



# MPA Europe: Goals and Results to date

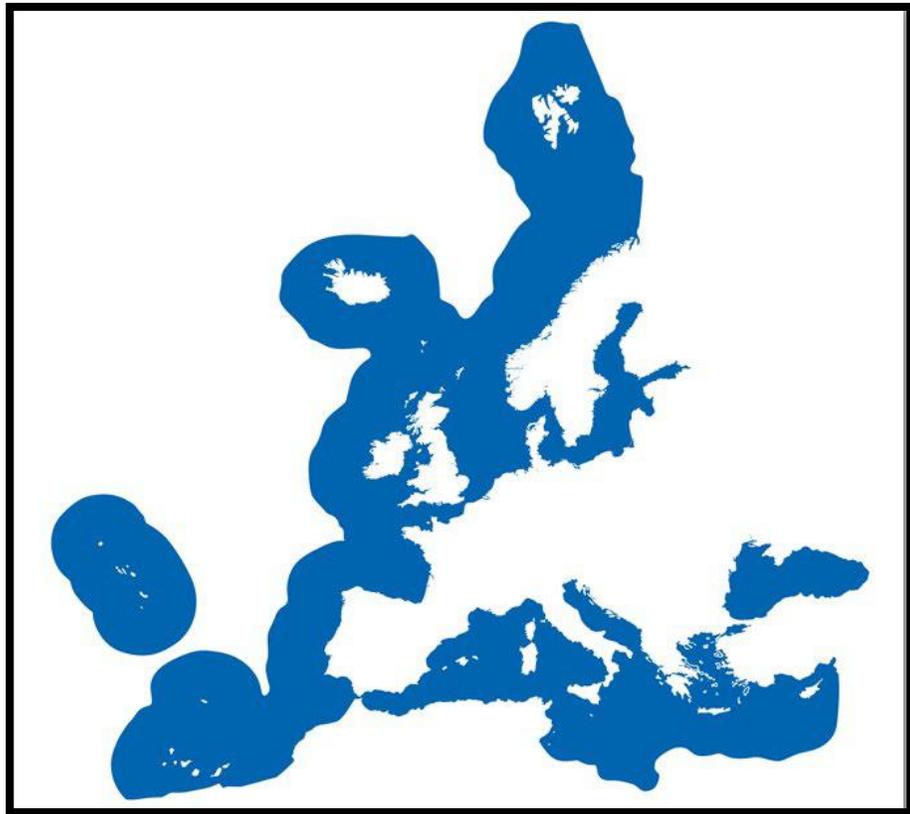
Belinda Bramley (CLIMAZUL),  
Silas Principe (OBIS, IOC UNESCO), Mark Costello, Anna Addamo  
(Nord University)  
3rd November 2025



MPA EUROPE IS MAPPING THE OPTIMAL LOCATIONS FOR MARINE PROTECTED AREAS IN EUROPEAN SEAS TO SUPPORT SCIENCE-BASED MARINE SPATIAL PLANNING

## SYSTEMATIC CONSERVATION PLANNING (SCP)

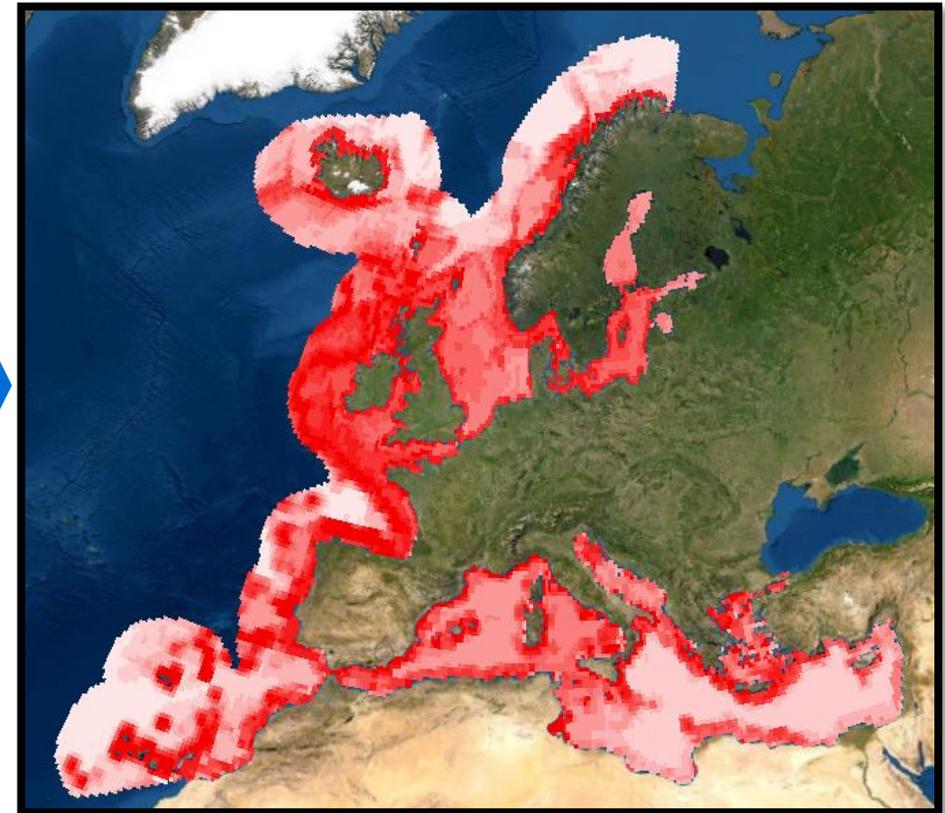
Standardised and complete data layers



© MPA Europe

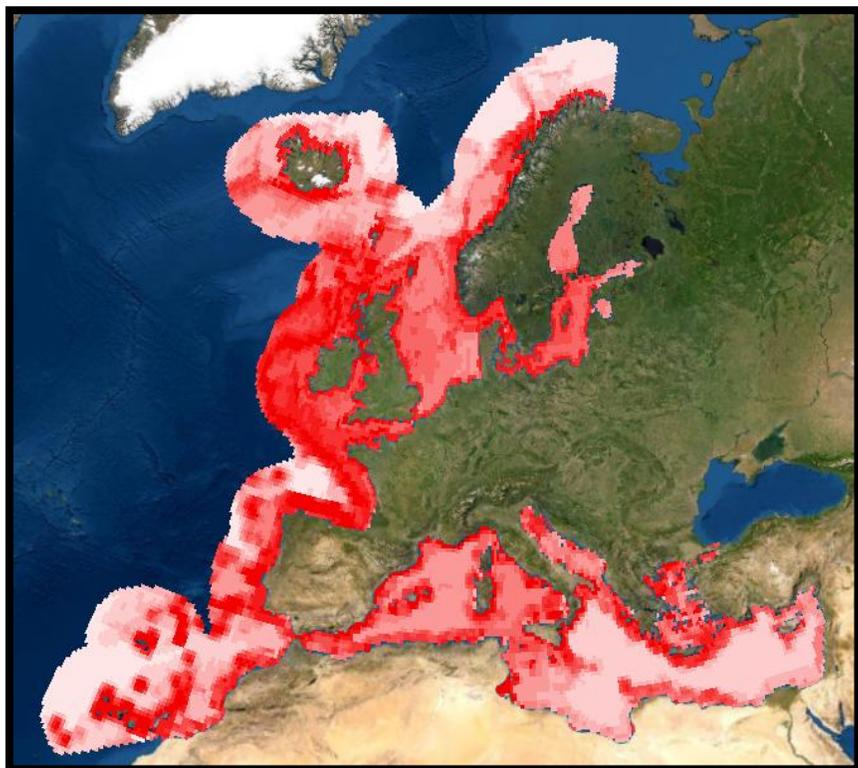


Example of prioritised areas  
(**darker red** = **higher priority**)



