



Terms of Reference

Deep-sea macrofauna taxonomy school: standardizing methodologies for biodiversity assessments

7-11 September 2026

Centre for Marine Living Resources & Ecology (CMLRE), Kochi, India

BACKGROUND

In accordance with the United Nations Convention on the Law of the Sea (UNCLOS), the International Seabed Authority (ISA) is mandated to regulate and control the activities in international seabed area (the Area), including the exploration and future exploitation of seabed mineral resources. ISA is also mandated to take the measures necessary to ensure effective protection of the marine environment from potential harmful effects that may arise from seabed activities. In so doing, ISA is required to promote the conduct of marine scientific research in the Area and coordinate and disseminate the results of such research when available.

Since 2020, the ISA Secretariat has organized annual workshops on deep-sea taxonomic standardization, in collaboration with the Ministry of Oceans and Fisheries of the Republic of Korea and the National Marine Biodiversity Institute of Korea (MABIK). These workshops have brought together a network of more than 300 deep-sea biodiversity experts from across 60 countries, promoting cooperation to advance deep-sea taxonomic knowledge and supporting the emergence of a new generation of deep-sea taxonomists.

In this context, in collaboration with the Centre for Marine Living Resources & Ecology (CMLRE), Ministry of Earth Sciences (MoES), Government of India and the Indian Ocean Rim Association (IORA), ISA aims to convene the seventh ISA deep-sea taxonomic standardization workshop, with a focus on enhancing capacity in macrofauna sampling, identification, and curation of samples and data for biodiversity assessments.

Macrofauna are organisms larger than meiofauna but smaller than megafauna, typically retained on 250–300 μm sieves and too small to be seen in seabed photos. In deep-sea abyssal regions currently explored for mineral resources, such as the Clarion Clipperton Zone and the Indian Ocean Basin, macrofauna include a diverse range of sediment-dwelling species with over 1,000 species found at single sites. Their abundance is relatively low (300–500 individuals/ m^2) compared to shallower and more coastal deep-sea regions, and most species are surface deposit feeders relying on organic material at



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the sediment-water interface. Around 95% of macrofauna live in the top 5 cm of sediment, where food is most accessible. They play key roles in ecosystem functions such as organic matter processing, sediment mixing (bioturbation), and nutrient cycling.

The workshop will be organized in person, from 7 to 11 September 2026 in Kochi, India. The workshop is expected to bridge the gap in understanding and studying macrofauna by facilitating capacity building, knowledge-sharing, and international collaboration, in line with ISA's Sustainable Seabed Knowledge Initiative (SSKI) and the IORA-ISA joint initiative on "Strengthening deep-sea science and technology in the Indian Ocean Region" (SDIOR) initiative.

The workshop's collaborative framework facilitates regional scientific cooperation and technology transfer. The workshop will raise a new generation of taxonomists and expand global networks of experts and trainers in this critical field of marine sciences. Through this workshop, the ISA will contribute to advancing deep-sea macrofauna research, including the description of new species and the development of innovative techniques for predicting impact and resilience in deep-sea ecosystems.

Overall, this workshop will contribute to the implementation of international agreements for ocean governance and biodiversity conservation, including the Biodiversity Beyond National Jurisdiction (BBNJ) agreement, as well as the implementation of ISA Action Plan in support of the United Nations Decade of Ocean Science and ISA Capacity Development Strategy.

WORKSHOP OBJECTIVES

The macrofauna taxonomy training workshop program encompasses various topics and disciplines, facilitating a comprehensive understanding of macrofauna diversity and its ecological significance.

Key programme areas and objectives include:

- **ISA Standardized Approaches:** Training participants in standardized macrofauna study methods for environmental baseline and monitoring studies.
- **Macrofauna Taxonomy:** Capacity building in macrofauna taxonomy, including the identification and description of new species and the creation of a network of deep-sea macrofauna taxonomists from developing countries.
- **Integrative Tools:** Providing knowledge and training in advanced techniques such as imaging (scanning electron microscopy and drawing), DNA barcoding, and data analyses.
- **Macrofaunal Functional Traits:** Exploring the use of functional traits as indicators of anthropogenic changes in deep-sea environments.



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- Macrofaunal Sample Curation and Data Sharing: Training participants in sample preservation and curation, as well as reporting and publishing data in open access databases
- Training and Outreach Immersive Tools: Developing online course materials to enhance the study and understanding of macrofauna diversity.

EXPECTED OUTPUTS

The workshop is expected to deliver the following outputs:

- Macrofauna "Training Kit": A comprehensive package including digital materials and tools for macrofauna identification, data sharing, and sample curation. The package will be freely available online, offering access to interested individuals to learn at their own pace.
- Collaboration opportunities: post-workshop interactions and sustained collaborations among participants as well as opportunities for selected participants to become new trainers with organizational skills to convene training schools in their countries.
- Expert and sample networks: strengthened linkages among experts, institutions, and biological sample collections relevant to deep-sea macrofauna research.

EXPECTED PARTICIPANTS

The workshop will welcome up to 30 participants with varying levels of experience (Postgraduate (PhD) students, postdoctoral, early-career and senior researchers) in macrofauna taxonomy, including species identification and description. As a minimum requirement, participants should hold a Bachelor's degree-level education (preferably in natural sciences) and should be enrolled in a first Master's level course (or equivalent) in marine biology, biodiversity and ecology.

Other requirements for all participants, include:

- National of a developing State member of ISA from the Indian Ocean region (required)
- Nomination by IORA Member States through their respective National Focal Point (Ministry of Foreign Affairs), where support through IORA channels is sought.
- Proficient in English language (required)
- Background in benthic fauna and/or taxonomy of macrofauna, including marine or freshwater taxa (recommended)
- Motivated and interested in investigating deep-sea macrofauna in the context of anthropogenic impact assessment.
- Demonstrated interest of the participant's host institution to undertake future training activities.