

MoMARSAT 2017- Maintenance of the EMSO-Azores observatory

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And the EMSO-Azores team

The upgrade of the EMSO-Azores observatory was successfully achieved during the yearly three-week maintenance cruise aboard the R/V Pourquoi Pas? (8-28 July). The observing capacity of the marine infrastructure - operating since 2010 on the Mid-Atlantic Ridge at the Lucky Strike hydrothermal vent field- 1700 m water depth - was upgraded last year thanks to the development of a new electronic core called COSTO2 based on Ethernet communication and implemented on the 2 monitoring nodes. This upgraded infrastructure was successfully redeployed and tested in situ using a WIFI link allowing communication at 50Mbits/sec between the ROV VICTOR6000 and the Sea monitoring station.

Transmissions are now back, and data from the connected instruments are accessible on the EMSO-Azores web page: <http://www.emso-fr.org/EMSO-Azores>

Over the coming year, these transmitted data will hopefully comprise:

- From the seabed: number, level and date of seismic events detected since deployment, seabed pressure, snapshots from an HDTV camera focused on a mussel assemblage, Iron concentration, Oxygen concentration, turbidity sensor signal, temperature and chlorinity sensor parameters from a nearby hot vent, and engineering parameters,
- From the sea surface: weather station parameters (wind, pressure, and temperature), buoy position and engineering parameters.

In addition, the observatory setup comprises several sets of autonomous instruments, whose data are collected during the yearly maintenance cruises. These data, and additional data stored in some of the connected instruments, will also be made available on the web after quality and format validation by the EMSO-Azores team. This year, the collected data includes: geodetic data from a GPS set on the transmission buoy,

current, pressure, temperature and salinity data from an oceanographic mooring set near the vent field, HD video footage from the instrumented mussel assemblage, complete seismic data from the connected seismometer and from a seabed array of four hydrophones set near the vents, temperature data from 24 temperature sensors distributed in hot and diffuse vents, bottom current and seafloor pressure from autonomous probes.

Highlights of this year's maintenance cruise are:

- 1- the uneventful maintenance of the whole system, indicating that we have reached a good level in terms of system robustness and maintenance procedures
- 2- the successful preliminary seafloor test of a brand new prototype (DEAFS) for sequential sampling of hot vent fluids. Following this test, the new instrument has been deployed for a year with preset sampling every month.
- 3- the exchange of the BOREL relay buoy for a brand new one after 7 years of operation.

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Figure 1: Deployment of BARS (temperature and

A single dive was performed at Menez Gwen within the frame. Like in 2013 with BIOBAZ Initial cruise, BIOBAZ Final 2017 (chief scientist François Lallier) could have been followed by MoMARSat17 cruise. A single dive was performed at Menez Gwen within the frame of MoMARSat17. Menez Gwen, located between Lucky Strike and Horta at the depth of 800m, allows to collect mussels (*Bathymodiolus azoricus*) in a very good physiological shape. This allows to continue biological experiments on this organisms on land in Horta or, like this year, in Brest after the transport of alive mussels to Oceanopolis. A one-day dive of ROV Victor has allowed

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to reach this goal, along with some supplementary analyses and pick-up of mussels for our Portuguese colleagues and DEEP/LEP laboratory.

A further novelty at this cruise was the involvement of artists and videographers as part of “arts and sciences” project Deep Thoughts. Its aim is to establish a collaboration between artists and scientists in preparation for the show on the deep sea environments in 2019. The project’s blog will be published in the form of a logbook (<http://donvor.blog/2017/07/page/3/>).

The team was composed of scientists from Ifremer (REM, RTD and EEP), 5 laboratories INSU (IPGP, LOPS, OMP-GET, IUEM, et LIENs-la Rochelle), 2 Portuguese partners (University of Açores and University of Lisbon), and colleagues from University of Washington in Seattle and from University of Bergen.

CNRS-IPGP, CNRS-GET, Ifremer, IMAR-DOP (Portugal), U. La Rochelle, LOPS, IUEM-UBO,

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