© MPA Europe

## PRIORITISATION



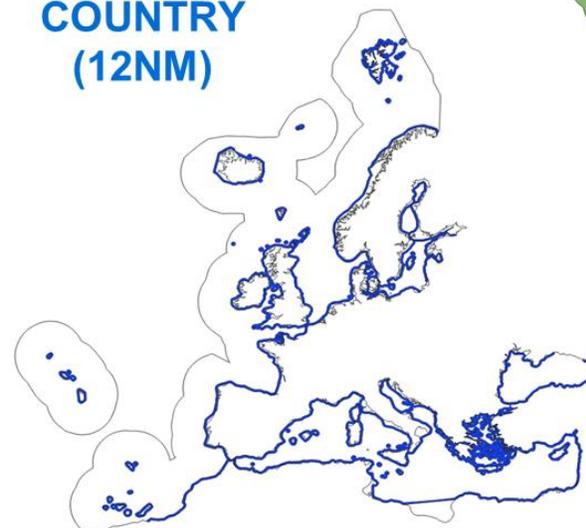
MARINE  
REGION



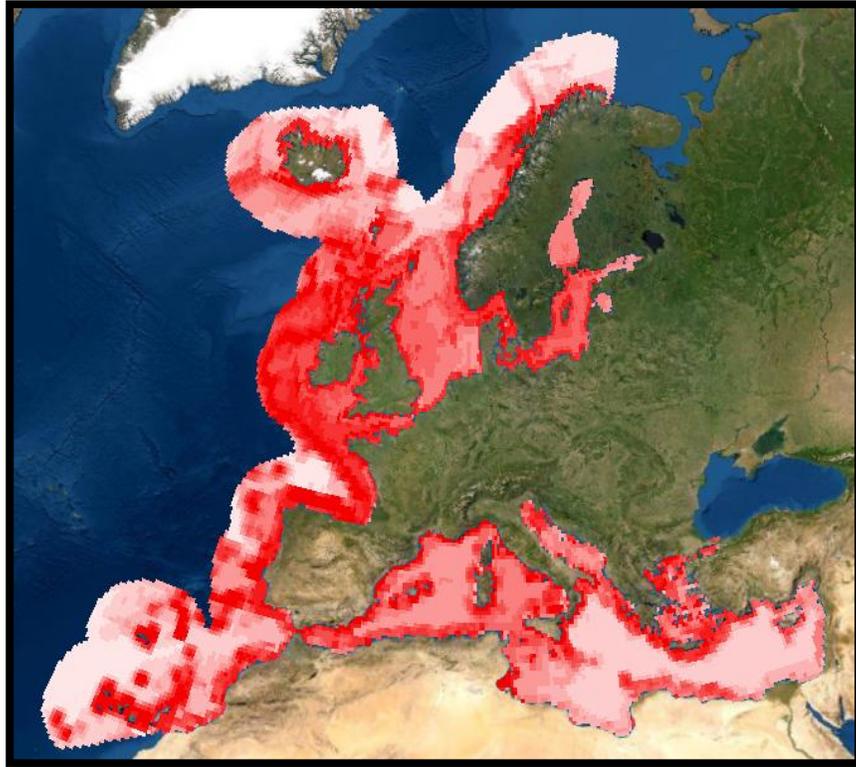
COUNTRY  
(EEZ)



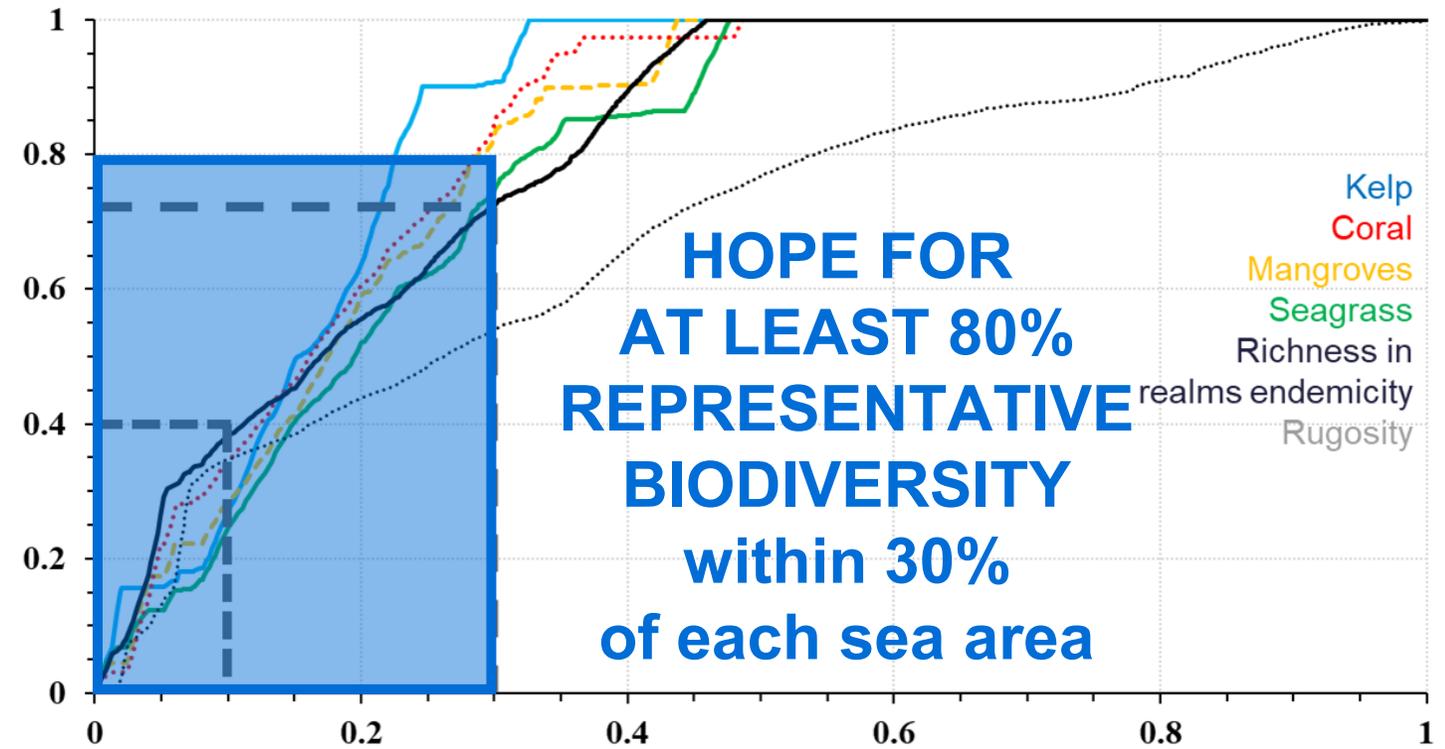
COUNTRY  
(12NM)



## PRIORITISATION



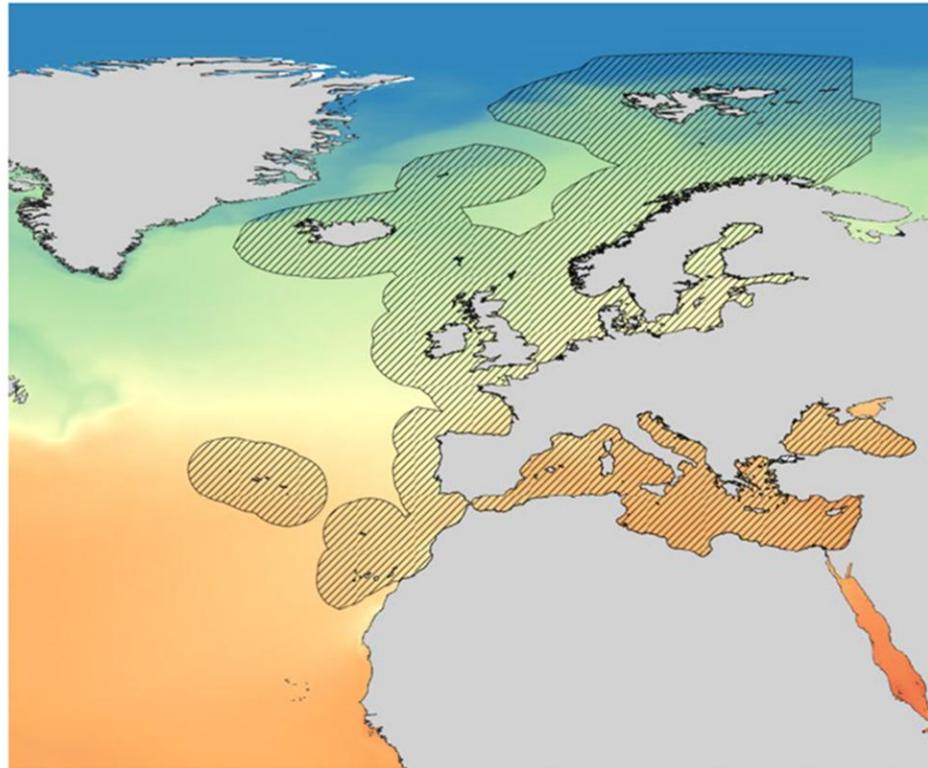
The proportion of **biodiversity** protected



