

ENVIRONMENTAL IMPACT OF GAS PLATFORMS IN THE NORTHERN ADRIATIC SEA: A CASE STUDY

G. Fabi¹, L. Da Ros², A.M. De Biasi³, S. Manoukian¹, C. Nasci⁴, M. Puletti⁵, E. Punzo^{1*}, A. Spagnolo¹

¹ CNR - Istituto di Scienze Marine (ISMAR) - Sede di Ancona - 60125 Ancona (Italy)

² CNR - Istituto di Scienze Marine (ISMAR) - Sede di Venezia - 30122 Venezia (Italy)

³ Consorzio Interuniversitario di Biologia Marina ed Ecologia applicata (CIBM) - 57128 Livorno (Italy)

⁴ Thetis SpA - 30122 Venezia (Italy)

⁵ ENI SpA - Divisione E&P - 48023 Marina di Ravenna (Italy) - g.fabi@ismar.cnr.it

Abstract

The potential impact induced by the installation of the off-shore gas platform PCMS-1 (Northern Adriatic Sea) on the surrounding sediments and benthic community, as well as bio-accumulation in mussels settled on the submerged part of the rig, was studied for 2 years. A few sediment anomalies were observed in the first survey, but they decreased in the following periods. The only change in zoobenthos occurred after one year from installation, when mussel mounds developed close to the rig. Differences in hydrocarbon and organic matter content between the platform mussels and those collected at a control site were detected only in the first survey year.

Keywords : Adriatic Sea, Bio-accumulation, Monitoring, Sediments, Zoobenthos.

Introduction

In spite of the large number of gas platforms existing in the Adriatic Sea (about 90), only a few studies focusing on the impact of these structures have been carried out. To cover this gap, starting from 1998 multidisciplinary studies have been performed by CNR-ISMAR of Ancona, in co-operation with ENI S.p.A. [1]. We report an example of these studies. Materials and Methods

The one-leg platform PCMS-1 was placed in July 2001 about 20 km far from Ravenna (Northern Adriatic Sea), at 24.5 m depth (clay-silt bottom). In 2002-03 two surveys in winter and two in summer were carried out to evaluate the impact induced by PCMS-1 construction on the surrounding environment. Sediments and benthic communities were sampled along a transect (7 sampling sites at increasing distances from the rig) intersecting the rig and directed from NW to SE, following the main Adriatic currents. Three control sites having the same geo-morphological features of the study area were also sampled. Sediments and benthic community (4 replicates) were collected by box corer and Van Veen grab (sampling surface = 0.11 m²) respectively. Polycyclic aromatic (PAH) and aliphatic (AH) hydrocarbons as well as organic matter (OM) contents were measured on the soft parts of mussels (*Mytilus galloprovincialis*) taken from the platform leg, both close (CA) and far (FA) from sacrificial anodes and at a control site (C). The multivariate analysis was carried out by MultiDimensional Scaling on 3 data sets: on particle size and content of OM, heavy metals and PAH for the sediments, on density and biomass of species groups for the zoobenthos and on PAH, AH and OM contents for bio-accumulation. Similarity was based on the Bray-Curtis index.

Results

In the MDS plot on sediment data set the sample points are arranged according to a seasonal gradient, especially clear during 2002 (Fig.1). In winter, anomalies in Cd, Pb and MO content were observed in PCMS site. They disappeared in the following surveys, hence this station increased its similarity to the others. MDS based on biotic data did not discriminate the PCMS site from the others in winter 2002 (8 months after the rig installation; Fig. 1). Soft-bottom species dominated everywhere, with a prevalence of polychaetes and molluscs. From summer 2002 onward, mussel mounds were recorded close to the rig. They were inhabited by a mixed community, with soft- and hard-bottom species. Such modification also occurred within 30 m from the rig, but only in that season. AH, PAH and MO contents showed similar seasonal variations in CA, FA and C mussels, but no quantitative differences were evidenced among the three sites. The only exception occurred in summer 2002, when AH and PAH contents were higher in C organisms (Fig. 1).

Conclusions

PCMS-1 installation did not cause a consistent impact on the surrounding sediments and benthic communities. This was likely due to its small dimensions and its location in an area characterized by a high density of productive platforms, where sediments are frequently remixed. The only evident change was the mussel mound development close to the platform after one year from construction, as already observed at other rigs located at the same depth [1]. No bio-accumulation processes were detected in the mussels settled on the submerged part of PCMS-1, being the hydrocarbons and OM contents similar to those observed in the organisms collected at the control site and lower than those reported in other Adriatic areas [2].

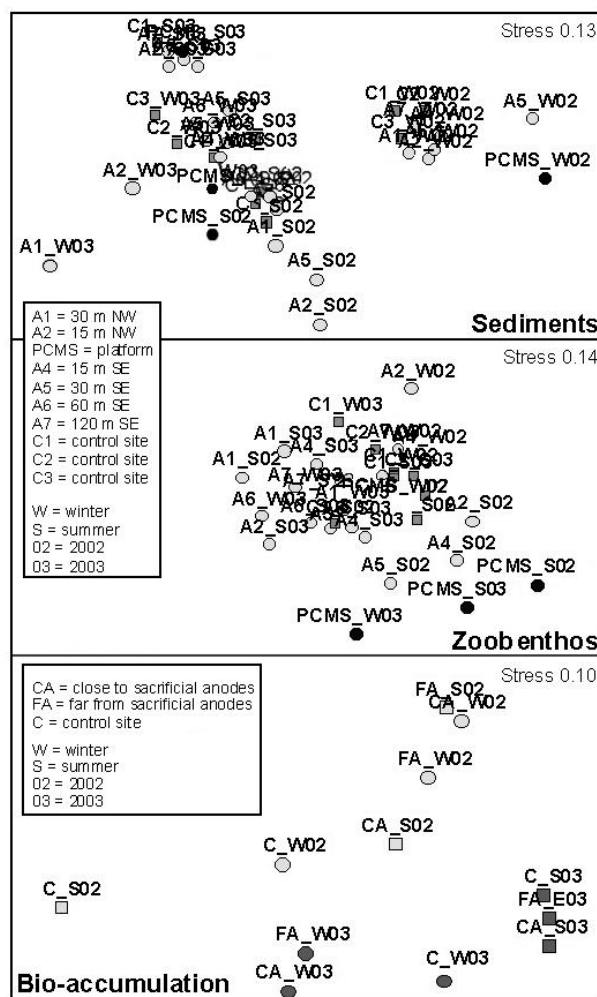


Fig. 1. MDS applied to sediments, zoobenthos and bio-accumulation data.

References

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