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Two Ocean Decade Programmes working towards reducing ocean stress

Kirsten Isensee IOC-UNESCO,

GO2NE & GOOD

GOA-ON, & OARS

GO$_2$NE
Global Ocean Oxygen NEtwork

The Ocean is losing its breath
Declining oxygen in the world's ocean and coastal waters

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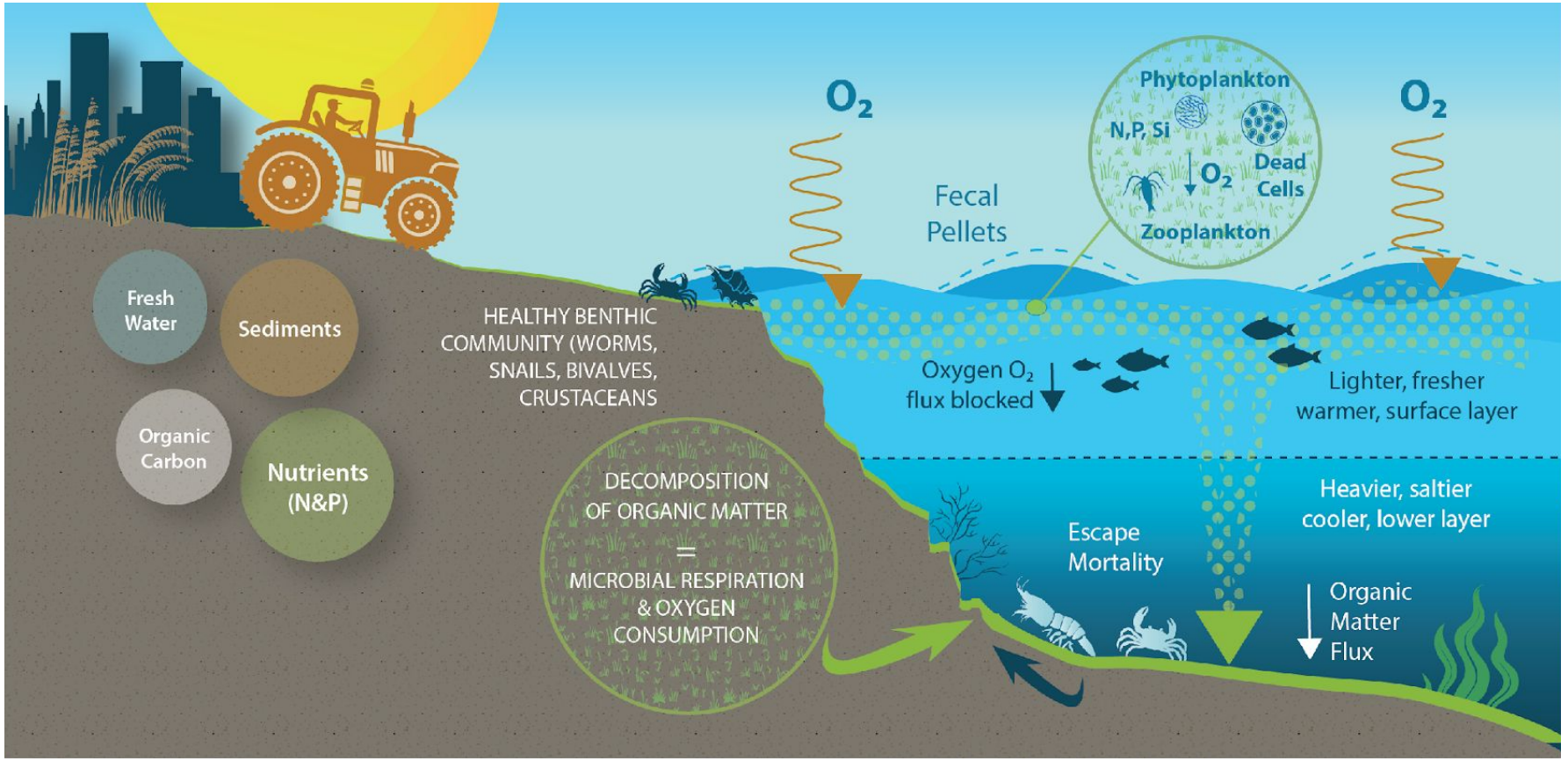
Intergovernmental Oceanographic Commission

Andrew Alteri, Denise Breitburg, Francisco Chavez, Sean Crowe, Minhan Dai, Marilaure Grégoire, Véronique Garçon, Dimitri Gutierrez, Shin-ichi Ito, Karin Limburg, Ivonne Montes, **Andreas Oschl**ies,, Kenny Rose, Jodie Rummer Damodar Shenoy, **Caroline Slomp**, Aileen Tan Shau Hwaim Moriaki Yasuhara

Secretarial support:
Kirsten Isensee, Jeremy Sterling

Previous but still active members:
Gil Jacinto, Lisa Levin, Grant Pitcher, Nancy Rabalais, Mike Roman



GO$_2$NE
Global Ocean Oxygen NEtwork

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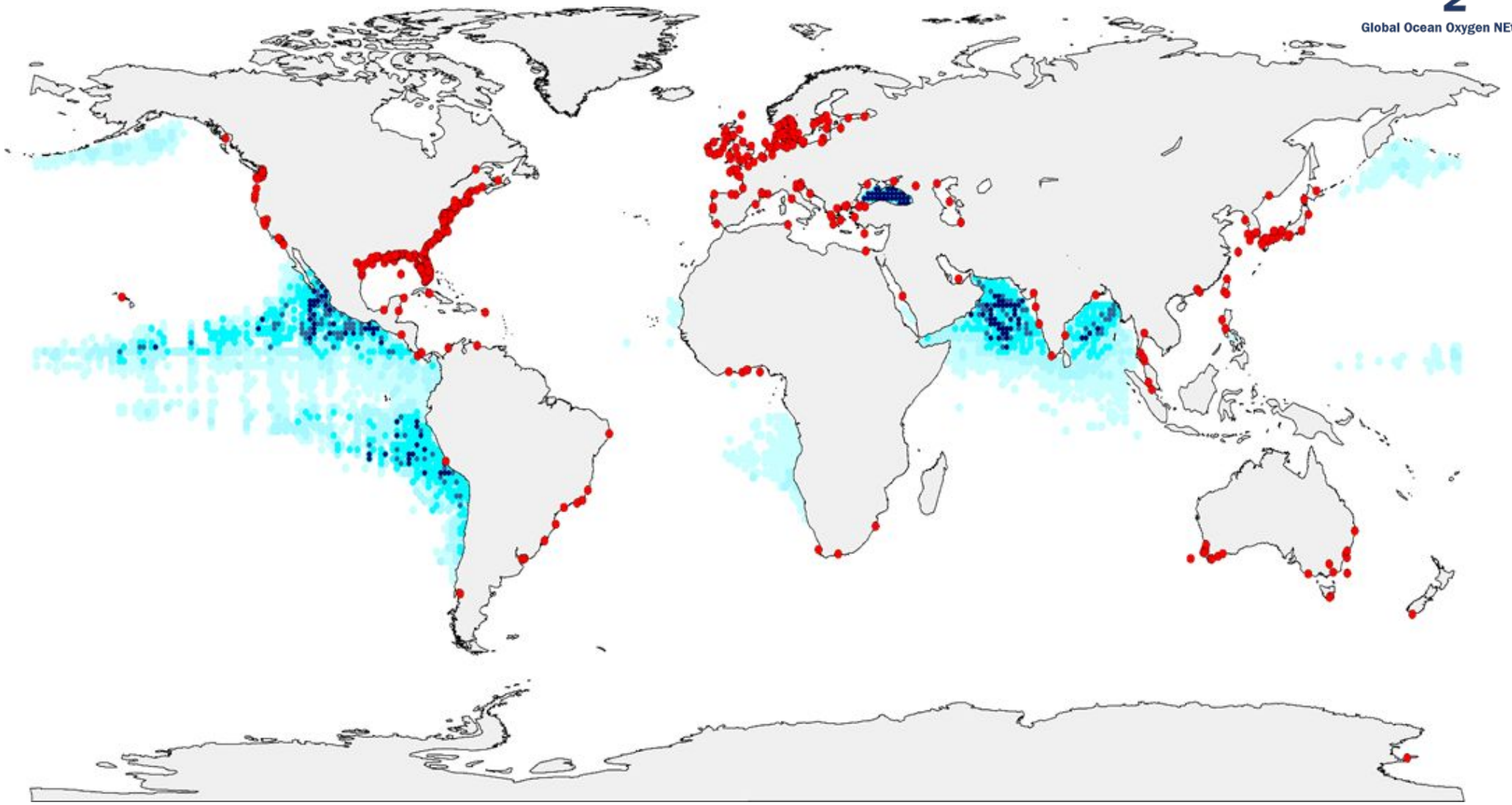

