



interoceanmetal
JOINT ORGANIZATION

30 years of environmental studies

ISA Workshop in Szczecin – REMPs views



Interoceanmetal IOM

IOM established in 1987 - intergovernmental agreement of sponsoring States

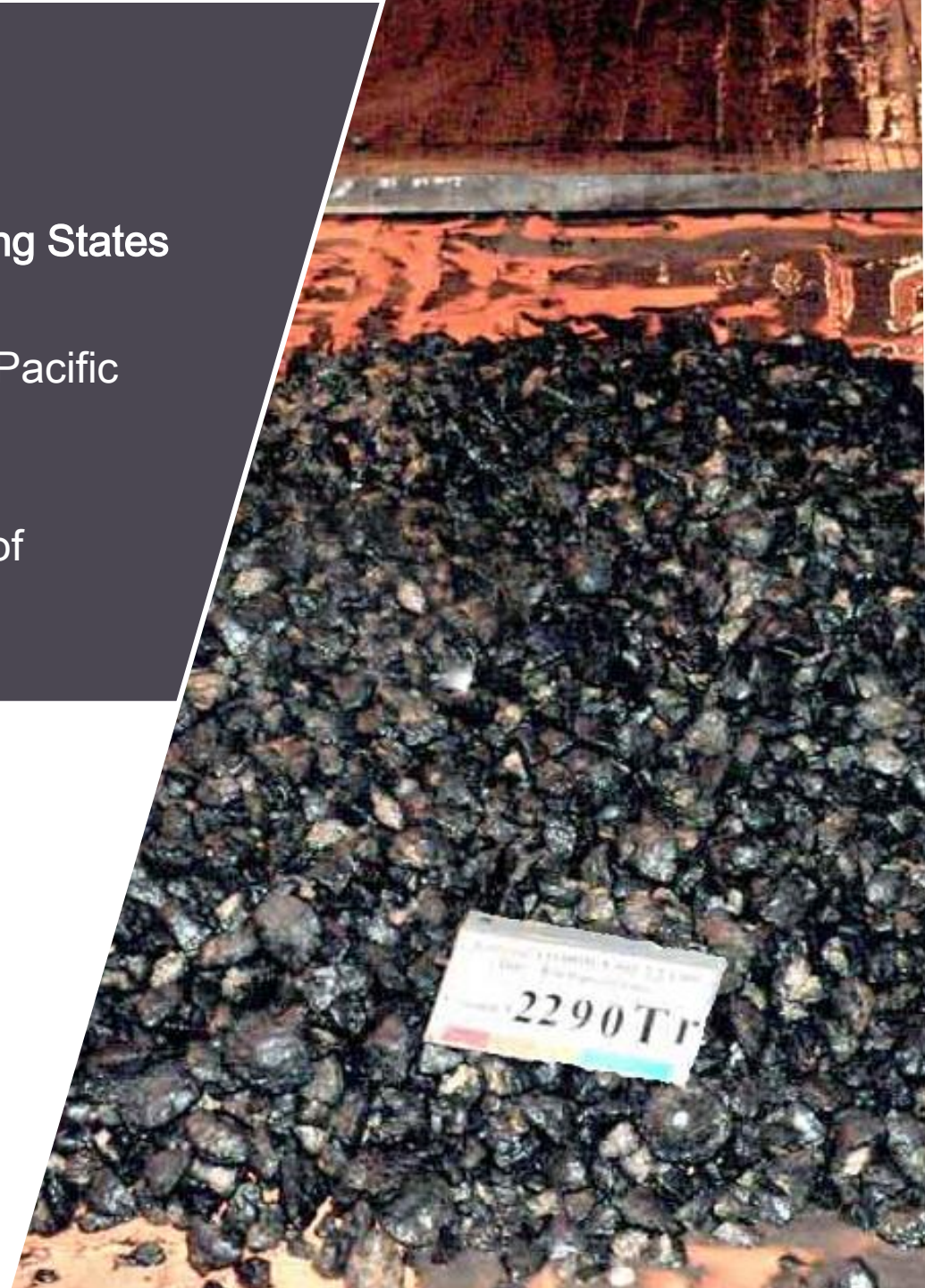
Area of exploration interest: eastern part of Clarion-Clipperton zone, Pacific Ocean.

Objectives: prospecting, exploration and preparation for exploitation of polymetallic nodule deposits

Initially in 1987 7 **member states**: Bulgaria, Cuba, Czechoslovakia, East Germany, Poland, Soviet Union, Vietnam

Presently 6 **member states**: Bulgaria, Cuba, Czech Republic, Poland, Russian Federation, Slovakia

The only international organization among ISA contractors



From exploration to exploitation

1

Exploration contract

Preparation of Application for Approval of Plan of Work

to apply upon termination of Exploration Contract according to Annex 3 Art. 7 para. 9

Extension – 5 years max. each extension period when:

- reason's beyond contractors' control
- economic circumstances

according to Annex 3 Art. 7 para. 9

Exploitation contract

Transition interval



according to Annex 3 Article 17 para. 2c

- production not required,
- construction of commercial-scale mining and processing system

Commercial production



according to: Annex 3 Article 17 para. g

'large-scale recovery operations which yield a quantity of materials sufficient to indicate clearly that the principal purpose is large-scale production rather than production intended for information gathering, analysis or testing of equipment of plant'

Duration: according to Annex 3 Article 17 para. 2b

Sufficient to:

- **conduct survey**
- **design and construct mining equipment**
- **design and construct small and medium processing plant for purpose of testing mining and processing system**

Sufficient to:

- **permit commercial extraction**

Phase I: Pioneer investor activities and prospecting baseline studies and unique Benthic Impact Experiment (IOM BIE)

Phase II: towards establishing the environmental baseline

1994 -
2000

2001 -
2018

29/03/
2001

2021...

IOM and ISA signed the contract for exploration of polymetallic nodules referring to a 75,000 km² exploration area in the eastern part of the CCZ.

...and beyond. Transition interval starts, preparation for exploitation - pilot test mining with environmental monitoring. The environmental baseline as the basis for assessing the impact of mining activity. Implementation of the EMMP

Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area

Standard clauses for exploration contract

Recommendations for the guidance of contractors for the assessment of the possible environmental impacts arising from exploration for marine minerals in the Area

Regulation 18

Data and information to be submitted for approval of the plan of work for exploration

(b) A description of the programme for oceanographic and environmental baseline studies in accordance with these Regulations and any environmental rules, regulations and procedures established by the Authority that would enable an assessment of the potential environmental impact of the proposed exploration activities, taking into account any recommendations issued by the Legal and Technical Commission;

Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area

Standard clauses for exploration contract

Recommendations for the guidance of contractors for the assessment of the possible environmental impacts arising from exploration for marine minerals in the Area



Section 5 Environmental monitoring

5.3 The Contractor shall, in accordance with the Regulations, gather environmental baseline data as exploration activities progress and develop and shall establish environmental baselines against which to assess the likely effects of the Contractor's activities on the marine environment.

Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area

Standard clauses for exploration contract

Recommendations for the guidance of contractors for the assessment of the possible environmental impacts arising from exploration for marine minerals in the Area

III. Environmental baseline studies Baseline data requirements

14. To set up the environmental baseline in the exploration area [...], the contractor [...] shall collect data for the purpose of establishing baseline conditions of physical, chemical, biological and other parameters that characterize the system likely to be impacted by exploration and possible test-mining activities. Baseline data documenting natural conditions prior to test mining are essential in order to monitor changes resulting from test-mining impacts and to predict impacts of commercial mining activities.

United Nation Convention on the Law of the Sea (UNCLOS)



Article 192

States have the obligation to protect and preserve the marine environment.

Environmental Management Plan for the CCZ

II. Environmental management

21. Best-practice management of damaging human activities

the use

protect

range of

and function within the management area. (...)

Introducion of areas of particular environmental interest (APEIs)

IV. Goals

35. The goals of the present Environmental Management Plan are to:

(...)

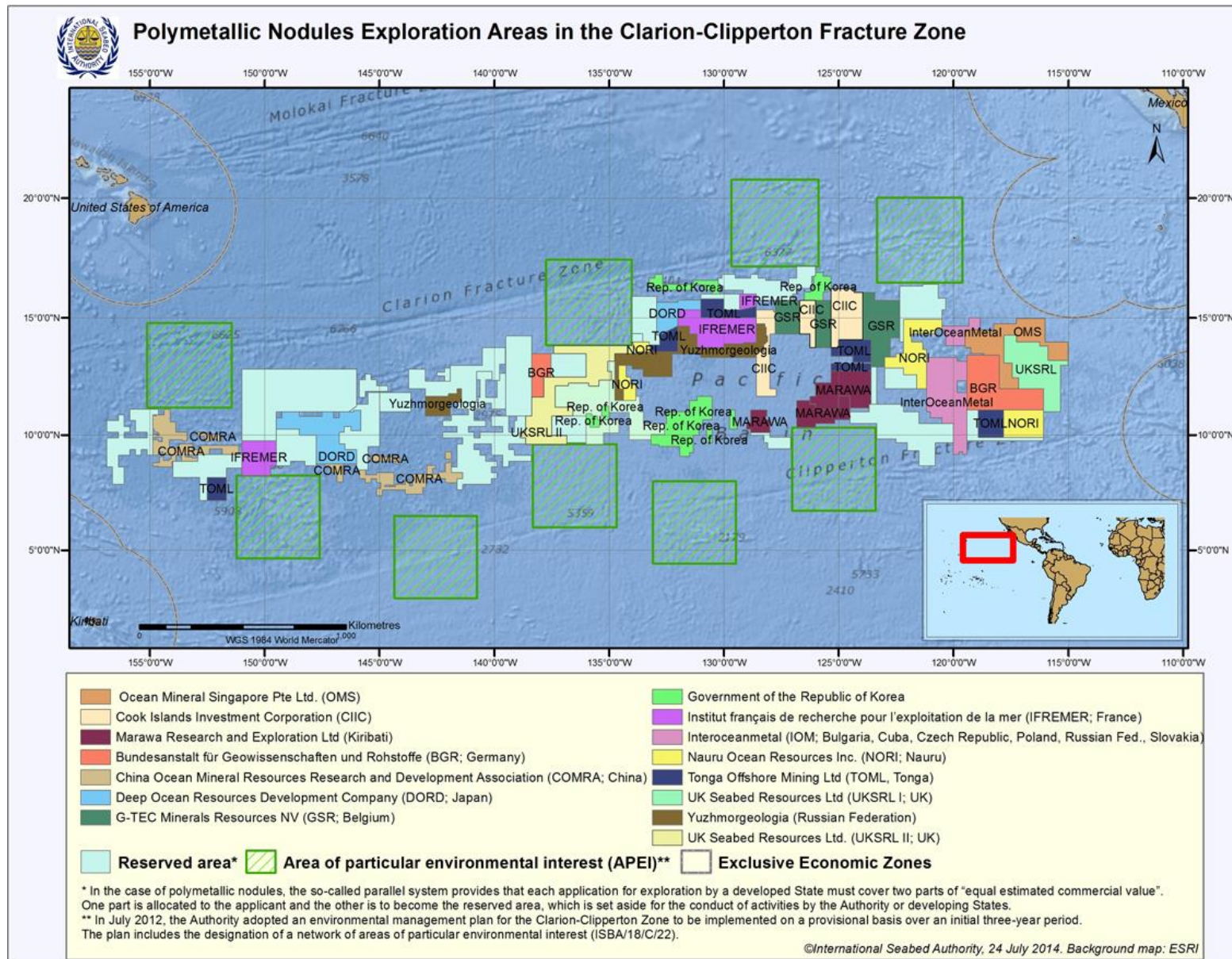
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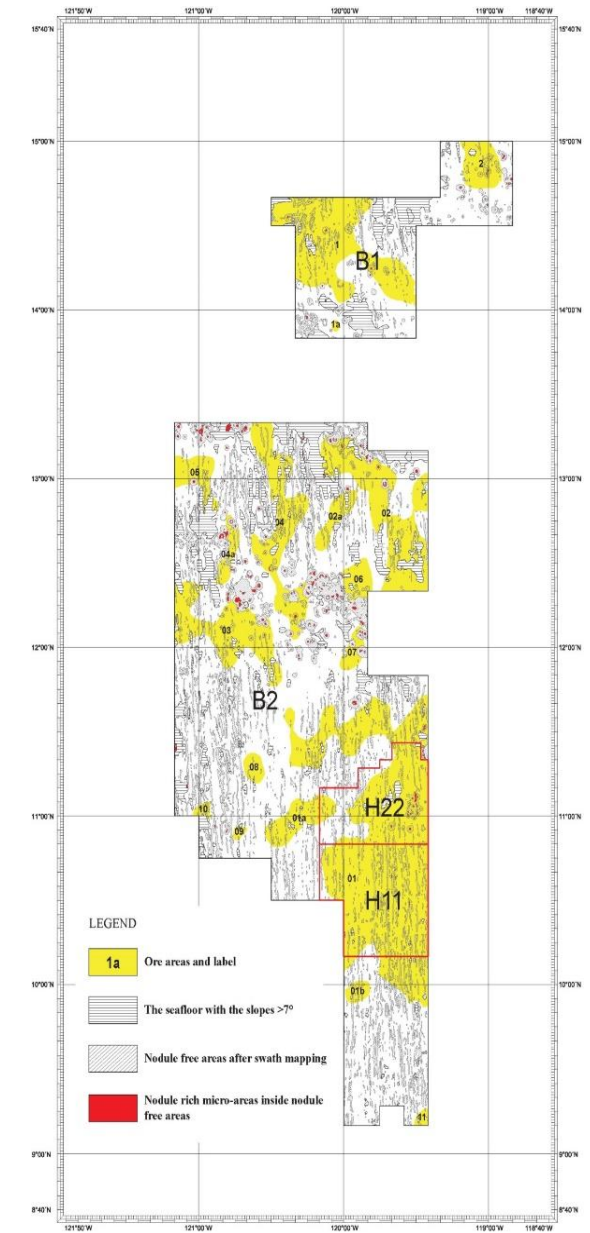
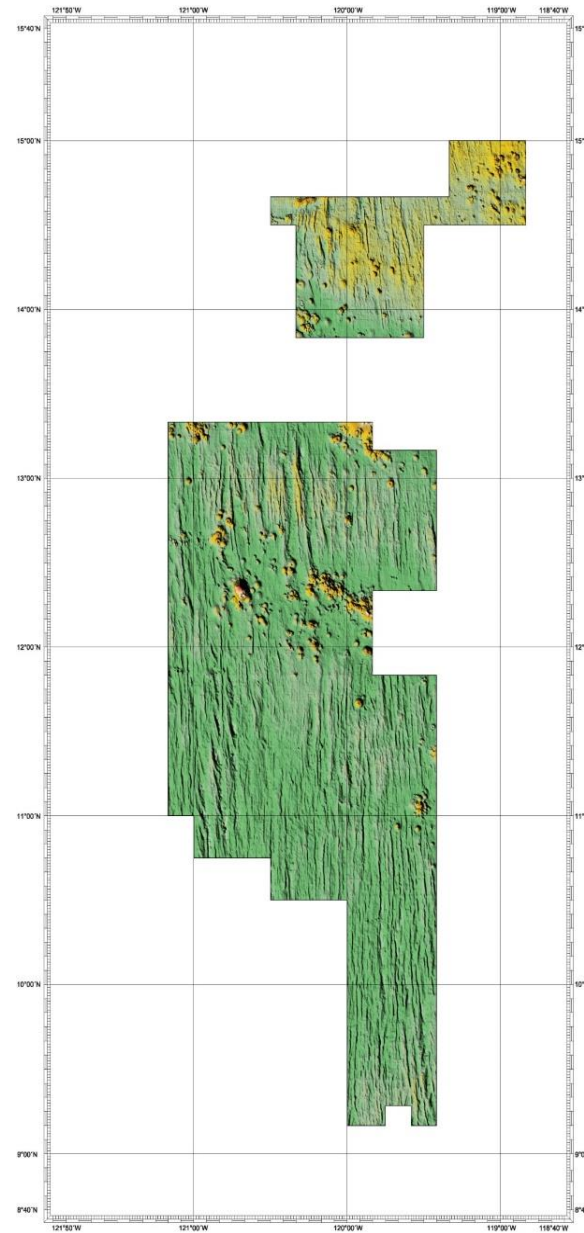
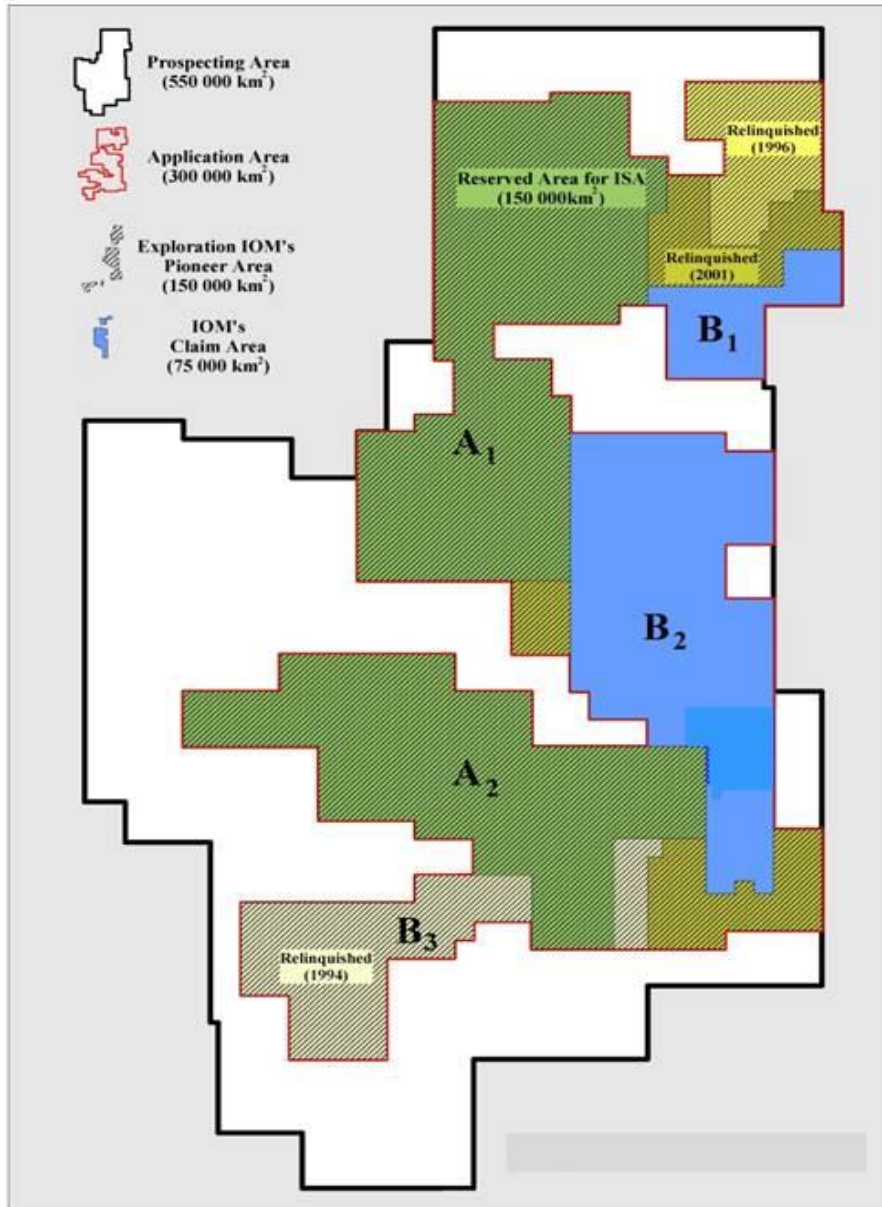
data spe

oceanographic and environmental baseline studies;

