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Commission

Ocean dimension of the climate change in the Mediterranean

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Intergovernmental
Oceanographic Commission
of UNESCO**

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The Intergovernmental Oceanographic Commission (IOC) of UNESCO



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- The only intergovernmental body of the UN system specializing in the **ocean science, services, observations, data exchange, and capacity development**
- Established 1960, **149** Member States

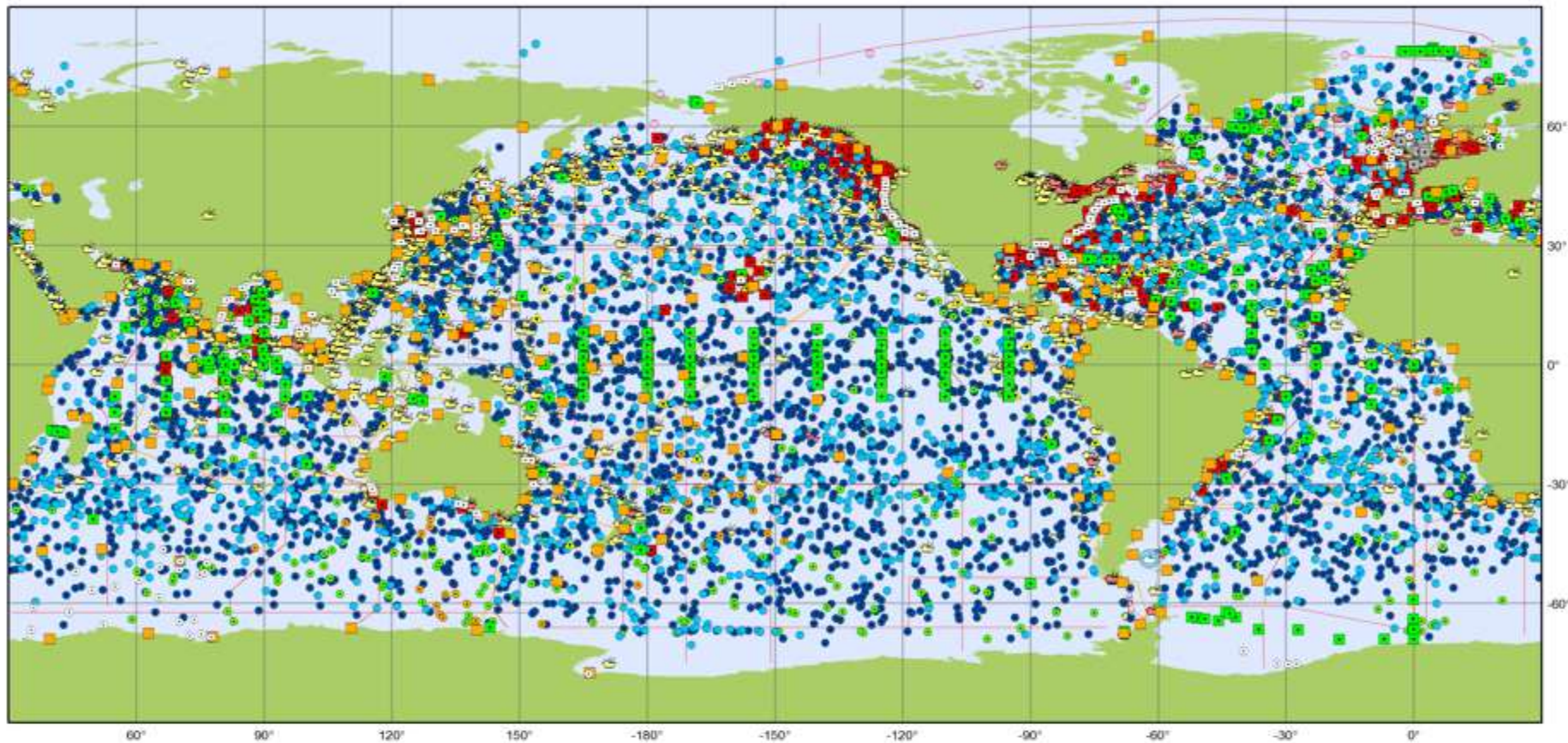


High-Level Objectives in 2014-2021:

- **Healthy ocean ecosystems**; [SEP]
- Early warning systems (e.g. tsunami); [SEP]
- **Resilience to climate change and variability by science-based services, adaptation and mitigation**; and [SEP]
- Emerging ocean science issues.



Global Ocean Observing System



Main in situ Elements of the Global Ocean Observing System

April 2018

Profiling Floats (Argo)

- Core (3821)
- Deep (57)
- BioGeoChemical (305)

Data Buoys (DBCP)

- Surface Drifters (1413)
- Offshore Platforms (96)
- Ice Buoys (11)
- Moored Buoys (386)
- ▲ Tsunameters (32)

Timeseries (OceanSITES)

- Interdisciplinary Moorings (338)
- Repeated Hydrography (GO-SHIP)
- Research Vessel Lines (61)
- Sea Level (GLOSS)
- Tide Gauges (252)

