4 December 2023

Report

Deep-Ocean Benthos Collection Workshop - DOSI and the Namibian Ministry of Fisheries and Natural Resources

Swakopmund, Namibia. 30th October – 3rd November 2023

Workshop Goals

To exchange practical knowledge around identification and taxonomic classification of deep-ocean Namibian benthic invertebrates collected during the Namibian Ministry of Fisheries and Marine Resources annual research expeditions. These collections are required for the eco-certification work focused around needs for the Marine Stewardship Council (MSC) Standard V 2.01 P2 Habitat Condition. The MSC Fisheries Standard is the leading international standard for sustainable fishing and is used to assess whether fisheries are well-managed and environmentally sustainable. It is expected that the Namibian collections will also inspire future deep-ocean taxonomic and ecological research papers led by Namibian scientists.

DOSI Participation

Organising Team: Maria Baker (UK); Sarah Paulus (Namibia); Bronwen Currie (Namibia); Lara Atkinson (S. Africa); Ana Hilario (Portugal); Kerry Howell (UK); Dai Herbert (S. Africa/UK); Christopher Barrio Frojan (UK)

Background

DOSI has a history of collaboration with the Namibian Ministry of Fisheries and Marine Resources starting with a deep-ocean benthos workshop in Swakopmund in April 2016. This first gathering of 30 participants was supported by INDEEP (International Network for Scientific Investigations of Deep-Sea Ecosystems), DOSI and enhanced by funding from the Endowment Fund of the International Seabed Authority. The workshop prompted a drive by Namibian colleagues to establish a deep-ocean benthic sampling programme in Namibian waters in association with their annual fisheries research expeditions for Hake, Monk and Crab. It was also hoped that a Namibian deep-ocean benthic invertebrate field guide could be produced based on these collections. Baseline knowledge of the invertebrate fauna of the deep-ocean in areas where fishing occurs will not only inform sustainable fisheries management but will also lead to furthering crucial ecological knowledge of the Namibian EEZ region. In the summer of 2020, DOSI experts worked together with NatMIRC and the Namibian National Museum to build on the successful deep-ocean benthos training in 2016 to begin the process of establishing the deep-ocean benthos collections and monitoring of benthic communities along the Namibian coast. This was accompanied by an online training workshop in July 2020 comprising presentations around at-sea sampling, processing (both at sea and back in the lab), storage, data management and VMEs with the fisheries researchers who will undertake this work. Since then, DOSI has been working with NatMIRC towards further critical in-person workshops, resulting in this in-person training event in 2023.

Workshop Summary

The workshop was opened by Sarah Paulus (NatMIRC, Namibia) who introduced the agenda for the week and is leading the Namibian benthic collections effort. She outlined the requirements for MSC certification for Namibia with respect to the deep-ocean bottom-living fauna – highlighting the importance of gathering this knowledge base. Bronwen Currie (NatMIRC -retired), with her many years of knowledge working with Namibian benthic systems, helped to set the scene with a presentation of the offshore Namibian habitats. Lara Atkinson (SAEON, South Africa) followed with a broad overview of the marine phyla and taxonomic classification followed by a description of what fauna may be expected in the region (Namibia collections) based on her many years of work on South African deep-ocean benthic fauna identification. She highlighted the successes and challenges associated with this work, including practicalities of collections at sea. Lara also gave a summary of the South African efforts towards fulfilling their MSC certification requirements. At the end of the day, the foreign visitors to NatMIRC were given a tour by Heidi Skrypzeck (NatMIRC) of the on-site aquaculture facilities, including the new molecular laboratories which are currently being established.

Day two began with the workshop introduction (history of collaboration, DOSI overview and workshop goals) from Maria Baker (DOSI, UK) (whose flight was delayed by 24 hours, hence the somewhat late introduction). Dai Herbert (Museum of Wales, UK) then gave a lecture to introduce the Mollusca, focussing on the gastropods and bivalves which make up a significant proportion of the Namibian benthos collections. These presentations were followed by the first laboratory session which comprised sorting of the Namibian benthic collections with instruction on high-level identification (giving names where possible), the use of taxonomic keys, labelling, data recording, specimen photography, sample fixation and long-term preservation/storage. Participants then formed small groups to work on identification of the bivalve and gastropod molluscs in the collections. Identification guides and taxonomic expertise were provided to aid this process. Meanwhile, examples of collected fauna were carefully photographed and labelled and the first Namibian deep-ocean

benthic invertebrate field guide is now in early stages of production for use by fisheries scientists and fisheries observers at sea. There were also some discoveries in the collections that thrilled the experts. Mollusca expert, Dai Herbert, was delighted to discover a wonderful specimen of *Acesta angolensis*!

