

Spatial variations in geochemical properties of surface sediments along the Northeastern Mediterranean coastal regions

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Abstract

Suspended particulate materials, comprising natural/anthropogenic organic matter and inorganic compounds, are carried to the coastal zones of marine environments via nutrient-laden river waters and direct discharges of wastewaters of domestic and industrial origins and surface runoffs. This study aimed to assess impacts of the enhanced terrestrial inputs, human activities and developing eutrophication on the abundance and composition (C/N) of bulk particulate organic matter (POM) in the coastal seawater collected from the Mersin Bay in April 2014 and February 2015 and surface sediments collected from the NE Mediterranean coastal regions in the summers of 2014-2016. Total carbon (TC), total polycyclic aromatic hydrocarbon (t-PAH) concentrations and grain size distributions of sediment samples were also determined. The TC content was the highest (>6.5%) in the river-fed Goksu-Tasucu coastal zone. Total organic carbon (TOC) concentrations ranged from 0.8-4 mg/g (dry weight) in the less contaminated areas to 4-11 mg/g in muddy (>60%) sediments of the Mersin and Iskenderun inner bays receiving wastewater discharges of metal industries and domestic sources. Similar spatial variability was recorded in the sediment-TN values ranging between 0.11 and 0.87 mg/g. Accordingly, TOC/TN molar ratios in sediment ranged from 6 in Iskenderun Bay to 15 in Mersin Bay while the C/N ratios of bulk POM in surface water were less variable (6-11) in the productive bay waters, suggesting selective decay of organic nitrogenous compounds in the buried sediments. Positive and significant correlation was observed between TOC, TN and t-PAH concentrations in surface sediments, indicating the roles of increasing human activities in the region and developing eutrophication on the NE Mediterranean coastal ecosystem.

Keywords: Sediment, total organic carbon, particulate organic matter, polycyclic aromatic hydrocarbon, pollution, Northeastern Mediterranean