United Nations
Educational, Scientific and
Cultural Organization

Intergovernmental
Oceanographic
Commission

# IOC's international coordination efforts on Climate Change and EBUS

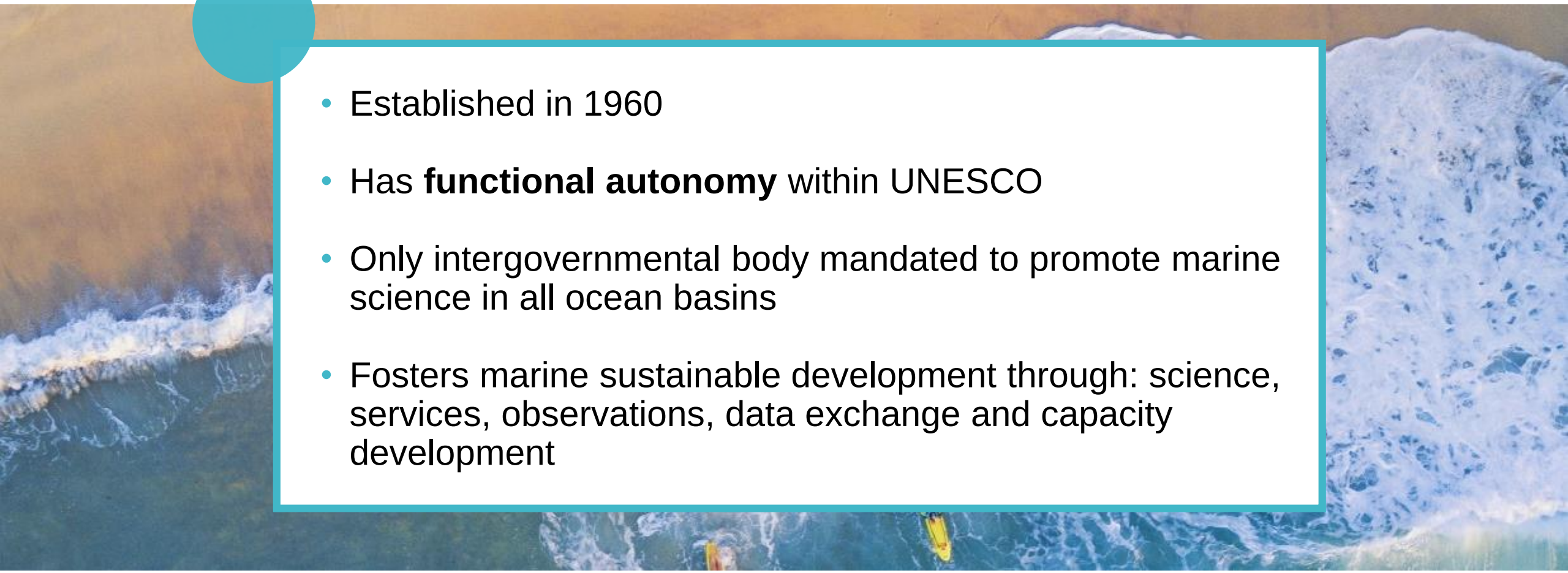
**Salvatore Aricò – 12 March 2020**

# The IOC of UNESCO

## Building knowledge and capacity for sustainable ocean management

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission



- Established in 1960
- Has **functional autonomy** within UNESCO
- Only intergovernmental body mandated to promote marine science in all ocean basins
- Fosters marine sustainable development through: science, services, observations, data exchange and capacity development

# The IOC within UN

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

Focal point for ocean observations, science, services and data exchange

Competent international organization for Marine Scientific Research (UNCLOS)

# IOC Vision

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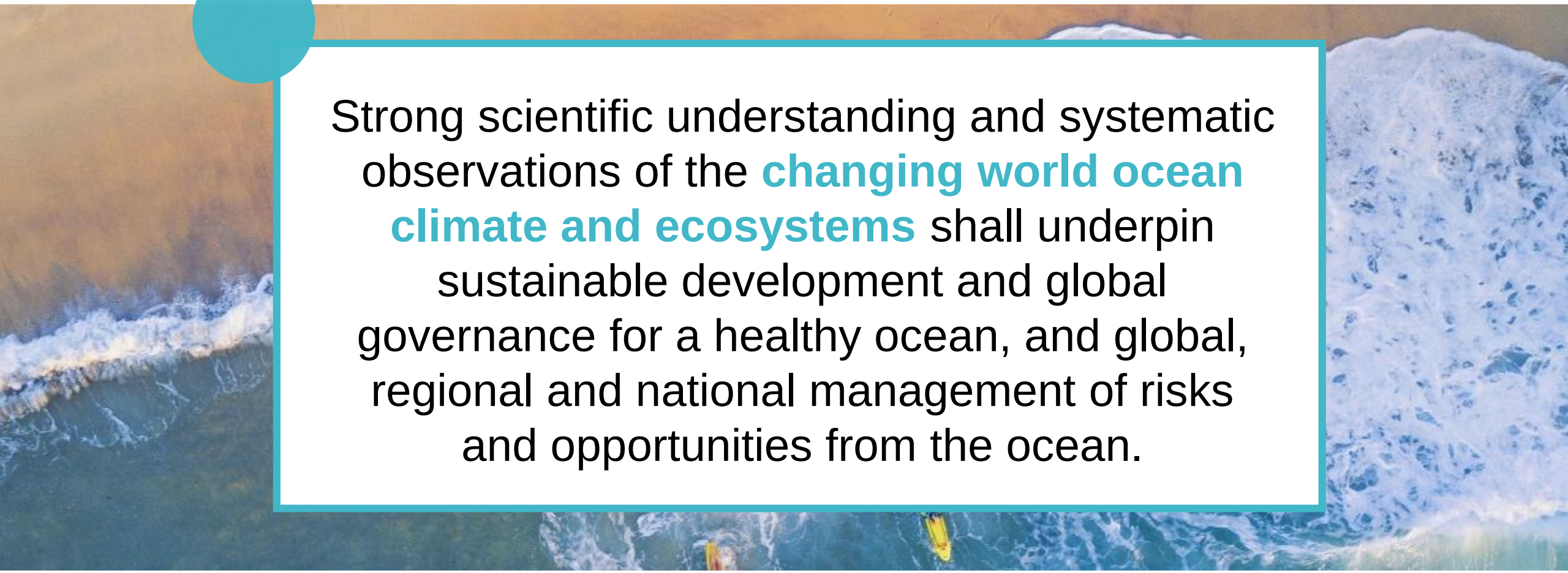
Intergovernmental Oceanographic Commission



Strong scientific understanding and systematic observations of the **changing world ocean climate and ecosystems** shall underpin sustainable development and global governance for a healthy ocean, and global, regional and national management of risks and opportunities from the ocean.

# IOC High-Level Objectives for 2014-2021

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## High Level Objectives: (…)

**3. Increased resiliency to climate change and variability and enhanced safety, efficiency and effectiveness of all ocean-based activities through scientifically-founded services, adaptation and mitigation strategies.**

Climate variability and change impact many elements on which human well-being depends, modifying patterns of rainfall and drought, sea-level and coastal erosion, and through temperature changes and ocean acidification, adding stress to ecosystems and impacting on the goods and services they provide. Thus, human development goals including food security, access to water resources, and preparedness and resilience to disasters are threatened. It is known that **the ocean plays a key role in climate**; IOC will therefore assist its Member States in developing capacity so as to enable them to develop and improve climate impact mitigation and adaptation strategies that are based on growing scientific knowledge.

