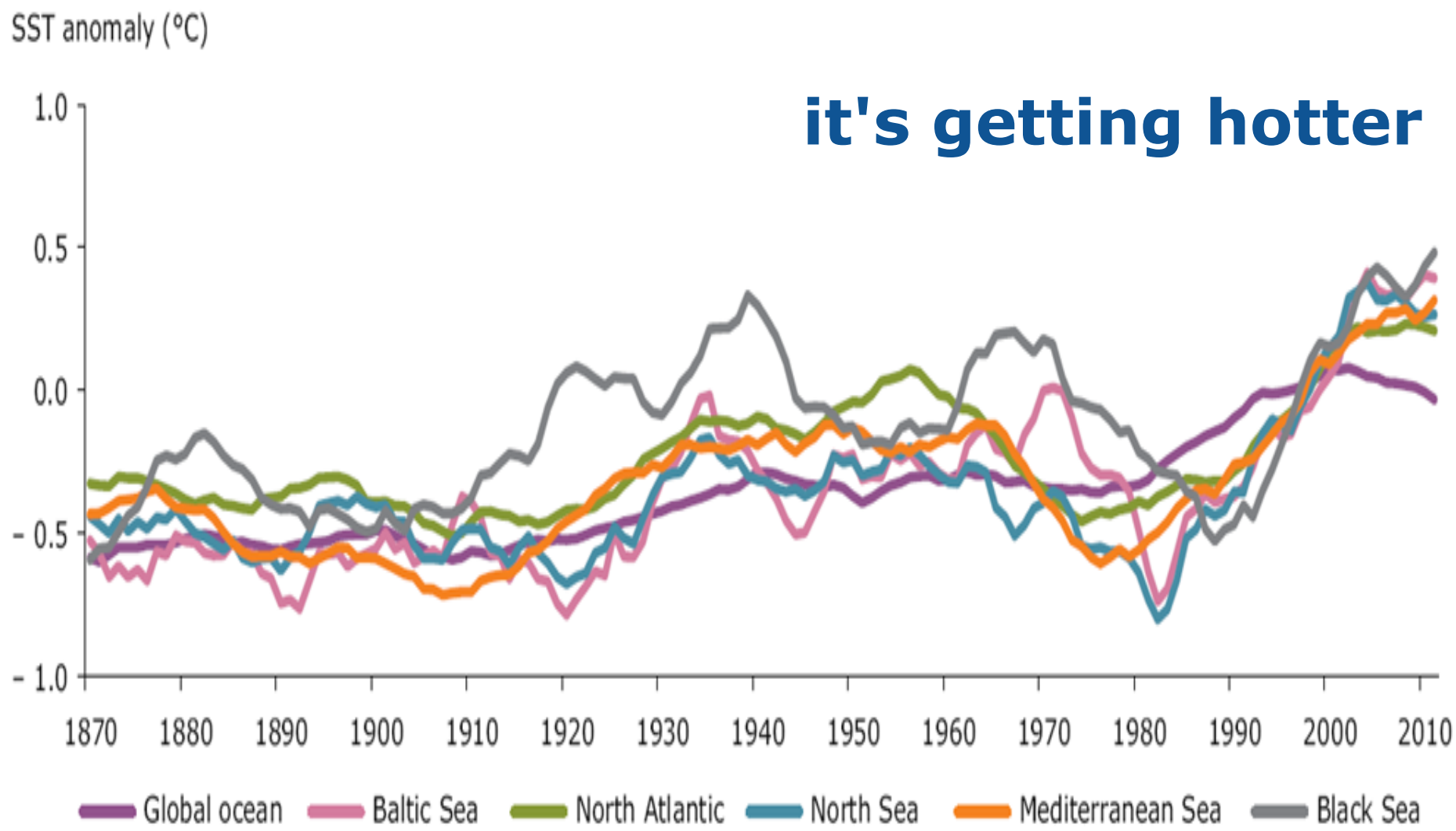
European Commission

Adaptation to Climate Change:

21 March , 2012

Integrated Maritime Policy

it's getting hotter



Note: Time series of annual average sea surface temperature (°C), referenced to the average temperature between 1986 and 2010, in each of the European seas.

Sources: SST datasets from the Hadley Centre (HADISST1 (global)), MOON-ENEA (Mediterranean Sea), and Bundesamt für Seeschifffahrt und Hydrographie (Baltic and North Seas), and MyOcean.

