

# **WORKSHOP ON TAXONOMIC METHODS AND STANDARDIZATION OF MACROFAUNA IN THE CCZ**

Jointly organized by the  
International Seabed Authority, Kingston, Jamaica  
and the  
Korea Institute of Ocean Science & Technology

## **Background Document**



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## **Introduction:**

Following the adoption of the regulations on prospecting and exploration for polymetallic nodules in the Area by the International Seabed Authority, six entities entered into exploration contracts in 2001; these were: Interoceanmetal Joint Organization (IOM), Yuhzormgeologiya, the Government of the Republic of Korea (KORDI), China Ocean Mineral Resources Research and Development Association (COMRA), Deep Ocean Mineral Resources Development Co. Ltd (DORD-Japan) and the Institut Français de Recherche pour l'exploitation de la mer (IFREMER-France). Later on, the Government of India signed a contract in 2002, and in 2006, the Institute for Geosciences and Natural Resources of Germany signed a contract as well. Nauru Ocean Resources Inc. signed a contract in 2011, Tonga Offshore Mining Limited (TOML) signed in 2012, and UK Seabed Resources Ltd, signed a contract in 2013. To date, applications by the Cook Islands, UK Seabed Resources Ltd, and Ocean Mineral Singapore Pty Ltd are pending for approval, thus adding up to 13 contracts awarded for exploration on polymetallic nodules soon. Other than the contract between the Government of India and the Authority, all the other contracts for polymetallic nodules exploration are in the Clarion-Clipperton Fracture Zone (CCZ). Under the Regulations (ISBA/6/A/18), an exploration contract is for a period of 15 years and the plan of work to be executed in three terms of five years. Of the above mentioned contracts, six will expire in 2016 and another one in 2017.

Each one of the contractors is required to submit an annual report to the Secretariat, covering its programme of activities in the exploration area as disclosed in each of the five year plans of work for their respective areas. The reports must contain sufficiently detailed information on: exploration work during each calendar year, including the provision of baseline environmental data and to establish baselines against which to assess the likely effects of its programme of activities under the plan of work for exploration on the marine environment and a programme to monitor and report on such effects. In this regard, contractors are required to:

- (i) gather data on biological communities, taking samples of fauna representative of variability of habitats, bottom topography, depth, seabed and sediment characteristics, abundance and the mineral resource being targeted;
- (ii) Collect data on the sea floor communities specifically relating to megafauna, macrofauna, meiofauna, microfauna, demersal scavengers and fauna associated directly with the resource, both in the exploration area and in areas that may be impacted by operations (e.g. the operational and discharge plumes); and to report on

- (iii) the results on test of proposed mining technologies and the results obtained from environmental monitoring programs, including observations, measurements, evaluations of environmental parameters: abiotic and biological.

### **Taxonomical workshops on deep-sea fauna:**

After a decade of annual reporting from contractors for polymetallic nodule resources, the need to provide guidelines for standardization on taxonomy reporting practices was detected. Following informal consultations between the Secretary-General and exploration contractors for polymetallic nodules in January 2012 in Jamaica, it was decided to organise a series of taxonomic exchange workshops on the megafauna, macrofauna, and meiofauna in contract areas. The need for such workshops bringing together contractors and experts for the different faunal groups became apparent to address potentially varying taxonomic standards and the differing taxonomic expertise available. Such needs were also in line with the international project INDEEP, which among other objectives, aims at providing large scale syntheses on biogeography and biodiversity patterns in the deep sea as well as fostering environmentally sustainable management of deep-sea resources.

The first of these standardisation workshops, supported by the ISA and INDEEP, focussed on the megafauna size component of the abyssal fauna. The megafauna is defined as organisms large enough to be determined on photographs, typically larger than 1 cm in size. Exploration of the abyssal region of the Clipperton–Clarion Fracture Zone (CCZ) reveals that there is considerable biodiversity at many scales. Most of this biodiversity remains undescribed. The reasons for this are many but relate fundamentally to the great size of the region, difficulty in sampling at great depths far from land and a discrepancy between the rate of discovery of new species and the availability of taxonomic expertise to describe them (the so called taxonomic impediment).

Currently the region is being explored by exploration contractors for polymetallic nodules with the Authority. Each contractor has a particular area or areas within the CCZ. Under their contracts, exploration contractors are obliged to conduct environmental baseline studies and submit relevant biological survey data to the International Seabed Authority, which enables the ISA to assemble the biodiversity data collected by the various contractors. Such geographic biodiversity knowledge will be required for informed decision-making on environmental management and on subsequent exploitation licenses.

While such studies do indeed provide a baseline against which future impacts can be assessed there are significant gaps in the types of data being produced and within the data themselves. The most significant gap is in the taxonomy of the organisms encountered and sampled. Many of the organisms are new to science and so have not been formally classified. The result is that each contractor develops their own taxonomy using a range of identifiers. This in turn results in a lack of standardisation between areas.

