



PI: Mark J. Costello, Nord University (NORD, Norway)

MPA Europe Mediterranean Regional Stakeholder workshop

In collaboration with



Tuesday, January 28th, 2025; Real Jardín Botánico - CSIC

The MPA Europe project is co-funded by the European Union under the Horizon Europe program (grant agreement no. 101059988)



OUTLINE

- MPA Europe goals and results to date (25 min)
 - Q&A session (15 min)
 - OPEN DISCUSSION (60 min)
- Wrap-up (5 min) + shared short report post-workshop



MPA Europe: Goals and Results to date

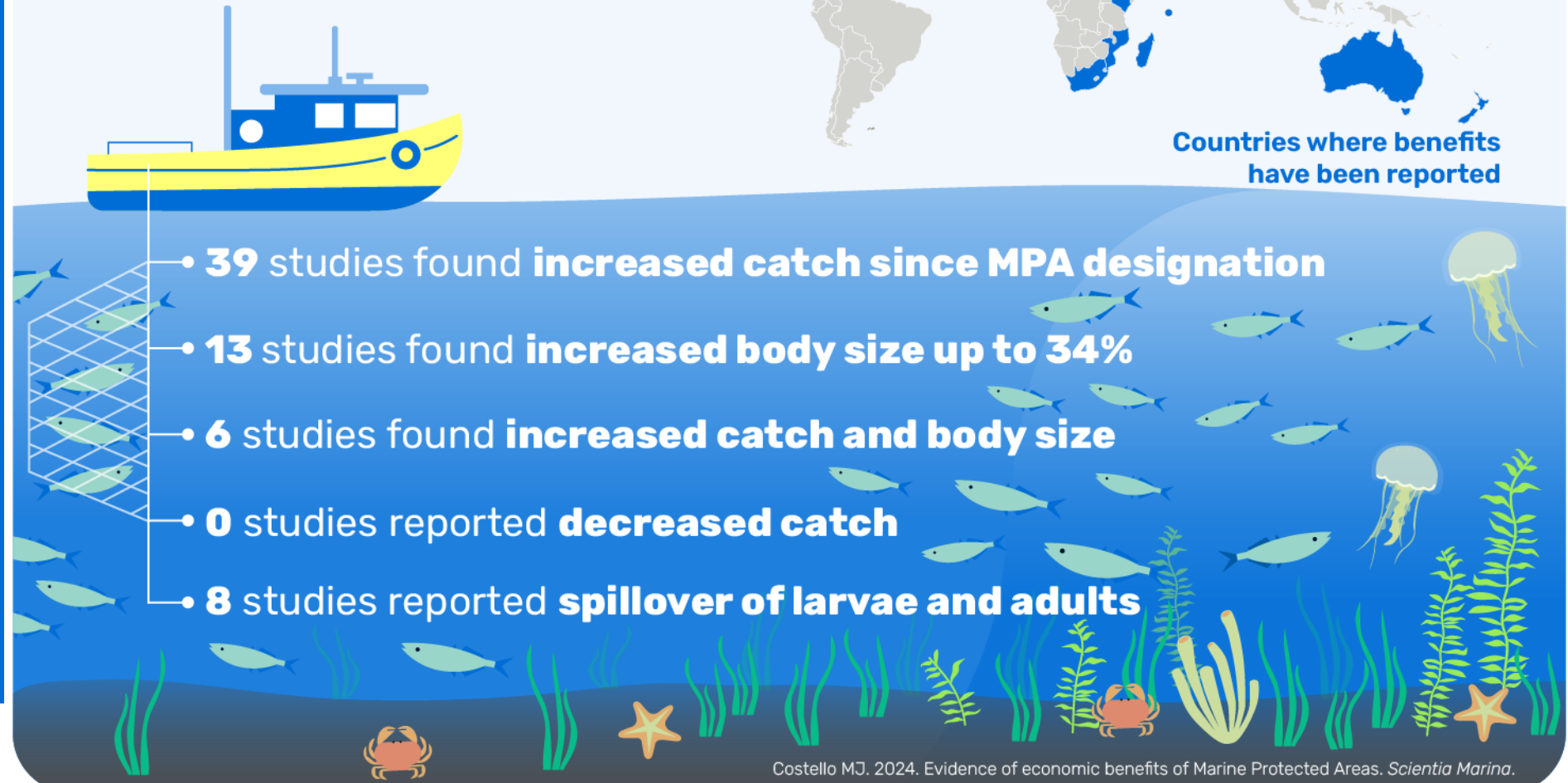
Anna M. Addamo, Nord University (Norway)
Silas C. Principe, UNESCO/IOC (Belgium)
Belinda Bramley and Thanos Smanis CLIMAZUL (Greece)

PROJECT BACKGROUND

New review of
science
literature on
MPA effects on
fisheries found
examples from
25 countries.

**No indications
of any fishery
loss due to
MPA anywhere.**

Economic benefits of MPAs for finfish, crustacean, and mollusc fisheries



- **39** studies found **increased catch since MPA designation**
- **13** studies found **increased body size up to 34%**
- **6** studies found **increased catch and body size**
- **0** studies reported **decreased catch**
- **8** studies reported **spillover of larvae and adults**



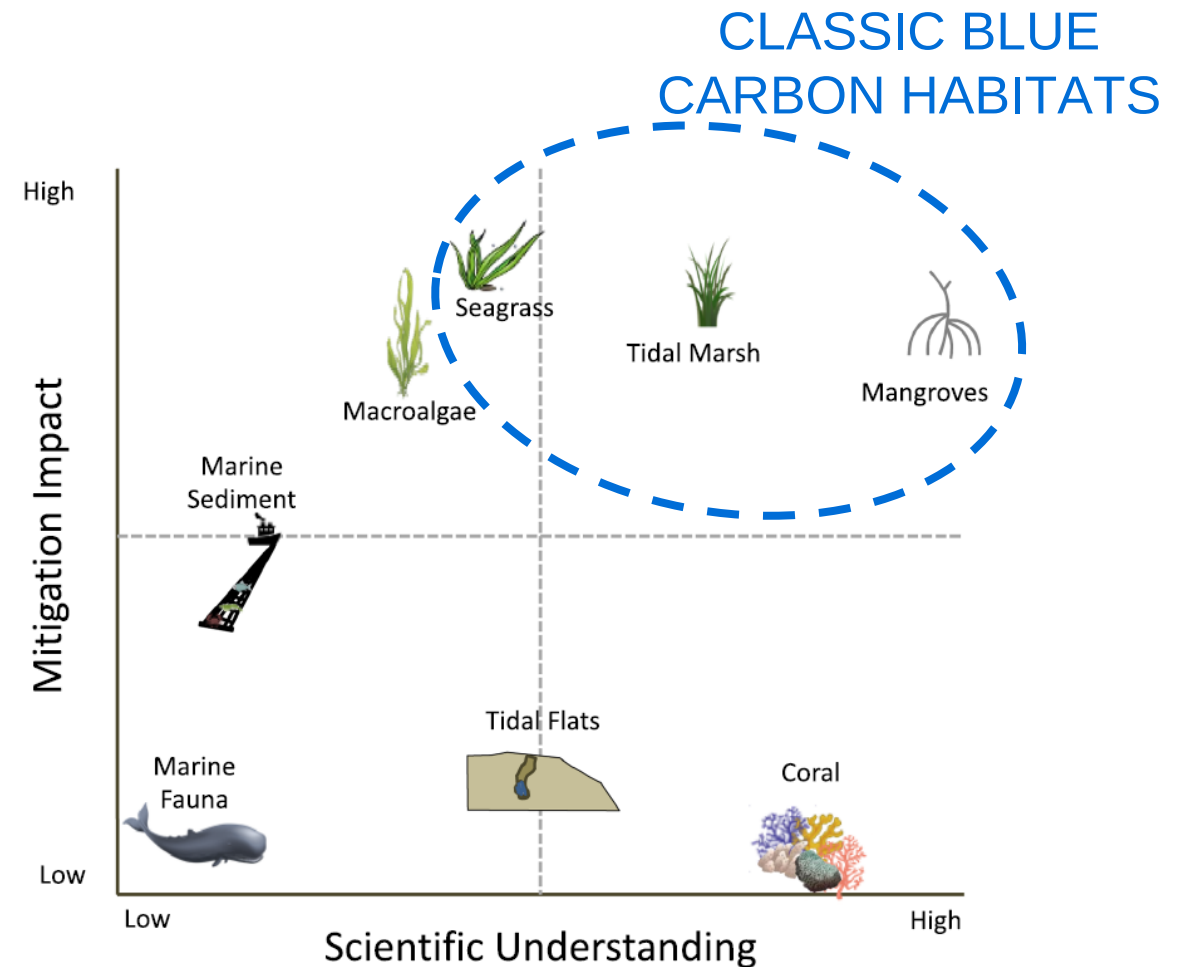
MPA EUROPE IS MAPPING
THE OPTIMAL LOCATIONS FOR
MARINE PROTECTED AREAS
IN EUROPEAN SEAS TO
SUPPORT SCIENCE-BASED
MARINE SPATIAL PLANNING

BIODIVERSITY

BLUE CARBON

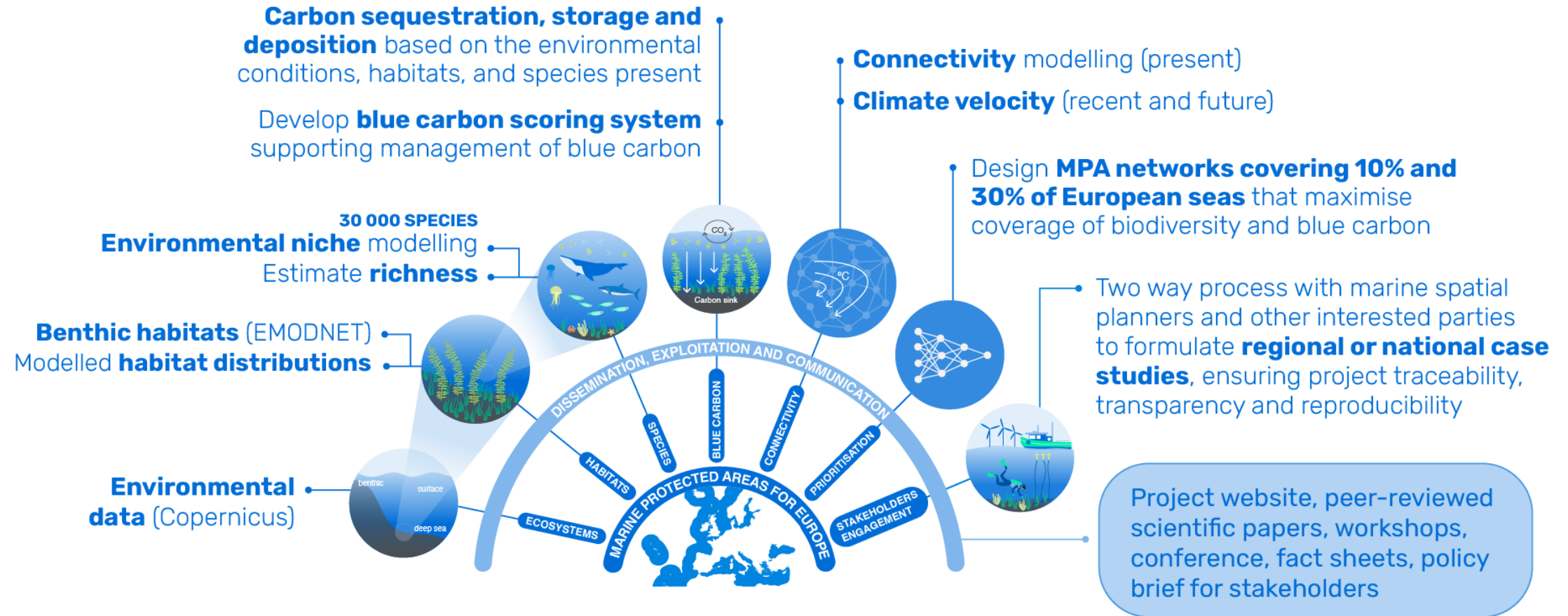
IPCC definition: “all biologically-driven carbon fluxes and storage in marine systems that are amenable to management”.

Management of Blue Carbon (BC):
Protection and restoration of BC habitats and associated C-sinks require information on BC location, size and associated drivers.



Howard et al. 2023

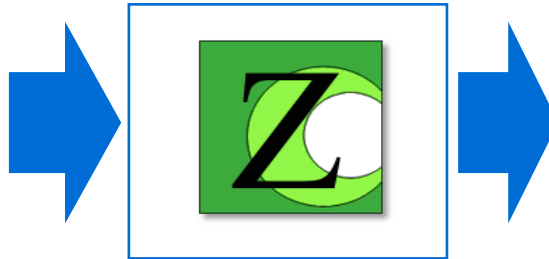
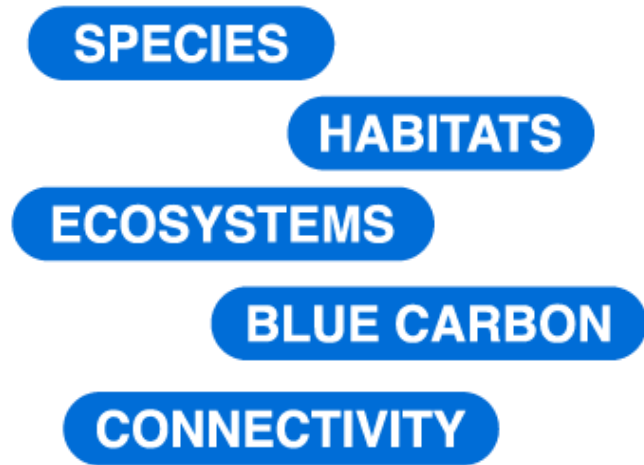
PROJECT COMPONENTS



PROJECT APPROACH

SYSTEMATIC CONSERVATION PLANNING (SCP)

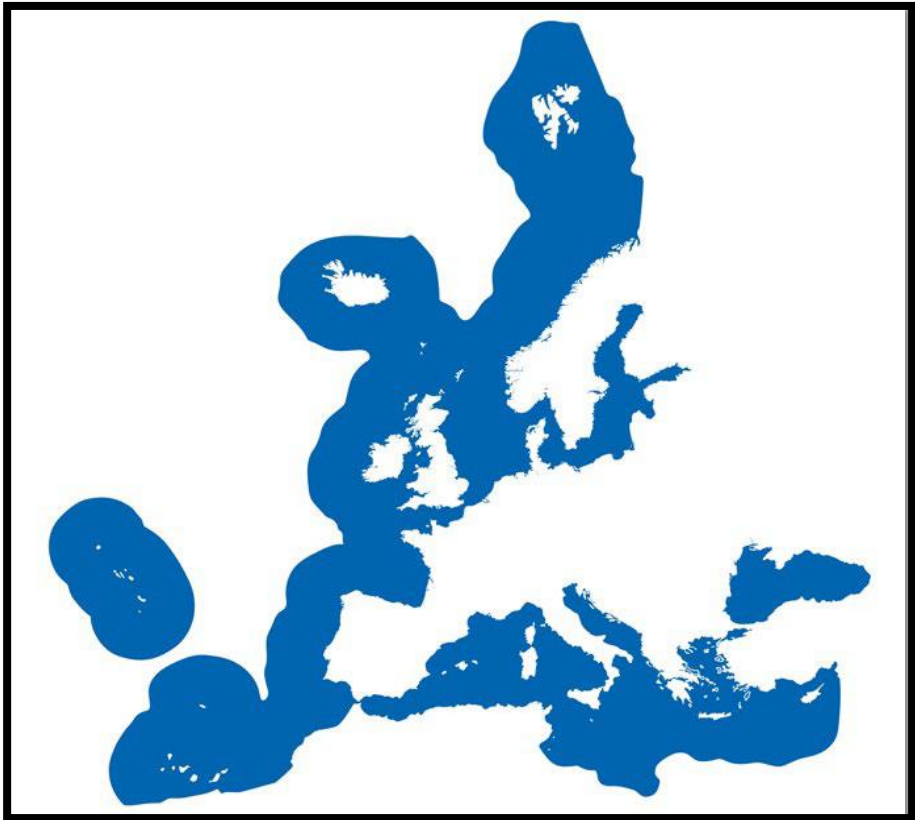
Standardised and
complete data layers



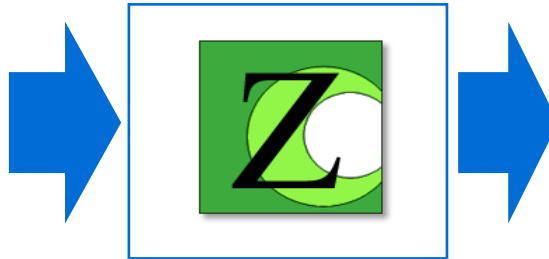
MPA EUROPE PROPOSE
PRIORITY AREAS TO
PROTECT
(A) BIODIVERSITY AND
(B) BLUE CARBON

SYSTEMATIC CONSERVATION PLANNING (SCP)

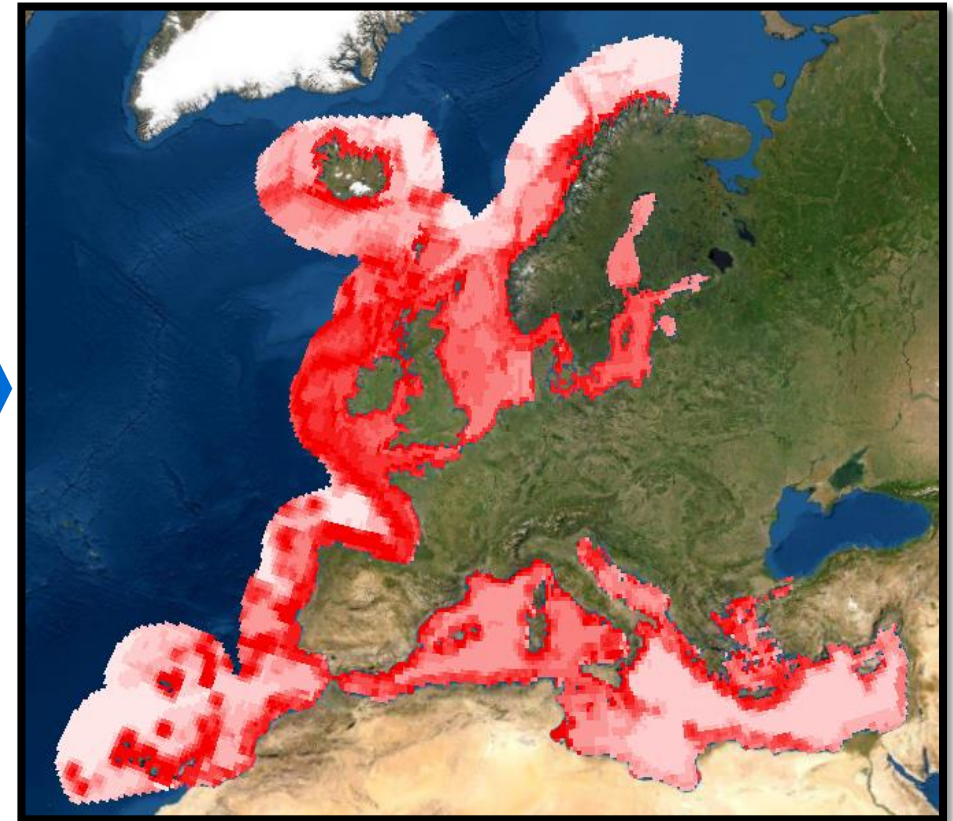
Standardised and
complete data layers



© MPA Europe



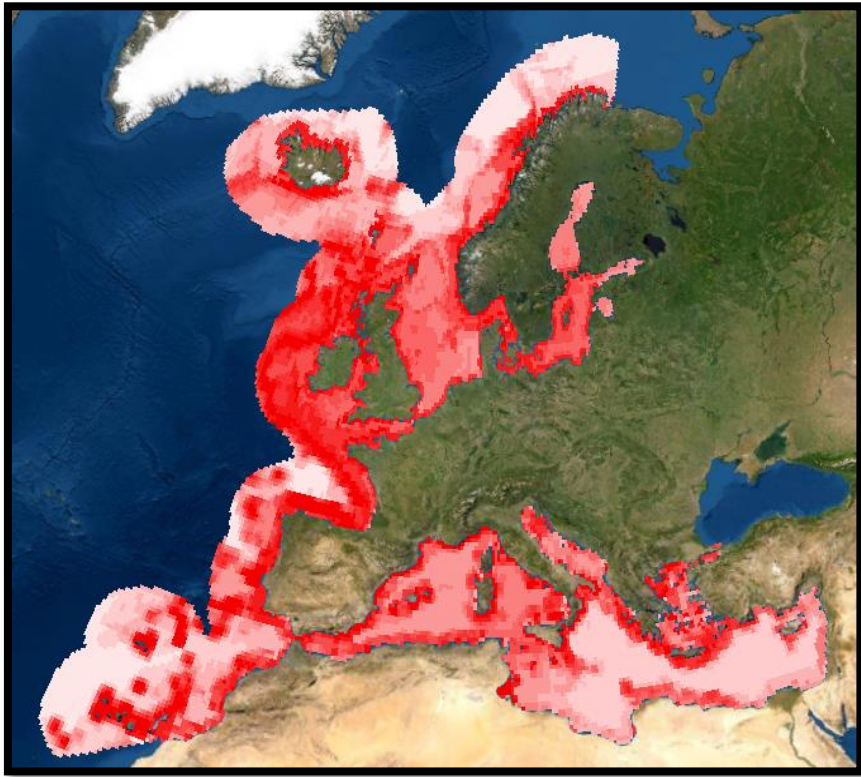
Example of prioritised areas
(**darker red** = **higher** priority)



