Plymouth Marine Laboratory (PML, registered charity, 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 with its experts conducting 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 has demonstrated the services these ecosystems provide society and the consequences of human actions upon them.

PML experts were on the IPCC Author Teams for AR4, AR5, SROCC, AR6; advised (inter)national governments, intergovernmental organisations, NGOs, businesses and other stakeholders on the ocean and climate change for over 20 years. PML has given technical and scientific evidence on ocean-climate nexus at various SBSTA's since 2006, the Rio+20 Earth Summit, the 2017 and 2022 UN Ocean Conferences, and enhanced the development of SDG14 e.g. through moderating the Interactive Dialogue on "Minimizing and addressing ocean acidification, deoxygenation and ocean warming" (2022) and panellist for Partnership Dialogue 3 (2017), side events and sitting on a UN SDG 14 Informal Preparatory Working Group. PML actively contributes to the UN Decade of Ocean Science for Sustainable Development and has attended all UNFCCC COPs since 2009, organising numerous side events including co-organising UN Ocean Action Day, the Virtual Ocean Pavilion and EU Ocean Day.

Recommendations

1. **It is imperative that rapid action on the reduction in greenhouse gas emissions, sufficient to meet the Paris Agreement of 1.5ºC warming, is undertaken as this will decrease the multiple impacts on the ocean and benefit its ecosystems and all of society** as the ocean has greatly slowed the rate of climate change. But at a cost: the ocean has also warmed, acidified and lost oxygen, whilst circulation patterns are changing, and sea levels are rising. The continuation of these changes not only threatens marine biodiversity and ecosystems, the delivery of SDG14, but also the future ability of the ocean to indirectly support all life on Earth.

2. **The ocean needs to be better integrated across and within UN bodies** e.g. within the UNFCCC mitigation, adaptation and financial processes, including Nationally Determined Contributions, National Adaptation Plans and the Global Stocktake; in the Convention on Biological Diversity to limit the local and regional extinction of ocean biodiversity and the UN Sustainable Development Goals in particular SDG14 as a healthy and biodiverse ocean provides food, wellbeing, cultural heritage, and support for the sustainable livelihoods of billions of people

3. **Develop and enforce sustainable and regulated climate adaptive fisheries and aquaculture for food** as **c**limate-driven changes to the ocean's physics, chemistry and biology are altering both the distribution and productivity of fish stocks. Maximizing catch from marine fisheries will therefore require climate-adaptive fisheries management that takes into account long-term sustainable catch rates, climate-driven shifts in productivity and international cooperation to reduce illegal, unregulated and unreported (IUU) fishing and maintain sustainable and equitable management across borders as fish populations shift move away from dependent populations.

4. **Improved ocean governance and management is needed to scale up marine protection and sustainable management in both the high seas and coastal waters** as the ocean offers

numerous mitigation and adaptation options for climate change but these need to managed smartly with future impacts of climate change in mind e.g. marine renewable energy, climate smart MPAs, sustainable fisheries, and protection and restoration of blue carbon ecosystems.

5. **Sustained, integrated and accessible to all global ocean observations and projections of ocean physics, chemistry and biology are essential to inform better short and long-term policy-making for the benefit of all people, nature and the economy** as ocean observations are mostly carried out by the developed countries but often these are on short term funding with few observations carried out in developing coastal and island.

6. **Innovative ocean finance is required to achieve a sustainable ocean economy and protect the ocean's natural capital** with increased investment in observations, predictions of risk, adaptation, mitigation and sustainable management.