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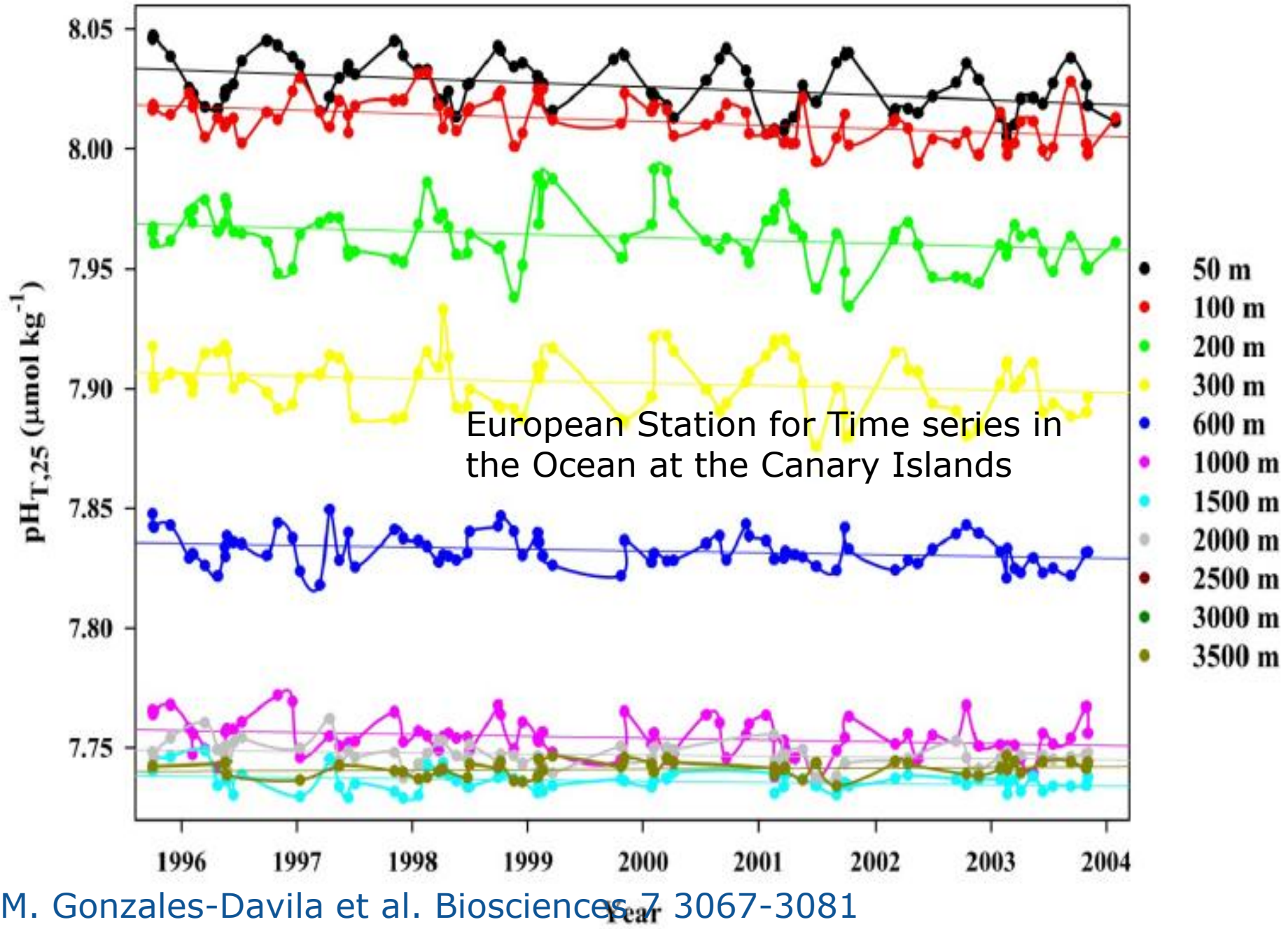
