The Global Ocean Observing System

GOOS Today: Building a fit-for-purpose global ocean observing system

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Global Ocean Observing System (GOOS)
Intergovernmental Oceanographic Commission of UNESCO

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The Ocean is key to pressing societal issues

Climate and weather

The ocean plays a huge role:

- 25% anthropogenic carbon / yr.
- extreme weather prediction
- 90% excess heat

At the same time, it is being affected by climate change.

Ocean health

Life in the ocean gives us the oxygen we breathe and the food we eat. Overfishing, climate change and pollution are putting biodiversity and food security at risk, and their impacts are critically under-observed.

Coastal communities

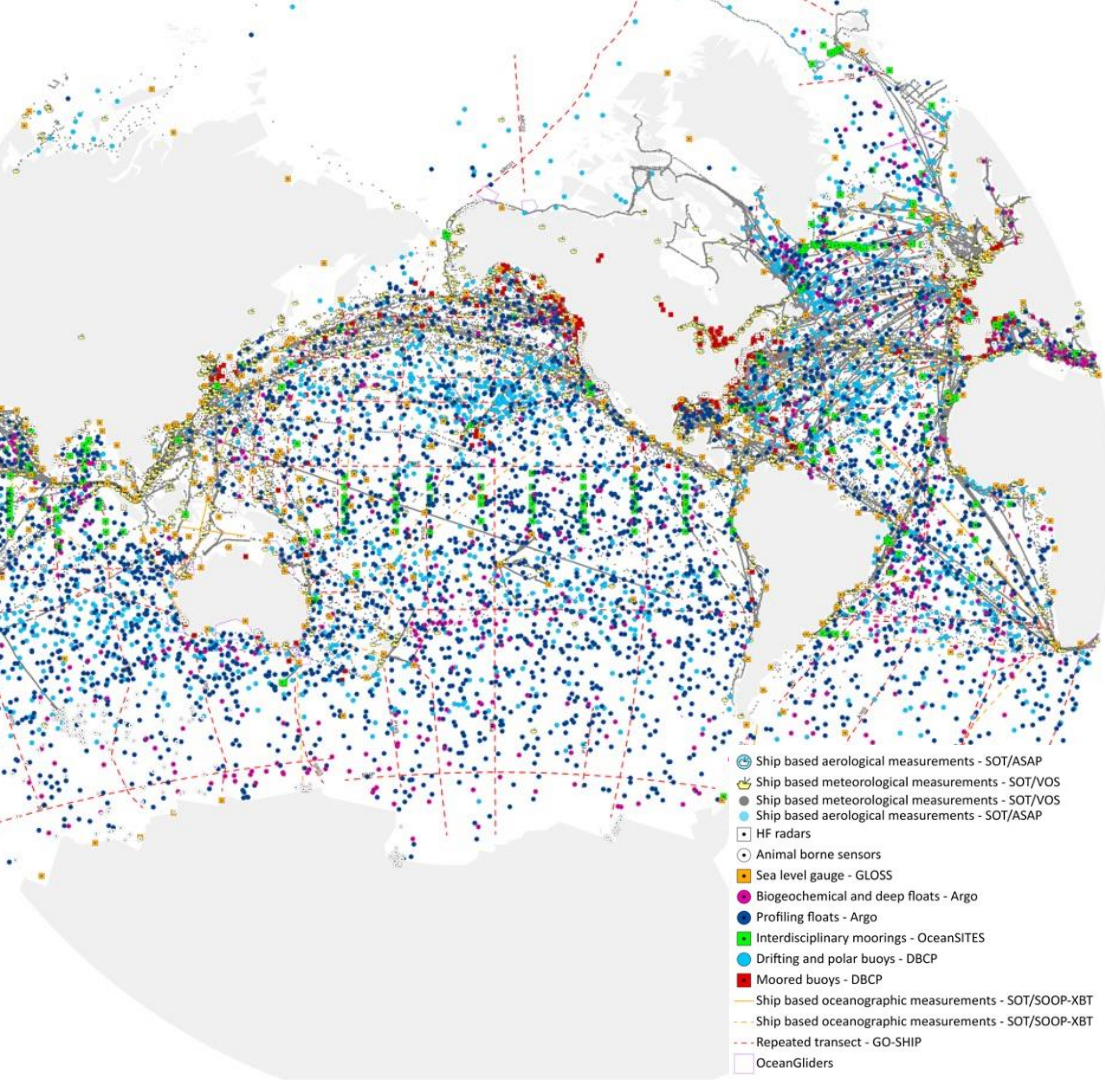
Coastal communities are in the front line facing threats posed by changing oceans. Communities in many less developed areas are particularly at risk from changing weather and ocean patterns, and increased disaster risk.

