



United Nations
Educational, Scientific and
Cultural Organization



Intergovernmental
Oceanographic
Commission



Sustainable
Development
Goals

One Planet, One Ocean

IOC's international coordination efforts on Climate Change and EBUS

ICTP-CLIVAR Summer School on Oceanic
Eastern Boundary Upwelling Systems
15 July 2019



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Project Specialist / Ocean Science Section
Intergovernmental Oceanographic Commission
(IOC) of UNESCO
i.deniz-gonzalez@unesco.org

The IOC of UNESCO:

Building knowledge and capacity for sustainable ocean management



One Planet, One Ocean

- 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



IOC Within UN



One Planet, One Ocean

- Focal point for ocean observations, science, services and data exchange
- Competent international organization for Marine Scientific Research (UNCLOS)



IOC Vision



United Nations
Educational, Scientific and
Cultural Organization



Intergovernmental
Oceanographic
Commission



Sustainable
Development
Goals

One Planet, One Ocean

*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



One Planet, One Ocean

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:



SUSTAINABLE DEVELOPMENT GOALS



United Nations
Educational, Scientific and
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Oceanographic
Commission



Sustainable
Development
Goals

One Planet, One Ocean

1 NO POVERTY

2 ZERO HUNGER

3 GOOD HEALTH AND WELL-BEING

4 QUALITY EDUCATION

5 GENDER EQUALITY

6 CLEAN WATER AND SANITATION

7 AFFORDABLE AND CLEAN ENERGY

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10 REDUCED INEQUALITIES

11 SUSTAINABLE CITIES AND COMMUNITIES

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

14 LIFE BELOW WATER

15 LIFE ON LAND

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

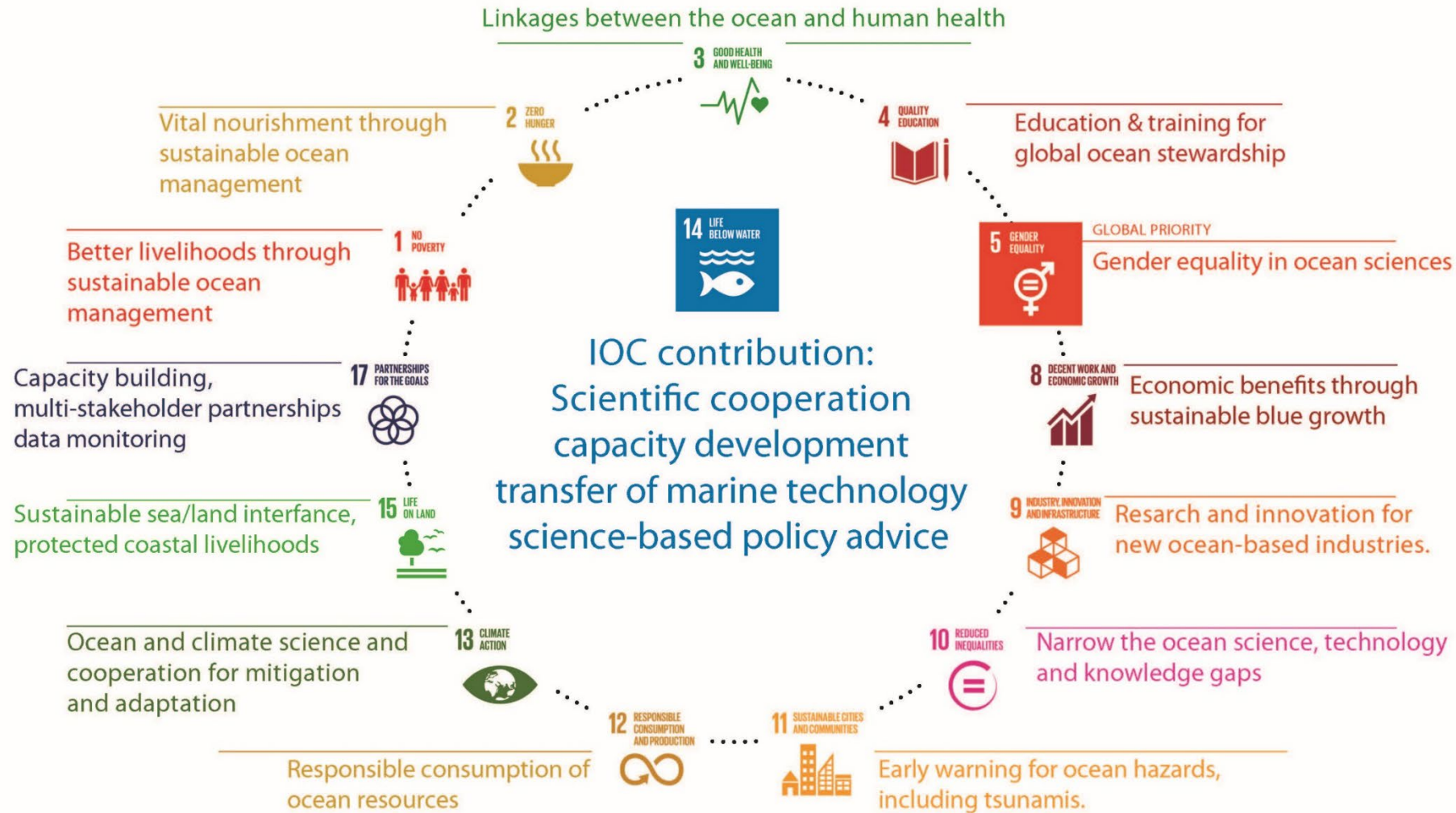
17 PARTNERSHIPS FOR THE GOALS

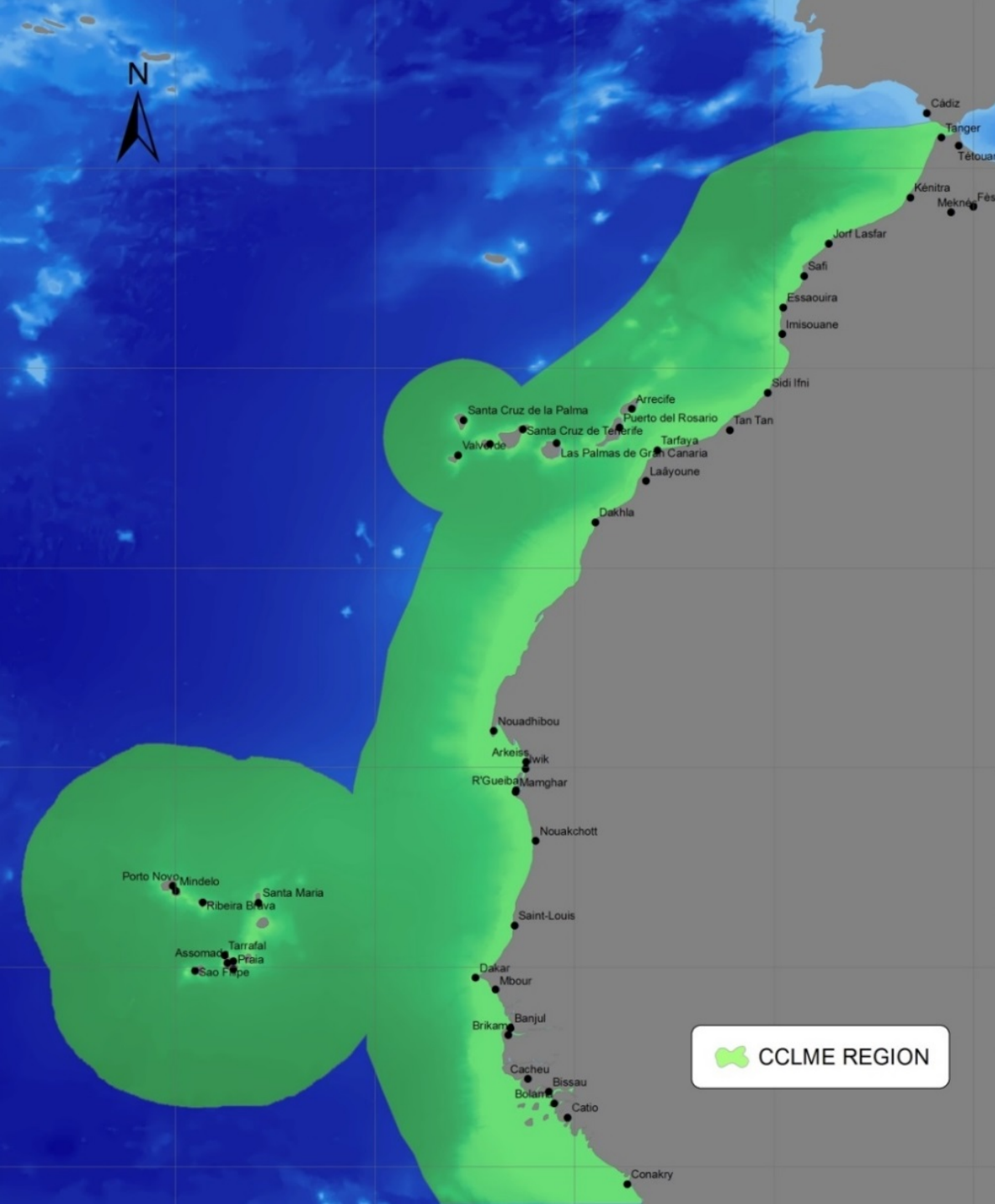
SUSTAINABLE DEVELOPMENT GOALS

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

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

One Planet, One Ocean





One Planet, One Ocean

The IOC Project “Enhancing oceanography capacities in CCLME Western Africa countries”

THE PROJECT: PHASES I & II

Project:

ENHANCING OCEANOGRAPHY CAPACITIES IN CCLME WESTERN AFRICA COUNTRIES PHASE III

Implementing Body:

IOC-UNESCO



Partner:

Instituto Español de Oceanografía -IEO-



Funding:

100% Spanish Agency for International Development Cooperation -AECID-



Period:

PHASE I: March 2013 – April 2015

PHASE II: May 2015 – September 2017

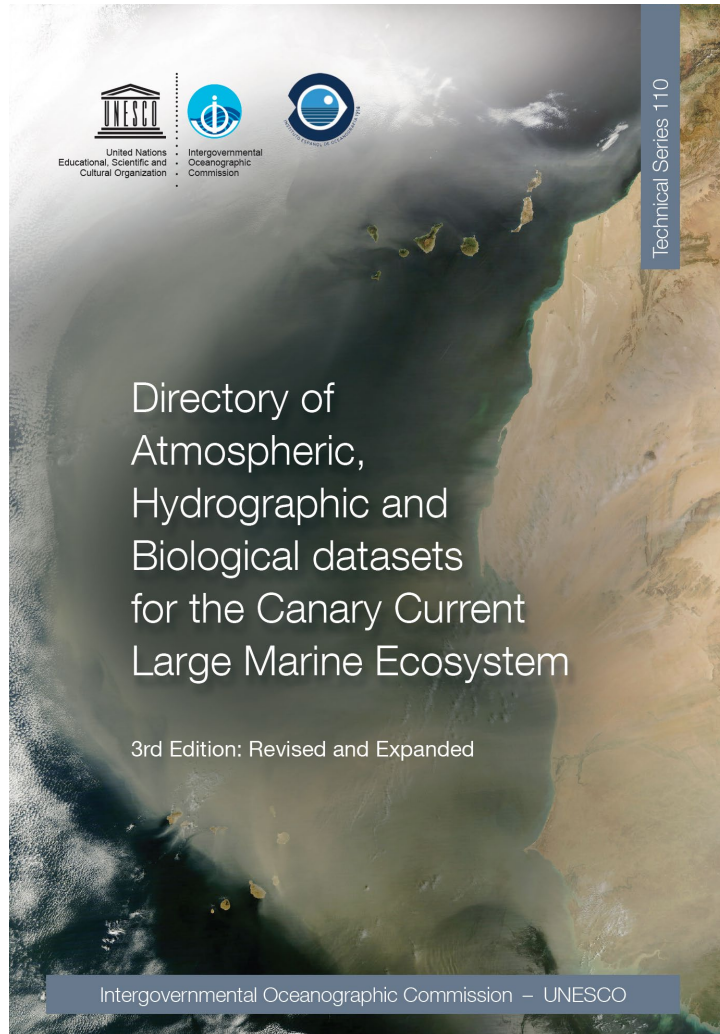


PHASES I & II: Overall goal

To **improve our understanding** of the oceanographic features and processes in the **Canary Current LME region** and increase the delivery of services to end users by

- (i) **making existing data accessible,**
- (ii) Phase I: by **developing data and information products** required for integrated ecosystem based management of the ocean and coastal areas of West Africa,
- (ii) Phase II: by **developing a GIS dynamic analytic tool** aimed to create meaningful data products at regional scale, adding value to raw data and producing new scientific knowledge on the ocean and coastal areas of the CCLME countries and,
- (iii) by **enhancing oceanographic capacities in the region.**

PRODUCT I: Inventory of metadata



Directory of Atmospheric, Hydrographic and Biological datasets for the Canary Current Large Marine Ecosystem
IOC Technical Series 110 (2014)