Science publication in January 2018, Breitburg et al. 2018

GOOD
Global Ocean Oxygen Decade

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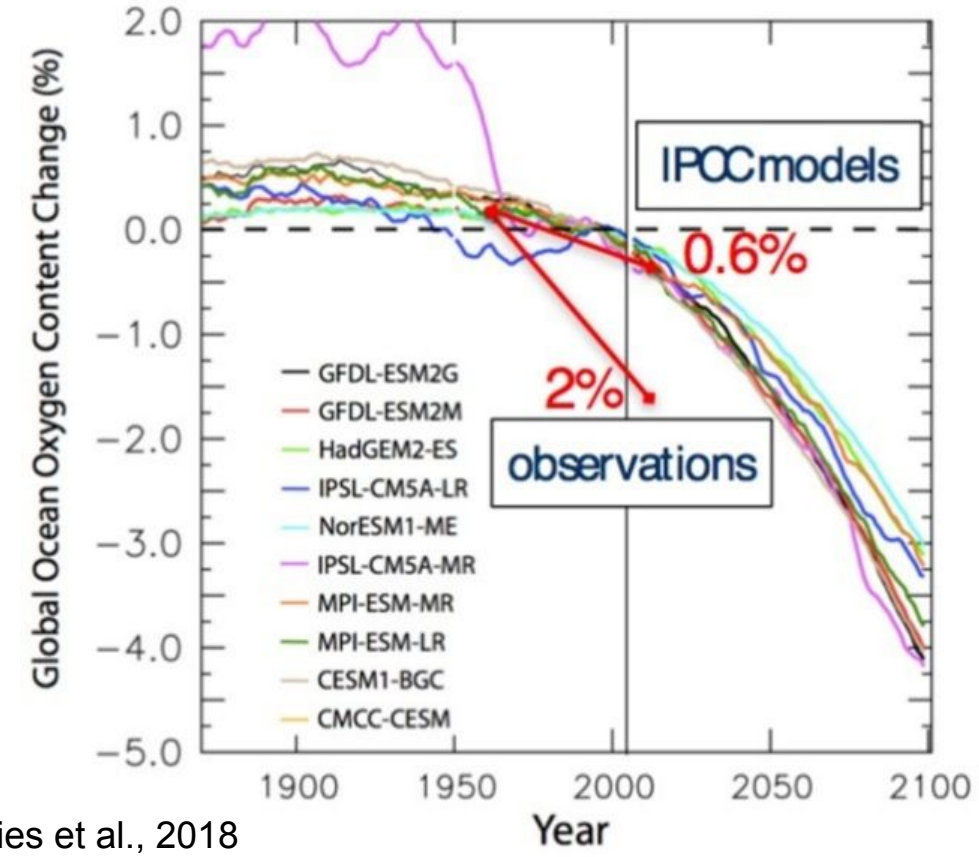
Intergovernmental Oceanographic Commission

Global Ocean Oxygen Decade (GOOD):

- will raise global awareness about ocean deoxygenation,
- **provide knowledge for action** and **develop mitigation and adaptation**
- **minimize impacts on the ocean economy** through local, regional, and global efforts, including transdisciplinary research, innovative outreach, and ocean education and literacy.

Deoxygenation trend over 1960–2005 differs between 0.6% and 2 %



Oschlies et al., 2018

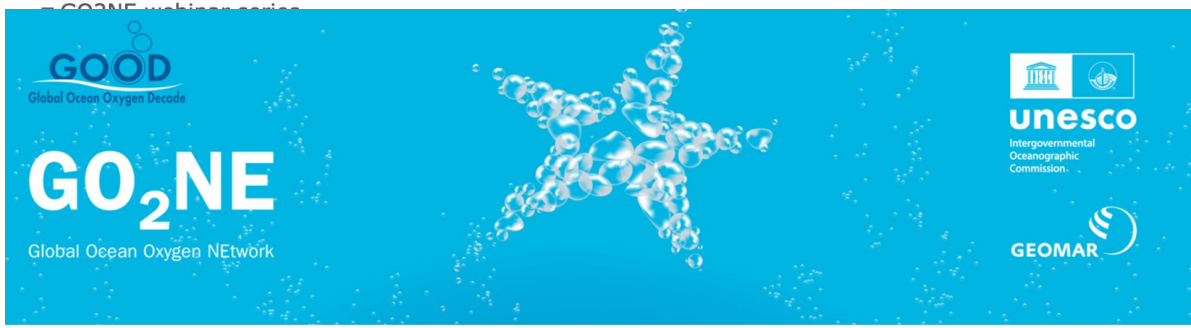
Activities

1. Increase knowledge about the causes, impacts and threats of deoxygenation
2. Increased capacity to measure, document, map, monitor and understand ocean deoxygenation,
3. Indicators and related methodologies will be provided to agencies and industries to ensure safe operating spaces,
4. Actionable strategies to mitigate and adapt to ocean deoxygenation on local to global scales.

https://www.ocean-oxygen.org/

In the third issue of GOOD News, you can read more about:

- GO2NE working group annual in-person meeting
- ECCWO-5: Ocean Deoxygenation: Physical, Biogeochemical and Ecological Research Advances and Future Needs
- Update of the Global Ocean Oxygen Database and Atlas (GO2DAT) project
- Spotlighting Ocean Deoxygenation at World Oceans Day – June 2023
- GO2DAT at the International Ocean Data Conference-II 2023



GO$_2$NE Webinar Series No.24

20 November 2023 | 17:00-18:00 CET

Do you want to know more about deoxygenation in the ocean? Join us for the upcoming webinar!

IODE

GDAC

GO_2DAT

COASTAL & OPEN, FAIR, transparent QC & QF

DATASETS

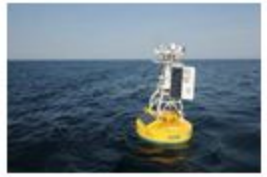
Winkler

CTD

ARGO

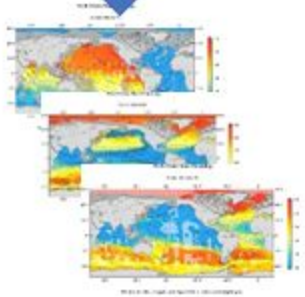
Glider

Mooring, emergent, benthic



PRODUCTS: maps and indicators

- GO_2DAT1
- GO_2DAT2
- GO_2DAT3
- GO_2DAT4
- GO_2DAT5



WEB PORTAL

USERS

IOC, WMO, IUCN, FAO, EEA, Civil society, private sector..

IPCC, IPBES, UN-Decade, UNFCCC, SOLAS, GOOS, IMBER, EU Green Deal, CBD, ..

GOOD

Global Ocean Oxygen Decade

unesco
Intergovernmental Oceanographic Commission

IAEA

Ocean Acidification International Coordination Centre
OA-ICC

NOAA
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

GOA-ON
Global Ocean Acidification Observing Network

Ocean Acidification Research for Sustainability (OARS)

A Decadal Vision For Ocean Acidification Research To Sustainably Manage Our Oceans.

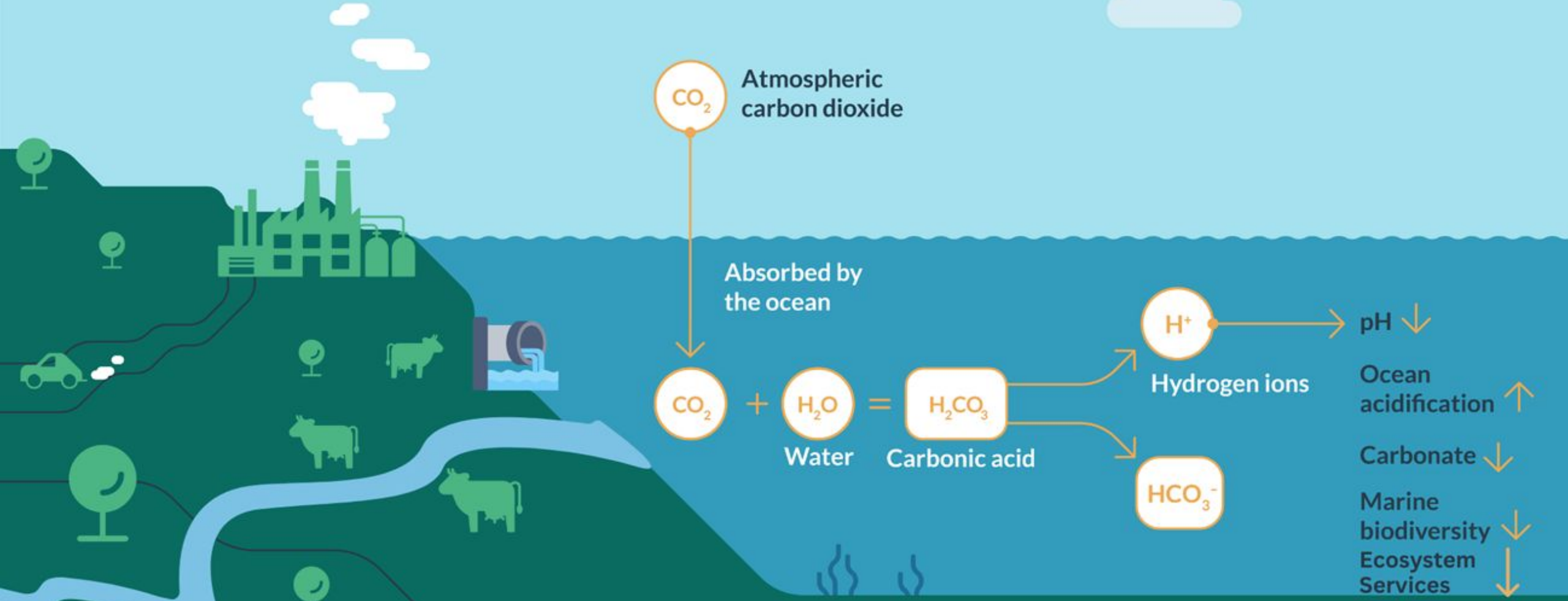
Jan Newton
(Univ. of Washington)
Kirsten Isensee
(IOC-UNESCO)
Steve Widdicombe
(Plymouth Marine Lab)

Amy Kenworthy
(OARS Project Officer)