# 2030 AGENDA

United Nations Educational, Scientific and Cultural Organization

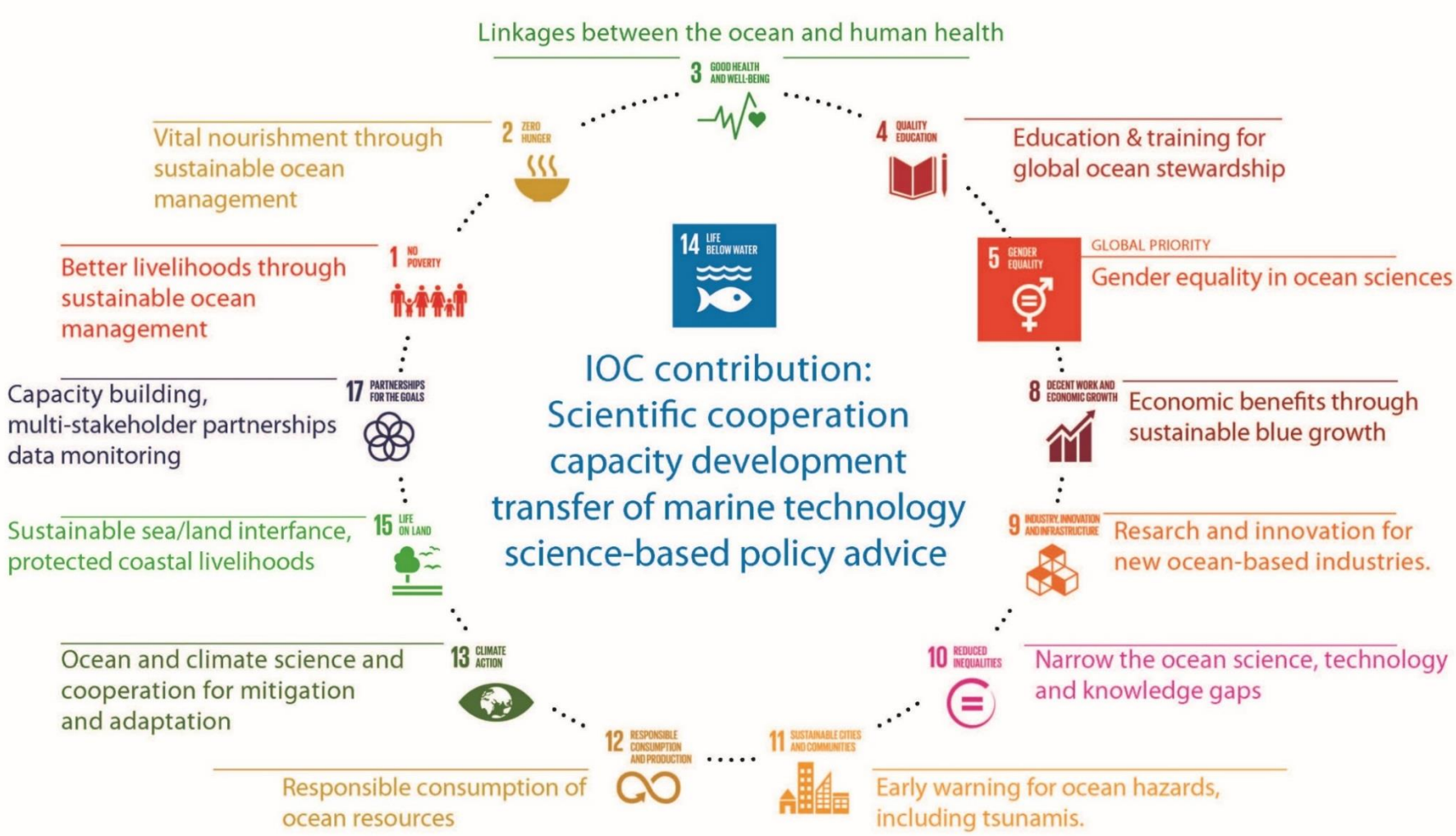
Intergovernmental Oceanographic Commission


Conserve and sustainably use the oceans, seas and marine resources for sustainable development

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

# The work of IOC of UNESCO is relevant to 13 out of 17 Sustainable Development Goals



# Science in EBUS WCRP CLIVAR

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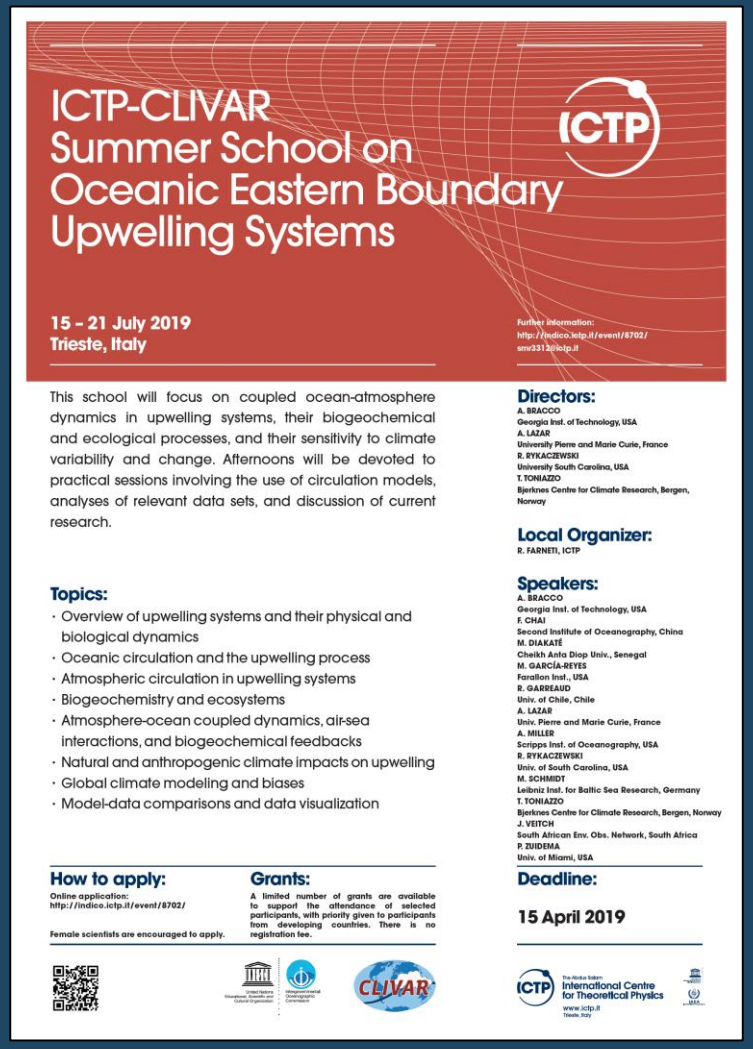
## ICTP-CLIVAR Summer School on Oceanic Eastern Boundary Upwelling Systems

Trieste (Italy)

15-19 July 2019

IOC-UNESCO co-sponsored participants from developing countries



# Science in EBUS SCOR WG 155

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Intergovernmental Oceanographic Commission

**SCOR WG EBUS 155**
**Summer School Changes in coastal upwelling systems and their impact on marine resources**

4-12 May 2020
Dakar (Senegal)

IOC-UNESCO co-sponsoring female participants from developing countries

**Open Science Conference on Eastern Boundary Upwelling Systems (EBUS): Past, Present and Future**

5-10 September 2021
Lima (Peru)

