The Global Ocean Observing System

Regional needs and the GOOS Ocean Decade Programmes

Emma Heslop, Acting Director of the Global Ocean Observing System

International Marine Science Conference on IOCARIBE-GOOS
May 8th, 2023

Ocean data creates opportunities

Climate and weather

Ocean health

Coastal communities

Enabling coastal communities to evolve and flourish

Supporting blue economic growth

Underpinning sustainable development

34 Essential Ocean Variables (EOVs)

Physics

E.g. Sea surface temperature

Biogeochemistry

E.g. Dissolved oxygen

Biology & ecosystems

E.g. Zooplankton

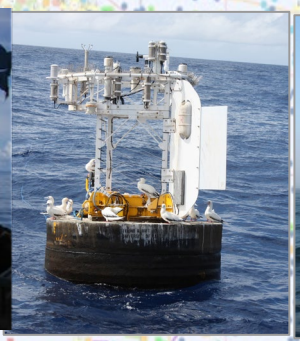
Cross-disciplinary

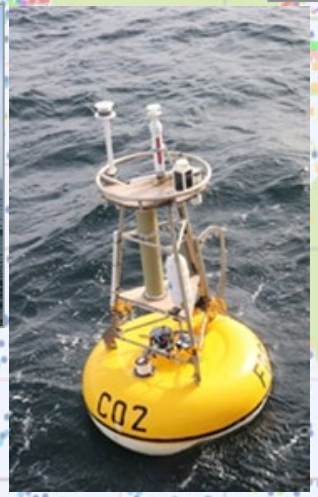
E.g. Ocean sound

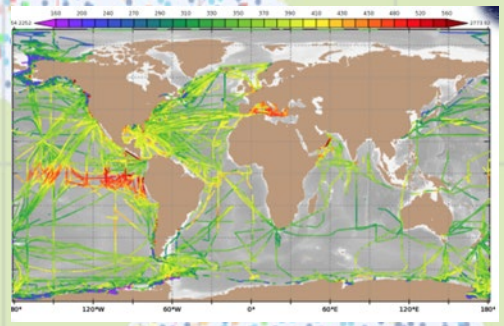
- Forecasts and early warnings
- Climate projections and assessments
- Ocean health monitoring

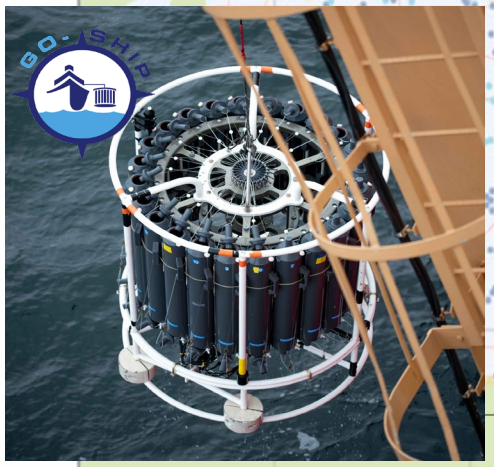
The majority of EOVs are also **Essential Climate Variables (ECVs)** defined by the Global Climate Observing System