Ocean Acidification

OARS
Ocean Acidification
Research for Sustainability

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

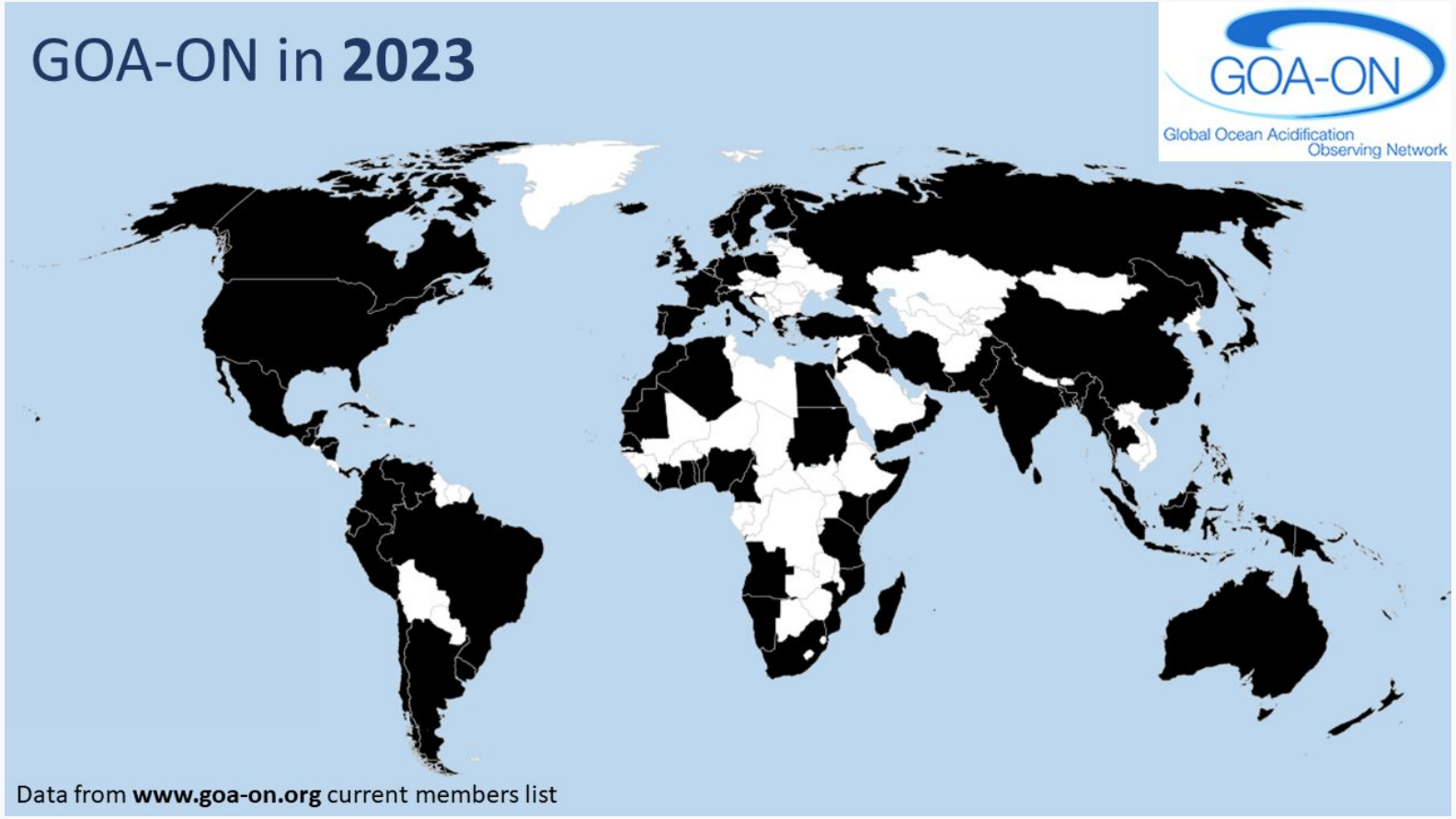


Infographic by Copernicus Marine Services (adapted)

This Global Problem needs a Global Effort

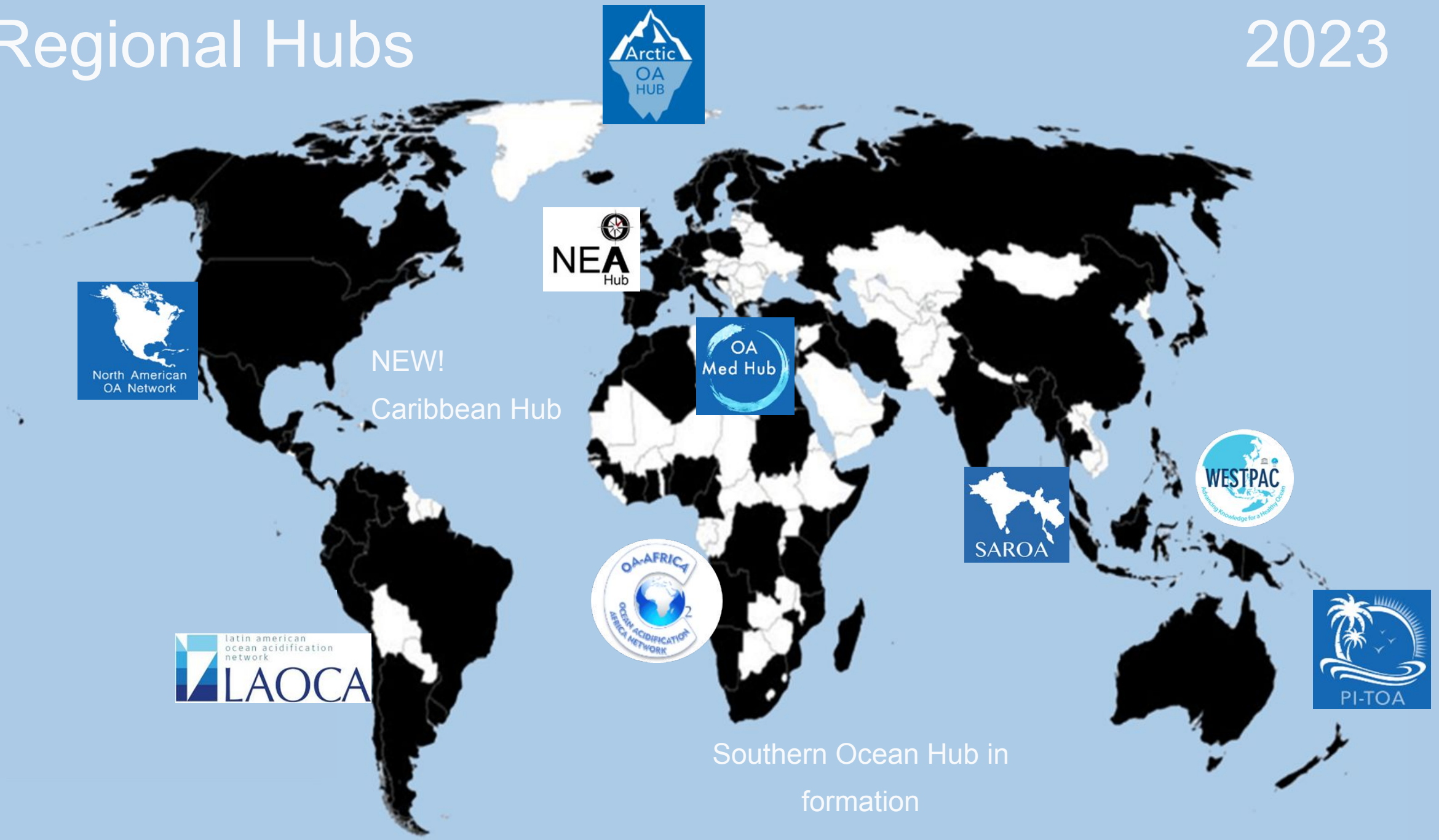
Formed in 2012, the Global Ocean Acidification-Observing Network (GOA-ON) is an international community partnership.

- GOA-ON is a network of 900+ scientists from 114 countries and territories.
- GOA-ON has more than 140 members from 24 Small Island Developing States (SIDS), which translates to 12% of the membership



Regional Hubs

2023



GOA-ON's response to the UN Ocean Decade

OARS
Ocean Acidification
Research for Sustainability

Fostering the co-development of ocean acidification science, including the impacts on marine life and sustainability of marine ecosystems in estuarine-coastal-open ocean environments.

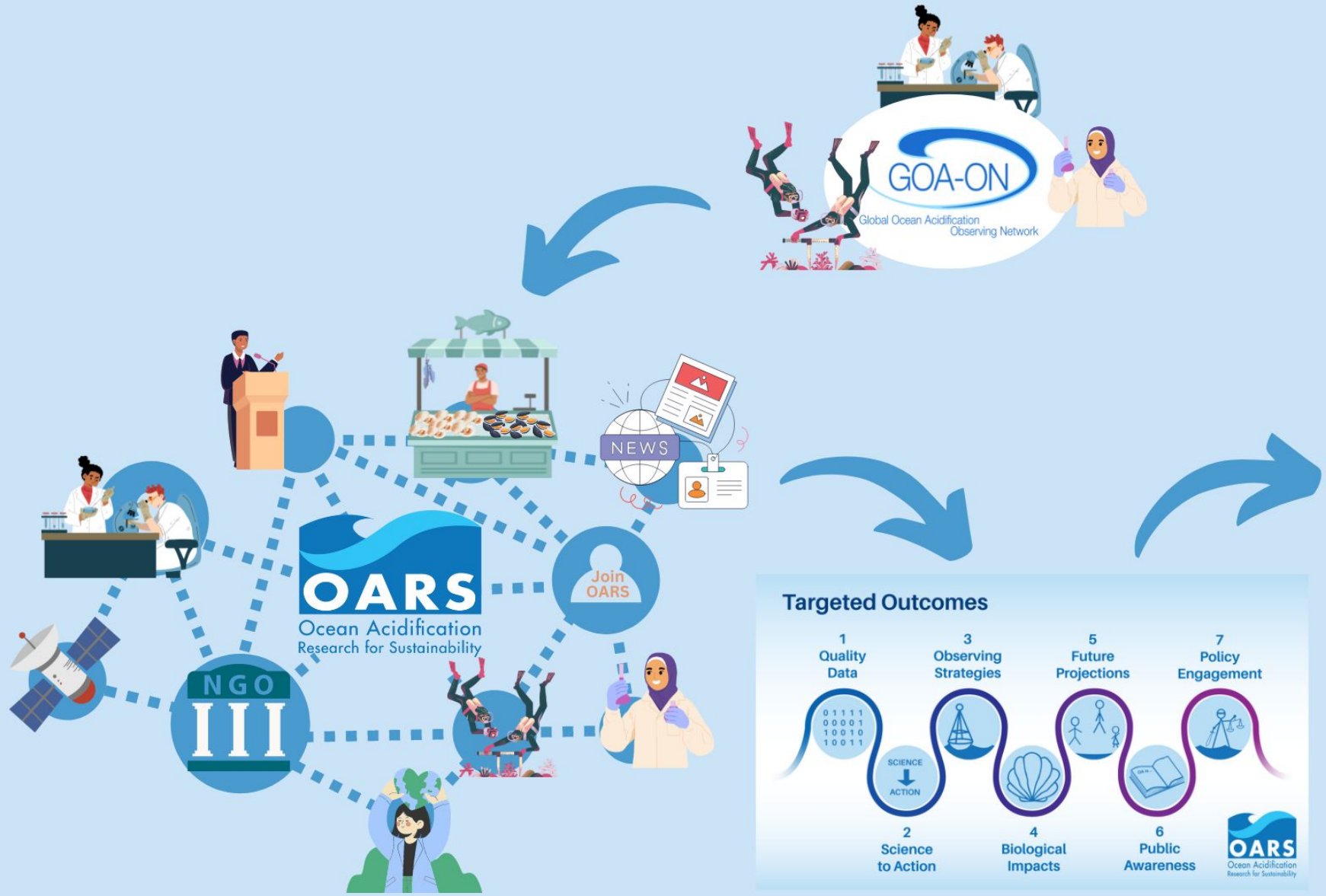
In June 2021, the UN Ocean Decade endorsed the OARS programme.

