

Ocean Acidification Observation in the Western Indian Ocean

Call for proposals for establishment of ocean acidification observation and laboratory experiments

WIOMSA in partnership with the Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO), the IAEA Ocean Acidification International Coordination Centre (OA-ICC) and the Global Ocean Acidification Observing Network (GOA-ON), is calling for proposals for establishing ocean acidification observation systems in the field, investigating biological response to ocean acidification stress using experimental set-ups in the laboratory, or a combination of both from institutions in the WIO region.

Deadline for completion of online survey: **19 May 2018**

Submission of proposals: **26 May 2018**

Background

The ocean absorbs approximately 26% of the annual emissions of anthropogenic CO₂ to the atmosphere, helping to alleviate the impacts of climate change on the planet. However, this comes at a steep ecological cost, as the absorbed CO₂ reacts in seawater, resulting in increased acidity levels in the ocean and associated impacts on marine organisms and ecosystems. The changing acidity is described by a decrease in seawater pH and is closely linked to shifts in the carbonate chemistry of the waters including the aragonite saturation state. Aragonite is the main form of calcium carbonate used by many organisms to form shells and skeletal material (e.g. reef building corals and shelled molluscs). Observations of marine acidity at open ocean and coastal locations have revealed that present-day conditions are often outside preindustrial bounds. Open ocean average surface pH has decreased by 0.1 unit since the industrial revolution, corresponding to a 30 % increase in ocean acidity.

Projections show that ocean acidification will affect all ocean basins, while consequences for marine organisms, ecosystems, and their function are expected to vary. Over the past decade several studies have demonstrated that ocean acidification can directly or indirectly influence e.g. recruitment success of coral reefs; overall marine biodiversity; aquaculture success, quality and taste; and survival and calcification across a broad range of taxa. Studies have also indicated that ocean acidification particularly affects species at lower trophic levels and that cascading effects within the food web have the potential to impact coastal economies.

Further, ocean acidification does not affect marine ecosystems in isolation. Multiple environmental stressors can interact with ocean acidification, such as ocean warming and stratification, de-oxygenation, or extreme events, as well as other anthropogenic perturbations such as overfishing and pollution.

While ocean acidification is a global phenomenon, its impacts are felt locally and those impacts vary across populations and ecosystems. Accordingly, local adaptation depends on our capacity to measure ocean acidification and to detect its impacts on marine life. Unfortunately, the needed data coming from sustained observation and experimentation are almost absent for the Western Indian Ocean. This is mostly a consequence of lack of awareness, training, resources and adequate technical equipment. A dedicated effort to build human and technical capacities to establish ocean acidification observation in the region will support the Member States of the Nairobi Convention to address the Sustainable Development Goal 14 of the Agenda 2030, and in particular, the target 14.3: *Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels.*

A two-day workshop on ocean acidification for the Western Indian Ocean was held in October 2017 and hosted by WIOMSA and the Nairobi Convention Secretariat, supported by IOC-UNESCO, Future Earth Coasts, GOA-ON, and the OA-ICC of the IAEA. One of the main recommendations of the workshop includes the establishment of ocean acidification observation and laboratory experiments at five sites in five different countries.

In response to these recommendations, WIOMSA, through its Marine and Coastal Science for Management (MASMA) Programme, and in collaboration with the IOC of UNESCO are inviting proposals from regional institutions whose specific research activities are designed to contribute to the following objectives:

- Expand ocean acidification monitoring in the Western Indian Ocean, where potential impacts might be severe, due to the numerous ecosystems services coastal populations heavily rely on.
- Provide information critical for adaptation to the changing ocean conditions.
- Meet the observing requirements of SDG 14.3.1, and provide information for the broader scope of 14.3.
- Contribute high quality data to the Global Ocean Acidification Observing Network (GOA-ON) and Portal.
- Build on the outcomes of the WIOMSA Ocean Acidification workshop (Dar es Salaam, Tanzania, October 2017) and strengthen the OA-Africa network.
- Overall support and expand scientific capacity in the region.
- Enforce the collaboration and scientific exchange between ocean acidification scientists in the region and globally.