© MPA Europe

PROJECT APPROACH

PRIORITIZATION



MARINE
REGION



COUNTRY
(12NM)

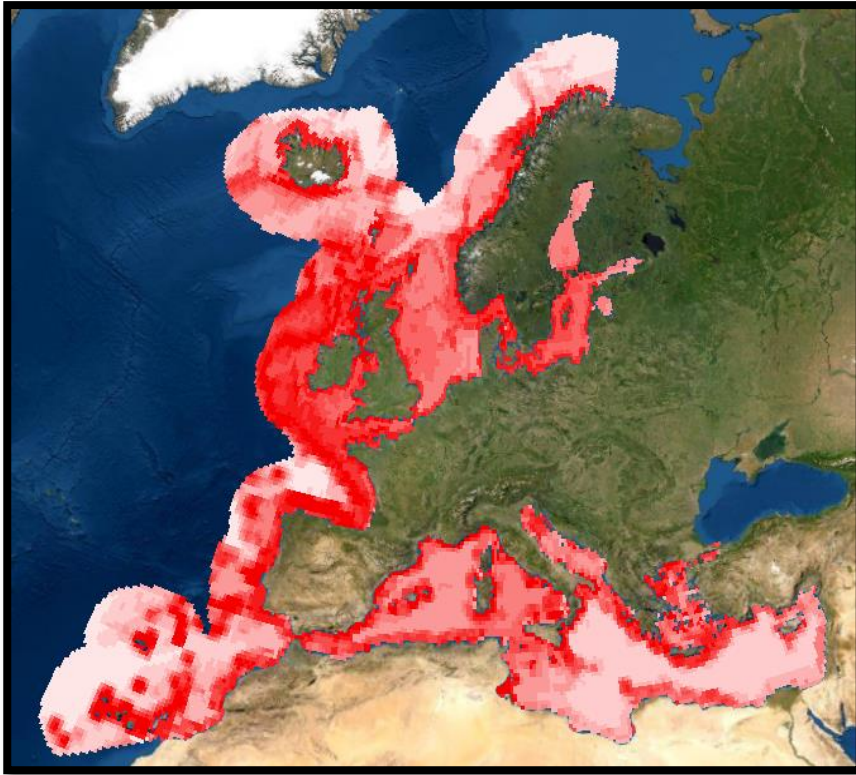


COUNTRY
(EEZ)

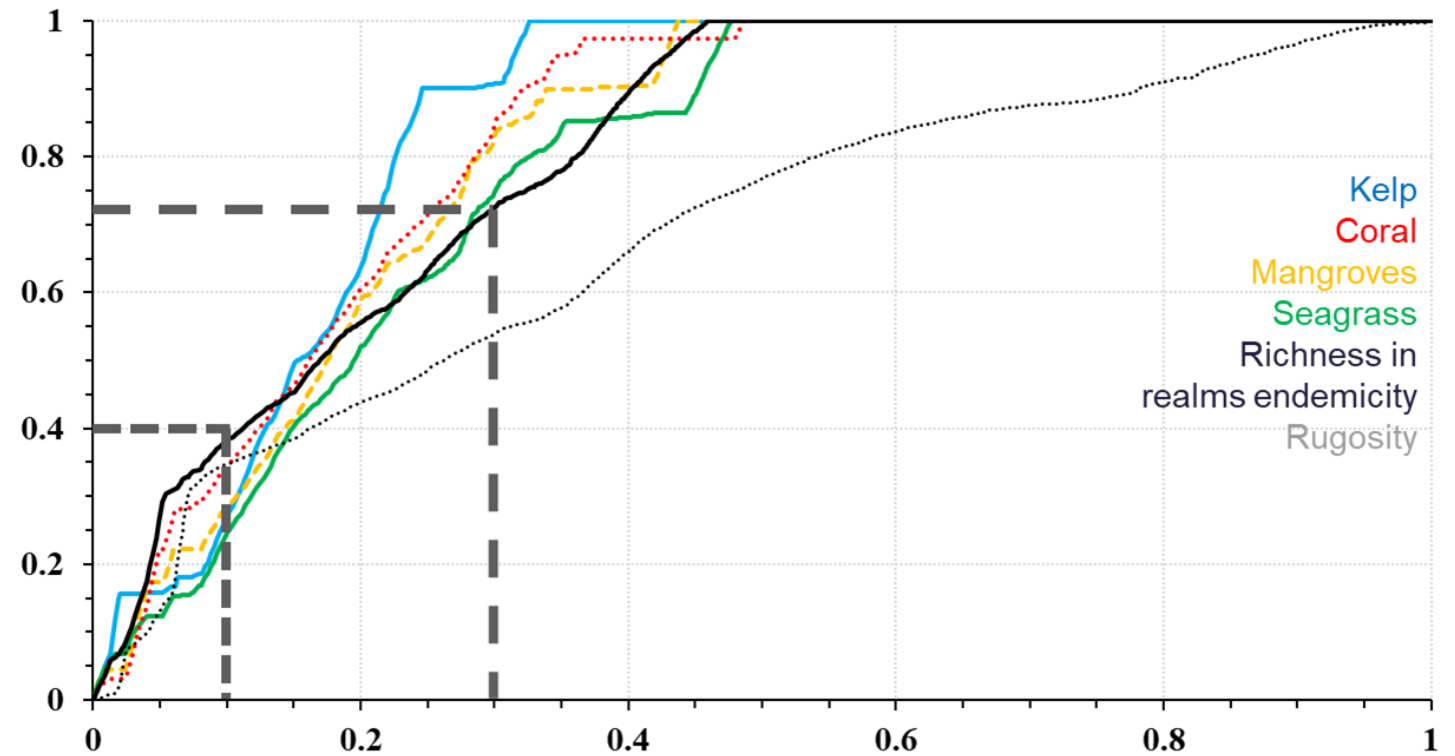


PROJECT APPROACH

PRIORITIZATION



The proportion of **biodiversity** protected

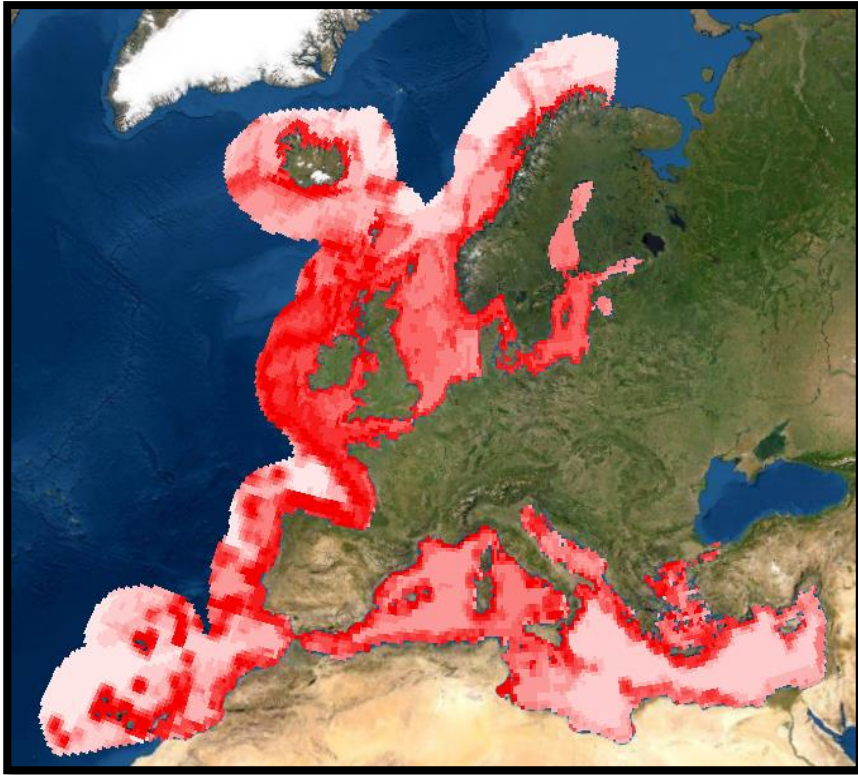


The proportion of **area** protected

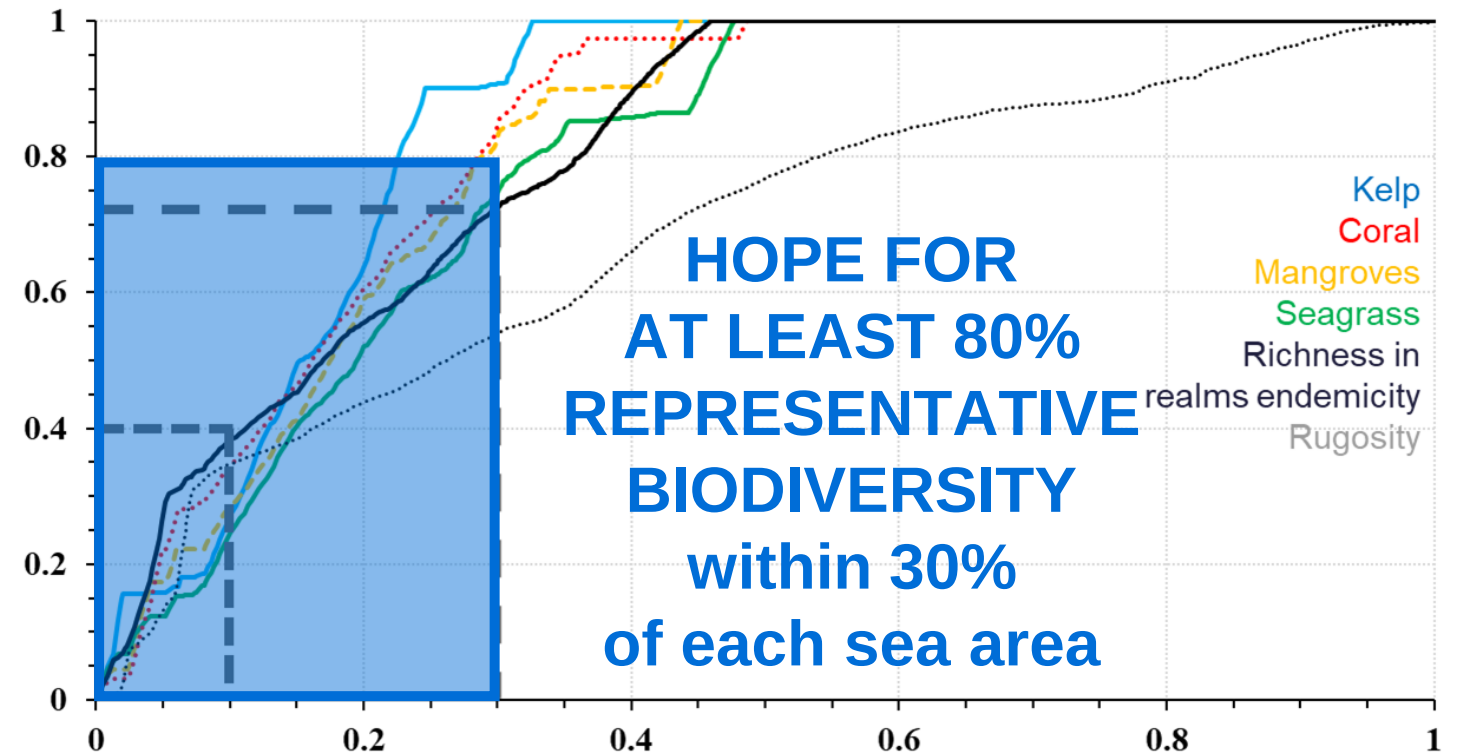
Zhao et al 2020

PROJECT APPROACH

PRIORITIZATION



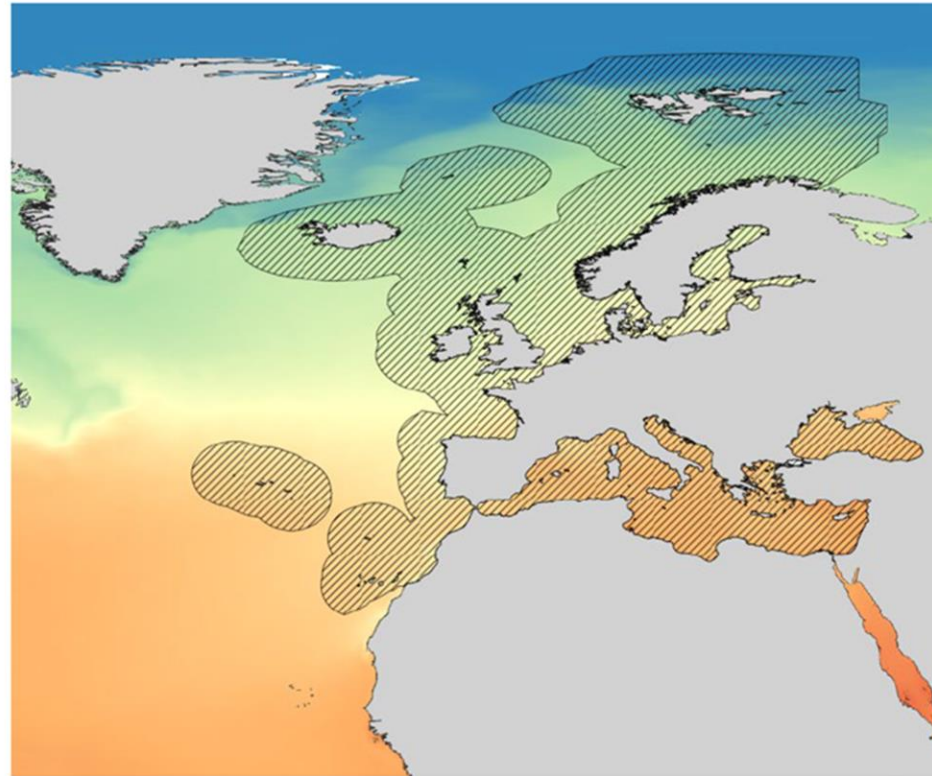
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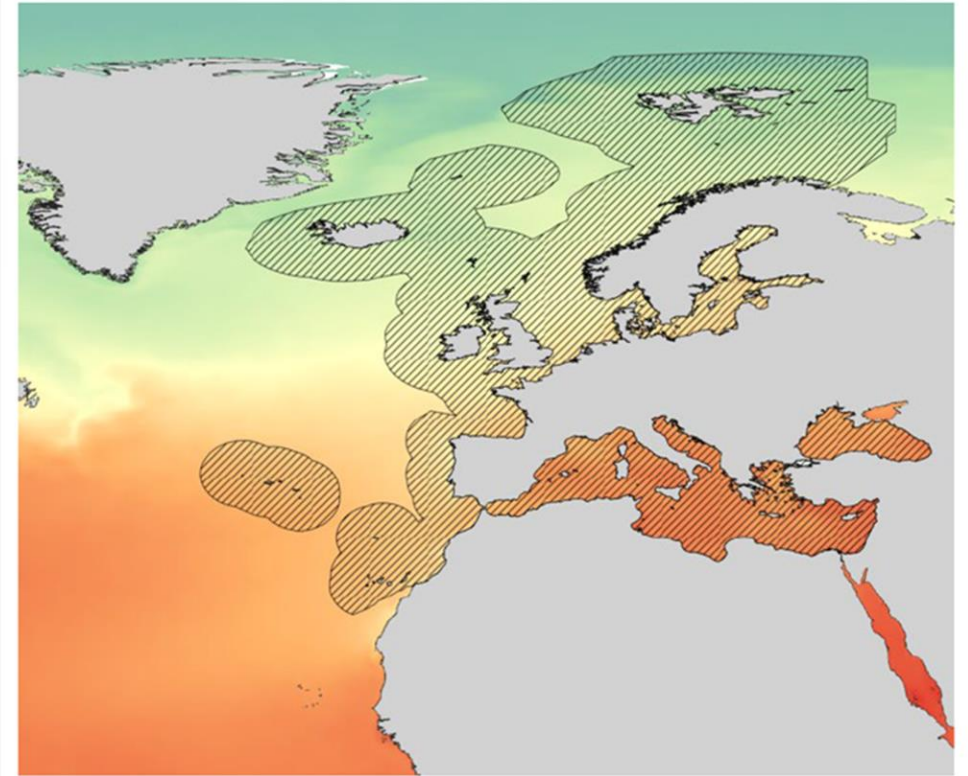
The proportion of **area** protected