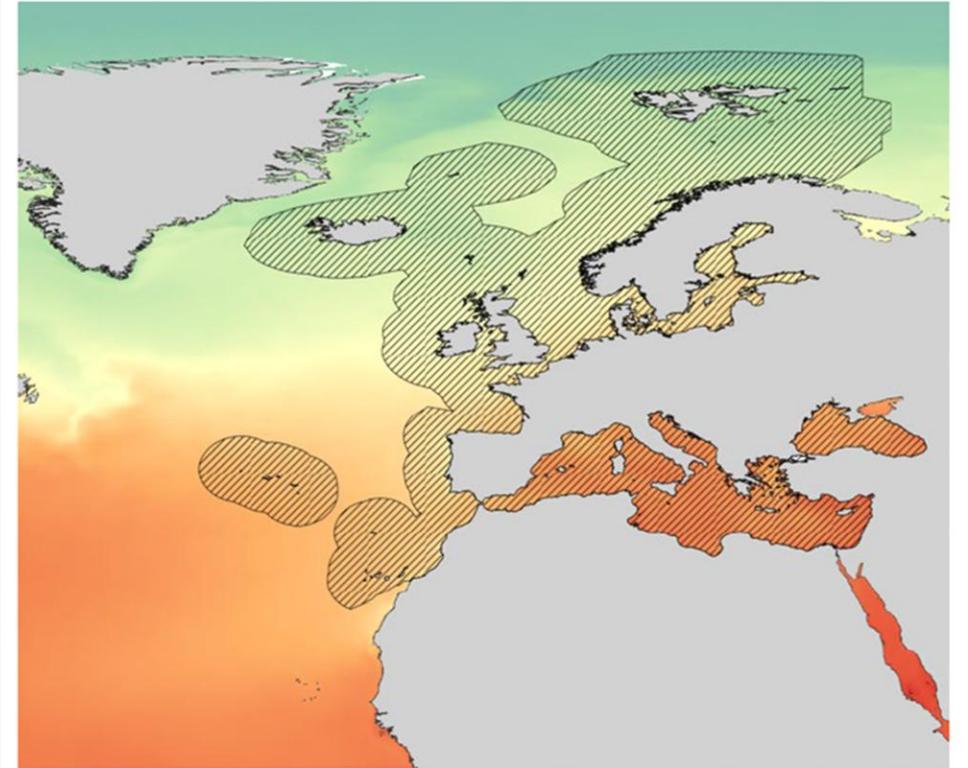
The proportion of **area** protected

# ENVIRONMENTAL DATA

Variable
Temperature
Salinity
Sea Ice Cover
Sea Ice Thickness
Sea Water Velocity
Mixed Layer Depth
Diffuse Attenuation Coefficient
PAR
PAR at bottom
Oxygen
pH
Iron
Phosphate
Nitrate
Silicate
Total phytoplankton
Chlorophyll
Topographic (slope)
Topographic (roughness)
EMODnet Bathymetry
Sedimentation Rates
Seabed Substrates
Distance to coast
Distance to closest port

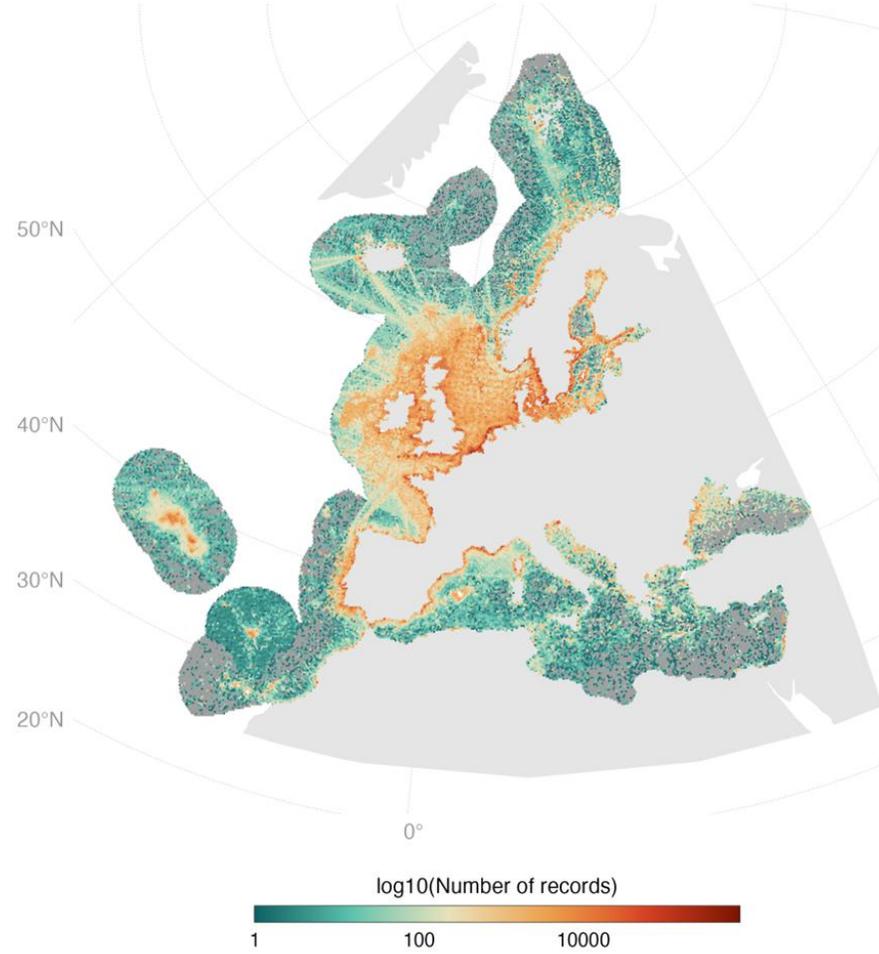
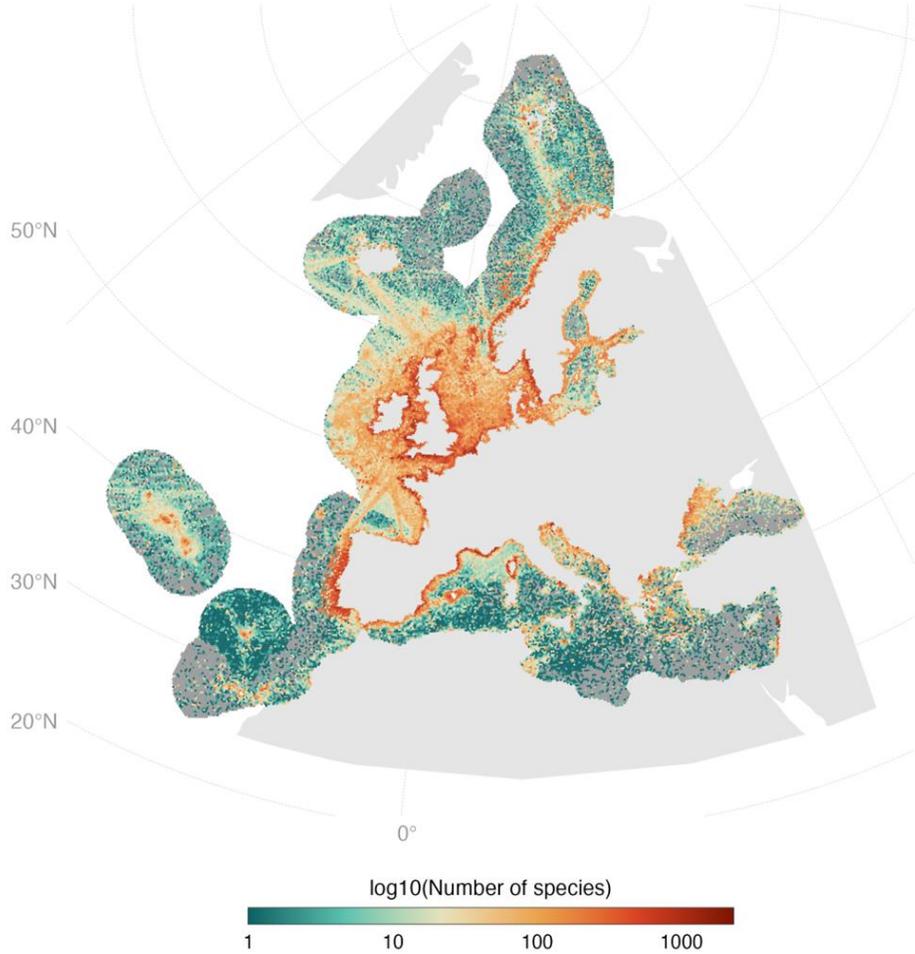


Present-day sea surface temperature



Future (decade 2090) sea surface temperature

Example of data layer produced for the European Seas from **BioOracle**.  
Colour gradients reflect spatial differences in °C from today (left) to 2090 (right)



## SOURCE OF ADDITIONAL SPECIES DATASETS (into OBIS)

- Peer
- BioTIME
- GBIF
- Dryad
- Literature
- ...

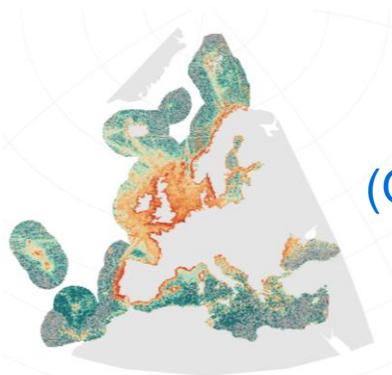


Marine species distribution data available in **OBIS**, including ~ 30,000 species (left) AND > 67,000,000 records (right)

# SPECIES DISTRIBUTION MODELLING

## Biodiversity & Environmental data

Species occurrence  
(OBIS + GBIF)



(BioORACLE v3)

Sea Surface Temperature



## Predicting potential distribution

SSP585

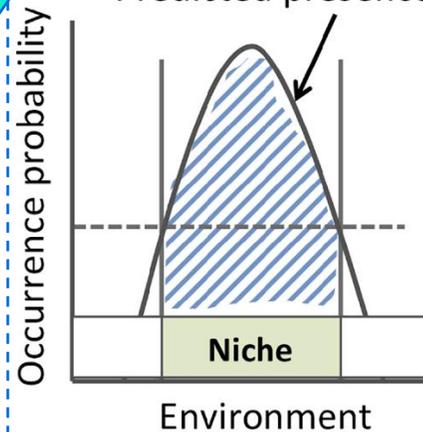


Decade 50

### SDMs

$$\text{logit}(\pi_i) = \alpha + \sum_{j=1}^p \beta_j X_{ij}$$

Predicted presence



Distribution maps for  
~12,000 marine species  
from Europe

Biogenic habitat  
maps, based on SDMs

Conservation status  
of species and habitats  
(Red List)