2 versions:

- Printed document
- On-line version

http://www.unesco.org/new/ioc_ts110

The Directory: outline

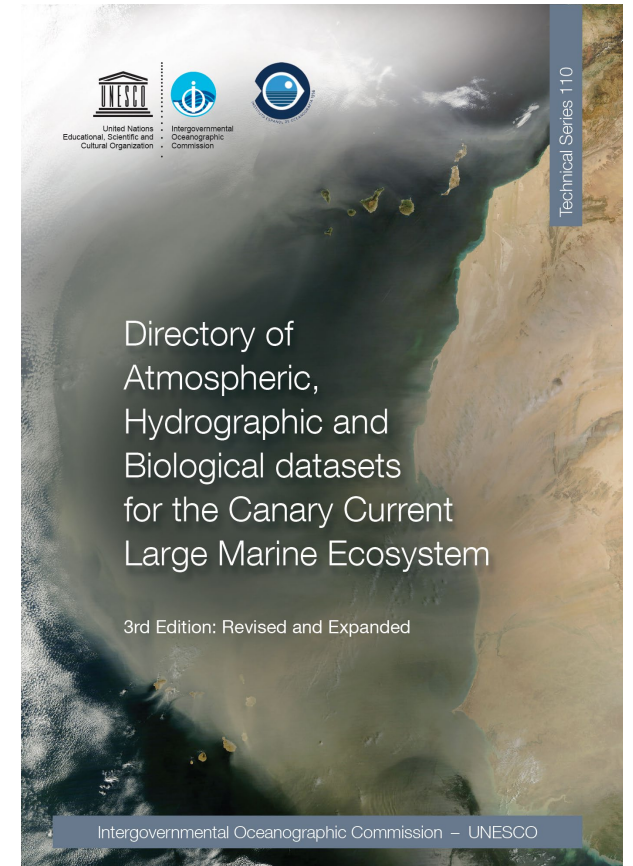
Metadata sheets were organised as follows:

- 1) Remote sensing;
- 2) Atmospheric data;
- 3) Tide-gauges, moorings and Argo float network;
- 4) Ocean observatories and ship based repeat hydrography;
- 5) Biological surveys;
- 6) Databases

The Directory **needed of a continuous maintenance** to ensure that **new data from research cruises but also recovered by the countries in the region** are identified and updated.



2 updates undertaken in 2016 and 2017
(Revised and Expanded editions)



3rd Edition Revised and Expanded so far...

Compilation of 118 metadata sheets referring :

- 449 datasets
- 34 databases
- 26 time-series sites

+ Discussion:
further data to be prospected
in the future & lessons learnt

NOUADHIBOU TIDE GAUGE
INSTITUT MAURITANIEN DE RECHERCHE OcéANOGRAPHIQUE ET DES PÊCHES (IMROP), MAURITANIA

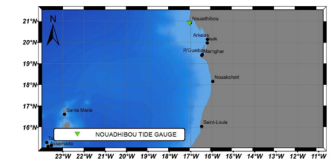


Figure 45. Location of the tide gauge at the Port of Nouadhibou.

Resource abstract:
The tide gauge is located at the Port Autonome de Nouadhibou at Nouadhibou city. Data inputs come from a float sensor. Data are recovered once a month.

Resource language: fr

Keyword values: Environmental monitoring facilities

Variables available: Observed variables
Sea level

Geographic location: 17.0522°W 20.8985°N

Spatial resolution: 1/6

Temporal extent: 2013-01-24 / present

Temporal resolution: One sample per 5 min

Depth range/resolution: Surface

Conditions for access & use: No conditions apply for access and use

Limitations on public access: No

Responsible organization: Institut Mauritanien de Recherche Océanographique et des Pêches, Nouadhibou, Mauritanie

Data via: Contact: abououla2005@hotmail.com
Abdoul Dia, Head of Laboratory, IMROP

Contact: bambayah@yahoo.fr
Bambaye Chaikh Sidi El-Mokhtar, Senior scientist, IMROP

Data format: Digital (plain text)

References: When dataset is used, the IMROP must be acknowledged as data owner

Additional information:
Datum information: The data reference is tide gauge zero.

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EAF-NANSEN PROJECT SURVEYS INVENTORY
INSTITUT NATIONAL DE RECHERCHES HALIEUTIQUES, MOROCCO
INSTITUT MAURITANIEN DE RECHERCHES OcéANOGRAPHIQUES ET DES PÊCHES, MAURITANIA
CENTRE DE RECHERCHES OcéANOGRAPHIQUES DE DAKAR-THIAROYE, SENEGAL
DEPARTMENT OF FISHERIES, THE GAMBIA
INSTITUTO NACIONAL DO DESENVOLVIMENTO DAS PÊSCAS, CABO VERDE
CENTRO DE INVESTIGAÇÃO PESQUEIRA APLICADA DE BISSAU, GUINEA-BISSAU
CENTRE NATIONAL DES SCIENCES HALIEUTIQUE DE BOUSSOURA, GUINEA
CENTRE DE RECHERCHE SCIENTIFIQUE DE CONAKRY-ROGBANÉ, GUINEA

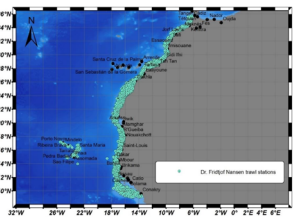


Figure 114. Area surveyed within this publication' target countries from 1984 to 2016. The map shows the travel stations sampled along the survey tracks (3498 stations sampled from 1984 to 2016). Data Source: EAF-Nansen Project.

Resource abstract:
The long term objective of the EAF-Nansen project is to strengthen regional and country specific efforts to reduce poverty and create conditions to assist in the achievement of food security through development of sustainable fisheries management regimes and specifically through the application of the ecosystem approach to fisheries in a number of developing countries at global level, with an early emphasis on Sub-Saharan Africa.

The long-term objective could be achieved through the provision of support for the development and country driven application of the conceptual framework of the Ecosystem Approach to Fisheries (EAF) through capacity-building, promoting standardized data collection and monitoring, supporting policy development and management practices consistent with EAF principles and contributing to an expanded knowledge base.

The immediate objectives of the project are to provide the fisheries research institutions and management administrations in the participating countries with additional knowledge on their ecosystems for their use in planning and monitoring, and to further increase the acceptance and application of the key principles of the EAF. These are the following:

- The fisheries should be managed to limit their impact on the ecosystem to an acceptable level
- The ecological relationships between species should be maintained
- The management measures should be compatible across the entire distribution of the resource

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REPOSITORIO DE DATOS MARINOS INTEGRADOS DE CANARIAS – REDMIC –
OBSERVATORIO AMBIENTAL GRANADILLA, SPAIN

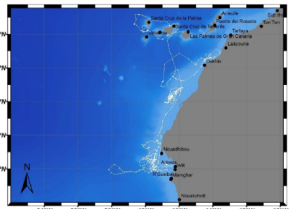


Figure 108. Registered positions and derived trajectory of the loggerhead scuttler (Caretta caretta) specimen named Catalina, obtained through a transmitter hooked on its carapace. The radiotracking started at the east Gran Canaria Island (Spain) on 02 July 2006 and last data was obtained off Arzels (Mauritania) on 27 July 2008. A distance of around 8500 km was covered during 746 days. Source: REDMIC, www.redmic.es (accessed 21 March 2017)

Resource abstract:
REDMIC (standing for Integrated Marine Data Repository for the Canary Islands) is a permanent system of systematic storage, custody, and service of marine data, which follows the OpenData and Open-Science philosophy. It has been designed for the Canary Islands (Spain), and by extension, Macaronesia. The novelty of REDMIC is that marine data, whatever their nature, are integrated in a single and coherent geographic information system. After the initial effort of feeding data in a common framework, thereafter they can be used and combined as often as desired with maximum agility. The aim of REDMIC is to maximize the potential use of marine data.

Resource language: en; spa

Keyword values: Environmental monitoring facilities; Elevation; Species distribution

Variables available: Observed variables
Species distribution
Bathymetry
Radiotracking of loggerhead scuttlers

Geographic location: 28.3088°N – 27.1229°N 12.6328°W – 19.6471°W

Spatial resolution: Variable: 100 m, 500 m, 1000 m and 5000 m grid

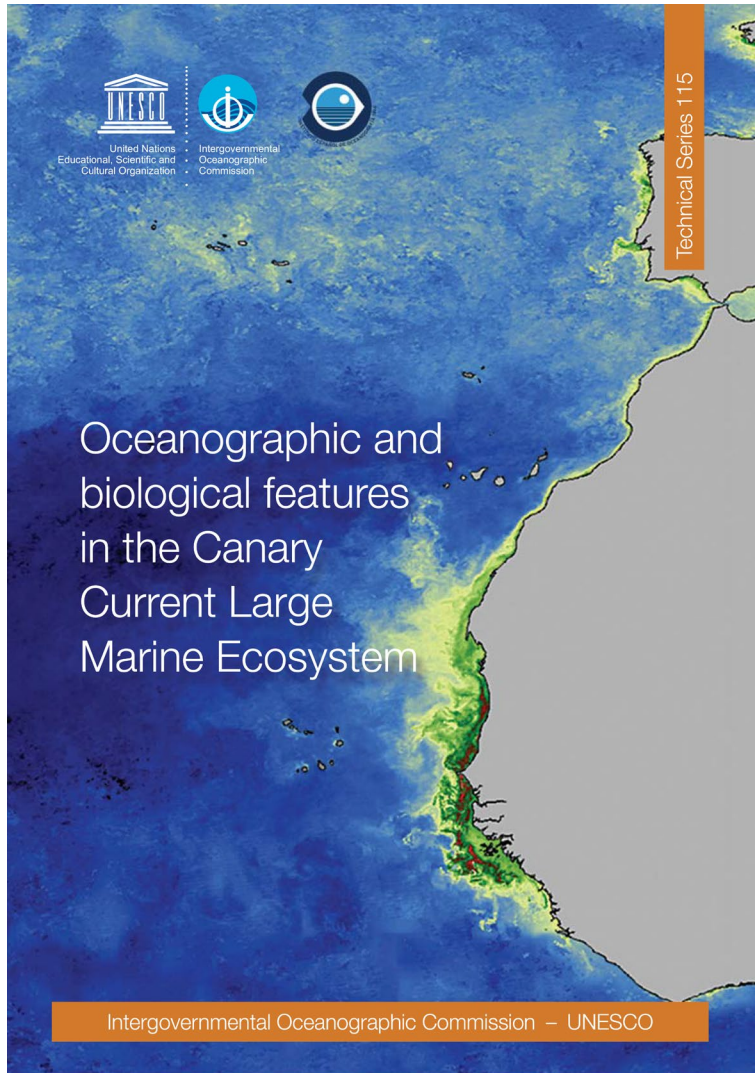
Temporal extent: 1825-12-31 / present

Temporal resolution: Variable

Depth range/resolution: From surface to seabed

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PRODUCT II: Data analysis



- *Oceanographic and biological features in the Canary Current Large Marine Ecosystem*
IOC Technical Series 115 (2015)

2 versions:

- Printed document
- On-line version
- **Offprints also available on-line!**

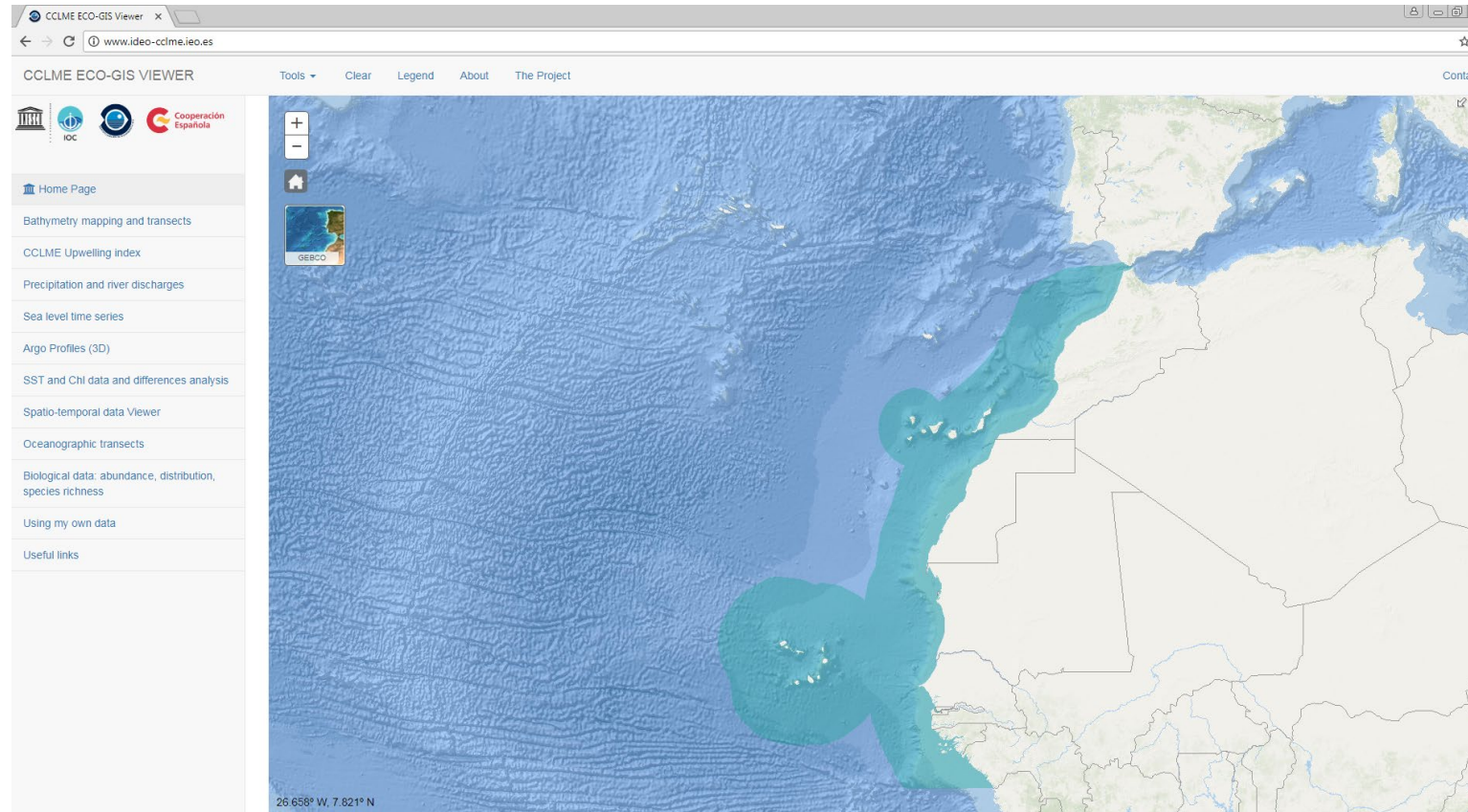
<http://www.unesco.org/new/en/ioc/ts115>