Zhao et al 2020

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



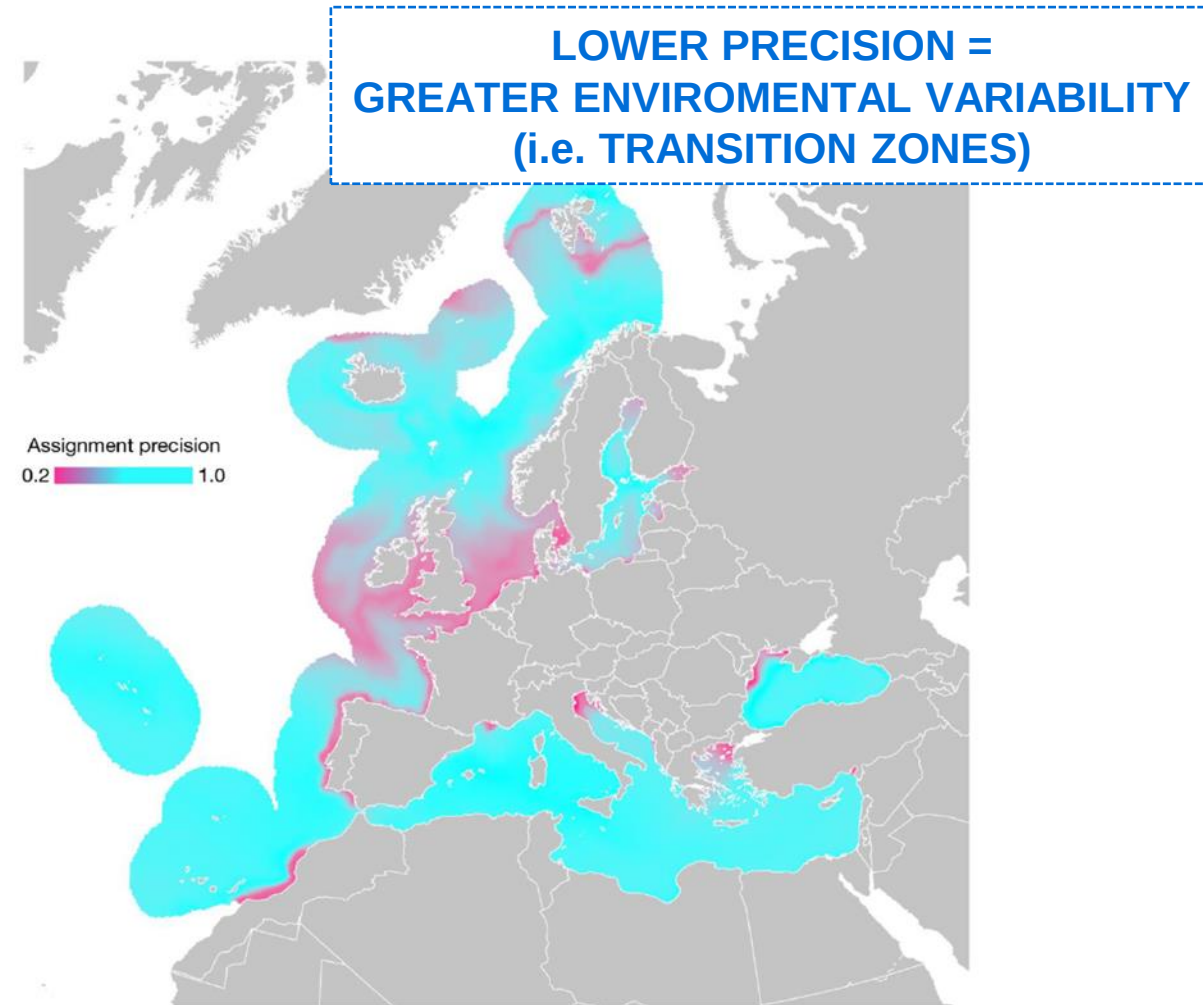
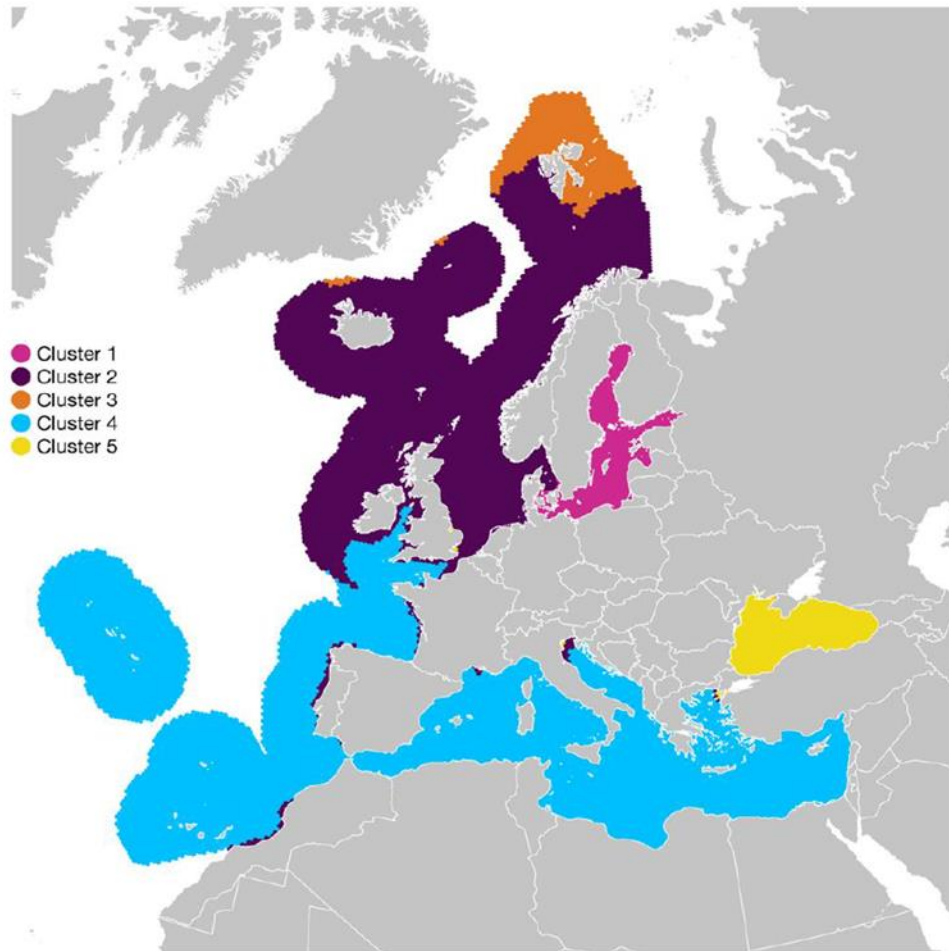
Present-day sea surface temperature



Future (decade 2090) sea surface temperature

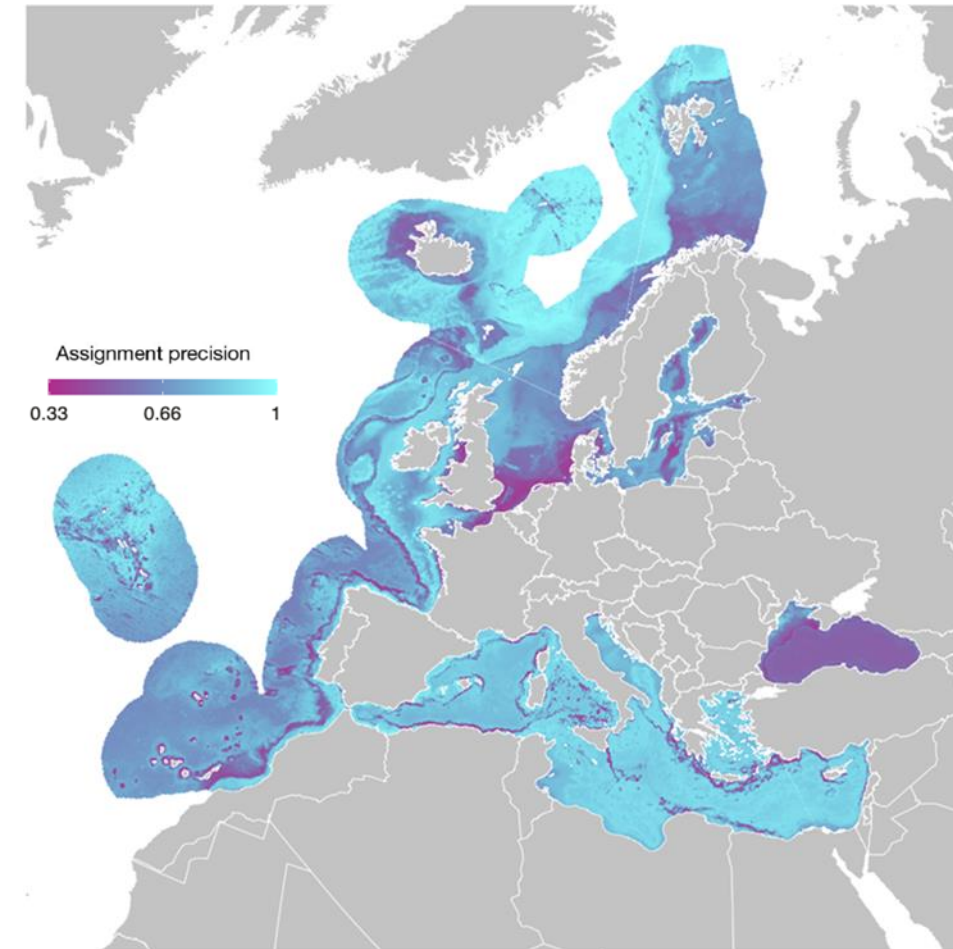
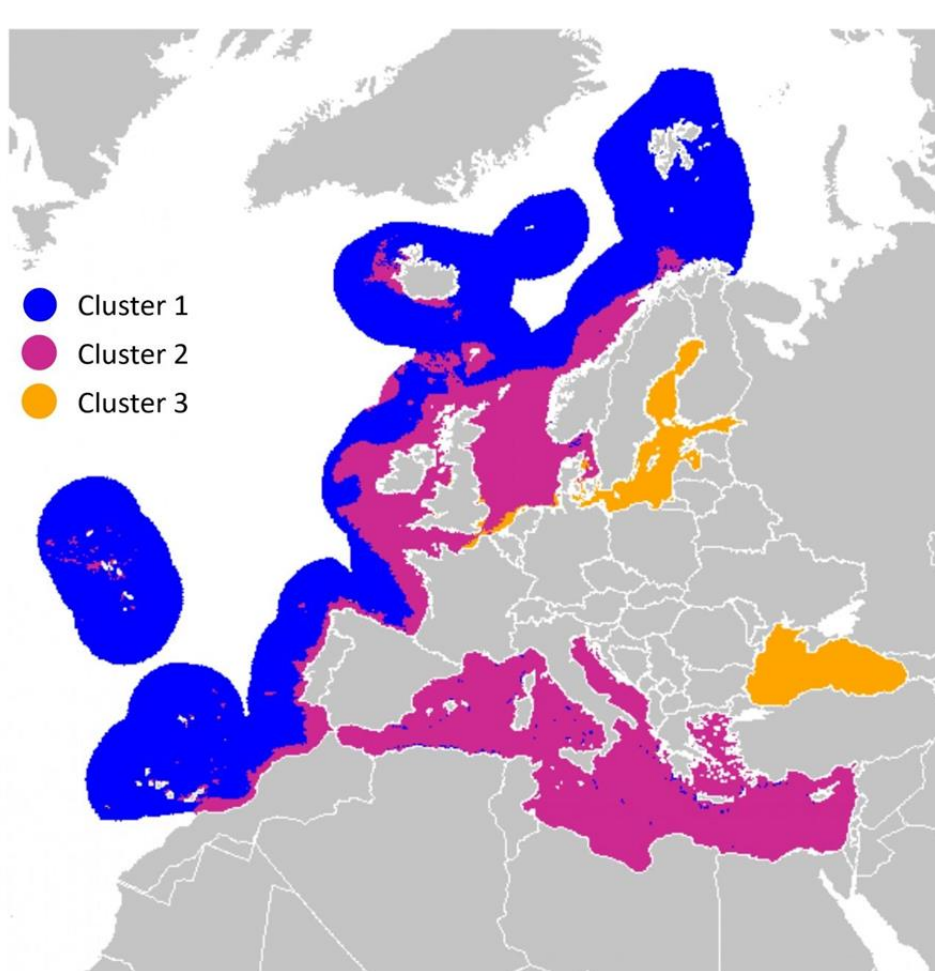
Example of data layer produced for the European Seas from **BioOracle**.
 Colour gradients reflect spatial differences in °C from today (left) to 2090 (right)

ECOSYSTEM CLASSIFICATION – SEA SURFACE

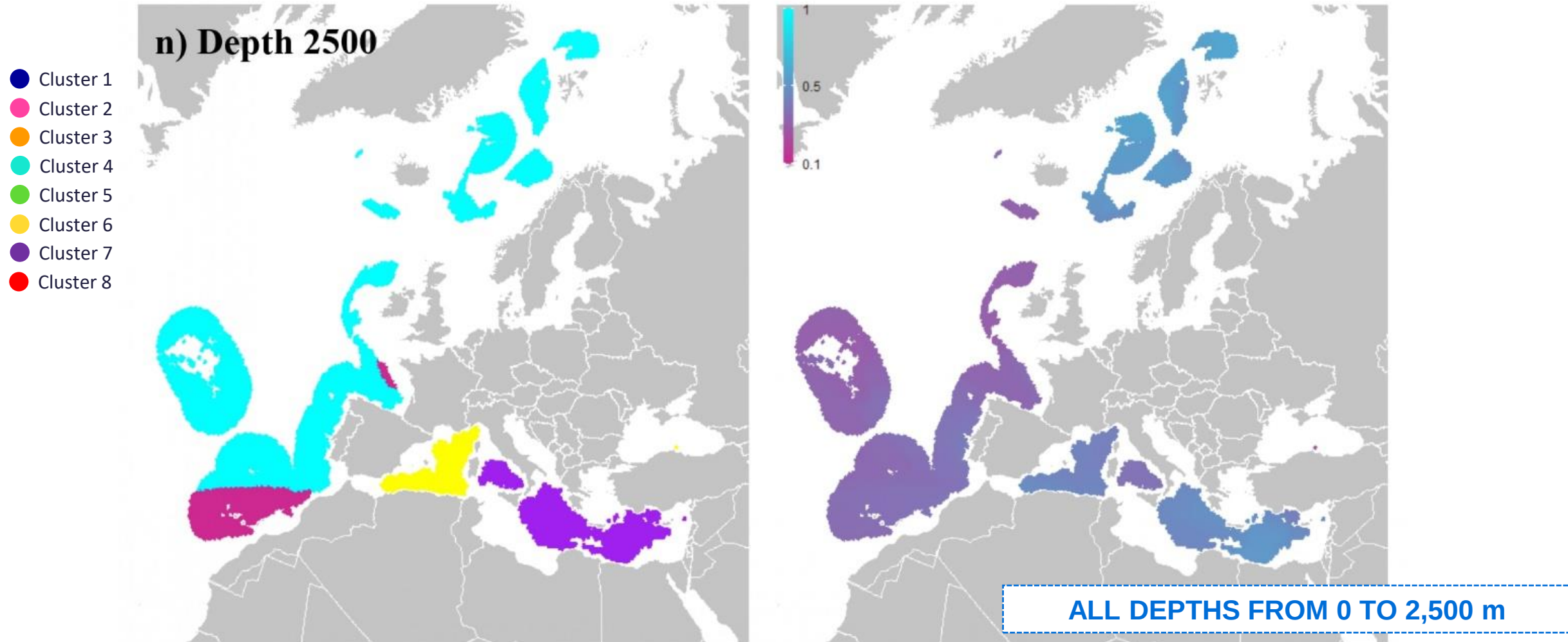


European marine ecosystems of **surface waters** estimated by k-means clustering analysis of environmental data (left) AND clustering assignment precision based on fuzzy logic (right)

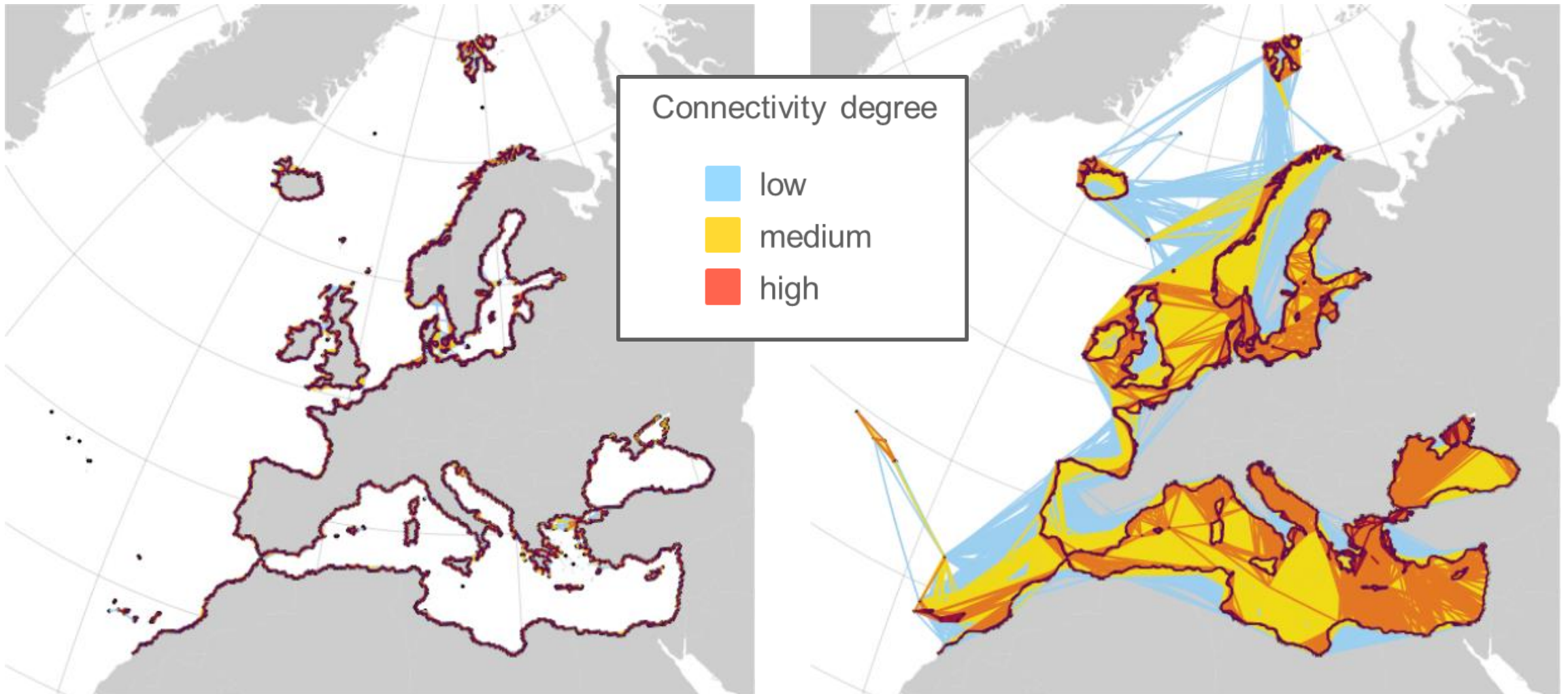
ECOSYSTEM CLASSIFICATION – NEAR SEABED



European marine ecosystems of **near seabed** estimated by k-means clustering analysis of environmental data (left) AND clustering assignment precision based on fuzzy logic (right)