IOC-UNESCO as co-sponsor

# SDG 14 10 targets – 10 ways to collect data

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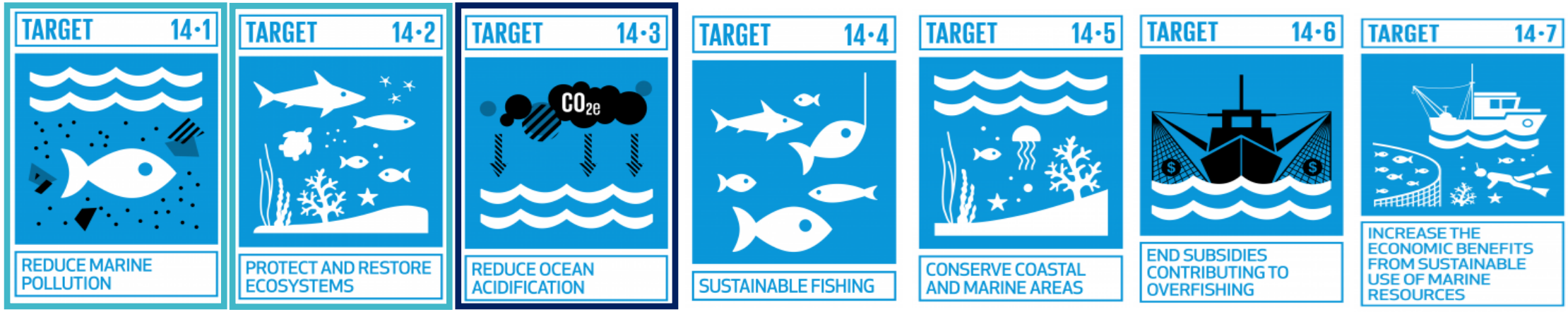
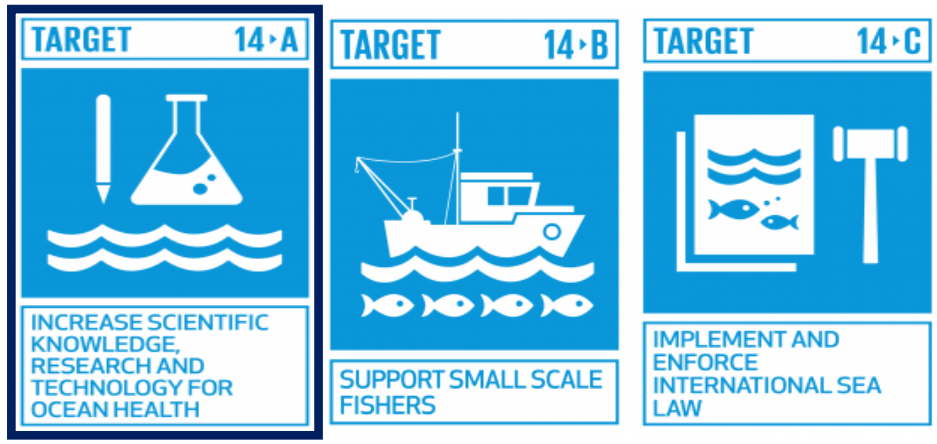
Intergovernmental Oceanographic Commission




| | | | |
|---|---|---|---|
| **14.1** | **UNEP supported by IOC-UNESCO** | **Tier III** | **2025** |
| **14.2** | **UNEP supported by IOC-UNESCO** | **Tier III** | **2020** |
| **14.3** | **IOC-UNESCO** | **Tier II** | **-** |
| 14.4 | FAO | Tier I | 2020 |
| 14.5 | UNEP-WCMC supported by IUCN | Tier I | 2020 |
| 14.6 | FAO | Tier II | 2020 |
| 14.7 | FAO supported by UNEP-WCMC | Tier III | 2030 |
| **14.A** | **IOC-UNESCO** | **Tier II** | **-** |
| 14.B | FAO | Tier II | - |
| 14.C | DOALOS | Tier III | - |

# Ocean Acidification a global 'issue' addressed at the regional scale

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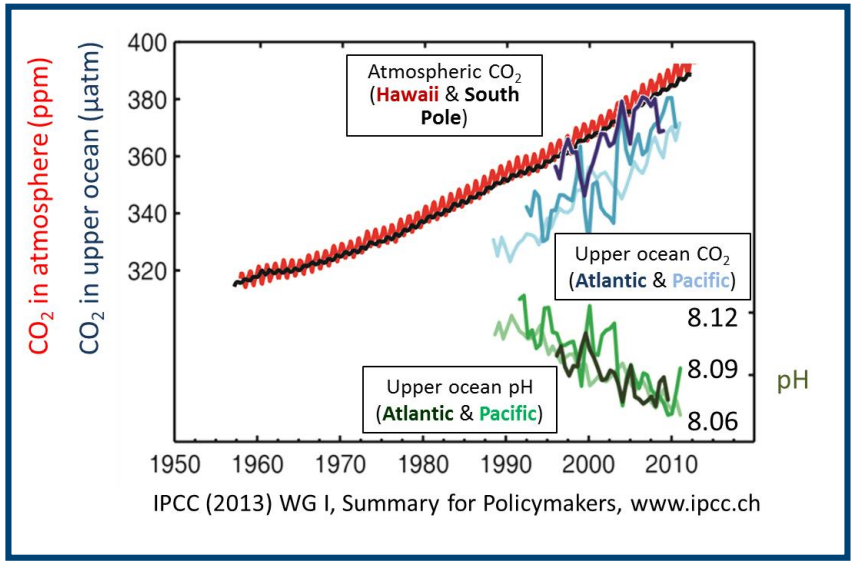
- The ocean has absorbed 1/3 of the fossil carbon released

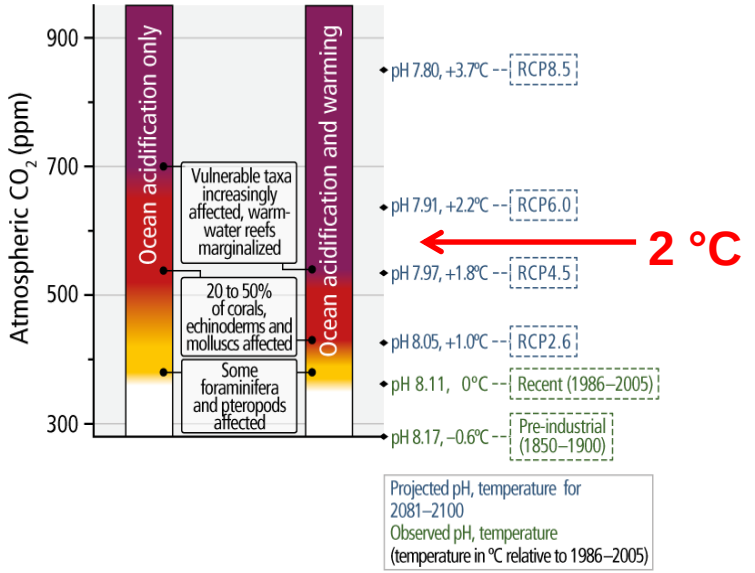



- Capacity of the ocean to continue to absorb carbon at the same rate is questioned by scientists.

- Absorbed $CO_2$ increased the acidity of seawater – **26 %** since 1900 and about **150%** in 2100

Increasing risk from RCP2.6 to RCP8.5

(b) Risk for marine species impacted by ocean acidification only, or additionally by warming extremes




- The **rate of change may be faster** than at any time during the last **300 million years**

# Data to measure the impact of OA - SDG 14.3

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Intergovernmental Oceanographic Commission