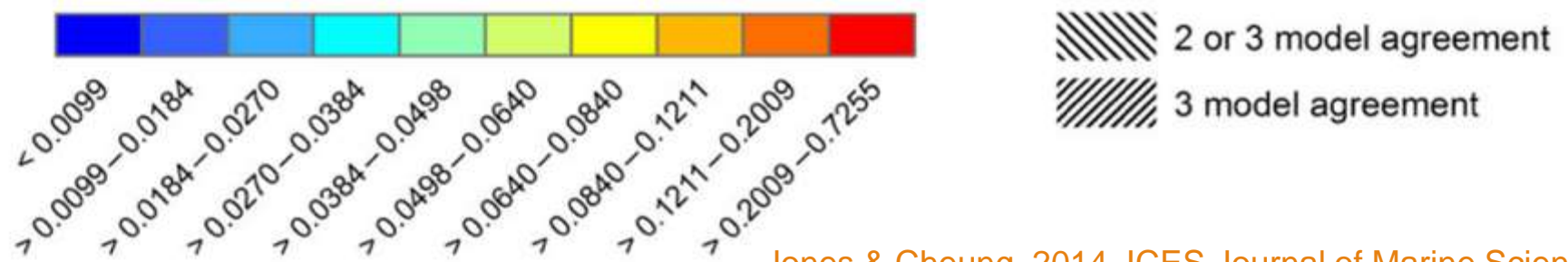
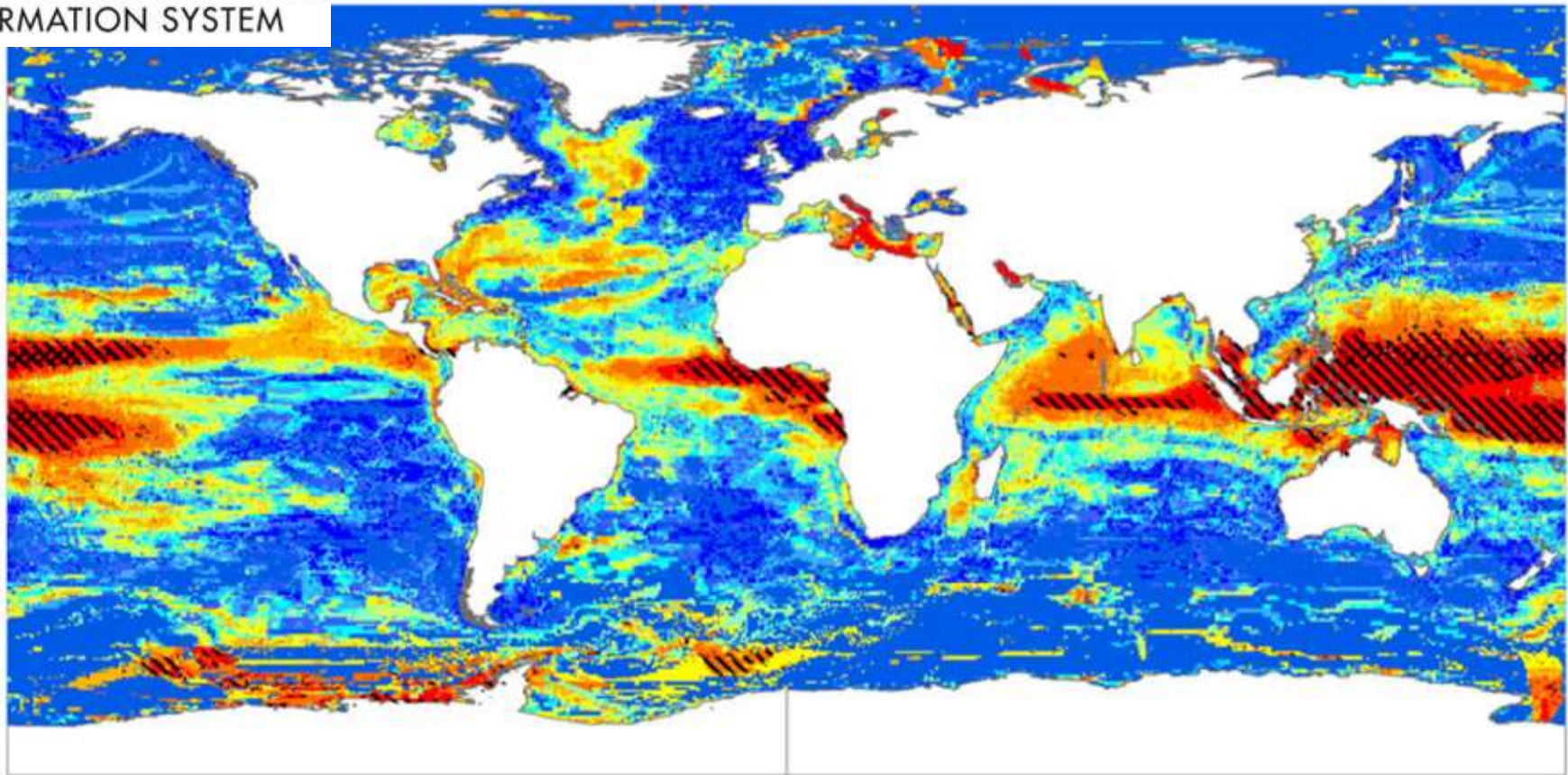
Ship based Measurements (SOT)