On day three, participants were introduced to the Echinodermata by Kerry Howell (University of Plymouth, UK) with particular attention to the starfish which are an abundant group in the Namibian collections. Most of the day comprised hands-on work with specimens, with groups identifying the starfish including with the use of microscopes to identify finer identification features. Further sorting, identification and photography of all collection specimens continued, with a view to further populating the new Namibian deep-ocean benthic invertebrate field guide.

The penultimate day was also largely spent in the labs, with a focus on the Vulnerable Marine Ecosystem (VME) species found in the collections. Kerry Howell gave a lecture on the importance of identification of VMEs and their history and hands-on work with these vulnerable species ensured that the fisheries scientists and observers know to look out for these in future expeditions. Dai Herbert also took this opportunity to prepare a dry collection of identified and labelled mollusc shells as an easy access reference resource for the Swakopmund lab.

On the final day, a guest lecture was delivered via Zoom from a new programme called Ocean Census. This presentation was given by Verity Nye (Science Coordinator at Ocean Census, UK) who explained about the programme, aims and approaches and wider activities in the region along with potential for collaboration in the future in terms of molecular work on the Namibian collections. This was followed by an overview by Lara of South African seagoing protocols, processing and data storage with a Q&A session with participants. Finally, all participants were asked to give feedback on the workshop – focusing on what they felt worked, what didn't and what they would like in future. The workshop organisers were delighted with the responses in which participants enthused about all they have learned and how eye-opening it was, how exciting it was to get to know the organisms, and how helpful it will be for future collections and research. They thanked the experts for their patience, passion, friendliness and encouragement and for the donated identification guides. There was also specific thanks for the correction of fixative/preservation dilutions being used which is critical for safety of the team. They are feeling much more confident in identification of their animal collections and identification of potential VMEs in Namibian waters and want to continue to work with DOSI. They now fully appreciate the ecosystem approach to fishing. Feedback from the experts who attended the workshop was equally as enthusiastic. Everyone found it a real pleasure to work in this interactive way and to learn from the Namibian scientists, observers and students as well as from each other.

Future Work and Outputs:

1) An online meeting was held with workshop participants following the November 2023 Monk Research Expedition to hear from those who conducted benthic collections at sea and to discuss any positive or challenging experiences (4th December 2023).
2) An online workshop led by Kerry Howell to master plotting in QGIS will also be undertaken in the coming weeks.
3) Aided by workshop organisers, Namibian scientists will lead proposals to conduct deep-ocean science in Namibian waters.
4) Organisers will work together to explore further taxonomic workshops in Namibia to further enhance the benthic collections.

5) A first comprehensive Namibian deep-ocean benthic invertebrate field guide will be produced and published in the coming years.
6) High standards for the benthos element of MSC certification requirements will be achieved.
7) New species descriptions and scientific research led by Namibian scientists.
8) It is hoped that NatMIRC scientists will aid other African nations to fulfil benthic investigation MSC criteria and deep-ocean benthos research.

Additional Notes:

1) Each participant received a certificate for successful workshop participation that can be added to their CV and a Google Folder with the workshop presentations and materials.
2) Coffee breaks and lunches were provided for all workshop participants throughout the week which gave opportunity for further discussion and networking opportunities.
3) Laboratory supplies were purchased for the workshop and to kick-start the programme. It is hoped that this will lead to the long-term financial maintenance of the benthos collection programme by the Namibian government.

Through the transfer of knowledge and opportunity, endeavours such as these decentralise and democratise deep-ocean expertise and provide the critical foundation for countries to sustainably manage their own deep-ocean environment and to implement global regulations at a local level.

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Gallery

Source: Photos by workshop participants