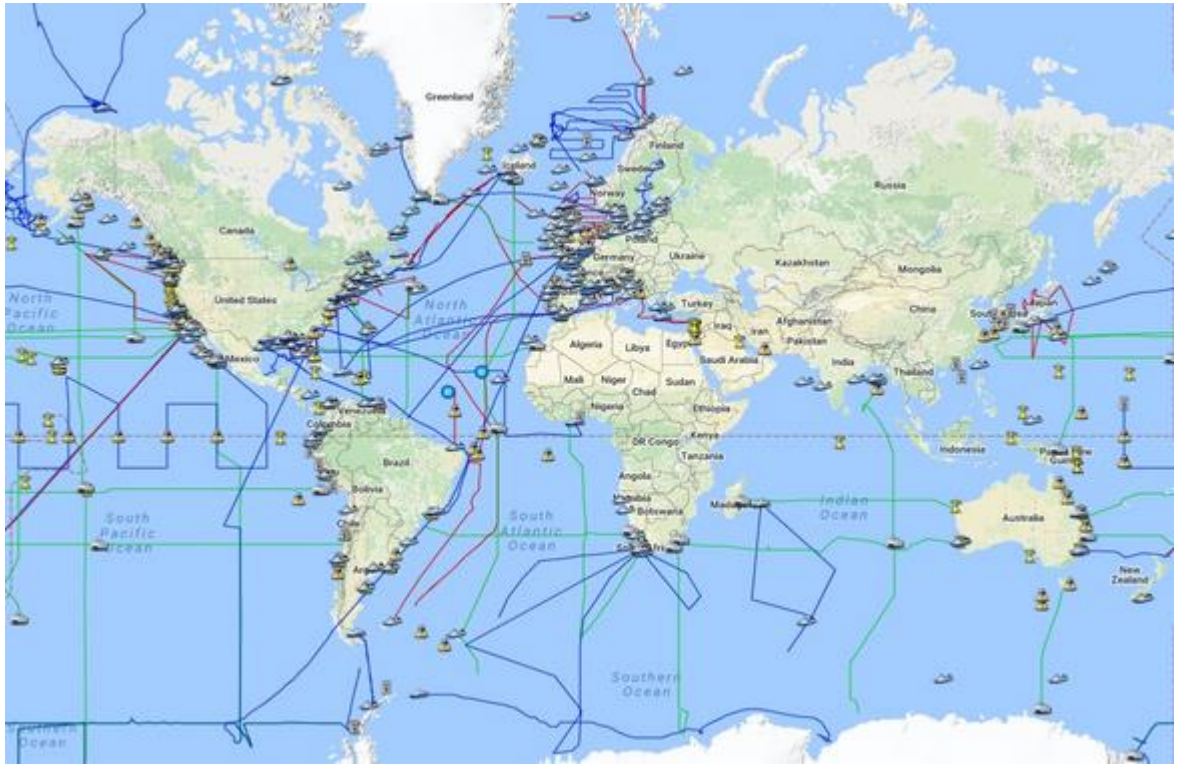
GOA-ON

Global Ocean Acidification Observing Network

## IOC OSS:

- supports the GOA-ON secretariat
- supports the coordination for the Communities of Ocean Action on Ocean Acidification
- Co-chairs the GOA-ON biological working group

## IOC custodian agency for SDG indicator 14.3.1



# Global Ocean Acidification Observing Network

GOA-ON
Global Ocean Acidification Observing Network

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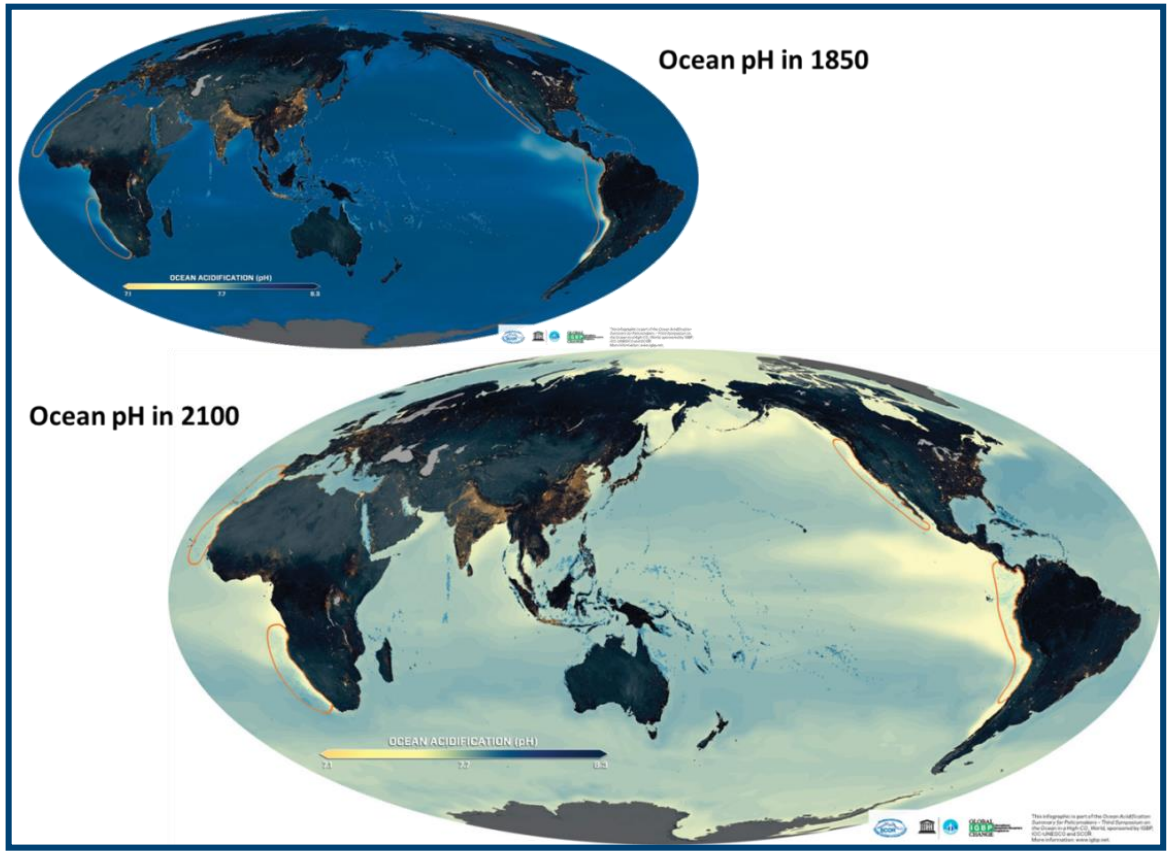
## EOV inorganic Carbon, Phytoplankton, Zooplankton, Hardcoral cover…


**Goal 1** Understanding of global OA conditions

**Goal 2** Understanding of ecosystem response to OA

**Goal 3** Data to optimize OA modeling

# GO$_2$NE - Global Ocean Oxygen Network

Global Ocean Oxygen NEtwork

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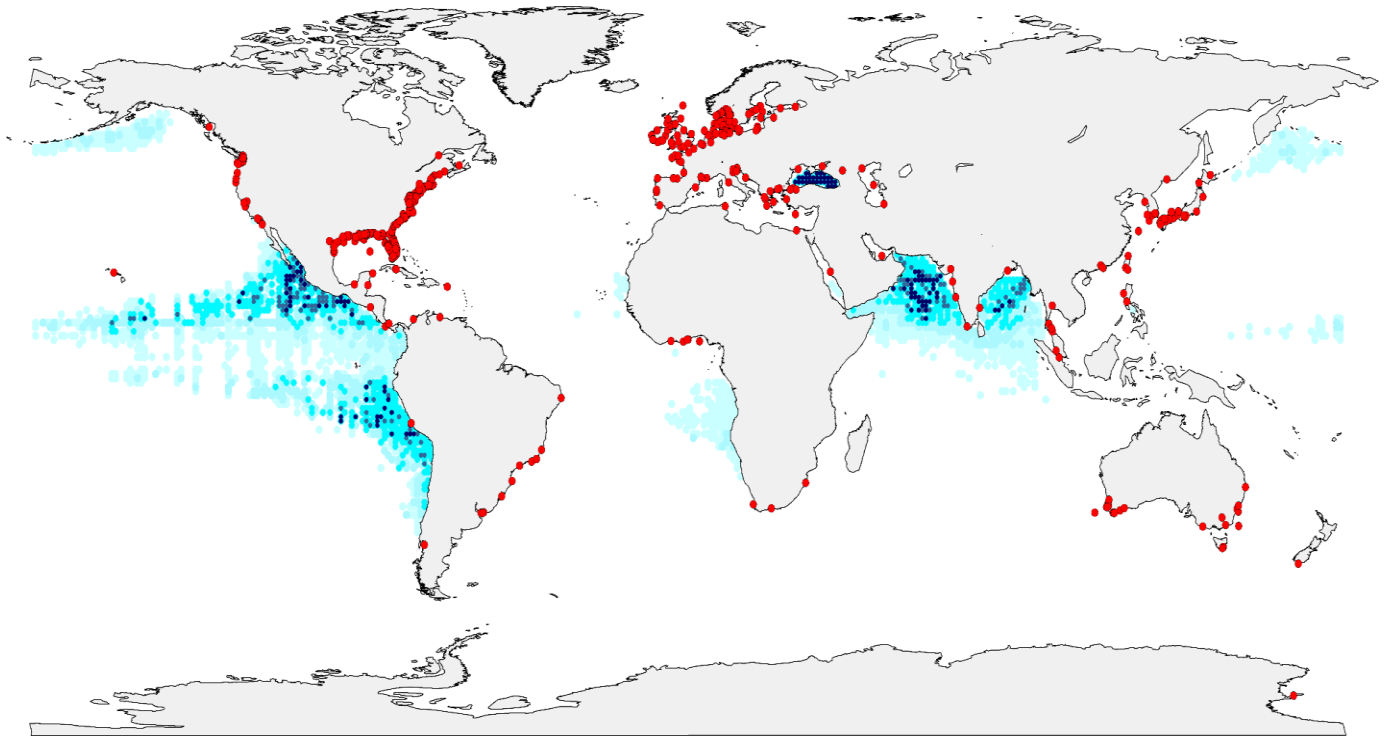
## EOV Oxygen, Fish abundance, Marine mammals, Benthic invertebrates