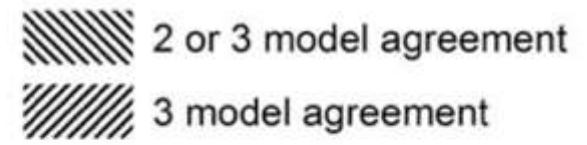
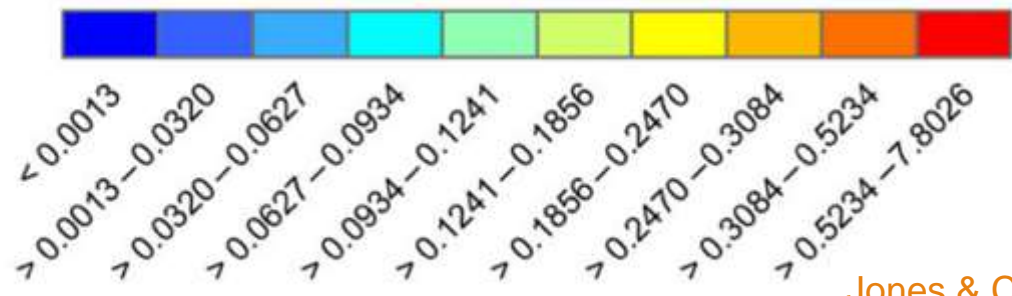
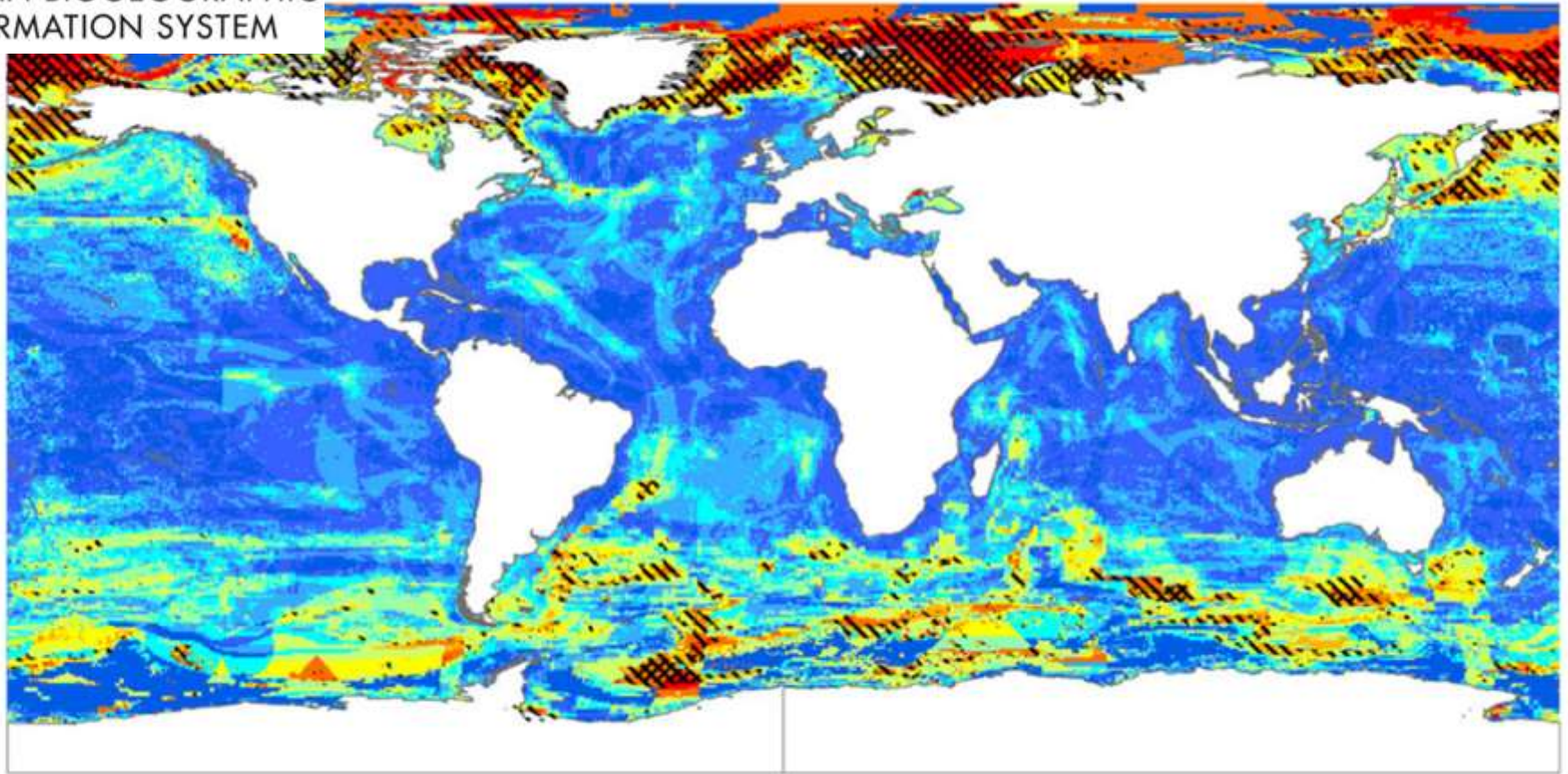
- Automated Weather Stations (249)
- Manned Weather Stations (1772)
- Radiosondes (8)
- eXpendable BathyThermographs (37)

Other Networks

- HF Radars (270)
- Animal Borne Sensors (53)







Climate change and anthropogenic impacts on the ocean



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Warming and
changes of salinity

Ocean acting as carbon
sink -> acidification

Deoxygenation,
dead zones

Sea-level rise

Arctic sea ice reduction

Atmospheric variability

Productivity decline

Phytoplankton decline, $<O_2$

Pollution (e.g. HABs+plastics)