Species range shifts

Five CMIP6  
scenarios  
(SSP1- SSP5)

Two periods  
(2050 / 2100)

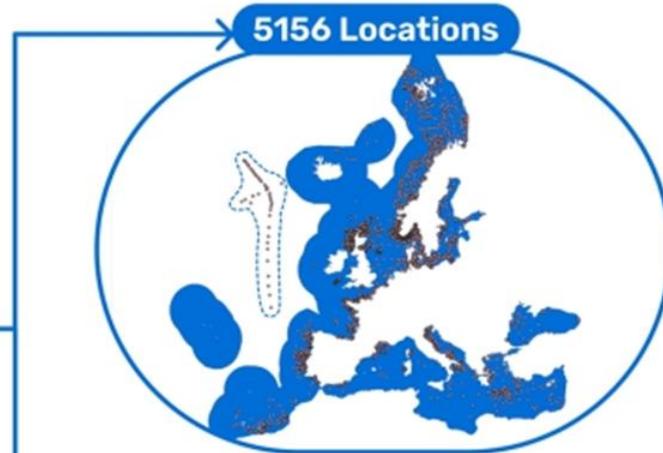
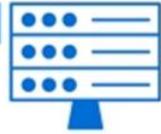
# BLUE CARBON DATA

80 CONTRIBUTORS

33 DATASETS



33,650 ENTRIES



- 19 EU countries
- 11 Non-EU countries
- High Seas

## SOURCES OF ADDITIONAL BLUE CARBON DATASETS



PANGAEA



SeaDataNet



EMODnet  
European Marine Observation and Data Network



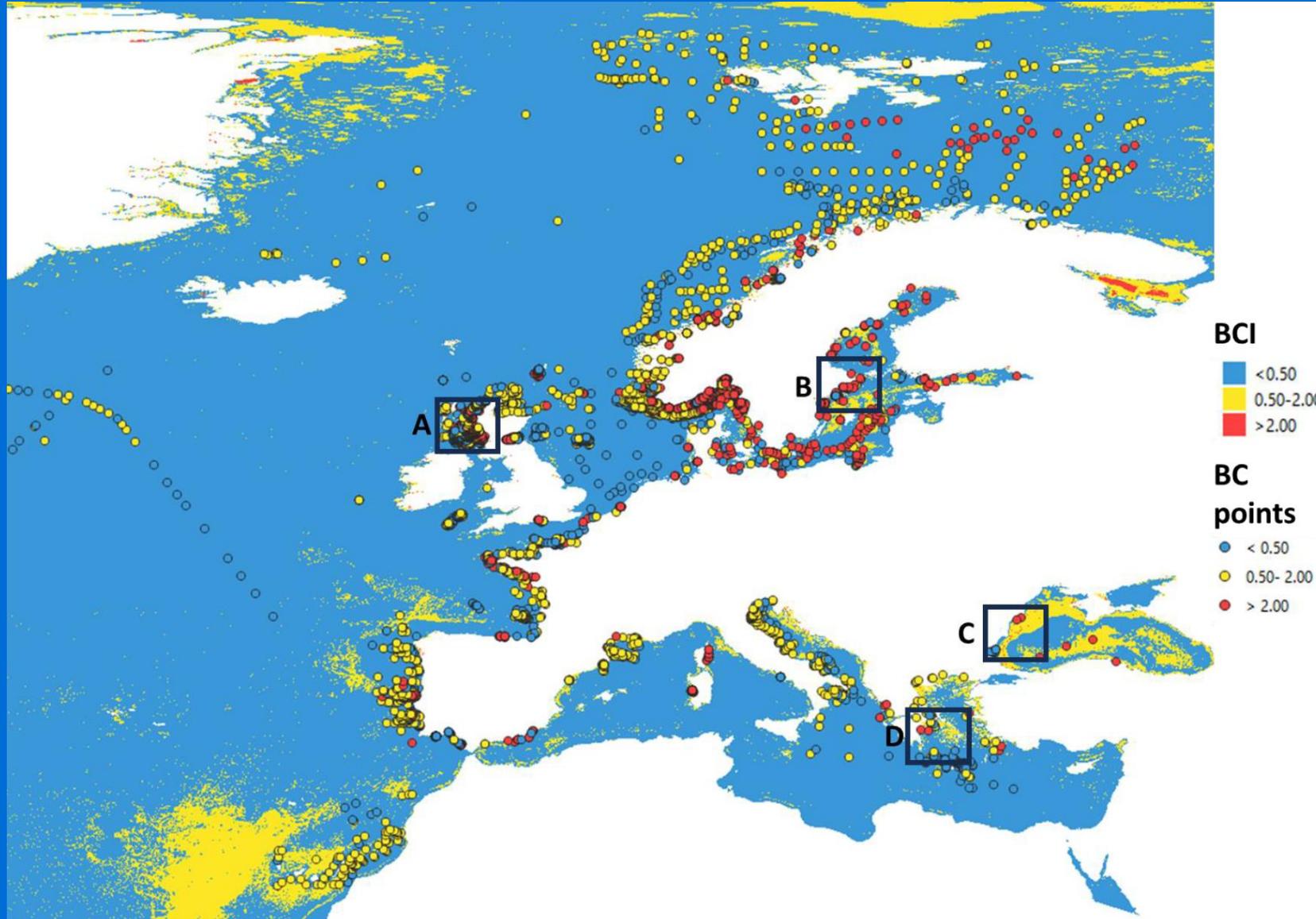
Geo-Seas



PERSPECTIVE  
The future of Blue Carbon science  
View: I. Marinović et al.

The term Blue Carbon (BC) was first coined in 2005 to describe the disproportionately large contribution of coastal vegetated ecosystems to global carbon sequestration. The role of BC in climate change mitigation and adaptation has been increasingly recognized. The European Union (EU) has set ambitious targets for reducing greenhouse gas emissions and increasing carbon sinks. BC ecosystems, including saltmarshes, seagrasses, and mangroves, are highly productive and store large amounts of carbon in their biomass and sediments. However, these ecosystems are also highly vulnerable to climate change, particularly sea level rise and ocean acidification. This perspective article discusses the current state of BC science, the challenges facing BC research, and the opportunities for future research. It highlights the need for a coordinated effort across disciplines and regions to improve our understanding of BC ecosystems and their role in the global carbon cycle. The article also discusses the potential for BC ecosystems to be used as natural climate solutions and the need for policies that support their conservation and restoration.