Proposed by GOA-ON, on behalf of the ocean acidification community, OARS offers a 10-year road map to deliver the ocean acidification science we need.

Creating a Community of OA Action

OARS
Ocean Acidification
Research for Sustainability

2021 2030 United Nations Decade of Ocean Science for Sustainable Development



swi@pml.ac.uk | @steve_swi | @OARSOceanDecade

The OARS Outcome ‘Onion’

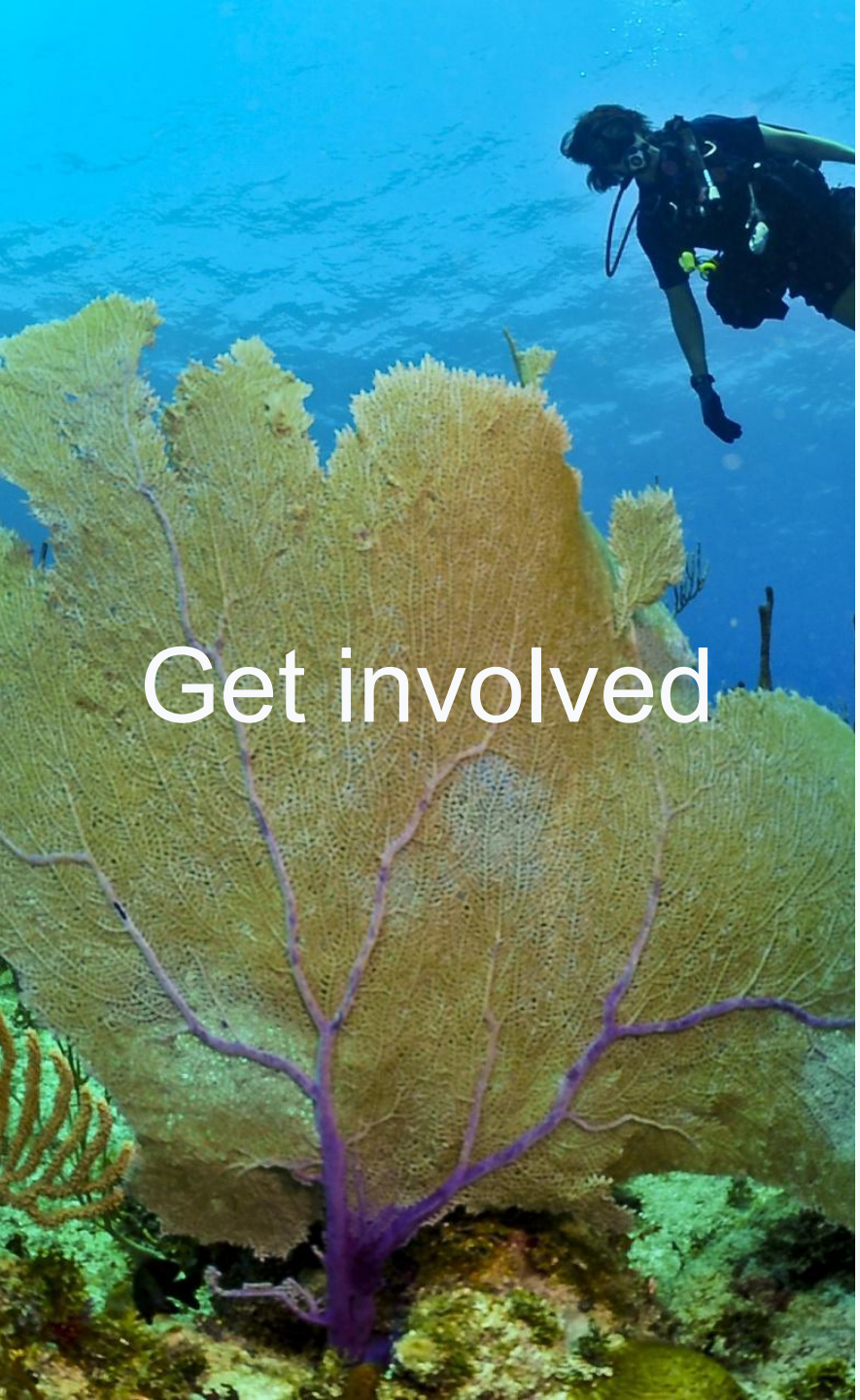
Co-Champions; will provide the leadership for each outcome.

Outcome Working Group; will support the co-champions in setting out the Theory of Change process that will deliver the implementation plan.

Experts and Specialists; will provide targeted knowledge and input for the development and delivery of the Outcome strategy.

Delivery Partners; will develop, lead and deliver specific activities, engagements and outputs that will contribute to the Outcome

Stakeholders and funders; will co-develop and contribute to key Outcome activities, engagements and outputs.



Get involved

Become a Working Group member

Create new projects and actions, as guided by the white papers, the co-champions and the working groups.

Register a Commitment to one or more of the OARS Outcomes.


OARS
Ocean Acidification
Research for Sustainability
United Nations Decade
of Ocean Science
2021-2030
Register Your Commitment
Join the OARS Ocean Decade Programme in tackling ocean acidification.
www.oars-commitments.org

Marine Life 2030

Proposed to the Ocean Decade by:

MBON
Marine Biodiversity Observation Network

IOOS Integrated Ocean Observing System

NOAA

GOOS The Global Ocean Observing System

BOEM

ONR

NASA

Smithsonian

GEO BON

AmeriGEOSS

BLUE PLANET Oceans and Society

CONSORTIUM FOR Ocean Leadership

Many US and international academic and civil society partners

Ocean Shot

The National Academies of SCIENCES ENGINEERING MEDICINE

ML2030 and the Ocean Decade Vision

Marine Life 2030 Vision: A globally coordinated system that delivers knowledge of marine life to those who need it, seeking to transform the observation and forecasting of marine life for the benefit of all people, promoting sustainable development and ocean conservation.

Ocean Decade Vision 2030: Marine Life 2030 is a network that specifically addresses UN Ocean Decade Challenge 2 “Protect and Restore Ecosystems and Biodiversity. Understand the effects of multiple stressors on ocean ecosystems, and develop solutions to monitor, protect, manage, and restore ecosystems and their biodiversity under changing environmental, social, and climate conditions”.

Other relevant UN Ocean Decade Challenges:

- Challenge 7: Expand the Global Ocean Observing System.
- Challenge 9: Skills, Knowledge and Technology for All.
- Challenge 10: Change humanity’s relationship with the ocean

Guiding Principles

- Identify benefits of marine life to stakeholders.
- Co-design solutions by defining clear science and management objectives.
- Commitment to respect of participants, and to fair and ethical interactions.
- Commitment to share a minimum set of common data on Essential Ocean Variables that can be used to develop Essential Biodiversity Variables.
- Commitment to applying standard data formatting (e.g., DarwinCore) that aid interoperability, integration, and publication of data through relevant open biological and environmental databases (OBIS, GBIF).

26 affiliated projects and growing: https://marinelife2030.org/affiliated-projects/

The Global Ocean Observing System

Session 6: Optimising synergy with the Ocean Decade

Part 3: The Decade Coordination Office for Ocean Observing and 11 ocean observing programmes, deep work in the Ocean Decade

Action #97: OASIS (Observing Air-Sea Interactions Strategy)

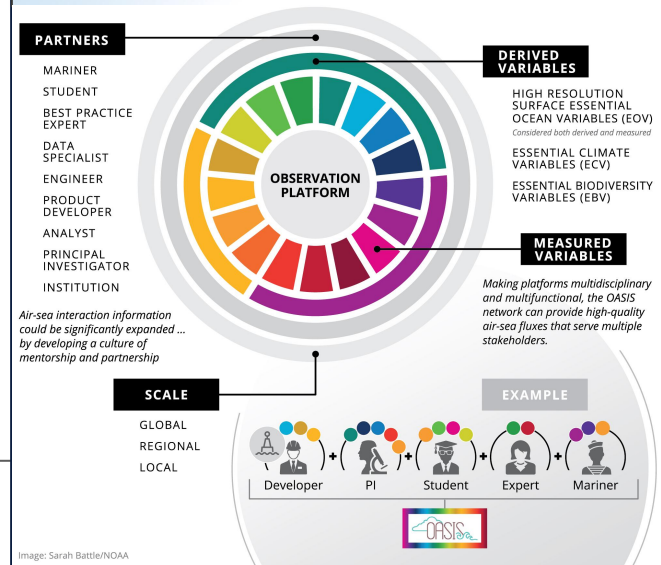
Meghan Cronin (USA), Christa Maradino (Germany), Seb Swart (Sweden)

Thirteenth GOOS Steering Committee Meeting [SC-13]

Barcelona 13th-16th April 2024

OASIS ACTIVITIES (select)

- Riihimaki et al. (In Press) “Ocean Surface Radiation Measurement Best Practice” – Endorsed by OceanSITES. **We request GOOS endorsement.**
- OASIS and OOPC are helping to develop a longterm partnership between TPOS Equatorial Pacific Experiment (TEPEX) and Pacific Community and Pacific Island-GOOS. **Request help with community building linking GOOS (TPOS), PI-GOOS GRA, SPC, OASIS and TEPEX.**
- Uncrewed Surface Vehicle Network for GOOS (Action #35.3 project linked to OASIS) is working to meet the attributes of an emerging network. USV for GOOS representatives have participated in OCG annual meetings in 2022, 2023, and in May 2024. **Request OCG and GOOS recognize the Uncrewed Surface Vehicle (USV) emerging network and provide guidance.**



OASIS Grand Ideas
And
Theory of Change
“Grandest Idea of All”

OASIS FUNDING PITCHES

(1) Early Career Ocean Professionals (ECOP) Honorariums, travel, page charges.

