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METHANE LEAKAGE MONITORING BY A CABLED BENTHIC OBSERVATORY ON POCKMARKS IN THE CORINTH SHELF (GREECE)

Long-term monitoring of methane emissions from the seafloor is an urgent task demanded by the scientific community in the framework of geohazard, biological, hydrocarbon exploration and global change studies. In this respect a new seafloor lander module (GMM – Gas Monitoring Module) has been developed by the European Commission ASSEM project (Array of Sensors for long term SEaBed Monitoring of geohazards) for continuous and long-term measurements of methane concentration in seawater at the benthic boundary layer. The module is designed to host a series of sensors controlled and managed by a data acquisition and control system capable of performing first-level data quality checks. The prototype includes three semi-conductor methane sensors, a H₂S electrode, a CTD for temperature, salinity, pressure recording, as well as interfaces available for further sensors. The electronics can perform a series of tasks including: data acquisition from all scientific packages and status sensors, preparation and continuous update of a periodic (e.g. hourly) data message, ready to be transmitted via serial link on request, management of the sensors (switch on/off of individual sensors according to command from operator; event detection), reception and management of commands from external units (data request, system reconfiguration, restart, etc.), monitor internal status parameters and external power supply, back-up of data in internal memory. The system is suitable to monitor, for long periods, natural gas emission from seafloor or leakages from pipelines and boreholes.

GMM is described in detail in Marinaro et al (2004).

In spring 2004 GMM has been deployed within an active pockmark field, at 40 m b.s.l., in the Corinth Gulf (Greece), where methane escape is linked to faults crossing Cretaceous carbonate rocks, which constitute a classical fractured hydrocarbon reservoir. Gas emission variability is investigated to assess episodicity, gas source potential and eventual links with seismic activity. The system was recovered on 23 September 2004 and re-deployed two days later for a second phase of monitoring. Final recovery is scheduled in December 2004.

The results of the first monitoring phase show the occurrence of anomalous and rapid variations of temperature and pressure associated with gas concentration peaks, which might be related to gas emission (bubbling) events. The signals acquired by GMM are going to be compared with meteorologic and seismic data. The GMM data represent in absolute the first long-term time series of gas concentration and chemico-physical parameters of seawater within a pockmark.
REFERENCES