



The Global Ocean Observing System

Advancing the Global Ocean Observing System with GOMO

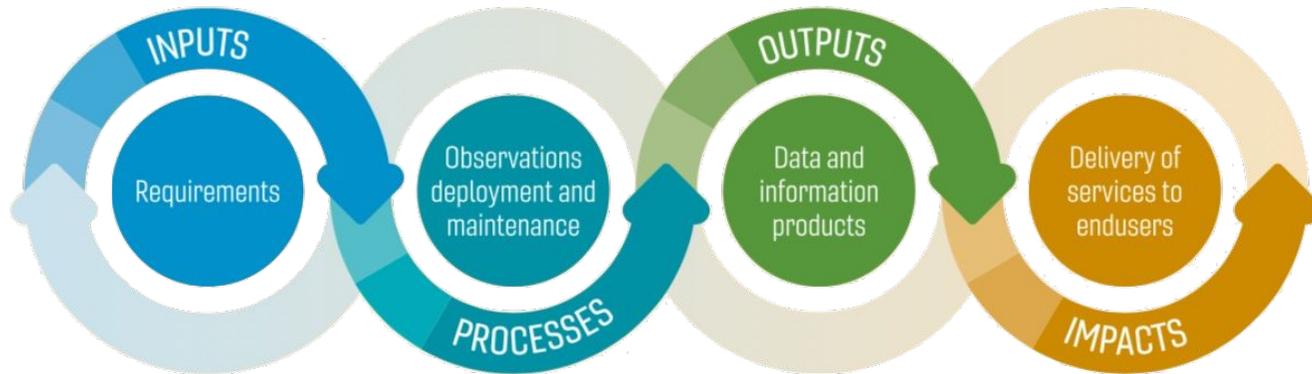
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Act. Office Director Global Ocean Observing System (GOOS)

Intergovernmental Oceanographic Commission of UNESCO

The Global Ocean Observing System (GOOS) coordinates a long-term, sustained ocean observing system



The Global Ocean Observing System

2030 Strategy



Vision of GOOS ~AirBNB between the communities (COMMS)



Ocean as critical buffer for climate change:

The ocean controls

100x

Heat of atmosphere

50x

Carbon of atmosphere

At the heart of important societal challenges



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**

Ocean data create opportunity

- Enable coastal communities to flourish
- Underpin sustainable development – flexible, data-based management of our ocean resource
- Stable growth of blue economies



