INVESTIGATION ON METAL CONCENTRATIONS AND ABUNDANCE OF THE SOUTH EASTERN BLACK SEA PLANKTON

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Abstract
Seasonal changes of some metal concentrations and planktonic groups abundance in plankton were investigated in Sürmene shore (Trabzon) of the South Eastern Black Sea from July 2010 to may 2011.Results showed that average metal concentrations in plankton decreased in the order; 270.42 (Zn), 45.08 (Ni), 24.49 (Cu), 14.61(Pb), 11.32 (Mn), 9.49 (As), 3.88 (Cr), 2.32 (Cd), 0.84 (Co), 0.62 (Mo) mg/kg dry weight respectively. Most kind of plankton groups as Dinopyhlagellate, Copepod, Cladocera and Bivalve were observed in July.

Keywords: Metals, Black Sea, Plankton

Introduction Heavy metals have interested considerable attention because of their environmental persistence, tend to be concentrated in aquatic organisms and negative effect on organisms in the aquatic environment [1], [2]. Metals coming from planktonic organism accumulate rapidly along the food chain. Because plankton are the main diet for many aquatic organism. So the metal concentration in planktonic organisms are very important. The objective of this study was to determine the metal concentrations and abundance of plankton groups in the nearshore and off-shore of Sürmene in Trabzon of the South Eastern Black Sea.

Material and Methods Plankton samples were collected seasonally from 50 cm upper layer of Black Sea horizontally with 200 μm mesh size Hensen type plankton net from nearshore (0.5 miles and 50 meters depth) and off-shore (10 miles and 750 meters depth) stations. Samples dried with freeze dryer after filtered. A temperature-controlled microwave heating device was used for digestion of the dried plankton. About 0.5 g homogenized samples were taken and placed into digestion flasks. Ultrapure concentration HNO_3 and H_2O_2 (7:1 v/v) was added on the samples and heated to 200ºC until dissolution. Sample preparation was carried out according to the procedure [3], [4]. After dissolution, samples diluted with ultra-pure water. Cobalt (Co), Chromium (Cr), Copper (Cu), Nickel (Ni), Cadmium (Cd), Arsenic (As), Lead (Pb), manganese (Mn), Molybdenum (Mo) and Zinc (Zn) were determined by ICP-MS (inductively coupled plasma mass spectrometry) [5].The Collosion Reaction Interface (CRI) was used during the determination of As. All data were given mg/kg dry weight (dw).

Results and Discussion Dinoflagellate (*Noctiluca scintilans*) and Copepod were the dominant groups in all seasons. However, Dinoflagellate, Copepod, Cladocera and bivalves were the most abundant plankton groups in July 2010. Copepods and dinophylagellates were determined as the most abundant species in the all seasons. Cobalt (Co), Chromium (Cr), Copper (Cu), Nickel (Ni) and Molybdenum (Mo) were increased, depending on the season except for autumn. Dinophylagellate abundance showed a smilar seasonal trend with Co, Cr, Cu, Ni and Mo.
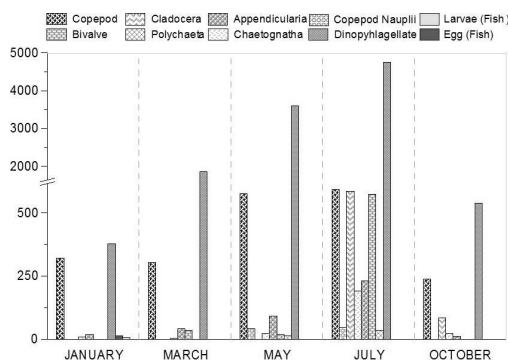

Fig. 1. Seasonal groups abundance(ind m^{-3}) in plankton samples

Manganese (Mn) concentrations were changed depending on season. While the highest Mn concentrations were measured during winter, the lowest measured in summer. The high Mn concentration may be associated with abundance of fish eggs and larvae especially during the winter. Abundance bivalve, cladocera and chaetognatha were increased during the summer. Relatively higher lead (Pb) and cadmium (Cd) concentration may be associated with this stuation.
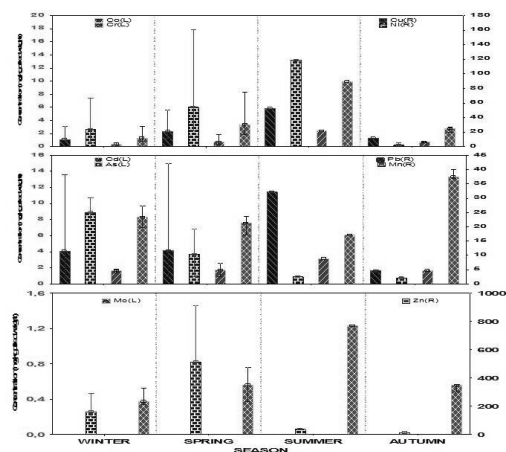

Fig. 2. Seasonal metal concentration (Co, Cr, Cu, Ni, Cd, As, Pb, Mn, Mo and Zn) in plankton samples

Conclusion
Metal concentrations of plankton are influenced by seasons and plankton abundance.

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