(2) Creation of a website and data portal for the "Uncrewed Surface Vehicle (USV) network for GOOS"

(3) OASIS project office

(4) Support for community workshops

(5) Data buys for air-sea interaction observations (e.g. from Saildrone, Inc., Sofar, Inc) delivered to public "Open Data" repositories and modeling & data centers around the world, with support of mission management and scientific analyses

(6) "Scientist in Residence" scientific extended visits (2 weeks or longer) to SIDS & the Global South and

(7a) Paid internships to foster international collaboration

(7b) OASIS Graduate Research Fellowships with advisors & mentors from different institutions & countries

OASIS Face to Face Workshop

February 17-18, 2024
New Orleans, LA USA

More than 54 In Person Participants with ECOPs from Africa, Europe, Australia, Asia, South America, North America. Online participants as well.

Ocean Decade Coordination Office
Ocean Observing

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

Decade Coordinating Office
Ocean Observing

GOOS Steering Committee
April 15, 2024

Terry McConnell
Lead

Emma Heslop
GOOS
IOC/UNESCO

Ocean Observing | Ocean Decade Coordination Office

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

The Global Ocean Observing System GOOS

DCO – Ocean Observing

- **Progammes & Projects Overview**
- **Vision & Strategy**

Ocean Observing | Ocean Decade Coordination Office

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

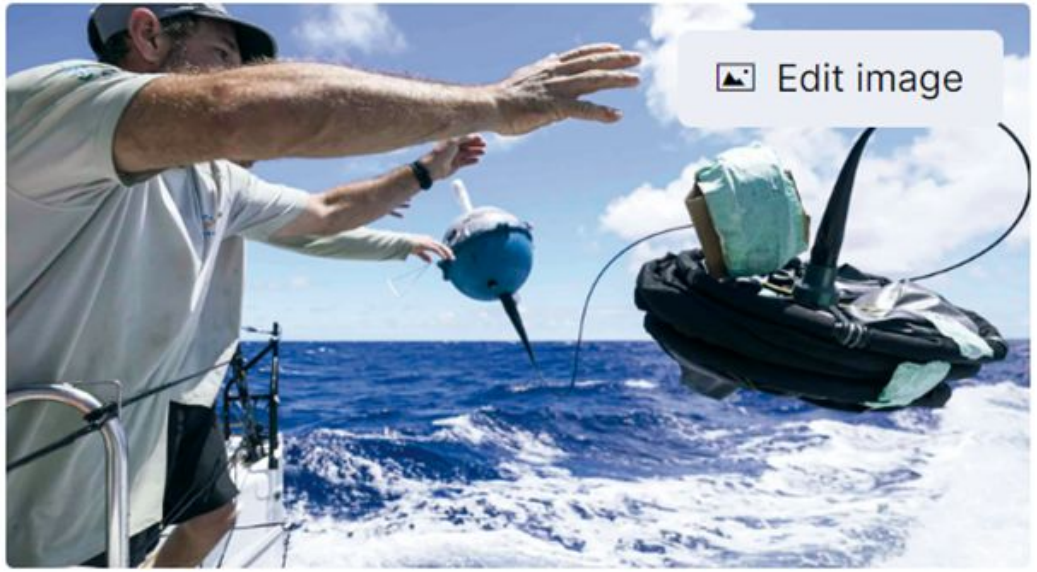
The Global Ocean Observing System GOOS

DCO – Ocean Observing

Progammes & Projects Overview

DCO – Ocean Observing

The Data Coordination Office (DCO) for Ocean Observing unites a community of 11 Programmes and 91 Projects working collaboratively with the GOOS (the Global Ocean Observing System) to expand, revolutionise and operationalize a truly inclusive ocean observing system, where both public and private sector entities collaborate to deliver tangible societal benefits.

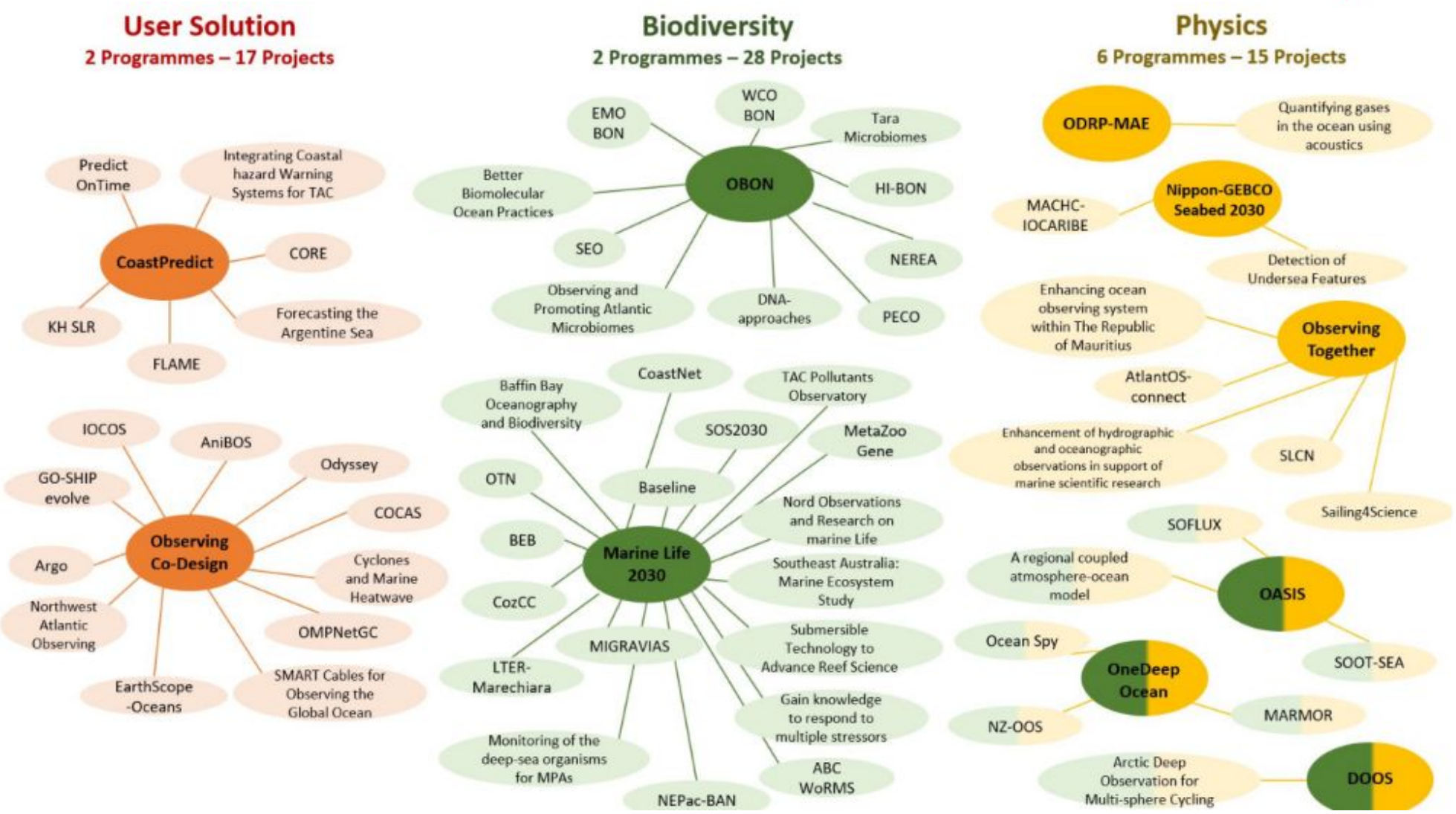


The DCO-Ocean Observing Programmes Group

11 OCEAN OBSERVING PROGRAMMES and 91 PROJECTS
(31% of Decade Actions)

Name	Description	Lead Institution
OneDeepOcean	Ocean network for **deep observation**	Ifremer, France
CoastPredict	Observing and predicting the **global coastal ocean**	Alma Mater Studiorum University of Bologna, Italy
Seabed 2030 Project	**Bathymetric** map of the entire ocean by 2030	Nippon Foundation-GEBCO, Monaco
ODRP-MAE	Research on the maritime **acoustic environment**	Interagency Working Group for Ocean Sound and Marine Life, US
Marine Life 2030	Global integrated **marine biodiversity information management and forecasting** system.	Marine Biodiversity Observation Network (MBON).
OBON	Ocean **biomolecular observing** network	POGO, US
OASIS	Observing **air-sea interactions** strategy	SCOR Working Group, US
DOOS	**Deep ocean** observing strategy	DOOS Working Group, US
Ocean Observing Co-Design	**Evolving ocean observing through co-design** to deliver the information nations need	GOOS, UNESCO IOC
Observing Together	Meeting stakeholder needs and **making every observation count**	GOOS, UNESCO IOC
Challenger 150	A decade to study **deep ocean sea life**	DOSI, UK

