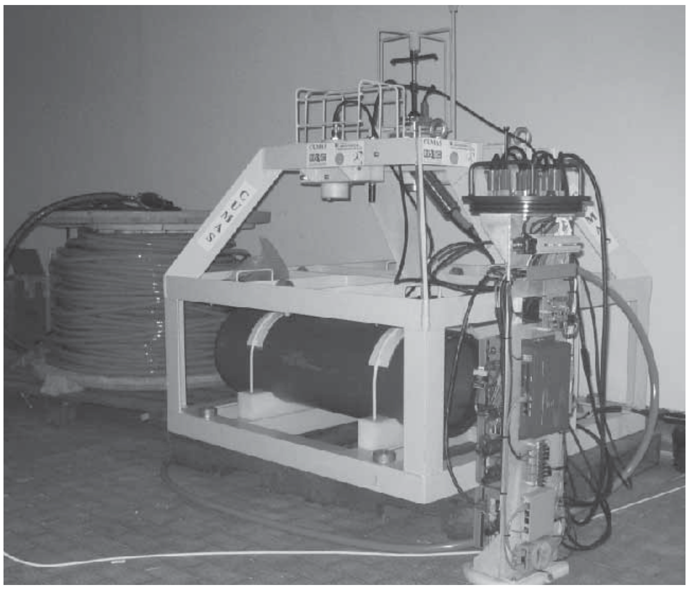

Figure 1. CUMAS fully equipped in lab during tests; the acquisition system and the seismic sensor were temporary kept out of the frame to check the operation.

3. Deployment and operation

CUMAS has been developed to be installed in the sea sector of the Campi Flegrei Caldera at 97 m w.d., from 2 to 3 km far from shore and about 4 km far from the acquisition land centre.

A buoy (elastic beacon), previously deployed and presently operating, is used as the support infrastructure for CUMAS. The buoy, 8 m high above the sea level, is equipped with batteries charged by solar panels and aeolic generator. A CISCO bridge, equipped with omnidirectional antenna, allows the data transmission to land.

A meteo station is also mounted on the buoy providing the local meteo measurements (e.g., barometric pressure, wind velocity and direction, rain-meter, thermometer) to allow correlation of the air and seafloor data.

The deployment of CUMAS is performed by lowering the module in the sea water by means of its own electro-mechanical cable with the support of a ship equipped with a crane. Once the module is on the seafloor, the cable is deployed on the seafloor too and its end is connected to a junction box installed on the top of the buoy.

The CUMAS operation on the seafloor is planned to be at least 1 year long.

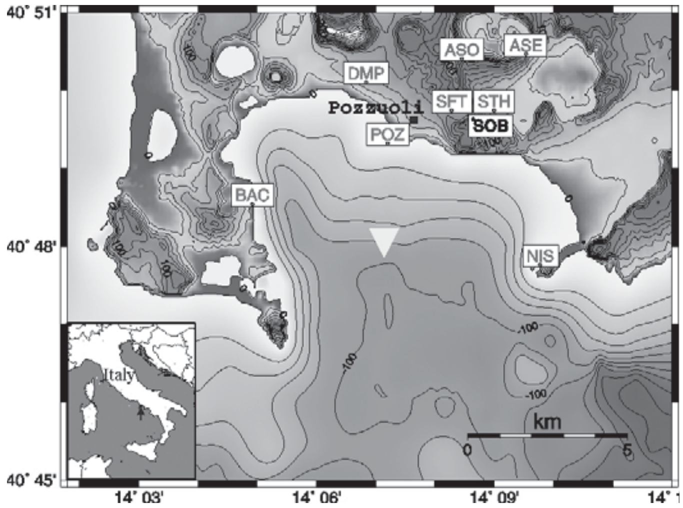

Figure 2. The Gulf of Pozzuoli (west of Naples) and the site (yellow triangle) selected for the deployment of CUMAS.