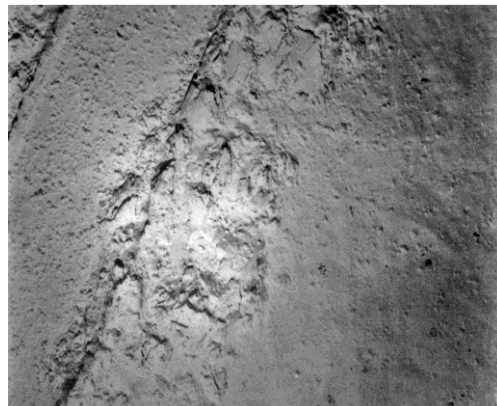
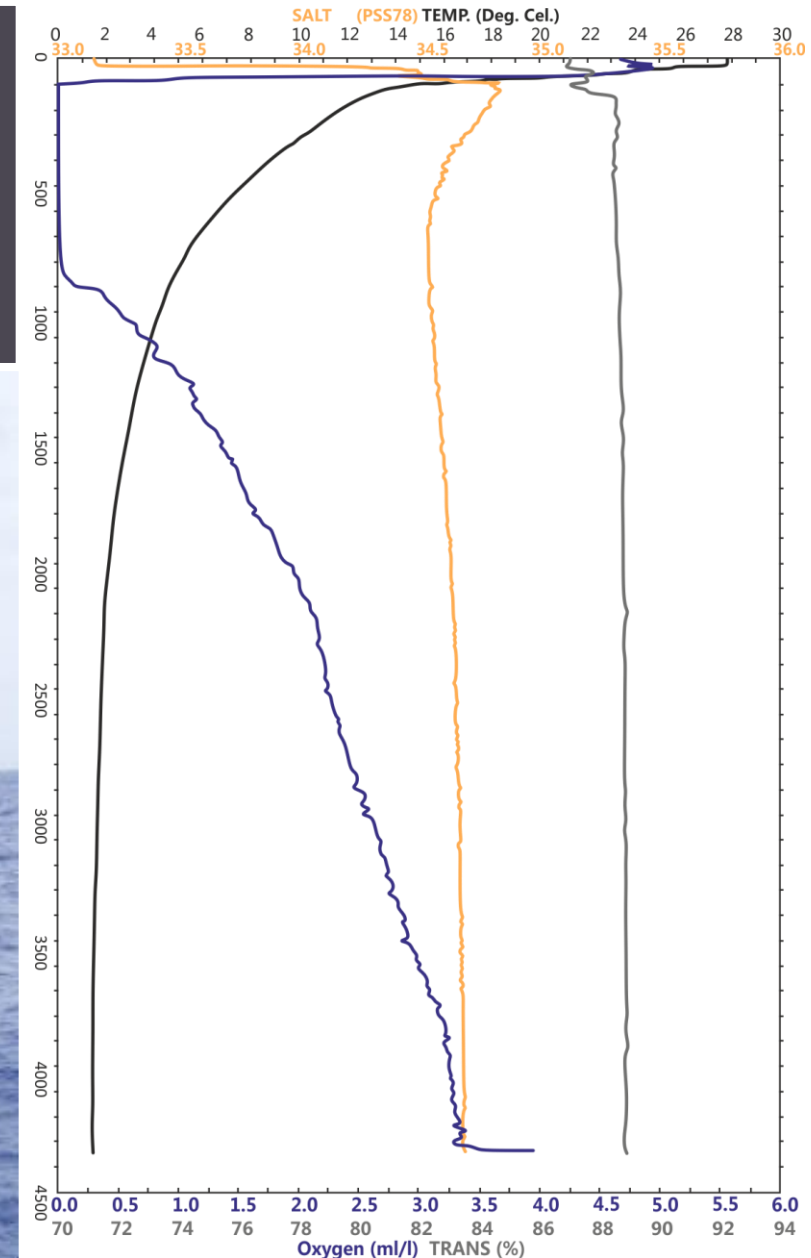
area-based
environmental management

non area-based
environmental management





- CTD casts and water sampling by the Rosette sampler, current measurements
- Box corer sampling
- Observation with deep-towed acoustic and TV-photo profiling devices
- Deep Sea Sediment Resuspension System (Disturber) operations