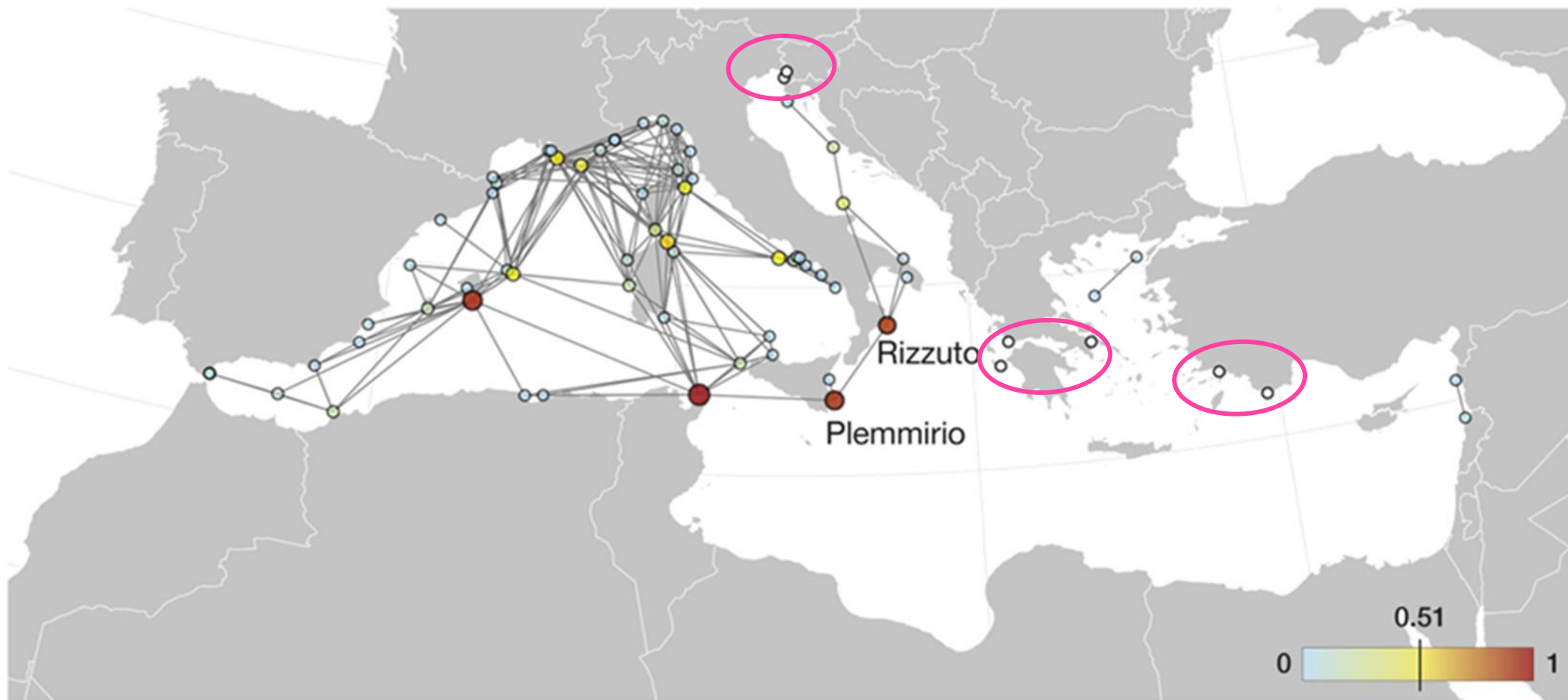
European **depth-integrated** marine ecosystems classification estimated by k-means clustering analysis of environmental data (left) AND their assignment precision based on fuzzy logic (right)



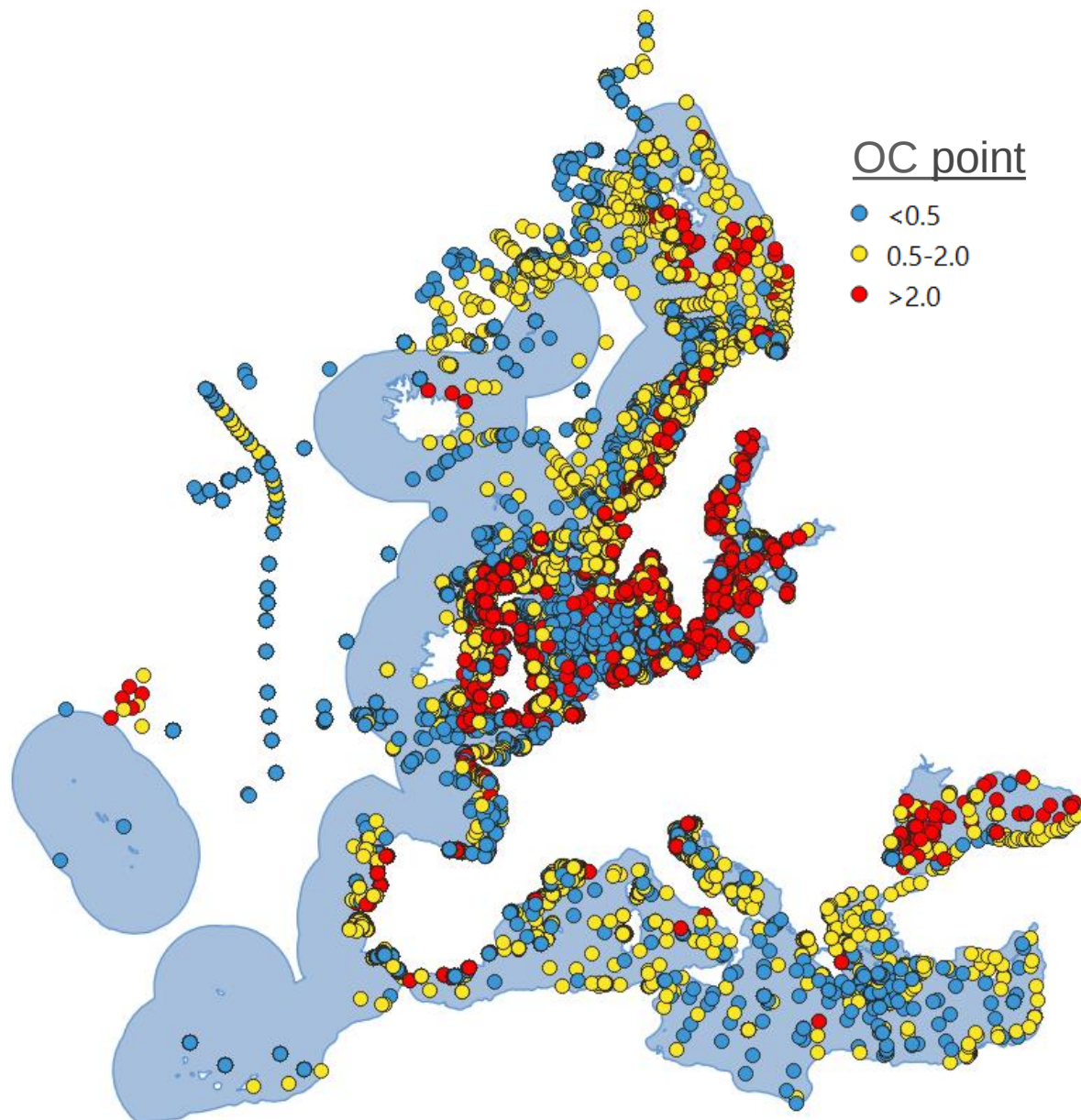
Connectivity and centrality (data not shown) for species with **5-day (left)**, 10-day, 20-day, 40-day, 60-day, 120-day and **180-day (right)** propagule duration

G4: Pisces, Crustacean & Echinodermata

Mean PD: 35.98 ± 34.08

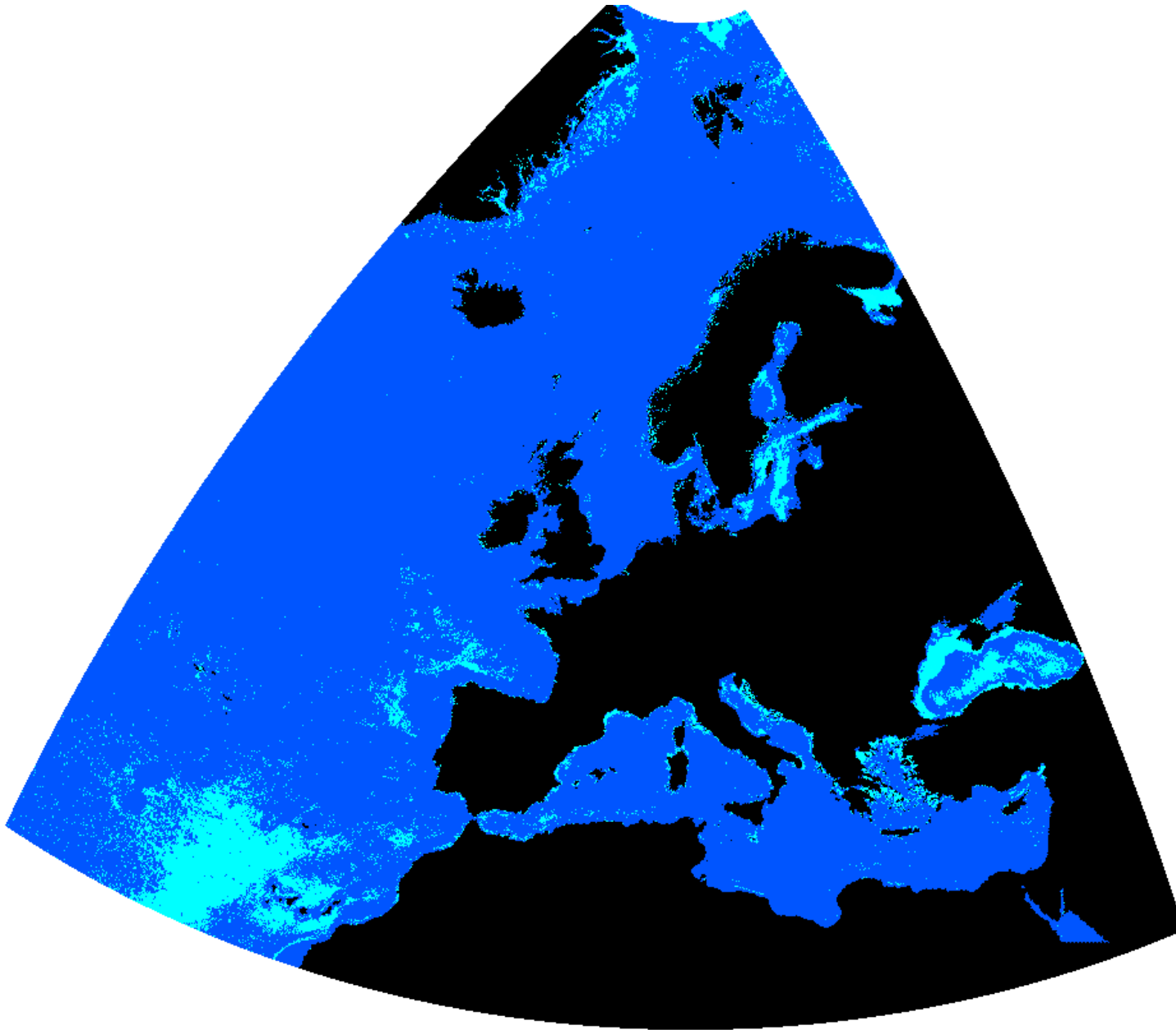


Key connectivity hubs in the Mediterranean marine reserve network.
Isolated reserves are shown in white.



61,000 sample data points
(update December 2024)

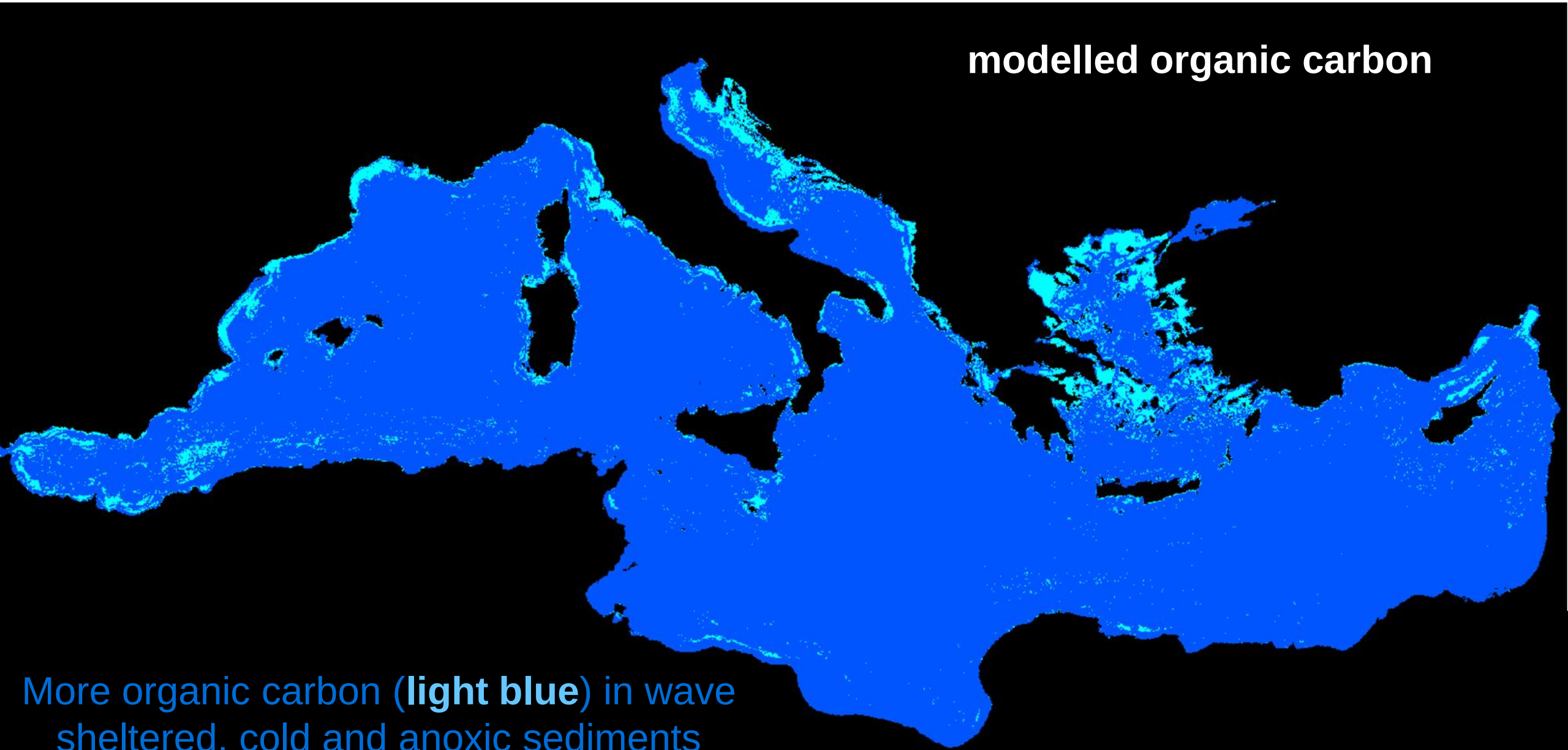
Spatial coverage of **organic carbon content (%OC)** in marine sediment (for **biogenic & non-biogenic habitats** (EUNIS definition) at European scale (and beyond)



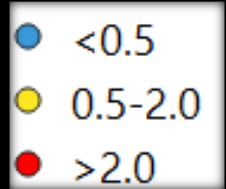
Modelled
organic carbon
in the
MPA Europe organic
carbon database

More organic carbon
(**light blue**) in wave
sheltered, cold and
anoxic sediments

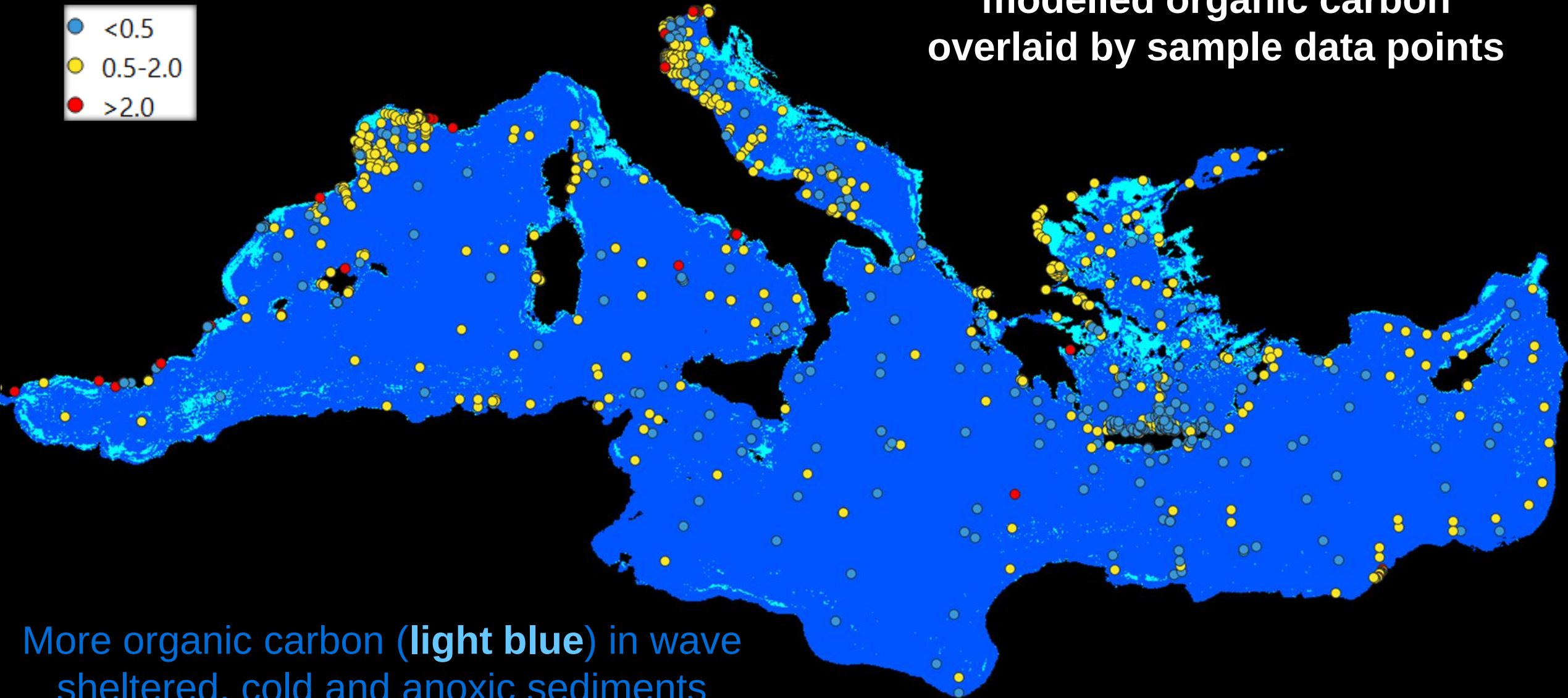
modelled organic carbon



More organic carbon (**light blue**) in wave sheltered, cold and anoxic sediments

