PETROLEUM AND DETERGENT CONTAMINATION IN COASTAL SURFACE WATER FROM PRINCE ISLANDS, MARMARA SEA

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Abstract
Oil and detergent pollution of the Prince Islands in Marmara Sea was investigated at 6 stations in October 2015. Total hydrocarbons were determined against chrysene standard using spectrofluorophotometer. Detergent contamination was investigated using spectrophotometer. The highest oil and detergent contaminations were found as 32,28 µg/L at Sivriada and 67,16 µg/L at Büyükada, respectively. According to results oil concentrations in all stations are much higher than limit value. There is no a limit value for detergent studies. Any study on chemical pollution was not found in Prince Islands in the literature. Therefore the results will be database for further studies of whole islands group.

Keywords: Marmara Sea, Detergent, Petroleum, Pollution

The Prince Islands (Adalar), a chain of nine islands on the southeast of Istanbul in the Marmara Sea, are much more preferred for recreational activities and bathing. Almost 100,000 people a year visit the Prince Islands [1]. Despite that high number of people, few studies have been conducted at the local level for the water quality of the islands by the related agencies [2]. For petroleum determination the seawater samples were taken in 2,8 L amber glass bottles and 15 ml dichlormethane (DCM) was immediately added for preservation. The samples were extracted with DCM and distilled. The residue was taken with hexane and analyzed by spectrofluorophotometer (Shimadzu RF 5301) at 310/ 360 nm (ex/em). Chrysene was used as reference according to suggestion (Aldrich) [3-6]. For detergent analysis seawater samples were alkalinized with 0.1 N NaOH, acidified with 0,1N H_2SO_4. Following extraction with chloroform they were shaken by wash solution and filtered. The filtrate volume was adjusted to 100 ml with chloroform, analyzed by UV spectrophotometer (Shimadzu, UV-1800) at 652 nm. Names of the stations are listed as Yassiada, Sivriada, Kinaliada, Heybeliada, Burgazada, Büyükada (Figure 1).

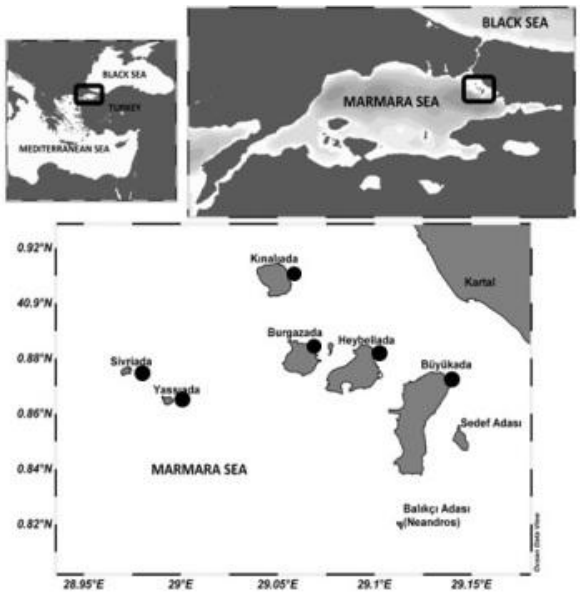

Fig. 1. Sampling Stations in Prince Islands

The oil and detegent pollution levels examined in sea water are shown in Figure 2. T-PAH contaminations relating the oil pollution were investigated at Büyükada [7], in Kinaliada [8,9] previously. Limit value of oil in sea water is reported as 2,5 µg/L by WHO. The highest oil levels were found at Sivriada and Yassiada as 32,28 µg/L and 30,2 µg/L, respectively. This case can be related either vessels and boats due to the construction activities on these islands or an instant contamination. According to findings oil concentrations in some stations are much higher than limit value.

The highest detergent pollution was found in Büyükada as 67,16 µg/L due to its high population. In other islands detergent concentrations are found as close values. Detergent value of Kinaliada has been found as 43,86 µg/L which exceeds the highest value (35,97 µg/L) in the same station of 2012 [10]. Detergent is a pollution parameter which is completely synthetic. There is no limit value for detergent concentration in seawater. This study showed that Prince Islands expose to high pollution even though they are much more preferred for recreational activities and bathing. For that reason, studies are strongly recommended for the monitoring programs.

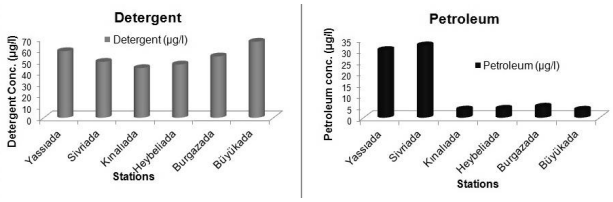

Fig. 2. Oil and detergent concentrations in the samples (µg/L)

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