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Short summary report of a Workshop Towards the development of a Strategic Environmental Management Plan for deep seabed mineral exploration and exploitation in the Atlantic basin

Introduction

A scoping workshop to consider issues relevant to an Atlantic SEMP took place in Horta, Azores, Portugal from 1-3 June 2015. The workshop was attended by 39 participants, from 11 nationalities and was informed by two remote presentations. The workshop and its preparation were kindly sponsored by the Directorate-General for Maritime Affairs and Fisheries European Commission, the Government of the Azores, the Pew Charitable Trusts, the Deep Sea Conservation Coalition, the Kaplan Fund and Oceans5.

Participants were welcomed to Horta by Helder Marques da Silva, President of IMAR, Director of DOP University of Azores, Ms Ana Colaço on behalf of the organizing committee and Fausto Brito e Abreu, Regional Secretary for the Sea Science and Technology. The European Parliament was also represented at the opening session through the Member Ricardo Serrão Santos.

The workshop was a response to greatly accelerated interest in deep-sea mining, an emerging activity with potential to have a significant adverse effect on the marine environment. At a strategic level, the challenge is to plan for environmentally sustainable exploitation at the scale of an ocean basin, balancing economic benefits of mineral extraction with conservation of marine ecosystems, whilst taking appropriate account of other maritime activities. As its geographic scope, the workshop focused on the Area in the North and South Atlantic, in particular the Mid Atlantic Ridge (MAR) and the Rio Grande Rise (RGR). A Pre-Workshop Data report (see [Annex 1](#)) was compiled to support and inform the workshop. This report collated available information from available publications, biogeographic databases, experts, online libraries and habitat suitability models.

Background

To provide context for the workshop a series of plenary presentations encompassed complementary exercises, current understanding about the mining footprint and the state of knowledge of Atlantic ecosystems. More specifically:

Craig Smith (University of Hawaii) explained the process of setting up Areas of Particular Environmental Interest (APEIs) in the Clarion-Clipperton Fracture Zone. Design principles were informed by general goals for marine protected area (MPA) networks in California and in common use elsewhere. The workshop noted this as the only other template, a SEMP the International Seabed Authority (ISA) approved in 2012.

Cindy van Dover (Duke University) summarized the 2010 Dinard Workshop deliberations and outcomes that developed guidelines for the conservation of vent

and seep ecosystems (see ISA Technical Study No. 9). Whilst design principles for these ecosystems mirror those for the CCZ, specific natural management units based on genetic connectivity and specific taxa represent a key difference. A recent expert workshop in Norway had considered the balance of protection needed between active and inactive vents.

Daniel Dunn (Duke University) set out lessons learned about data mining and visualization from the Convention on Biological Diversity (CBD) Ecologically or Biologically Significant Areas (EBSAs) process. He concluded that whilst the site specific and expert process of describing EBSAs is different from the SEMP exercise as EBSAs focus on individual sites and not bioregional representativity or connectivity, EBSA criteria and some individual EBSA descriptions have relevance and the processes are complementary.

David Freestone (Sargasso Sea Commission) provided an overview of Atlantic governance. The established legal regime, although in many ways fragmented and uncoordinated, sets out obligations and responsibilities fundamental to any SEMP and its application.

Angel Perez (UNIVALI) and **Ana Colaço** (IMAR) respectively presented general overviews of the Rio Grande Rise (RGR)(South Atlantic Ocean) and Mid Atlantic Ridge (MAR) benthic and pelagic ecosystems. Both emphasized the heterogeneity of habitats arising from a complex topography, a rather strong coupling between benthic-demersal and pelagic realms and potential cumulative impacts of human activities targeting resources in these ecosystems, the importance of understanding genetic connectivity as well as an overall paucity of biological knowledge. They considered it essential that SEMP acknowledge fundamental differences between geological and ecological timescales.

Rob Tinch (Median, *presenting remotely*) reflected on the precautionary approach and adaptive management in the context of deep-sea mining. As this is an emerging activity there is a need to understand uncertainties and unknowns, to quantify serious risks (both reversible and irreversible), the timing of actions and distribution of costs and benefits. ISA have the legal mandate to achieve this on behalf of mankind as a whole and will need to reflect the value of the Area.

Phil Weaver (Seascope, MIDAS) examined contrasting patterns in deep-sea mining footprints and economic opportunities. He speculated on likely timing and extent of mining exploitation, explaining work-in hand within MIDAS to quantify plumes, ecotoxicity and ecosystem recovery potential. Evaluation of mitigation strategies could take decades, confirming a need for precaution.

Gwenaelle Le Gurun (ISA, *presenting remotely*) provided an overview of existing contracts for mineral exploration in the Atlantic Area. ISA anticipated discussion on whether the Atlantic would benefit from one or several SEMP; better understanding of scientific drivers and data availability to determine APEIs including the size and location of buffer zones; and the need for a coordinated and integrated approach. She also recalled the process involved in the environmental management plan for the Clarion-Clipperton Zone and emphasized the need to

build a robust scientific case as a first step in the process for developing any strategic environmental management plan.

Telmo Morato (IMAR) and **Jesse Cleary** (Duke University), on behalf of the data collation team, elaborated on the different data layers captured in the pre-Workshop Data Report and knowledge gaps in the wider Atlantic Ocean. Data had been sourced from major repositories including OBIS, Pangaea, and EMODnet as well as other portals. Some data was not available yet and some further work to finalize the data report was envisaged. Data availability was skewed to the northern part of the MAR. The workshop agreed that extra effort to obtain data known to exist is desirable and a selection of sources and possible updates were highlighted.