IOC-UNESCO established a new network of scientists, which focusses on deoxygenation in the marine environment – in the **Open Ocean** and **Coastal Areas, including the impacts of climate change and eutrophication**.

- Since 1950 - Over 500 coastal systems identified with ≤20-25% oxygen saturation
- Since 1960 - The open ocean has lost 2% of its oxygen inventory = 77 billion tons $O_2$
- Science Publication in 2018 Breitburg et al.



GO$_2$NE
Global Ocean Oxygen NEtwork

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Intergovernmental Oceanographic Commission


# Publication of GO$_2$NE policy brief

# - International Group for Marine Ecological Time Series

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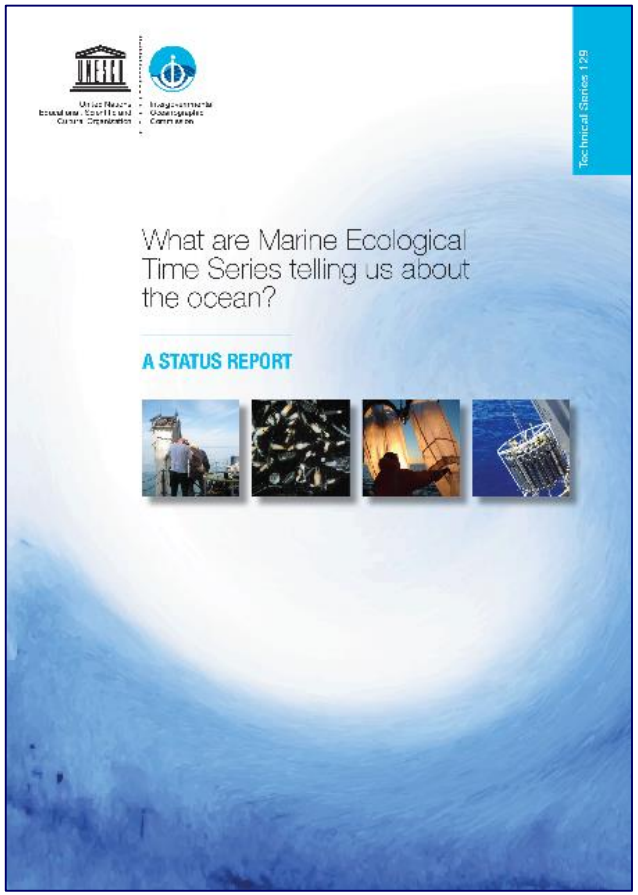
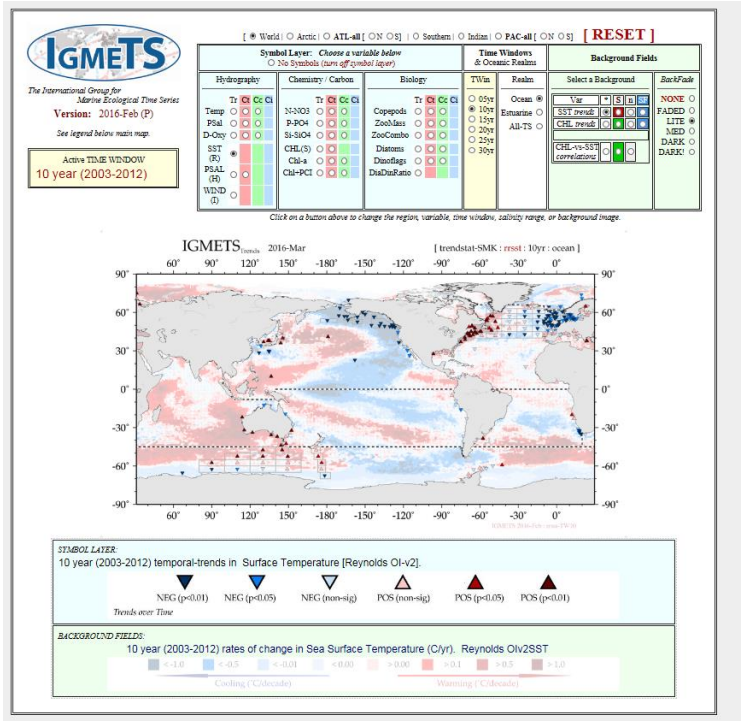
Intergovernmental Oceanographic Commission

## EOV Phytoplankton, Zooplankton

IGMETS Report – What are Marine Ecological Time Series telling us about the ocean? – A status report (IOC Technical Series 129)




IGMETS Explorer – Online resource
http://igmets.net/explorer

# TrendsPO

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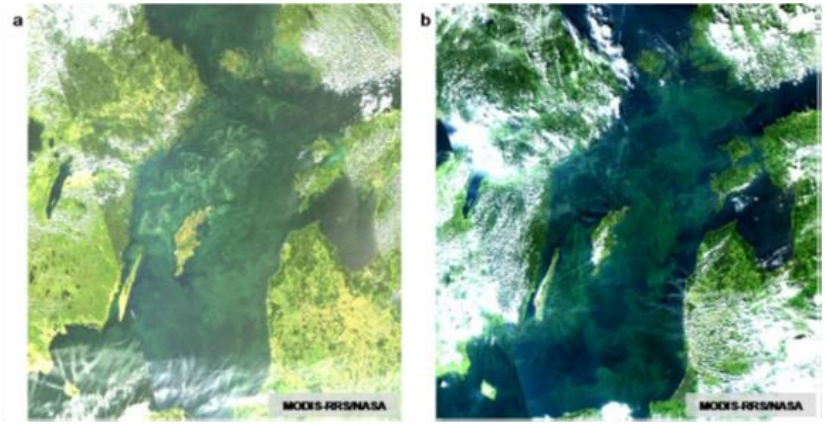
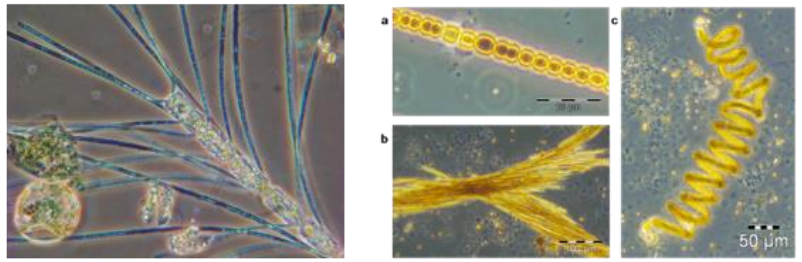
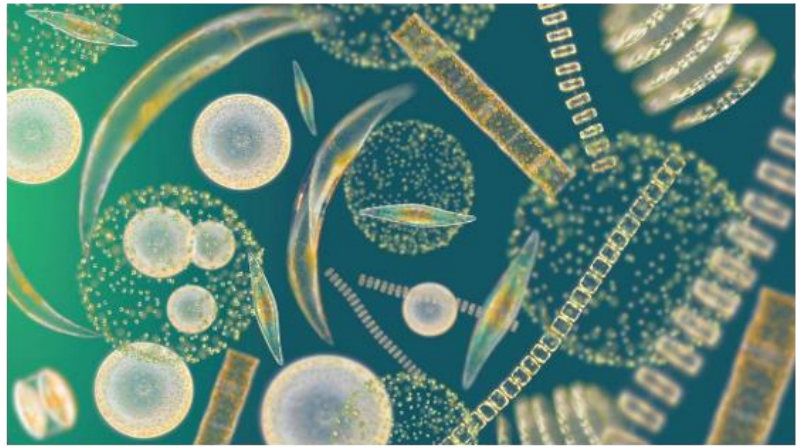
IOC Working Group to Investigate Climate Change and Global Trends of Phytoplankton in the Oceans



