The CLIVAR IORP/POGO Regional training workshop on observing the coastal and marginal seas in the western Indian Ocean including the Arabian/Persian Gulf and the Sea of Oman Hybrid 7 June - 9 June 2022.

Background and rationale

The Western Indian Ocean (which includes here East African countries and those surrounding the marginal and coastal seas) has more than 60 million people living on its marine coast. The coastal rural communities rely on marine ecosystems as a source of food and livelihood. The ocean economy is also important for countries with foreign income from fisheries, tourism, etc.

The WIO is warming rapidly and is a marine "hotspot" for climate change. Extreme weather events (tropical cyclones, heat waves, abnormal monsoons, etc) are becoming more frequent and intense, resulting in the destruction of coastal and marine habitats, ecosystems showing stress and less productivity, hence an impact on fisheries. These in turn will impact people in the region who rely on coastal and marine ecosystems for food security and income. Similarly, biodiversity loss as a consequence of climate change is posing a challenge to the tourism industry in the WIO.

Observational data are scarce in the WIO, in particular in the coastal and marginal seas where satellite products and numerical ocean models are limited. Mid- to long-term ocean observation systems are needed to monitor and understand marine processes and to validate satellite derived data and global model outputs for better prediction of day-to-day and future change in marine resources.

The ReMoTURB Project from the Mozambican National Fisheries Research Institute (IIP), in partnership with the Nelson Mandela University (NMU) in South Africa, is in a start-up phase, establishing a simple but robust Mozambique Ocean observing system (MozOOS). Currently there are underwater temperature recorded (UTRs) deployed by SA researchers between 2002/03 (blue dots Figure 1) and new sites established between 2016 and 2021 (red dots). There is, however, a big gap in the Sofala Bank, which is the most important fishing ground in Mozambique and the WIO region. There is an urge to establish an observational system there, but the local expertise is limited.

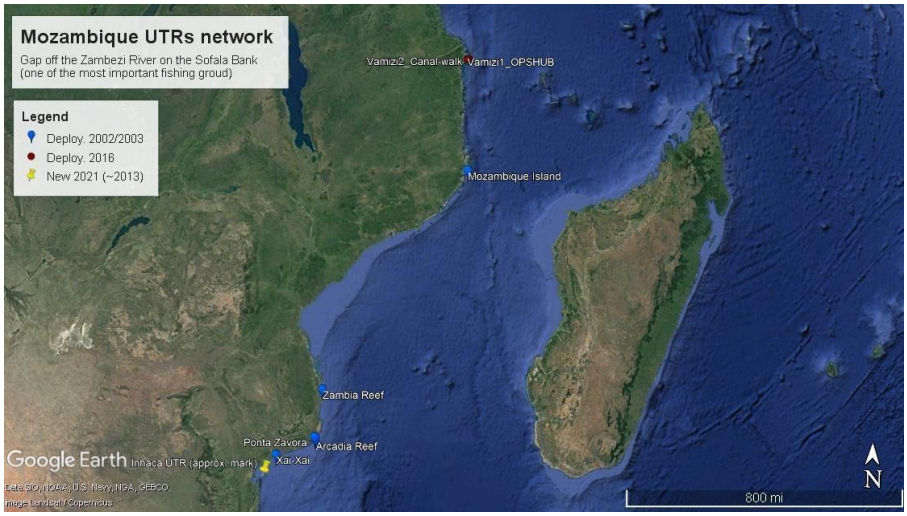

Figure 1. UTR sites along the coast of Mozambique

In contrast, the ROPME (Regional Organization for the Protection of the Marine Environment) marginal seas (including Arabian/Persian Gulf, Sea of Oman and the NW Arabian Sea), has several real-time environmental monitoring systems. However, the ROPME Integrated Information System (RIIS) is not available online and data quality assurance needs to be checked. The data archived in the system would allow preparing information for decision and policy makers, utilization of the data by scientific and research institutes, as well as by agencies responsible for managing ROPME marine coastal zone, and the public at large.

A coordinated approach to sustainable observations in the WIO is essential to maximise on experience already gained in the region as well as to learn from international experts and to form a support network among regional scientists. The proposed workshop will look at these under-observed regions of the WIO, whilst learning from the existing observation systems. It will also include cross cutting discussions on topics related to climate change, the effect of extreme weather events e.g. abnormal monsoons, ENSO, and other relevant subjects that could benefit the countries of the region.

We anticipate this workshop will create a cohort of observational, regional scientists and foster collaborations with international observing experts to create and support the growth of coastal and ocean observations in these regions, and create a greater interest from global observing systems, planting the seed for expanding observations in these regions. We will focus on current innovations in ocean observing systems which are best suited to the WIO, including success from the marginal seas. In addition to this we will share materials with regional scientists to help support discussions with policy makers and raise the profile and importance of ocean observing systems.

The proposed workshop is also in line with the recommendation from the IndOOS-2 Roadmap (2021-2030), ‘to rapidly intensify the IndOOS coverage of the Arabian Sea and western equatorial Indian Ocean, including biogeochemical measurements’.

Training plan, schedule, teaching resources and impact evaluation

The workshop will be a hybrid format with 3 components taking place simultaneously – physical workshop venues in Maputo, Mozambique, virtual attendance and presentation in Kuwait, and global virtual attendance. In person participants will be 15 in Mozambique, with one delegate from each country in the WIO (Kenya, Tanzania, South Africa, Madagascar, Comoros and Seychelles) excluding Somalia where currently ocean observation is not practical due to maritime piracy risk. From Mozambique, as the host, there will be seven participants, including 2 from the provinces outside Maputo. The workshop in Mozambique will be co-organized by ReMoTURB. In Kuwait we are expecting 10-15 participants (virtually) and 50-75 globally. Prior to the workshop, each participant from the WIO will update on the status of the existing observation system in their country. We will endeavour to ensure that the participants have the support of their home organisations and where possible we will include early career ocean science and technician professionals.

This workshop will encourage the countries bordering the WIO (including marginal seas) to be engaged in coastal observing programs and research as effective partners, since they are interconnected with the wide oceans, and have a common interest in reducing anthropogenic impacts on marine resources and in global issues of concern such as climate change, acidification, and predicting the impacts on the ocean resources as well as the impact of changing oceans on human wellbeing. The workshop will also identify the training needs and capacity building in the participating countries and will provide the opportunity for starting countries to learn from others who have already established programs.

The workshop will bring in some local, regional and international experts to teach cost effective, best practices of ocean observing methods as well as various pros and cons, experiences and lessons learned about ocean observation. The focus will be on observing equipment which is available to the countries. As part of this workshop we will also improve understanding of and access to available data such as Argo floats and build an outreach and awareness website, inclusive of "how to" information to access freely available Argo data, deployment techniques and information new users would be needing in the field. We would also extend to satellite observations on the value of ocean science and how we study the oceans using ocean observing platforms. Finally, there will be some lectures on climate impacts on the marginal seas and coast in the WIO. These lectures will provide material for regional scientists to use into the future when discussing the importance of ocean observations and impressing on policy makers the impact of climate change. There will be a practical and field section where the groups will break out to consider UTR sensor setup, deployment/recovery operation, data download, processing and archive.

The workshop will be linked with the World Climate Research Programme (WCRP) Academy group to ensure that it is inline with their planned activities and to get support for training the trainers as well as future generations of climate scientists. The WCRP Academy will also support better understanding of societal needs and linking to resources and expertise needed for this training workshop.