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EXtreme Ecosystem Studies in the Deep OCEan: Technological Developments EXOCET/D

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ABSTRACT

The general objective of EXOCET/D is to develop, implement and test specific instruments aimed at exploring, describing, quantifying and monitoring biodiversity in deep-sea fragmented habitats as well as at identifying links between community structure and environmental dynamics. Onboard experimental devices will complement the approach, enabling experiments on species physiology. The EXOCET/D working fields include: video and acoustic imagery, *in situ* analysis of physico-chemical factors, quantitative sampling of macro- and micro-organisms, *in vivo* experiments, integration of multidisciplinary data, implementation on European deep-submersibles and a final phase of technical and scientific validation.

KEYWORDS: Deep sea; ecosystem; imagery; *in situ* analysis; faunal sampling; submersibles; observatory.

INTRODUCTION

The use of deep-sea submersibles during the last decades brought new insights into deep-sea environments with the discovery of unusual biologically rich areas on continental and plate margins. The acquisition of deep underwater vehicles by several European countries brings our scientific community at the leading edge of the studies of remote ecosystems. Moreover, the increasing anthropic pressure on the deep-sea (offshore exploitation, wrecks, waste disposal) and the requirements of the Convention on Biological Diversity, reinforce the strategic importance of our ability to observe, sample, measure and experiment in deep environments through the development of non-invasive approaches that will help minimizing threats to their fragile biodiversity.

The general objective of EXOCET/D is to develop, implement and test specific instruments aimed at exploring, describing and quantifying biodiversity in deep-sea fragmented habitats as well as at identifying links between community structure and environmental dynamics. Onboard experimental devices will complement the approach, enabling experiments on species physiology.

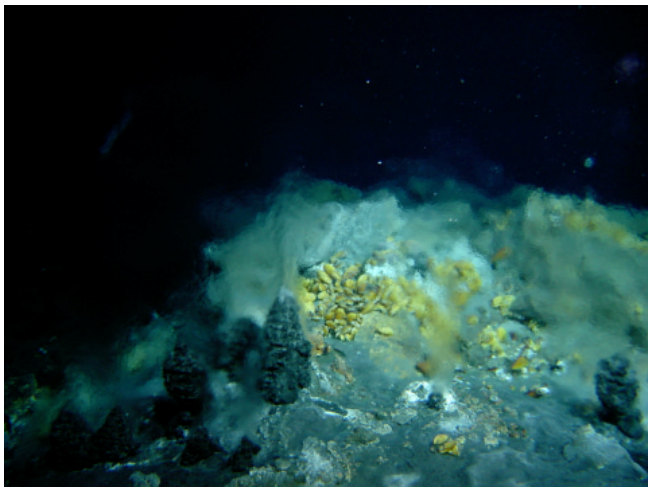

Fig. 1. Mussels assemblage on Menez Gwen hydrothermal vent (Mid Atlantic Ridge)

The targeted ecosystems are related to the emission of reduced fluids (cold seeps, hydrothermal vents), peculiar topographic structures (seamounts, deep corals), massive organic inputs (sunken woods) or to unpredictable events (pollution, earthquakes). Beside their insularity in the abyssal plain, these ecosystems are characterised by patchy faunal distributions, unusual biological productivity, steep chemical and/or physical gradients, high perturbation levels and strong organism/habitat interactions at infra-metric scales. Their reduced size and unique biological composition and functioning make them difficult to study