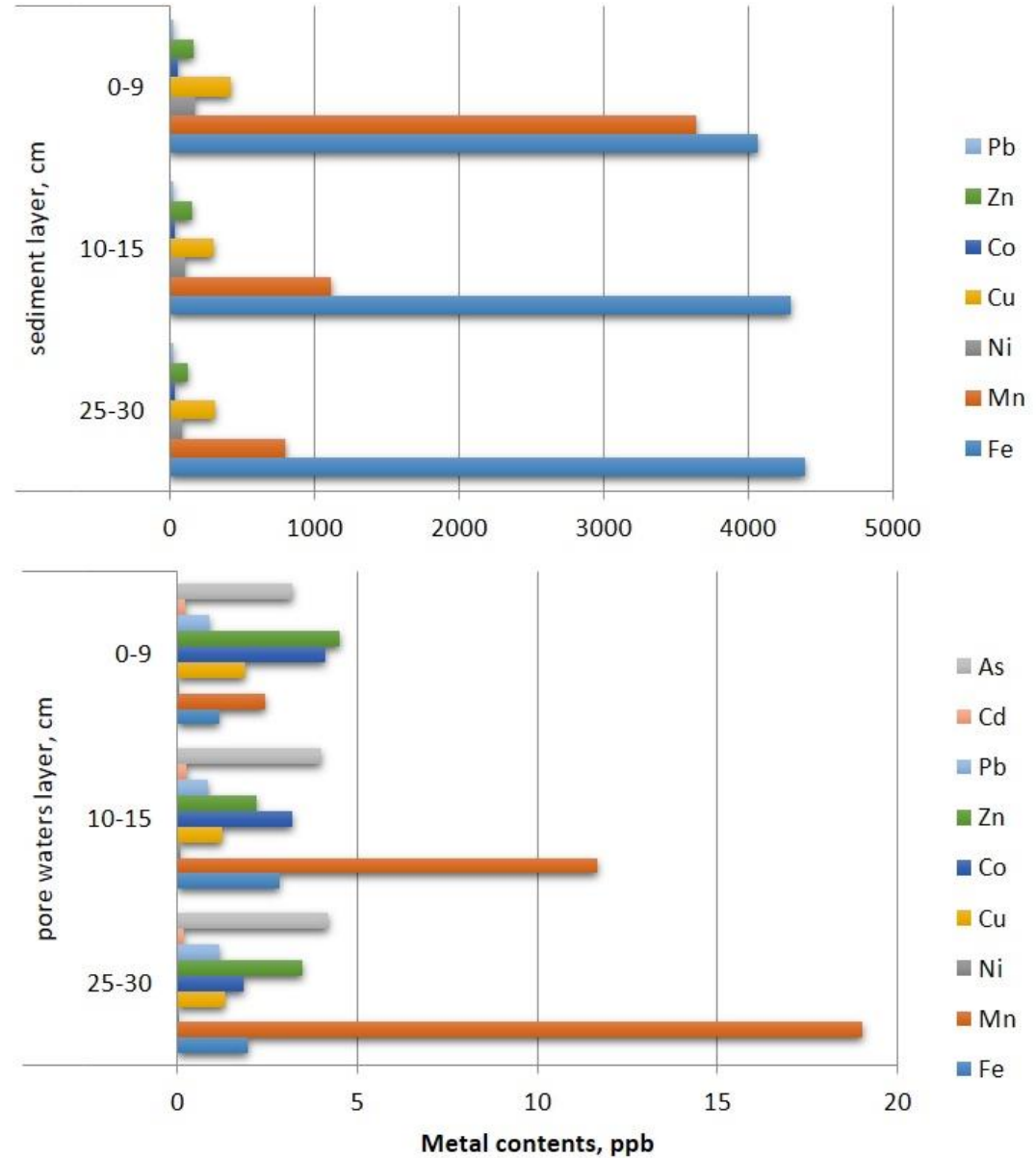
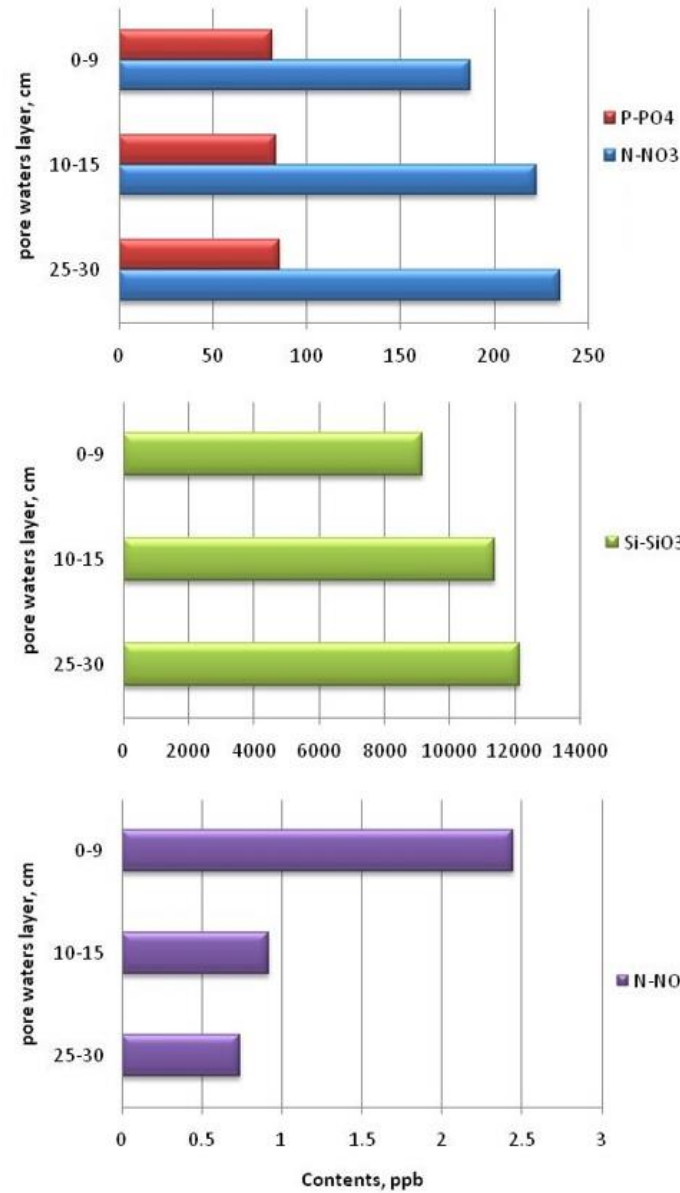


- physical and chemical profiles in the water column
- near-bottom currents regime
- sediment mechanics, suspension and re-settlement
- chemical composition of sediments
- pore waters chemistry (nutrients and heavy metals)
- meio-, macro- and megabenthos
- disturbance thickness, changes in the sediment properties, biological response to the disturbance in time series
- bioturbation