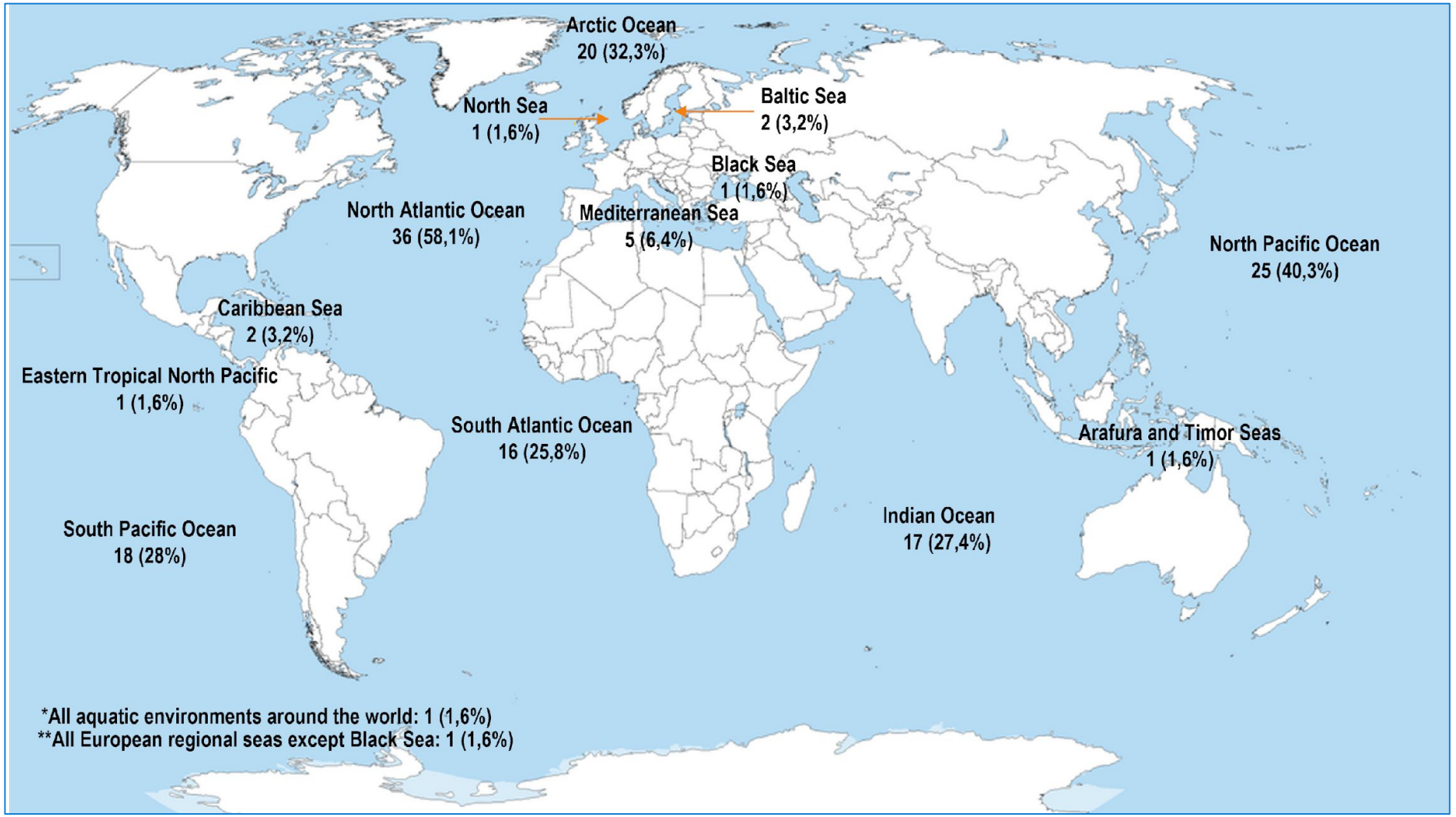
Programmes and affiliated Projects



Ocean Observing in the Decade

Ocean Decade Coordination Office
Ocean Observing

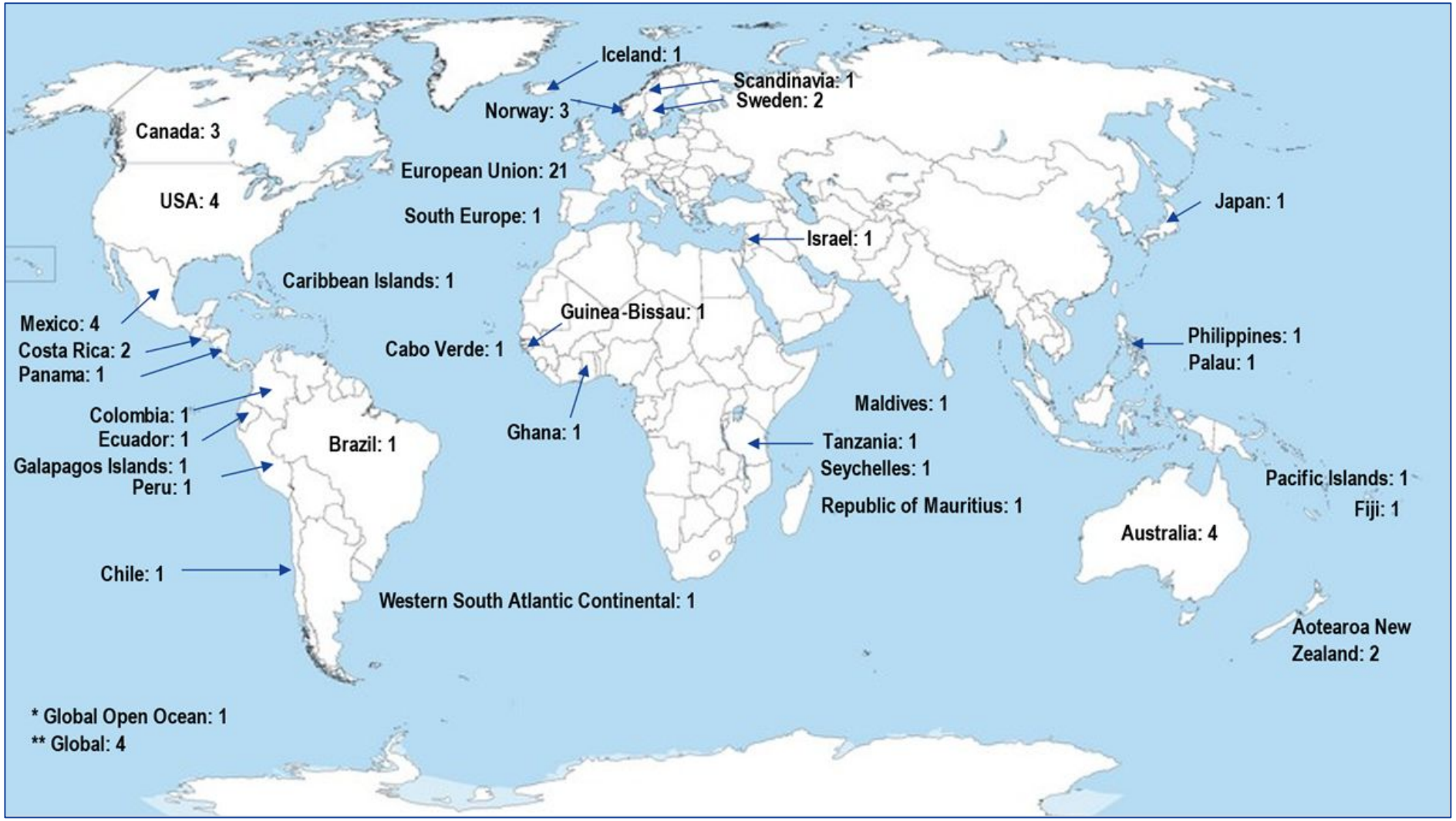
Project focus areas: Ocean Basins



Ocean Observing in the Decade

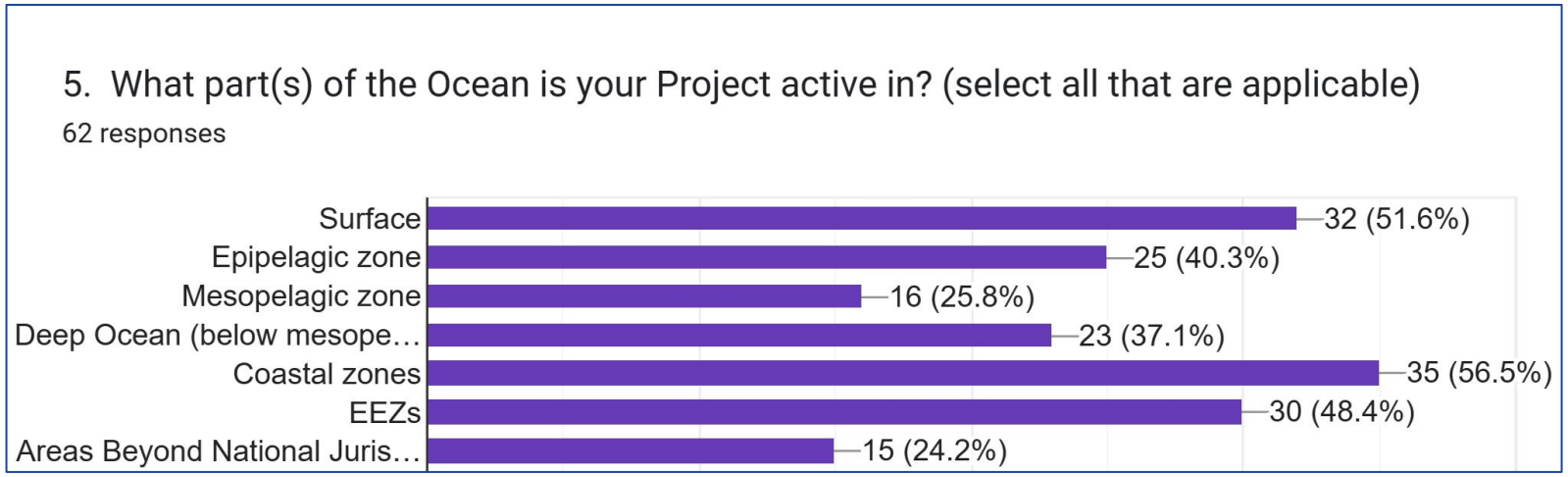
Ocean Decade Coordination Office
Ocean Observing