Urgently need a step-change in Ocean Observation

GOOS is the Heart of the Ocean Decade

Ocean Co-design – designing observations

Coast Predict – High seas to coastal communities

Observing Together – Capacity Building

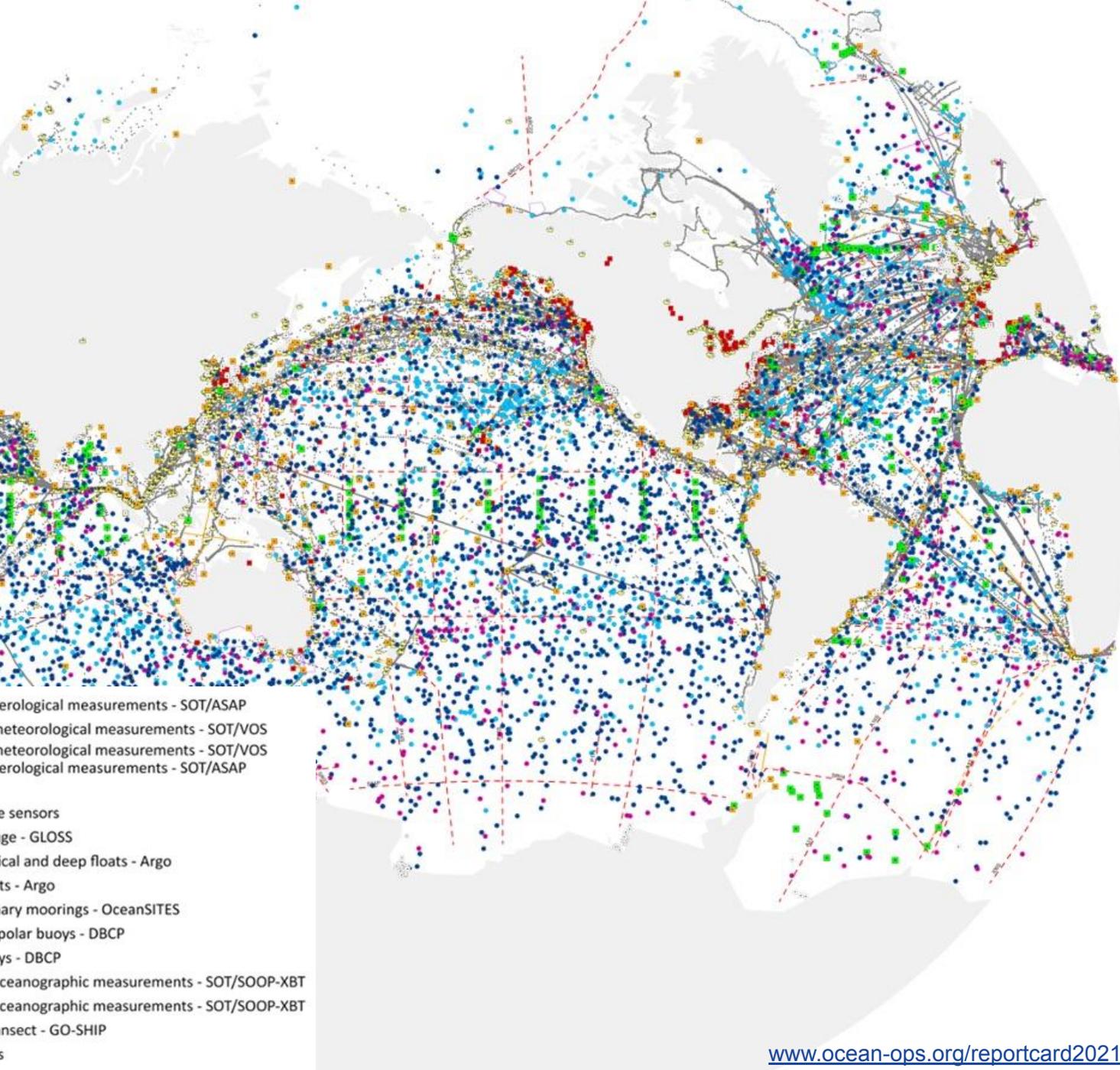
Ocean observations = linked to Challenge 7 in Ocean Decade

Co-ordination Centre for Ocean Decade = GOOS



We face critical gaps that will hinder nations ability to cope with climate change and other stressors

Partnership is vital... need work together on a step change...



GOOS today

- **Mature global system**
- **Delivering data** for climate services, weather and hazard warnings and ocean health
- **Supporting** Essential ocean and climate variables

“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

GOMO support is critical

- US invests approx. \$80 - \$100 million per year in situ observing ocean observations – approx.
- 55% of the operational ocean observing platforms, in and beyond national jurisdiction
- Provide leadership, resource, and funding in key areas
- Actively contributes to the GOOS Steering Committee
- GOMO provides stability (long-term view) and supports innovation



Opportunity to expand observing capacity, increase efficiency, and to support blue economy



