Workshop on Enhancing Genetic Approaches to Advance Deep-Sea Taxonomy

23-25 November 2022

Seocheon, Republic of Korea

Background

The mandate of ISA, on behalf of the State Parties to the United Nations Convention on the Law of the Sea (UNCLOS), is to regulate and control activities in the "Area" (international seabed area) for the benefit of humankind as a whole. At the core of its mandate is to take the measures necessary to ensure effective protection of the marine environment from potential harmful effects that may arise from seabed activities[1].

In addition, ISA is mandated to promote and encourage the conduct of marine scientific research in the Area, and coordinate and disseminate the results of such research and analysis when available[2]. The importance of this obligation is highlighted by the Strategic Plan of ISA for the period 2019-2023[3], particularly strategic direction 4 ("Promote and encourage marine scientific research in the Area"), which is being implemented through the High-level Action Plan for 2019-2023[4].

To support the fulfilment of these mandates, the ISA Assembly in 2020 adopted the Action plan of the International Seabed Authority in support of the United Nations Decade of Ocean Science for Sustainable Development[5]. One of the six strategic research priorities identified in the Action Plan is focused on standardizing and innovating methodologies for deep-sea biodiversity assessment, including taxonomic identification and description, in the Area.

In this context and continuing the work of the ISA secretariat to facilitate the integration of taxonomic knowledge into ISA's efforts for the protection of the marine environment in Area, two workshops have been convened in collaboration with the Ministry of Oceans and Fisheries of the Republic of Korea (MOMAF) and the National Marine Biodiversity Institute of Korea (MABIK). In the first of these workshops, held in September 2020[6], several priority actions were identified for developing a collaborative

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[1] UNCLOS, Article 145

[2] UNCLOS, Article 143 (2)

[3] ISBA/24/A/10

[4] ISBA/25/A/15

[5] ISBA/26/A/17

[6] Workshop on Deep Sea Taxonomic Standardization: Strategic Approaches for Collaboration | International Seabed Authority (isa.org.jm)

platform to advance deep-sea taxonomic knowledge in the Area. The following workshop in October 2021[7] identified key elements for a standardized model of image data exchange, archiving and sharing to support biodiversity assessment and monitoring.

Along with the increased use of deep-sea imagery as a powerful noninvasive methodology for investigating the deep-sea environment, significant advances are being made towards the use of environmental DNA (eDNA) as another non-destructive, cost-effective, and easily replicable methodology for studying deep-sea biodiversity. Nonetheless, the utility and scientific value of the information generated by these approaches remain to be unfolded. This is due to the lack of consistency across surveys, as well as absence of comprehensive genetic reference catalogues, which are critical in identifying organisms and matching the genetic sequences. A standardized and comprehensive compilation of genetic data emerging from exploration activities and other scientific research projects in the Area will significantly contribute to enhancing species identification and description. Enhanced taxonomic knowledgebase will further enable the application of innovative methodologies and improve broad-scale biodiversity assessments.

In this context, the ISA secretariat, in collaboration with MOMAF and MABIK, is convening a workshop on "Enhancing genetic approaches to advance deep-sea taxonomy", to identify key elements for effective access to and exchange of genetic data and information to support deep-sea biodiversity assessment and monitoring. This workshop will focus on challenges and opportunities for enhancing data interoperability between the ISA DeepData database and international genetic databases (e.g., GenBank, BOLD, NCBI, SILVA, etc.). The workshop will discuss best available protocols for quality assurance and control, as well as practical approaches to standardizing methods for eDNA surveys in benthic and pelagic habitats. The workshop will also discuss collaborative approaches to building deep-sea research capacity and literacy with a focus on technologies, methodologies, and tools and their adequate application at a larger scale.

Objectives of the workshop:

The workshop aims at identifying key elements and technical means necessary for effective sharing and use of genetic data, including through a collaborative platform in the context of ISA, with a view to enhancing deep-sea species identification and quantification, as well as increasing capacity and literacy in deep-sea taxonomy.

Expected outputs:

1. Key elements identified for standardized methods of eDNA biodiversity assessments;
2. Proposed procedures for effective sharing of genetic data and information and exchange of eDNA assessments;
3. Potential opportunities for collaboration identified to develop methodologies and tools for species identification and quantification using genetic data; and
4. Potential opportunities for collaboration identified to develop capacity-building and deep-sea literacy programmes on deep-sea biodiversity assessments using eDNA.

Expected outcomes:

1. Improved synthesis of research outputs for enhancing scientific knowledge and assessment of deep-sea biodiversity in the Area;

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[7] Workshop on Enhancing Image-based Biodiversity Assessments to Advance Deep-Sea Taxonomy | International Seabed Authority (isa.org.jm)

2. Enhanced capacity of ISA member States, in particular developing countries, to establish a platform for sharing deep-sea taxonomy knowledge using genetic data; and
3. Increased literacy of the public and policymakers on deep-sea taxonomy and deep-sea in general, building a virtuous cycle of increased public and political support.
4. Enhanced synergies with relevant UN global processes on the use of genetic data for deep-sea biodiversity assessment and monitoring, including the UN Decade of Ocean Science for Sustainable Development, the CBD post-2020 Global Biodiversity Framework, and the ongoing negotiations of an international legally binding instrument under UNCLOS on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction.

Expected participants:

- Experts on tools and technologies for environmental DNA-based biodiversity assessments;
- Experts on collecting and utilizing genetic data including taxonomists, curators, educators, among other data users; and
- Experts on genetic data management and archiving.
- ISA members, contractors, and other stakeholders as well as public, especially students and young scientists in the field of deep-sea taxonomy, biology, and other related disciplines;
- Private companies and organizations in the field of research and development, research technologies, environmental monitoring and observations, and database management etc.;
- Relevant UN/international/regional organizations/bodies/programmes/initiatives.