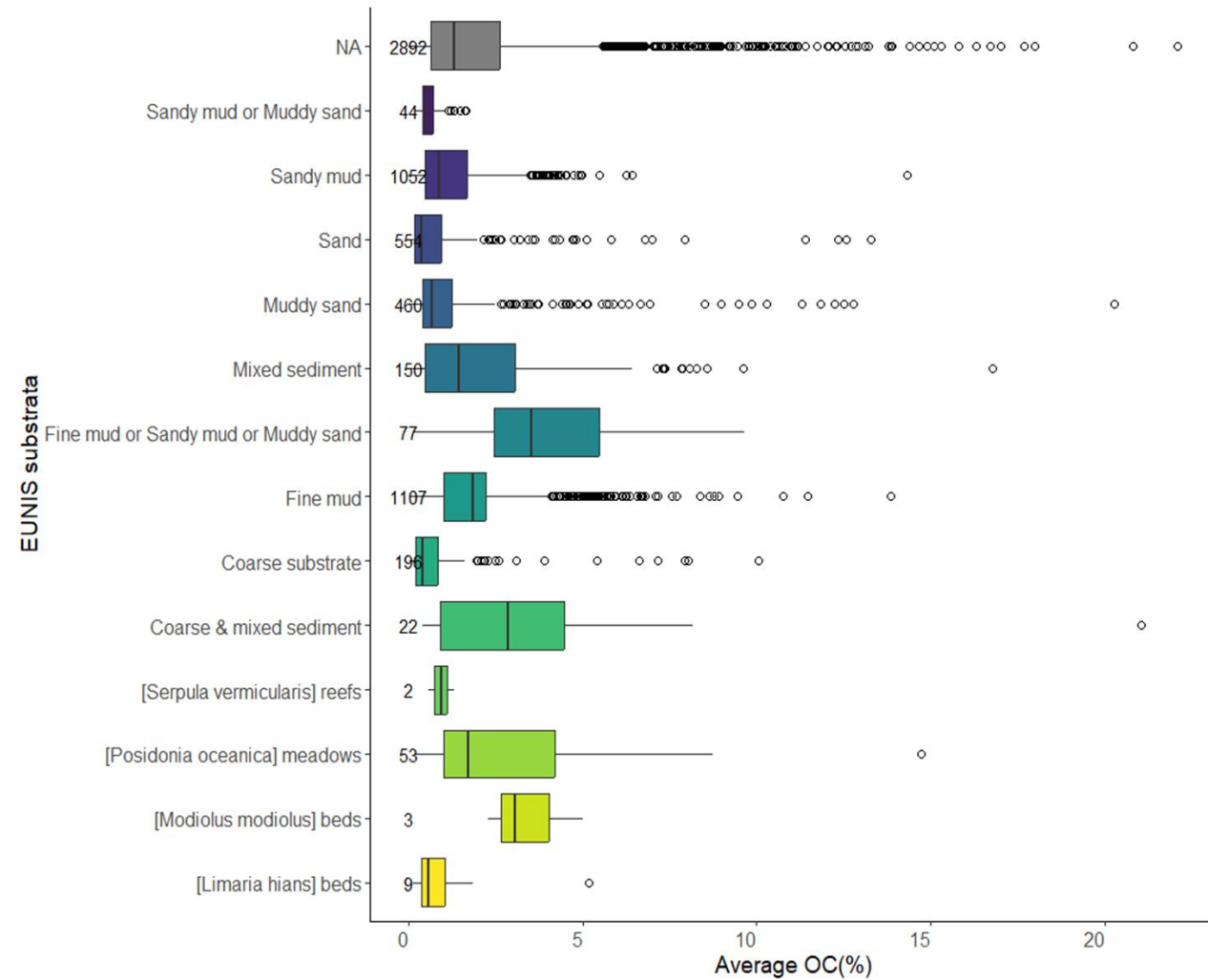
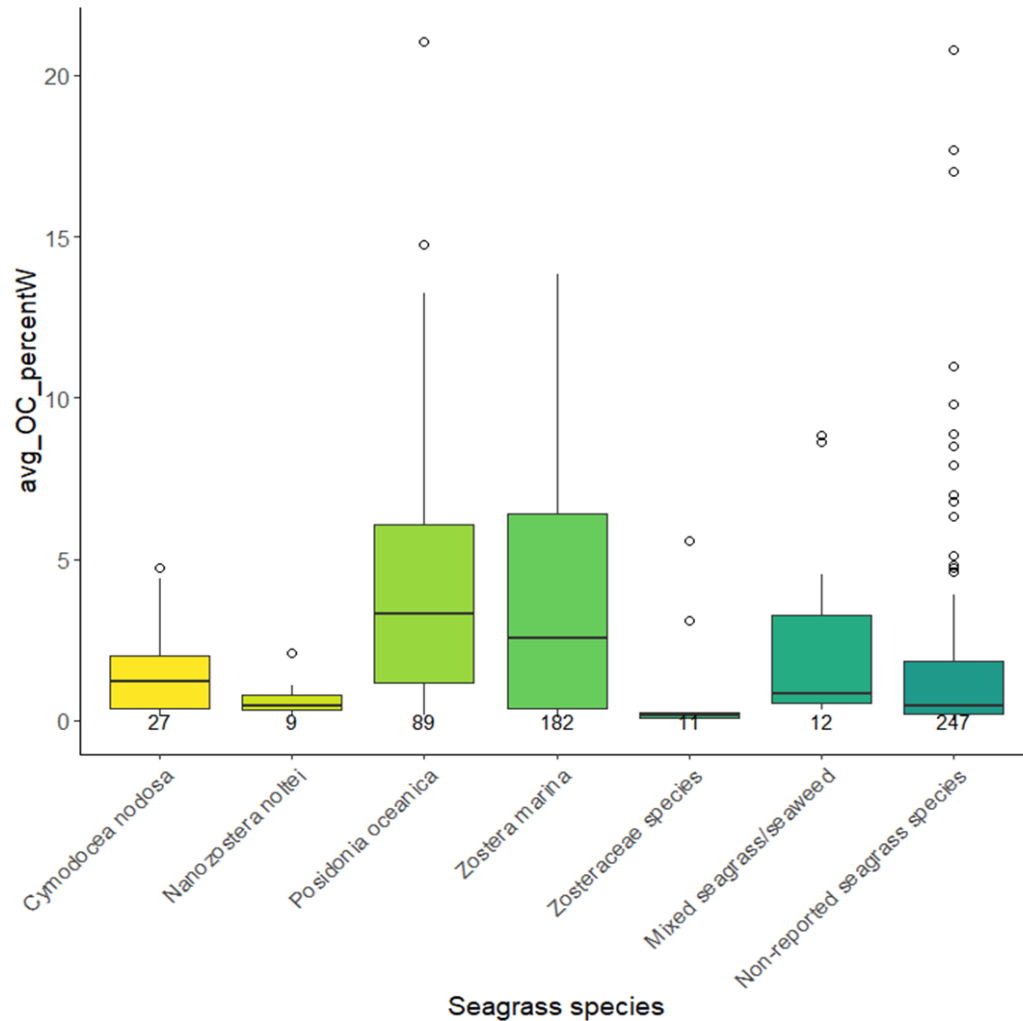


modelled organic carbon
overlaid by sample data points

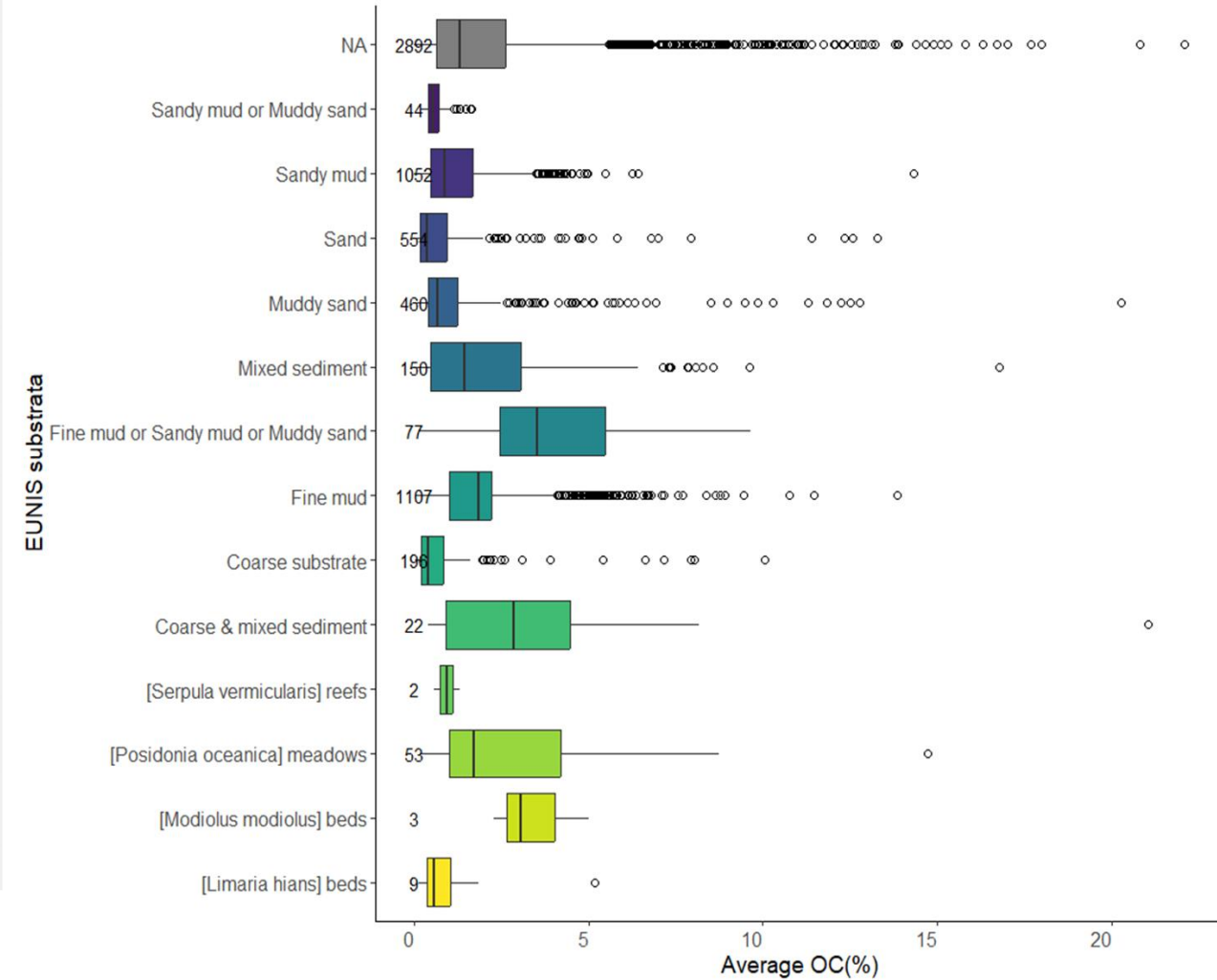
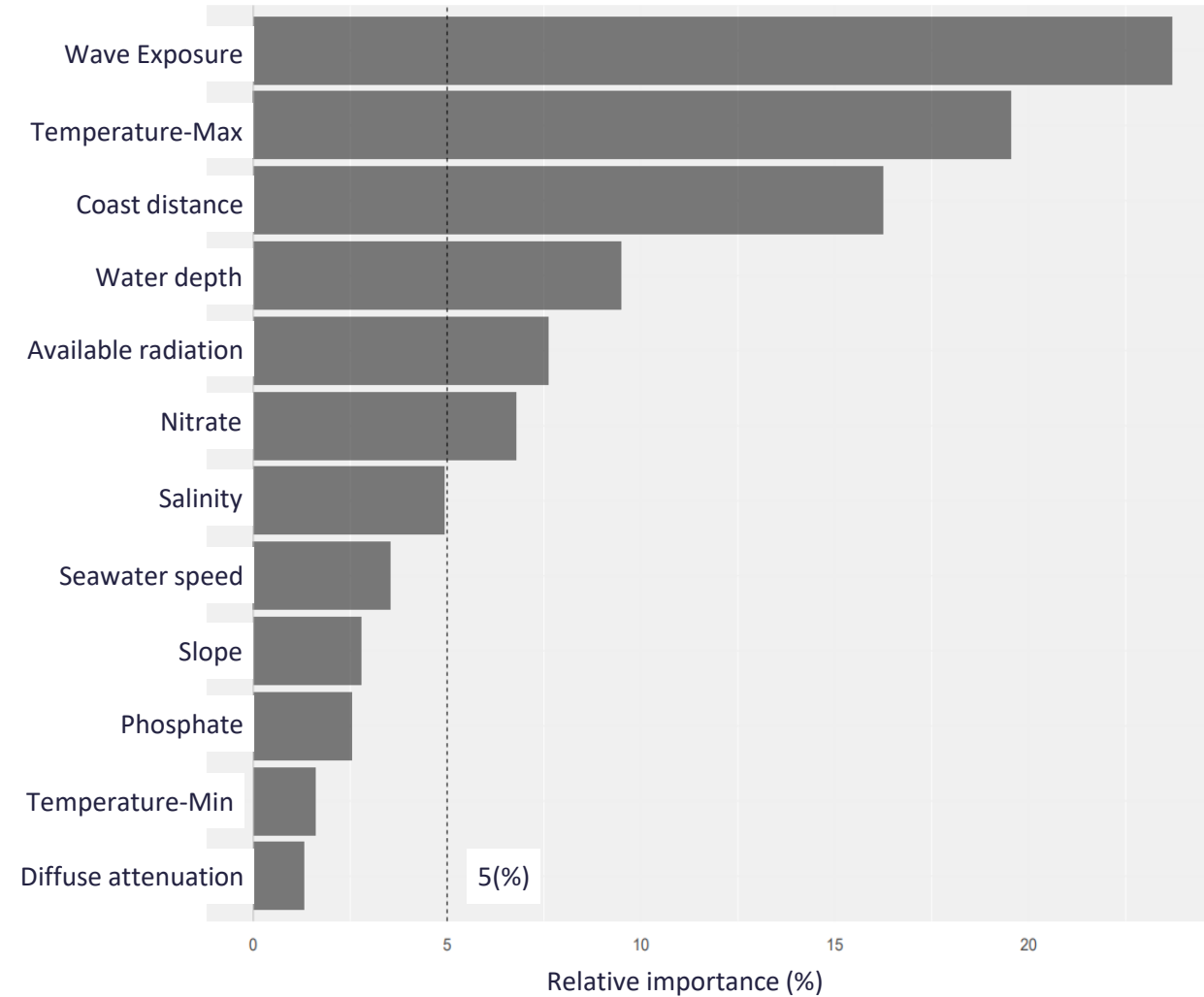


More organic carbon (**light blue**) in wave sheltered, cold and anoxic sediments

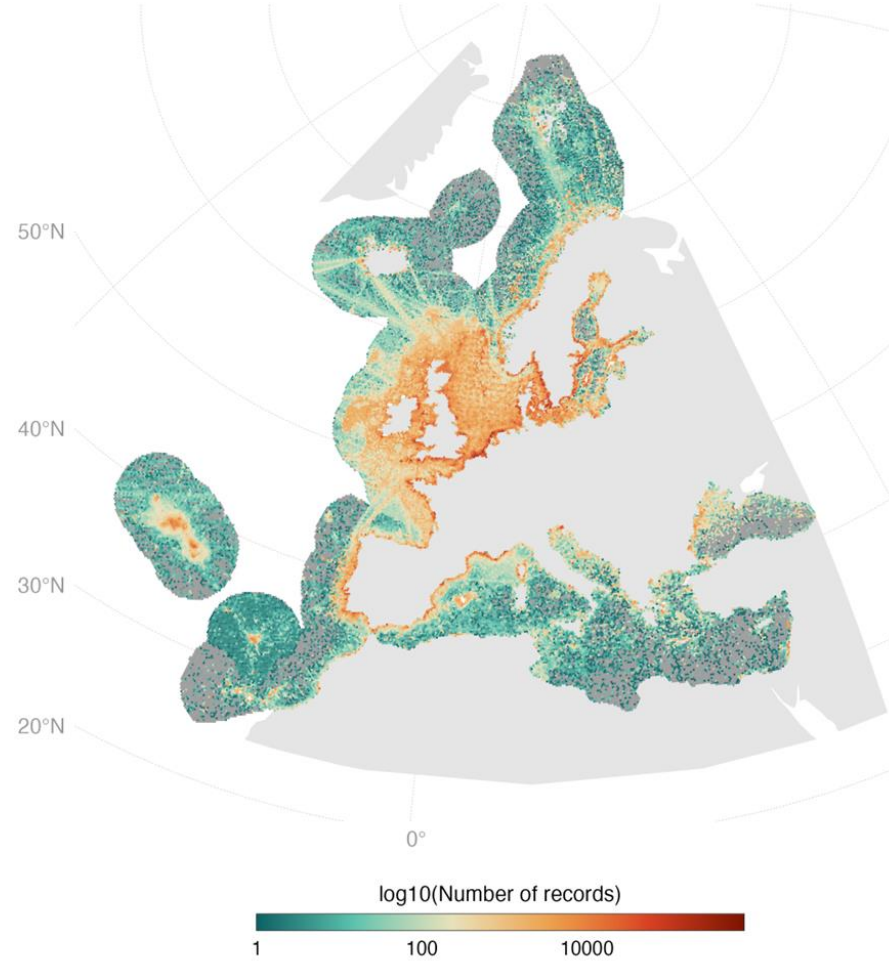
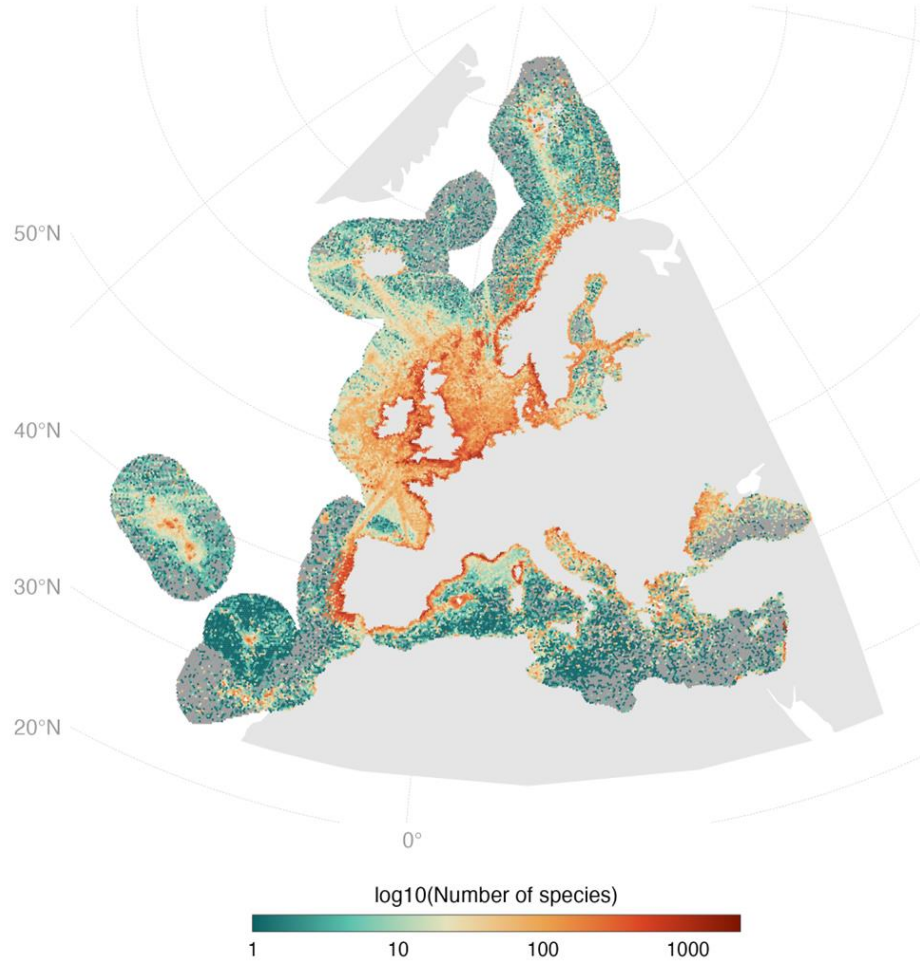
OC within & beyond BIOGENIC habitats



Organic carbon content (%OC) in seagrass species (left), marine sediment (EUNIS definition) (right), AND the importance of environmental predictor in describing the OC (right)



Organic carbon content (%OC) in seagrass species (left), marine sediment (EUNIS definition) (right), AND the importance of environmental predictor in describing the OC (right)



SOURCE OF ADDITIONAL SPECIES DATASETS (into OBIS)

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

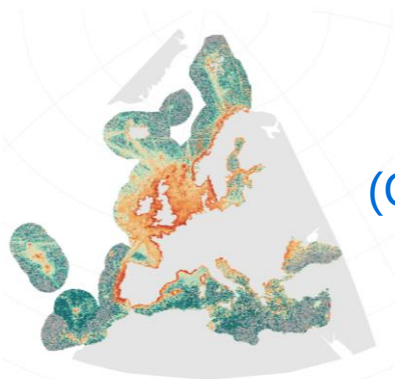


Marine species distribution data available in **OBIS**, including ~ 30,000 species (left) AND > 67,000,000 records (right)

SPECIES & HABITAT DISTRIBUTION MODELLING

Biodiversity & Environmental data

Species
occurrence
(OBIS + GBIF)



(BioORACLE v3)