Invasive species

Habitat destruction

IUU Fishing + unsustainable
mariculture practices

Accidental damage

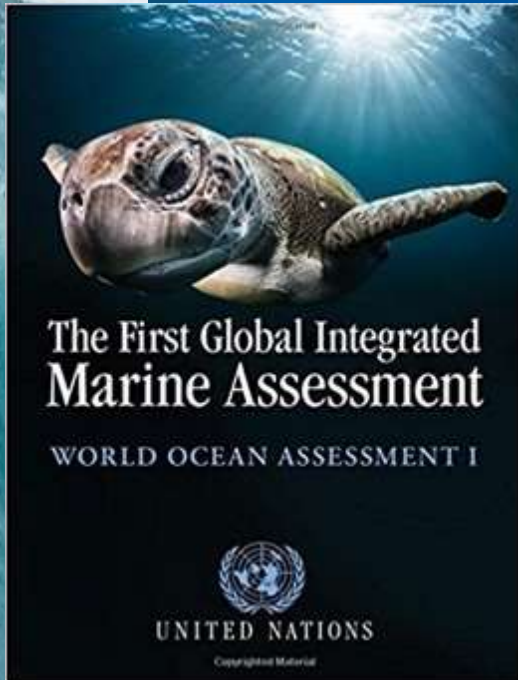
Major Assessments



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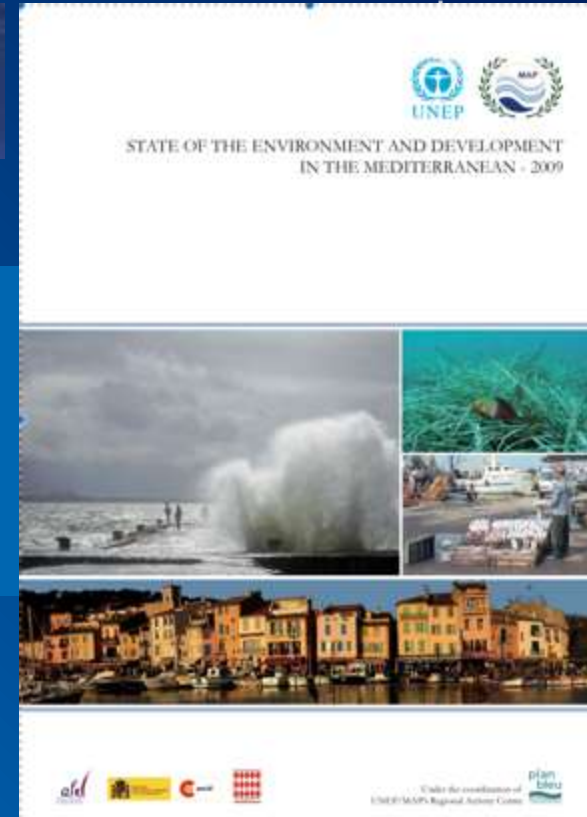


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2019: Special Report on the Ocean and Cryosphere in a Changing Climate

2017: World Ocean Assessment: due to the multitude and complex nature of stressors, the world is running out of time to save and sustainably manage its ocean!



2009: State of Environment and Development in the Mediterranean

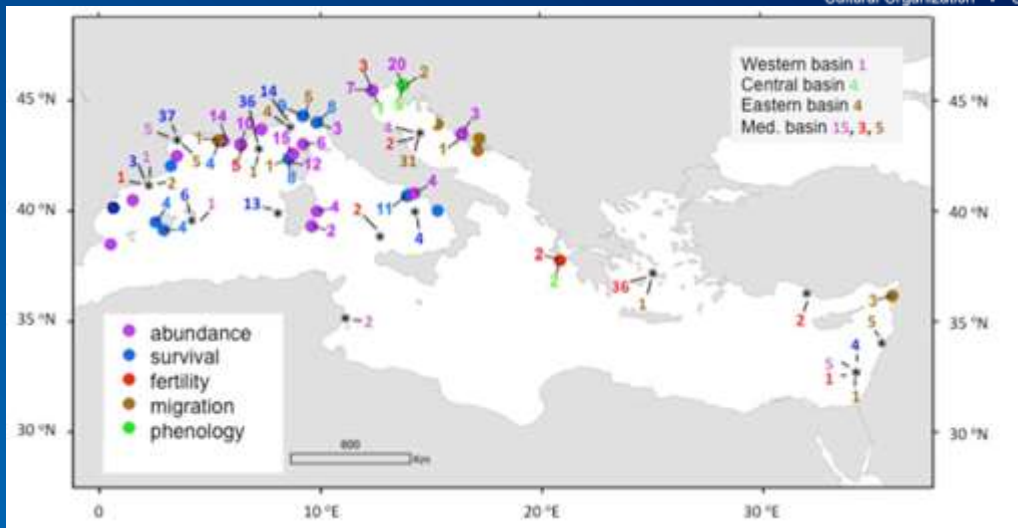
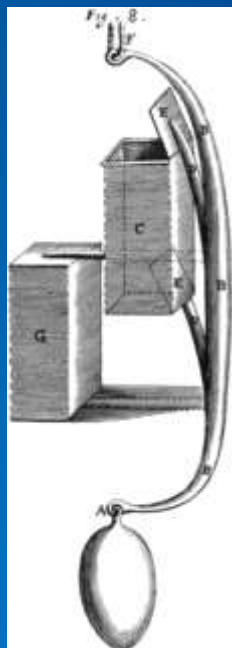
Mediterranean: Knowledge and Governance



