Sampling scheme identifier**: Deep-sea habitats and VMEs identification and monitoring - DEEPVMEs**

MS: **PRT**
Region: North-East Atlantic
Sampling scheme identifier: DEEPVMEs
Sampling scheme type: Research survey at sea
Observation type: SciObsAtSea
Time period of validity: 2025-2027
Short description (max 100 words): The monitoring phased-sampling program aims to map habitat types and VME indicator taxa as well as to assess the extent of GES. Deep-sea areas of the Portuguese continental coast where VMEs are plausible to occur will be investigated. The phased nature of the program is associated with spatial area covered in each year; priority will be given to the plausible VME occurring areas identified by ICES. The methodology will include high-resolution multibeam echosounder bathymetric survey and underwater imagery sampling conducted by ROV. Fine-scale distribution of VME indicator taxa and the evaluation of their GES status are the expected outputs.
Description of the population
Population targeted: Non-commercial invertebrates deep-sea vulnerable species (e.g., corals, sponges, gorgonians and sea pens). The population of the target species will be quantitatively analysed to monitor population density, demography, health status of the colonies (e.g., parasitism and damaged branches) and associated megafauna. The main objective is to evaluate the distribution of benthic megafauna and VME taxa using MiniROV System. Secondarily significant adverse impacts (SAI) and lost fishing gear at same surveyed sites will be also evaluated. The monitoring areas are the ones presented in the Annex II of the Commission Implementing Regulation (EU) 2022/1614 of 15 September 2022, for the Portuguese Mainland coast. **Population sampled:** Deep-sea epibenthic species, including vulnerable invertebrate species. **Stratification:** NA.
Sampling design and protocols
Sampling design description: Epibenthic communities will be investigated using a deep-water camera installed on a MiniROV System, calibrated with seabed grab samples whenever feasible. The sampling dives and transects will be defined based on bathymetry and bottom type maps of the area to be surveyed and will cover the area in a way that could be spatially quantitatively analysed. For that purpose, multibeam surveys will take place to gather seabed morphology information, as well as acoustic backscatter information. The sampling effort of VME survey corresponds to the number of dive stations/transects. This sampling effort be initially determined for each surveyed area but would not exceed 15 days at sea. In every dive,

the miniROV will be lowered from the starboard side of the RV "Mário Ruivo", stationed in Dynamic Positioning (DP). Duration of each dive will depend on surface conditions (wind, wave height, and currents), bottom currents and visibility.
As footage quality is an essential aspect in these studies so an assessment of video and/or stills quality will be made before any dive. Analysts onboard will complete the assessment within the initial viewing of a video.
Data storage will be considered and redundant external supports will be used. Depending on resolution, one hour of video recording can occupy from 5 to 60 GB of disk space.
The analyst(s) on-board will take survey notes related to: i) taxonomic resolution expected in survey; ii) taxonomic resolution available from video; iii) video issues such as camera footage loss, times where seabed was not visible; iv) whether the video is acceptable for analysis at any taxonomic level; and v) type of sediment, litter and other features.
Temperature, salinity, Chl-*a* and dissolved oxygen profiles are taken with a CTD and biogeochemical parameters with water samples from rosette-sampler Niskin bottles, according to a predefined square grid, to characterize the abiotic environment. This monitoring will contribute for future analyses of climate and other abiotic changes.

Is the sampling design compliant with the 4S principle:
NA.

Regional coordination:
It will be established with Spain (e.g., IEO) where areas are of common interest.

Link to sampling design documentation:
No link available yet. Manual will be developed based on ocean best practices in Ocean Research, Applications and Data/Information Management
https://repository.oceanbestpractices.org/bitstream/handle/11329/866/epibiota_operational_guidelines_final.pdf?sequence=1&isAllowed=y

Design follows international recommendations:
NA.

Link to sampling protocol documentation:
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https://repository.oceanbestpractices.org/bitstream/handle/11329/866/epibiota_operational_guidelines_final.pdf?sequence=1&isAllowed=y

Protocol follows international recommendations:
NA.

Sampling implementation

Recording of refusal rate:
NA.

Monitoring of sampling progress within the sampling year:
NA.

Data capture

Means of data capture:
characterization of species (deep-water tow camera/mini-ROV transepts), hydrology (CTD/DO Sensor), biogeochemical parameters (Rosette-sampler Niskin bottles).

Data capture documentation:
No link available yet. Manual will be developed based on ocean best practices in Ocean Research, Applications and Data/Information Management

https://repository.oceanbestpractices.org/bitstream/handle/11329/866/epibiota_operational_guidelines_final.pdf?sequence=1&isAllowed=y

Quality checks documentation:
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Data storage

National database:
"Somos Atlântico" (We are Atlantic) IPMA's Digital Infrastructure

International database:
VME Indicators: ICES VME database (http://vme.ices.dk)
Hydrography-CTD: IODE/SeaDataNet/EMODnet

Quality checks and data validation documentation:
No link available yet. Manual will be developed based on ocean best practices in Ocean Research, Applications and Data/Information Management
https://repository.oceanbestpractices.org/bitstream/handle/11329/866/epibiota_operational_guidelines_final.pdf?sequence=1&isAllowed=y

Sample storage

Storage description:
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Sample analysis:
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Data processing

Evaluation of data accuracy (bias and precision):
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https://repository.oceanbestpractices.org/bitstream/handle/11329/866/epibiota_operational_guidelines_final.pdf?sequence=1&isAllowed=y

Editing and imputation methods:
No link available yet. Manual will be developed based on ocean best practices in Ocean Research, Applications and Data/Information Management
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Quality document associated to a dataset:
No link available yet. Manual will be developed based on ocean best practices in Ocean Research, Applications and Data/Information Management
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Validation of the final dataset:

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