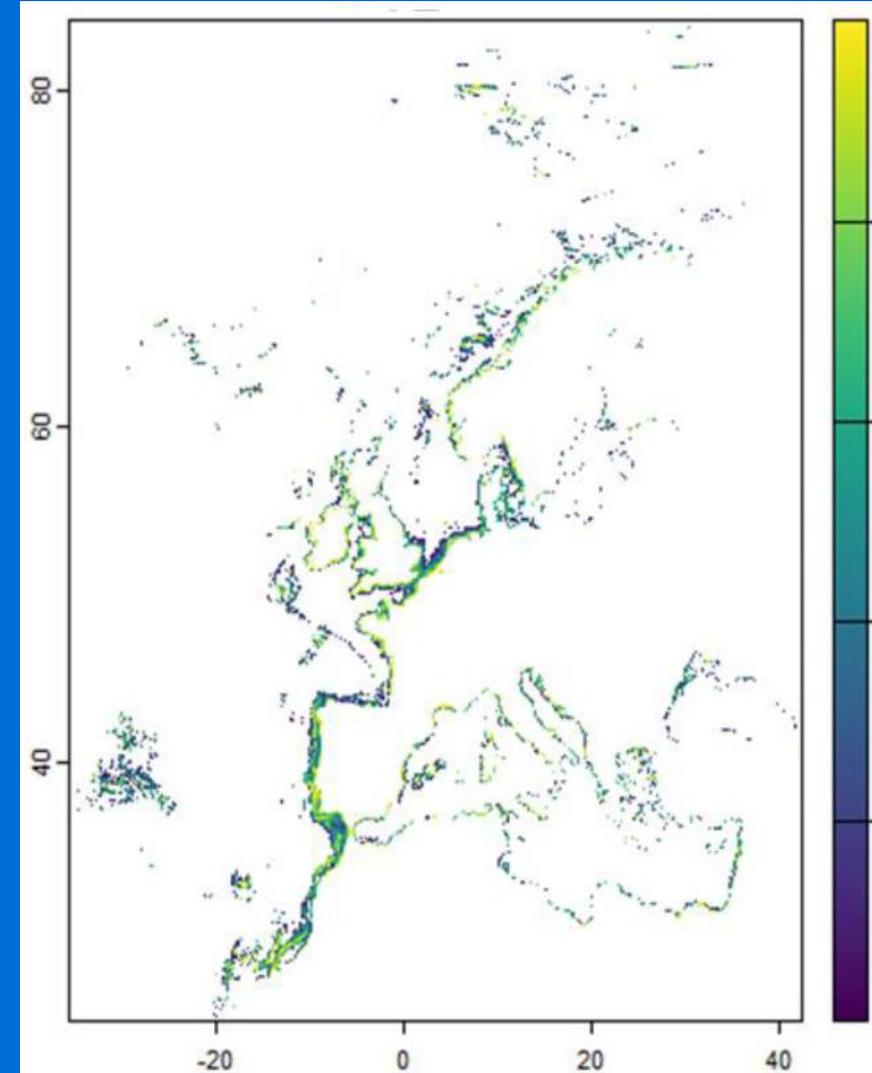
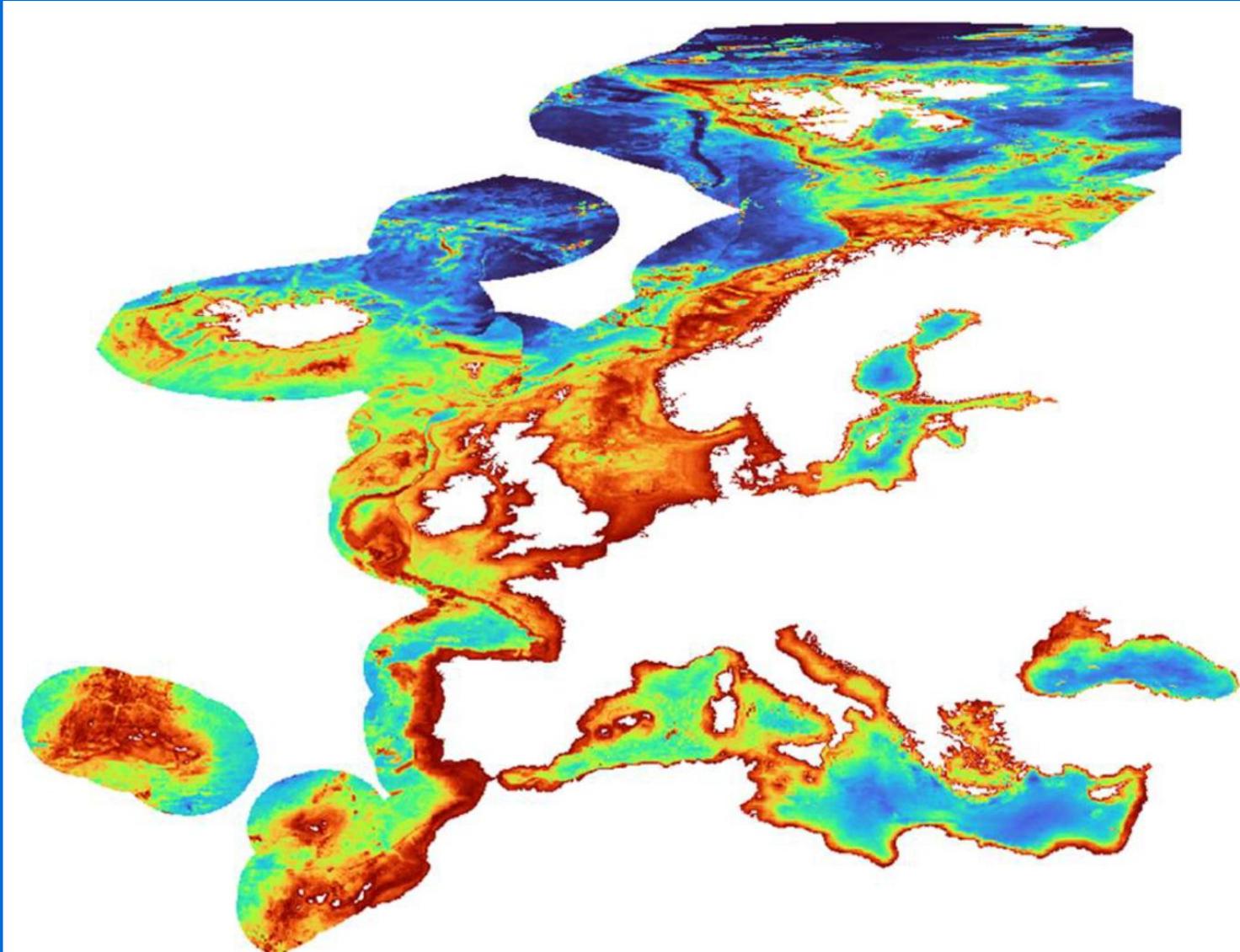


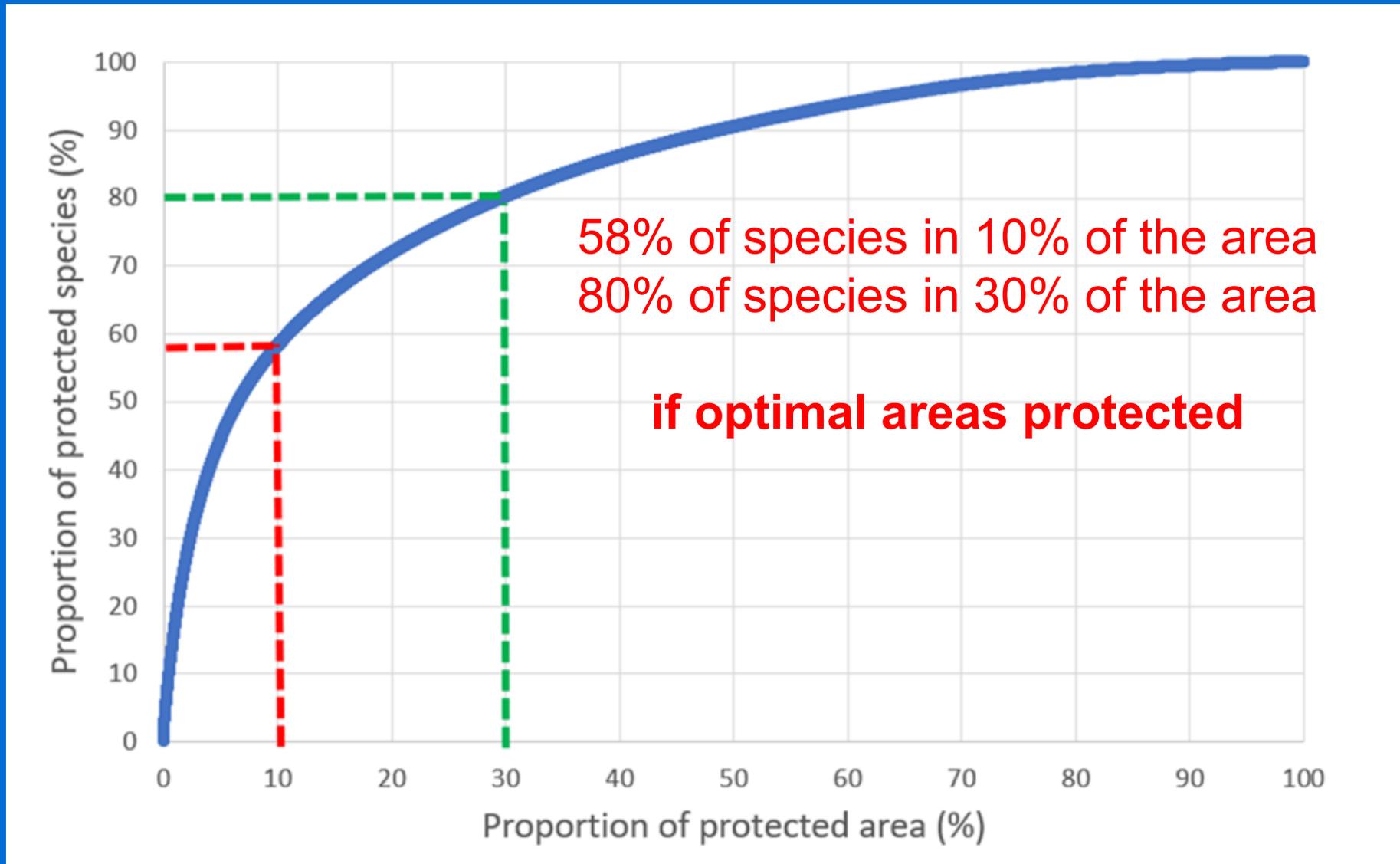


Modelled organic carbon concentration in seabed sediments, overlaid by sample data points, in the MPA Europe EURO-CARBON database.



