Global Ocean Observing System

unesco Intergovernmental Oceanographic Commission

WORLD METEOROLOGICAL ORGANIZATION

UN environment programme

International Science Council

The Global Ocean Observing System - Advances in ocean monitoring

The ocean has absorbed…

>90%

of excess heat from climate change

~1/3

of global CO_2 emissions from human activities

Yet, it remains dangerously under-observed.

Why observe the ocean?

Climate action

Forecasts & Early warning systems

Blue economy

Community adaptation

Ocean health

Carbon strategies

But the ocean is so vast,
no one country can observe it effectively on its own.

Without long-term ocean observations, climate policies are flying blind.

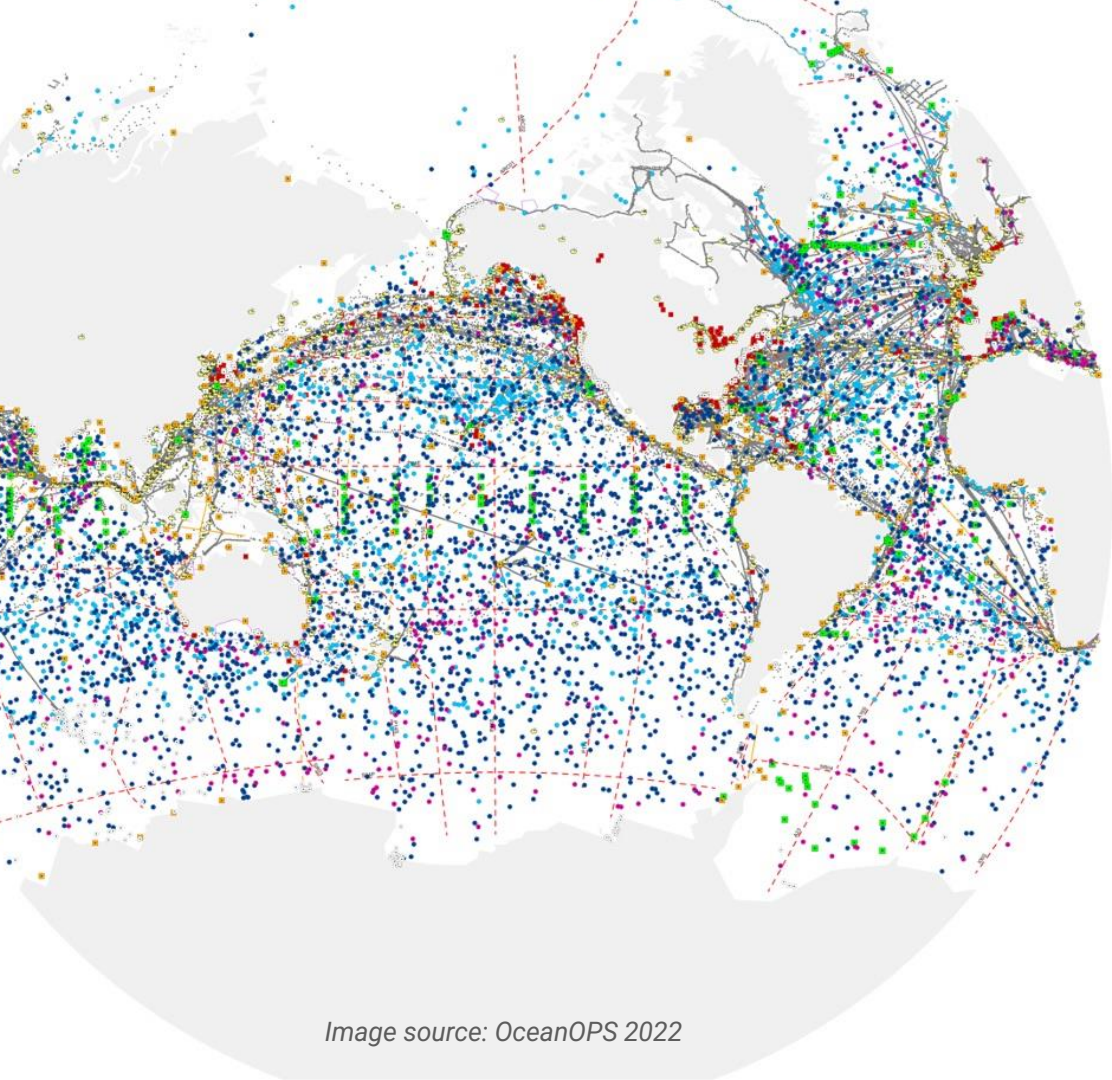


Image source: OceanOPS 2022

GOOS Today is subcritical

84 countries

8,000+ observing platforms

13 global observing networks (**+4** emerging)

>120,000 observations per day

Coverage gaps

Southern Ocean
remains the most under-observed

Deep ocean
observations remain very few

Systemic challenges

- Vulnerability to **financial and geopolitical disruptions**
- **Limited sustainability** of observing infrastructure
- Need for **broader/more diverse partnerships**

Find out more in the GOOS Status Report 2025 to be launched this November

A lack of informed **deep-ocean baselines** limits assessment of climate services and impact, resource management, and effective mitigation / adaptation strategies.