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(Marba et al, 2015)



(Pinardi et al, 2018)



**Mediterranean Action Plan
Barcelona Convention**

Mediterranean: hotspot of marine biodiversity



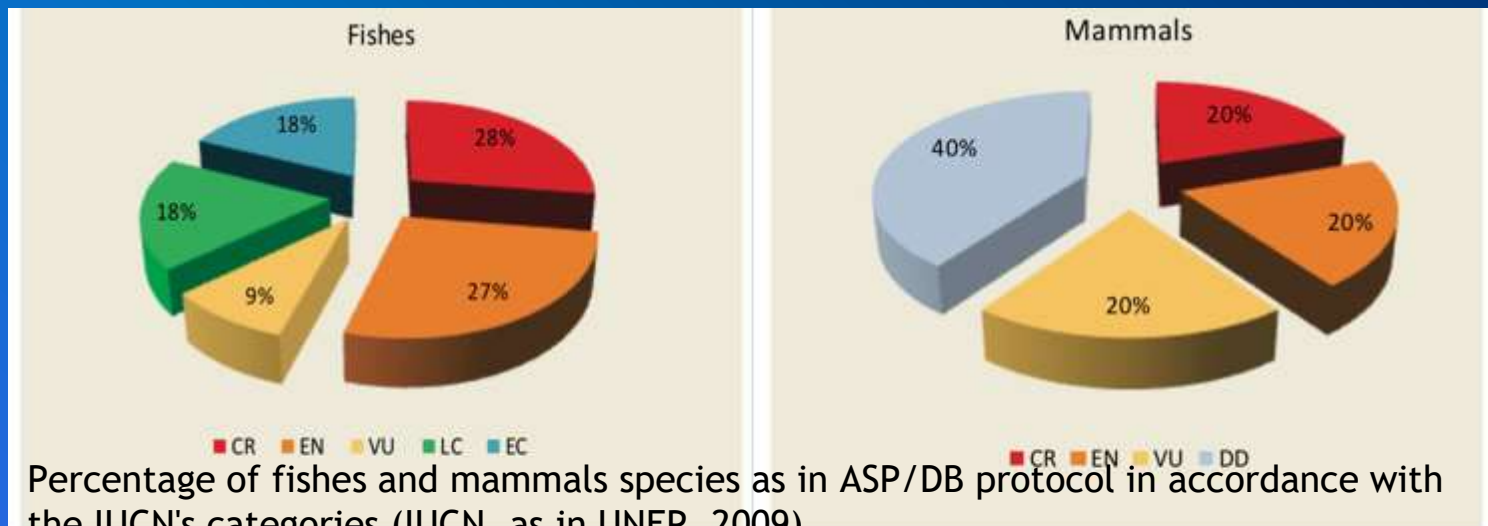
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0.8% of the world's ocean area, 0.3% of its volume, 7 to 8% of all known marine species. > 17,000 species known.

90% of the known benthic plant species and > 75% of fish species in the shallow water (<50 m), which represents 5% of Mediterranean area.



Percentage of fishes and mammals species as in ASP/DB protocol in accordance with the IUCN's categories (IUCN, as in UNEP, 2009)

