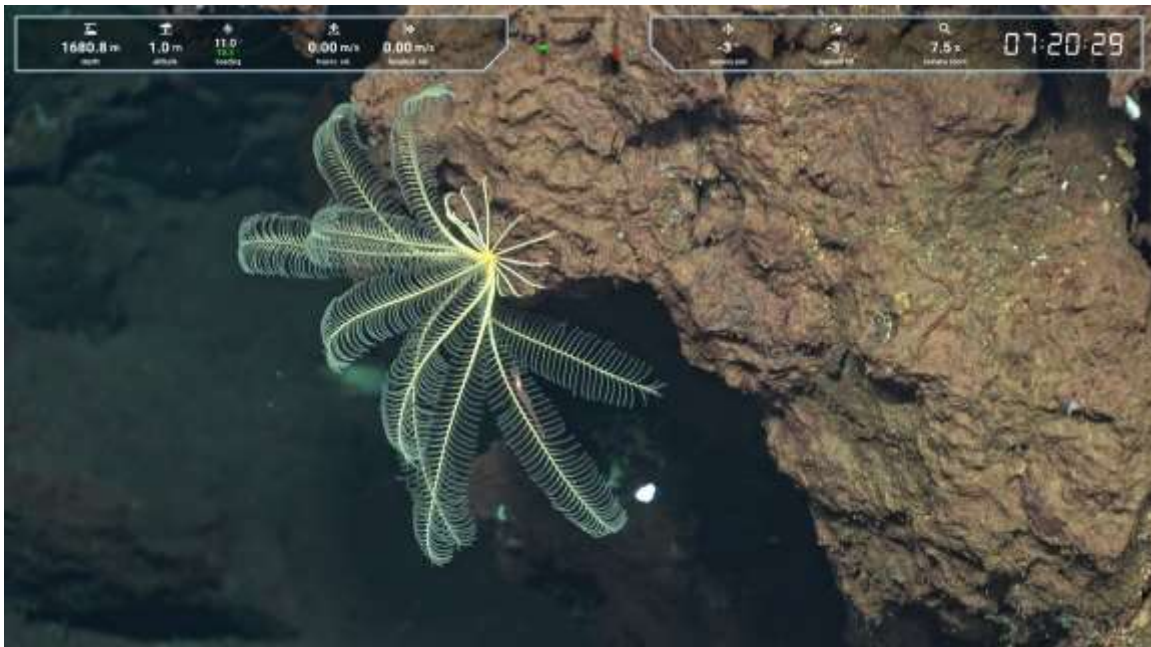




Conservation and restoration of marine ecosystems in the context of deep-sea mining

## DEEP REST – Sixth Newsletter



Deep-sea creature (crinoid) on a basaltic substratum on the Mid-Atlantic Ridge. Photo credit: Victor6000, Momarsat cruise 2024 © Ifremer

April–August 2024

# Hot off the project !

**Editorial** – Dear all. We are now approaching –already- the end of the project. We still have a lot to achieve, several deliverables are due, we have to focus on them and more importantly, think about the legacy of our project. As a real team effort, we produced a policy brief that was distributed during the last ISA meeting in July. It was apparently well received by the delegates. We should pursue this team effort to make sure that our results are put forward and helpful to inform the next steps of writing the regulations for the exploitation of mineral resources in the deep-sea. Hopefully, this community will continue to work together, this project was way too short, we are just starting to build meaningful collaborations, especially with our jurists & economists. Have a great fall! –Jozée

## 2<sup>nd</sup> Deep Rest annual meeting

14-16th May, Faro



Figure 1. The 31 participants to the second DEEP REST annual meeting

A lot was achieved during the second annual meeting of DEEP REST last May. 31 participants were present in Faro, welcomed by the wonderful and efficient team of University of Algarve (Figure 1). Our Ifremer assistant Annaïg also contributed remotely to the success of this meeting. The meeting was also available online and our advisory board was able to follow our discussions.

