

HEAVY METAL POLLUTION OF THE TURKISH SHORES OF THE BLACK SEA

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Abstract

This study aims to investigate the effects of the terrestrial originated (natural+industrial) inputs on the heavy metal distribution. For this reason sampling procedure at the depth of 10 m was accomplished along the shore from the Iğneada to Hopa. Overall trace metal content of the water body (dissolved+adsorbed in the suspended material) was investigated in two different periods; in September 2004 and in April 2005. Along the shelf, the amount of dissolved metals (Fe, Mn, Pb, Cd, Hg, and Cu) and the suspended solid matters (Fe, Mn, Pb, Cd, and Cu) are found above the average shelf values [1].

Keywords : Black Sea, Metals, Surface Waters.

Results and Discussion

Water dissolved cadmium (Cd) contents in the southern Black Sea shelf are generally higher. This arises from the high water solubility of Cd. The highest values were in front of the Samsun Harbour. The values above the shelf average show the terrestrial originated anthropogenic inputs. Whereas the dissolved iron (Fe) content was higher in April 2005, however it was lower in September 2004 (Table 1). This is because of the presence of the dissolved Fe mineral brought together with the humic material by the rivers as a consequence of the melting snow and increasing rainfall during April. The higher values of the manganese (Mn) content in the eastern shelf originated from the transports from the manganese mineral zones in Trabzon, Rize and Hopa [2]. However, it is thought that the high values in front of Samsun Harbour are due to the heavy traffic. The high copper (Cu) contents values in mid-end of the eastern parts of the shelf are originated from the metal zones present in this region which also indicates the influence of the Danube River [2].

References

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- 3 - Tankéré, S.P.C., Muller, F.L.L. Burton, J.D. Statham, P.J. Guieu, C. Martin, J.M. 2001. Trace Metal distributions in shelf waters of the North-western Black Sea. *Con. Shelf: Res.* 21:1501-1532.

Tab. 1. Water dissolved metal and metal in TSS contents at 10 m depth

	WaterCd (µg/l)		Cu (µg/l)		Mn (µg/l)		Co (µg/l)		Pb (µg/l)		Hg (µg/l)		TSS (µg/l)		Cd (µg/l)		Cu (µg/l)		Mn (µg/l)		Co (µg/l)		Pb (µg/l)		
	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	
Waters	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Iğneada	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Zonguldak	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Samsun	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Trabzon	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Rize	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Hopa	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Hazar	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
İstanbul	0.1	2	0.2	0.5	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03

The lead (Pb) contents both in dissolved form and in suspended solid form are higher in September 2004 period (Table 1). High values in mid and eastern parts of the shelf showed the presence of industrial and mine originated inputs. Water dissolved chromium (Cr) contents are higher. The values are especially higher in Bartın, Zonguldak, Samsun, Trabzon and Rize where the river inputs (inflows) are dense (Table 1). Inputs are related particularly with the terrestrial anthropogenic (industrial inputs). It is known that Cr is used in Steel, Textile and Tanning Industries and in the production of stainless steel householdings. Mercury (Hg) contents are higher in fronts of Samsun where there are heavy sea traffic and dense urbanization. And again it is higher in the Iğne Island which is under the influence of the Tuna River. In the coastal region which is saturated between Inebolu and Sinop in the southern Black Sea, Hg mining zone is present [2]. The values in this zone are related with the coastal erosions from the Hg mineral zone. As a result, the metal contents in the southern Black Sea water are generally higher than the average [1]. Besides the values in the west side of the shelf showed a good correlation with the previous studies.[3] High values are the signs of the increasing metal pollution due to the dense urbanization, industrial activities, sea traffic and the river transports from the mineral zones.

Dedicated to sainted Prof. Dr. Erdoğan Okuş who sacrificed his life for marine sciences.