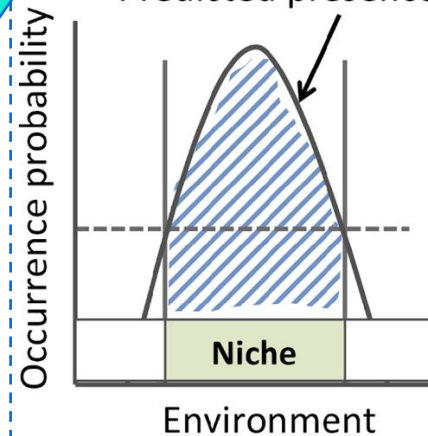
Sea Surface
Temperature



SDMs

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

Predicted presence



Predicting potential distribution



Five CMIP6
scenarios
(SSP1- SSP5)

Two periods
(2050 / 2100)

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

12,000 species distribution models for all five IPCC climate change scenarios to 2050 and 2100

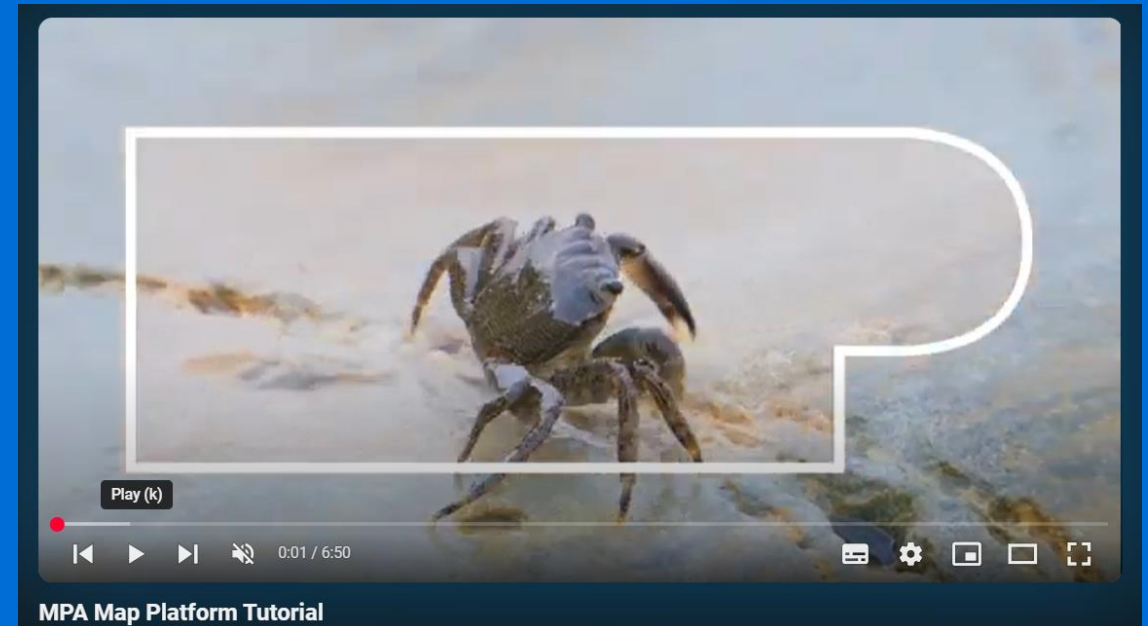
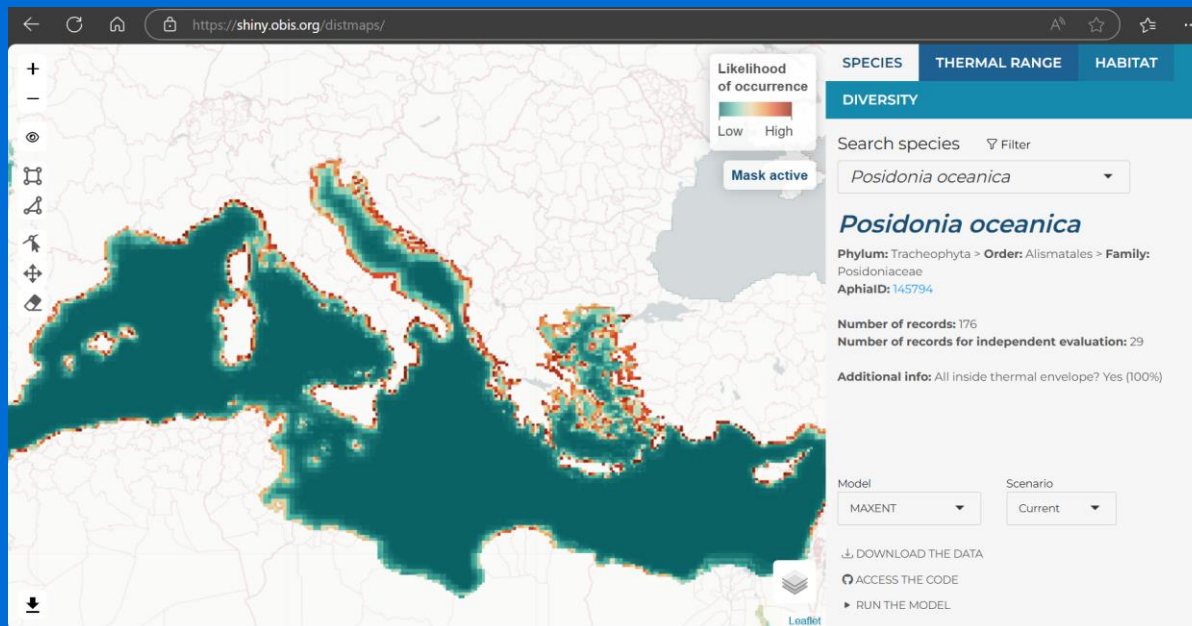
<https://shiny.obis.org/distmaps/>

https://iobis.github.io/mpaeu_docs/

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

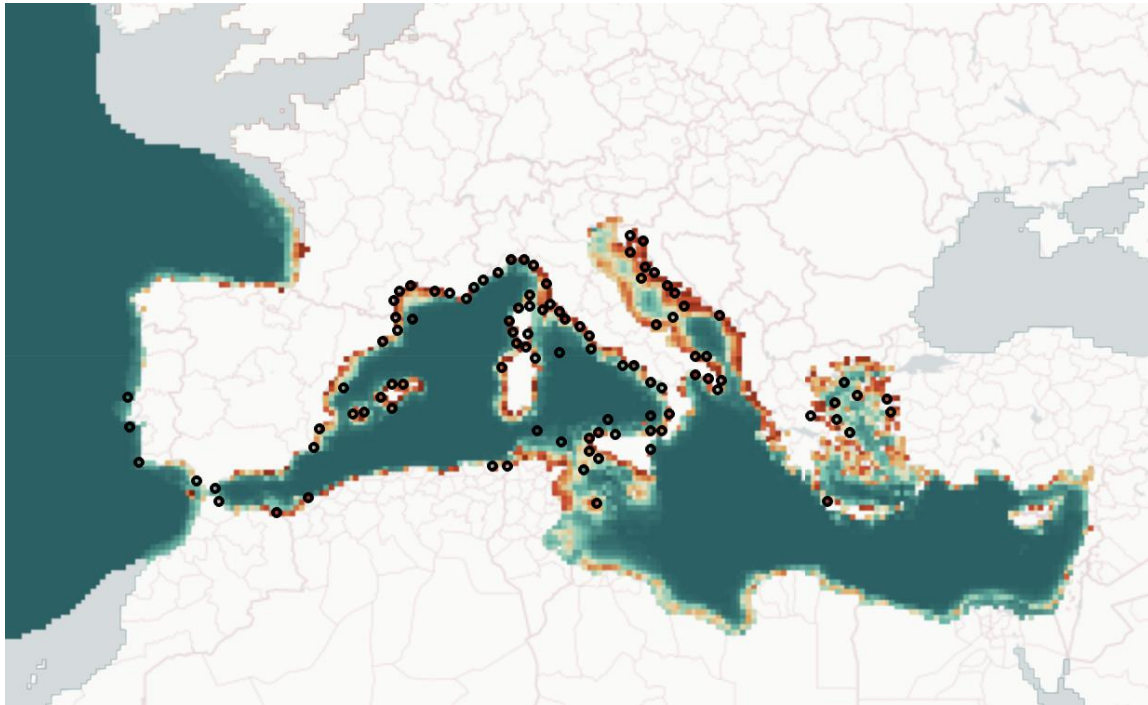


Scan me!

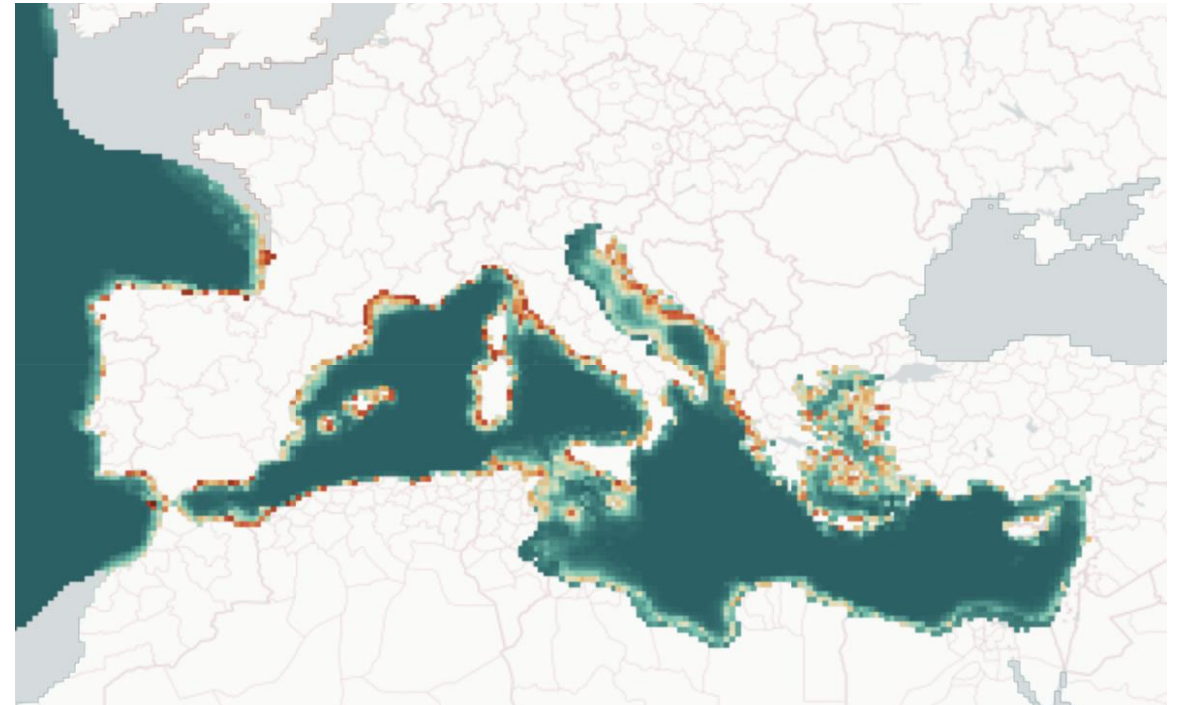


7065 species occurring in the Mediterranean were modeled

DISTRIBUTION MAP FOR *Paramuricea clavata*



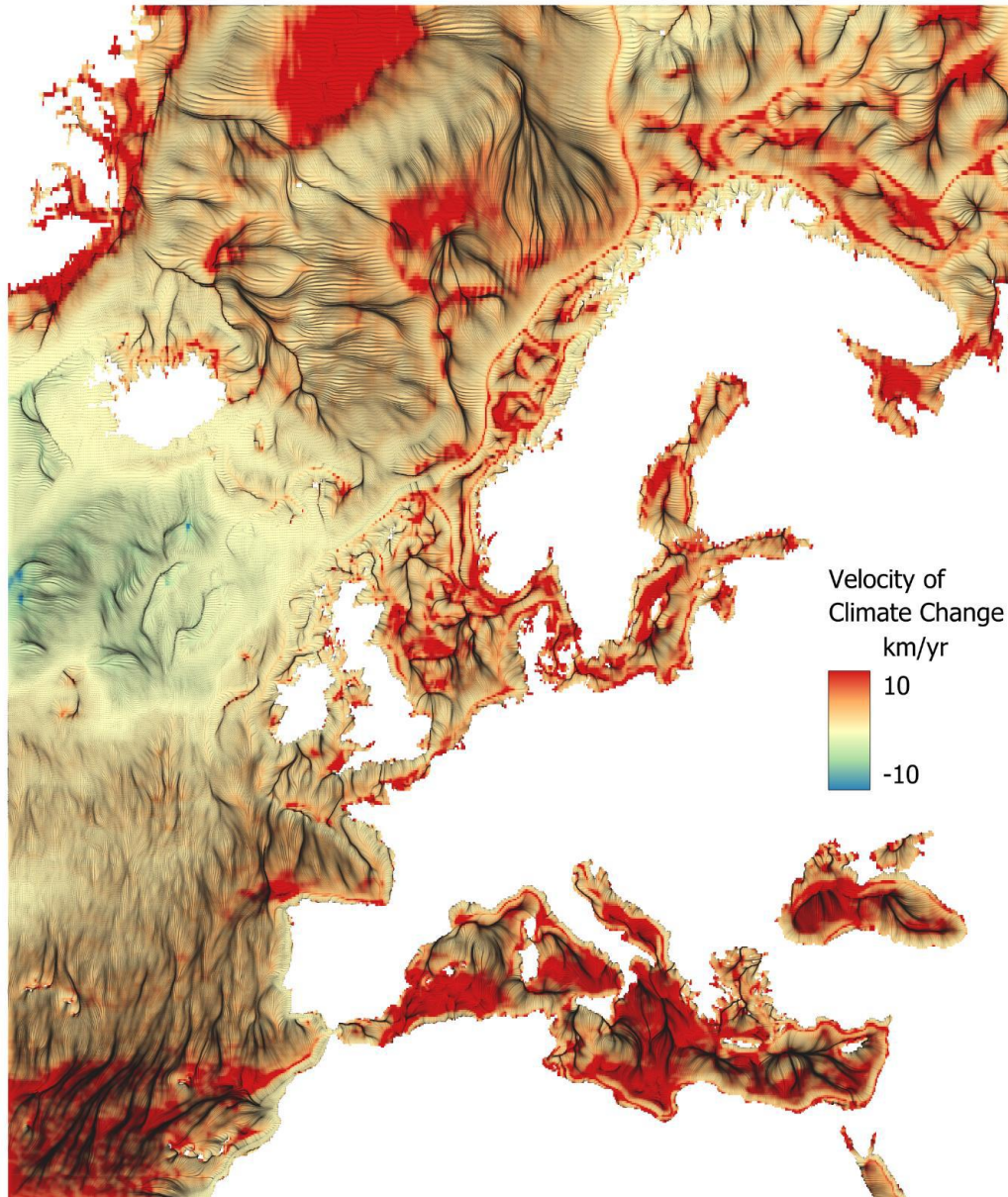
Current



SSP3 - 2100

CLIMATE VELOCITY MAP

Velocity of projected climate change
for sea surface temperature in
European seas (SSP370 – 2050).



Magnitude of climate velocity (v):

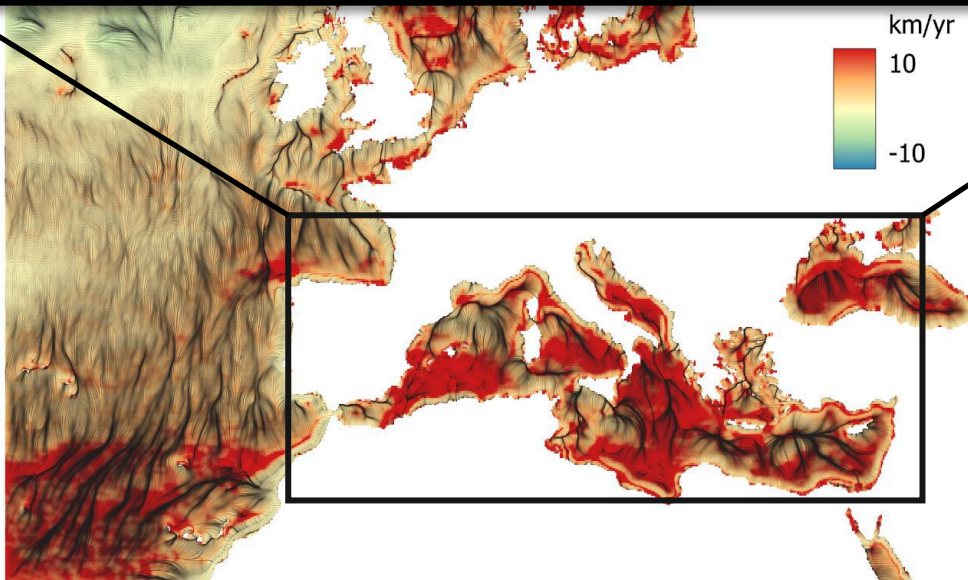
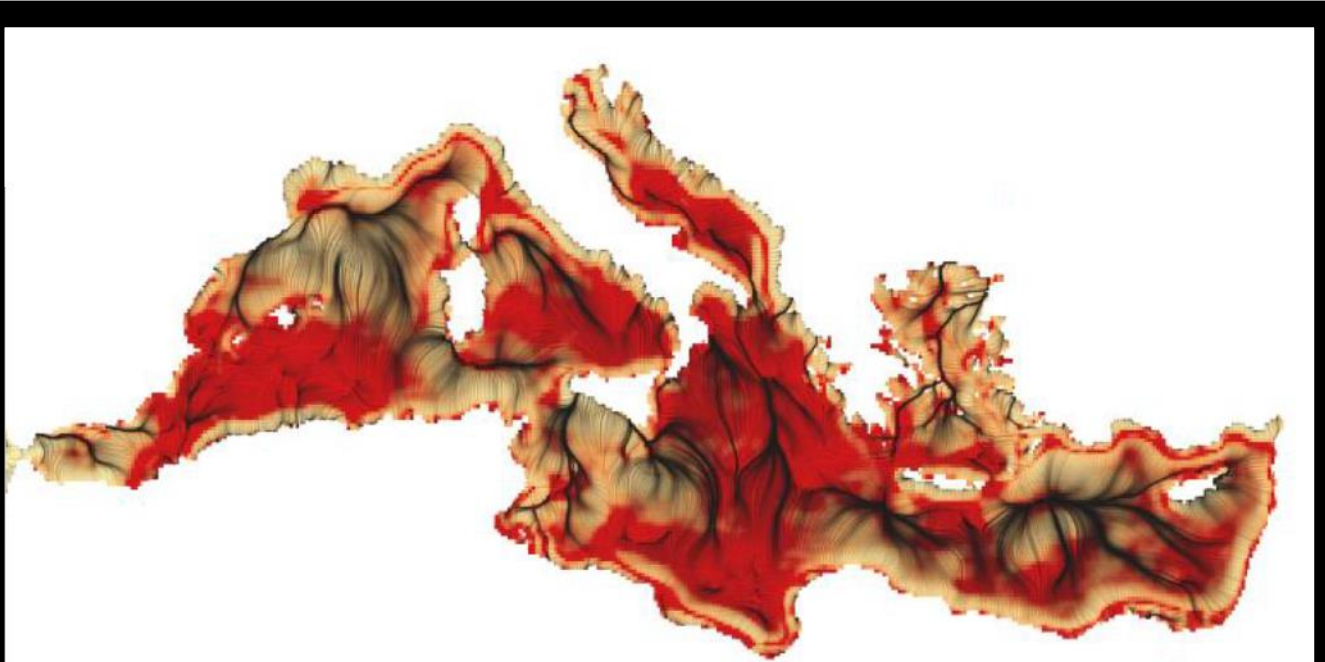
- red (high (v)),
- yellow (low or zero (v))
- green to blue (negative (v) i.e. cold temperature).

