PML | Plymouth Marine Laboratory

listen to the ocean

Submission to the Ocean Dialogue at the 52nd Session of SBSTA (June 2020), Bonn.

BACKGROUND

Plymouth Marine Laboratory (PML, www.pml.ac.uk) is an independent and impartial provider of policy relevant scientific research and advice, focused on pioneering research for sustaining the global ocean, its ecosystems and resources for the benefit of society's health and prosperity.

PML's research is consistently recognised as being of national and international significance for addressing societal challenges of relevance worldwide, PML has been ranked 6th globally (1st in the UK) by the International Centre for Climate Governance for role in influencing climate-related & energy policy.

PML's experts conduct interdisciplinary science to understand complex natural systems and forecast the consequences of human actions on these systems and the impacts on society. By observing, understanding, modelling and forecasting the structure and function of marine ecosystems, PML experts have demonstrated the services these ecosystems provide society and the consequences of human actions upon them.

PML is a registered charity and works with the UK Research & Innovation (umbrella organization of the UK Research Councils) as well as UK and international governments, policy makers, environmental managers, other charities, foundations and industry to understand how the ocean works and translates that knowledge, leading to the development of solutions to address societal challenges. PML is also engaged in public understanding of science, capacity building and assistance in developing countries, and the application of science.

PML experts have been part of the IPCC Author Teams for AR4, AR5, SROCC, and are currently involved in the forthcoming AR6; advised national and international governments, intergovernmental organisations (such as Group on Earth Observations), NGOs, businesses and other stakeholders on the ocean and climate change over the last two decades. PML has given technical and scientific evidence on ocean-climate nexus at various SBSTA's since 2006, presented at both the Rio+20 Earth Summit and the 2017 UN Ocean Conference, and enhanced the development of SDG14 e.g. through participation in the Partnership Dialogue 3 and side events. PML is also contributing to the planning process for the UN Decade of Ocean Science for Sustainable Development.

PML has attended all UNFCCC COPs since 2009, participated in, organised and facilitated numerous ocean side events, including co-organisation of Oceans Action Day and EU Ocean Day at the COPs, bringing the evidence of the latest ocean-climate science to the delegates.

RECOMMENDED ACTIONS:

1. **Deliver on the Paris Agreement**
   The ultimate objective of UNFCCC is "…to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would **prevent dangerous anthropogenic interference** with the climate system." (UNFCCC Convention Article 2). The "climate system" is defined as "the totality of the atmosphere, **hydrosphere**, biosphere and geosphere and their interactions." (Article 1.3). [Note: ocean and cryosphere are part of the hydrosphere].

   The ocean is at the front line of climate change: Since pre-industrial times the ocean has taken up over 25% of the anthropogenic CO2 from emissions to the atmosphere from burning fossil fuels, absorbed over 90% of the heat energy from global warming and received 100% of the water from melting ice, which have led oceans to warm, acidify and loose oxygen, and sea levels to rise worldwide. As CO_2 emissions increase the impact on the ocean, its physical and chemical properties, its vast biodiversity and ecosystems, as well as the risk and vulnerability of dependent ocean and coastal industries and economies, and human communities will intensify greatly (IPCC SROCC).

   Therefore the **most important action for the ocean, under the UNFCCC is to have greater ambition on** greenhouse gases (GHG) **emissions reduction, and to deliver the Paris Agreement** of "holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change".

2. **Adopt the World Meteorological Organisation (WMO) Global Climate Indicators in the Global Stocktake**
   Global climate indicators should support and inform the UNFCCC, its processes and the Global Stocktake. Whilst atmospheric concentrations of greenhouse gases are clearly the main indicator, it is essential to monitor the whole carbon and heat cycles, including that related to the land, cryosphere and **ocean**. Of the seven WMO Global Climate Indicators (https://gcos.wmo.int/en/global-climate-indicators) there are four that are specifically relevant to the ocean (ocean heat content, ocean acidification, sea level, and sea ice extent). **Adoption by the UNFCCC of the WMO Global Climate Indicators in the Global Stocktake would help to harmonise ocean actions more fully within the UNFCCC process.** This would enable the UNFCCC to check if we are on track to prevent dangerous anthropogenic interference in the whole "climate system" as outlined in Article 2 of the Convention.