If we haven't got data underpinning our decisions, we might as well be guessing at solutions

The GOOS 2030 Strategy

Vision
A truly global ocean observing system that delivers the essential information needed for our sustainable development, safety, wellbeing and prosperity

Mission
To lead the ocean observing community and create the partnerships to grow an integrated, responsive and sustained observing system

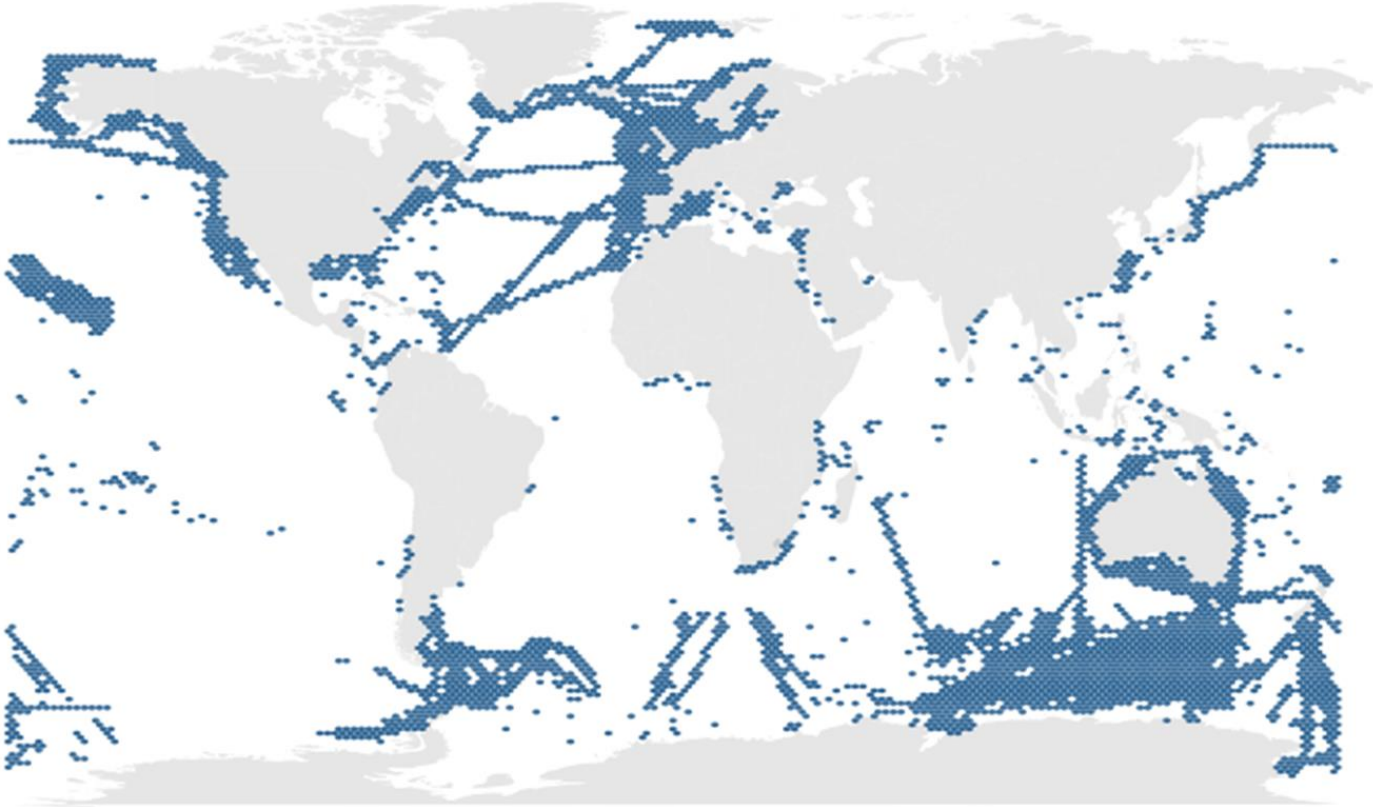


GOOS Today

- **84 countries, 8,700+ observing platforms, 13 global networks**
- **More than 100,000 observations per day - delivering an accessible, safe and productive ocean**

DBCP: ~2000 platform in operation
1518 drifter
416 moored buoy
41 tsunami buoy

"The weather forecasting systems will run off the rails if they don't have the surface pressure information over the ocean to constrain them" - Lars Peter Riishojgaard, Director of the Earth System Branch WMO



Satterthwaite et al. (2021) Frontiers in Marine Science - GOOS news

Biological & ecological observations

- 203 active, long-term programs that systematically sample BioEco EOVs
  …and more out there..
- Only 7% of the ocean surface has an *identified* active monitoring program
- Some of the biggest gaps are in areas of high biodiversity and high human pressure

Biology and Ecosystems Panel

GOOS Core Coordination

GOOS Steering Committee

Expert Panels

Ocean Observation Physics and Climate Panel (OOPC)

Biology and Ecosystem Panel (BioEco)

Biogeochemical Panel (IOCCP/BGC)

Observing

Observations Coordinating Group (OCG)

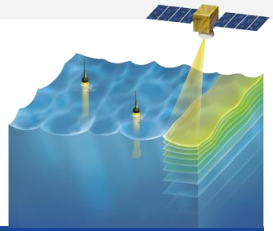
Global Regional Alliances (GRA)

OceanOPS

GOOS National Focal Points

Projects (TPOS, DOOS, OBPS, AtlantOS)

ETOOFS



Prediction

Expert Team on Operational Ocean Forecast Systems (ETOOFS)