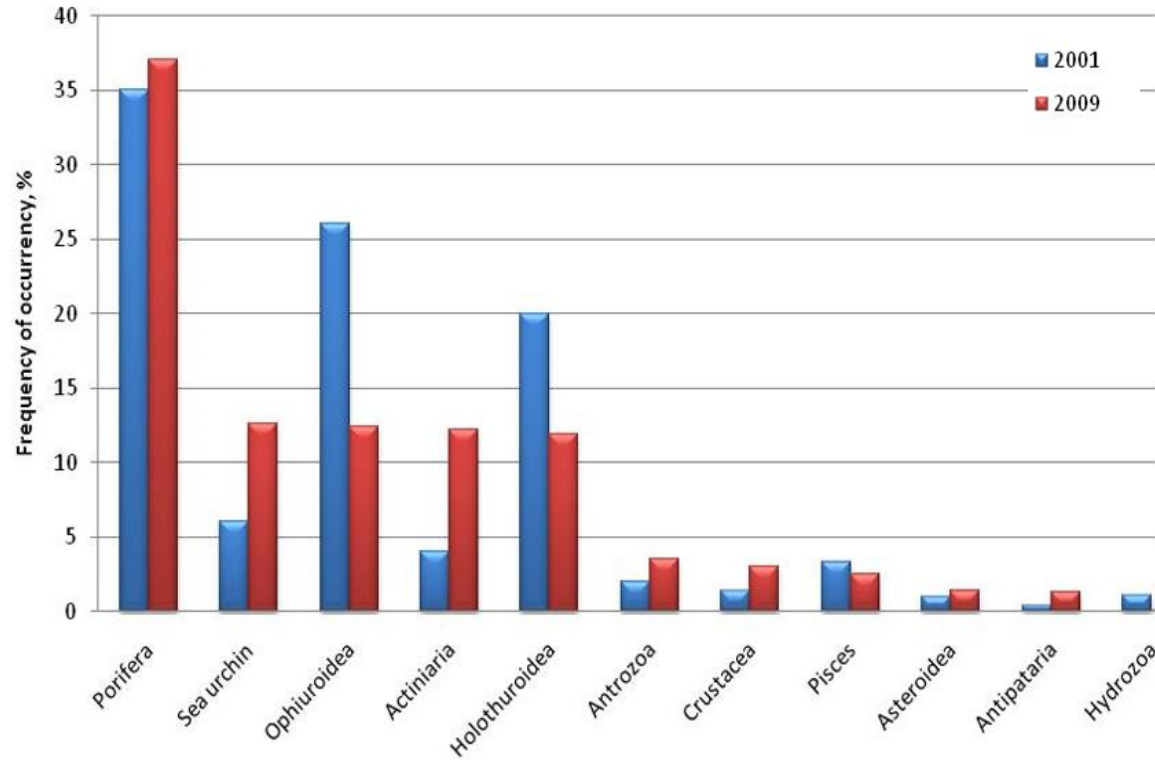
classification and
systematization

ocean physics
ocean chemistry
sediment properties
biological communities
bioturbation
sedimentation