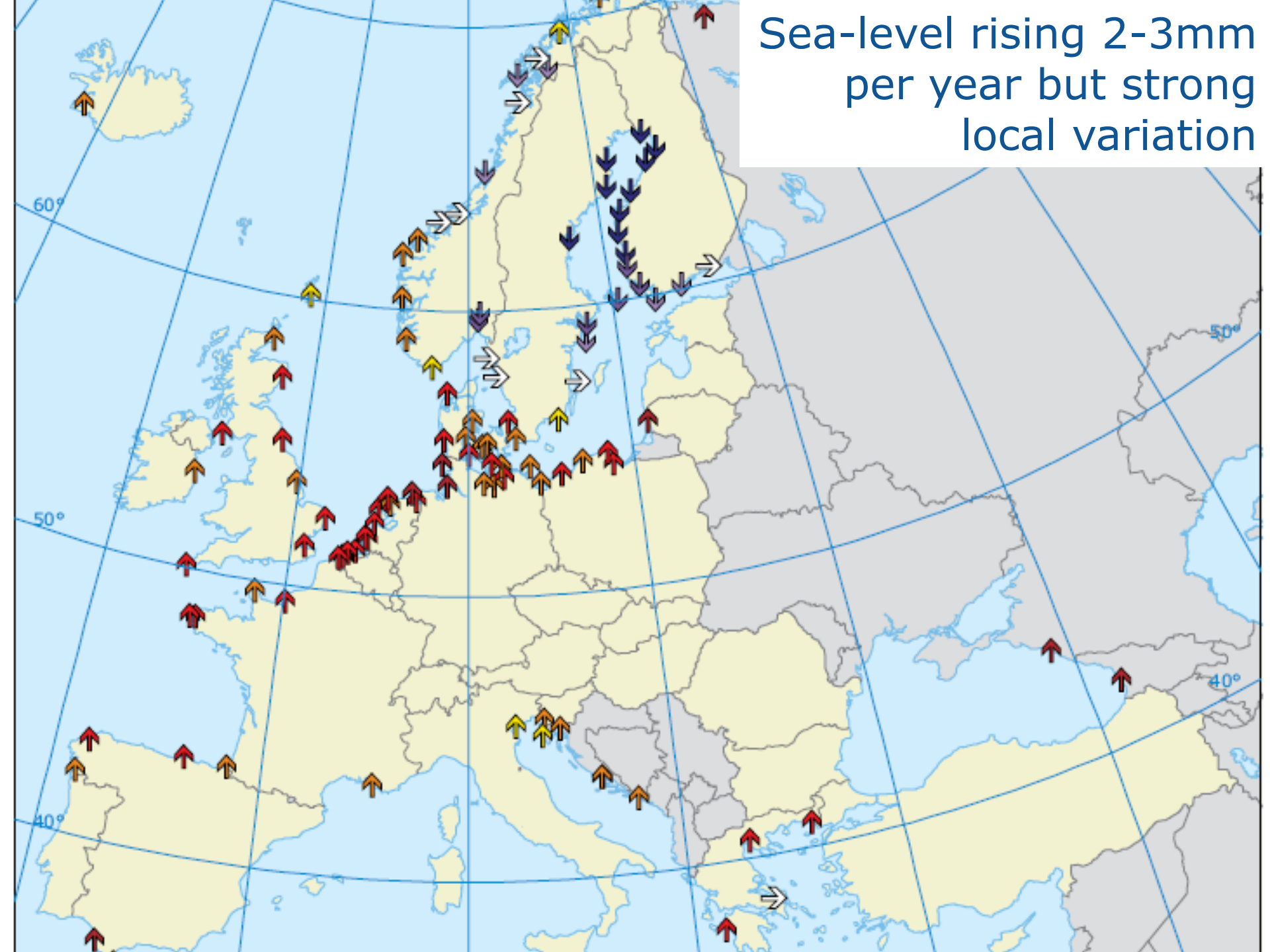
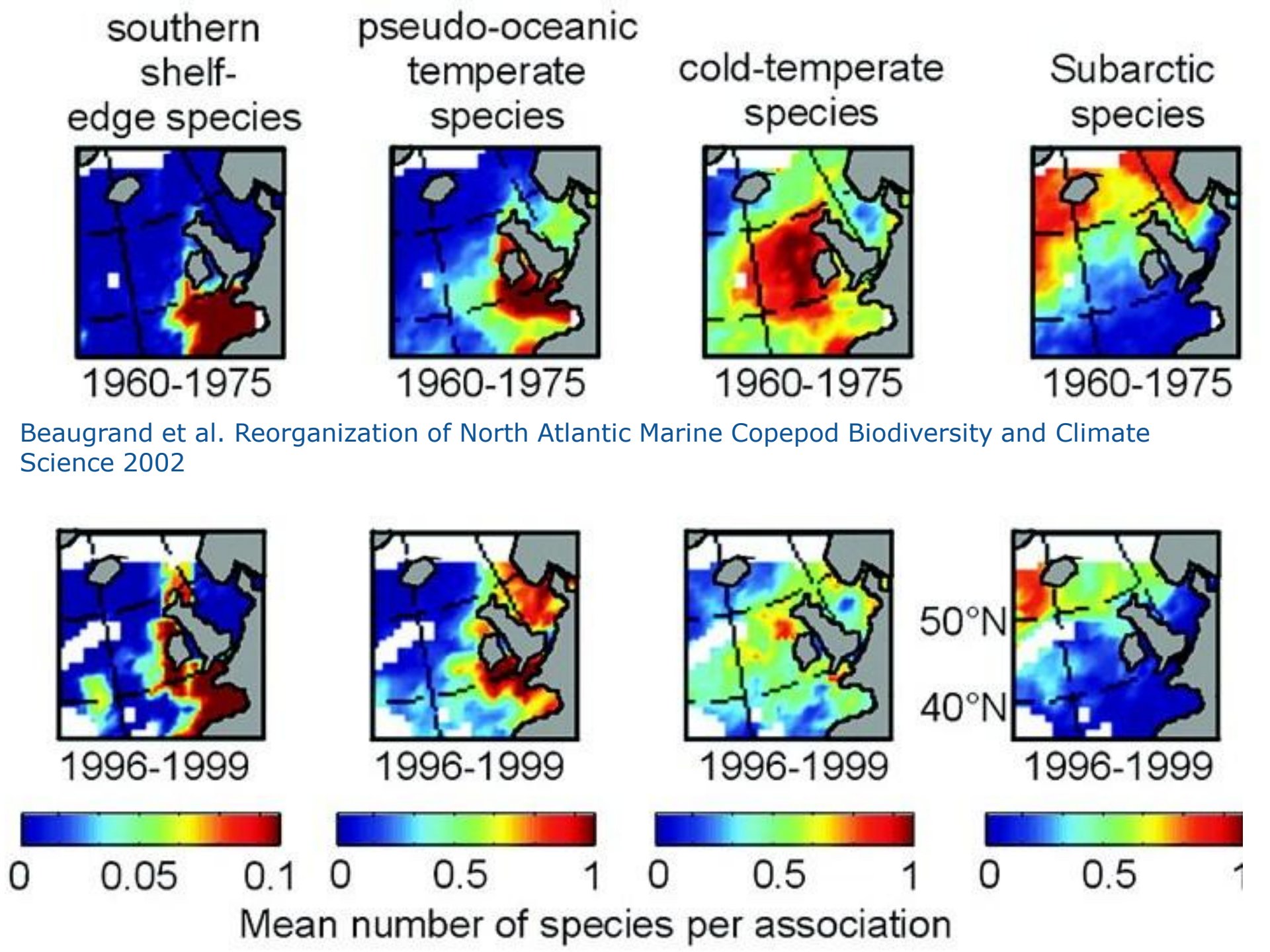
and more acidic