4. Expected results

CUMAS represents the first marine node of a land-sea integrated network for geo-hazard monitoring. Its data, continuously sent to the land acquisition center, will be integrated with those belonging to the whole surveillance system. In particular the seismological data will be used jointly with the land seismic network and contribute to improve the location of the earthquakes occurring in the sea sector of the Caldera. Furthermore, as demonstrated by Vassallo et al. [1] this use will enhance the seismic detection capability of low energy earthquakes usually masked by the high level anthropic seismic noise typical of densely populated areas.

The pressure gauge measurements, corrected for tidal effect and complemented with coastal tide gauge network data, can for the first time estimate vertical seafloor bradiseismic movement, till now measured only on land.

5. References

[1] Vassallo M., Bobbio A. and Iannaccone G., Analysis of broad band seismic data acquired under the sea of Pozzuoli Gulf (Southern Italy), European Geophysical Union General Assembly, Wien, 2006.

REAL TIME TRANSMISSOIN OF CURRENT AND TURBIDITY DATA FROM THE NEAR BOTTOM VAR CANYON SYSTEM

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1. Introduction

Under the umbrella of the EU-FP6 HERMES program, Ifremer is committed in the monitoring of the particle dynamics in the Var canyon. For this purpose, several seabed measurement stations with a near-real time link to shore were installed, enabling the monitoring of the Var Valley from Brest. Two currentmeters and one fluorometry and turbidity sensor, installed on the levee of the valley at a depth of 2000 metres, send their measurement data every six hours to shore. The paper describes the measurement and data transmission system, its functioning and the main lessons learnt along two years of implementation.

2. System description, Results and Discussion

Among the various measurement stations and moorings installed in the Var Canyon [1] two stations were fitted with the SEAMON technology developed during the EU-FP5 ASSEM project [2]. This technology enables the measurement data from various local deep sea sensors to be collected as and when generated, then periodically forwarded to a data base on shore. MAP3 (currentmeter, fluorometer and turbidity sensor near the seabed) and SSB (currentmeter) stations benefited from this service. The near real-time link comprises one acoustic segment between each seafloor station and a relay-buoy, followed by an Iridium satellite segment joining the buoy to a shore server. The link is bi-directional, allowing the modification of the measurement parameters at any time, by an operator on shore.

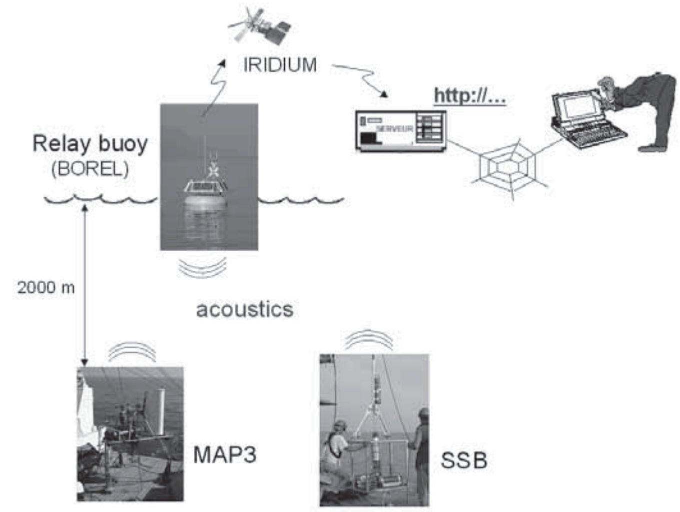

Figure 1. Data transmission chain between seafloor and user on shore

The functioning parameters of the stations are also monitored, for a proper preparation of the maintenance interventions scheduled at each periodic cruise over the Var Valley. The data transmission results over the two years are presented.

3. Conclusions

The system presented here offers the functions of a near real time sea observatory, at a modest cost. In addition to delivering the seafloor data in near real time, it allows a permanent technical monitoring of the seafloor equipment and can transmit alerts from the seafloor. These two years of operation allowed to significantly increase its reliability.