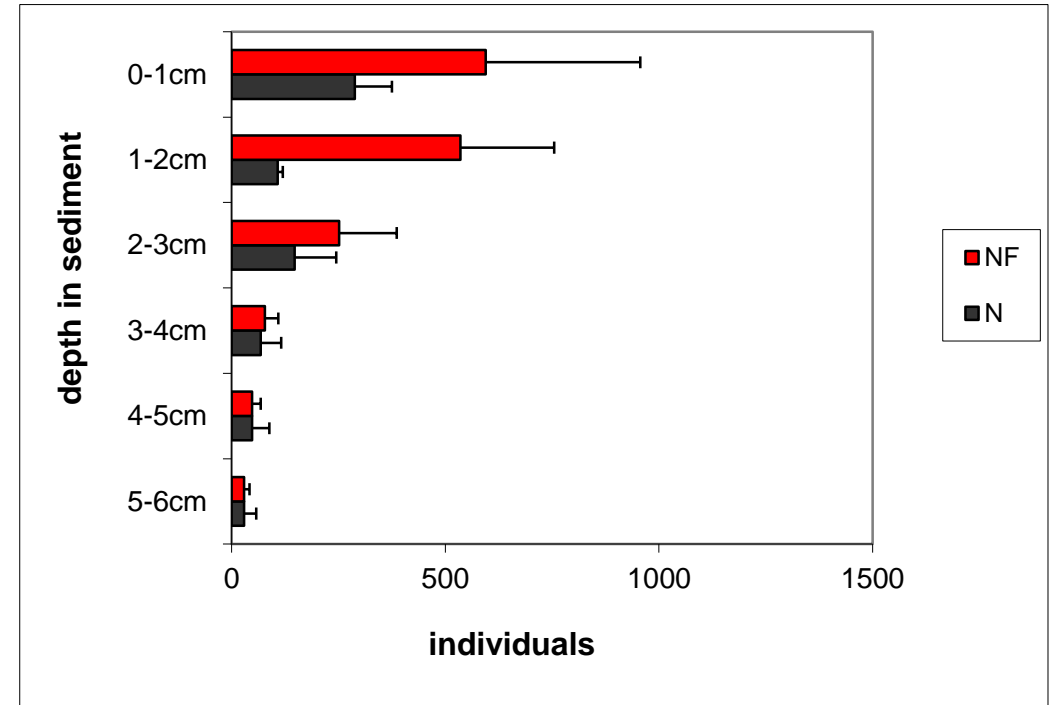


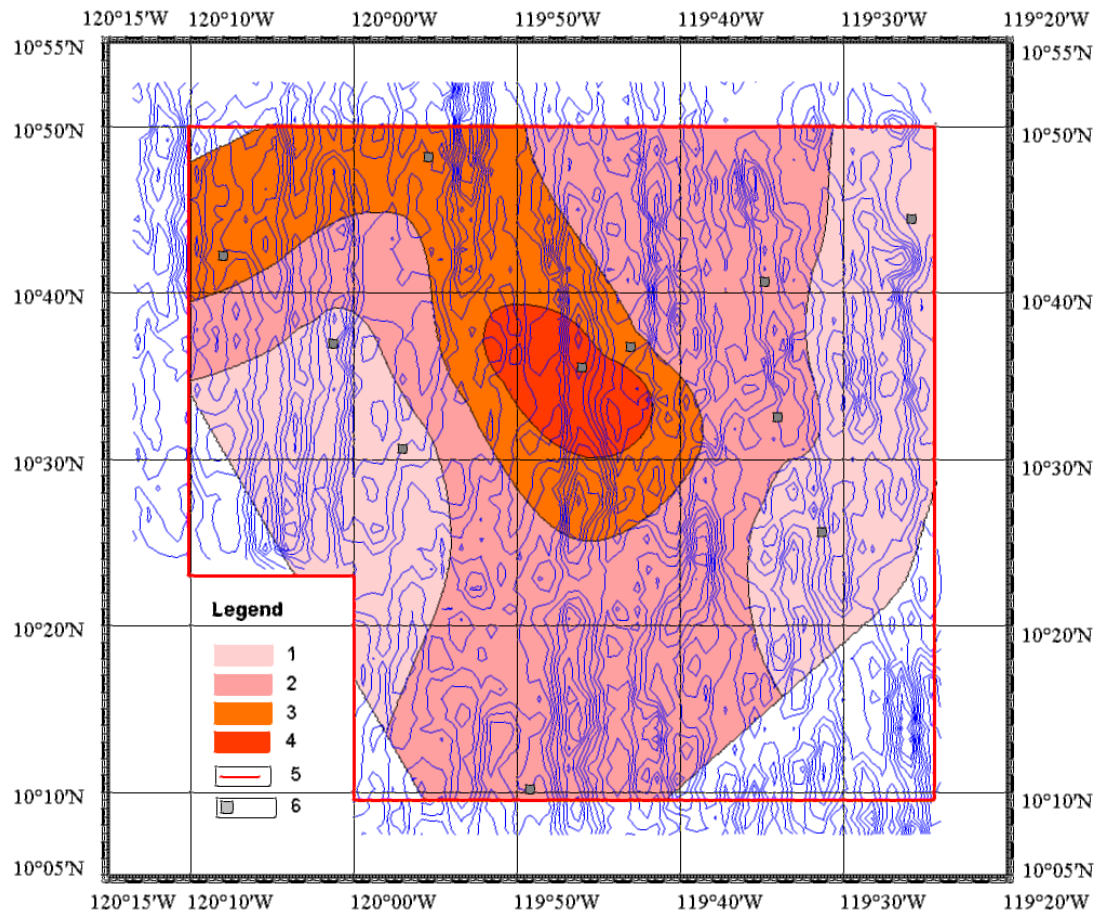


IOM megafauna 2001 and 2009

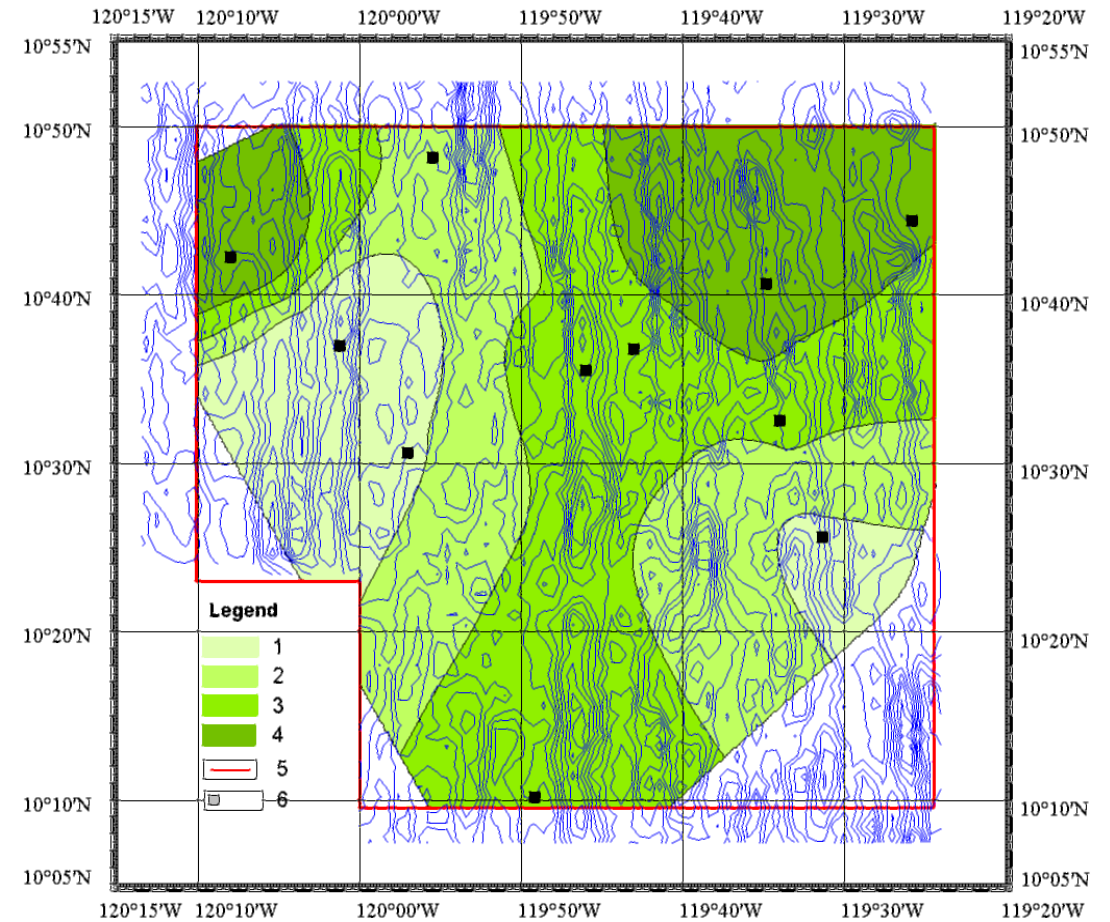


Vertical distribution of meiofauna in nodule-bearing (N) and nodule-free (NF) seafloor





1) 40 - 90, 2) 91-140, 3) 141-190, 4) 191-240 inds/m²



1) 24- 54, 2) 55-80, 3) 81-110, 4) 111-150 inds/m²



**MEGAFAUNA**

- Structure: domination of 6 taxa (Xenophyophorida, Porifera, Ophiuroidea, Actiniaria, Echinoidea, Holothuroidea)
- Less abundant megafauna in nodule-free (274 inds/ha) than in nodule-bearing areas (355 inds/ha)

**MACROFAUNA**

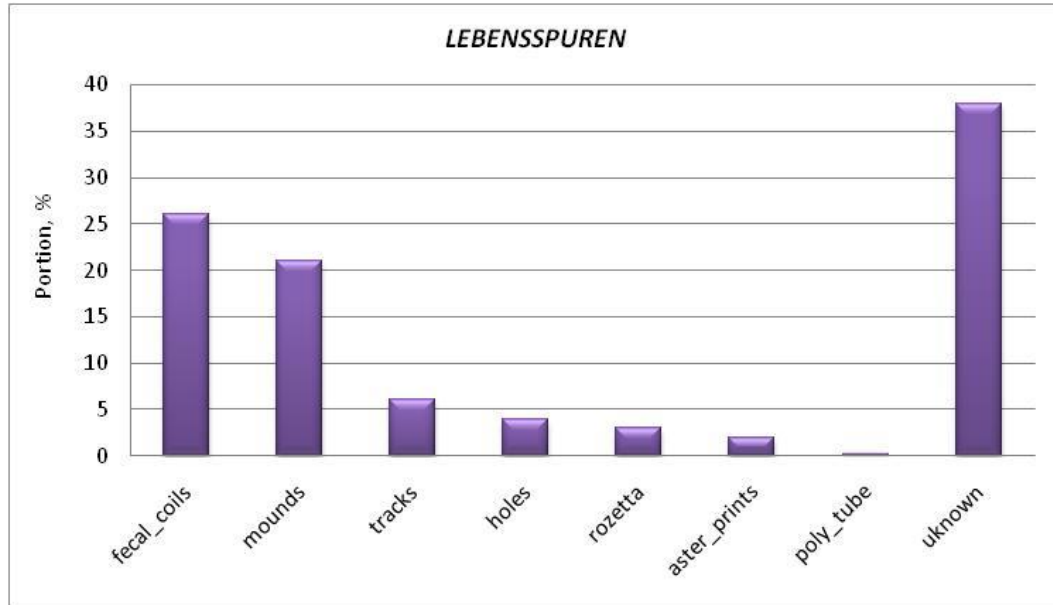
- 22 taxa identified
- Structure: Polychaete (42%), Tanaidacea (26%), Isopoda (12%), Bivalvia (8%), Gastropoda (3%)
- Highest abundance in 0-3 cm sediment layer (170 inds/m³), considerable decrease in 5-10 cm (58 inds/m³)
- No spatial distribution pattern discovered

MEIOFAUNA

- Structure: domination of Nematoda and Harpacticoida
- Lower abundance in nodule-bearing than in nodule-free sediment, 7 taxa found only in nodule-bearing sediment
- Highest abundance in the uppermost sediment layer