M. Gonzales-Davila et al. Biosciences 7 3067-3081


Sea-level rising 2-3mm
per year but strong
local variation
60°
50°
40°
50°
40°



Beaugrand et al. Reorganization of North Atlantic Marine Copepod Biodiversity and Climate Science 2002

management options

- protection:
  - sea-walls or hard structures
- managed retreat:
  - abandoning land to the sea
- accommodation:
  - reinforcement of dunes or through wetlands

Wetland of Aliki, Greece, Wikimedia

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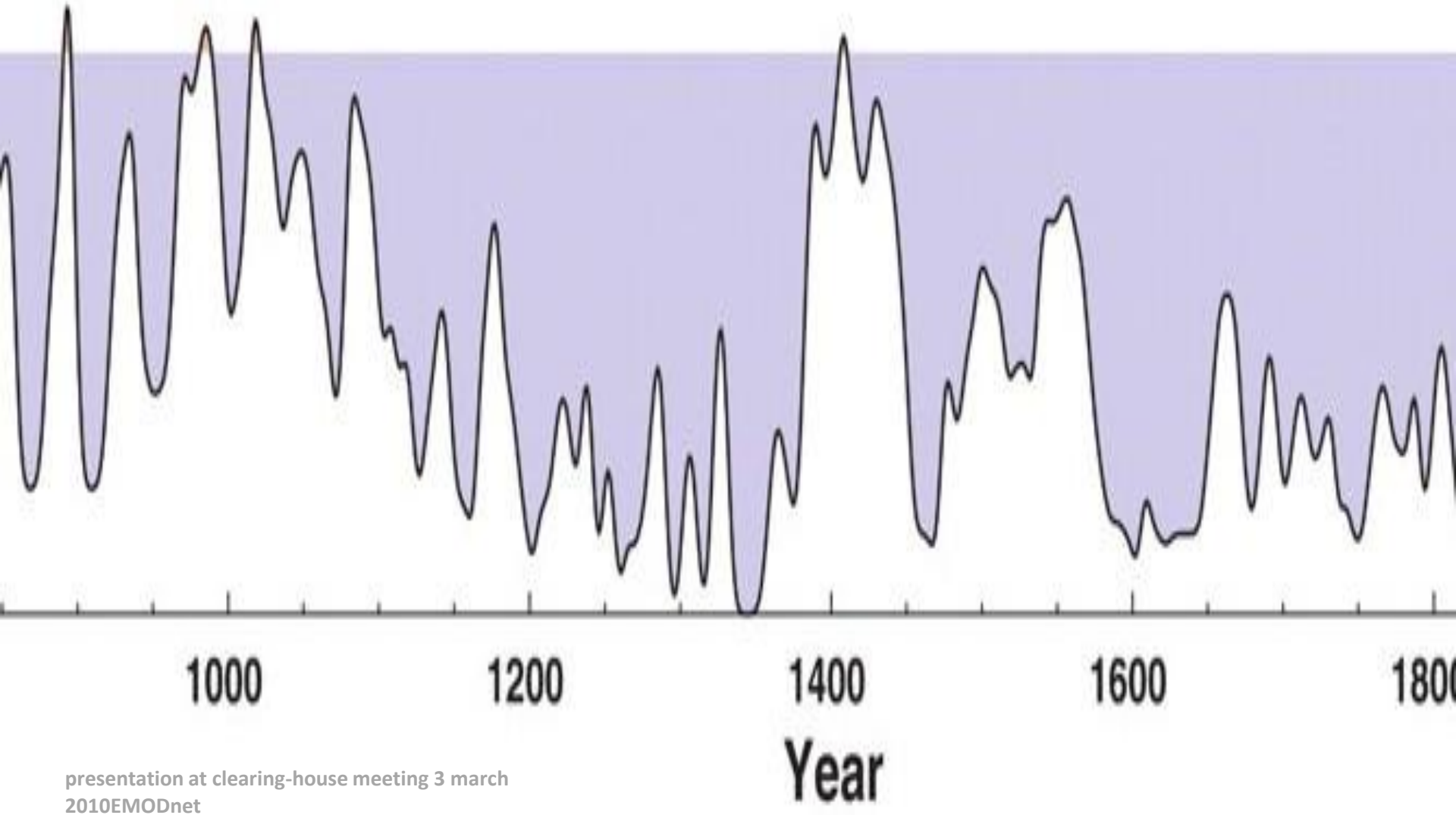
there is now clear evidence from all European seas that changes in sea temperature and other environmental factors have already altered fish population structure, recruitment, distribution (range extensions, retractions), phenology (timing) and migration routes. Fish like salmon and eels that live partly in rivers, partly in the sea have been strongly affected.

Change is not necessarily slow

Number of abnormally warm proxy temperature records minus number of cold ones



knowledge gap 1 – global drivers

- further observations and research are needed to reduce uncertainty in phenomena that have an impact on global sea-level rise; in particular the melting of ice in Greenland and Antarctica

knowledge gap 2 – local impacts

- further observations are needed at a regional and local level on changes in
- temperature,
  - sea water acidity,
  - coastal erosion and
  - ecosystems
- in order to provide management and business with time to react to unexpected changes.