**May 14<sup>th</sup>**- The first day was dedicated to the presentation of results from WP2, WP3 and WP4 with an open discussion at the end of the day. We then visited the Centro Ciência Viva do Algarve, a museum dedicated to the local marine life. Thanks to the director Cristina Veiga-Pires, we were able to organize a session of the Blue Diplomasea game at this site with voluntary DEEP REST participants.

**May 15<sup>th</sup>**- The second day was devoted to talks from WP5 & WP6. We then broke up in small groups to brainstorm about several aspects of the project before expressing them in plenary session. We focussed on (1) Recommendations: main message from our project, (2) How to target different stakeholders?, (3) Collaborative publications/policy briefs, (4) Up-coming workshops + perspectives and (5) The format of our next final meeting. Then the project's legal task force energetically enlightened us on the legal aspects of deep-sea mining.

**May 16<sup>th</sup>**- The third day, a synthesis was presented by each package leaders and deliverables were examined one by one. All of them should be achieved as planned but with a 6 month delay. Then, our four advisory board members (L. Genio, S. Smith, D. Billett and R. Serrao-Santo) commented on the progress of DEEP REST. The collaborative spirit of the project and its vibrant community was put forward and AB members were impressed by the achievements done so far. The large-scale work was appreciated and the importance of experimenting in the deep sea was raised. The committee put forward that reaching different stakeholders to increase awareness about the deep-sea and environmental issues was of utmost importance. The work achieved with the stakeholders in WP5 was much appreciated. The integration of the work of all WPs is a fundamental step that should be prioritized. Funds to bring the theater play SPLUJ ahead should be raised as it is important to put feelings forward. It would also be crucial to gather all deep-sea educational material to one place. The data management report was found very informative and the web site could be improved. The fact that the timescale needed to gather significant results from restoration experiments is much longer than the duration of most projects was raised: there is a mismatch between funding & monitoring. Plan for a 6-month extension of DEEP REST is well viewed by all members of the AB. An e-mail was sent to the Biodiversa bureau May 22<sup>nd</sup>, right after the meeting. No news so far.

Last points of the meeting was a discussion about the restoration workshop and the writing of the policy brief on mitigation as well as the perspectives of the project. A draft version of the vox-pop interviews with the general public was presented. The Azores team engaged to send their interviews for integration in the fall. Vox-pop should be online during the fall. Next and final meeting will be February/March 2025 or in June/July 2025 if extension.

## **Information sheet “The Mitigation Hierarchy: Polymetallic Nodules and Sulphides” shared with delegates at the 29th Session of the International Seabed Authority (ISA)**

**Sabine Gollner (NIOZ)**

In the framework of the DEEP REST project, a workshop was held to produce an information sheet on the mitigation hierarchy, including current knowledge on effectiveness of mitigation actions to reduce mining impacts. The workshop was kicked off in person during the 2<sup>nd</sup> annual DEEP REST meeting in Faro, Portugal, in May 2024, followed by several online meetings. DOSI members of the Minerals Working Group were invited to join the hybrid workshop, and the DOSI office provided support for information sheet production.

Several ISA delegation members, working at the same time on the mitigation hierarchy in the framework of discussions on the ISA’s draft exploitation regulations, were informed and kept updated about the DEEP REST/DOSI action. The aim was to share up-to-date scientific information in the form of an information sheet with all delegations during the 29<sup>th</sup> ISA council meeting in Kingston, Jamaica, in July 2024.

The information sheet (<https://www.dosi-project.org/wp-content/uploads/mitigation-hierarchy.pdf>) explains the general concept of the mitigation hierarchy and how it can be applied in the context of deep-sea mining for polymetallic nodules and massive sulphide deposits (Figure 2). Detailed information on mitigation possibilities was provided in the form of supplementary tables to the information sheet. Key messages included that avoidance and minimisation of deep-sea mining are the only measures that can maintain environmental objectives. The effectiveness of rehabilitation/restoration after deep-sea mining impact is currently unproven. Offsetting cannot replicate the unique biodiversity and mineral-associated ecosystem functions lost at mined locations.