The top 10% of the area – coastal including islands

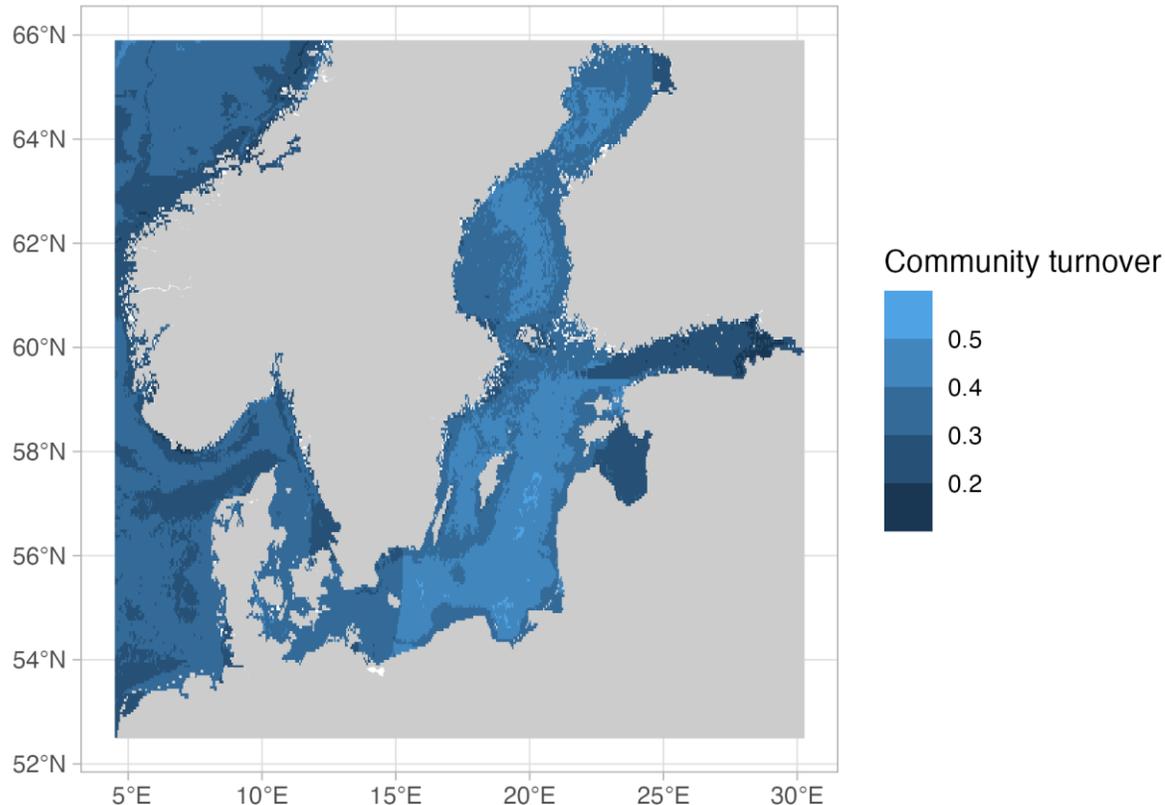




# SPECIES TURNOVER & CLIMATE REFUGIA

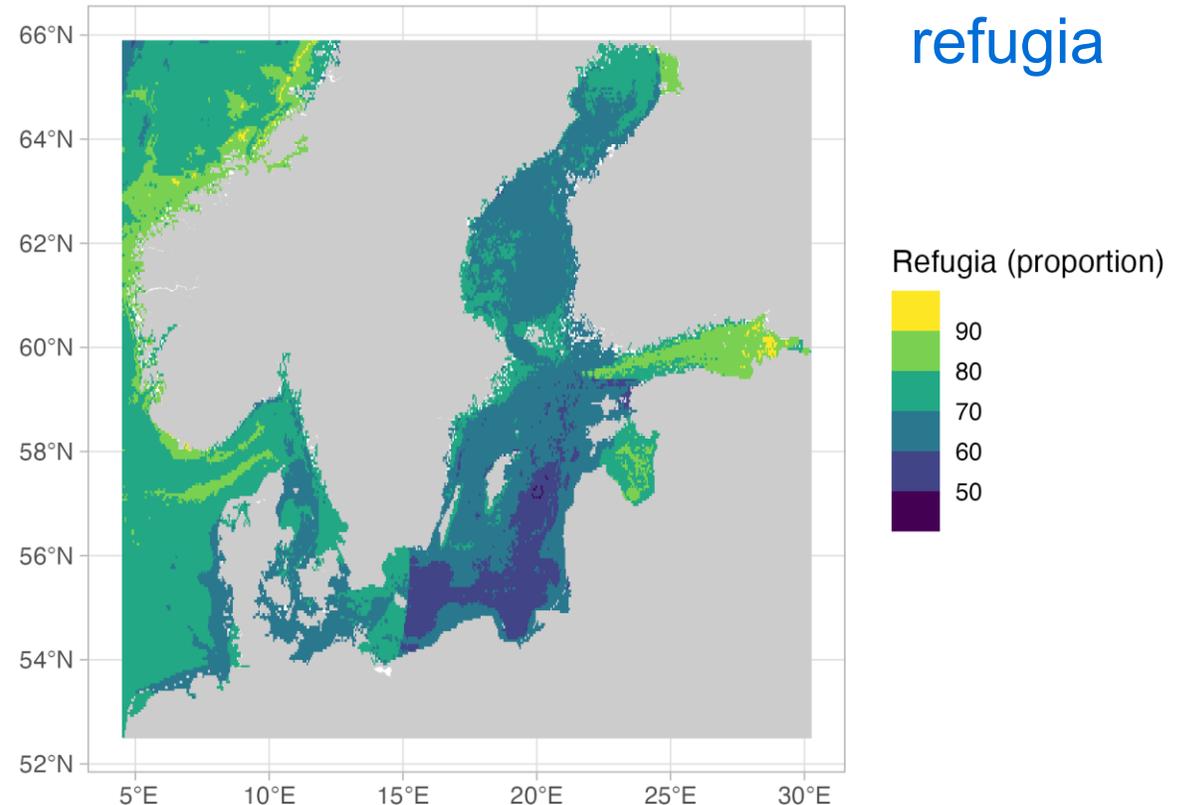
Difference between current and projected future ranges of species for the low emission climate change scenario SSP1-2.6 **1.8 °C** by 2100

Baltic sea and Atlantic (SSP1 - 2.6 - 2100) - community turnover



Refugia

Refugia is depicted as the proportion of species persisting on that cell



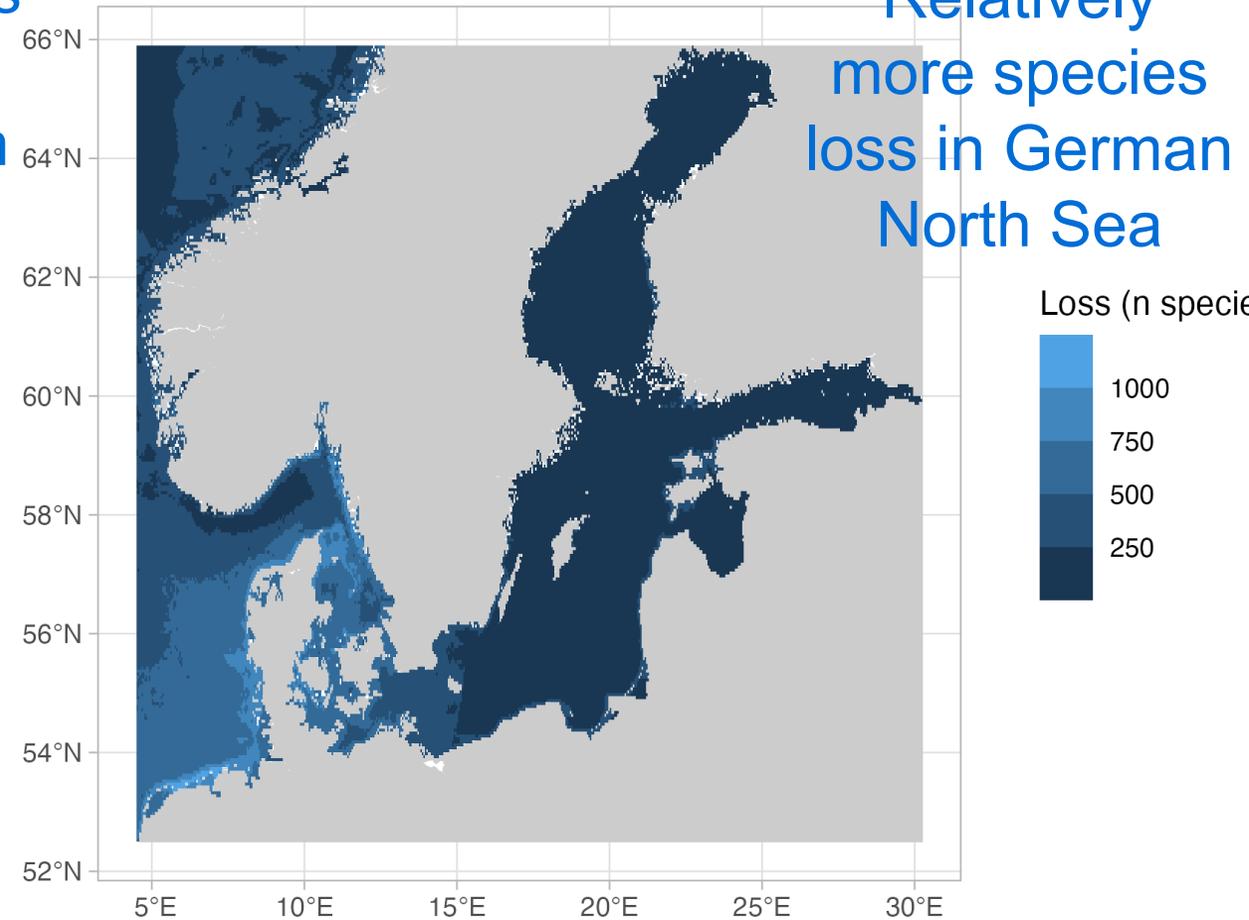
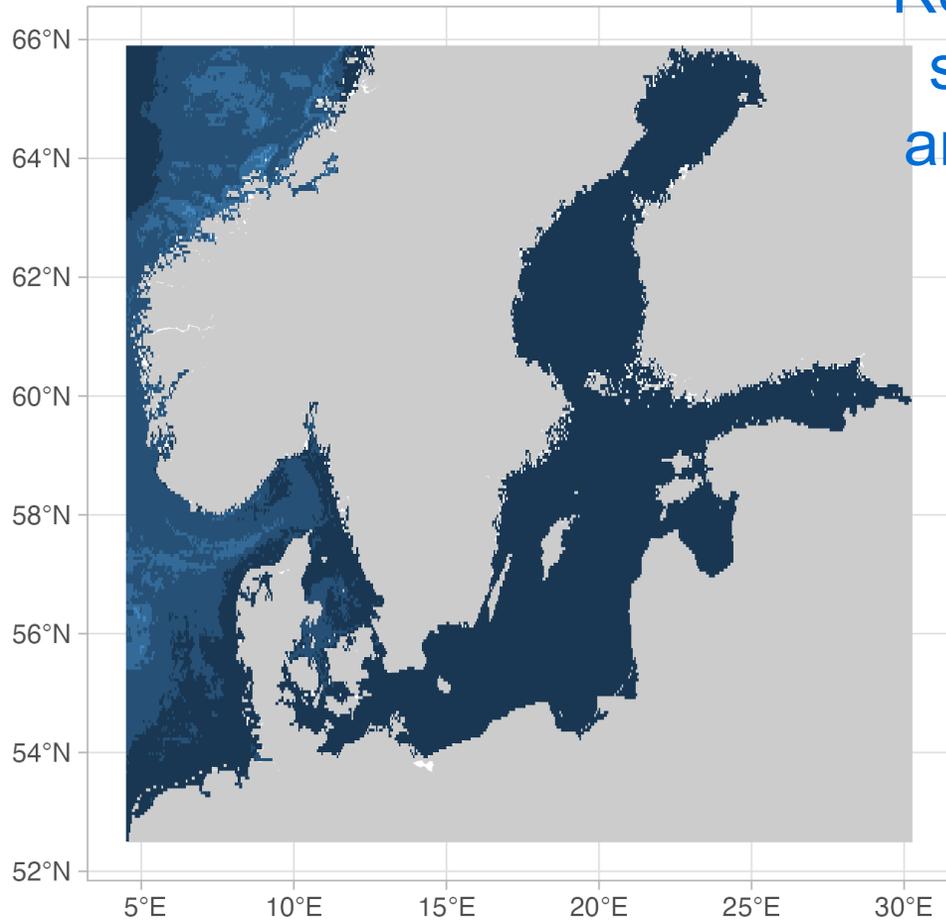
Least turnover of species in refugia

