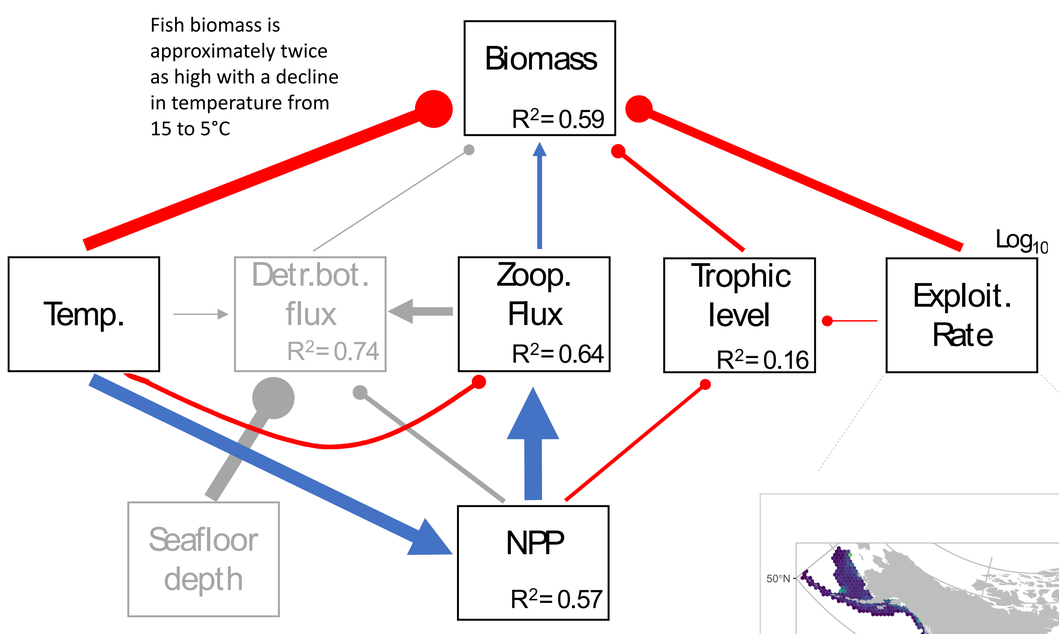
Theory predicts fish community biomass to decline with increasing temperature due to higher metabolic losses resulting in less efficient energy transfer in warm-water food webs. However, whether these metabolic predictions explain observed macroecological patterns in fish community biomass is unknown.

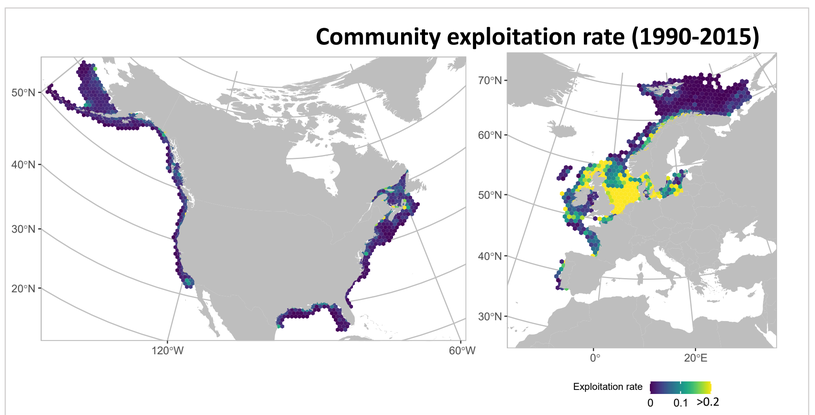


1. We compiled high-resolution bottom trawl survey data of fish biomass containing 180,000 unique tows and corrected biomass for differences in sampling area and trawl gear catchability.



2. We examined whether relationships between net primary production and demersal fish community biomass are mediated by temperature, food-web structure, and the level of fishing exploitation.

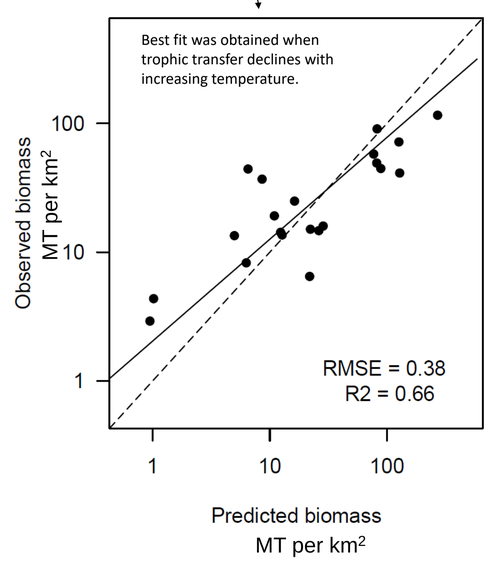




3. Demersal biomass was predicted with a trophodynamic equation accounting for food chain length variations and trophic transfer efficiency.

$$B_i = (D_{flux,i} \times TE_i^{MTL_i - 1} + p_i \times Z_{flux,i} \times TE_i^{MTL_i - 2.1})/ER_i$$

Benthic prey pathway | Pelagic prey pathway | Exploitation rate

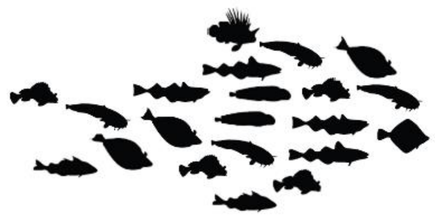


CONCLUSION

Our study supports the hypothesis that **TEMPERATURE** is a main driver of large-scale cross-regional variation in fish community biomass

The cross-regional pattern suggests that long-term impacts of **CLIMATE WARMING** will be negative on biomass.

These results provide an **EMPIRICAL BASIS** for predicting future changes in fish community biomass and suggest a set of explanatory variables that are most important



Centre for Ocean Life
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Read the pre-print here: 10.22541/au.167275091.18905396/v1

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