{rokbox title=|Location in the North Atlantic of the nine ATLAS study areas examined in the present study :: Image: Authors| thumb=|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-assessing-environmental-status-selected-north-atlantic-deep-sea-ecosystems-kazanidis-et-al-2020-thumb.jpg|}images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-assessing-environmental-status-selected-north-atlantic-deep-sea-ecosystems-kazanidis-et-al-2020.jpg{/rokbox}

Georgios Kazanidis, **Covadonga Orejas**, Angel Borja, Ellen Kenchington, Lea-Anne Henry, Oisín Callery, Marina Carreiro-Silva, Hronn Egilsdottir, Eva Giacomello, Anthony Grehan, Lénaïck Menot, Telmo Morato, Stefán Áki Ragnarsson, José Luis Rueda, David Stirling, Tanja Stratmann, Dick van Oevelen, Andreas Palialexis, David Johnson, J Murray Roberts, 2020.
Assessing the environmental status of selected North Atlantic deep-sea ecosystems.
Ecological Indicators. Volume 119, December 2020, 106624.
https://doi.org/10.1016/j.ecolind.2020.106624

Abstract: The deep sea is the largest biome on Earth but the least explored. Our knowledge of it comes from scattered sources spanning different spatial and temporal scales. Implementation of marine policies like the European Union's Marine Strategy Framework Directive (MSFD) and support for Blue Growth in the deep sea are therefore hindered by lack of data. Integrated assessments of environmental status require tools to work with different and disaggregated datasets (e.g. density of deep-sea habitat-forming species, body-size distribution of commercial fishes, intensity of bottom trawling) across spatial and temporal scales. A feasibility study was conducted as part of the four-year ATLAS project to assess the effectiveness of the open-access Nested Environmental status Assessment Tool (NEAT) to assess deep-sea environmental status. We worked at nine selected study areas in the North Atlantic focusing on five MSFD descriptors (D1-Biodiversity, D3-Commercial fish and shellfish, D4-Food webs, D6-Seafloor integrity, D10-Marine litter). The objectives of the present study were to i) explore and propose indicators that could be used in the assessment of deep-sea environmental status, ii) evaluate the performance of NEAT in the deep sea, and iii) identify challenges and opportunities for the assessment of deep-sea status. Based on data availability, data quality and expert judgement, in total 24 indicators (one for D1, one for D3, seven for D4, 13 for D6, two for D10) were used in the assessment of the nine study areas, their habitats and ecosystem components. NEAT analyses revealed differences among the study areas for their environmental status ranging from "poor" to "high". Overall, the NEAT results were in moderate to complete agreement with expert judgement, previous assessments, scientific literature on human-pressure gradients and expected management outcomes. We suggest that the assessment of deep-sea environmental status should take place at habitat and ecosystem level (rather than at species level) and at relatively large spatial scales, in comparison to

shallow-water areas. Limited knowledge across space (e.g. distribution of habitat-forming species) and the scarcity of long-term data sets limit our knowledge about natural variability and human impacts in the deep sea preventing a more systematic assessment of habitat and ecosystem components in the deep sea. However, stronger cross-sectoral collaborations, the use of novel technologies and open data-sharing platforms will be critical for establishing environmental baseline indicator values in the deep sea that will contribute to the science base supporting the implementation of marine policies and stimulating Blue Growth.

Keywords: Deep-sea environmental status, Vulnerable Marine Ecosystems, Indicators, Baselines, Marine Strategy Framework Directive, NEAT