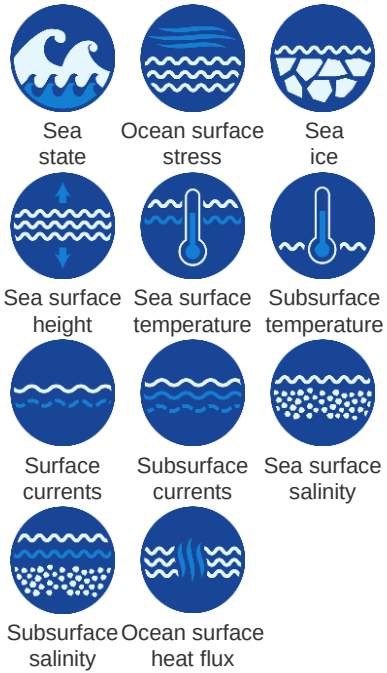
In-situ observing network status

GOOS *in situ* networks [1]	Implementation STATUS [2]	Data & metadata REAL TIME [3]	Data & metadata ARCHIVED DELAYED MODE [4]	Data & metadata META-DATA [5]	Best practices [6]	GOOS delivery areas [7] OPERATIONAL SERVICES	GOOS delivery areas [7] CLIMATE	GOOS delivery areas [7] OCEAN HEALTH
Ship based meteorological - SOT	★★☆	★★☆	★★☆	★★☆	★★☆	✓	✓	
Ship based oceanographic - SOT	★★☆	★★½	★★★	★½☆	★★☆	✓	✓	
Repeated transects - GO-SHIP	★★½	Not applicable	★★★	★☆☆	★★★		✓	✓
Sea level gauges - GLOSS	★★½	★★☆	★★★	★☆☆	★★☆	✓	✓	
Time series sites - OceanSITES	★★☆	Not applicable	★★½	★★☆	★★☆		✓	✓
Moored buoys - DBCP	★★½	★★★	★★★	★★☆	★★½	✓	✓	✓
Tsunami buoys - DBCP	★★☆	★★★	★★★	★☆☆	★★★	✓		
HF radars	★½☆ Emerging	★½☆	★☆☆	★☆☆	★★★	✓	✓	
Drifting buoys - DBCP	★★★	★★½	★★½	★½☆	★★★	✓	✓	