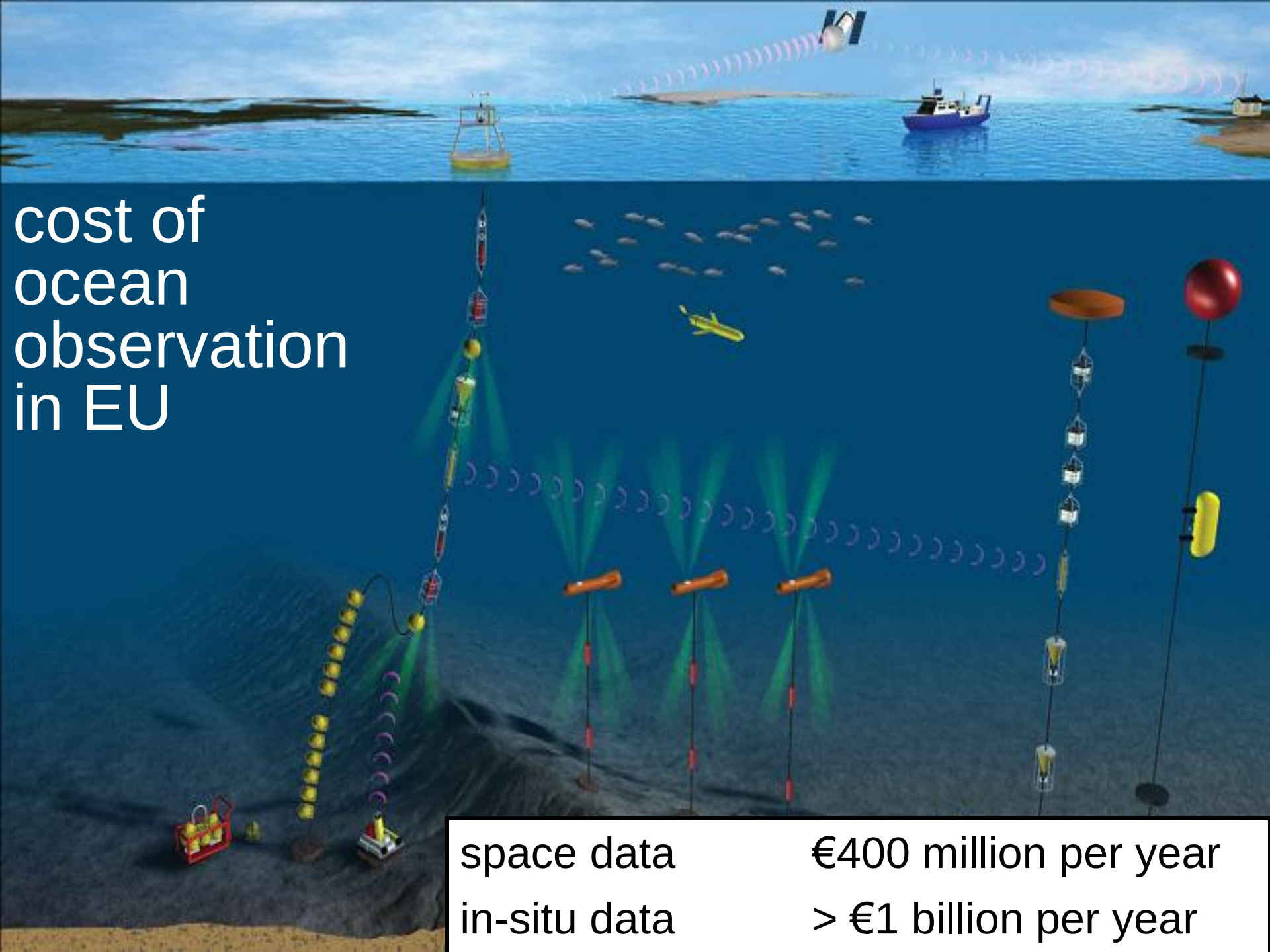
knowledge gap 3 – socio-economic impact

- additional work is needed to better estimate the evolution of
  - population,
  - economy,
  - land cover,
- in order to help national and regional authorities develop the most appropriate and cost-effective strategy for coastal protection

knowledge gap 4 – costs and benefits

- additional research is needed on the costs and benefits of alternative adaptation actions in coastal areas;
- in particular the need to protect human life, property and economic assets should not result in further destruction of coastal habitats.

