



## 2nd Expert Scoping Workshop: Charting Future Horizons – Harnessing Advanced Technologies for the Protection and Sustainable Use of the International Seabed Area:

### “Monitoring”

10 - 13 June 2025  
Kobe, Japan (Hybrid)

### Draft Agenda

#### Day 1 - Tuesday, 10 June

Time (JST) <sup>i</sup>	Meeting Activities
9:30 – 10:00 am	<b><i>Agenda Item 1: Opening of the Workshop</i></b> Moderator: [TBD] <ul style="list-style-type: none"> <li>Leticia Carvalho, Secretary-General, International Seabed Authority (ISA)</li> <li>Yuzo Yamaguchi, Ministry of Economy, Trade and Industry of Japan (METI)</li> <li>Masato Fujiwara, President of Kobe University, Japan</li> <li>Katsuhiko Suzuki, Japan Agency for Marine-Earth Science and Technology (JAMSTEC)</li> </ul>
10:00 – 10:20 am	<b><i>Group Photo</i></b>
10:20 – 10:50 am	<b><i>Agenda Item 2: Meeting Background, Scope and Expected Outputs Addressing Key Technologies, Technological Needs, Research and Development Activities</i></b> <ul style="list-style-type: none"> <li>Ulrich Schwarz-Schampera (ISA Secretariat), Tomohiko Fukushima (Legal and Technical Commission [LTC])</li> </ul>
10:50 – 12:20 pm	<b><i>Agenda Item 3: Marine Monitoring – Setting the Scene (requirements, examples)</i></b> Chair: [TBD] <ul style="list-style-type: none"> <li>Pedro Madureira (University of Evora, Portugal): <i>The Draft Regulations for Exploitation and Existing Regulations and Guidelines for Deep-Sea Monitoring</i></li> <li>Menhyao Zhu (OPRI, Japan): <i>Bridging Science, Policy, and Society through the “Ocean Shot” Initiative: Innovations in Monitoring for Ocean Discoveries</i></li> <li>Muhammad Zarar (Geo-Tech Consultancy Services, Pakistan): <i>Technological Barriers for Deep-sea Monitoring and How to Over-come them by using Geo-spatial &amp; Geophysical Data Collection Technologies integrating with AI &amp; Gen-AI pathways</i></li> </ul>

Time (JST) <sup>i</sup>	Meeting Activities
	<ul style="list-style-type: none"> <li>Musa Animashaun (ST Hudson Engineers, Inc., United States): <i>Hydrography in the Deep Sea: Enabling Transparent, Scalable Monitoring of the International Seabed Area</i></li> </ul> <b>Discussion (20 min.)</b>
12:20 pm – 2:00 pm	<b>Lunch Time &amp; Coffee Break</b>
2:00 – 3:10 pm	<b>Agenda Item 3: Marine Monitoring – Setting the Scene (requirements, examples) (cont'd)</b> Chair: [TBD] <ul style="list-style-type: none"> <li>José Miguel Almeida, Alfredo Martins, Betina Neves, Eduardo Silva (INESCTEC): <i>TRIDENT: Project, Updates and Tech Insights for Long-Term Deep-Sea Monitoring</i></li> <li>Matthieu Straub (NineNorth, USA, France): <i>The Visualization of Environmental Data and the Possible Outreach Solutions</i></li> <li>Haiyan Yang (BPHTDC, China): <i>Monitoring Program under Low-Disturbance Polymetallic Nodule Collecting Condition</i></li> </ul> <b>Discussion (20 min.)</b>
3:10 – 4:15 pm	<b>Agenda Item 4: Data Handling and Communication</b> Chair: [TBD] <ul style="list-style-type: none"> <li>Susumu Takatsuka (Sony, Japan): <i>High-precision Direct Observation of Particles on the Seafloor Using an Event-based Vision Sensor (EVS)</i></li> <li>Hina Muranaka (NEC Networks &amp; System Integration Corp., Japan): <i>Seafloor earthquake and tsunami observation system for issuing Earthquake Early Warnings and clarifying earthquake mechanisms</i></li> <li>Curtis Lee (QYSEA Technology, China): <i>Intelligent Underwater Drones for Seabed Monitoring, Water Quality Assessment, and Infrastructure Inspection</i></li> </ul> <b>Discussion (20 min.)</b>
4:15 – 4:30 pm	<b>Coffee Break</b>
4:30 – 5:00 pm	<b>Agenda Item 5: Compilation of Thematic Discussion for Relevance and Priorities in Marine Monitoring, Data Handling and Communication</b> <ul style="list-style-type: none"> <li>Workshop Co-chairs</li> <li>ISA Secretariat</li> </ul>
6:00 – 8:00 pm	<b>Workshop Reception Dinner</b>