The information sheet was publically made available online (<https://www.dosi-project.org/wp-content/uploads/mitigation-hierarchy.pdf>). Printed copies and a sheet with a QR code linking to the pdf were shared with ISA delegates by DOSI/DEEP REST members on site during the 29<sup>th</sup> ISA council meeting. The information sheet was very well received and appreciated by delegates.

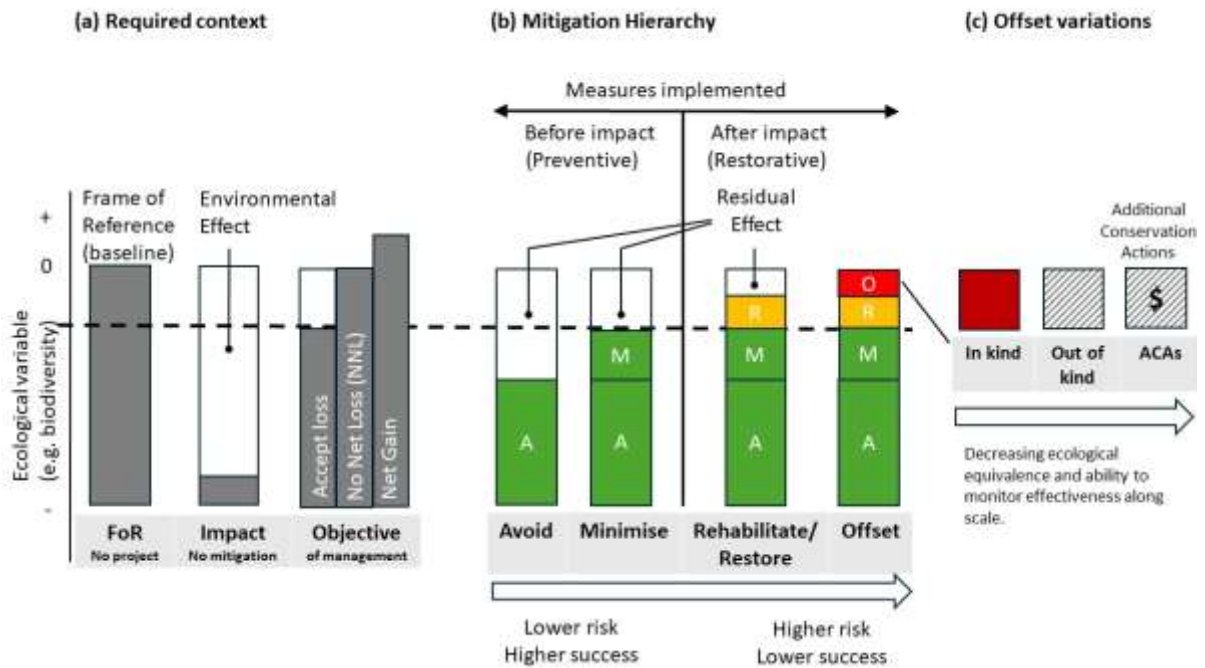


Figure 2. Mitigation hierarchy in the context of deep-sea mining. Please see the information on the document for further information and credits.

## New publication by PhD student Alicia Veillot & co-authors

Alicia Veillot

Alicia Veillot, Florence Pradillon, Loïc N. Michel, Cécile Cathalot, Marie-Anne Cambon, Jozée Sarrazin. Ecology of *Bathymodiolus puteoserpentis* mussels from the Snake Pit vent field (Mid-Atlantic Ridge). *Marine Environmental Research*. Vol. 200, September 2024. <https://doi.org/10.1016/j.marenvres.2024.106653>

Along the northern Mid-Atlantic Ridge, in habitats under moderate (<10 °C) hydrothermal influence on the Snake Pit vent field (SP), large assemblages dominated by *Bathymodiolus* mussels remain poorly characterised, contrary to those in warmer habitats dominated by gastropods and alvinocaridid shrimps that were recently described. In this study, we assessed and compared the population structure, biomass, diversity and trophic interactions of two *Bathymodiolus puteoserpentis* assemblages and their associated fauna at SP.