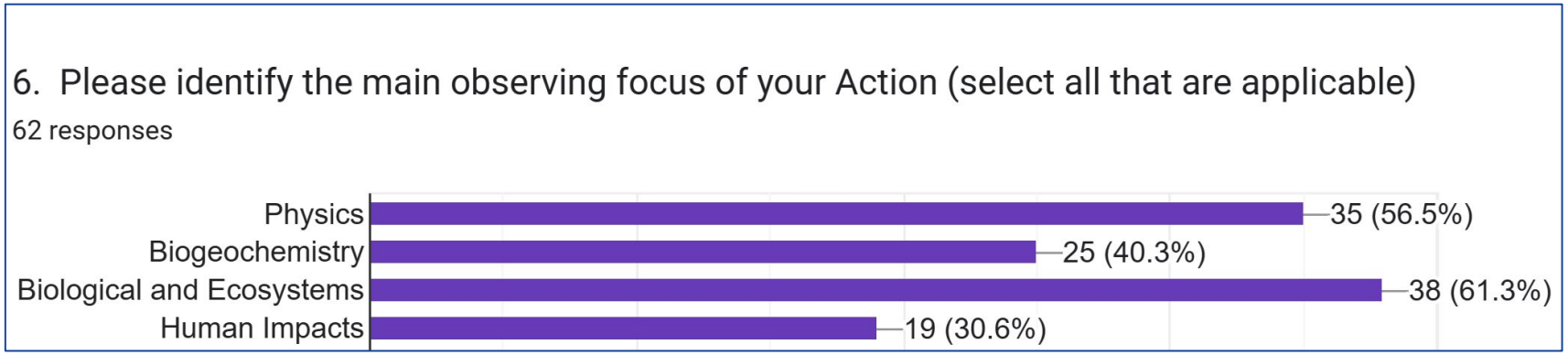
Project focus areas: EEZs



Ocean Observing in the Decade

Vertical Zones and EOVs



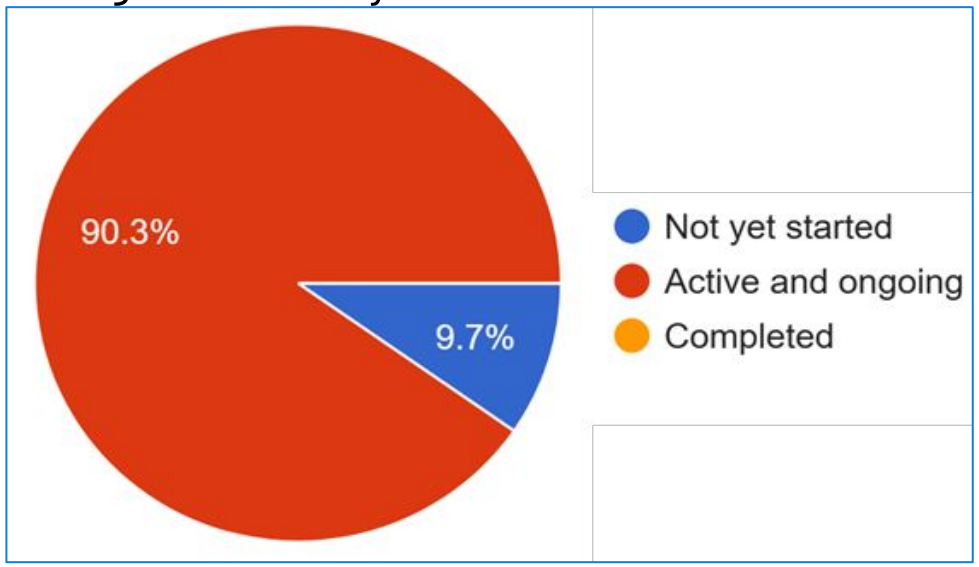


Ocean Observing in the Decade

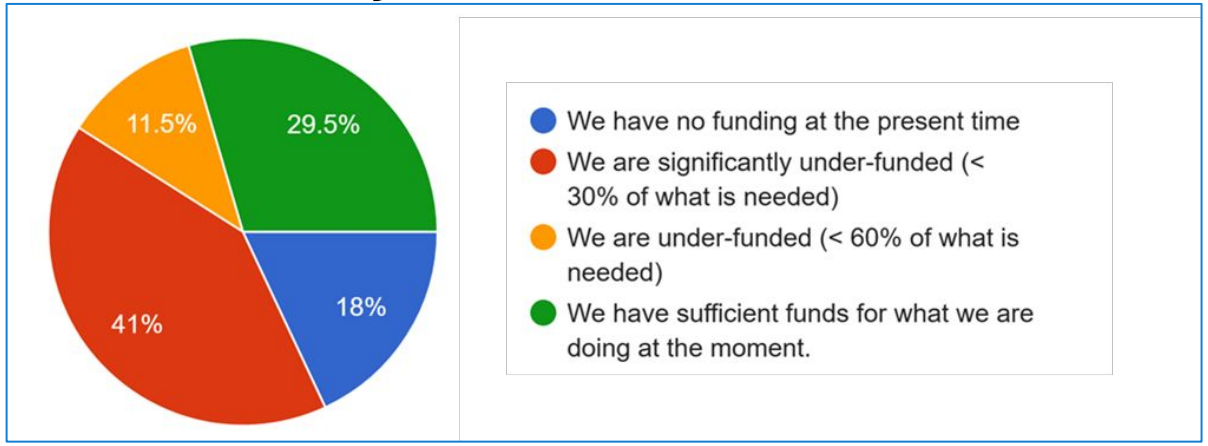
Ocean Decade Coordination Office
Ocean Observing

Project status: Stage of activity, Funding, Resources

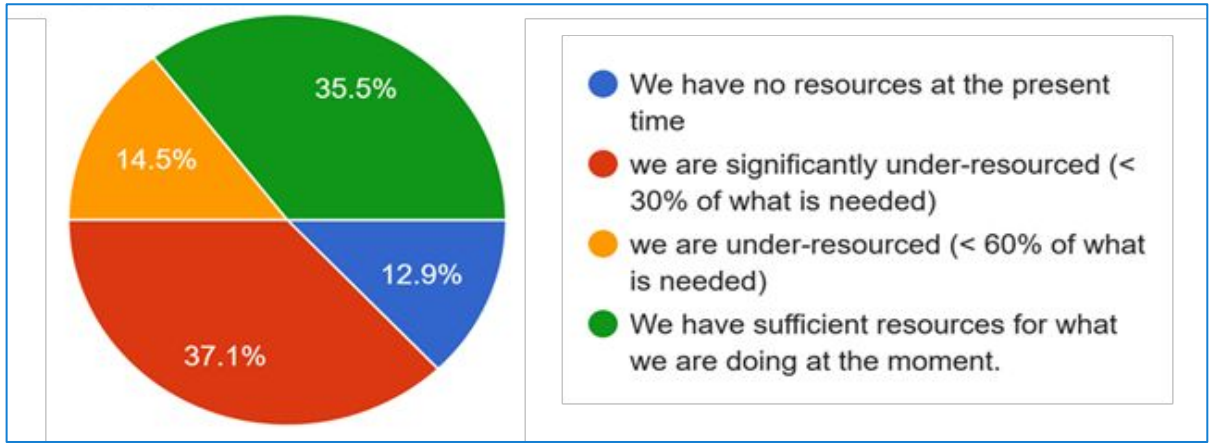
Stage of Activity



Level of Funding



Available Resources



Ocean Observing in the Decade

Comparison of Decade Challenge WGs defined needs vs. Project activity

Ocean Basins

- The North Atlantic and North Pacific oceans have the highest proportion of **active Projects** but is ranked **lowest in importance** for focus with the WGs.
- The Southern, Arctic and Indian oceans are ranked markedly **higher in importance** for focus by the WGs but have a **low to medium** proportion of the active Projects.

Area of desired impact

- Human Impacts **scores the highest** in indicated importance by the WGs. However, this is the **most weakly represented** in active Projects.
- Physics measurements is measured very **low in importance** with the WG but shares a **strong lead** in Project activity.
- Biological and Eco-systems ranks 2nd in importance from the WGs, and indeed **shares the lead** for current active from the Projects.

Vertical and Horizontal focus areas

- *Coastal zones*, followed by EEZs are ranked in that order by the WGs as having the highest importance for focus. This **matches** what the Projects indicate is currently underway.
- Surface waters are the highest focal interest for the WGs, **matching** the activity of the Projects. The activity in, and importance of, Mid-level and deep waters are generally **equally distributed**

Ocean Observing in the Decade

Comparison of Decade Challenge WGs defined needs vs. Project activity

Physics EOVs

- Sea surface and sub-surface temperature measurements are the **largest area** of activity with the Projects, followed by Sea surface and sub-surface salinity measurements.
- While these are considered of relatively high importance by the WGs, with the exception of surface temperature, they are **superseded in ranking** of highest importance by Sea state, Sea ice and Ocean surface heat flux.

Bio-Chemical EOVs

- The relative ranking of the importance of EOVs in the realm of Bio-chemistry by the WGs is nicely **matched** by the relative activity levels by the Projects.

Biological and Ecosystems EOVs

- There are two groupings of **highest interest** from the WGs:
  - Biomass (including Fish) distribution, and
  - Carbon Sink distribution (Mangroves, Seagrass, Macroalgal canopy coverage)

  Project activity on Biomass measurements is high but is **quite low** in the mapping of Carbon Sink environments.
- Mapping distributions of larger sea life is indicated to be of **lower priority** for the WGs but has a relatively **high Project activity** level.