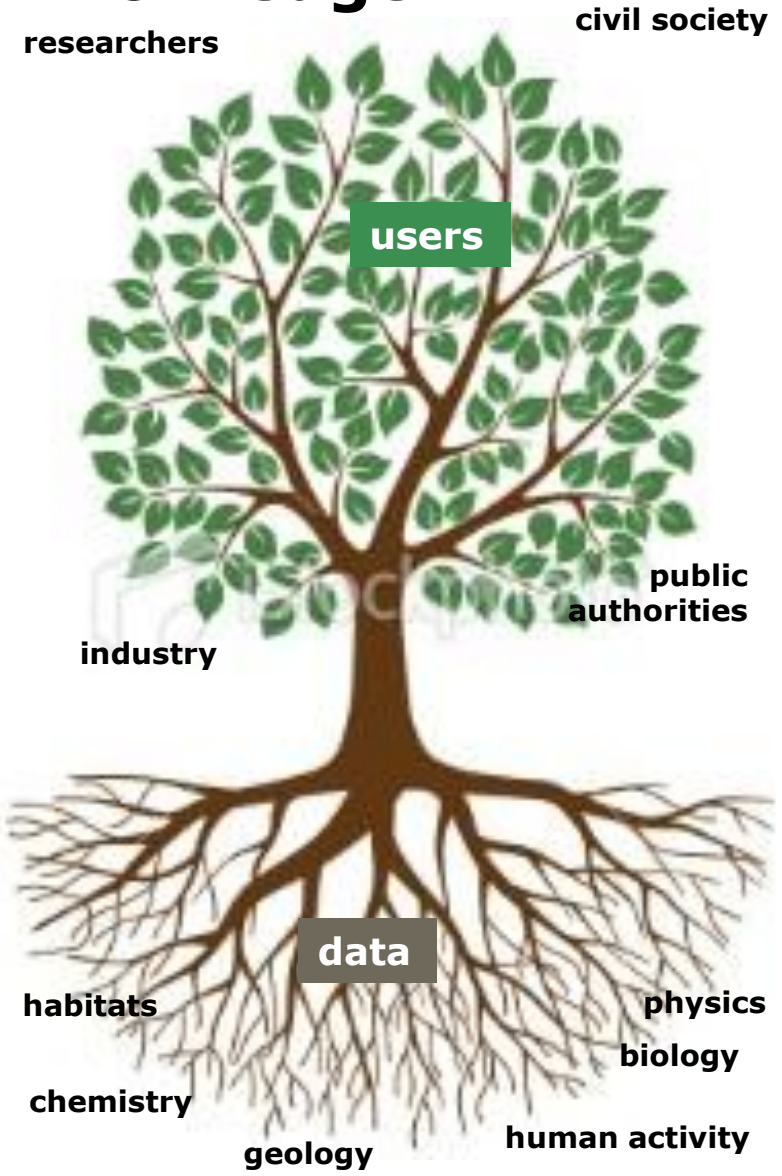
how can we close the knowledge gap?

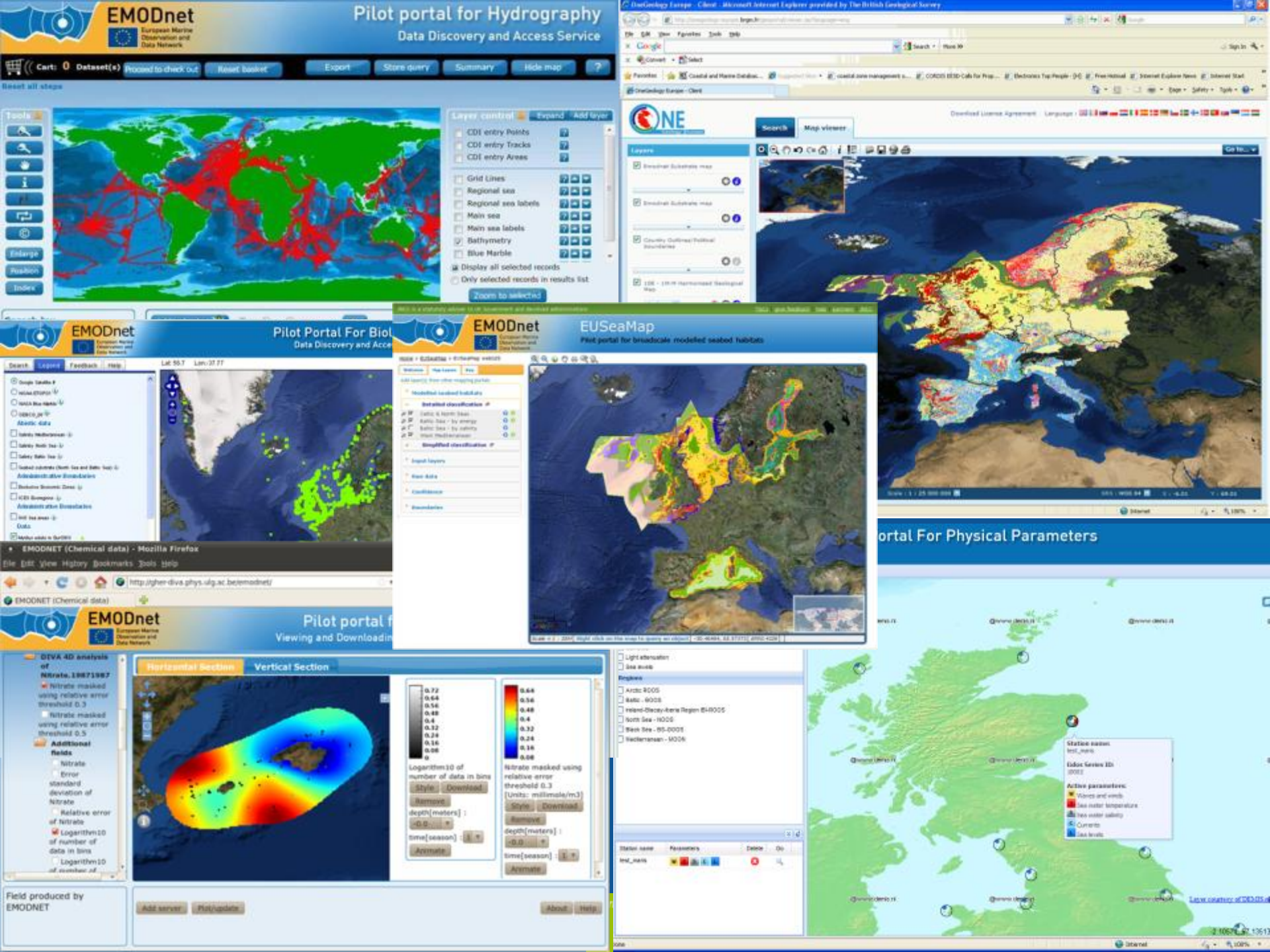

cost of ocean observation in EU
space data
€400 million per year
in-situ data
> €1 billion per year