4. References

[1] Vangriesheim A., Khripounoff A., Mas. V, "Current and turbiditic events observed in the VAR canyon (Mediterranean Sea)". EGU General Assembly, Vienna, April 2007.
[2] Blandin J., Person R., Strout J.M., Briole P., Ballu V., Etiope G., Masson M., Golightly C.R., Lykousis V. and Ferentinos G. "ASSEM : A new concept of observatories for long term seabed monitoring", Ocean Margin Conference, Paris, September 2003.

CONSTRUCTION OF THE OBSEA CABLED SUBMARINE OBSERVATORY

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1. Introduction

The OBSEA Project (Expandable Submarine Observatory) comes up from the necessity to develop the elements and required technology to be able to design, build and exploit an observation system and take measures of submarine parameters. This technology must be able to be adapted to different requirements and configurations, with the only wish to provide with the necessary technology to the scientific community for the installation of submarine measure points in the more interesting enclaves, contributing to the capacity of obtaining tailored information in a stable way, for an observation period medium or long.

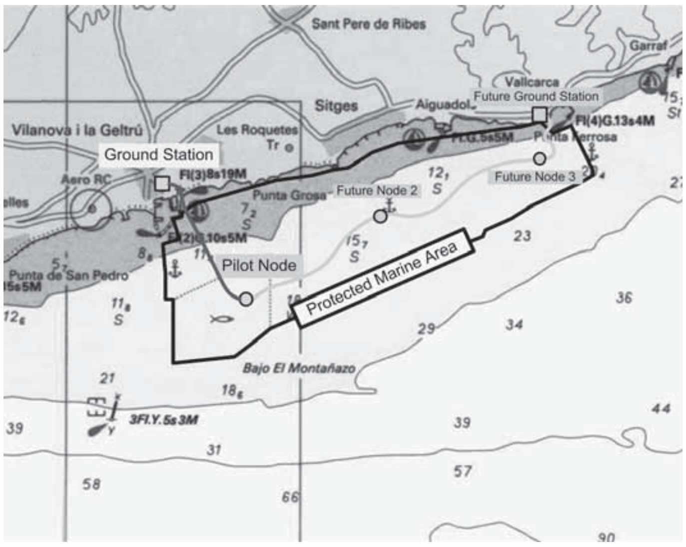

figure 1. Possible node locations.

The structure is based on a group of submarine wired nodes that are forming an enlargeable communications network that is powered and linked to ground using a submarine cable. The network is powering the submarine instruments and is carrying out monitoring, supervision and maintenance works to guarantee the maximum reliability and availability of the installation.

2. Results and Discussion

In the ground station it will be the management server in charge of the state monitoring of all elements in the system, and the data server which will continually store the information and it will provide the interface toward the world, giving controlled access to the scientific community. This station is completed with the communications system which transmits the information through the submarine fibre optic and the power system in charge of giving the necessary electrical power to the submerged elements. The submarine nodes will provide the interface to the oceanographic instruments managing the communications and power at the same time that are monitoring all the necessary parameters to assure the operation of the devices.

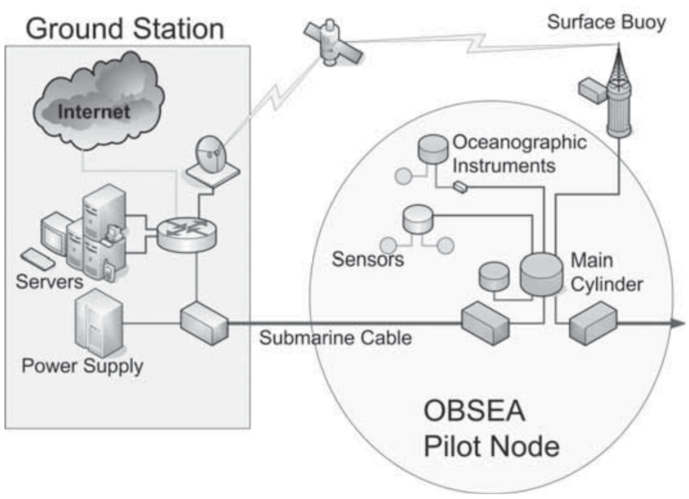

Figure 2. Preliminary Submarine Station Network design.