The IOC Technical Series 115: Outline

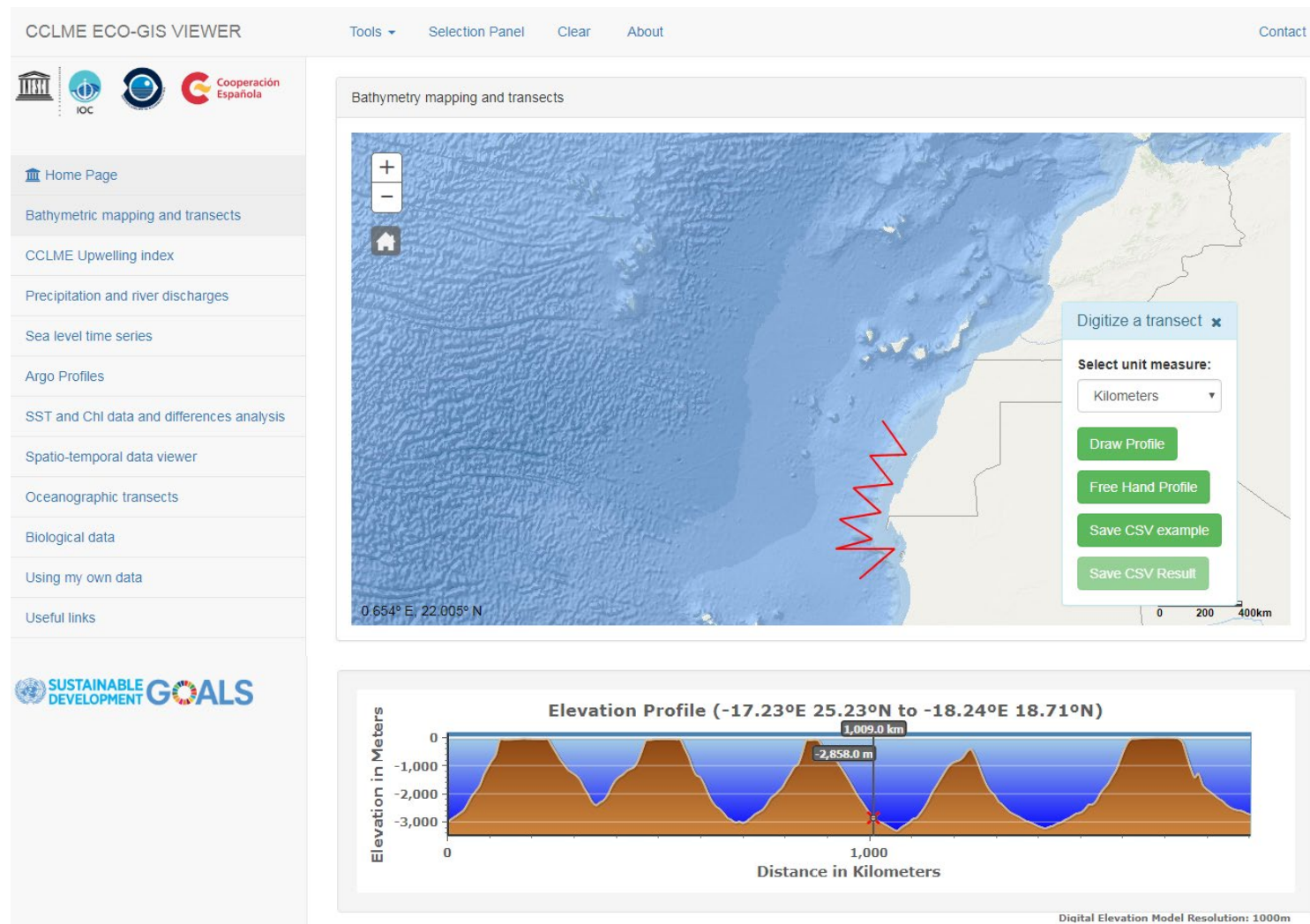
- 54 scientists from 25 institutions
- 28 articles structured as follows:
 - (i) the ocean geomorphology and geological materials
 - (ii) the hydrographic structure and the ocean circulation
 - (iii) the biogeochemical characteristics of the marine environment
 - (iv) the life in the sea
 - (v) the interannual, interdecadal and long-term variability

PRODUCT III: Data analytic viewer

CCLME Eco-GIS Viewer: <http://www.ideo-cclme.ieo.es/>




CCLME Eco-GIS Viewer




CCLME Eco-GIS Viewer

CCLME ECO-GIS VIEWER About [Contact](#)



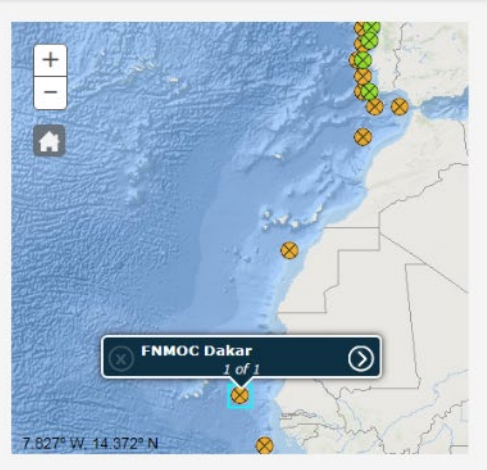
- Home Page
- Bathymetric mapping and transects
- CCLME Upwelling index
- Precipitation and river discharges
- Sea level time series
- Argo Profiles
- SST and Chl data and differences analysis
- Spatio-temporal data viewer
- Oceanographic transects
- Biological data
- Using my own data
- Useful links



CCLME Upwelling index

FNMOCC Dakar Several years

2007 2017

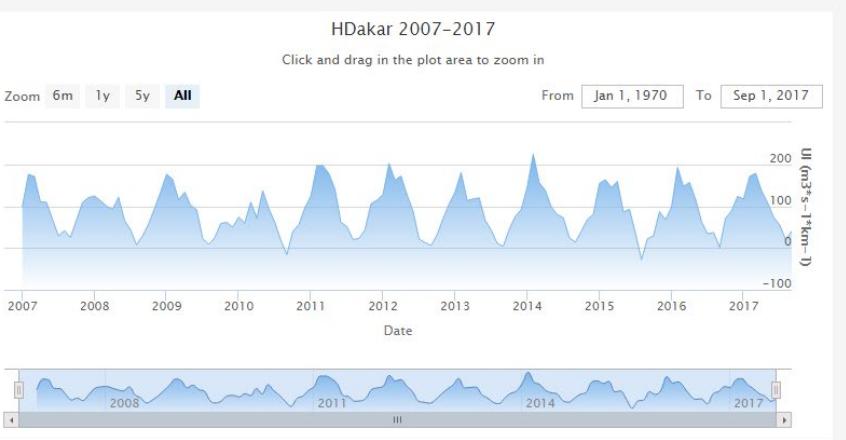


7.627° W, 14.372° N

HDakar 2007-2017


Click and drag in the plot area to zoom in

Zoom 6m 1y 5y **All** From Jan 1, 1970 To Sep 1, 2017




CCLME Eco-GIS Viewer

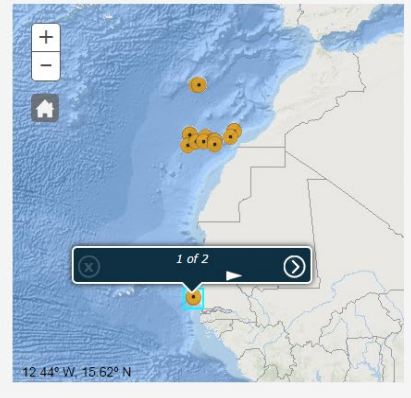
CCLME ECO-GIS VIEWER
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Sea level time series



Sea Level Stations

Search:

Country	Name	Cod	Years
Portugal	FUNCHAL II	2024	2003-2014
Portugal	FUNCHAL	1030	1963-2008
Portugal	PORTO GRANDE (ST. VINCENT) 2	1769	1990-1995
Senegal	DAKAR	476	1942-1966
Spain	SANTA CRUZ DE LA PALMA	585	1949-1960
Spain	LA PALMA	2064	2007-2015
Spain	SANTA CRUZ DE LA PALMA B	568	1949-2016

Showing 1 to 21 of 21 entries

Sea Level Data

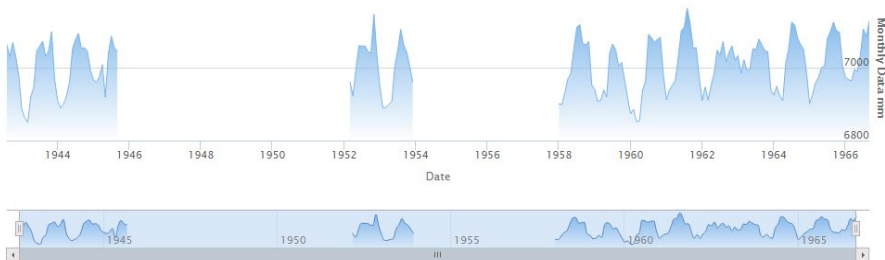
monthly DAKAR/Senegal (Code: 476)

Trends & Linear Regression

Click and drag in the plot area to zoom in





Zoom 6m 1y 5y **All**

From Aug 1, 1942 To Sep 1, 1966



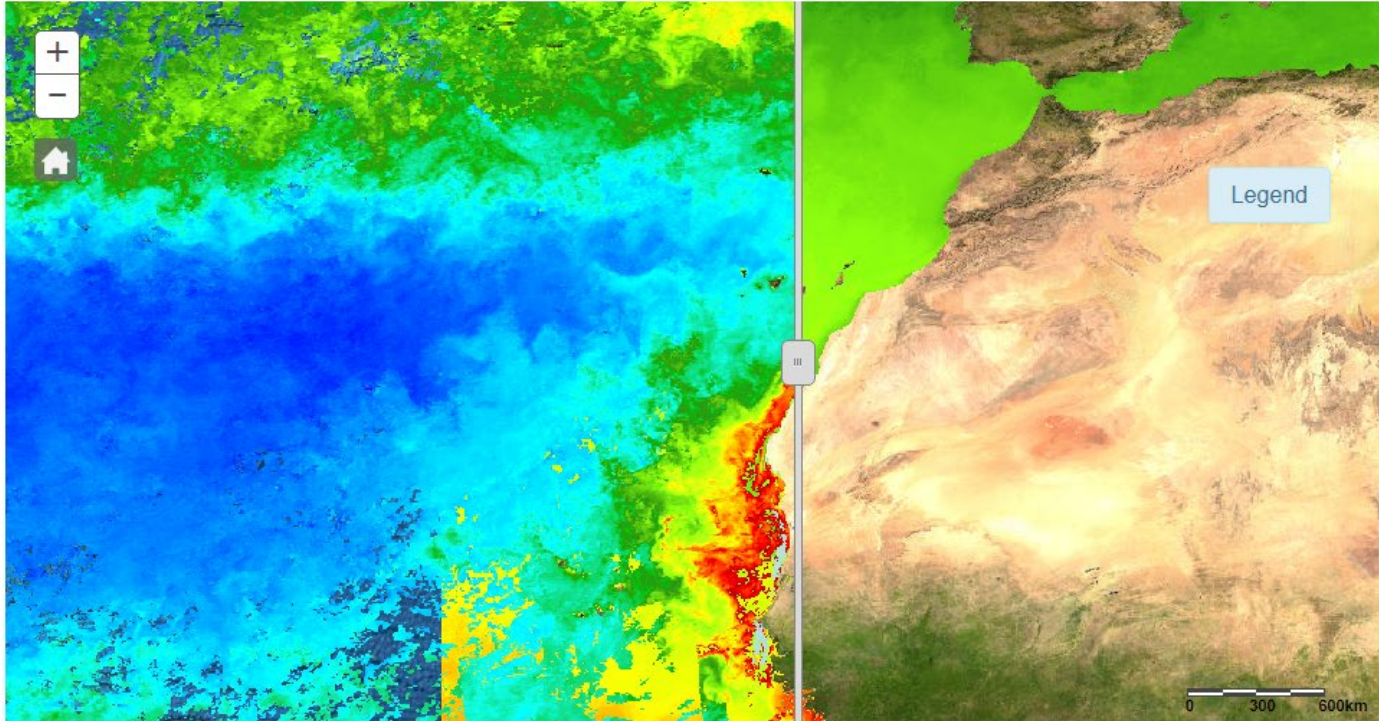
CCLME Eco-GIS Viewer

CCLME ECO-GIS VIEWER Tools ▾ Selection Panel Clear Legend About Contact

- Home Page
- Bathymetric mapping and transects
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- Biological data
- Using my own data
- Useful links