CR : Critically endangered
EN : Endangered
VU: Vulnerable

Threatened
species

LC : least concern
EC : under evaluation
DD : data deficient

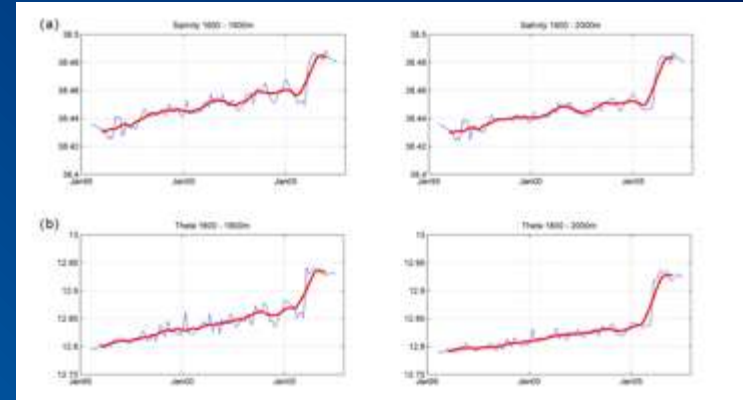
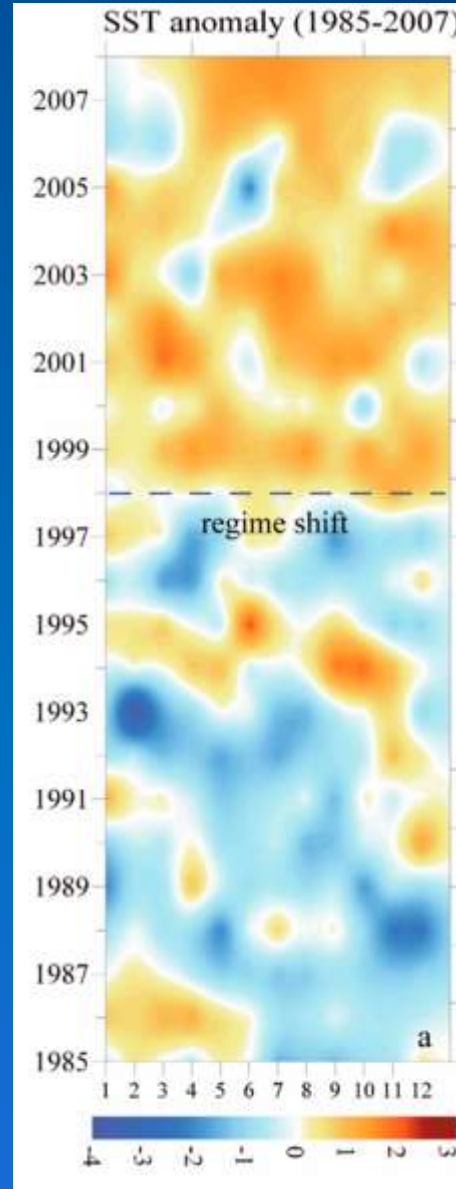
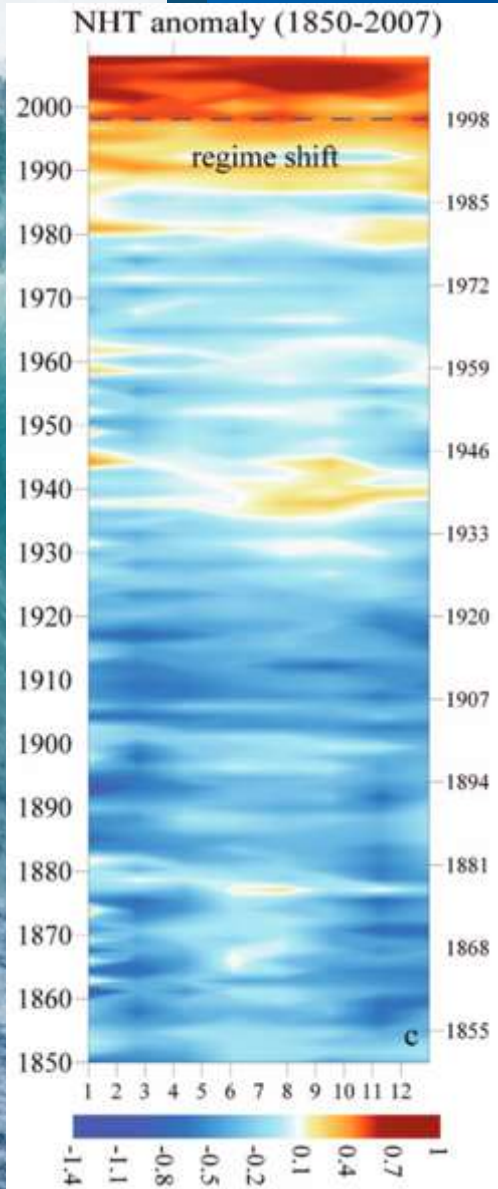
Warming/Salinity



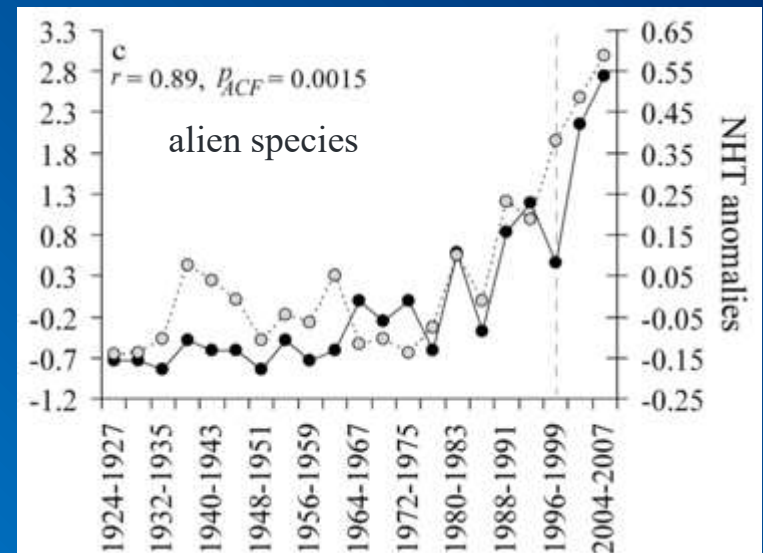
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(Borghini et al., 2014)