Profiling floats - Argo	★★★	★★★	★★★	★★★	★★☆	✓	✓	
Deep & biogeochemistry floats - Argo	★☆☆ Emerging	★★½	★★½	★★★	★★☆	✓	✓	✓
OceanGliders	½☆☆ Emerging	★★☆	★☆☆	★½☆	★★☆	✓	✓	✓
Animal borne sensors - AniBOS	½☆☆ Emerging	★☆☆	★★☆	½☆☆	★★☆	✓	✓	✓

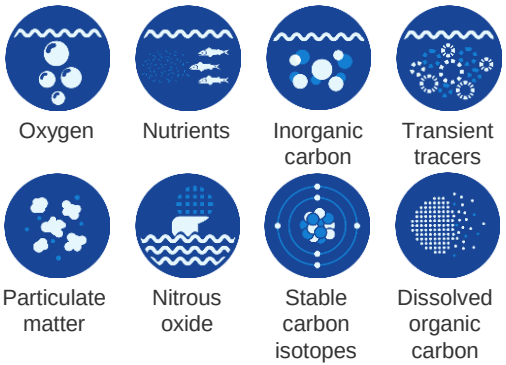
Observations Coordination Group

34 Essential Ocean Variables (EOVs)

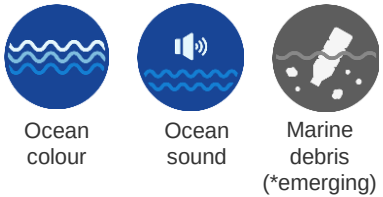
Physics



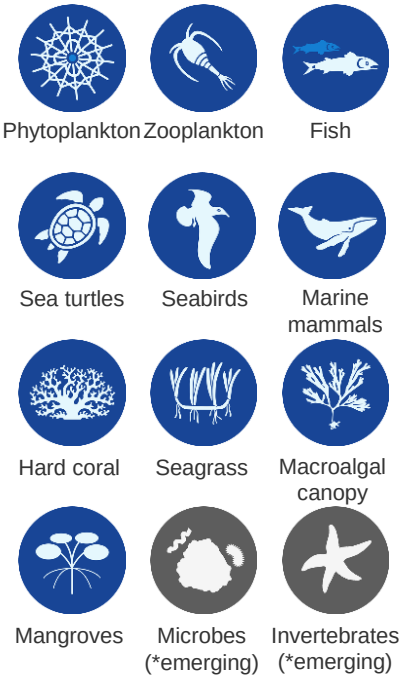
Biogeochemistry



Cross-disciplinary



Biology & ecosystems



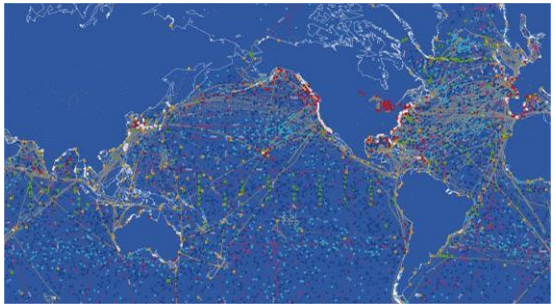
We face key challenges in expanding observations and enhancing fit for purpose of our system

Need a step change…

To help achieve the Global Ocean Observing System 2030 Strategy and the Ocean Decade outcomes, GOOS has launched 3 integrated programmes that will be foundational building blocks for the Ocean Decade.