# SPECIES TURNOVER – GAINS & LOSSES

Difference between current and projected future ranges of species for the low emission climate change scenario SSP1-2.6 **1.8 °C** by 2100

Relatively less species lost and gained in Baltic Sea

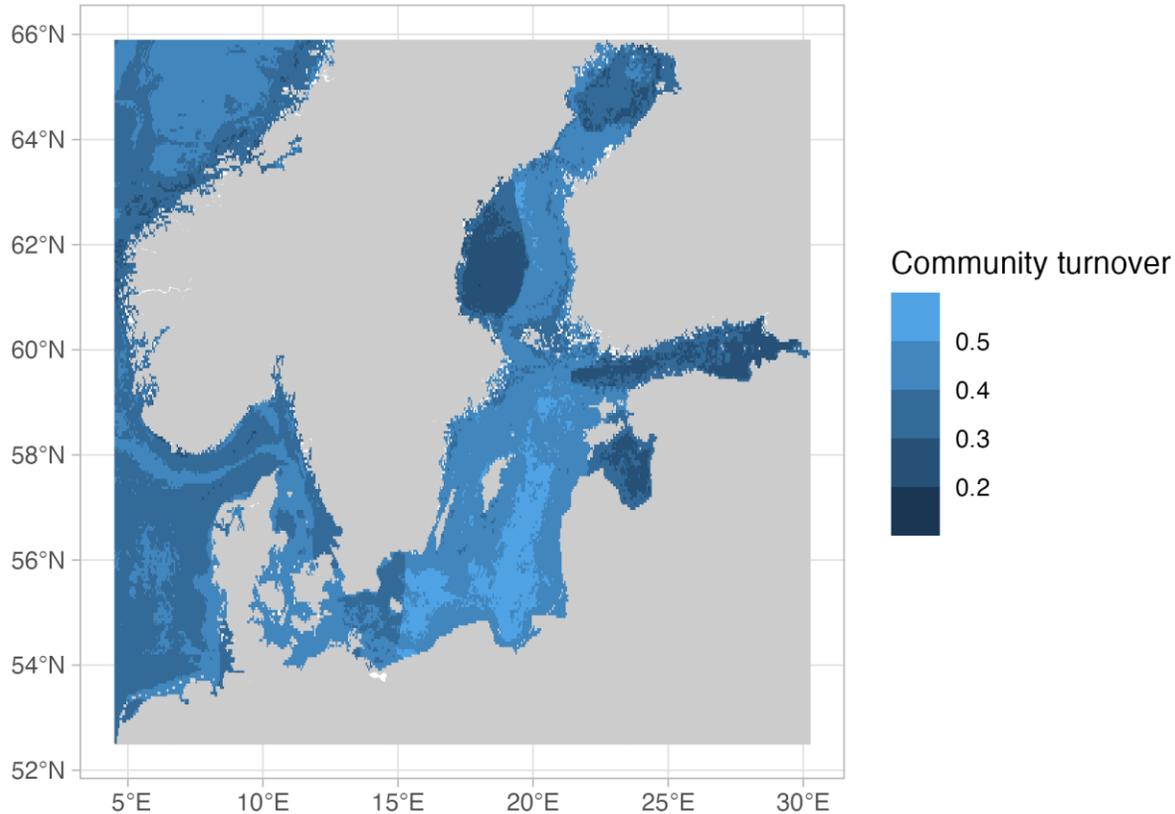
Relatively more species loss in German North Sea



# SPECIES TURNOVER & CLIMATE REFUGIA

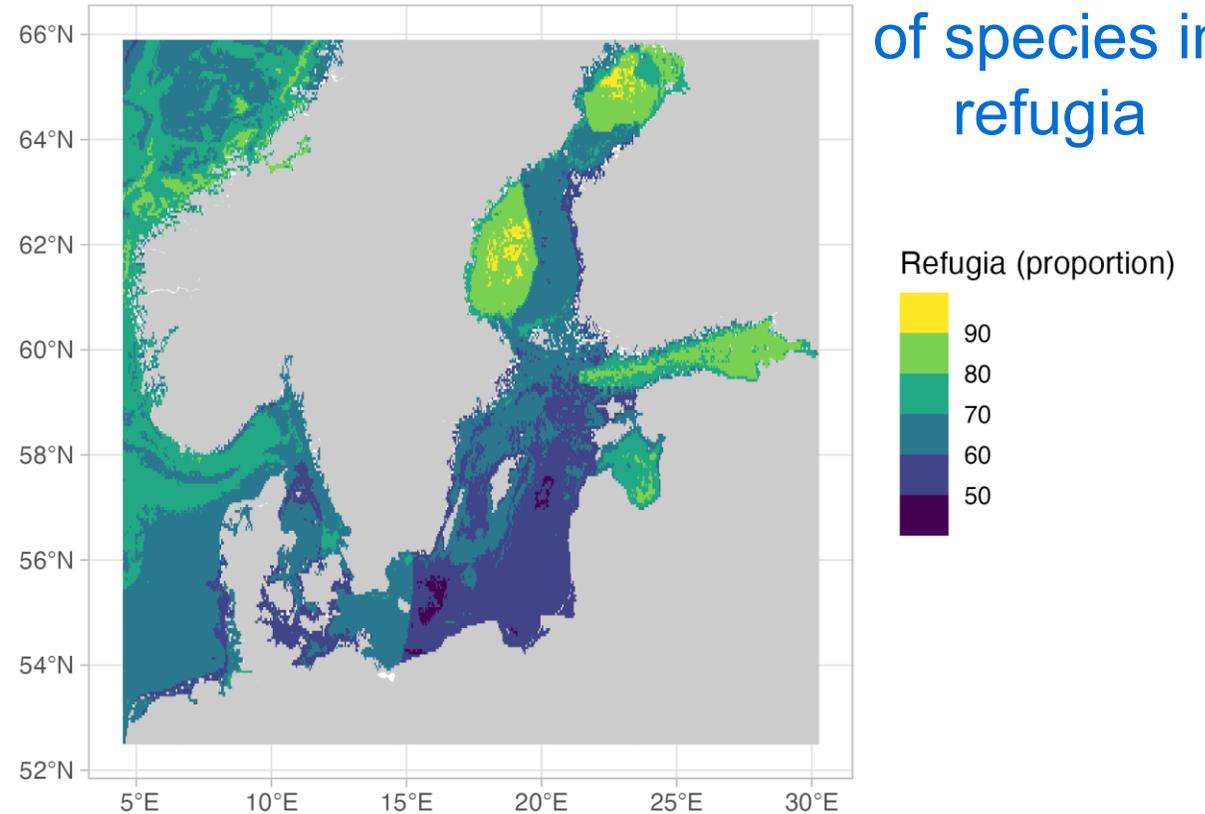
Difference between current and projected future ranges of species  
for the high emissions climate change scenario SSP3-7.0 **3.6 °C** by 2100