A maximum of five institutions in five different countries (research groups) in the Western Indian Ocean region will be selected. The assessment of research proposals will consider local needs, existing capacities, project aims, how each of the selected applicants will benefit from technical and human knowledge transfer such as the provision of equipment, reference material, consumables and appropriate training. Projects can focus on observing ocean acidification in the field, investigating biological response to ocean acidification stress using experimental set-ups in the laboratory, or a combination of both.

The maximum budget per site/institutions to support the research activities in the proposed project is 100.000 USD, including equipment, consumables, training and travel expenses for a three-year project.

APPLICATION PROCESS

The selection of institutions shall be made by a team to be constituted from WIOMSA, IOC-UNESCO, the OA-ICC of the IAEA and GOA-ON. The selection shall be based on the assessment of information provided by the applicant in an online survey and in the proposal as follows:

1. First, applying institutes are asked to fill in an online survey to allow assessment of the existing level of technical and human capacities of the institute.
<https://docs.google.com/forms/d/e/1FAIpQLSeeRlrb9HE2dqTeOMychPCz5xAXUWx2ke9tz82DAXL5a2S0IA/viewform>
2. Second, institutes are asked to provide information about the goals and objectives of the proposed ocean acidification project. The following information should be provided:
 - a. Contact information of the applying institute and names and positions of the proposed ocean acidification team (responsible principal investigator(s), technical staff etc.).
 - b. A brief project description (2-3 pages), explaining the scientific question(s) and expected outcome, local constraints, opportunities, specific data needs, proposed methodologies and preliminary results if available. The document should be structured as follows:
 - The objectives and goals of the planned investigation, including the biological aspects such as ecologically and/or socio-economically relevant species, and the relevance for the 2030 Agenda for Sustainable Development (SDG target 14.3; see

<https://oceanconference.un.org/coa/OceanAcidification>;

<https://unstats.un.org/sdgs/indicators/indicators-list/>) and regional needs.

- Project partners (national, regional and/or international) and roles, if applicable.
 - For ocean acidification observation projects this section should include:
 - Why particular locations were selected
 - Sampling scheme (e.g. geographical position, intervals, depths)
 - Details on parameters and methods for marine carbonate system measurements, and other related parameters
 - Equipment and capability needs,
 - Available infrastructure (boats, staff, equipment) if any to support the monitoring
 - How data will be made available (data centre and time to make data available, publication plans)
 - For experimental studies:
 - What is the tested question and hypothesis
 - Tested organism or ecosystems, life-history stages, food, etc.
 - Experimental design (replication, duration etc.)
 - Statistical strategy
 - Endpoints and sampling strategy
 - Methods for manipulation and measurement of the carbonate chemistry
 - For experimental and observation studies:
 - Plan for data storage and how data will be shared publicly
 - Communication plan for dissemination and publication of results, including public outreach/education and policy briefings
 - Plan for active participation in the regional (OA-Africa) and global (GOA-ON) ocean acidification networks
 - Time line of implementation (both for the 3-year period of WIOMSA support and plans for sustaining research in the long term)
- c. Detailed budget and budget justification for each year of the project, including costs for training, equipment, consumables and travel.
- d. Plan for sustaining ocean acidification research for a minimum of 5 years after the completion of the initial 3-year WIOMSA project (e.g. suggestions on how to maintain the research team through commitment to sustain funds for trained staff, consumables, etc., or efforts to obtain new and/or complementary funds).
- e. Self-assessment: what is currently missing to establish/implement long-term ocean acidification monitoring or laboratory research (specific items to describe: expertise/training, and equipment needs detailed).

EVALUATION/SELECTION PROCESS

Applications will be evaluated based on the information included in the online survey and the document described in (2) above. The main selection criteria will be:

- Relevance and technical quality of the proposed research project

- Accessibility of data derived from the project, and plans for disseminating results, including data management plans
- A realistic budget
- Plans and potential to maintain the research in the future, either with direct pledge of funds or creative ideas to obtain future funds.
- Potential for collaboration and partnerships with other institutions in the region, contribution to and collaboration with existing networks, in particular OA-Africa and the Global Ocean Acidification Observing Network

APPLICATION DEADLINE AND METHOD OF SUBMISSION

Proposals should be submitted to **the Executive Secretary, Email: secretary@wiomsa.org** with the subject title ‘Ocean Acidification Observation System’ copy to Kirsten Isensee (k.isensee@unesco.org) by **26th May 2018**. The online survey should be completed by **19th May 2018**.