Maria Damanaki, Commissioner for Maritime Affairs and Fisheries

(..) the data collected through these observations can only generate knowledge and innovation if Europe's engineers and scientists are able to find, access, assemble and apply them efficiently and rapidly. At present this is often not the case.

tree of marine knowledge

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Pilot portal for Hydrography
Data Discovery and Access Service
Cart: 0 Dataset(s)
Proceed to check out
Reset basket
Export
Store query
Summary
Hide map
Layer control
Expand
Add layer
CDI entry Points
CDI entry Tracks
CDI entry Areas
Grid Lines
Regional sea
Regional sea labels
Main sea
Main sea labels
Bathymetry
Blue Marble
Display all selected records
Only selected records in results list
Zoom to selected
Search
Map viewer
EMODnet
Pilot Portal For Biol
Data Discovery and Acce
EMODnet
EUSeaMap
Pilot portal for broadscale modelled seabed habitats
EMODNET (Chemical data) - Mozilla Firefox
http://gher-diva.phys.ulg.ac.be/emodnet/
EMODNET (Chemical data)
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DIVA 4D analysis of Nitrate, 19871987
Horizontal Section
Vertical Section
Logarithm10 of number of data in bins
Nitrate masked using relative error threshold 0.3 [Units: millimole/m3]
Style
Download
Remove
depth[meters] :
time[season] :
Animate
Field produced by EMODNET
Add server
Plot/update
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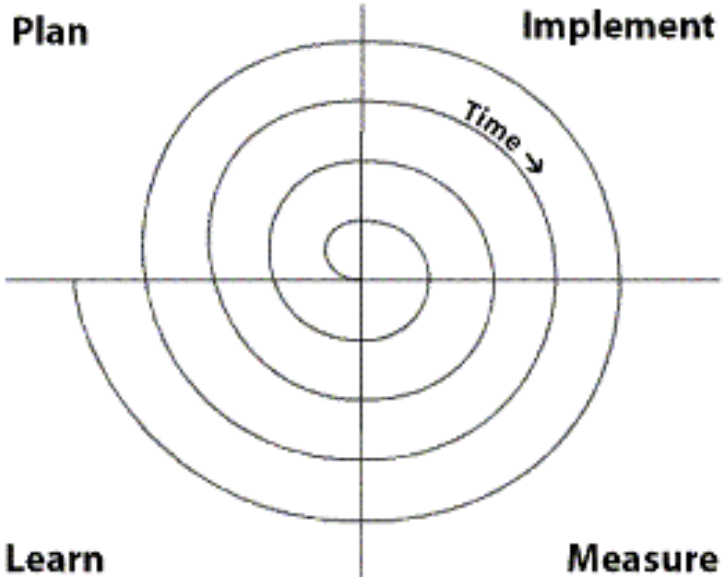
EMODnet European Marine Observation and Data Network

prototype method

2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Phase 1 – limited sea basins											
				Phase 2 - low resolution							
						Phase 3 - multi-resolution					