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# Harmful Algal Blooms

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## EOV phytoplankton

## HABs:

Reoccurring, persistent. Major events with profound societal impacts in 2016

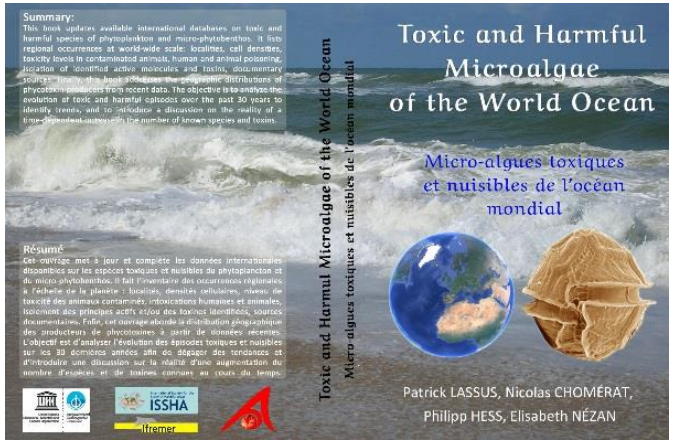
IOC responses:

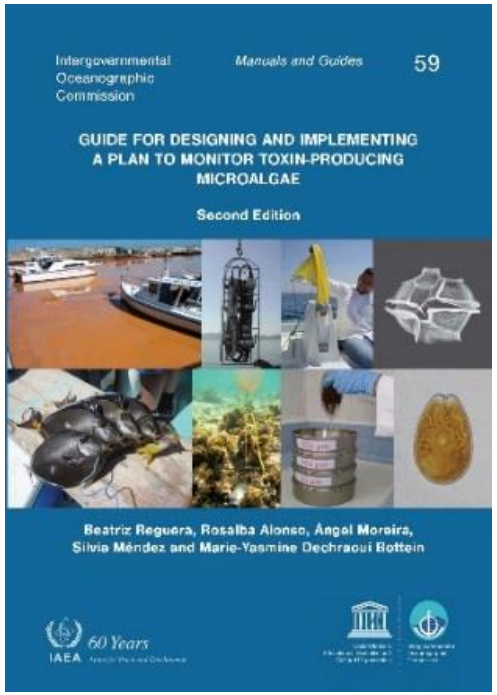
Science is addressed jointly with SCOR through the research programme GlobalHAB.

Long term CD effort

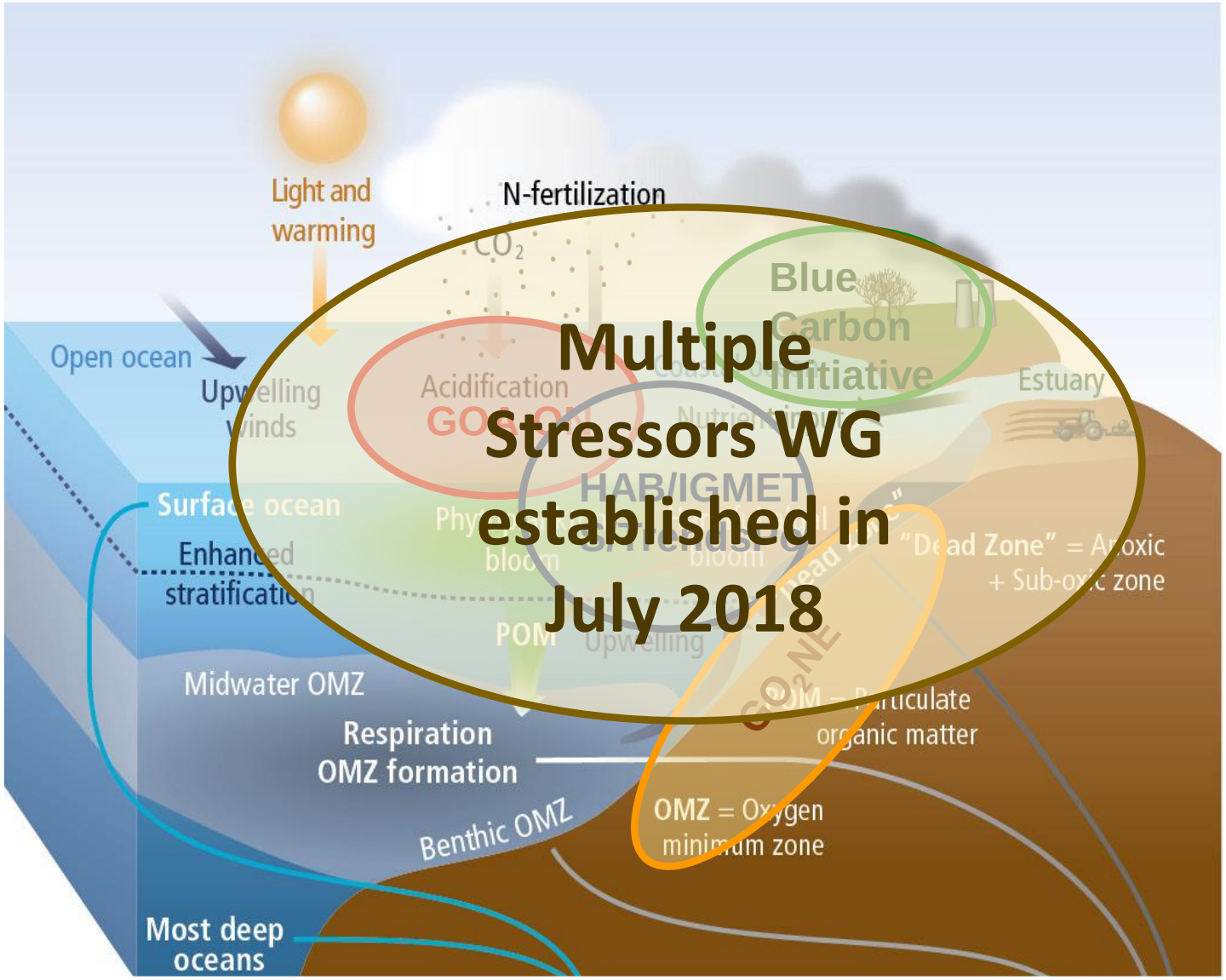
Development of a Global HAB Status Report is in progress linked to OBIS.

Long-term partnerships with SCOR, ICES, PICES and IAEA.