1. Observation Coordination – global networks

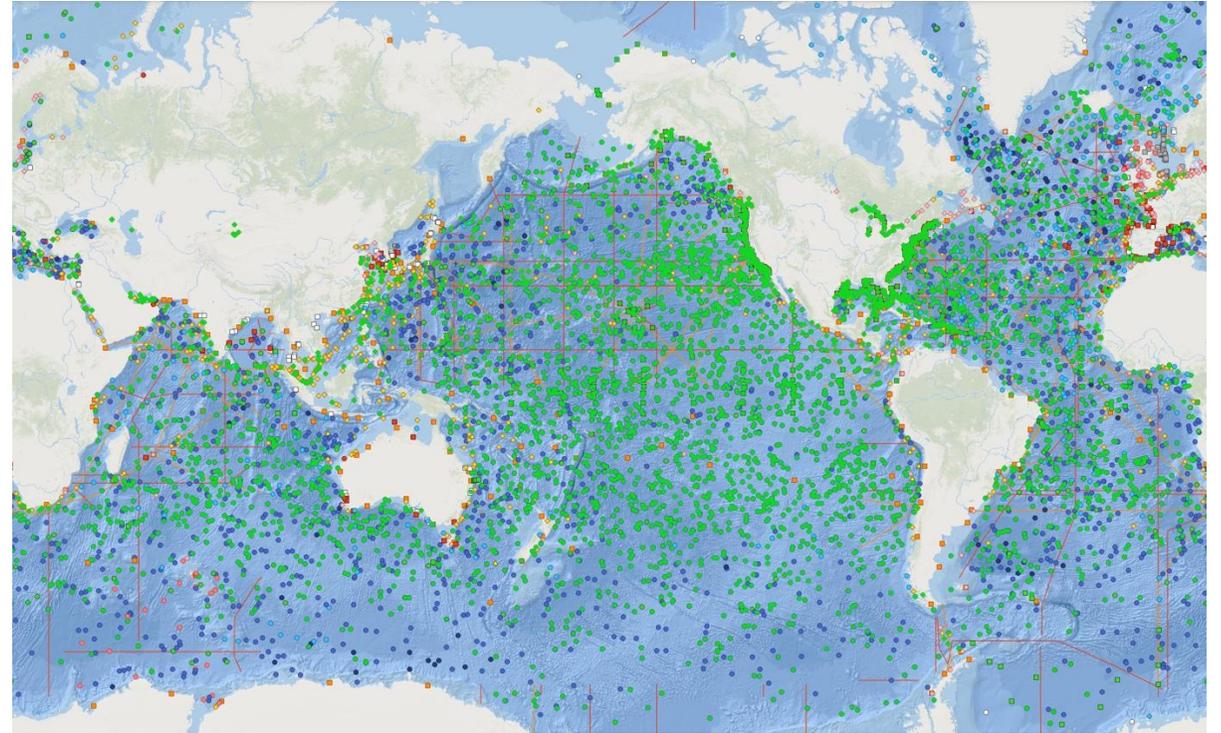
OCG does...

People:

- NOAA leadership for the Observation Coordination Group – a key component of GOOS, coordinating across the 12 global observing networks
- Coordinating staff support

Networks (table - % and people)

- Argo Programme 55%, BGC Argo 37%, Deep Argo 53%
- Tropical Moored Array 100 %
- DBCP Global Drifter Array 78%
- DBCP moored bouys (national, polar, tsunami meters) 65 %
- Voluntery Observing Ships (VOS) 50%
- GOSHIP ~35 %
- OceanGliders 45%
- NOAA and other USA institutes provide leadership for the following global ocean observing networks; Argo, Voluntary Observing Ships (VOS), GLOSS, Argo, OceanSITES, GO-SHIP, HF Radar.



The US contribution across the 12 global ocean observing networks (USA contribution in green) approximately 55% of the operational ocean observing platforms in total
Map courtesy of OceanOPS.