Approach

The workshop agreed to consider the full extent of the Area in both the North and South Atlantic as its geographic scope. Participants were sensitive to submissions by Atlantic States to the Commission on the Limits of the Continental Shelf (CLCS), recognizing that in future the ISA will need to initiate bilateral discussions with any States considering deep-sea mining in their national waters that could affect or be affected by seabed mining impacts.

The draft Data Report concentrated on the MAR and RGR, taking a pragmatic view regarding data availability and anticipating that the main interest of the workshop would therefore focus away from the GOODS Abyssal Provinces (i.e. above 3500m), removing areas within EEZs and CLCS submissions, and not considering the CCAMLR Convention Area.

For these reasons and given the locations of existing ISA license blocks the workshop focused on the northern and central MAR and the RGR, accepting that any viable network of areas where no mining should take place is likely to intersect existing and potential future claim areas.

At the same time the workshop also recognized the need for adaptive management, acknowledging that compared to the Atlantic the CCZ is a 'simpler system' and main ecological drivers for CCZ-EMP are surface productivity, bottom depth and seamount distribution. As for the CCZ, protection should be proportionate to anticipated mining activity and in line with persistence of direct and indirect adverse environmental impacts.

Objectives

Main objectives for the workshop were recalled. These were stated as follows:

1. Gather and review the adequacy of available baseline information on the marine environment including the location of sensitive deep-sea habitats and ecosystems;
2. Identify gaps in the baseline information and discuss how to fill them;
3. Identify related legislation and policy initiatives;

4. Identify the nature, distribution and intensity of pressures and impacts associated with mining as they interact with other anthropogenic activities and stresses; and
5. Agree upon a roadmap for the development of a SEMP for the Atlantic and the strategic aims and goals of such a plan.

Working groups

The workshop then established two working groups. Detailed deliberations of the working groups will be set out in the full report, but in summary they:

- Reviewed existing science-based goals for the development of an Atlantic SEMP, building on those agreed for the CCZ-EMP and proposed by the DINARD Workshop. A preliminary set of conservation and management objectives as defined by the workshop were accepted as an initial list that could be evolved into a more hierarchical set of goals and objectives;
- Reviewed existing policy and regulations in the context of deep-sea mining including management measures already adopted by other competent international organizations;
- Identified the categories of information required for environmental management and adequacy of available baseline information;
- Proposed guidelines for APEIs/Preservation Reference Zones (PRZs) for sulfides and crusts giving particular attention to active and inactive vents, fracture zones and water column features. A key consideration was to formulate mineral deposit and Atlantic-specific design principles to guide GIS-based optimization in order to recommend best locations for and spacing between APEIs and/or PRZs;
- Considered the nature, distribution and intensity of all human uses and likely interactions with mining; and
- Identified knowledge gaps and how to fill them in the context of a proposed roadmap.

Outcomes

High-level outcomes are summarized below:

Issue	Rationale	Outcomes
Data gathering:	SEMPIA should be informed by integrated data at appropriate temporal and spatial scales and resolutions	SEMPIA data report has collated data and meta data from researchers, cruises, publications as set out in the workshop data report
Data adequacy	Categories of information / quality discussed	Post workshop efforts and next steps
Gaps in baseline information	Data deficiencies recognized	Disparity between North and South Atlantic Action required includes: i. existing data yet to be aggregated ii. new data gathering e.g. targeted cruises

		iii. unlikely data; may be addressed through modeling and proxies
Science-based goals	Fundamental to a SEMP CCZ-EMP principles and Dinard report used as a basis	Draft conservation and management objectives to inform a scientific approach proposed for future consideration
Design principles:	Ridges are more heterogeneous than abyssal plain – topographic effects such as ridge crests, variable current systems, proximity of faults, depth of valleys (i.e. up to 4km constraining flows), fracture zones and chemosynthetic ecosystems, – RGR modified PRZ approach – dictating specific considerations	APEI parameters suggested for future consideration including dimensions and placement of protection to assure connectivity and representative depths APEI and PRZ options were scoped for further consideration and scientific analysis
Related policy and legislation	Existing spatial management measures (VMEs / MPAs / Important Bird Areas etc.) are limited to certain regions Associated policies provide opportunities / considerations	Agreed that these should be factored into the SEMP and anticipate more Note these and seek synergy with deep-sea fisheries and conservation measures
Pressures and impacts associated with mining operations	Major operational impacts such as habitat loss plus plumes and noise. SEMP should factor in recommendations from research projects (e.g. plume effects, toxicity, recovery and rehabilitation)	Conservation tools including set aside of areas with appropriate buffer zones and other mitigation measures
Taking into consideration other sectoral activities	Interaction with water column is a key consideration as the Atlantic is a very 'busy' ocean	Attention should be paid to cumulative effects, interaction with other anthropogenic stresses
Adaptive SEMP	Review and monitoring	Need to build in opportunities for periodic revision based on new knowledge and greater certainty

Way forward

The workshop accepted that its efforts were a first attempt at scoping of the issues and therefore a further process is needed. To that end a roadmap was elaborated, proposing a series of further scientific meetings considered necessary to establish a more robust basis upon which to base an Atlantic SEMP.

The workshop also recognized that the ISA has exclusive competence for management of mining-related activities in the Area, and it would be for the ISA to further develop, recognize and adopt any SEMP. Thus the roadmap proposed also seeks to articulate with ISA meetings and any SEMP-related initiatives

suggested by the Legal and Technical Commission of the ISA. Workshop participants wished to work with and alongside the ISA to achieve an Atlantic SEMP.

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