SST and Chl data and differences analysis




The main map area displays two side-by-side panels. The left panel shows a color-coded map of the Mediterranean Sea, with colors ranging from blue (cooler) to red (warmer), representing Sea Surface Temperature (SST) and Chlorophyll a (Chl) data. The right panel shows a satellite-style map of the same region, with a 'Legend' box overlaid. A scale bar at the bottom right of the right panel indicates 0, 300, and 600 km. Navigation controls (plus, minus, and home icons) are visible on the left side of the map area.

CCLME Eco-GIS Viewer

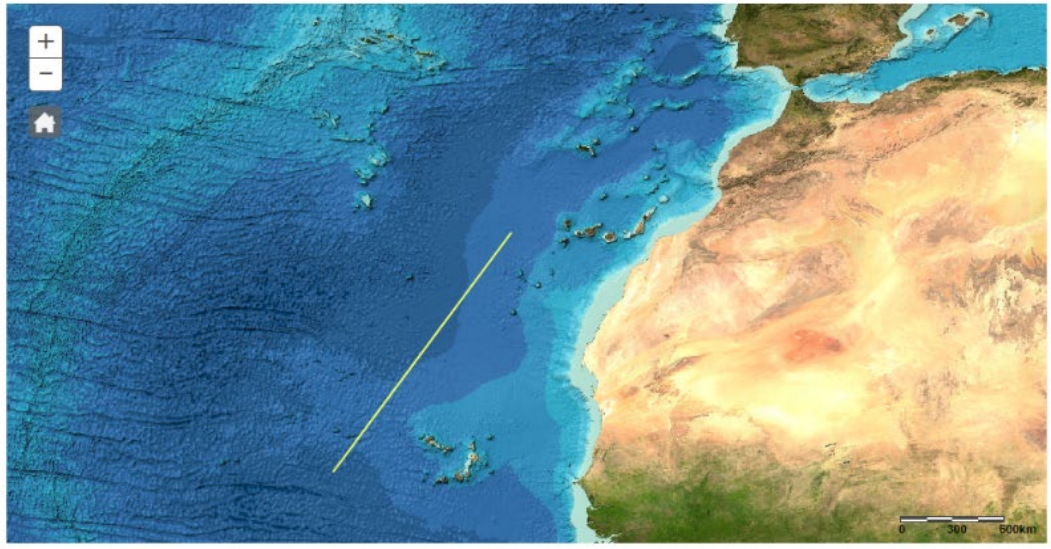
CCLME ECO-GIS VIEWER Tools Selection Panel Clear About Contact



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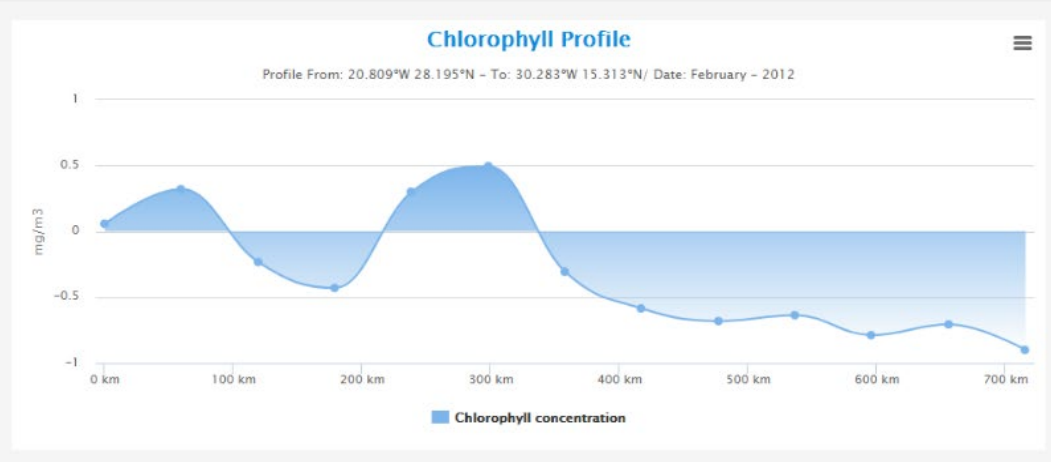


Oceanographic transects



Chlorophyll Profile

Profile From: 20.809°W 28.195°N - To: 30.283°W 15.313°N/ Date: February - 2012



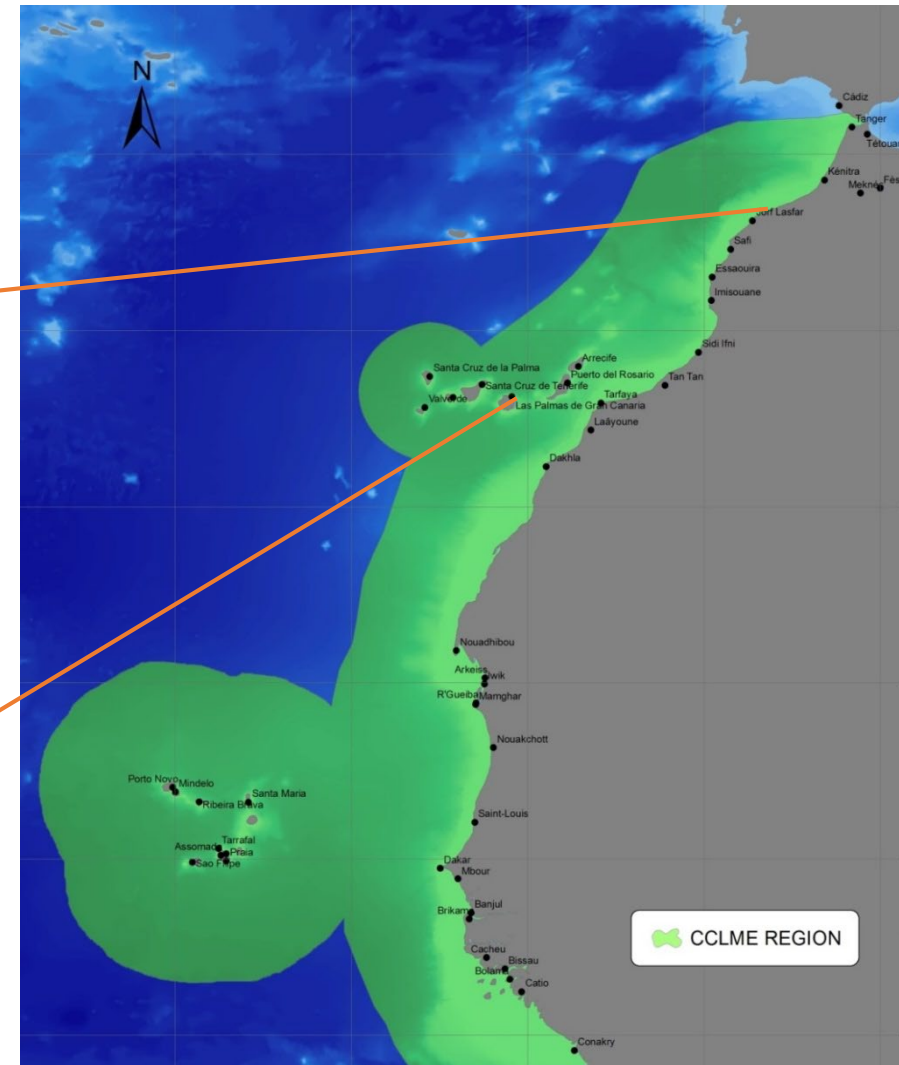
Distance (km)	Chlorophyll concentration (mg/m³)
0	0.0
50	0.3
100	0.0
150	-0.2
200	-0.4
250	0.3
300	0.5
350	0.0
400	-0.6
450	-0.7
500	-0.7
550	-0.6
600	-0.8
650	-0.7
700	-0.9

Workshops (I)

Workshop on “Upwelling and environmental indicators” held in Casablanca, Morocco (8-10 April 2014)



Workshop on “Oceanographic and biological features and trends in the Canary Current Large Marine Ecosystem” held in Las Palmas de Gran Canaria, Spain (27-29 January 2015)



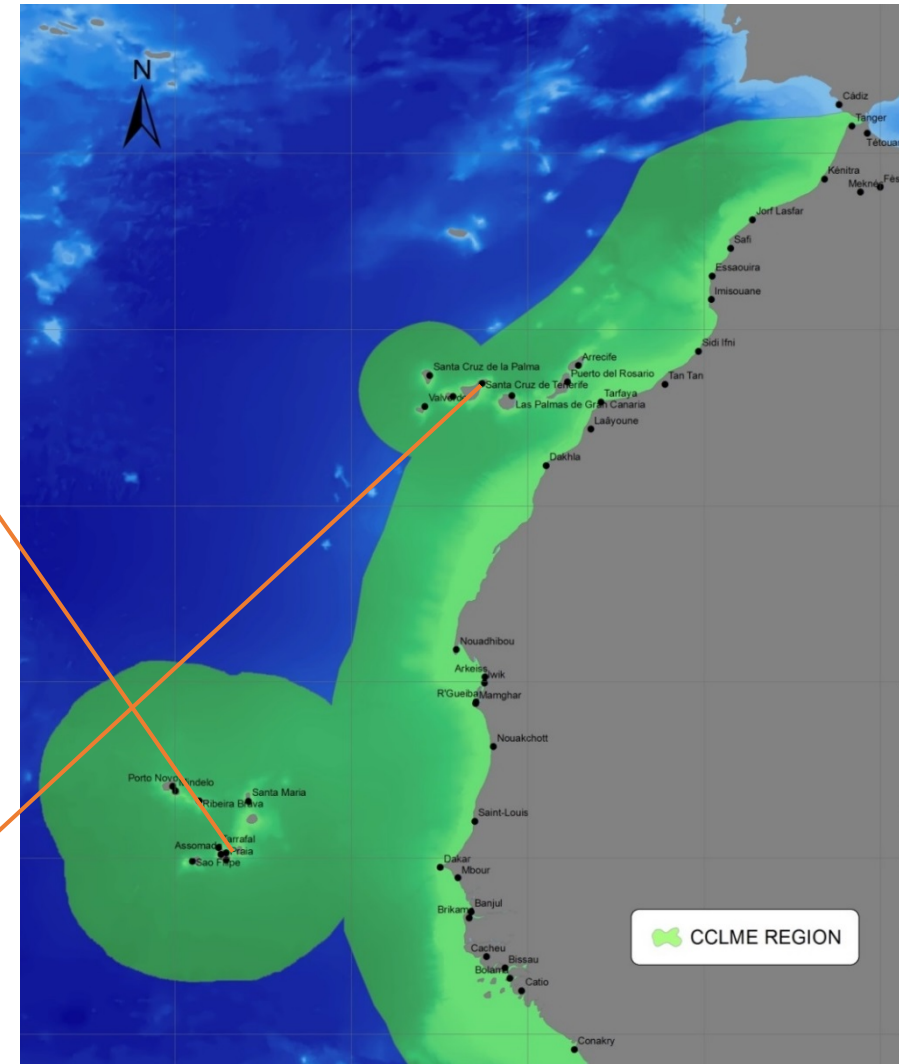
Workshops (II)

Workshop on the “Update of metadata, data availability and application needs for a CCLME Eco-GIS viewer”

held in Praia, Cabo
Verde
(3-5 November 2015)



Hands-on Workshop on “The use of the CCLME Eco-GIS Viewer” held in Santa Cruz de Tenerife, Spain (11-13 July 2017)



THE PROJECT: PHASE III

Project:

ENHANCING OCEANOGRAPHY CAPACITIES IN CCLME WESTERN AFRICA COUNTRIES PHASE III

Implementing Body:

IOC-UNESCO



Partner:

Instituto Español de Oceanografía -IEO-



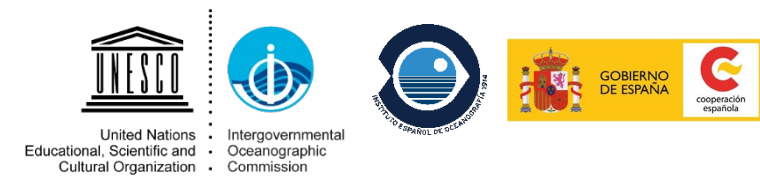
Funding:

100% Spanish Agency for International Development Cooperation -AECID-



Period:

January 2018 – January 2020

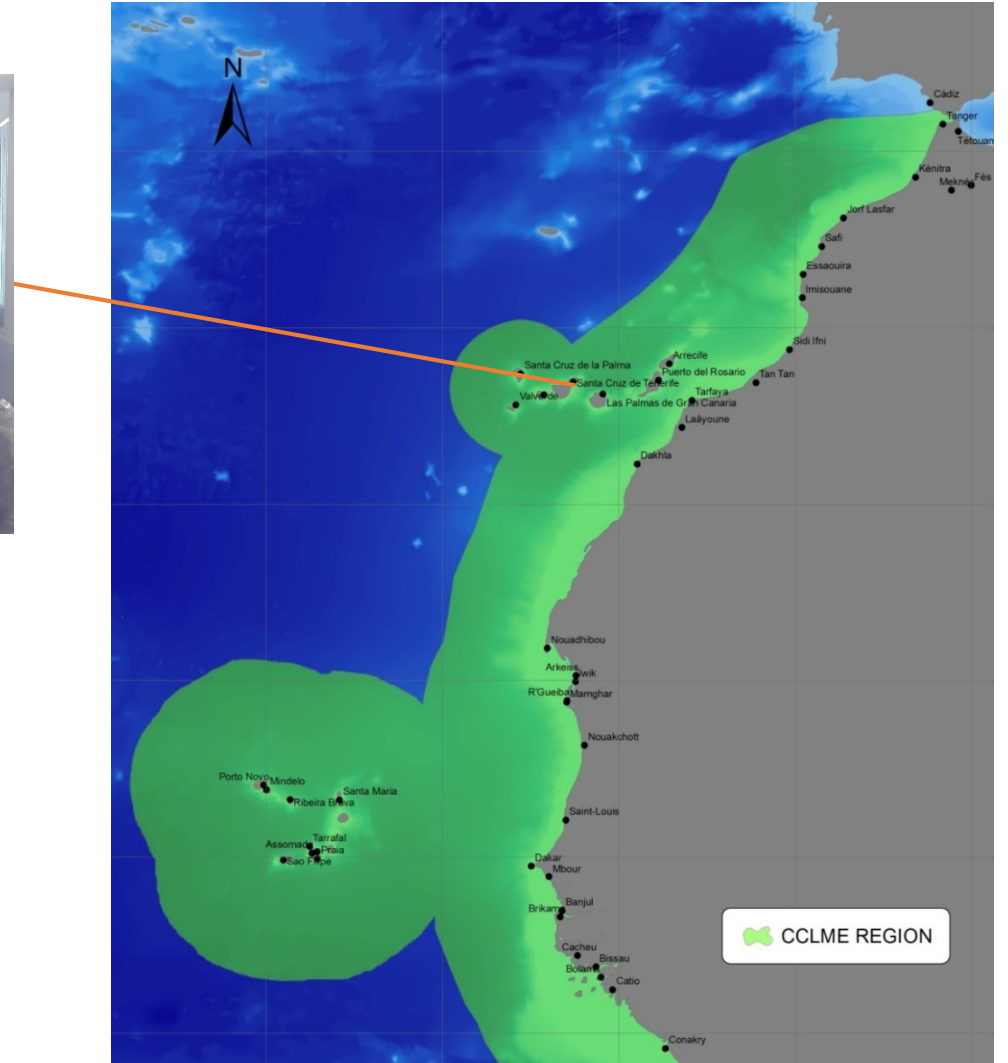


PHASES III: Overall goal

*To improve the existing knowledge on the effects of **climate change** on the Canary Current Large Marine Ecosystem (CCLME) and to continue building regional science capacity in this regard.*

Workshops (I)

Workshop on “The effects of climate change on the productivity of the CCLME” held in Santa Cruz de Tenerife, Spain (18-20 September 2018)



Research and Capacity Development Plan



The Research Agenda

Goal	Address fundamental scientific knowledge gaps in the CCLME through regional cooperation in research activities, with a focus on: (i) total primary productivity and functional diversity ; (ii) and physical forcing .
Strategy	To set up a specific regional productivity model for the CCLME and cross validate the existing upwelling indices including: (i) data gathering and provisional access; (ii) coordination of new research efforts; (iii) data analysis and modelling; (iv) communication of results.

The Capacity Development Agenda

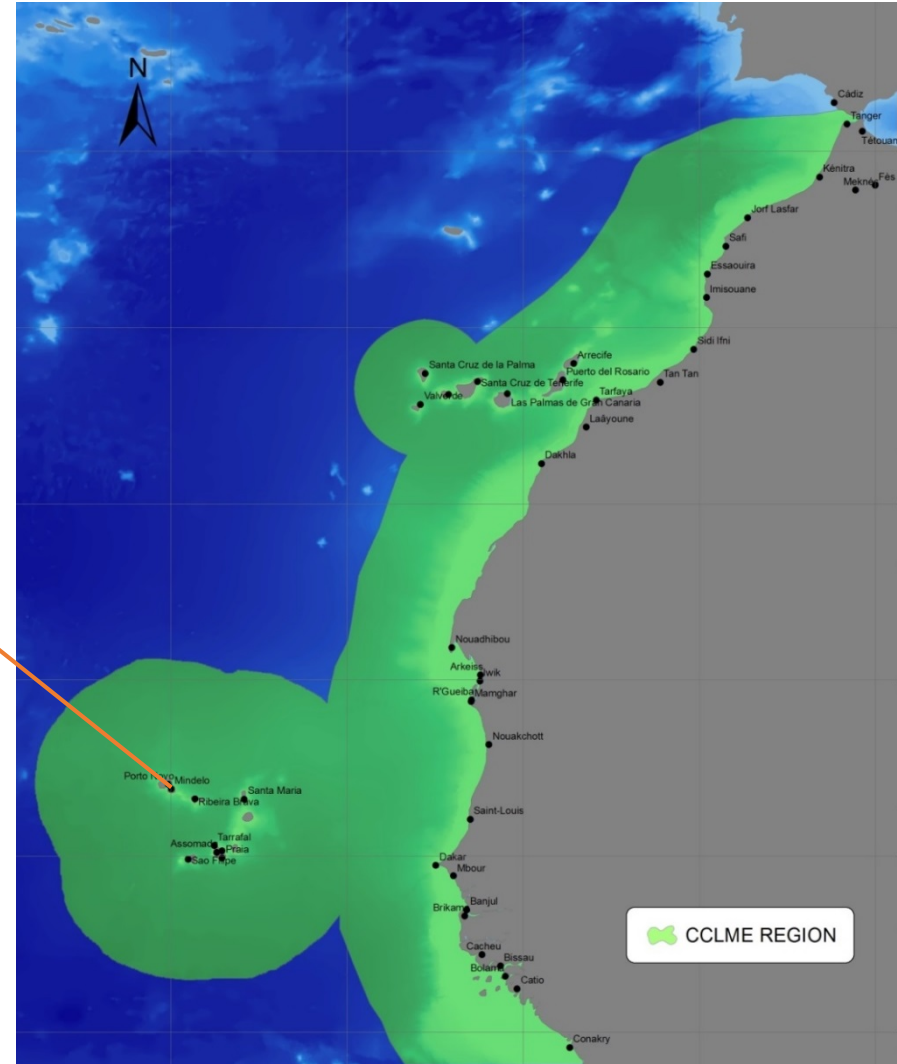
Goal	Develop a common capacity development (CD) agenda and related implementation strategy for the coastal nations in the CCLME region.
Strategy	To set up a series of activities aimed at boosting the development of relevant capacities for the CCLME according to different levels of capacity development (individual and organizational)

Workshops (II)

Workshop II:

Tentative venue:

São Vicente Island, Cabo Verde
(November 2019)



<http://www.unesco.org/new/en/natural-sciences/ioc-oceans/sections-and-programmes/ocean-sciences/canary-current-large-marine-ecosystem-project-cclme/>

TO BE
UPDATED
SOON



United Nations
Educational, Scientific and
Cultural Organization



Intergovernmental
Oceanographic
Commission



Science in Eastern Boundary Upwelling Systems: further activities

Open Science Conference Lima 2021
(September 2021)
IOC-UNESCO as co-sponsor

ICTP-CLIVAR Summer School on Oceanic Eastern Boundary Upwelling Systems

IOC-UNESCO is co-sponsoring participants from developing countries



One Planet, One Ocean

ICTP-CLIVAR Summer School on Oceanic Eastern Boundary Upwelling Systems

15 - 21 July 2019
Trieste, Italy

Further information:
<http://indico.ictp.it/event/8702/>
sm331@ictp.it

Directors:
A. BRACCO
Georgia Inst. of Technology, USA
A. LAZAR
University Pierre and Marie Curie, France
R. RYKACZEWSKI
University South Carolina, USA
T. TONIAZZO
Bjerknes Centre for Climate Research, Bergen, Norway

Local Organizer:
R. FARNETTI, ICTP

Speakers:
A. BRACCO
Georgia Inst. of Technology, USA
F. CHAI
Second Institute of Oceanography, China
M. DIAKATE
Cheikh Anta Diop Univ., Senegal
M. GARCIA-RIVAS
Ferdinand Univ., USA
R. GARREAU
Univ. of Chile, Chile
A. LAZAR
Univ. Pierre and Marie Curie, France
A. MILLER
Scrpps Inst. of Oceanography, USA
R. RYKACZEWSKI
Univ. of South Carolina, USA
M. SCHMIDT
Leibniz Inst. for Baltic Sea Research, Germany
T. TONIAZZO
Bjerknes Centre for Climate Research, Bergen, Norway
J. VERTIC
South African Env. Obs. Network, South Africa
P. ZUIDEMA
Univ. of Miami, USA

Topics:

- Overview of upwelling systems and their physical and biological dynamics
- Oceanic circulation and the upwelling process
- Atmospheric circulation in upwelling systems
- Biogeochemistry and ecosystems
- Atmosphere-ocean coupled dynamics, air-sea interactions, and biogeochemical feedbacks
- Natural and anthropogenic climate impacts on upwelling
- Global climate modeling and biases
- Model-data comparisons and data visualization

How to apply:
Online application:
<http://indico.ictp.it/event/8702/>

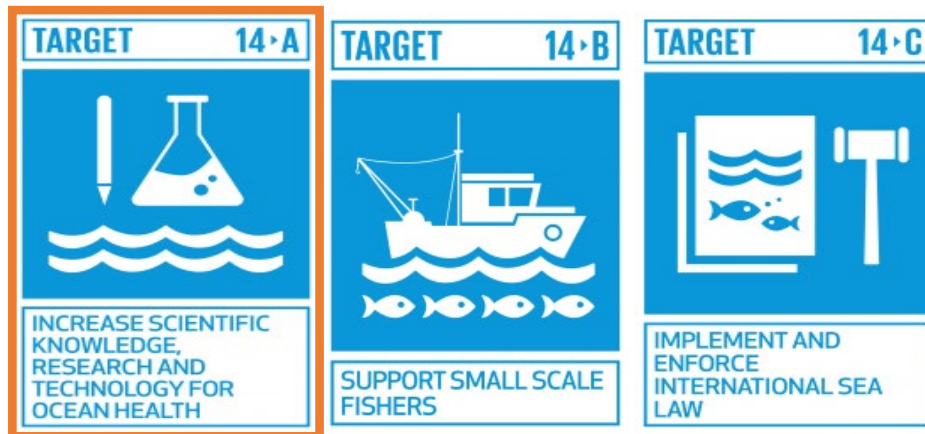
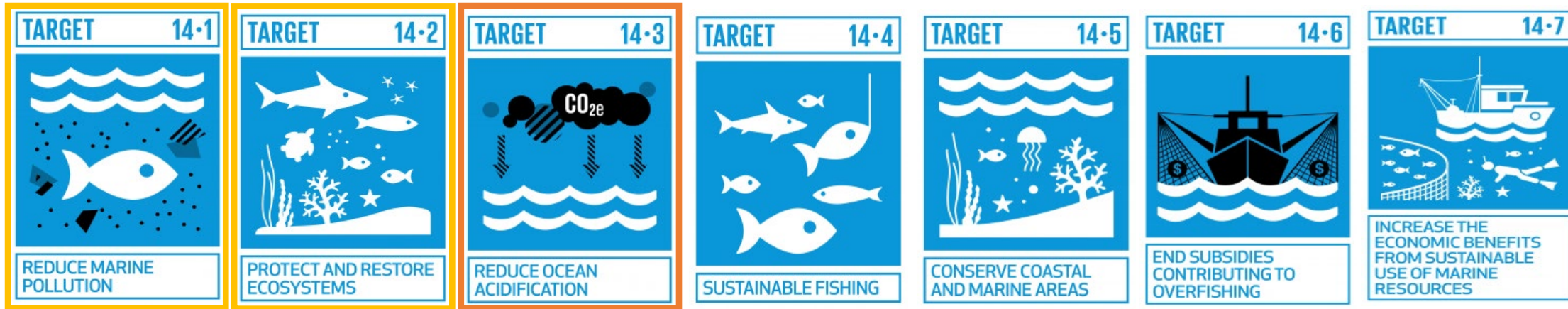
Grants:
A limited number of grants are available to support the attendance of selected participants, with priority given to participants from developing countries. There is no registration fee.