# Multiple stressors




Iddri, 2015

# Ocean Carbon - IOCR

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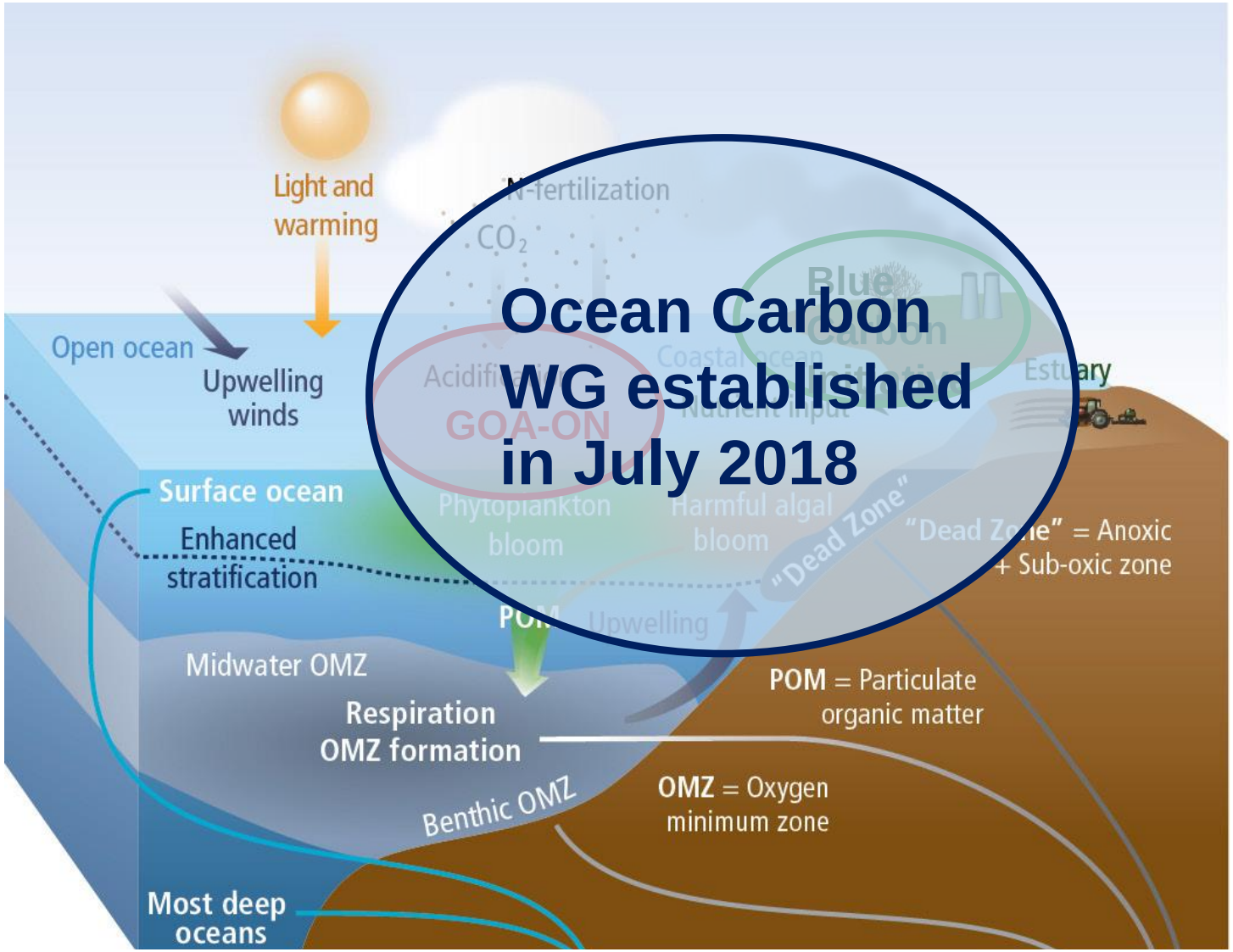



**Ocean Carbon WG established in July 2018**

Iddri, 2015

# Global Ocean Science Report

United Nations Educational, Scientific and Cultural Organization · Intergovernmental Oceanographic Commission


## Ocean science – how, where and by whom?

Assesses for the first time the status and trends in **ocean science capacity around the world**.

A global record of how, where, and by whom ocean science is conducted.

Information used for reporting towards **SDG target 14.a** – 2030 Agenda for Sustainable Development

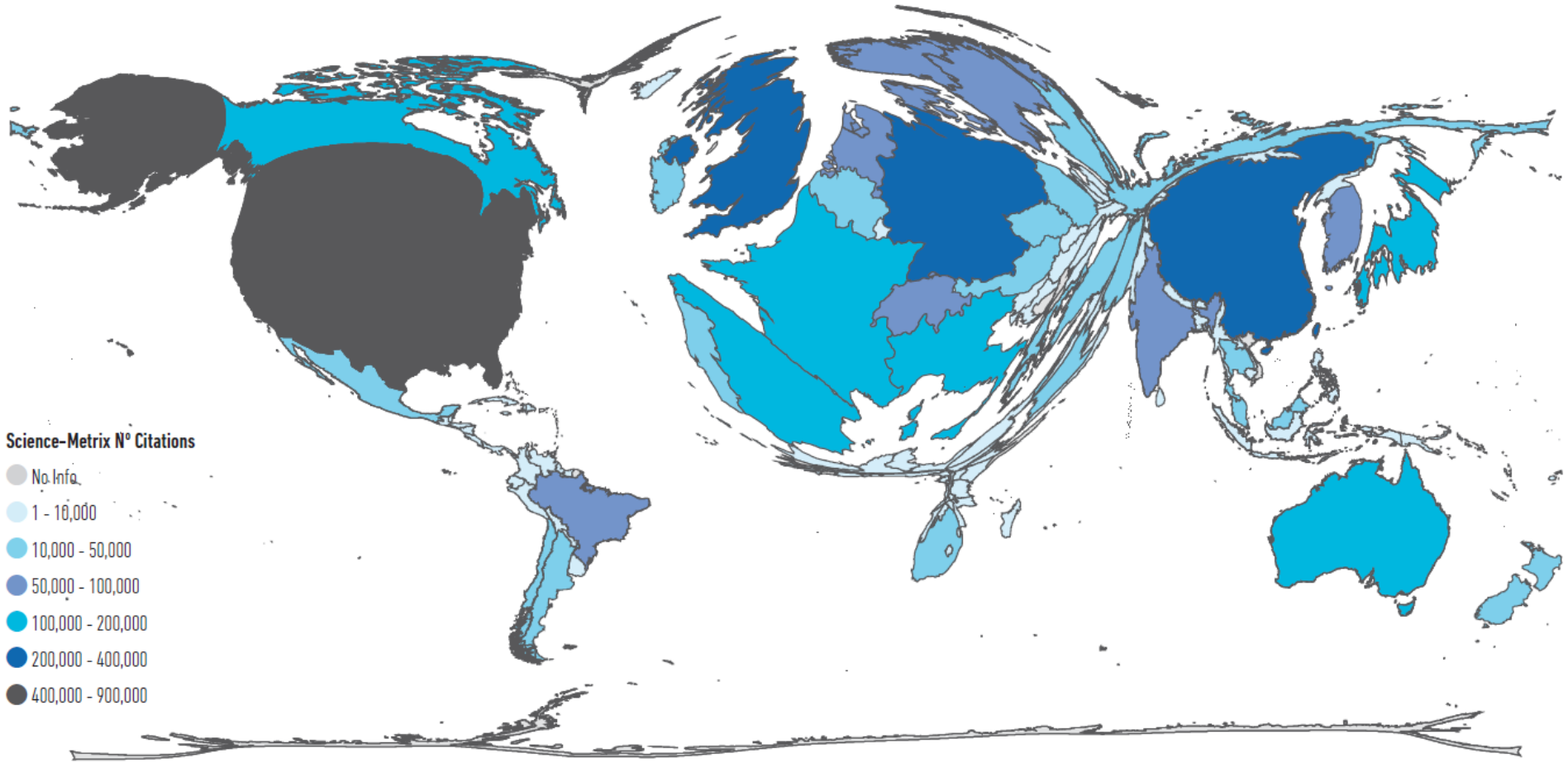

**IOC-UNESCO, Global Ocean Science Report, 2017**
**http://unesco.org/gosr**

# How ‘big’ is our ocean science?

United Nations Educational, Scientific and Cultural Organization · Intergovernmental Oceanographic Commission