1. Observation Coordination – OceanOPS

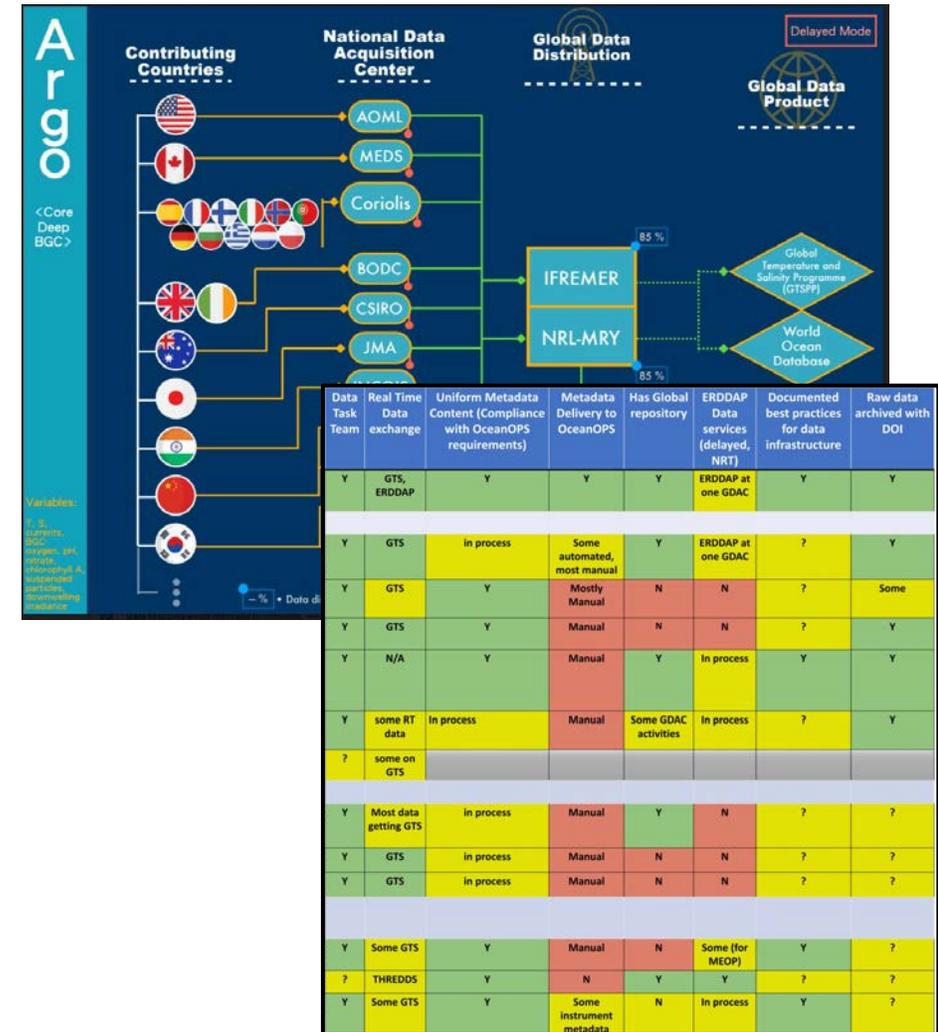
- OceanOPS is,
- It provides vital services to GOOS, data management systems and the OCG/global networks is tracking, visualising the system, metadata quality and flow and quality

- % budget
- Argo Technical coordinator



OCG Data and Metadata

- Aims/scope - improve FAIR compliance of data systems for the part of data flow that is undertaken by the
- GOMO leadership - Observations Coordination Group (OCG) Vice Chair for Data Management - improving structure, flow, standards
- Mapping the data flows of the global networks – gaps (support), efficiency, Identify gaps and opportunities to
- Data implementation plan development; requirements to reduce friction on flow data and metadata, fit for future – harvestable endpoints for a federated system
- Participate in Integration with International Oceanographic Data Exchange (IODE) and World Meteorological Organization (WMO) data policy and strategy development – e.g. new WMO Unified Data Policy, ODIS, WMO Wis 2.0
- Innovated - Open Access to the GTS (see recorded presentation – adopted by WMO (WIS 2.0 Pilot)
- Ad hoc resource to mature networks data flow st up ERDDAP servers, BUFFR templates



Innovation 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

Support: Leadership, coordination personnel



Ocean Observing Co-Design

by The Global Ocean Observing System



2021
2030
United Nations Decade
of Ocean Science
for Sustainable Development



We will have tools in place that allow
sponsors to ask key questions about cost
and benefit and receive clear answers.