Female scientists are encouraged to apply.

Deadline:
15 April 2019

SDG 14 – 10 targets – 10 ways to collect data

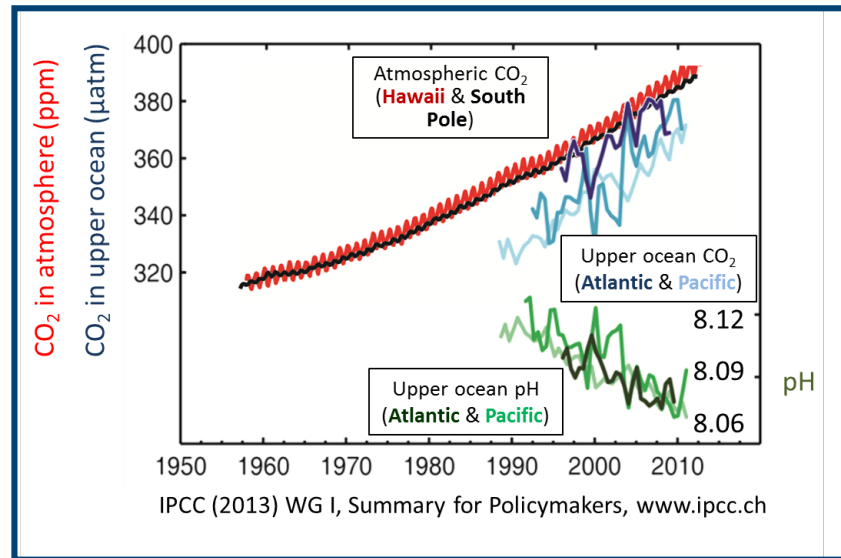
One Planet, One Ocean



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

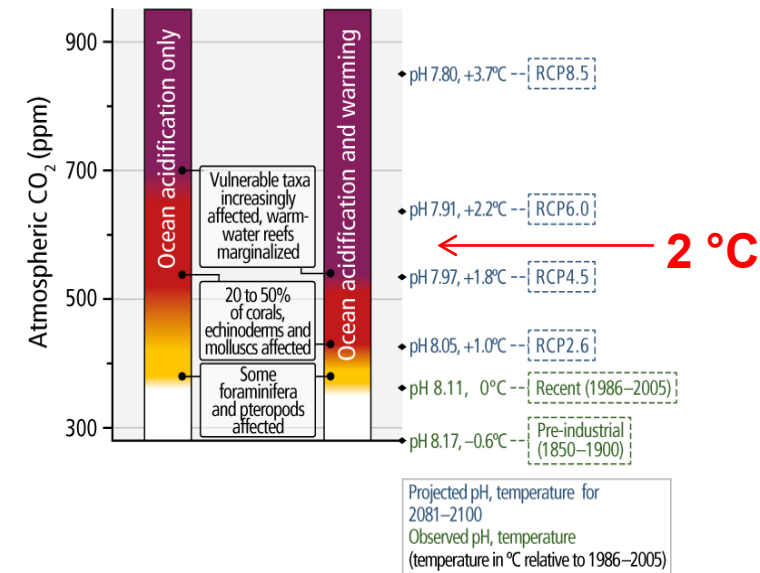
- The ocean has absorbed 1/3 of the fossil carbon released



- Capacity of the ocean to continue to absorb carbon at the same rate is questioned by scientists.
- Absorbed CO₂ 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

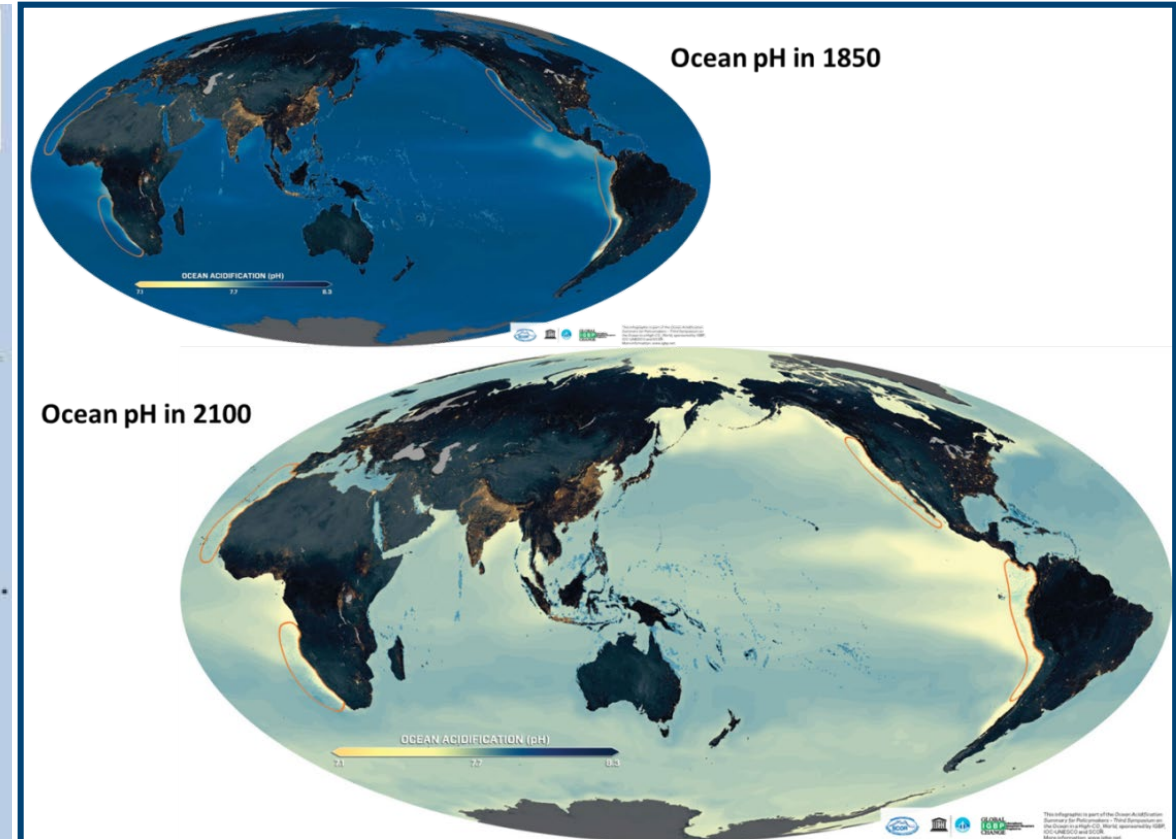


IOC OSS:

- 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





Goal 1 Understanding of global
OA conditions

Goal 2 Understanding of
ecosystem response to
OA

Goal 3 Data to optimize
OA modeling

GO₂NE

Global Ocean Oxygen Network

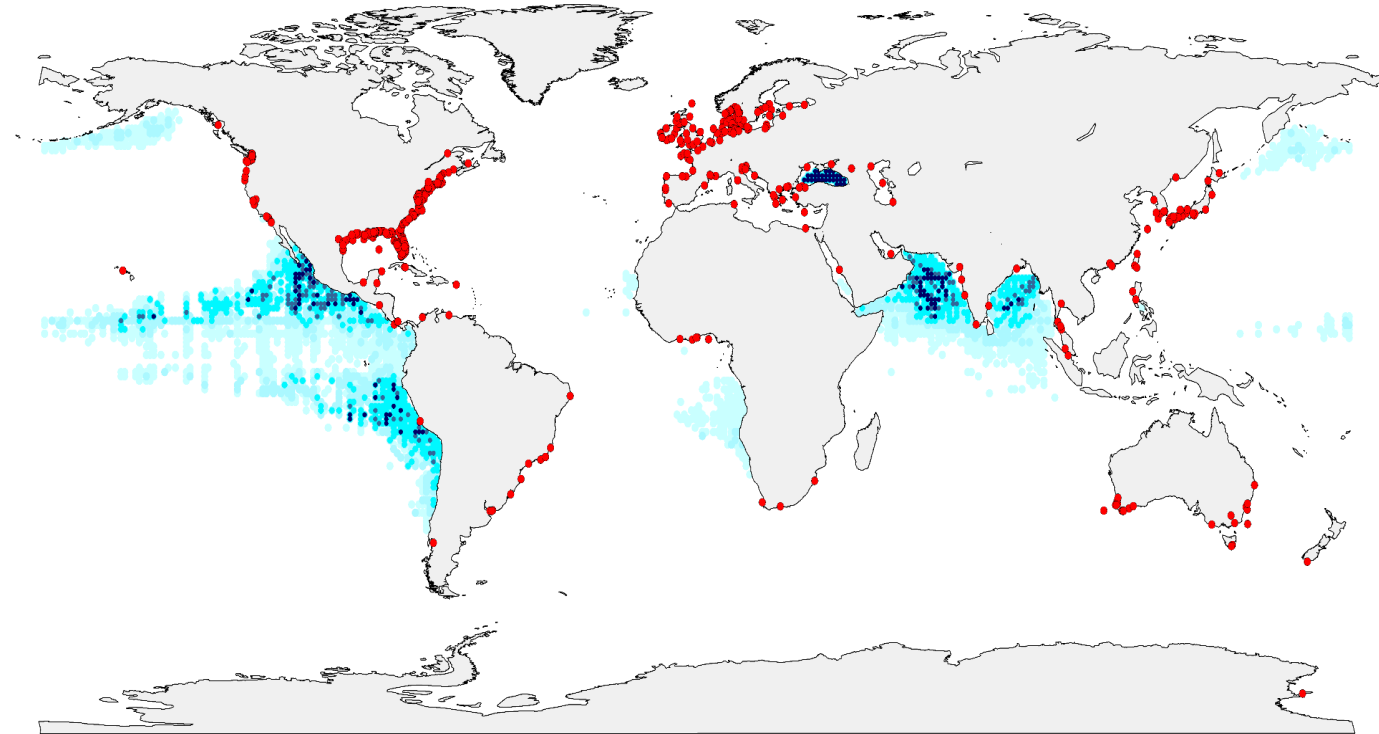
EOV Oxygen, Fish abundance, Marine mammals,
Benthic invertebrates



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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 $\leq 20\text{-}25\%$ oxygen saturation
- Since 1960 - The open ocean has lost 2% of its oxygen inventory = 77 billion tons O₂
- Science Publication in 2018 Breitburg et al.



Global Ocean Oxygen Network

GO₂NE

Global Ocean Oxygen Network



United Nations
Educational, Scientific and
Cultural Organization



Intergovernmental
Oceanographic
Commission



Sustainable
Development
Goals

One Planet, One Ocean

Publication of GO₂NE policy brief

The cover of the policy brief features a stylized illustration of an ocean canyon. The canyon walls are dark blue, and the water is a lighter blue. Various marine life are depicted, including a sea turtle, several fish, and jellyfish. The title 'The Ocean Is Losing its Breath' is written in large, white, sans-serif font across the center. At the top right, a blue box contains the text 'SUMMARY FOR POLICY MAKERS'. At the bottom, the title 'Declining Oxygen in the World's Ocean and Coastal Waters' is written in black. Logos for UNESCO, the Intergovernmental Oceanographic Commission, and GO₂NE are displayed at the bottom right.