## New publication by postdoc Shani Friedman

Shani Friedman. (2024). The interaction of the BBNJ agreement and the legal regime of the Area, and its influence on the implementation of the BBNJ agreement. *Marine Policy*, 167, 106235. <https://doi.org/10.1016/j.marpol.2024.106235>

Despite institutional overlap, the Agreement under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (BBNJ) does not really acknowledge or address the ISA or the

regime of the Area set out in UNCLOS, the governing instrument of the BBNJ. Essentially, there is a legal separation between the high seas and the seabed and between living and non-living resources. In practice, these aspects are interconnected, which poses some challenges for the implementation of the BBNJ agreement. This paper provides account for the connectivity of these aspects and analyzes the possible challenges that may hinder compliance with the new treaty.



## Momarsat 2024

Jozée Sarrazin & Marjolaine Matabos

The Momarsat cruise was held from August 4<sup>th</sup> to August 24<sup>th</sup> 2024 on the R/V L'Atalante with the ROV Victor6000. The main objective of this series of cruises is the maintenance of the EMSO-Azores observatory. However, while taking care of the monitoring nodes once recovered on board, each cruise represents a great opportunity to pursue parallel scientific objectives and do experimentations on the seafloor. We had four objectives related to DEEP REST: (1) Continue to follow the recolonization experiment, part of William Johnson Da Silva thesis, (2) Sample fauna and gather imagery for the post-doc of Riwan Leroux on the evaluation of the impacts of long-term research activities on Lucky Strike vent field ecosystems, (3) Deploy the SPIDER experiment to evaluate the impacts of sulphide deposition on *Bathymodiolus azoricus* mussel communities (Figure 3), (4) Recover the experiment that was deployed last year to measure mussel growth rates. All objectives were fulfilled and the cruise was a real success.



Figure 3. Deployment of the SPIDER particle spreader on a *Bathymodiolus azoricus* assemblage. Sulphide particles were spread over the fauna and the chamber was left for ~96 hours. Then, the fauna was recovered and conditioned for different analyses. Collaboration Ifremer/University of Açores/University of Algarve.

A FB web page was dedicated to the cruise (<https://www.facebook.com/CampagneMomarsat/>).



## **Blue DiplomaSEA**

**Joëlle Richard**

On April 16th, teams from AMURE and BEEP got together to test the 'Blue DiplomaSEA' game initiated by Joelle Richard and Charline Guillou to introduce Deep Sea Mining and AIFM issues to stakeholders.



After a lot of hard work, version 1.0 was released and tested in a friendly atmosphere by a dozen or so participants to get feedback on both form and content: relevance and wealth of information.



A second test phase was carried out at the 2<sup>nd</sup> annual Deep Rest meeting in Faro in May, with the ultimate aim of presenting version 2.0 at the UNOC in Nice in summer 2025.

## An art & science workshop for Master students to create theatrical forms on deep-sea related issues

Jozée Sarrazin



Figure 4. The whole team of the “art & science” workshop on the Sein island in June 2024.

In June 2024, a group of twelve Master's students from different universities in Brittany discovered the little-known world of deep-sea ecosystems through theater. Starting by an introductory lecture by researcher Jozée Sarrazin (Ifremer) and the provision of various sources of inspiration (books, videos, image), participants immersed themselves in these difficult-to-access environments (Figure 4).

The various writing, acting and scenography sessions enabled them to illustrate the results of their reflections and compare their ideas on this science and society subject. As if on a real oceanographic mission, they spent a week immersed on the island of Sein: the time spent living together and wandering around the island contributed fully to the spirit of the workshop. Accompanied by two artists from Teatr PIBA professional company and one Ifremer scientist, this workshop encouraged them to imagine, in a creative way, innovative solutions to future scientific, legal and societal challenges.

