

## **The relative importance of accidental and chronic inputs of PAHs in the marine environment**

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Polycyclic aromatic hydrocarbons (PAHs) are ubiquitous components in the marine environment primarily as a result of anthropogenic activities. Their main sources comprise accidental or operational oil spills, including oil production and tanker deballasting waters, and combustion of fossil fuels, including coal and wood. PAHs are present as mixtures of parent and alkylated species. PAHs originated at high temperatures (combustion) are dominated by the parent species, in contrast with crude oils that contain a wide range of alkyl-derivatives. Therefore, ratios between different isomeric or homologous components can be used for recognizing pollution sources.

The large range of values of their physicochemical properties, particularly those governing their solubility or ability to be associated with particles, influence their transport pathways and final destination in the marine environment. On the other hand, the composition and concentration of the PAH assemblages will determine the early impact of the spilled product on marine biota. In this respect, greater acute toxicity is generally associated with the lower molecular weight PAHs whereas some of the higher molecular weight components form carcinogenically active metabolites (Neff, 2002).

This presentation will analyse the different types of PAH inputs, which contribute to PAHs pollution in the N.E. Atlantic. Human activity sectors considered as driving forces for the release of PAHs to the marine environment and the consequent environmental pressures will be examined. As a result, a conceptual model linking Drivers and Pressures with the State of the environment will be described and illustrated using different types of scenarios, such as oil tanker accidents (e.g. *Sea Empress*); oil spills from shipping activity at harbours; illegal discharges; unexpected release by energy production facilities; and results from the UK National Maritime Monitoring Program (MEMG, 2004); and PAH contents in bivalves around England and Wales (Fig. 1).



**Figure 1:** Sites to illustrate different types of scenarios for PAHs inputs

The analysis of the different scenarios would allow a comparison of the effects produced by accidental and chronic inputs of PAHs and an assessment of their relative importance. Its significance will be discussed in relation to the impact to the marine environment, to natural marine resources and potentially to the human health.

The comparison between the different types of scenarios shows the importance of several factors that need to be considered when assessing oil pollution and its significance.

In conclusion, the presentation will also highlight existing gaps regarding monitoring strategies for oil pollution and consequently will identify relevant gaps needed to consider on the Management of the Marine Environment, and its policy implications.

## REFERENCES

- Marine Environment Monitoring Group (2004). UK National Marine Monitoring Programme – Second Report (1999-2001).  
Neff J.M. (2002). *Bioaccumulation in marine organisms*, Elsevier, Amsterdam.