3. **Protect and Further Explore Ocean Carbon Stocks**
   One way to deliver on greater ambition for curbing GHG emissions within the Paris Agreement is to help raise awareness and encourage greater uptake of ocean-based solutions delivered by marine ecosystems to limit and mitigate emissions, capitalising on ocean focused initiatives

within nationally determined contributions (NDCs). The UNFCCC convention states that "all Parties shall promote sustainable management, and promote and cooperate in the conservation and enhancement, as appropriate, of sinks and reservoirs of all greenhouse gases, including biomass, forests and **oceans** as well as other terrestrial, coastal and marine ecosystems." (Article 4.1). The ocean and coasts harbour vital carbon pathways intimately linked to the climate system, and sequester substantial amounts of carbon, locking these away from the atmosphere. These have been termed "blue carbon" and some of those carbon sinks have been relatively well explored (e.g. mangroves, sea grass beds, salt marshes) and need to be protected or restored. However, the role, magnitude, scaling potential and state of other carbon sinks and sequesters have been less well researched (e.g. carbon rich coastal and shelf sea sediments; large seaweeds forests) and requires urgent investigation**. Protection and investigation of open ocean and coastal carbon sequesters as well as reservoirs can be encouraged in Parties NDCs and NAPs.**

4. **Protect the Ocean and Coasts from Other Threats**
   A healthy ocean ecosystem is more likely to be more resilient to climate change. However, ocean and coastal ecosystems are under multiple threats [e.g. illegal, unregulated and unreported (IUU) fishing and unsustainable fishing and aquaculture, multiple forms of pollution and habitat destruction] in addition to those related to climate change (ocean warming, acidification, deoxygenation, and sea level rise). **Eliminating or substantially reducing non-climate anthropogenic threats will reduce the risk of exacerbated impacts for some marine ecosystems also under risk from climate-related threats**. Actions such as reducing pollution discharge from land and sea, creating sustainable ways of harvesting and cultivating ocean resources, and applying dynamic ocean management approaches such as designing climate smart Marine Protected Area networks to act as refugia for marine biodiversity will all reduce risk to ocean ecosystems, their services and the societies that are dependent on them.

5. **Promote Smart Ocean-Based Renewables**
   The ocean and coasts are a potentially enormous resource for energy production: Offshore wind, tidal, and wave energy can contribute enormously to GHG emissions reduction and therefore limit climate impact on the ocean. However, there may well be feedbacks to ocean ecosystems through siting of structures (such as wind and wave turbines and tidal barrages). **The consequences of such ocean-based renewable energy structures need to be assessed and consideration given of how they could deliver co-benefits for ecosystems, biodiversity and society investigated.**

6. **Research and International Cooperation**
   The Cancun Agreement recognizes the need to strengthen international cooperation and expertise to understand and reduce loss and damage associated with the adverse effects of climate change, including the impacts of extreme weather events and slow onset events (including **sea level rise, increasing temperatures, ocean acidification,** glacial retreat and related impacts, salinization, land and forest degradation, **loss of biodiversity,** and desertification). The

Paris Agreement also addresses the need to strengthening international cooperation [article 7.6] and research and systematic observations of the climate system [article 7.7c].

Data allows well informed decision making: Collection of long-term observational data sets and research is required to fully understand the role of the ocean in climate change, to predict changes, to determine risk to ecosystems and people, and to assess appropriate actions that can be taken. The development of better monitoring technologies and greater automation would increase the cost effectiveness and scales of observation. Such climate data records are essential decision support tools for the UNFCCC and its member states.

The Global Ocean Observing System (GOOS) is a permanent global system for observations, modelling and analysis of marine and ocean variables to support operational ocean services**.** The Global Ocean Acidification Observing Network (GOA-OA) for example is one of the GOOS observing networks. GOA-ON is a collaborative international network to detect and understand the drivers of ocean acidification in estuarine-coastal-open ocean environments, the resulting impacts on marine ecosystems, and to make the information available to optimize modelling studies. GOA-ON provides early-warning of the impacts of ocean acidification on natural ecosystems, wild and aquaculture fisheries, coastal protection, tourism and local economies. The network provides key input to communities, industry, and governments seeking to develop action plans, best practices, and mitigation or adaptation strategies to address ocean acidification impacts.

The UN Decade of Ocean Science for Sustainable Development and the UN Decade on Ecosystem Restoration (provide increased opportunities for collaboration and science-based support of Parties in their commitments. More nations, especially developing nations need to have the capacity to contribute to and use these data. **The UNFCCC should encourage Parties to invest in observation and research of the ocean and give guidance on how Parties can best include these in their NDC's and national adaptation plans (NAPs). Funding of capacity building (training, mentoring and facilities) for developing countries should be encouraged through the activities of the UNFCCC.**