This project received funding from the European DEEP REST project as part of the BiodivRestore call for proposals (GA N°101003777).

More photos: <https://isblue.fr/actualites/formation/pim-artssciences-embarques-explorer-les-grands-fonds-marins-par-la-creation-de-petites-formes-theatrales-en-immersion-sur-lile-de-sein/>





### **Koen Stuij, Master NIOZ**



I am a second-year marine sciences master student from the University of Utrecht. I am doing a thesis at the Royal Netherlands Institute of Sea Research (NIOZ, Netherlands) with Sabine. I am studying the (artificial) nodules deployed in the BGR Trial mining site to assess the restoration potential of artificial nodules.

### **Lara Baptista, PhD NIOZ**

I am currently a post-doctoral researcher within the SUBLIFE project (PI: Sabine Gollner) at the Royal Netherlands Institute for Sea Research (NIOZ, Netherlands), studying macro- and meiofaunal diversity in newly found shallow sub-seafloor cavities below deep-sea hydrothermal vents at 9° North East Pacific Rise (EPR) vents at 2500 meters depth. By studying which metazoans can use the crustal seafloor as permanent or transient habitat, this project aims to increase our understanding and the extent of connectivity between the seafloor and sub-seafloor biospheres. Within the DEEP REST project, I will conduct trait analyses of EPR fauna before and after volcanic eruption and from different vent and non-vent habitats, aiming for a better understanding of the resilience and recovery of deep-sea communities after disturbances.



## A portrait of Jozée Sarrazin in the “La Croix” journal in France



A portrait of researcher Jozée Sarrazin was published in the “La Croix” journal last July. A look back at her career and the importance she places on communicating with the general public using new approaches such as "art and science". The objectives of the DEEP REST project are mentioned.



### Deep-sea biology symposium, Hong-Kong 13 to 17 January 2025

DSBS17 aims to bring together experts from around the world who have strong interest in deep-sea biological science, biodiversity conservation, deep-sea environment policy and management for better protection of biodiversity and ecosystems. Several DEEP REST scientists will assist. Note that a session a session entitled "*Arts and Science in Deep-Sea Environmental Management*" led by Maria Baker and Jozée Sarrazin will be organized. The DEEP REST project & preliminary results will also be presented.

### Small info

- The final version of the **consortium agreement** has been finalized and sent to all DEEP REST partners.
- The **data management plan** needs your inputs. Please take a few minutes to identify the data you will be using during this project.
- **Post-cards** of the project are available on the web site. Don't forget to bring them along for your meetings and outreach activities.

## Communication tools

**Web site:** <https://deep-rest.ifremer.fr/> on which you can access the [Partners' dedicated area](#) (authentication requested) including templates, links to the google drive, filming protocol and useful resources and official documents

**Mailing to deep-rest organization team (WP1):** [deep\\_rest@ifremer.fr](mailto:deep_rest@ifremer.fr)

**General DEEP REST mailing list:** [deeprestall@listes.ifremer.fr](mailto:deeprestall@listes.ifremer.fr)

**WP leader list:** [deeprestwpleader@listes.ifremer.fr](mailto:deeprestwpleader@listes.ifremer.fr)

**Our advisory board** is composed of: Samantha Smith, David Billett, Luciana Genio and Ricardo Serrao Santos. You can see their profiles on the web site and contact them directly by using their mailing list: [advisory\\_board\\_deep-rest@listes.ifremer.fr](mailto:advisory_board_deep-rest@listes.ifremer.fr). Thanks to all of them to be part of our great project!

## Please cite DEEP REST in your acknowledgements (publications, conferences, activities) and add the logos (found on the web site)

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You may add the UN Decade logo and the Challenger 150 logos as we recently had their endorsement.



**-The end-**