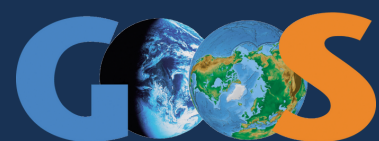


Your eye on **the ocean** in the face of climate change

The ocean is inextricably connected to climate and our whole existence on Earth. It absorbs carbon dioxide, regulates climatic and weather conditions, delivers the oxygen we breathe and provides us with vital natural resources. At the same time, as the ocean is hard at work mitigating climate change, the benefits it provides are under increasing threat.

Ocean observations enable humanity to deal with climate change by:

- improving prediction of **extreme weather** events
- developing an accurate baseline for **carbon accounting**
- better management of **natural resources**
- facilitating **adaptation** of coastal communities



The Global Ocean
Observing System

Ocean data to predict **weather extremes**

Climate change has increased the likelihood and severity of extreme weather events. The number of such disasters has multiplied by five-fold over the last 50 years: fires, droughts, floods, hurricanes and heatwaves are now heavily impacting our societies and economies.

“If you like your 7-day forecast, thank an oceanographer”

- Craig McLean, Acting Chief Scientist at NOAA

We tend to think that the changing weather is an atmosphere-only phenomena but this is not true. The ocean regulates our weather and climate, and our daily, weekly and seasonal forecasts require data from the ocean to enable resilient and sustainable blue economies, and to save lives and protect property.

For instance, our Indian moored buoy system withstood the cyclone Amphan on 19th May 2020 and transmitted valuable data that allowed an accurate prediction of a landfall, saving many precious lives. As extreme events become more dangerous, there is a need to increase targeted ocean observations to fuel the forecasts, and to anticipate and mitigate the impacts of extreme events protecting the lives and livelihoods of many.



Ocean impacts national **carbon budgets**

The ocean is the largest reservoir of carbon in the Earth system. Currently, it is taking up about 25% of the CO₂ emitted by our burning of fossil fuels - that is the amount of CO₂ that would be emitted if one billion people decided to board planes and take a circuit around the Earth.

“As the ocean responds to climate change, there are large uncertainties over its continued ability to take up and store CO₂. If this changes in any significant way, global and national carbon budgets are out the window.”

- Anya Waite, Co-Chair GOOS, Ocean Frontiers Institute

The global ambitions for a net-zero carbon emissions by 2050 are based on the assumption that the ocean will be able to continue absorbing anthropogenic CO₂ at the current rates, continually reducing the CO₂ concentration in the atmosphere. This represents the most significant unknown in climate change policy.

Today the ocean is inadequately observed for carbon. To make sure nations are reducing and mitigating their carbon emissions at the right pace, information on the trends and variability in ocean carbon storage is essential.

Better management of vital marine resources

Marine biodiversity in its many forms provides a wide range of benefits to coastal communities. Vivid examples are coral reefs, seagrass and mangroves, which act as nursery grounds to the fish that local families rely on, and also reduce the impact of storms on coastal communities. However, these benefits are increasingly threatened by the impacts of climate change on marine biodiversity, coupled with the overuse of marine biological resources by the growing population.

Developing countries already suffer a disproportionate impact of the declines in the extent and quality of their marine resources. This generates an urgent need for improved resource management. Nevertheless, coastal areas in these countries often lack marine biodiversity observations needed to make informed decisions.

“While the opportunities for action through sustainable use and conservation are growing, not all of these interventions will have positive outcomes if data are missing.”

- Nic Bax, Co-Chair of the GOOS BioEco Panel

Consistent and reliable information from marine biodiversity observations would increase the chances of making appropriate decisions and de-risk investment in such interventions.



Photo: © Pacific Community (SPC)

Ocean information for coastal communities

Across the Pacific Ocean, more than 10 million inhabitants in the island states face the challenges posed by sea-level rise, increasing extreme events, ocean warming, biodiversity loss and a variety of associated socio-economic impacts. Traditional knowledge has enabled survival in these remote islands for millennia. However, in presence of climate change, strengthened resilience requires localized, reliable predictions and actionable information about future ocean conditions.

“Just imagine the vast region we are responsible for in terms of providing ocean services, forecasts or warnings. It's really challenging when we have limited ocean monitoring systems.”

- Ueneta Toorua, Director of Kiribati Meteorological Service.

But as observation technology has become more robust and affordable, more Pacific islands are recognising the importance of investing in on-site observation systems. Four new wave buoys have been deployed in Fiji, Kiribati, and New Caledonia in the last year, and other sensor deployments are in the pipeline in a handful of other Pacific Islands. To optimize the value of these new observations, the data they collect needs to be developed into decision-making products and tools for community users at the local level.

GOOS recommends investment in:

A targeted increase in observations to improve the forecast of **extreme events**. GOOS works across nations and networks to facilitate the flow of observations to prediction centers acting in each country.

Establishing **ocean carbon observatories** in key areas of ocean carbon exchange, such as the North Atlantic and Southern Ocean. Such systems are necessary to balance our carbon budgets and achieve societal solutions.

The expansion and integration of **marine biodiversity** observing efforts into a global network. This will transform the quality of information used for developing local biodiversity loss mitigation strategies and decision making.

GOOS's Observing Together Programme - under the UN Ocean Decade - which supports **coastal communities** in their aspirations to observe and predict the ocean, and gives investors the opportunity to have impact both locally and globally.

→ goosocean.org



The Global Ocean Observing System

GOOS is the global home of ocean observing expertise.

We lead and support a community of international, regional and national ocean observing programmes, governments, UN agencies, research organizations and individual scientists.

Our Core Team of expert panels, networks, alliances and projects supported by a GOOS Office is in touch with ocean observing and forecasting around the world. We are an Intergovernmental Oceanographic Commission (IOC) led programme with UN and science co-sponsors WMO, UNEP and ISC.