SUMMARY FOR POLICY MAKERS

The Ocean Is Losing its Breath

Declining Oxygen in the World's Ocean and Coastal Waters

UNESCO
United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

GO₂NE
Global Ocean Oxygen Network



International Group for Marine Ecological Time Series - EOV Phytoplankton, Zooplankton



United Nations
Educational, Scientific and
Cultural Organization

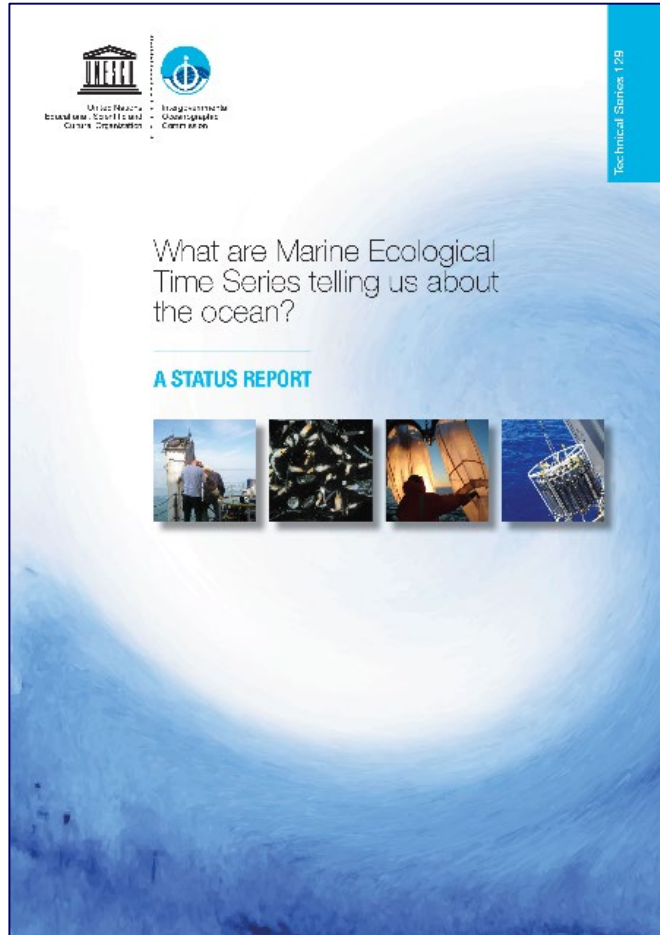


Intergovernmental
Oceanographic
Commission

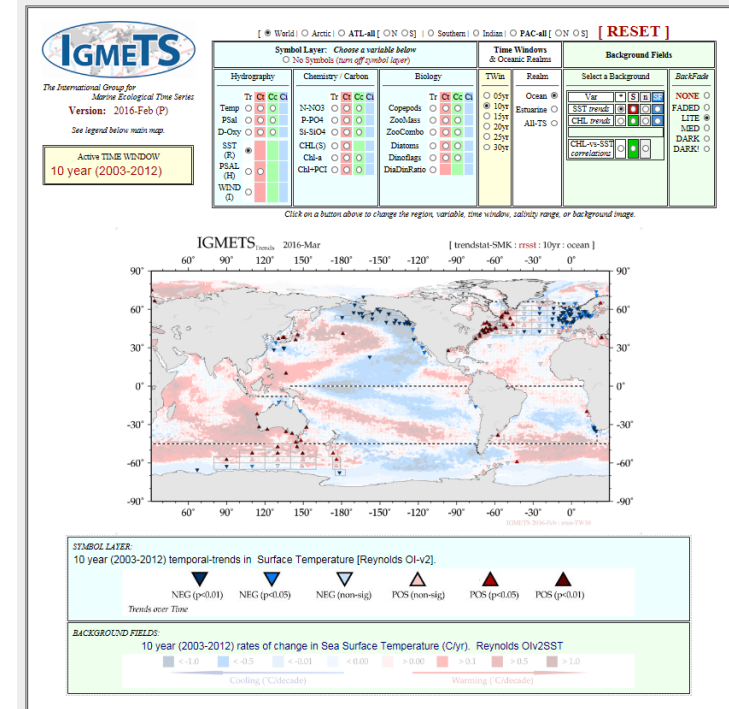


Sustainable
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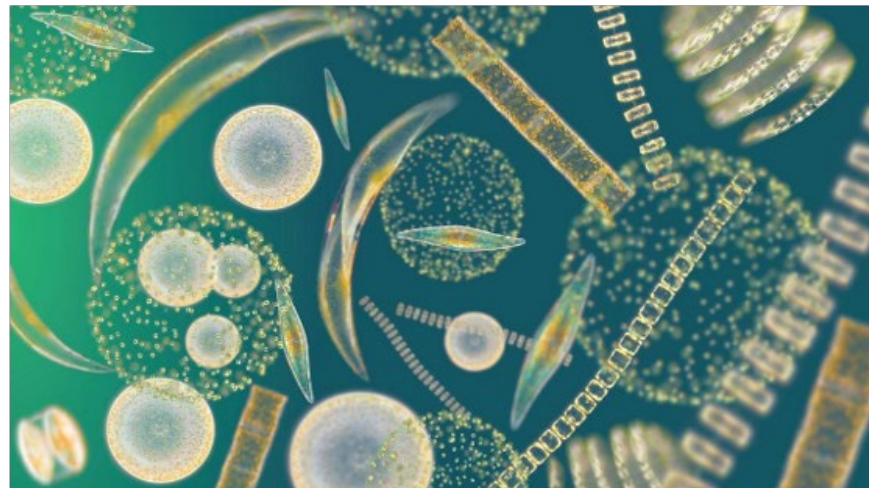
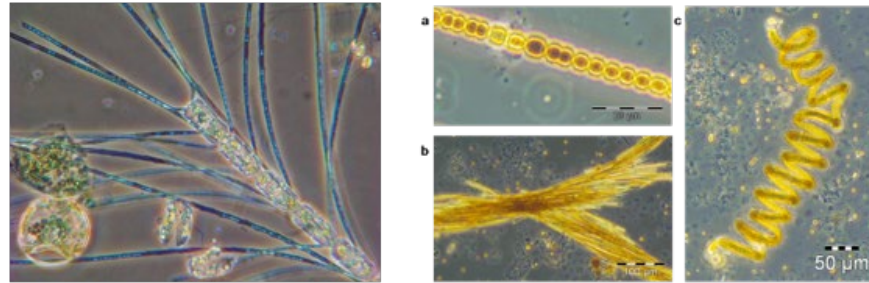
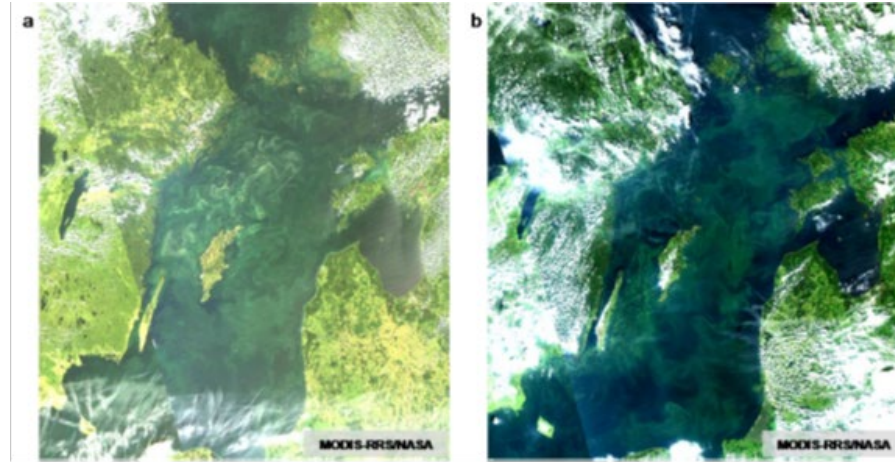
IGMETS Report – What are Marine Ecological Time Series telling us about the ocean? – A status report (IOC Technical Series 129)



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

TrendsPO

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



©Isensee, Smithsonian



Harmful Algal Blooms

EOV phytoplankton



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HABs:

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

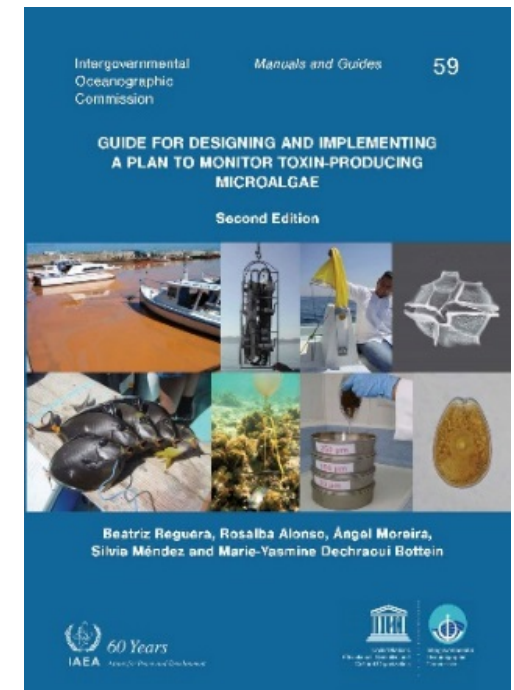
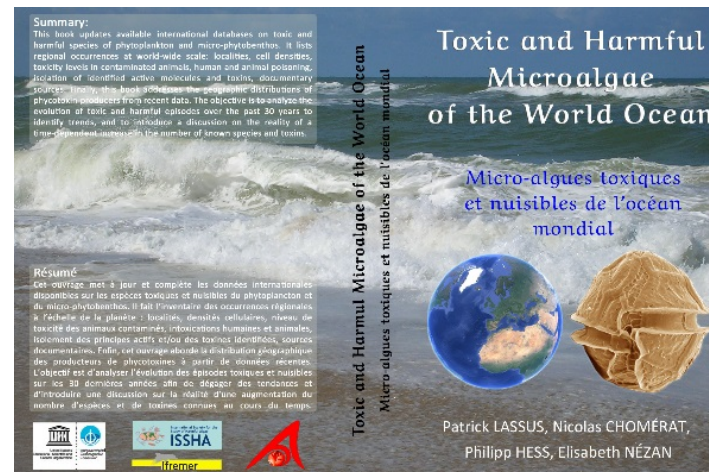
IOC responses:

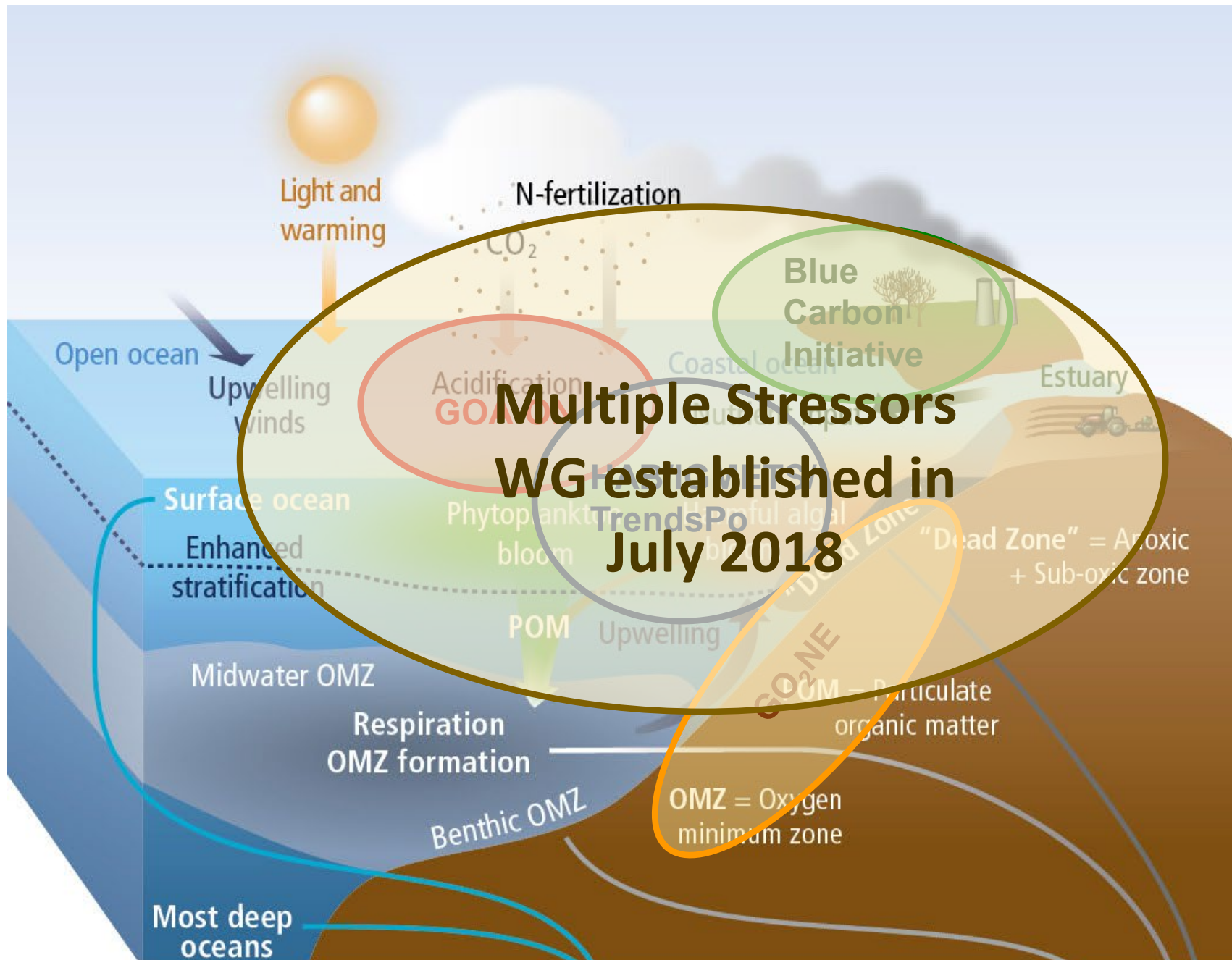
Science is addressed jointly with SCOR through the research programme GlobalHAB.