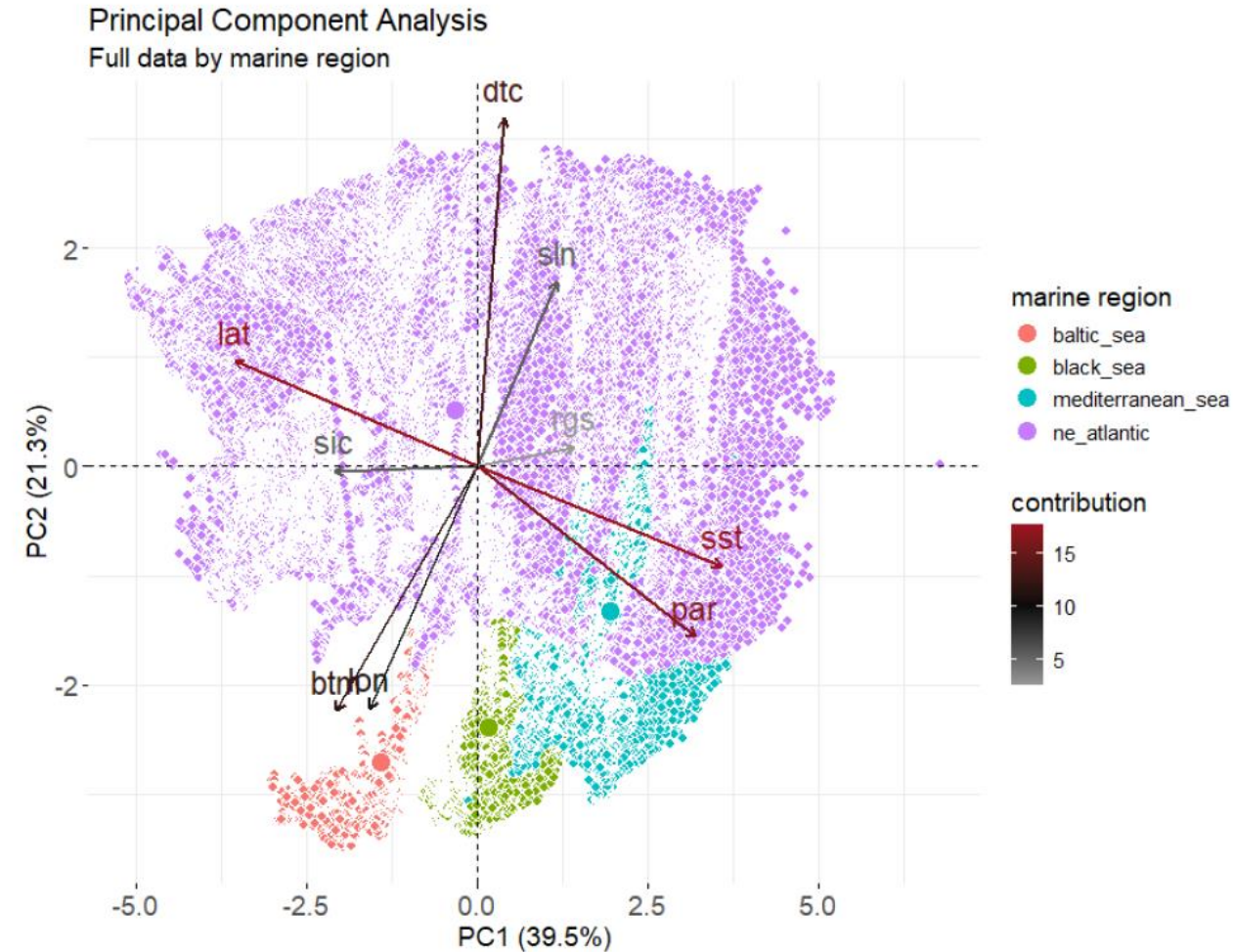
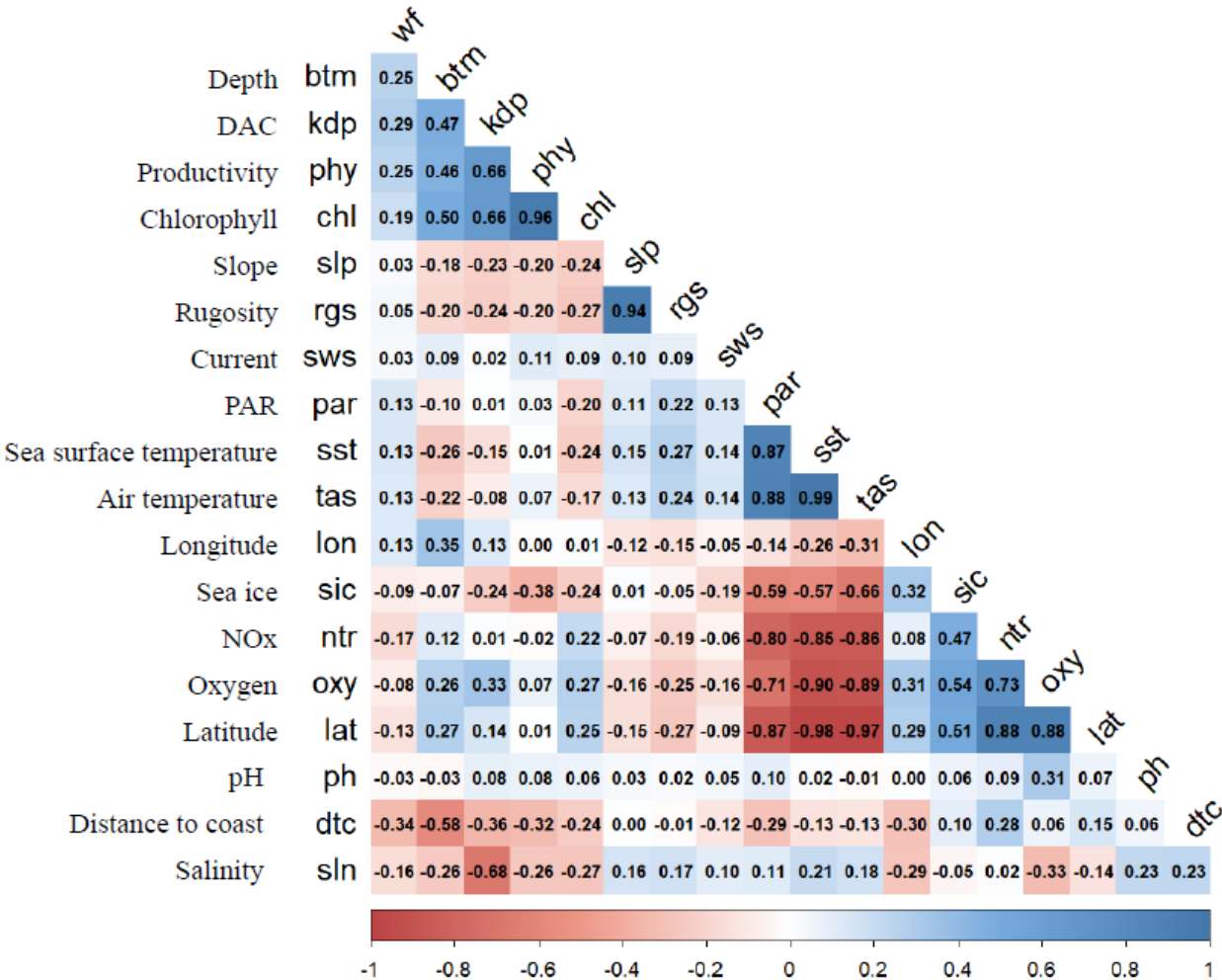
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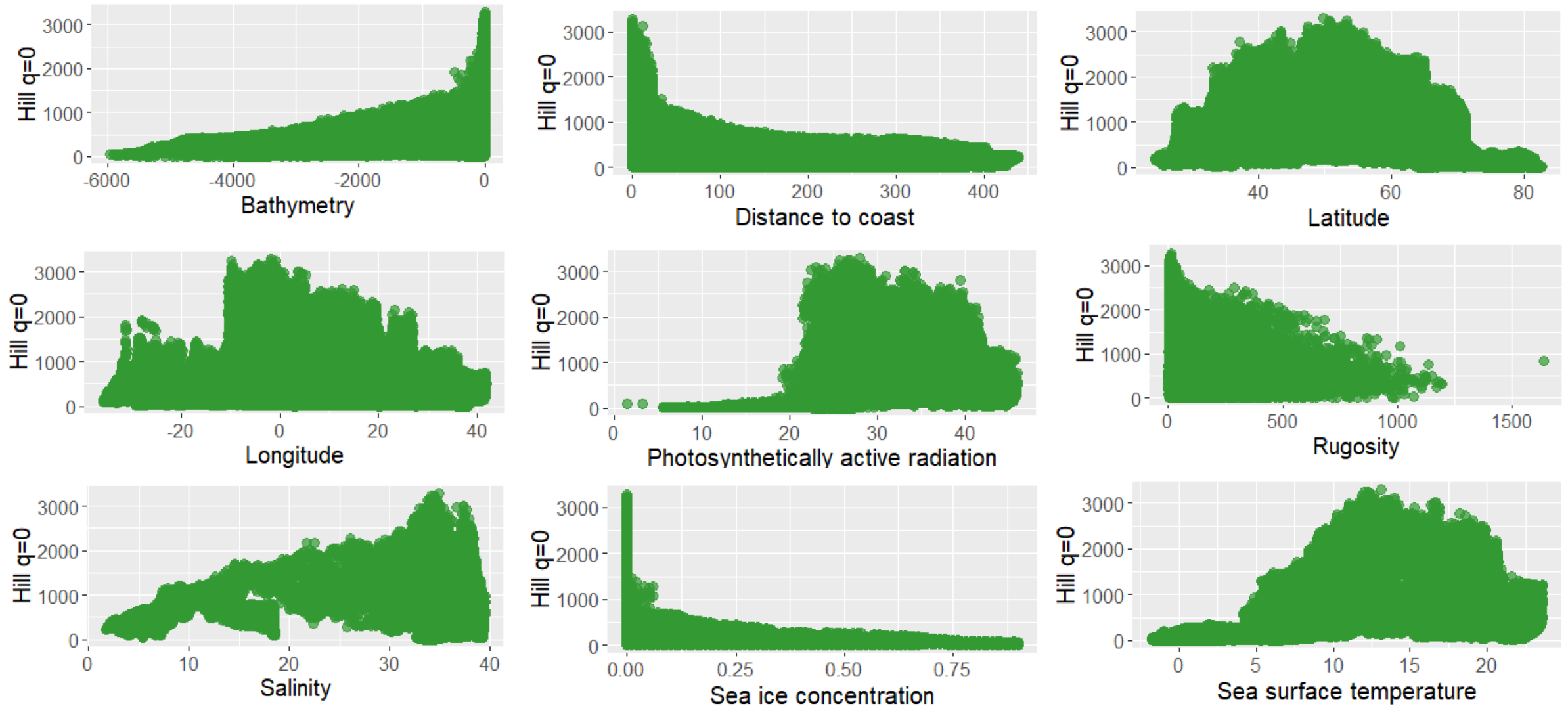
Magnitude of climate velocity (v):

- red (high v),
- yellow (low or zero v)
- green to blue (negative v) i.e. cold temperature).





Sea surface temperature (sst) and photosynthetically active radiation (par), and latitude (lat) have a positive and negative relationship to PC1, respectively



Comparison between diversity metrics Hill $q=0$ (left) and environmental variables



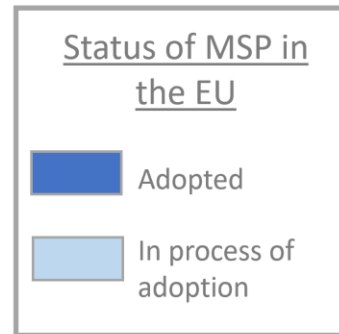
MPA Europe: Stakeholder engagement

Belinda Bramley and Thanos Smanis CLIMAZUL (Greece)



Key benefits of **MSP** include:

- **Reduction of conflicts**
- **Creation of synergies**
- **Increased cross-border cooperation** between countries to develop energy grids, shipping lanes, pipelines, submarine cables and other activities, **but also to develop coherent networks of protected areas**
- **It's a National Process**



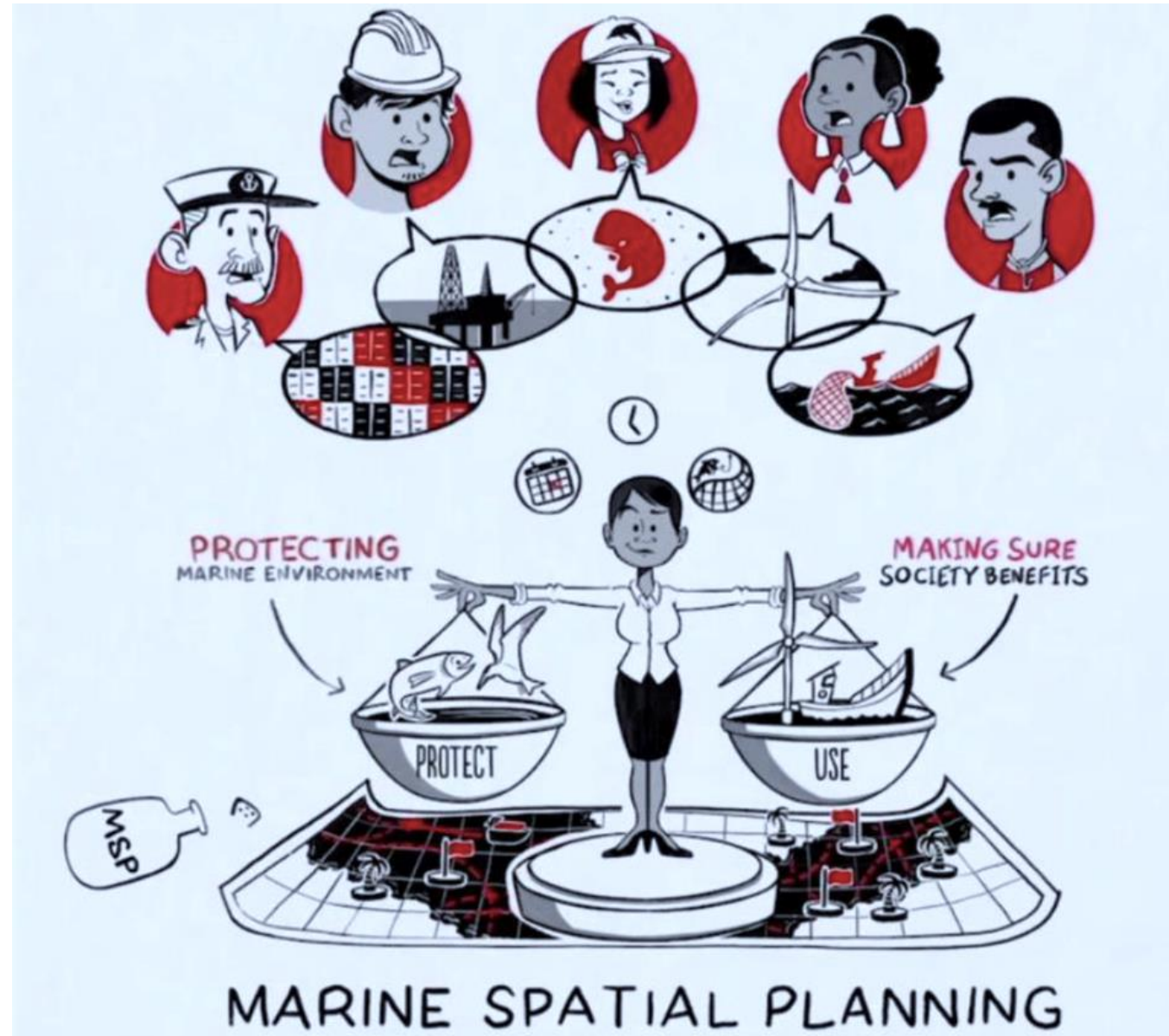
Considerations:

- MSP responsible authorities most of the times **different** from ministries responsible for MPAs
- Climate change leads to the redistribution of marine biodiversity and human activities, which affects MSP process.

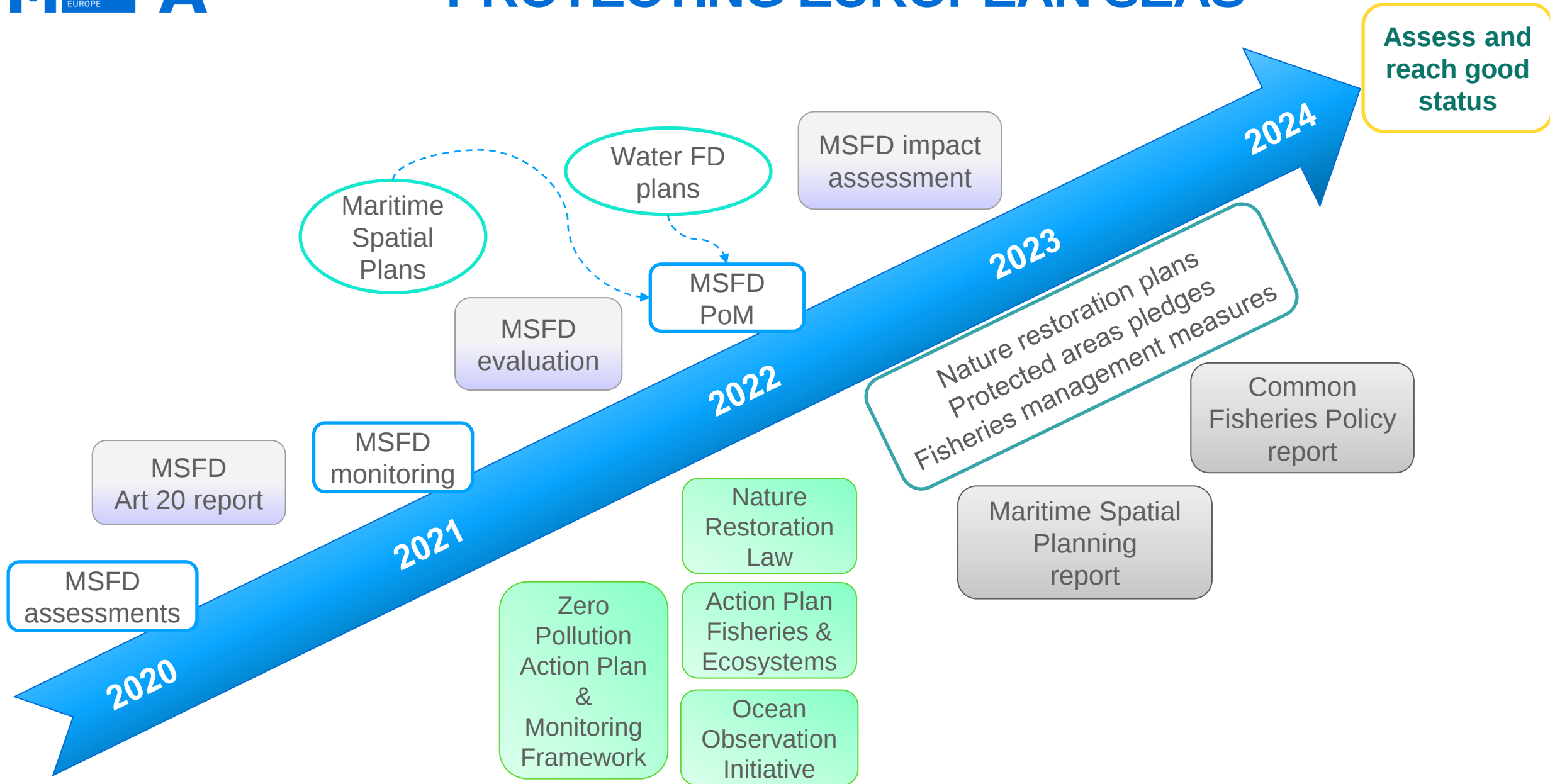


MSP AS AN ENABLER....