- CO-DESIGN
- COASTAL OCEAN
- CAPACITY DEVELOPMENT

GOOS and the Ocean Decade



Ocean Observing Co-Design

by The Global Ocean Observing System

Ocean Observing Co-Design will transform our **ocean observing system assessment and design processes.**

CoastPredict

with The Global Ocean Observing System

CoastPredict will revolutionise **Global Coastal Ocean observing and forecasting**.

Observing Together

by The Global Ocean Observing System

Observing Together will **meet stakeholder needs** and make every observation count through **enhanced support to both new and existing community-scale projects.**

Ocean Observing Co-Design

by The Global Ocean Observing System

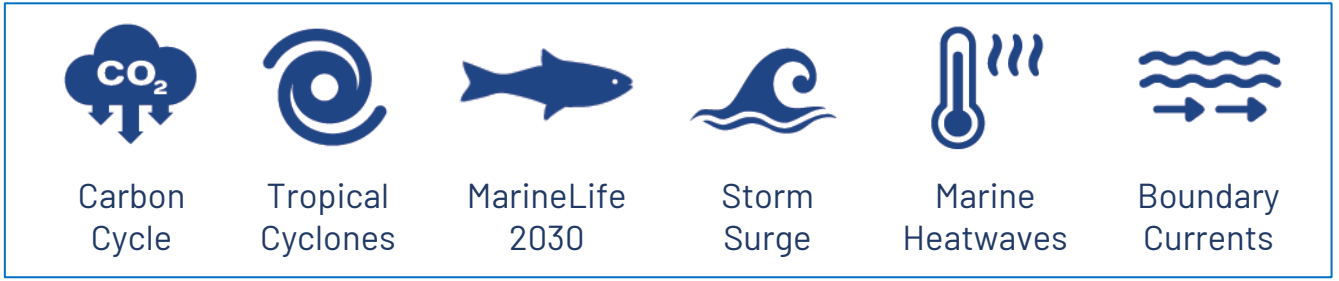
Transforming our ocean observing system assessment and design process

Ocean Observing Co-Design will build a system co-designed with scientific experts in observations and forecasts, and with key user stakeholders.

First steps: develop process and system capability through co-design 'exemplar' projects

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

EXEMPLAR PROJECTS



Develop best practices

Implement recommendations as part of GOOS infrastructure tools that track, evaluate, and communicate recommendations

First Co-Design Exemplar

- Address key ga
  manner observi
  - users
- More accessible
  information, ser
- A fit for purpose
  observing syste
- Inform investme
  governments
- System diagnos
  capability and ir

ving marine resources
s and establishing

d natural resources.

versity and economies
ent, tourism, climate and

ected Area management,
ing and weather forecasts.

