ASSESSMENT OF HEAVY METAL CONTAMINATION IN SURFACE SEDIMENTS OF THE HOMA LAGOON IN THE IZMIR BAY (EASTERN AEGEAN)

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Abstract
The heavy metal (Pb, Cr, Cu, Zn and Fe) concentrations in sediment were investigated in Homa Lagoon from the Izmir Bay. The surface sediments were collected from 8 stations at September 2005 - 2006. Homa Lagoon was polluted with Cr. On the contrary, Pb Cu, Zn and Fe values were smaller than those for average shale.
Keywords: Aegean Sea, Metals, Pollution, Sediments

Introduction
Marine sediments provide useful information for environmental and geochemical research about marine pollution. Urban and industrial activities contribute to the introduction of significant amounts of pollutants into the marine environment and affect directly the coastal systems where they are quite often deposited. Also, heavy metals, pesticides and other toxic substances could be absorbed from the water column onto surfaces of fine particles and usually move thereafter with the sediments [1]**.**The study area Homa Lagoon is a coastal lagoon located in the Gediz Delta where agricultural drainage, water, industrial and domestic wastewater are transported by Gediz River. The lagoon is one of the 10 most productive lagoons in the Aegean Sea.

Materials and Methods
The surface sediments were collected from 8 stations in the Homa Lagoon in September 2005-2006. Sediment samples were taken using van-Veen grab. Immediately after collection, the sediments were placed in acid cleaned polyethylene bottles and frozen (-20^{o}C). Thereafter, samples were dried in an oven at 50^{o}C, and then sieved to pass 63 mm and homogenized. Samples were digested in microwave digestion system (Milestone 1200) with a HNO_3-HF-$HClO_4$-HCl acid mixture solutions were analyzed by flame AAS (Varian Spectraa-300 plus), using the manufacturer's conditions and with background correction [2,3].

Results
The mean concentrations of heavy metals in sediments and the average shale values were summarized in Table 1. Comparison of the metal concentrations with average shale values revealed that most of the samples from the Homa Lagoon were polluted with Cr. On the contrary, Pb Cu, Zn and Fe values were smaller than those for average shale, which indicated that there were no major sources of pollution for these elements in the Homa Lagoon. The highest Pb, Zn and Fe were measured at station E while maximum level of Cr was found at station C. Also the Cu content was high at station B. The statistical analysis of intermetallic relationship revealed that the high degree of correlation and significant regression relation among the metals indicate the identical behavior of metals in the marine environment. Sediment Pb showed positive correlation with Zn (r=0.81), Cu (r=0.93) and Fe (r=0.87). Also, significant positive correlations were observed between Cr- Zn (r=0.55), Cr-Fe (r=0.59), Cu-Zn (r=0.83), Cu-Fe (r=0.93) and Zn-Fe (r=0.80). Those correlations are probably indicating that these elements have the same source, possibly lithologic, characteristic of sediment was non impacted and therefore, of natural origin [1].

Table1. Total metal concentrations in sediment (mean±S.D. in mg kg-1, dry weight) from Homa Lagoon and background values (BCG) [4]

St.	Pb	Cr	Cu	Zn	Fe
A	10.4±8.58	101.3±23.3	17.2±7.37	63.4±23.6	21716±6593
B	11.9±4.38	106.8±30.7	22.1±3.11	78.9±14.6	25774±5544
C	12.8±4.62	110.2±9.16	20.7±3.96	76.5±3.68	25593±4594
D	12.4±2.10	109.0±15.1	19.9±0.98	81.3±12.0	24787±1331
E	15.6±2.30	106.9±22.8	24.0±2.63	89.6±3.26	27361±4063
F	4.05±2.29	93.6±13.6	13.5±0.16	50.4±5.81	20289±1039
G	12.7±0.55	87.3±3.88	19.4±2.19	67.9±8.54	21956±443
H	3.97±0.82	105.5±3.77	11.3±1.54	60.1±18.9	18702±1273
BCG	**20**	**90**	**45**	**95**	**47000**

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