Innovation WITH Industry

- INDUSTRY DIALOGUES
- Facilitate dialogue between government, science and industry across the value chain
- Lower barriers and increase opportunity for private sector engagement and partnership
- Recommendations for GOOS, government, science, and industry to act on
- 4 Sessions: Sep 2022 – Feb 2023

Support: SeaGrant fellow 50% 6 months, senior management commitment and to connection



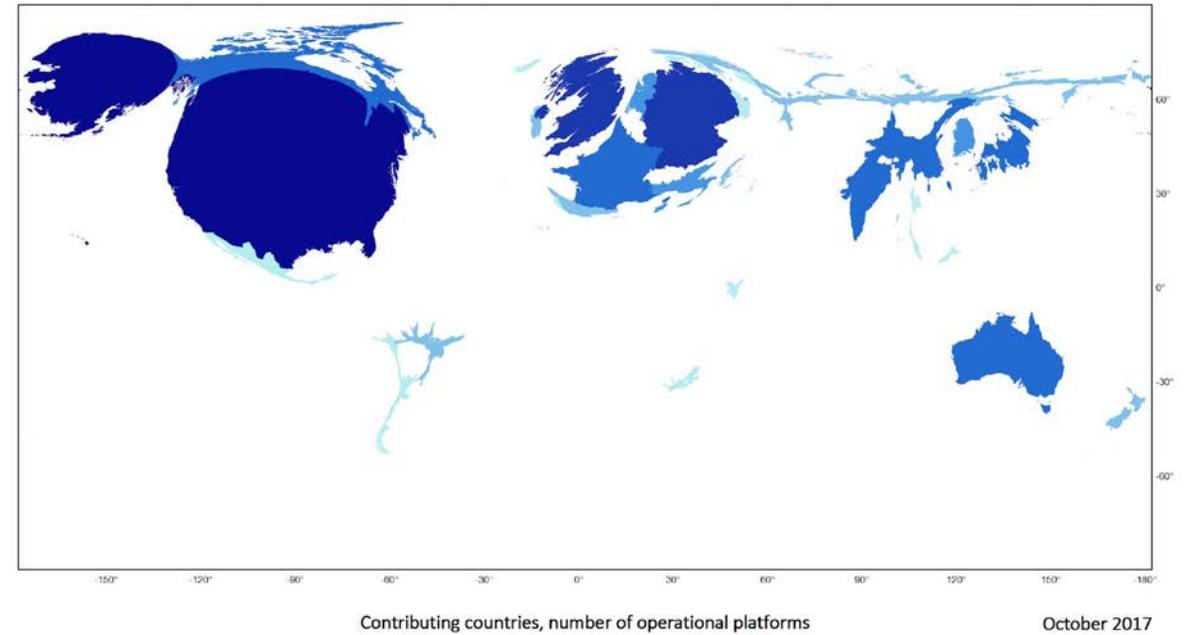
Opportunity runs deep™



*Expanding observing capacity,
increasing efficiency, and growing the
the NEW BLUE Economy*

Emerging systems

- Juliet comments
- Support: no direct program – willingness to engage for the global good.



Platform number 1 - 10 11 - 50 51 - 100 101 - 500 501 - 1000 1001 - 3820



Generated by www.jcommops.org, 20/10/2017

GOOS

86 countries supporting global networks

57 National Focal Points/committees

13 Regional Alliances (+emerging)

7 Components

3 Decade Programmes

5 System Projects

Funding sustainability networks	Ocean	Meteo
Solved today, no problems foreseen in the future	28%	68%
Solved today, but problems foreseen in 2-3 years	52%	27%
No funding today, but plans for funding in the near future is under	7%	3%
No funding today and no plans for funding in the near future way	9%	2%



GOOS CORE Coordination Support



Expert Panels

OOPC
BGC
BioEco



Observing

OCG
GRAS
Projects



Prediction

ETOOFS...?

Future



Maintain system support >> operational

Current investment critical to maintain – beware death by 1000 small cuts – detected now

Move to longer time horizon funding for sustained system – operational targets

Support infrastructure development towards fit-for-purpose sustained responsive and operational system – identify and actively to co-support (with other nations) operational components – use NOAA expertise to improve

- OceanOPS – tracking implementation and delivery
- Ocean Best Practices System – harmonization and efficiency
- Data flow – critical role ocean observing getting high quality data and metadata to harvestable end points