**EPIFAUNA**

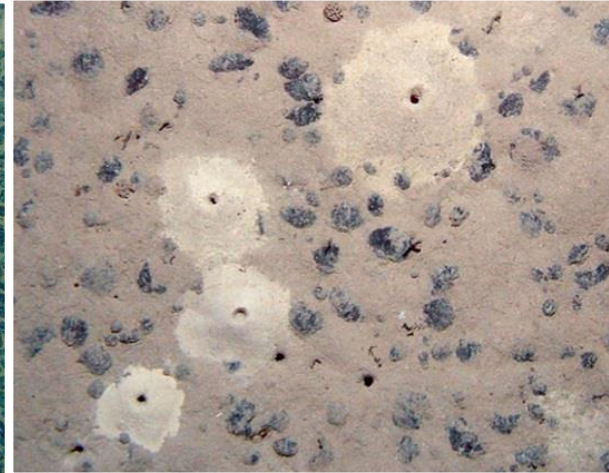
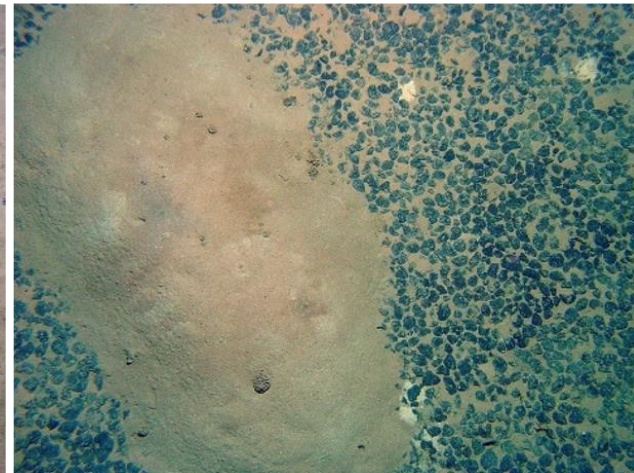
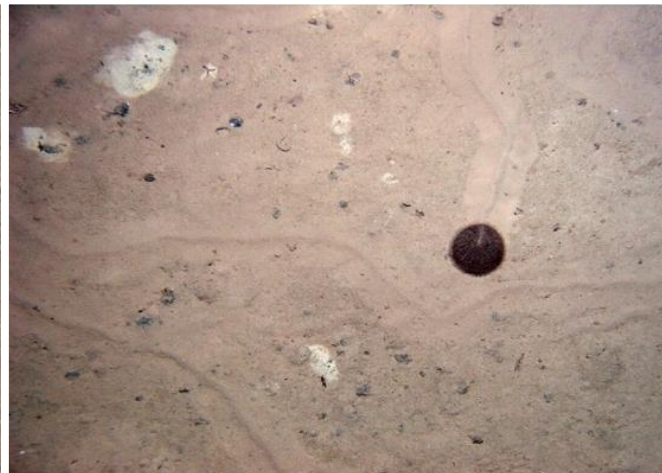
- Structure: domination of Bryozoa, Polychaeta, Porifera and Stephanoscyphus (>80% of identified specimens)
- Spotty spatial distribution of Bryozoa and Polychaeta
- Relationship nodule coverage / faunal abundance to be examined



> 11,000 bottom photographs (with a mean frame of 4 m²) examined with a special attention on the **evidence of biogenic activities** on the sediment-water interface

main types of benthic sediment structures:

- burrows and mounds
- tracks and traces
- aster prints and coils



Future efforts of IOM will focus on maintaining substantial progress in the establishment of environmental baselines and monitoring of environmental conditions and will include the following main works:

- analyzes and processing of data on megafauna, macrofauna and bioturbation
- at-sea environmental research within *the prime areas* involving meteorological observations, CTD-casts and sampling of the entire water column, photo-TV profiling, bottom sampling with a box corer and multi corer to study sediments and their pore waters, biological communities (macrofauna and meiofauna), bioturbation and nodule fauna
- Research activities at *impact reference zone* and *preservation reference zone*
- establishment of database of standard groups and key parameters of marine environment within the IOM exploration area in accordance with the ISA Recommendations



Goal #1: to balance the need of environmental protection and commercial activities

- all cases – to MINIMIZE the impact of mining activities
- efforts undertaken to MITIGATE and COMPENSATE (negative) impact of mining activities

Goal #2: to better describe deep-sea environment

- to CALIBRATE and VALIDATE the environmental models against the newly collected data
- to MAINTAIN and UPDATE the database of environmental conditions
- to COLLABORATE with scientists and International Seabed Authority and to be as TRANSPARENT as possible

Goal #3: to establish objective criteria of impact measurements

- where PLUME begins? Question of clean water definition
- where IMPACT ends? Question of spatial distribution of various disturbances
- what is REPRESENTATIVE area? Question of sufficient resolution



Views on REMPs,

Implementation of any area or on-area based REMP should be consistent with the Exploitation Code or EC should be consistent with REMP regulations.

The consistency checking procedure should be implemented. For example it is not clear if present implementation of *impact reference zones IRZ* and *preservation reference zones PRZ*, has any connection with REMPs in terms of objectives, obligations and assessment of anticipated performance.

According to the *Preliminary strategy for the development of regional environmental management plans for the Area (ISBA/24/C/3)*: *In broad terms, the objective of regional environmental management plans is to provide the relevant organs of the Authority, **as well as contractors** and their sponsoring States, with a proactive **area-based management tool** to support informed decision-making that balances resource development **with conservation** (such objective differs from APEI goals and objectives in the CCZ)*

“Impact reference zones” assessing the effect of activities ... on the marine environment and which are representative of the environmental characteristics of the Area - **area-based management tool**

“Preservation reference zones” to ensure representative and stable biota of the seabed in order to assess any changes in the biodiversity of the marine environment - **conservation**

Overlapping with contractor's area or buffer zones – if there is an environmentally sensitive area of a high importance for conservation, it may take time to adopt regulations to facilitate contractors rights.

Human activities other than marine minerals exploration and exploitation within already defined REMP, e.g. establishment of thermal energy convertors. ISA may have no jurisdiction in such cases.

Implementation of long-term independent monitoring programmes to ensure the effectiveness of areas of particular environmental interest. But what specific bio-relations are to be studied? Are they well defined and clearly understood and accepted by the community?

APEI CCZ:

„Contractors also have a critical role to play in the development of regional environmental management plans, given their contractual obligation to undertake environmental baseline studies, which makes them the primary providers of environmental data” - contractual obligations are only within specified exploration area and are not valid outside of this area.



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Thank you for your attention!