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This is the second of the three workshops to standardized the taxonomy of fauna-associated with deep seabed polymetallic nodules. “The Taxonomic Standardization of Deep-sea Macrofauna associated with polymetallic nodule deposits” is being hosted by the Korean Institute of Ocean Sciences and Technology (KIOST) at the East Sea Research Institute.

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<sup>1</sup> The recommendations of this workshop are contained in Annex 1

### **Objectives of the workshop:**

The objective of this workshop is to bring together international deep-sea macrofauna experts with representatives of ISA contractors for the exploration for polymetallic nodules in the Area to facilitate the establishment of a standardized taxonomy for the baseline studies of macrofauna associated with these resources. This will be achieved through:

1. the creation of a standardized nomenclature with associated descriptions and keys, to be made available on the web for the use by contractors;
2. the recommendation of a standardized taxonomic identification including sampling and storing methods for contractors;
3. the creation of a database of the locations where different species have been observed (including biogeographic variables), as it was started for the megafauna workshop, ultimately to create a faunal distribution atlas for the CCFZ;
4. the provision of guidelines and procedures to be utilized by contractors, prospectors and the marine scientific researching community in applying the standardized nomenclature;
5. the collection of representative images for each identified species;
6. the creation of an atlas of the locations where different species have been observed, and
7. A programme of work to address any gaps in knowledge or understanding.

### **Expected outcome from the workshop:**

Upon completion of the third workshop, on “The Taxonomic Standardization on Deep-sea Meiofauna Associated with Polymetallic Nodules”, it is expected that the recommended standardized taxonomies for the megafauna, macrofauna and meiofauna as well as the guidelines and procedures to be utilized by contractors, prospectors and marine scientific researching organizations on the fauna

associated with deep seabed polymetallic nodules in the Area will be considered by the LTC with a view to making its own recommendations to the Council on taxonomies to use for such fauna.

Contractor representatives have been requested to bring to the workshop the following information and data:

1. all ecological data of deep-sea macrofauna previously collected by the contractor in its exploration area (including density distributions of species in the area as well as lists of collected voucher specimens), and
2. preserved specimens –both classified and not-yet-identified– to work directly with the team of expert taxonomists for deep-sea macrofauna that will be present throughout the workshop.

In a 20-min presentation, contractors have also been requested to outline the *status quo* of their macro faunal baseline studies to date, especially, whether the level of taxonomic identification at high resolution is being achieved, and if that is not yet the case, how long it is anticipated until taxonomic identification at high-level resolution will be attained. Furthermore, it would be desirable to learn, whether contractors seek collaboration to succeed in their faunal baseline studies.

## **Annex 1**

### **Recommendation of the Authority's workshop to standardize the taxonomy of fauna associated with deep seabed polymetallic nodule deposits of the Area**

- Voucher specimens of the species found in each claim area should be made and deposited in appropriate collections facilities, such as national museums. These collections must be available for further study.
- Develop a common protocol of best practices to collect specimens, including, inter alia, minimum standards of sampling intensity, the use of taxon-specific preservation methods and the involvement of relevant taxonomic experts. It is also important to establish consistent methodologies for imaging of specimens before sampling, ideally a combination of images *in situ/in vivo* of specimens should be made.
- Molecular samples need to be collected to provide data on connectivity across the CCZ.
- Develop taxonomic capacity in accordance with the workshop aims to ensure that the standardisation work is completed within a reasonable time frame. On-going taxonomic support of contractors could be provided through a clearing house mechanism with appropriate funding.
- Data management procedures and infrastructures must ensure that knowledge and images are available to all parties for further taxonomic classification. Spatial approaches are essential and any geo-referenced data must be kept in geo-spatial databases, allowing for further biogeographic analyses.
- The ISA and INDEEP should facilitate an expert workshop on imaging methodology, analyses and data management.

- Foster cooperation between contractors for taxonomic inter-calibration, both locally and across CCZ. Training should be provided to ensure that all groups identifying organisms are working to the same standard.
- Encourage biology- focused cruises as a priority for the contractors. In this context, the recent biology-focussed joint French-German cruise (Bionod) by IFREMER and BGR was pointed out as a successful example of cooperation.
- Encourage contractors to provide additional high-resolution geo-referenced photographs and to grant permissions for reproduction.
- The ISA and contractors should investigate providing images under creative common licences to facilitate the public understanding of the deep sea.
- Despite the limitations of images, an atlas and website should be produced illustrating the dominant morphotypes found in the CCZ as a first step towards a standardised taxonomy.
- While printed catalogues are useful, it is clear that this is an on-going process, so the development of a collaborative web-based infrastructure would help contractors and taxonomist to keep the data continuously updated.