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EXtreme ecosystem studies in the deep OCEan : Technological Developments

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The aim of EXOCET/D European project was the technological development of a specific instrumentation allowing the study of natural or accidentally perturbed ecosystems found in the deep ocean. These ecosystems are related to the emission of reduced fluids, peculiar topographic structures and massive organic inputs. Beside their insularity in the abyssal plain, the targeted ecosystems are characterised by patchy faunal distributions, unusual biological productivity, steep chemical and/or physical gradients, high perturbation levels and strong organism/habitat interactions. Their reduced size and unique biological composition and functioning make them difficult to study with conventional instrumentation and require the use of submersibles able to work at small scales on the seafloor as well as the development of autonomous instruments for

long-term monitoring.

The general objective of EXOCET/D was to develop, implement and test specific technologies aimed at exploring, describing and quantifying biodiversity in deep-sea fragmented habitats as well as at identifying links between community structure and environmental dynamics. The first leg of the MoMARETO[1] cruise, held from August 6 to September 6, 2006 on the new French oceanographic vessel Pourquoi pas? constituted the final demonstration action of EXOCET/D. In addition to sea trials, the scientific objective of the cruise was to study the spatial and temporal dynamics of hydrothermal communities colonizing active hydrothermal sites on the Mid-Atlantic Ridge. Three vent fields, ranging from 850m to 2300m, were visited by the ROV Victor 6000 during the cruise.

The first deployment and at sea validation of 13 prototype instruments developed within EXOCET/D[2] are presented. The instrument improvement and development were focused on three major topics: i) Quantitative imaging, ii) Sampling and in situ measurements and, iii) Faunal sampling and in vivo experiments.

Finally, the results of the project were shared with the public through different media. A day-to-day log book of the cruise[3] allowed close interactions with web users and cruise events were reported in several national and international newspapers, radio and TV shows. The most challenging communication event was the real-time transmission of Victor 6000 video imagery from the bottom to a 250 person audience on land.

[1] Sarrazin, J., Sarradin,P.M. and the MoMARETO cruise participants, InterRidge News, (2006), V15, 24-33.

[2] http://www.ifremer.fr/exocetd

[3] http://www.ifremer.fr/momareto