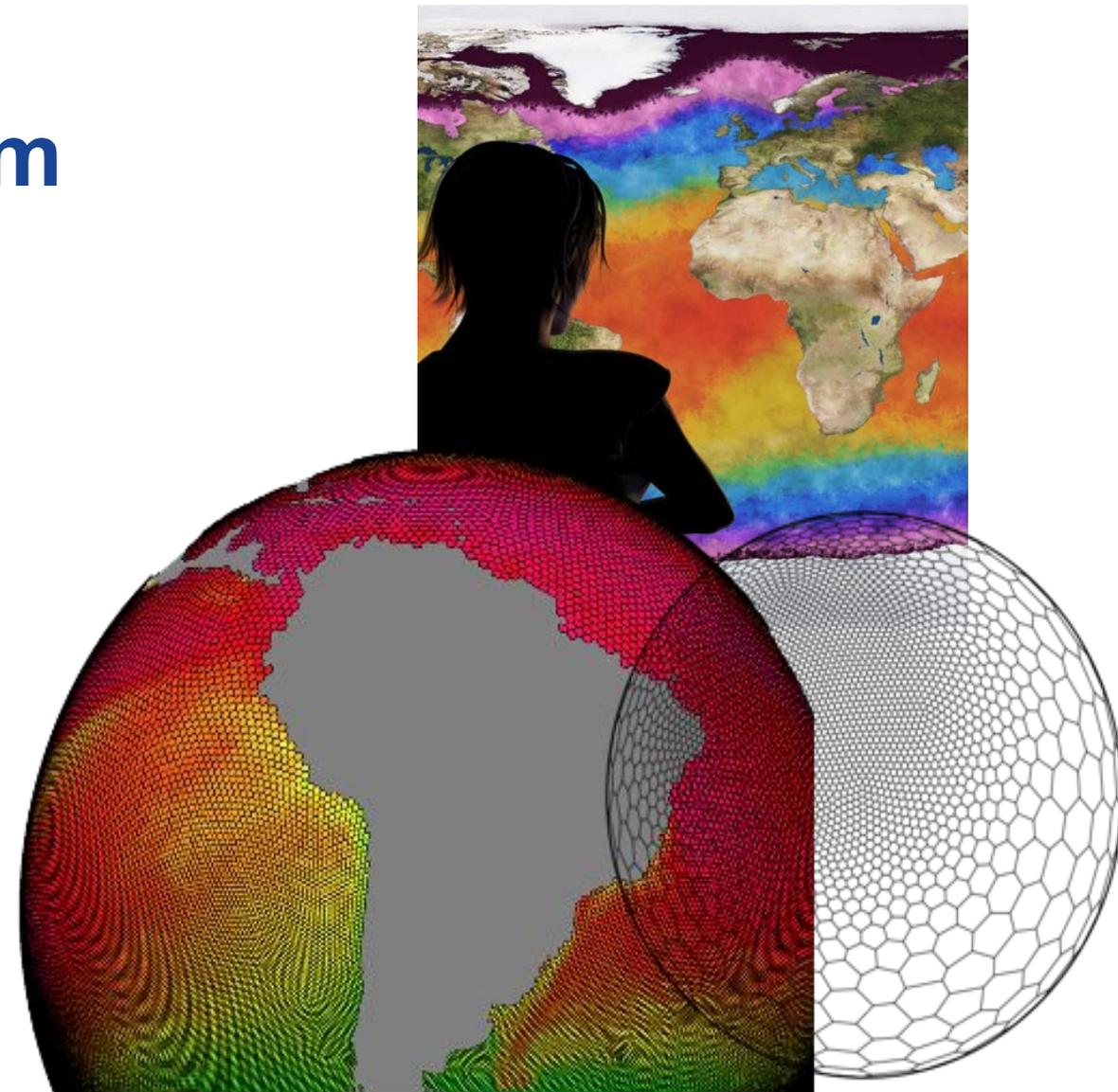


Co-Design to lift the system

Address key gaps in an integrated manner - spanning modelling/observing satellite and in-situ/services/users

Build on existing efforts and lessons learnt

- **Ocean carbon:** national policy, assessing carbon storage
- **Marine heatwaves:** aquaculture, fisheries
- **Tropical cyclones:** national forecasting agencies
- **Storm surge:** coastal managers, industries, communities
- **Boundary currents:** transport, fisheries, forecasts
- **Marine life:** local fisheries, regional management, global assessment



First co-design exemplar proposals Sept 2022

Communicate/advocate - benefit and urgency

Work with GOOS – amplify messages

Advocate across government

Use economic tools being developed to aid regional decision making

Support advocacy to philanthropic sector (large in US)

Evolve a GOOS national committee – under GOMO? - give it mandate to connect national elements (industry, government sectors) and give feedback to GOOS



Invest in coordination – global

Secondments

Leadership

Re-join UNESCO – investment currently via WMO – support to core weak.