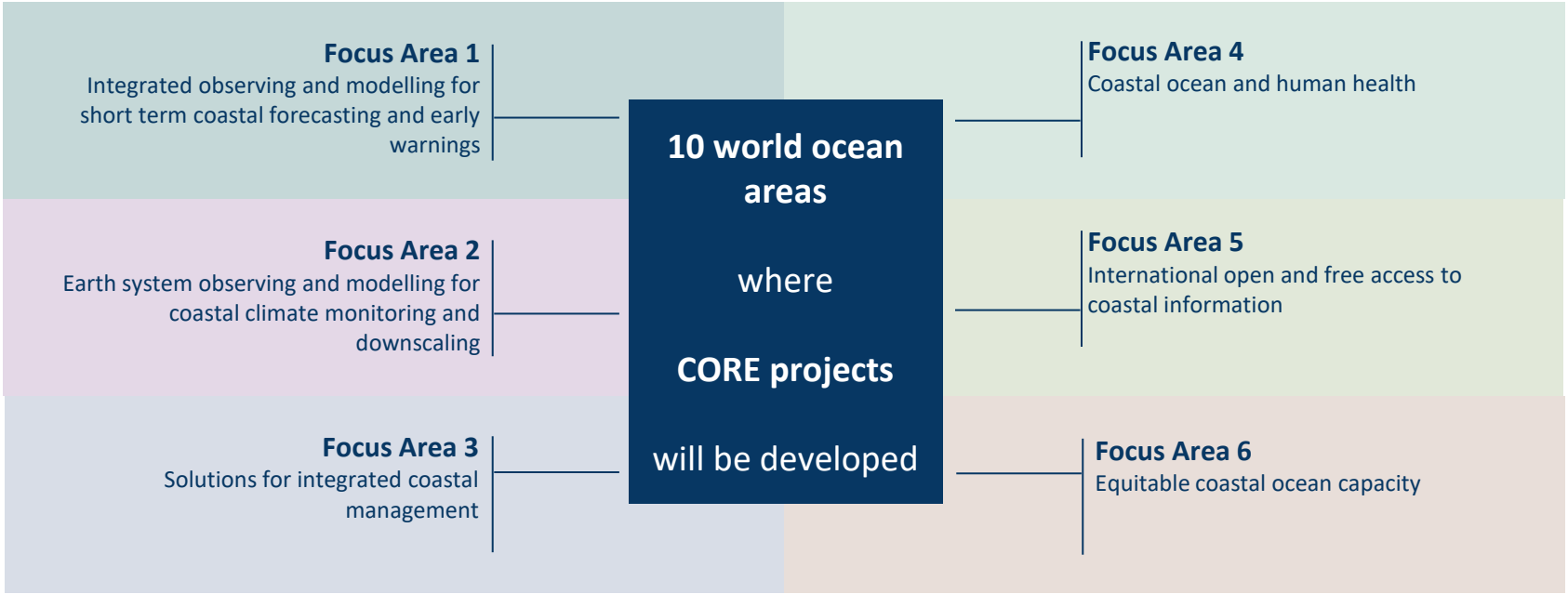
NATIONAL OBSERVING SYSTEMS DEVELOPMENT

- **Enhancing ocean observing system within the Republic of Mauritius**
- **Enhancement of hydrographic and oceanographic observations in the Kingdom of Morocco**

- developing and enhancing national systems to advance ocean knowledge and forecasting
- strengthen capacity in terms of platforms and network development
- develop modelling capabilities
- benefit from and adhere to best practices
- contribute to the regional programmes of African / Indian Ocean regions