Priority Areas

- **Global deep ocean baselines** for temperature, salinity, oxygen, and carbon.
- **Vertical pathways** of processes that connect the surface and deep ocean.
- A comprehensive **seafloor map** with **ecosystem characterization.**
- Novel, **accessible technology solutions** to expand observations.
- Standardized **data pipelines** and **interoperable databases** to translate raw observations into actionable knowledge.

To achieve solutions with global-scale impact we must focus on **targeted coordination efforts.**

THE NIPPON FOUNDATION-GEBCO SEABED 2030

CHALLENGER 150 — A DECADE TO STUDY DEEP SEA LIFE

Synchro

ODIS

DOSI — DEEP-OCEAN STEWARDSHIP INITIATIVE

DOOS

DOOS is a project of GOOS and provides a central nexus for the deep ocean community to align toward collective solution-based science.

GOOS

The AMOC case

Conflicting model results — from minor changes to upcoming collapse — highlight how scarce ocean data still limit our understanding of the Atlantic Meridional Overturning Circulation.

Without more robust ocean observations, especially in the deep ocean, the future of the AMOC and our climate will remain uncertain.

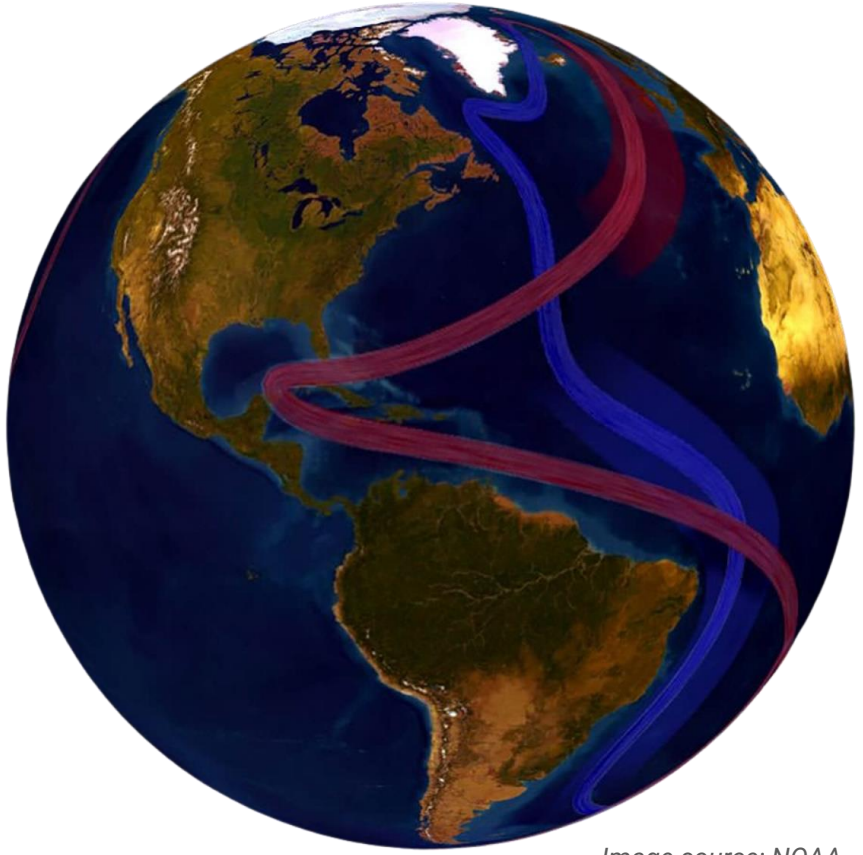
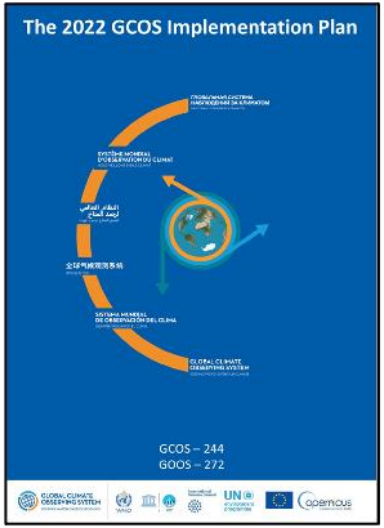