allows users to assess and improve product by trying it out

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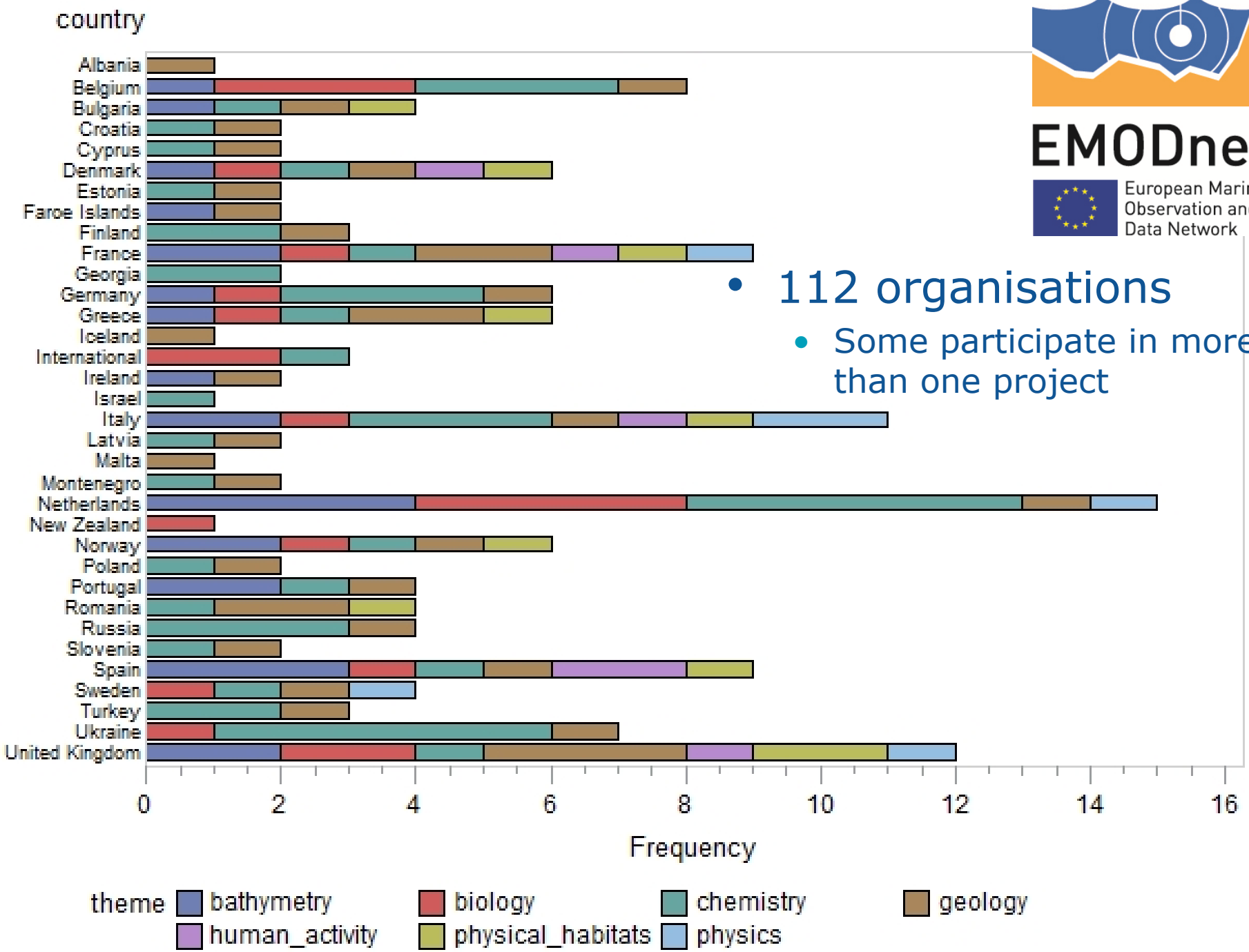


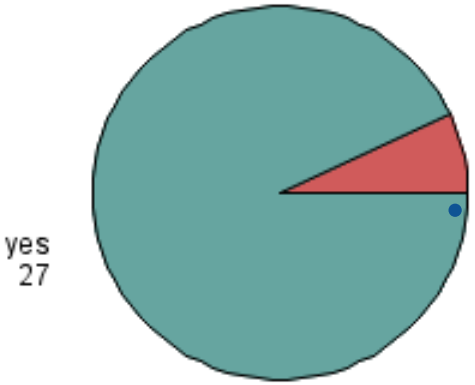
EMODnet

European Marine Observation and Data Network

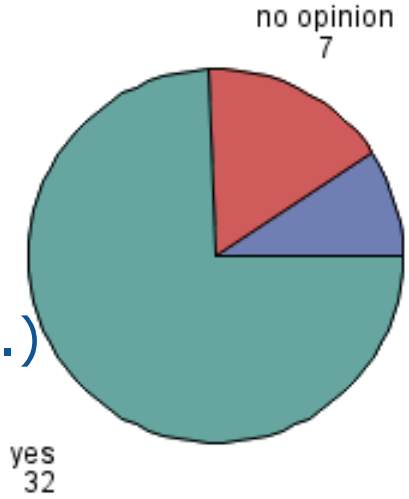
- 112 organisations
  - Some participate in more than one project

Should licenced offshore private sector actors be obliged to contribute to wider monitoring of the sea where this is feasible?

civil society



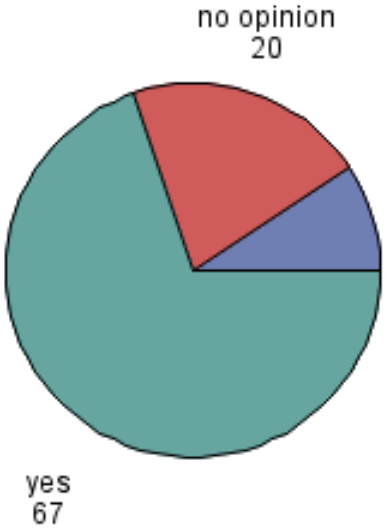
the industry (..) remains positive (..) if sampling from existing structures can help realising that and if it does not interfere with the function and operation of the structures



private sector

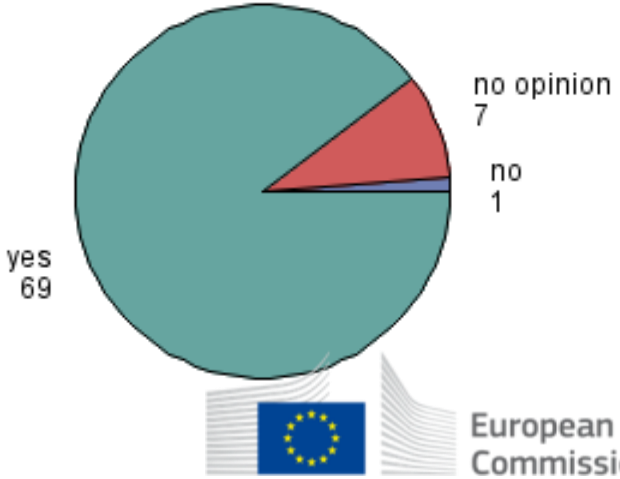
respondent=public

public bodies



respondent=research

researchers



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next steps

- finalise summary document
- impact assessment

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