## Day 2 - Wednesday, 11 June

Time (JST) <sup>i</sup>	Meeting Activities
9:30 – 10:00 am	<b>Summary of Day 1</b> <ul style="list-style-type: none"> <li>Junichiro Ishibashi (KOBEC) and Kioshi Mishiro (ISA)</li> </ul>
10:00 – 10:20 am	<b>Agenda Item 6: Introduction of KOBEC Research Activities</b> <ul style="list-style-type: none"> <li>Hiroko Sugioka, Tokihiro Katsui, Jun-ichiro Ishibashi (Kobe Ocean-Bottom Exploration Center, KOBEC): <i>Introduction of Activities</i></li> </ul>
10:20 – 11:20 am	<b>Agenda Item 7: Technical Requirements for Plume Detection and Measurements</b> Chair: [TBD]

Time (JST) <sup>i</sup>	Meeting Activities
	<ul style="list-style-type: none"> <li>Thomas Peacock &amp; Souha El Mousadik (MIT, United States): <i>Monitoring and Modeling Deep-Sea Nodule Mining: Lessons from Recent Collector Trials in the CCZ</i></li> <li>Yasuo Furushima (JAMSTEC, Japan): <i>In-situ Measurements and Estimation Method for Turbulence Intensity (Turbulent Kinetic Energy Dissipation Rate) Near the Deep-Sea Floor</i></li> <li>Scott Loranger (Kongsberg, Norway): <i>Acoustic Measurements of Suspended Sediment to Assess Potential Environmental Impacts from Deep Sea Mineral Extraction</i></li> </ul> <p><b>Discussion (20 min.)</b></p>
11:20 – 11:40 am	<b>Coffee Break</b>
11:40 – 12:40 pm	<p><b>Agenda Item 7: Technical Requirements (stationary, mobile) (cont'd)</b> Chair: [TBD]</p> <ul style="list-style-type: none"> <li>José Miguel Almeida, Alfredo Martins, Betina Neves, Eduardo Silva, Carlos Almeida (INESCTEC, Portugal): <i>PETRA: Innovative Robotics for Deploy/Recover and Monitoring in the Deep Sea for “Shipless” Operations</i></li> <li>Berit Floor Lund (Kongsberg, Norway): <i>Machine Learning for Interpretation of Hydroacoustic Data Streams, Real-Time and Post Processing</i></li> <li>Hiroyuki Yamamoto, Tetsuya Miwa (JAMSTEC, Japan): <i>Monitoring System and Technical Story of Edokko Mark-I</i></li> </ul> <p><b>Discussion (20 min.)</b></p>
12:40 – 2:30 pm	<b>Lunch &amp; Coffee Break</b>
2:30 – 4:00 pm	<p><b>Agenda Item 8: Monitoring of Activities on Different Marine Minerals (Polymetallic Nodules, Polymetallic Sulphides and Cobalt-rich Ferromanganese Crusts: Surface, Mid-Water and Seabed)</b> Chair: [TBD]</p> <ul style="list-style-type: none"> <li>Dhugal Lindsay (Deep Ocean Stewardship Initiative [DOSI], JAMSTEC), Mehul Sangekar (University of Tokyo, JAMSTEC), Ariell Friedman (Greybits Engineering): <i>Leveraging AI for Image-Based Monitoring of Pelagic Communities</i></li> <li>Akira Tsune (DORD, Japan): <i>Application of Monitoring Technologies to Polymetallic Nodules’ Exploration Activities and the Technical Transfer</i></li> <li>Hiroko Kamoshida (JOGMEC, Japan): <i>Environmental Monitoring and Simulation: Knowledge-Gap and Assignments</i></li> <li>Fadhili Malesa (BAS Cambridge, UK): <i>Modelling of Sediment Plumes from Deep Sea Mining: Current Approach and Future Direction</i></li> <li>Georgios Salavasidis (NOC, UK): <i>Novel Sensing and Autonomous Platforms for Deep-Sea Mining Impact Monitoring</i></li> </ul> <p><b>Discussion (20 min.)</b></p>
4:00 – 5:30 pm	<b>Coffee Break</b>
5:30 – 6:00 pm	<p><b>Agenda Item 9: Compilation of Thematic Discussion for Technical Requirements for the Monitoring of Activities on Different Marine Minerals</b></p> <ul style="list-style-type: none"> <li>Workshop Co-Chairs</li> <li>ISA Secretariat</li> </ul>