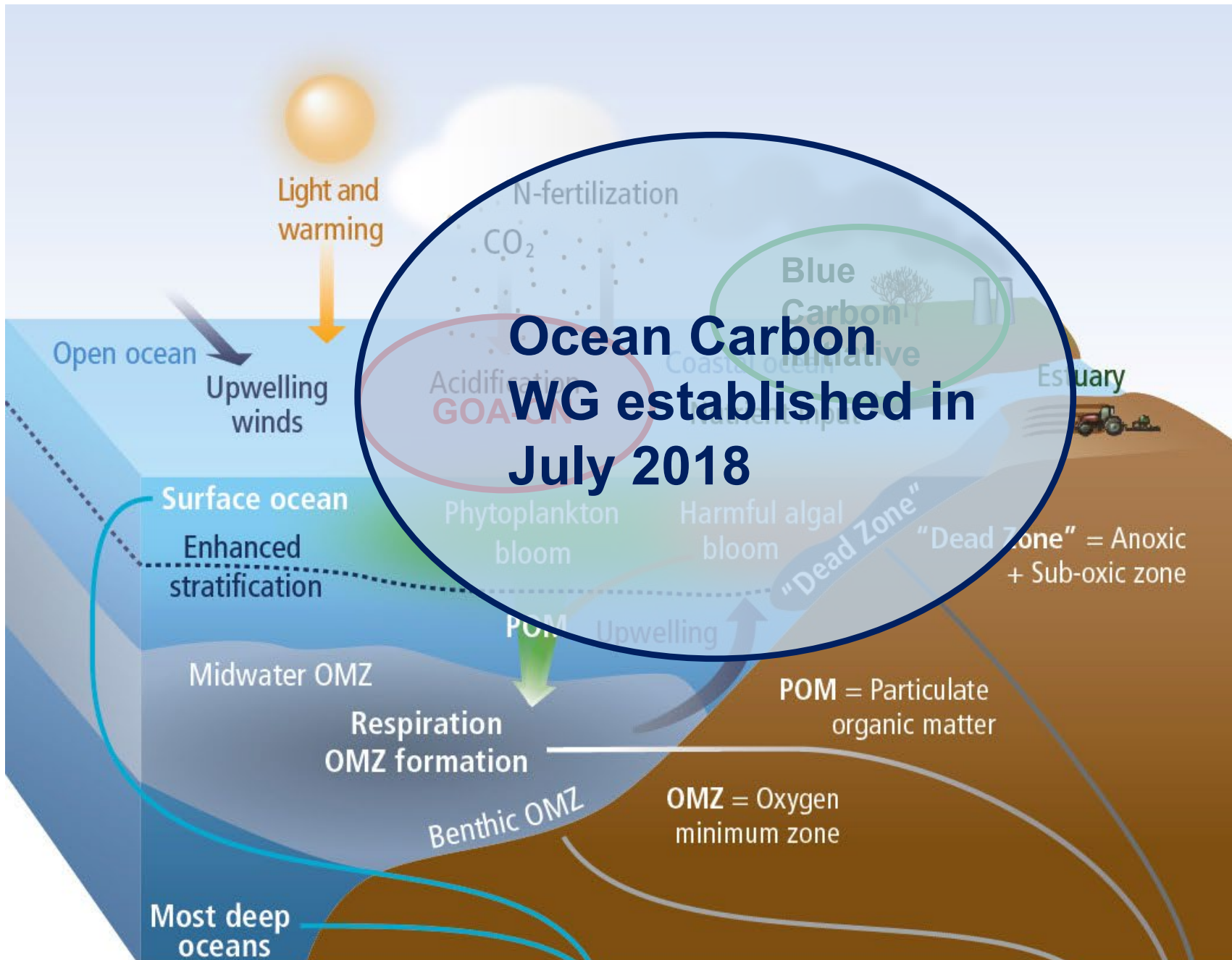
Long term CD effort

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

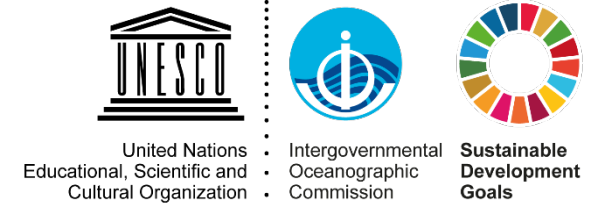
Long-term partnerships with SCOR, ICES, PICES and IAEA.







Global Ocean Science Report



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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



The Current Status
of Ocean Science
around the World



IOC-UNESCO, Global Ocean Science Report, 2017

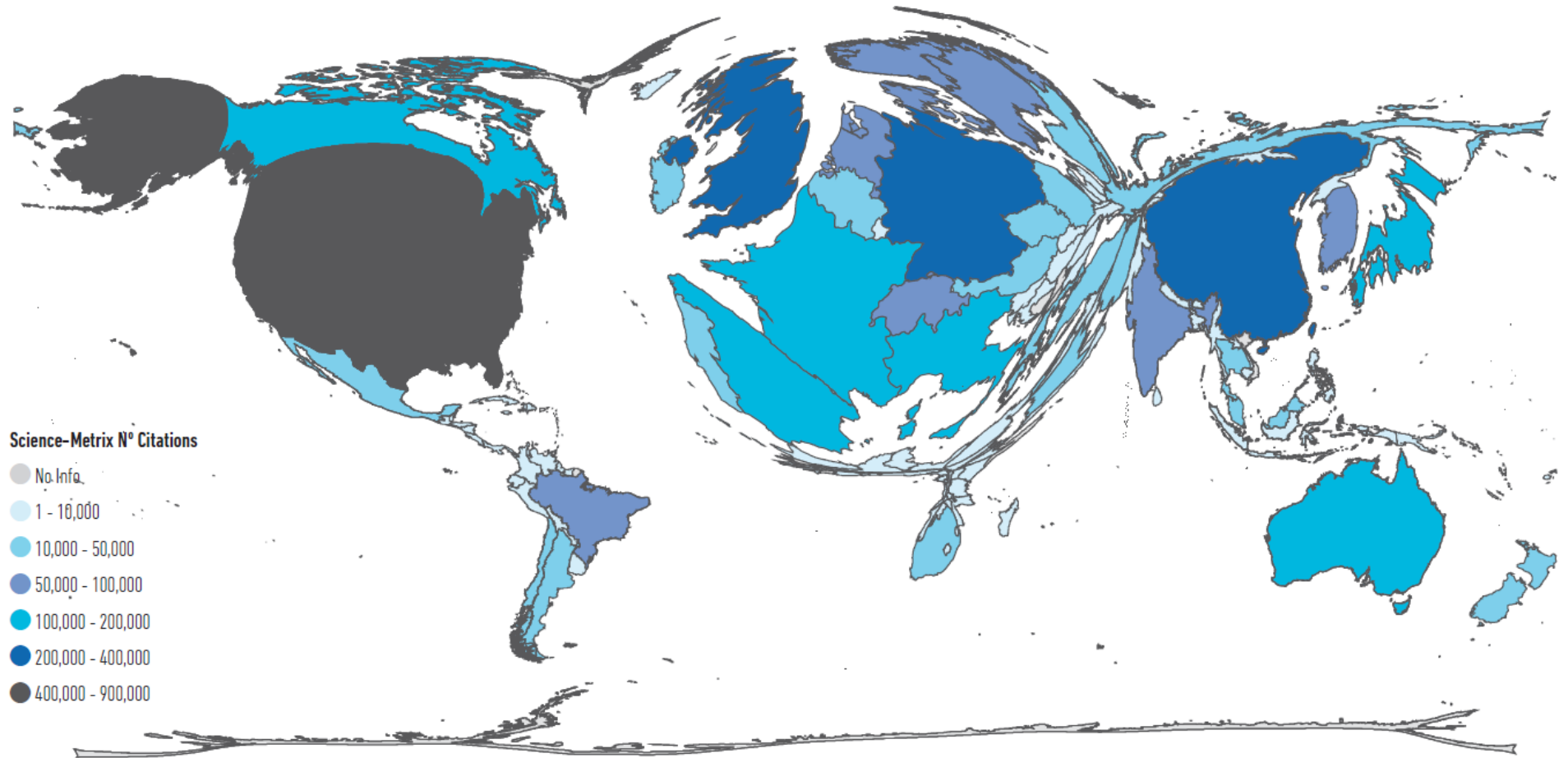
<http://unesco.org/gosr>

How 'big' is our ocean science?

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Global Citation Map for Ocean Science

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

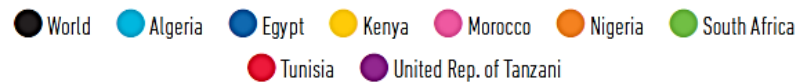
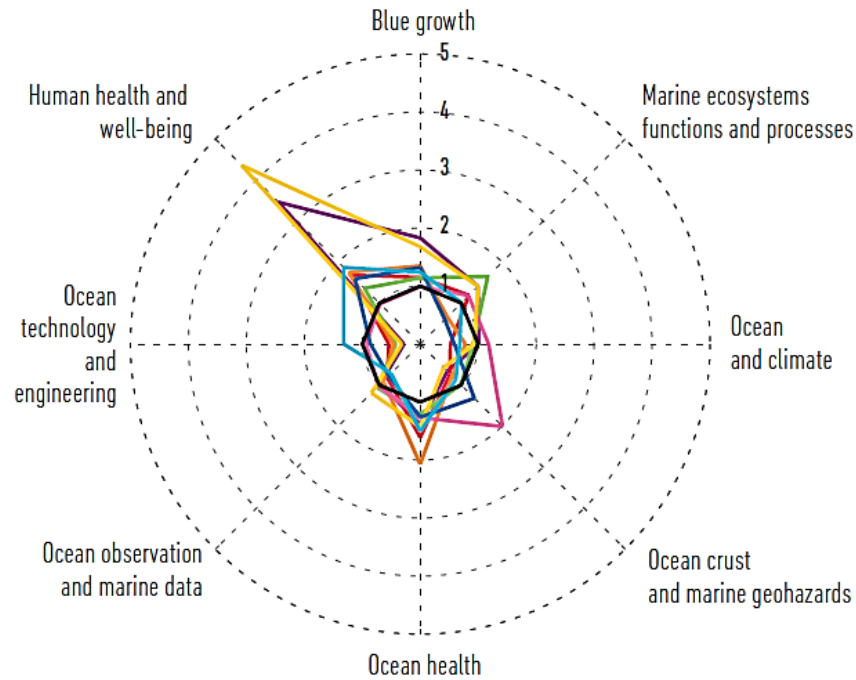


What are the national strengths in different ocean sciences categories?

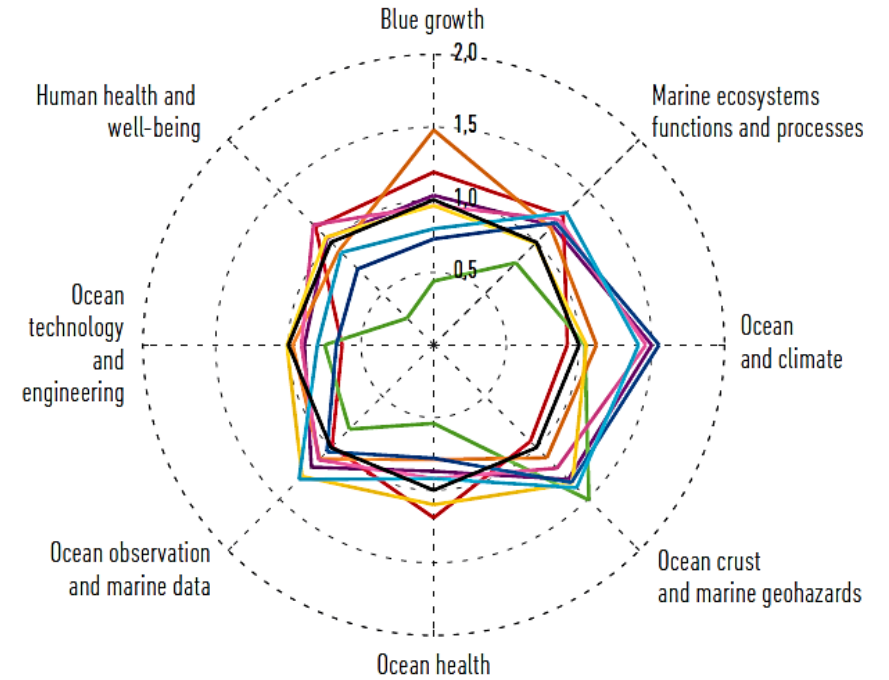
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National strengths in different ocean sciences categories. Spider plots show the Specialization Index (SI) compared to the world (2010–2014).

Africa



Europe



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

June 2020



United Nations
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Intergovernmental
Oceanographic
Commission



Sustainable
Development
Goals

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Baseline information to support the UN Decade of Ocean Science for Sustainable Development 2021-2030



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



Thank you for your attention!

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