Active role in evolving GOOS governance to support operational fit for purpose system with an expanded delivery role

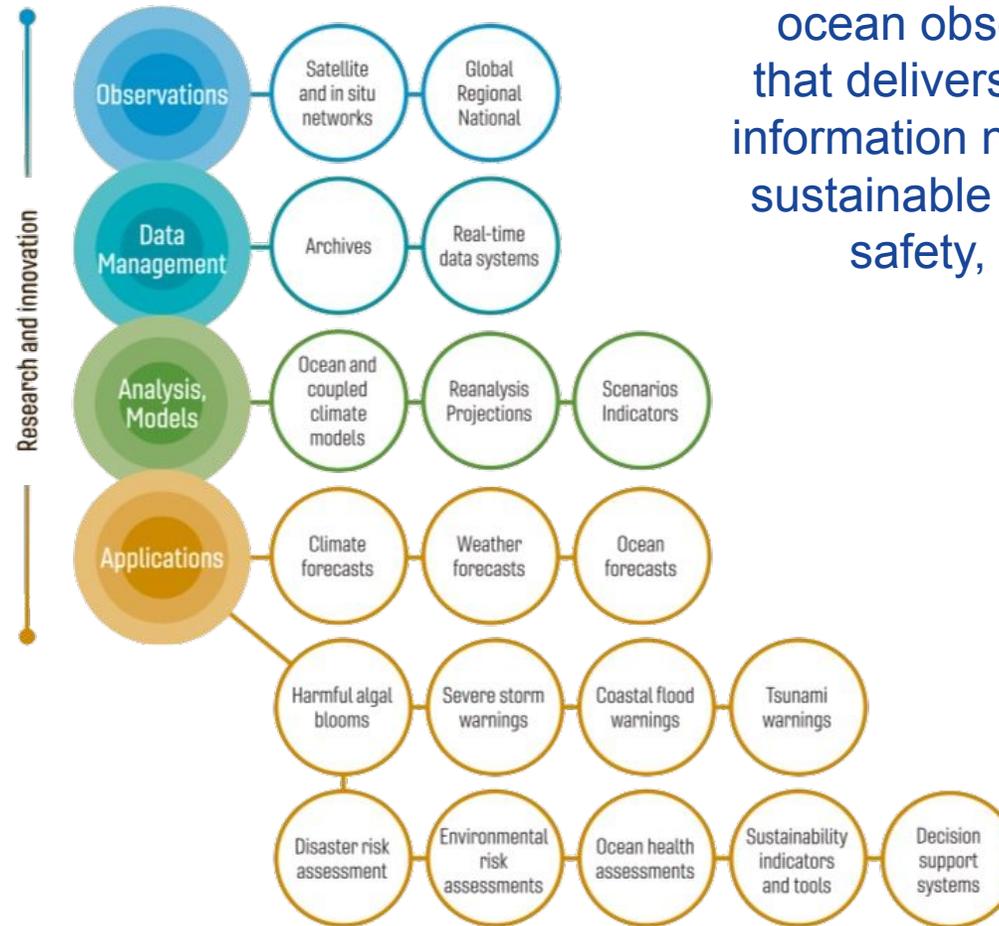


The Global Ocean Observing System

2030 Strategy

Underpinning a wide range of applications

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





The Global Ocean Observing System

Thank you

goosocean.org



unesco
Intergovernmental
Oceanographic
Commission



WORLD
METEOROLOGICAL
ORGANIZATION



UN
environment
programme

International
Science Council

