



Characterization and source apportionment of polycyclic aromatic hydrocarbons (PAHs) in Sediments from the Bohai Sea, China

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Polycyclic aromatic hydrocarbons (PAHs) are a class of ubiquitous organic contaminants in the environment. Indeed, 16 PAH compounds have been listed as priority pollutants by the United States Environmental Protection Agency and the European Union because of their potential toxicity to humans and ecosystems. As POPs are released or escape into the environment, their global accumulation in marine sediments generates a complex balance between inputs and outputs. Furthermore, PAHs in coastal sediments can serve as effective tracers of materials transport from land-to-sea (Fang et al., 2009). Hence, investigations of PAHs in sediments can provide useful information for further understanding of environmental processes and material transport.

In this study, sixteen polycyclic aromatic hydrocarbons (PAHs) were extracted from a total of 112 surface sediment samples collected across the entire territory of the Bohai Sea. The detectable concentrations of PAHs ranged from 97.2 to 300.7 ng/g across all samples, indicating low contamination levels of PAHs compared with reported values for other coastal sediments in China and developed countries. The highest concentrations were found within three belts in the vicinity of Luan River Estuary-Qinhuangdao Harbor, the Cao River Estuary-Bohai Sea Center, and north of the Yellow River Estuary. The distribution patterns of PAHs and source identification implied that PAH contamination in the Bohai Sea mainly originates from offshore oil exploration, sewage discharge from rivers and shipping activities. Further Principal components analysis (PCA)/multivariate linear regression (MLR) analysis suggested that the contributions of spilled oil products (petrogenic), coal combustion and traffic-related pollution were 39, 38 and 23%, respectively. Pyrogenic sources (coal combustion and traffic-related pollution) contributed 61% of anthropogenic PAHs to sediments, which indicates that energy consumption is a predominant factor in PAH pollution in the Bohai Sea.

Acknowledgements: This work was jointly supported by National Science Fund, China (Grant No.40806025), the State Oceanic Administration, China (Grant No. 201105003, 908-02-02-05, and GY02-2009G19).

References

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