### Day 3 – Thursday, 12 June

Time (JST) <sup>i</sup>	Meeting Activities
9:30 – 10:00 am	<b>Summary of Day 2</b> <ul style="list-style-type: none"> <li>Tomohiko Fukushima (LTC) and Ulrich Schwarz-Schampera (ISA)</li> </ul>
10:00 – 11:30 am	<b>Agenda Item 10: Monitoring Schemes &amp; Data Reporting</b> Chair: Tomohiko Fukushima (LTC) <ul style="list-style-type: none"> <li>Kanae Komaki (Chowa Giken Cooperation, Japan): <i>AI-Supported Structural Review of Deep-Sea Environmental Monitoring Reports: A Conceptual Framework</i></li> <li>Matthias Haeckel (GEOMAR, Germany): <i>Mining Impact, DISCOL, Monitoring of the Patania-II Trials, and the Ongoing Threshold Discussions</i></li> <li>Timoteo Badalotti (ABS, United States): <i>MRV (Monitoring, Reporting, and Verification) – The Role of Class Society</i></li> <li>Jens Laugesen (DNV, Norway): <i>Environmental Monitoring of Seabed Activities – how can this be done correctly and at the same time within acceptable economic constraints?</i></li> <li>João Carvalho (Deep Focus, Portugal): <i>Application of Machine Learning for Deep-Sea Mineral Resource Assessment and Habitat Mapping and Monitoring: Challenges and Opportunities</i></li> </ul> <b>Discussion (20 min.)</b>
11:30 am – 12:00 pm	<b>Coffee Break</b>
12:00 – 12:30 pm	<b>Agenda Item 11: Monitoring Assessment – Workshop Summary</b> <ul style="list-style-type: none"> <li>Co-Chairs</li> <li>Ulrich Schwarz-Schampera (ISA)</li> </ul>
12:30 – 2:00 pm	<b>Lunch Break</b>
2:00 – 4:00 pm	<b>Agenda Item 12: Plenary Session: Open Discussion and Consolidation of Future Steps</b> <ul style="list-style-type: none"> <li>Co-Chairs</li> <li>Ulrich Schwarz-Schampera (ISA)</li> </ul>
4:00 – 5:00 pm	<b>Agenda Item 13: Closure of the Workshop</b>

### Day 4 – Friday, 13 June (Voluntary)

Time (JST) <sup>i</sup>	Kobe Meeting Activities
9:00 – 12:30 pm	<b>Agenda Item 14: Port of Kobe Cruise, Kobe Maritime Museum: A Journey Through Kobe's Maritime History and Future</b>

<sup>i</sup> Agenda times are approximate and subject to change depending on speaker presentations and discussions.