Observing Networks



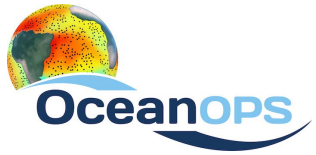






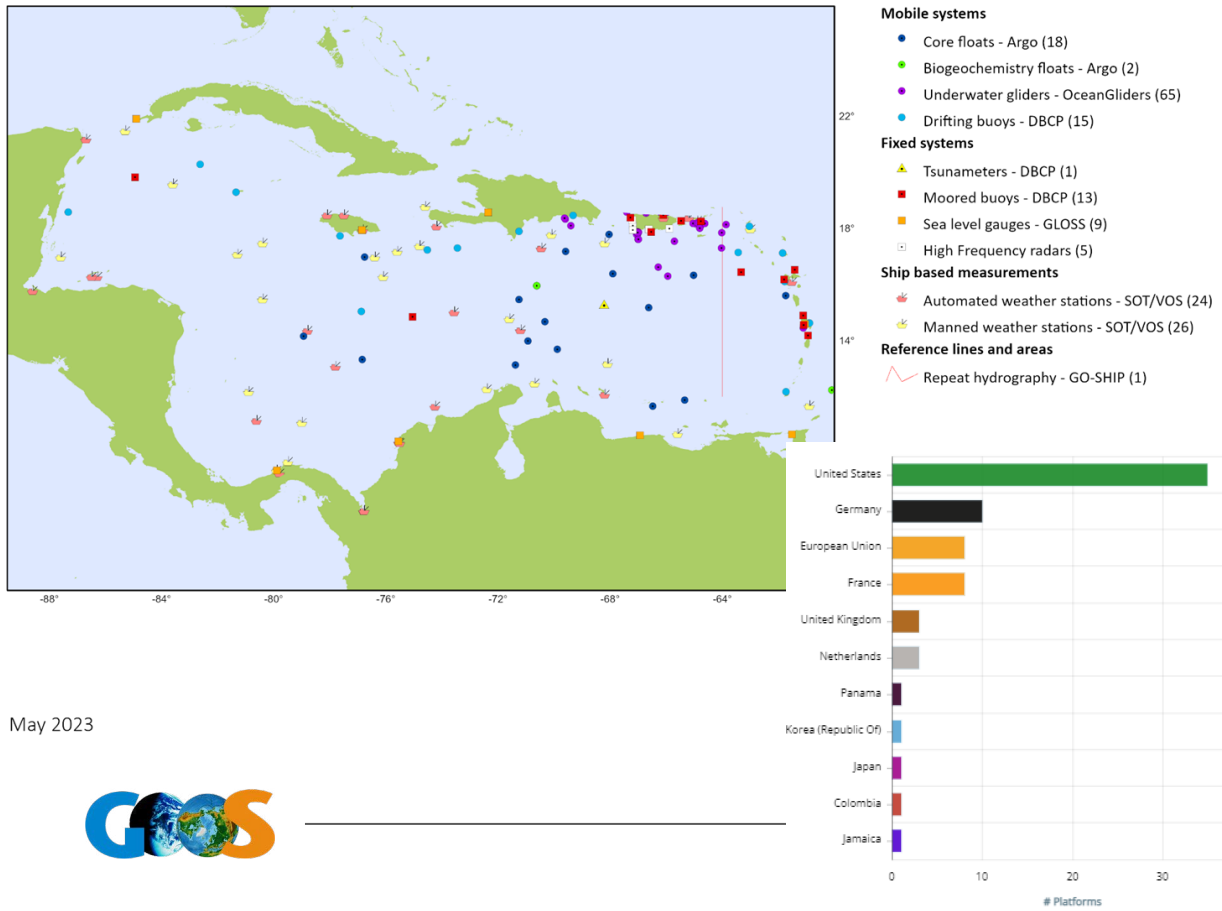
Current global observing networks in the region

provided by



Carribean Sea observing system

In situ operational platforms monitored by OceanOPS



May 2023

- Surface Drifters - good coverage
- Voluntary Ships (weather) - good coverage

- Argo floats (approx. 50%)
- 1 Glider mission active (East)
- Fixed systems good in East (Indies) low in West/South
- 1 GO-SHIP line - potential for more
- More GLOSS stations
- No XBT, HF Radar, AniBOS
- Many coastal systems are certainly missing >> **link metadata with OceanOPS**

Biological & ecological observations

- Many gaps - but perhaps there is more out there - connect up regional initiatives - 12 EOVs
- Only 7% of the ocean surface has an *identified* active BioEco monitoring program
- Some of the biggest gaps are in areas of high biodiversity and high human pressure

GOOS BioEco Portal (with OBIS/IODE) - here

Biology and Ecosystems Panel

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

Need a step change…

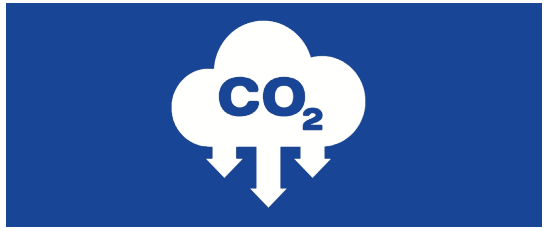
To help achieve the Global Ocean Observing System 2030 Strategy and the Ocean Decade outcomes, GOOS has launched **3 integrated programmes** that will be foundational building blocks for the Ocean Decade.