Raitsos et al., 2010

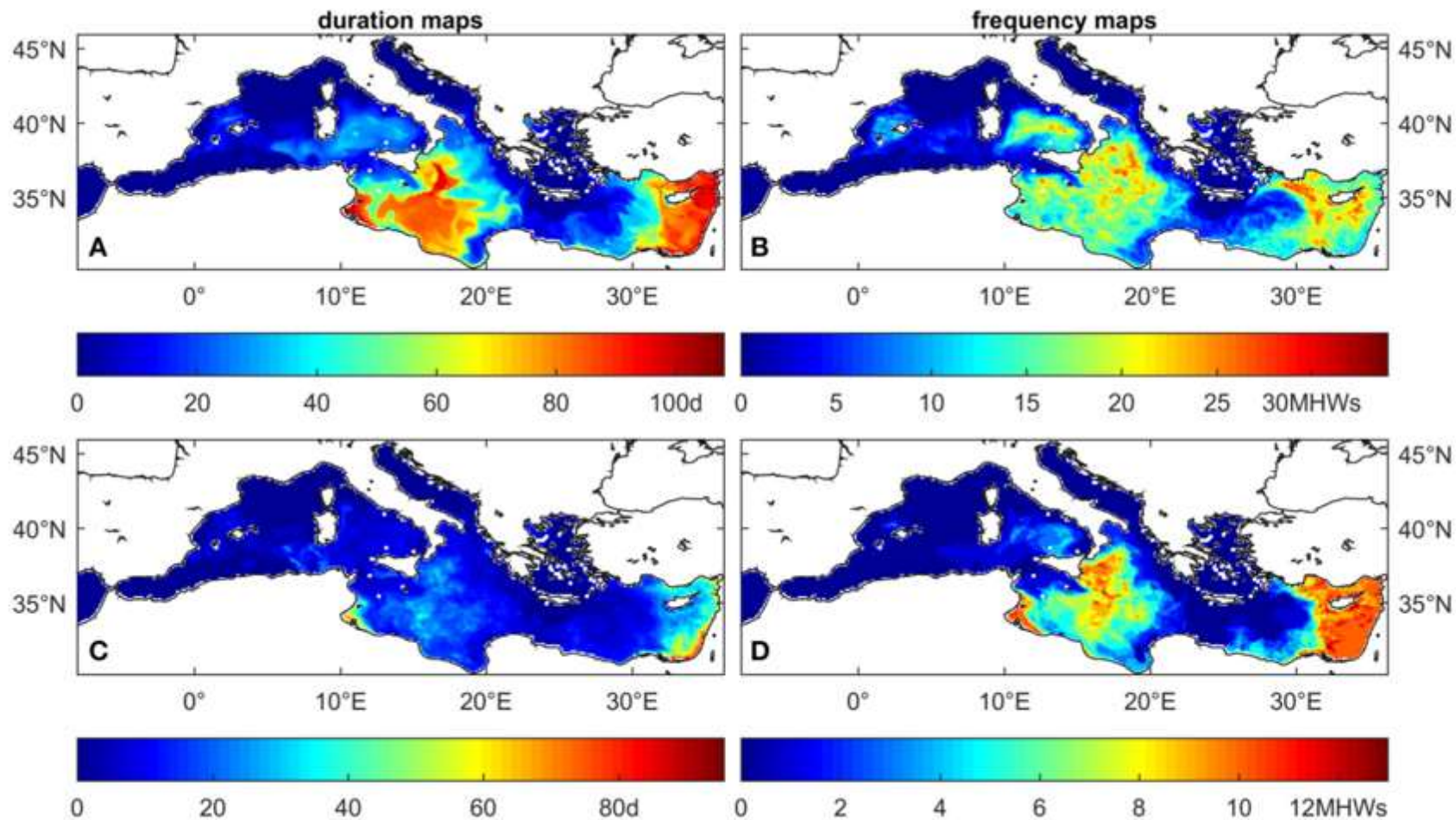
Heat waves



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(Galli et al., 2017)

Climate change and anthropogenic impacts on the Mediterranean Sea



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“Tropicalization” of the Mediterranean under Atlantic flux, Lessepsian migration, human action (aquaculture), and climate warming

Loss of biodiversity, mostly due to habitat destruction, overexploitation, and invasive species

Affected ecosystems and habitats: most of ecosystems (including magnoliophytes and corallogenic reefs), beaches, coastal cities

Impacts manifest in economy (esp. in tourism and fisheries/aquaculture) and human health