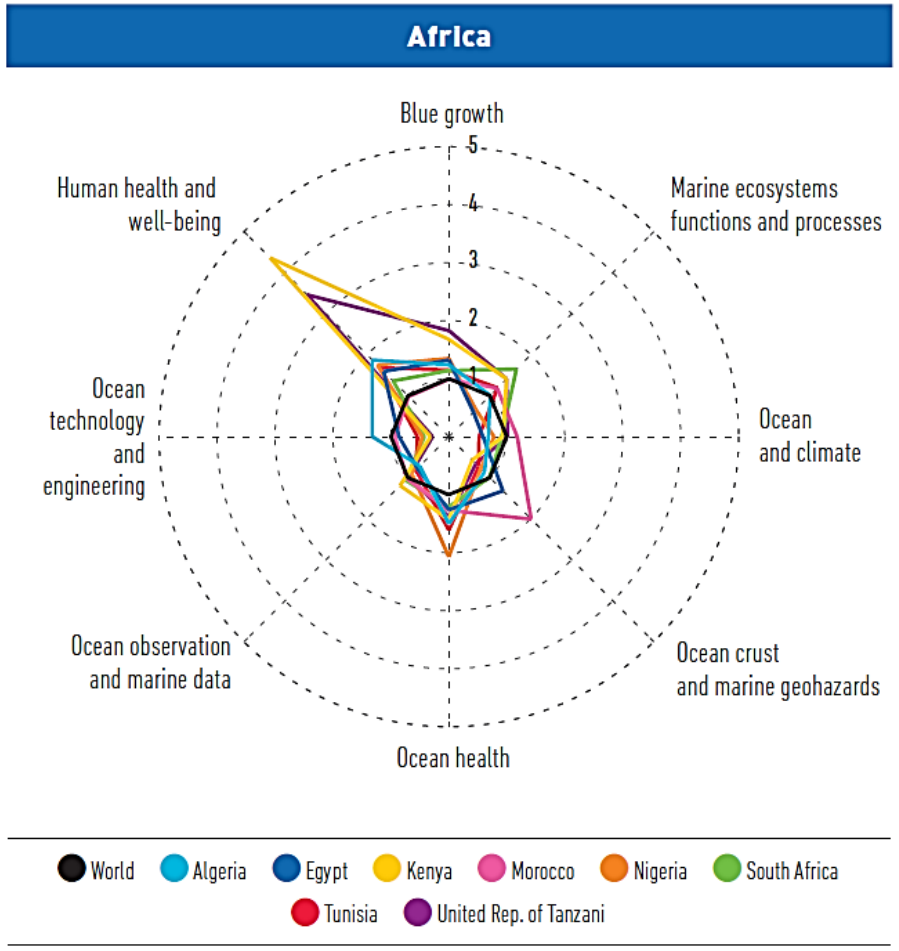
## Global Citation Map for **Ocean Science**

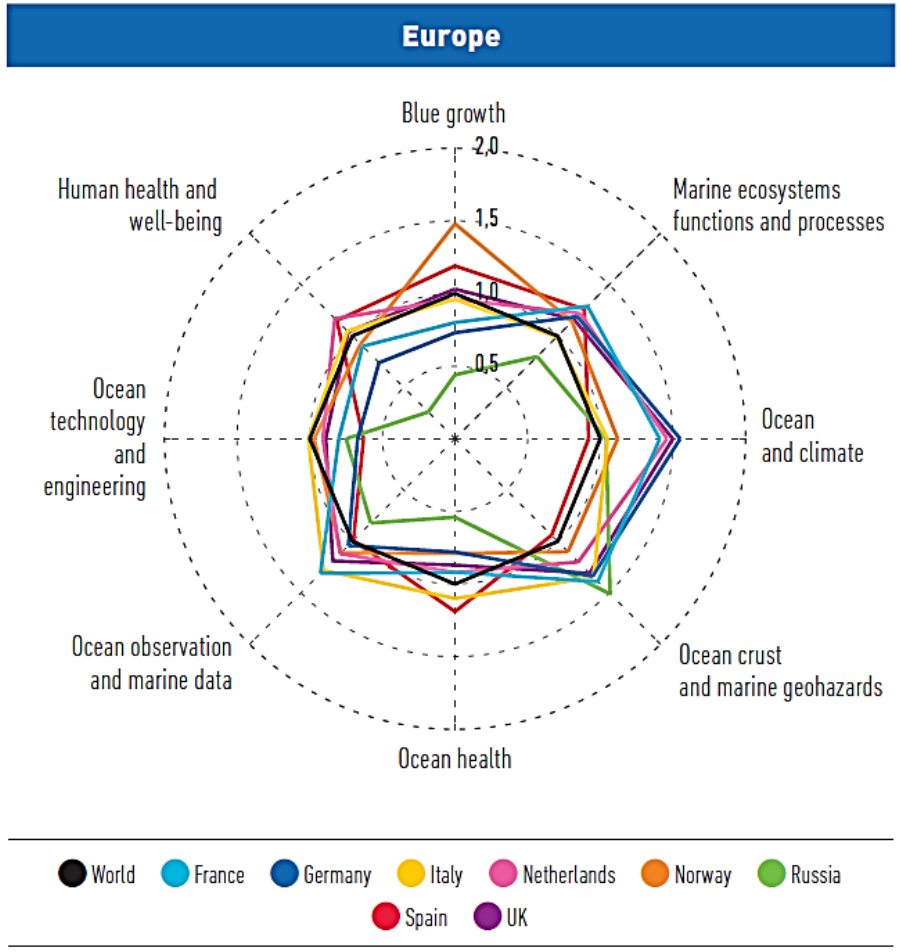
Area of each country is scaled and deformed according to the number of citations received



# What are the national strengths in different ocean sciences categories?

National strengths in different ocean sciences categories. Spider plots show the Specialization Index (SI) compared to the world (2010–2014).



# UN Decade of Ocean Science for Sustainable Development

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

## A Clean Ocean

Sources of pollution are identified, quantified and reduced, and pollutants removed from the Ocean.

## A Healthy and Resilient Ocean

Marine ecosystems are mapped and protected, multiple impacts, including climate change, are measured and reduced, and the provision of Ocean ecosystem services is maintained.

## A Predicted Ocean

Society has the capacity to understand current and future Ocean conditions, forecast their change and impact on human wellbeing and livelihoods.

## A Safe Ocean

Human communities are protected from ocean hazards and the safety of operations at sea and on the coast is guaranteed.

## A Sustainable Productive Ocean

The provision of food supply and alternative livelihoods are secured.

## A transparent & accessible Ocean

All nations, stakeholders and citizens have access to ocean data and information, technologies, and are capable of making informed decisions.

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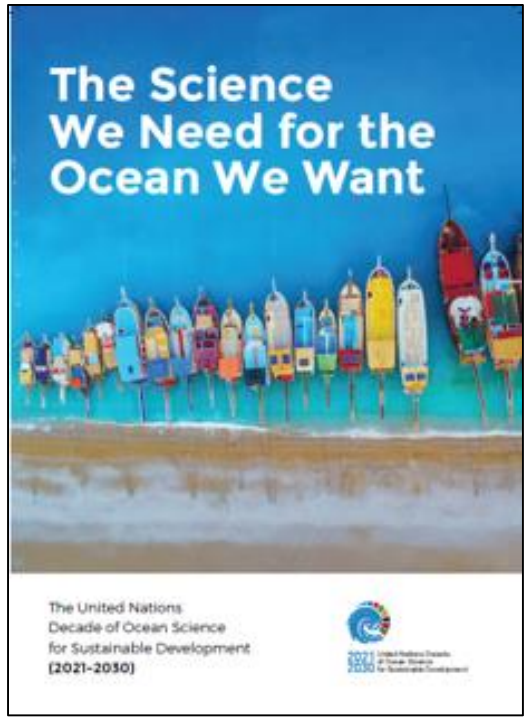

# Global Ocean Science Report 2020


United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

## 2020 UN Ocean Conference

Lisbon, 2-6 June 2020

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

# THANK YOU

Salvatore Aricò, IOC Head of Ocean Science Section: s.arico@unesco.org