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TEMPO: a new ecological module for studying deep-sea community dynamics at hydrothermal vents

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There is world-wide recognition for the need of long term in situ monitoring of the marine environment. While the intertidal zone and coral reefs have retained much attention because of their accessibility and because their most common species make them well suited to manipulative experiments (Estes and Peterson 2000), technological limitations have delayed observational studies of community structure in the deep ocean. Only recently are we beginning to understand some of the dynamics of deep-sea communities. Even more important, most of the traditional techniques used to evaluate the influence of biological interactions are not yet applicable in subtidal or deep-sea habitats. As a result, our knowledge of the influence of biotic and abiotic factors in these ecosystems is extremely limited compared to shallower environments.

Particularly lacking in the study of abyssal benthic communities are time-series data. Regular visits to the deep-sea are prohibitively costly and ecologists have been slow to develop monitoring instruments to study community dynamics and patterns of succession in distant habitats. Time-series studies provide a means of studying organism growth, faunal succession, biological interactions and the response of species and communities to environmental changes (Sarrazin et al. 1997). Understanding community dynamics is also an important prerequisite for management, conservation and protection of natural ecosystems. A great effort is now being invested by the international scientific community into developing new ways to study the temporal aspect of both environmental and biotic factors in abyssal zones. The goal of networked seafloor observatories (c.f. ESONET, NEPTUNE) is to develop multidisciplinary long-term experiments for observations and monitoring of seafloor active processes through the

provision of communications and power to scientific instruments. The development of new autonomous scientific tools, suited for long-term deployment, is an essential step to insure the success of these future observatories.

The major goal of this project, elaborated in the frame of the STREP Exocet/D European project (contract # GOCE-CT-2003-505342), was to design a first autonomous long-term imaging module equipped with a deep-sea video camera, adequate lightning and sufficient energy storage while taking advantage of most recent progress in imaging and photonics. The system developed is able to pilot the projectors and to record digital pictures on a hard disk. A biofouling protection, based on localized microchloration, was installed on the camera port hole and on the lights. In addition, a CHEMINI Fe *in situ* analyzer and three temperature probes were coupled to the TEMPO module to monitor environmental changes in parallel to community dynamics. The whole system is powered by a Sea-Monitoring Node (SEAMON, Blandin et al. 2005).

TEMPO was tested and deployed during the Momareto cruise held from August 6 to September 6, 2006 on the new French oceanographic vessel Pourquoi pas?, with the ROV Victor 6000 (Sarrazin et al. 2006).

References

Blandin J. and J.F. Rolin. *Sea Technology*, 46: 33-36 2005.

Estes, J.A. and Peterson, C.H. (2000). *Marine Ecology Progress Series*, 195, 281-289.

Sarrazin, J., Robigou V., Juniper, S. K. and Delaney, J. R. (1997). *Marine Ecology Progress Series*, 153, 5-24.

J. Sarrazin, P.M. Sarradin and the MoMARETO cruise participants. 2006. Interridge News, 24-33.