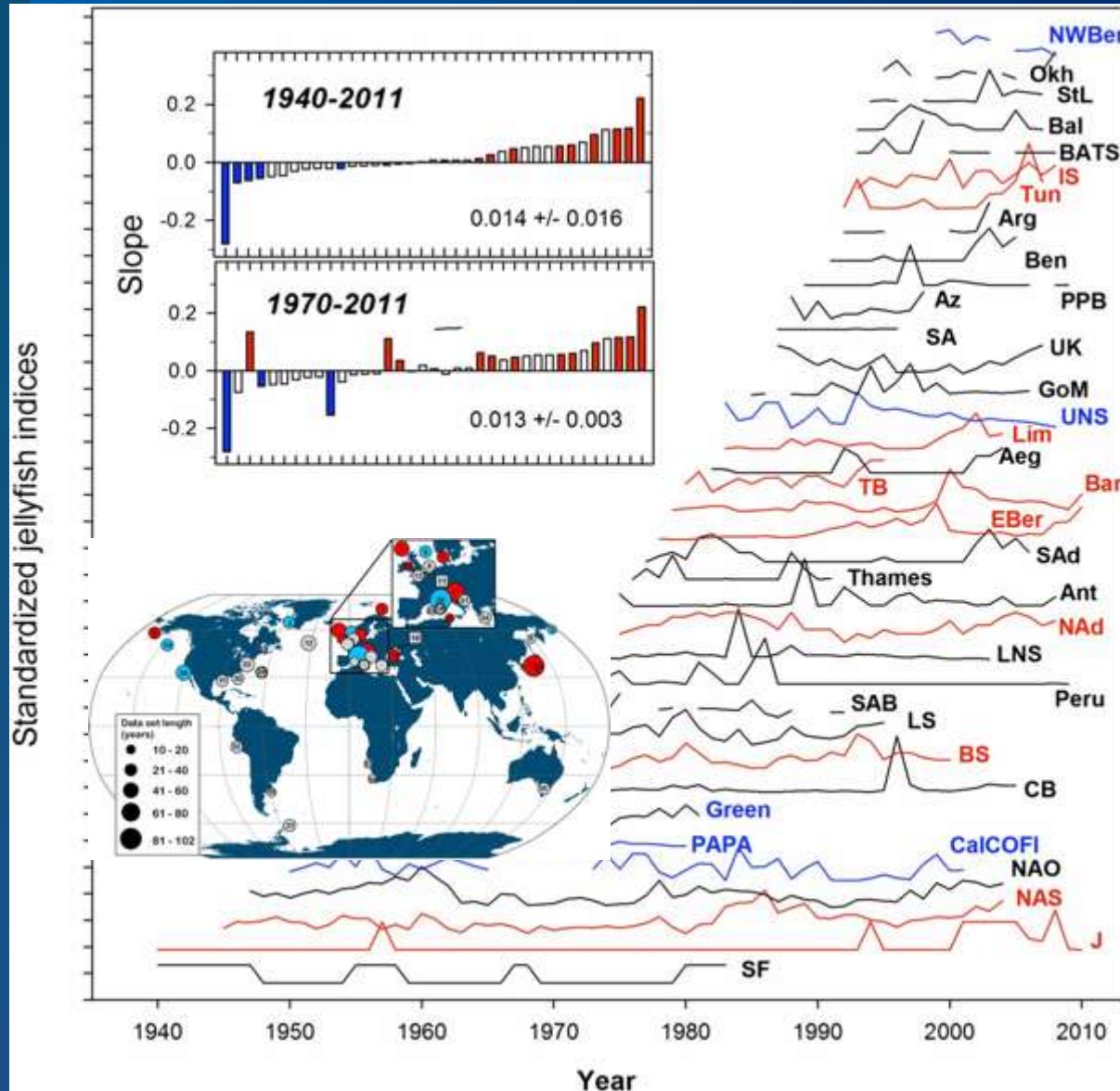
Major uncertainties exist: jellyfish



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(Condon et al., 2013)

Ocean and the 2030 Agenda, UN Frameworks



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Approach: science – based CZM, MSP, MPAs

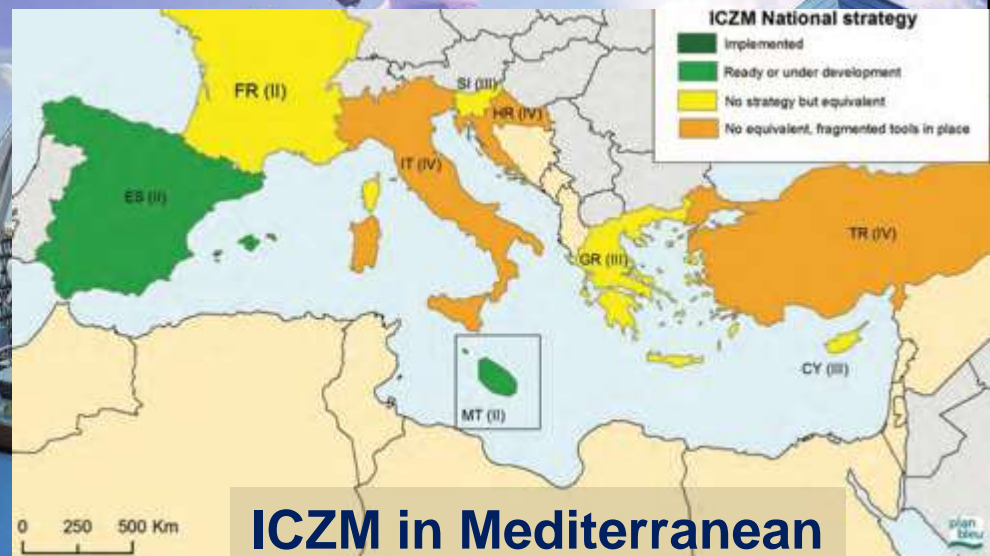
% of Area of World EEZs Covered by Approved MSP



Note: Surface Area of the World's EEZs is ≈ 140 million km²

Major Adaptation Programme needed

(OECD, 2016)



(UNEP, 2009)



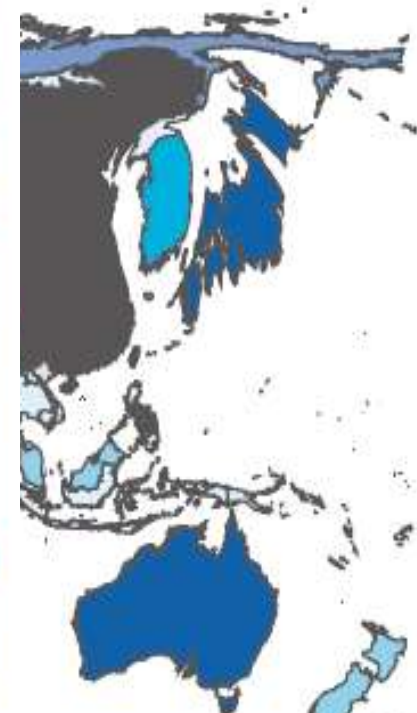
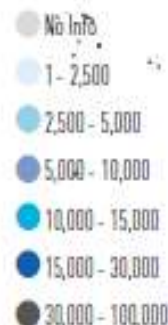
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Science-Metrix N° Papers



The Current Status
of Ocean Science
around the World



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Sustainable
Development
Goals



UNGA-72 Omnibus Resolution



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The Ocean
We Need
for the
Future
We Want

Proposal for an International
Decade of Ocean Science for
Sustainable Development
(2021-2030)



One Planet, One Ocean

UN Decade of Ocean Science for Sustainable Development, 2021-2030

A Mediterranean Component?

Thank you!
Ευχαριστώ!