Image source: NOAA

GOOS Carbon and GHG Plan - Application-oriented Implementation



Priority Areas

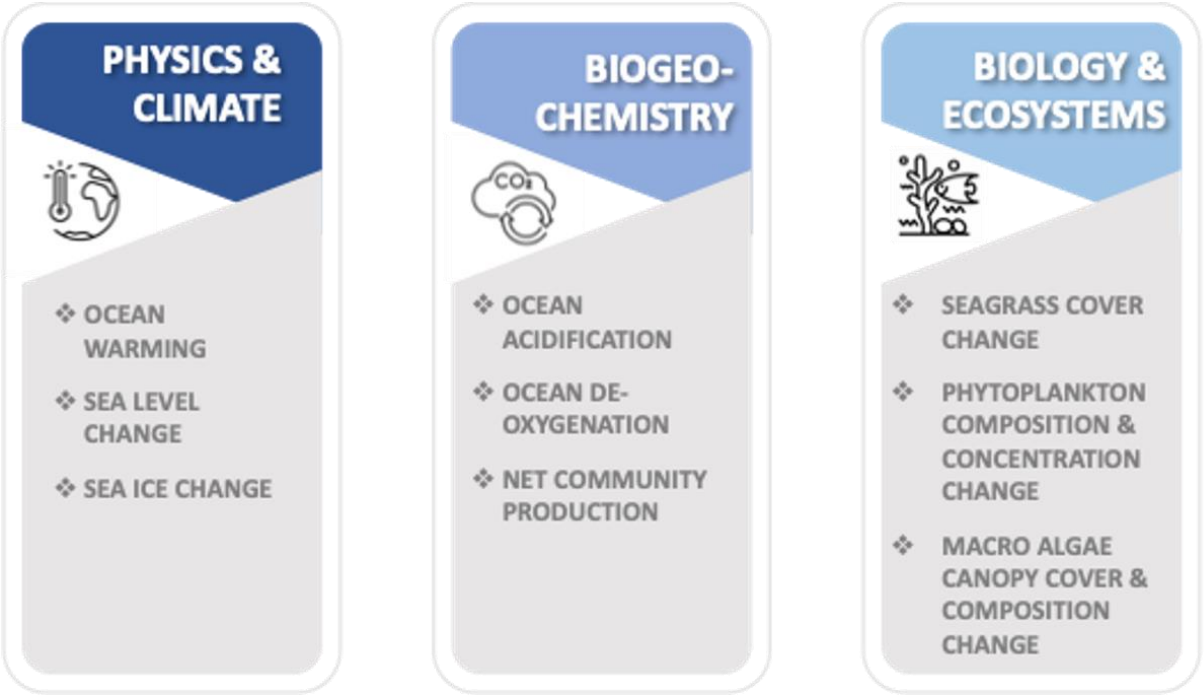
Assuring sustainable existence of coordinated ocean GHG observing networks

Co-Designing the system for observations and services that respond to needs of existing and new user groups

Building connections with satellite community and significantly enhancing data management operations

Exploring funding and governance models for private sector engagement

Global Ocean Indicators: Marking Pathways at the Science-Policy Nexus



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Thank you

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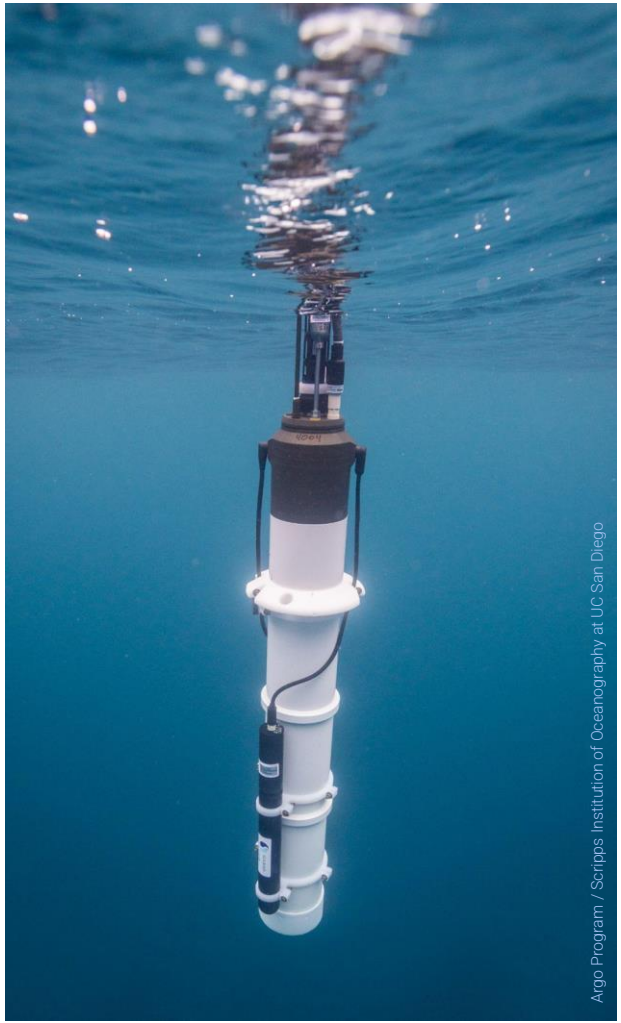

Argo Program / Scripps Institution of Oceanography at UC San Diego