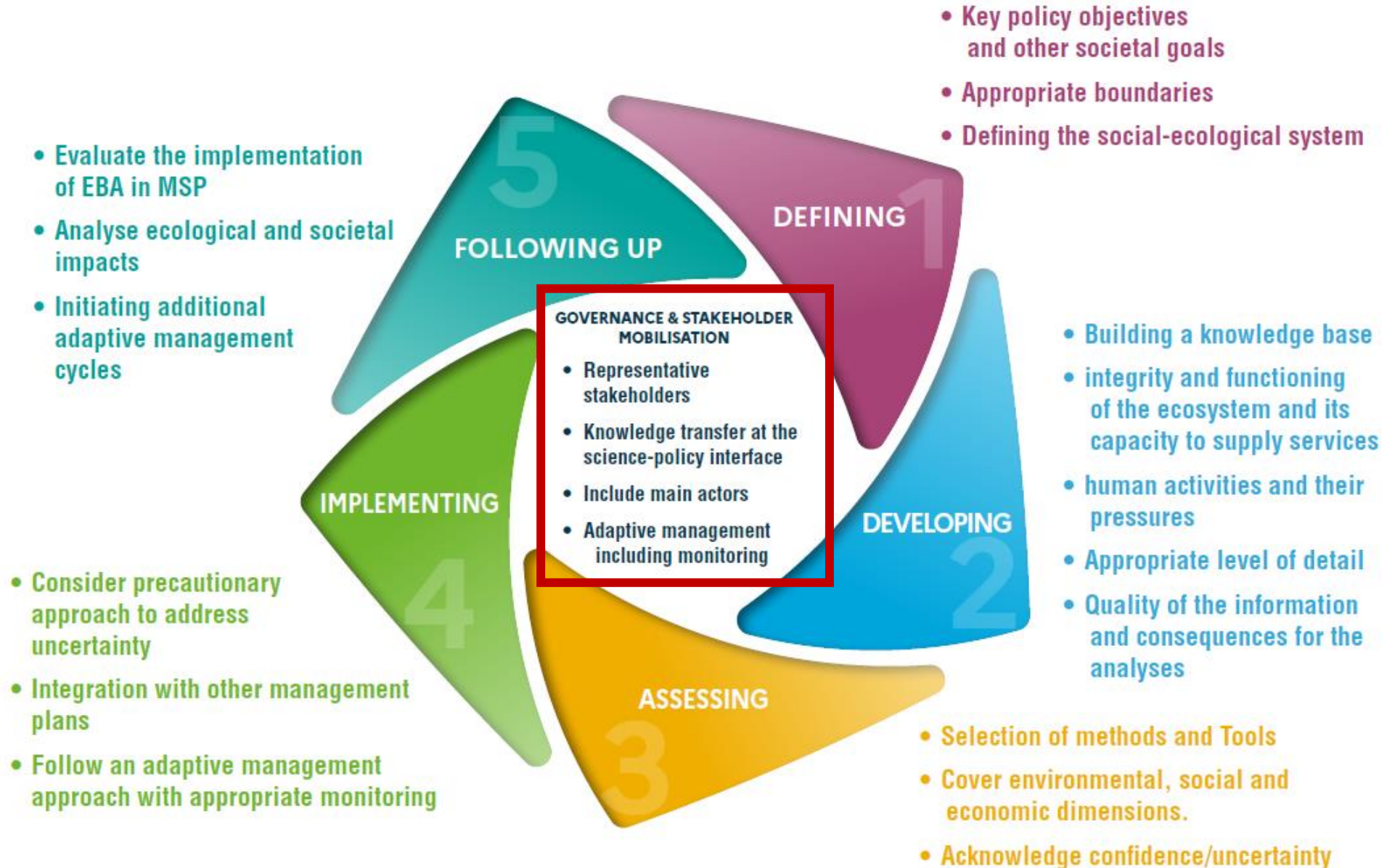
- For **comprehensive dialogue** between stakeholders
- As a pivotal tool to support implementation of a strategic vision for a **sustainable BE** which integrates marine and land policies
- To engage all the stakeholders (including citizens) to become aware of marine and maritime issues by putting on the map the **potential futures for the use**
- To reduce monopolistic approach of existing maritime sectors on the common good
- To identify and to solve conflicts in space allocation including the time dimension
- To support innovation and develop BE as a key contribution for national and EU economy for local development for established and emerging sectors



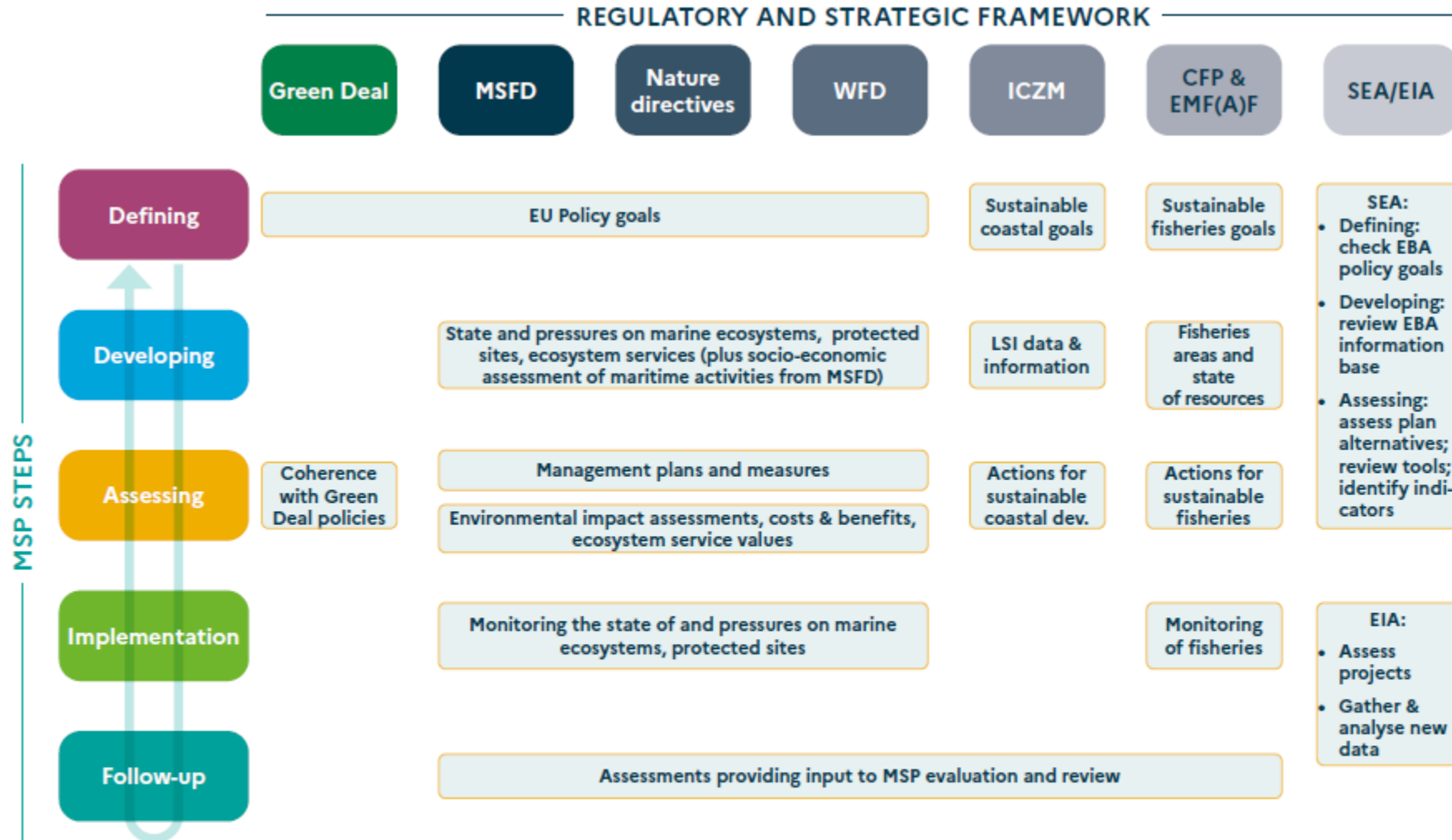
PROTECTING EUROPEAN SEAS



STAKEHOLDER ENGAGEMENT THROUGHOUT



MULTILEVEL AND MULTISECTORIAL ENGAGEMENT



Complex process to mobilize different groups of stakeholders

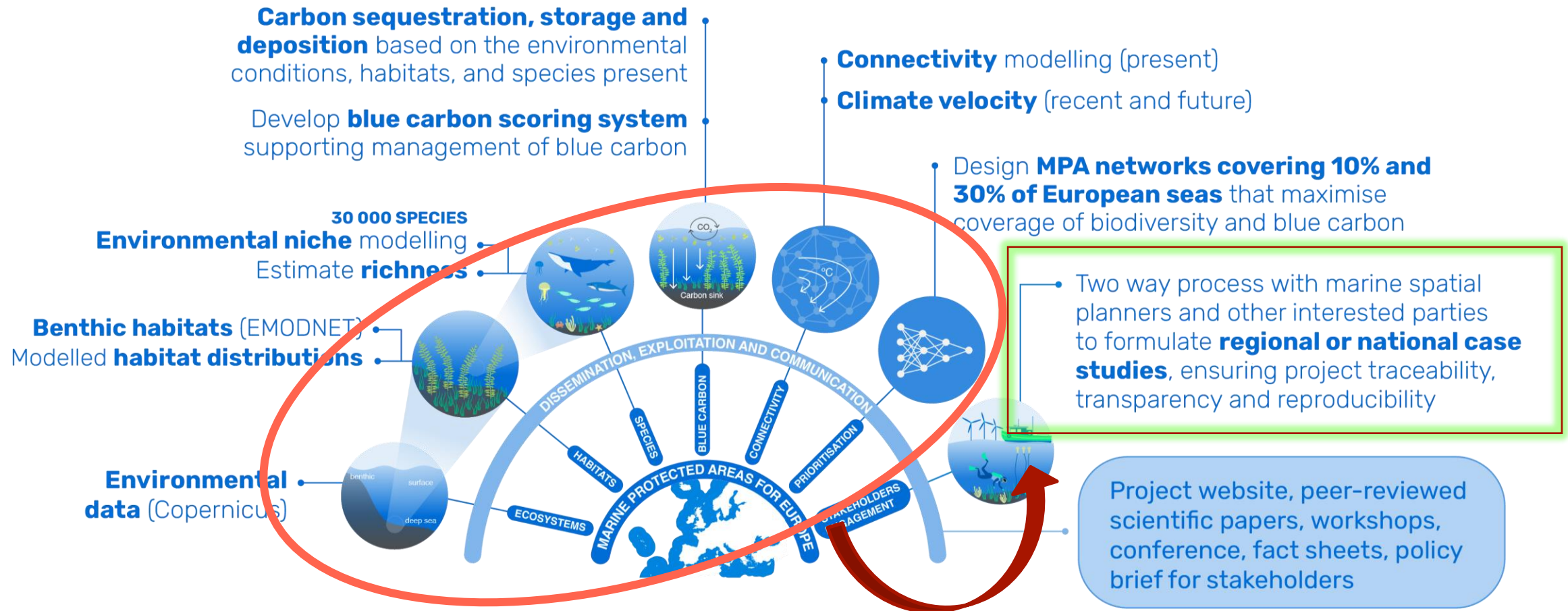


...AND WHY



PROJECT WP6 - OTHER WPs CONNECTION

Improve the science basis for national authorities to include marine areas in **climate change mitigation** and **marine spatial plans** and design optimal MPAs including expanding Special Areas of Conservation and increasing levels of protection in existing areas



Open engagement approach

>165 Stakeholders

No Pilots or Test Sites

Co-design case studies (UN Ocean Decade)



STAKEHOLDER ENGAGEMENT PROCESS

ENGAGE

Share project & seek feedback;
answer FAQs



Introduce MPA Europe:
May – September 2024

INVOLVE

Stakeholders participate &
validate approaches and outputs



Regional in-person workshops in
synergy with relevant events:
February 2024 – February 2025

PARTNER

Stakeholders propose use cases



Regional case uses co-identified with
stakeholders:
January 2023 – April 2025

SHARE LEARNINGS



International conference:
July 2025, Bodø
Policy brief:
December 2025

PROJECT SCOPE AND OUTCOMES

+ How I

DATA ACCESS AND RESOLUTION

+ I unde
to eac

CASE STUDIES

+ What is t

+ Will yo
some

EXISTING ACTIVITIES AT SEA

+ Does the

+ Anoth
exper

+ Can you e
guidance

+ How are
move th

DATA SOURCES

+ Will yo

+ I'm inter

+ Do you al
occurs, w

+ Will map

+ Are you

+ I noticed we are talking about estimating species richness, is that based on temperature and existing species, or temperature and conservation/active restoration?

+ So you are taking species data to which you add a further list of environmental data, and then overlay it with temperature modelling. Is that right?

The data sources you are using are the global data aggregators. From my previous experience I have seen a lot of data is held in national institutions and scientific organisations and they do not share it with the aggregators. Do you have the capacity or plan to consider national databases, which often do not often conform to FAIR principles, so you have to standardise the data?

+ For seabirds will the maps be built based on Important Bird Areas data, or what other data?

+ It seems you are taking into account the changing ranges of species. Does this mean that once the MPAs are designated, there is the possibility of changing the boundaries or are these set in stone?

+ You mentioned you will produce Species Distribution Models. What is the difference between EMODnet Biology and EMODnet Seabed Habitats? Do you plan to acquire new data?

THE BL

+ Think
recom

CLIMAT

STAKEH

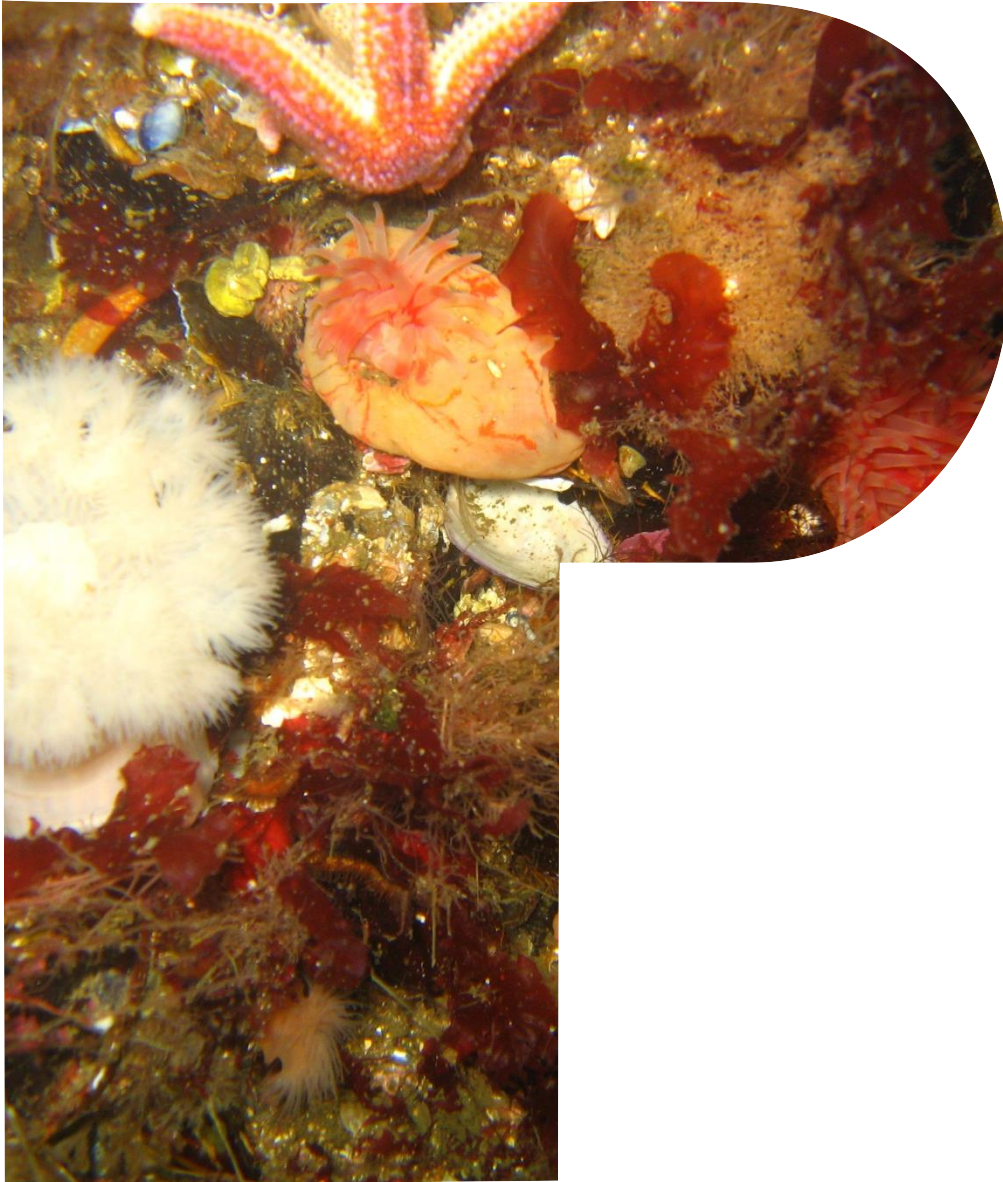
+ Does the

+ What exa

OTHER

+ Are you
some of

KEY POINTS FOR WORKSHOP DISCUSSIONS



- ❖ How would you like to see our results used for **national, transboundary or regional marine spatial planning**?
- ❖ How would you like to see our results used for **strengthening existing marine protected areas**?
- ❖ How would you like to see our results used for **extending the network of existing marine protected areas in the region**?
- ❖ Would you like to **co-identify a use case** with us based on any of the project's results?

STAKEHOLDER FEEDBACK

BALTIC SEA REGION



MPA Europe's approach could be improved by the inclusion of absence and abundance data, and important areas for key species groups such as seabirds or mammals.



BALTIC SEA STAKEHOLDER WORKSHOP

29th February 2024

In collaboration with
PROTECT BALTIC

Good spatial maps and species distribution models can support stakeholder consultations, when justifying new MPA boundaries, and support countries to update their marine spatial plans.



STAKEHOLDER FEEDBACK



BLACK SEA REGION



This work is very helpful for all the current processes in Bulgaria and Romania for MPAs. **Would it be possible to request modelling for a certain area, and if so when?**



BLACK SEA STAKEHOLDER WORKSHOP

20th June 2024

In collaboration with
MSP-GREEN and **MSP4BIO**

We think your support is **most valuable at regional level**, for example in helping Bulgaria and Romania reach a common approach on the identification and designations of their Protected Areas and, within those, the 10% strictly protected cores.

STAKEHOLDER WORKSHOPS IN 2025

MEDITERRANEAN WORKSHOP

28th January 2025, Madrid, with MEDIGREEN



NORTH ATLANTIC WORKSHOP & MPA EUROPE SYMPOSIUM
18th February 2025, Copenhagen, with EEA

CASE STUDIES



**European
Environment
Agency**

*Blue carbon habitats in
MPA networks
(underway)*



*MPA network
adequacy
(underway)*



European
MSP Platform

*Species app & video
tutorial for MSP
community (underway)*



*Optimal expansion of
MPAs and ORE
(proposed)*



Others TBD

INTERNATIONAL CONFERENCE

Marine Protected Areas IN Marine Spatial Planning

9-12 July 2025

Bodø, Norway



Call for
abstracts
is now
open

58th



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