- CO-DESIGN
- COASTAL OCEAN
- CAPACITY DEVELOPMENT

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

Co-Design Exemplars

*Each exemplar is at different levels of maturity



The Ocean Carbon Cycle

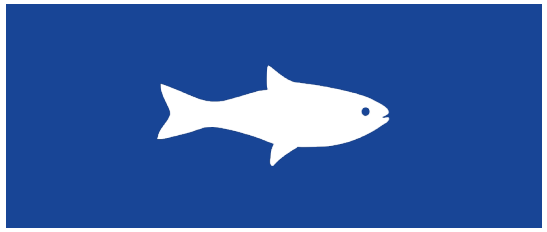
Improving carbon data to inform targets and action

Tropical Cyclones

Advancing tropical cyclone forecasting to save lives & property

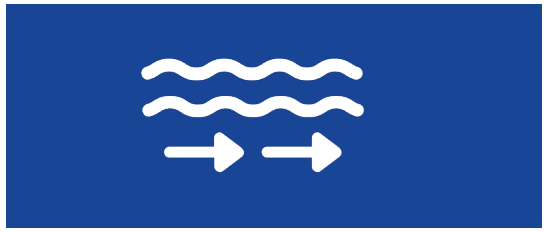
Storm Surge

Improving predictions to minimise impact on vulnerable communities



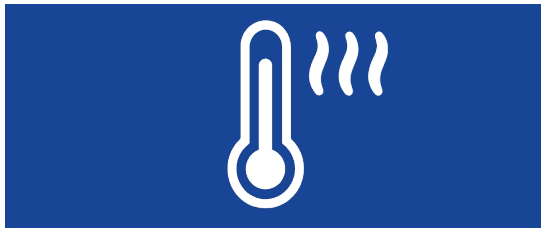
Marine Life

Conserving marine biodiversity and supporting sustainable use of resources



Boundary Currents

Understanding key systems that significantly influence productivity, weather and climate