Baltic sea and Atlantic (SSP3 - 7.0 - 2100) - community turnover



Refugia

Refugia is depicted as the proportion of species persisting on that cell

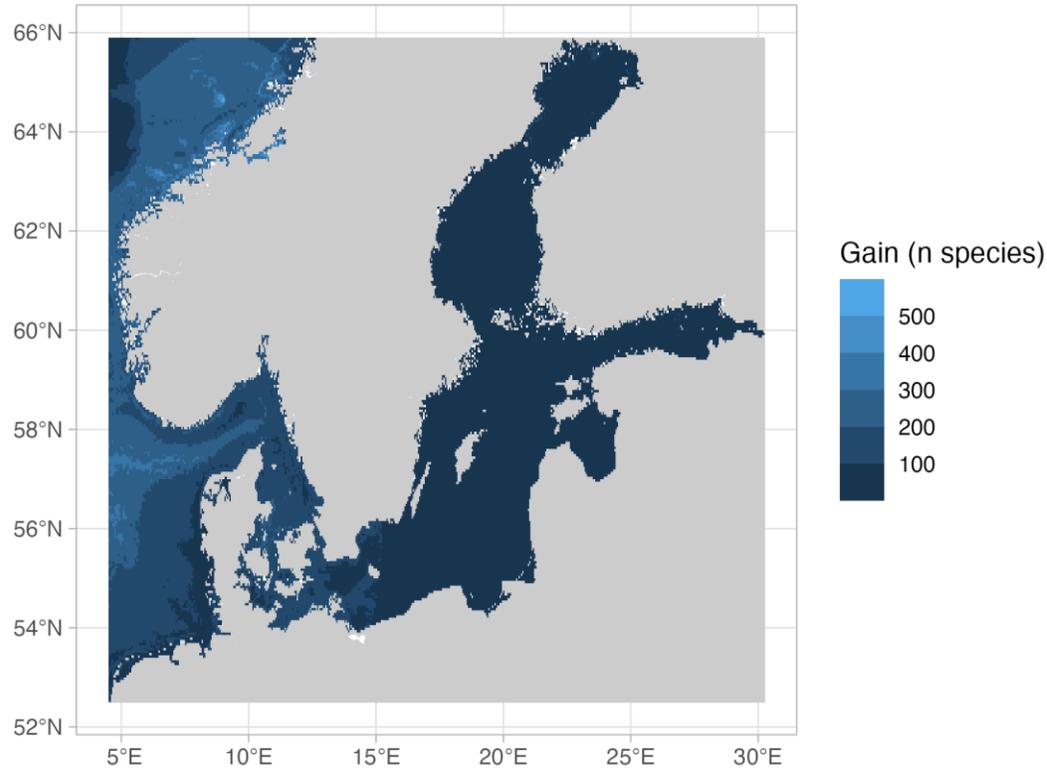


Least turnover  
of species in  
refugia

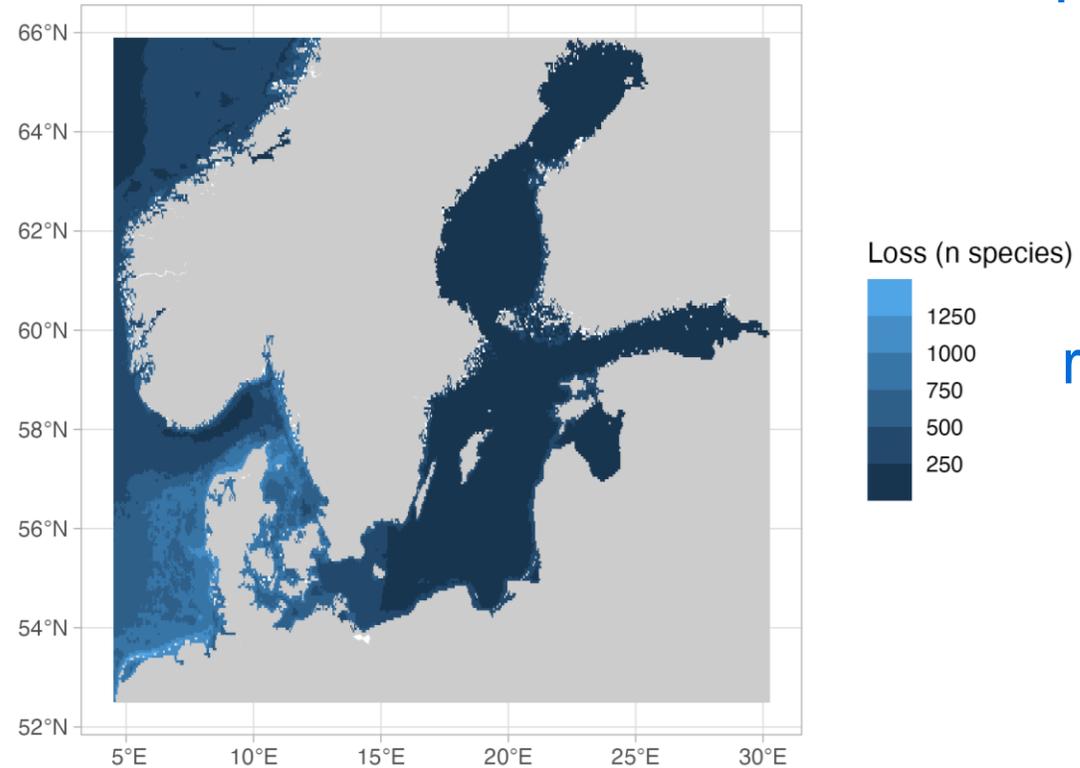
# SPECIES TURNOVER – GAINS & LOSSES

Difference between current and projected future ranges of species for the high emissions climate change scenario SSP3-7.0 **3.6 °C** by 2100

Gain of species



Loss of species



Few species lost and gained in Baltic Sea; more relative loss in German North Sea

## NEW ATLAS LAYERS COMING SOON!

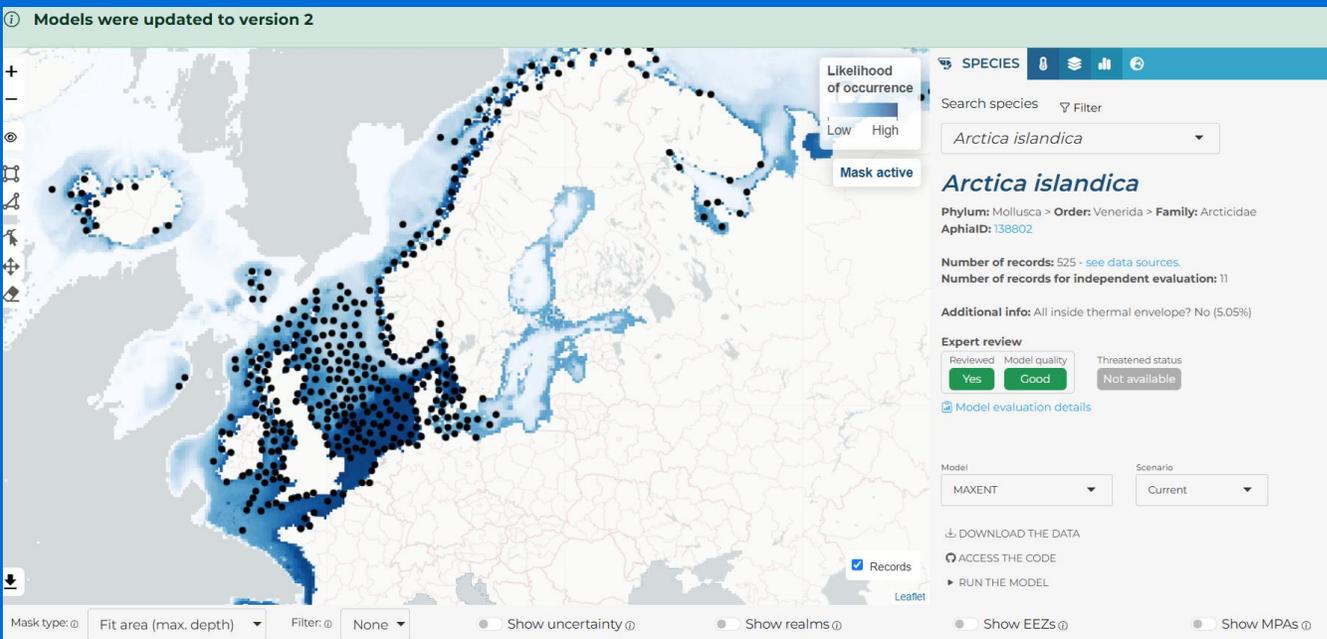
<https://shiny.obis.org/distmaps/>

[https://iobis.github.io/mpaeu\\_docs/](https://iobis.github.io/mpaeu_docs/)

Video tutorial: <https://www.youtube.com/watch?v=o0DwqXiZVe8&t=2s>



Scan me!



# THANK YOU

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