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Variability of PAHs and trace metals in the sediments in relation to environmental characteristics of the bottom layer in the middle Adriatic Sea

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In the framework of the project PERSEUS (Policy-oriented marine Environmental Research in the Southern EUropean Seas), two interdisciplinary surveys were carried out in April 2013 and April 2014 in the middle Adriatic Sea along the Pescara-Sibenik transect (Jabuka Pits area) and Vieste-Split transect (Palagruza Sill area) with Croatian research vessel "Bios II" and the Italian research vessel "G. Dallaporta", respectively. The main objective of these research cruises was the implementation of the Marine Strategy Framework Directive (MSFD) in the Adriatic region for collecting physical, chemical and biological data in order to get a better understanding of whole Adriatic ecosystem.
The two transects are already recognised as a key areas for the interception and the study of dense water modification (Zore-Armanda, 1963; Marini et al., 2006; Grilli et al., 2013). Due to seasonal circulation patterns, they are characterized by high temporal variability of the thermohaline structure (Grbec and Morović, 1997; Vilibić, et al., 2004) and other oceanographic parameters. Long term oceanographic records from the Middle Adriatic enable better understanding of the ecosystem response to changes of atmospheric and sea conditions through physical, chemical and biological processes (Marasović et al., 1995).
Several oceanographic parameters relevant and useful for the ecosystem assessment of the two areas (temperature, salinity, density, fluorescence, oxygen, nutrients, chlorophyll, phyto- and zoo-plankton as well as selected pollutants , trace metals and Polycyclic Aromatic Hydrocarbons-PAHs in sediments) were collected.
In the present work, the variations of PAHs and trace metals concentration in the marine sediments are presented in relation to the physical and chemical characteristics of the bottom layer. A constant influx of metal induces more intense accumulation of anthropogenic metals, especially Cd, in sediment from Jabuka Pit, and the metal content slightly increases towards the Italian coast.
The total PAHs concentrations (sum of 16 PAH priority pollutant - US EPA) recorded in the marine sediments during the cruise in April 2013 showed a higher level of PAH contamination in the pits, especially in the central pit (28.5 ng/g d.w.), in comparison to others analyzed samples. The corresponding bottom water in the central pit is characterized by a temperature of 10.9°C, density of 29.6 kg/m3, salinity of 38.6 and low values of DIN (0.55 μmol•l-1). The linear regression between DIN and PAHs showed a significant negative relationship ($p \leq 0.05$). This feature implies a possible accumulation of PAHs very likely due to a lower microbial activity as demonstrated by Xu et al. (2014). The physical and chemical characteristics of the bottom layer in these areas could influence the PAHs contamination of the deep sediments.

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