Ocean Observing | Ocean Decade Coordination Office

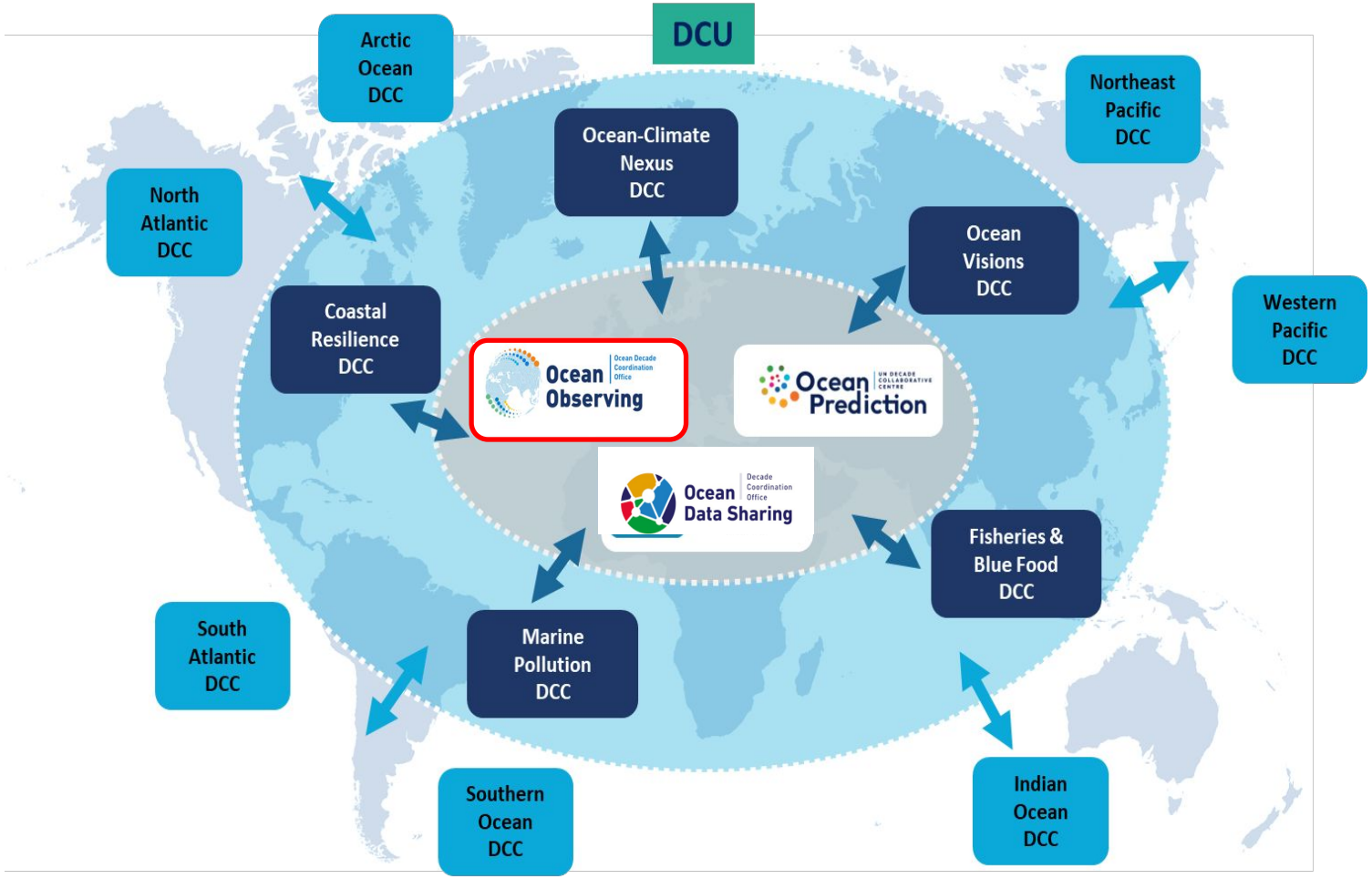
2021 2030 United Nations Decade of Ocean Science for Sustainable Development

The Global Ocean Observing System GOOS

DCO – Ocean Observing

Vision & Strategy

DCO – Ocean Observing within the Decade



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DCO – Ocean Observing Vision

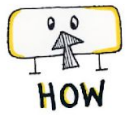
Institutional strategy:
Cohesive, coordinated and interoperable ocean observing systems; global, regional and national

Community Engagement:
Private sector and societal participants in the Blue Economy and a healthy Ocean

Sustained Ocean financing:
Innovative, long-term finance for a sustainable Global Ocean Observing system

Prioritization of societally relevant observing requirements: Geographic & Thematic.

Standardization around universally agreed EOVs, ECVs and measurement & data management best practice.



Capacity Development:
Ensure equitable access to observational data and technology for all stakeholders

Technology Development:
Autonomous & low-cost sensors. Complementary use of remotely sensed & in-situ data

Ocean Decade Coordination Office
Ocean Observing

A global ocean observing system responsive to the needs of end users; enabling a healthy, resilient ocean and sustainable blue economies.

END-USER APPLICATIONS

Ocean Prediction
UN Decade Collaborative Centre

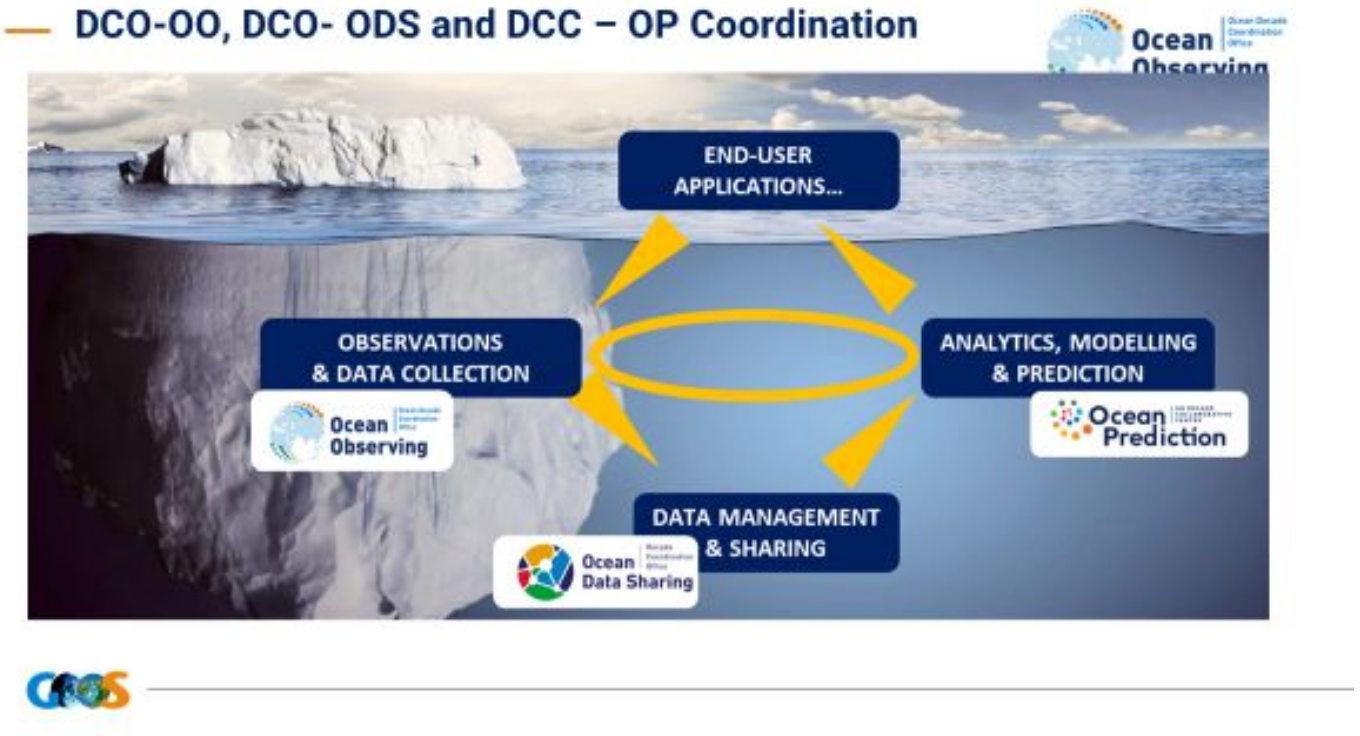
Ocean Data Sharing
Decade Coordination Office

DCO – Ocean Observing

Digital Ocean Data Eco-system

- The DCO – Ocean Observing will work jointly with the DCO – Ocean Data Sharing and the DCC – OceanPredict towards the implementation of a FAIR ocean data digital eco-system

  - ✔ Enable scientists to find and access data
  - ✔ Support for decision makers to make informed choices
  - ✔ Empower the “Blue Economy”



DCO – Ocean Observing

The Ocean Decade's Data & Information Strategy recognizes three key underpinning components that need to be well coordinated and interconnected to create a productive Digital Ecosystem:

- ❑ Observations and data collection,
- ❑ Data management and sharing, and
- ❑ Analytics modelling and prediction.

DCO – Ocean Observing

The Vision

A truly global ocean observing system

responsive to the needs of end users;

enabling a healthy, resilient ocean and

A sustainable Blue Economy.

DCO – Ocean Observing

What is needed

Prioritization of societally relevant observing requirements: Geographic & Thematic.

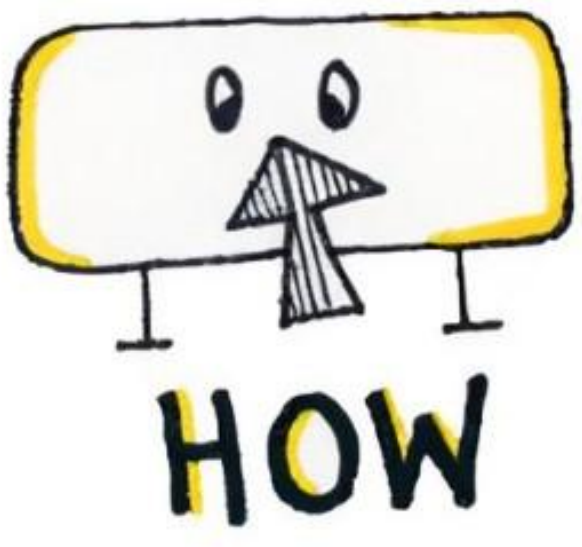
Standardization around universally agreed EOVs, ECVs and measurement & data management best practice.

Capacity Development: Ensure equitable access to observational data and technology for all stakeholders

Technology Development: Autonomous & low-cost sensors. Complementary use of remotely sensed & in-situ data

DCO – Ocean Observing

How we achieve this vision



Institutional strategy:

Cohesive, coordinated and interoperable ocean observing systems; global, regional and national

Community Engagement:

Private sector and societal participants in the Blue Economy and a healthy Ocean

Sustained Ocean financing:

Innovative, long-term finance for a sustainable Global Ocean Observing system

GOOS: At the heart of the Decade

Ocean Decade Coordination Office
Ocean Observing

GOOS | At the heart of the Ocean Decade

GOOS is the global home of ocean observing expertise.

Challenge 7: Expand the 'Global Ocean Observing System' aims to ensure a sustainable ocean observing system endures well past the year 2030.

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

Ocean Observing

Ocean Decade Coordination Office

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

The Global Ocean Observing System

GOOS

Discussion