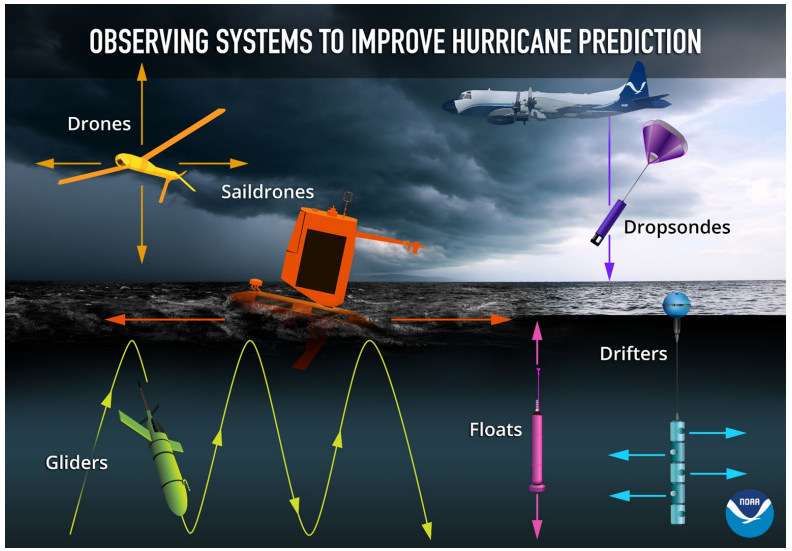


Marine Heatwaves

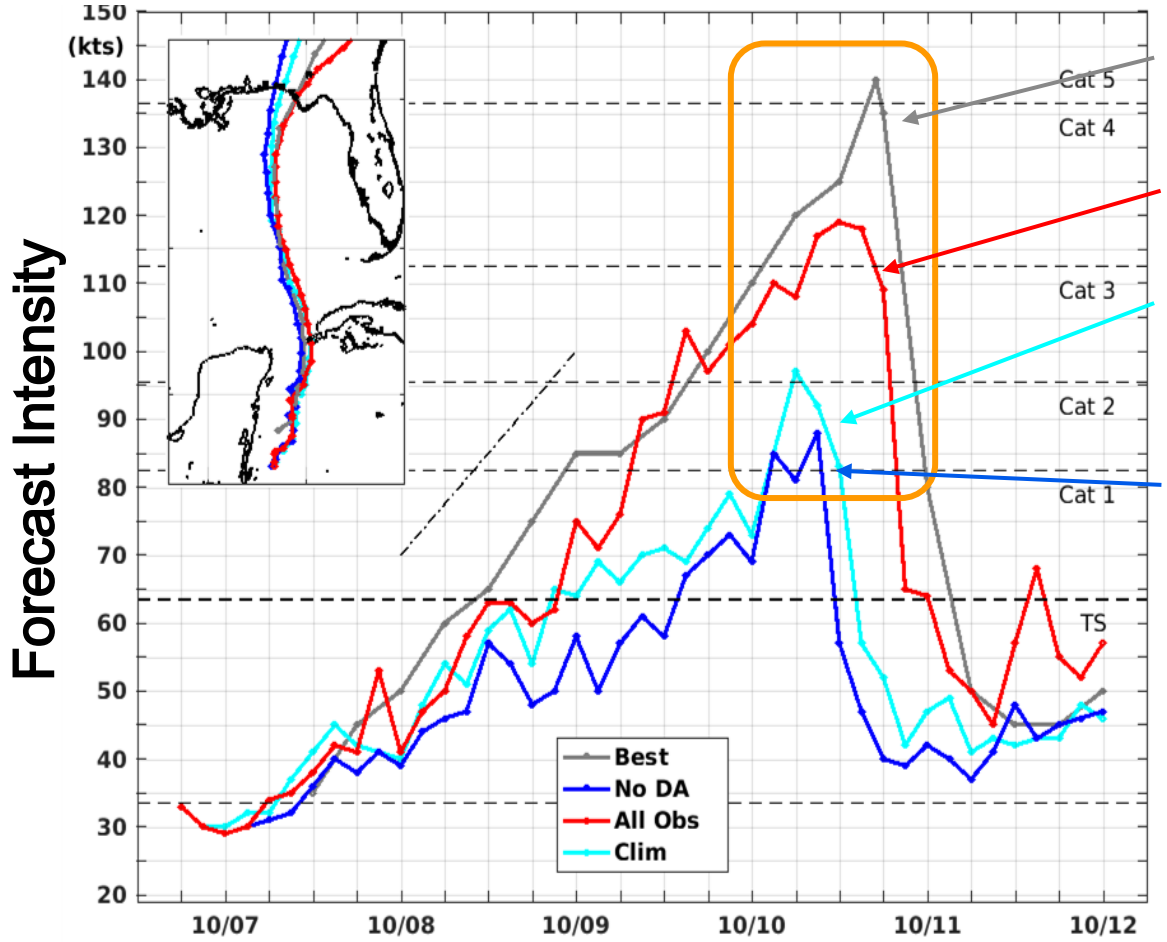
Monitoring and forecasting marine heatwaves for biodiversity and economies

Tropical Cyclone/Hurricane Exemplar

- Ocean information directly impacts Hurricane Intensity
- NEED MORE OCEAN observations: but which ones most effective?
- Tropical Cyclone Exemplar is evaluating new ocean observing technologies



Source: NOAA/PMEL



Observed Intensity

Assimilate Ocean Data

Climatology

Ignore Ocean Data

Le Henaff et al. 2021 | Hurricane Michael (2018)

Pilot Areas

Tropical Cyclones - 3

Currents - 2

Ocean Carbon - 1

Boundary

Storm

Identify regional needs

- Blue economy:
  Coastal community resilience
  Wise tourism management
  Fisheries
- Biodiversity (30 x 30)
  Sustainable development / artisanal / local needs
- Tropical storm prediction
- Downscale climate prediction
- Sustainable ocean management - tourism, sargassum
- Sea level and inundation
- marine heatwaves
- Oil spills - other pollution
- Tsunami

Defined priorities with national ocean observing initiatives and regional stakeholders

IOCARIBE - GOOS

- **Develop Regional Strategy** for ocean observing and forecasting - based on needs, existing expertise and partners
    - map observing networks, BioEco communities, ocean forecasting capacity
    - link with regional governance structures that are important in the TAC region
    - services/access to data for users
    - encourage GOOS NFP

- Leverage opportunities for partnership and support with GRAs, Ocean Decade Programmes, joint ventures, WMO SOFF, blue/green funds, private sector


RESEARCH

The Global Ocean Observing System

Thank you

goosocean.org

unesco
Intergovernmental Oceanographic Commission

WORLD METEOROLOGICAL ORGANIZATION

UN environment programme

International Science Council