

Temporal dynamics of the Lucky Strike hydrothermal vent field – the EMSO Azores observatory

Introduction

The EMSO-Azores observatory was first deployed in 2010. It aims at understanding the links between geological, physical and chemical processes and their effects on the dynamics of the hydrothermal fauna at different spatial and temporal scales at the Lucky Strike vent field (1700m depth, Mid Atlantic Ridge).

Methods

The autonomous observing system comprises two Sea Monitoring Nodes providing the energy, controlling the sensors, archiving and transmitting the data. The first node is deployed on the Lucky Strike fossil lava lake and measures the seismic activity and the vertical deformation of the sea floor. The second one is deployed at the base of the Tour Eiffel active edifice and monitors the variability of the edifice and its associated ecosystem. The nodes are acoustically linked to a surface buoy, ensuring satellite communication to the land base station. Data are available on the EMSO-Azores web page. The observatory setup comprises sets of autonomous instruments. A complementary site studies program is implemented during the cruises to increase the set of accessible parameters and to extend the spatial coverage of the project.

Results

Over the last 10 years, decisive results were obtained on the establishment of the fluid circulation in the hydrothermal system, on the key role of hydrothermal emissions in the iron content of the oceans or on the spatial dispersion of particles and larvae of organisms by local currents. The stability of these hydrothermal communities on a decadal scale was highlighted and we showed for the first time the existence of biological rhythms on a deep-sea hydrothermal species!

Conclusion

The technologies developed and the knowledge acquired is a step forward to respond more effectively to the evaluation of the impacts of human activities in the deep sea (pollution, mineral resource exploitation, etc.).

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