Photo by Guillaume Baudusseau on Unsplash

Focus areas and initial projects

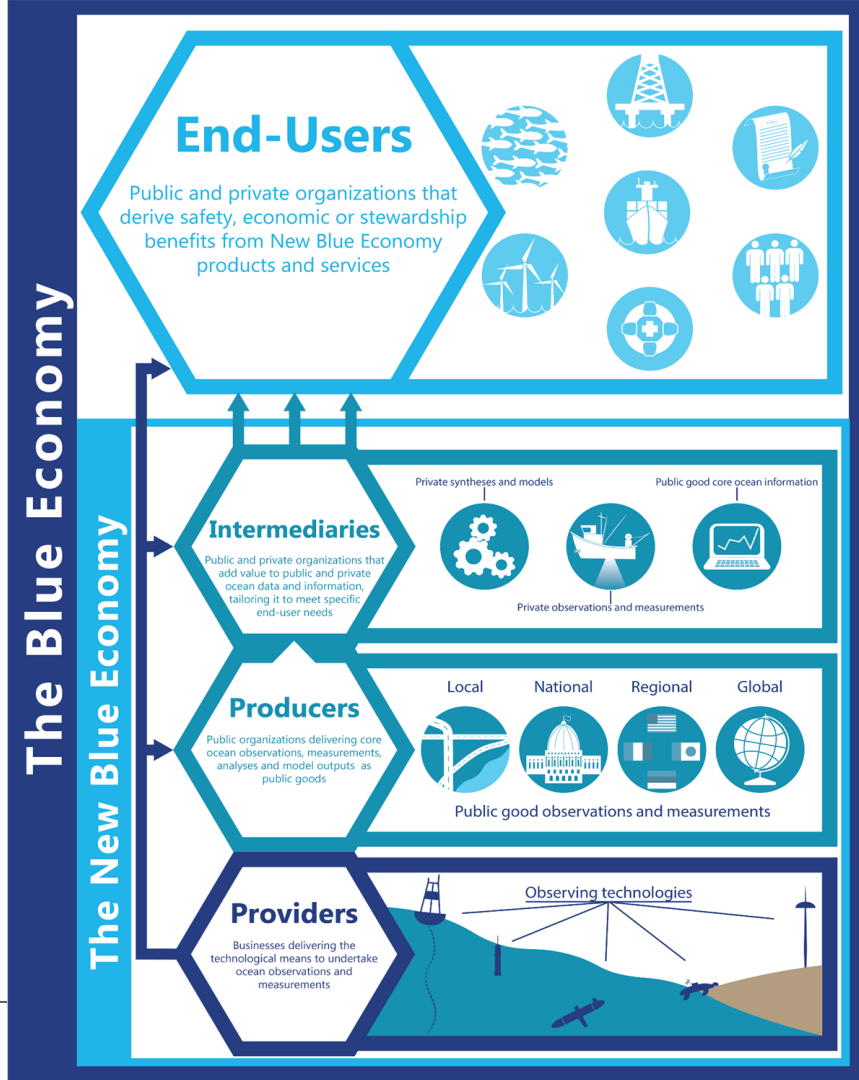


Partners already submitted **30** contributing projects.
3 Core Projects are endorsed

Advocating for ocean observing…

The New Blue Economy

- **GOOS/MTS Industry Dialogues** - Facilitate dialogue between government, science and industry across the value chain
- Lower barriers and increase opportunity for private sector engagement and partnership
- Opportunity to expand observing capacity, increase efficiency, and to support blue economy, through public and private sector actors
- Sessions run from Sep 2022 – Feb 2023 - recommendations for GOOS, government, and industry



Source: NOAA, 2021. The Ocean Enterprise 2015-2020

THE LAW OF THE SEA

+ BBNJ

Convention on Biological Diversity

GPA Global Programme of Action for the Protection of the Marine Environment from Land-based Activities

UNEP Regional Seas

United Nations Educational, Scientific and Cultural Organization

The Protection of the Underwater Cultural Heritage

New: ILBI on Plastic Pollution 2024

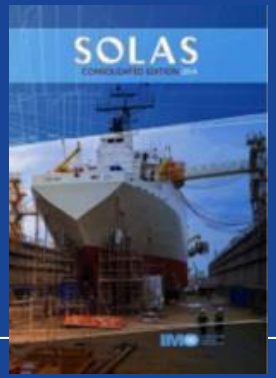
Sendai Framework for Disaster Risk Reduction

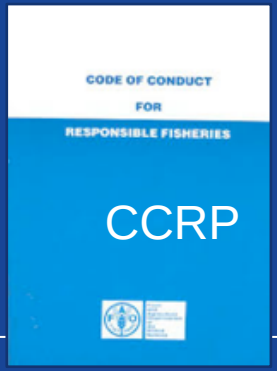
2015 - 2030

ISLAND VOICES GLOBAL CHOICES

UN Conference on Small Island Developing States

SAMOA PATHWAY






Ocean observing: an opportunity to address climate change and economic sustainability.
The time to act is now.

The Global Ocean Observing System

Thank you

goosocean.org

unesco Intergovernmental Oceanographic Commission

WORLD METEOROLOGICAL ORGANIZATION

UN environment programme

International Science Council