

RELATIONSHIP BETWEEN THE DISTRIBUTION OF ORGANIC MATTER AND NUTRIENTS IN THE NORTHEAST MEDITERRANEAN (MERSIN BAY)

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Abstract

In the present study, 6 field studies were performed in the Mersin Bay during September 2008 – August 2009. Nitrate (NO_3+NO_2) concentrations varied between 3.6-10.8 μM in the river-fed nearshore waters, whereas phosphate (o-PO_4) ranged merely between 0.02-0.14 μM , exhibiting higher N/P ratio (35-50) in the nearshore zone. Surface distributions of total phosphorus (TP), chlorophyll-a (CHL) and particulate organic matter (POC, PON, PP) displayed similar spatial patterns in the productive shelf waters. TP and CHL contents of the polluted nearshore waters were 0.43 μM and 2.0 $\mu\text{g/L}$, respectively, as the offshore values were as low as 0.02 μM for TP and 0.02 $\mu\text{g/L}$ for CHL. Particulate-P ranged between 0.01-0.41 μM in the bay waters.

Keywords: Nutrients, Organic Matter, Particulates

Introduction

The Eastern Mediterranean is a typical example for the oligotrophic water masses of the world ocean system [1-3]. However, Cilician shelf zone of the northeastern Mediterranean have been polluted by discharges of the major rivers (Seyhan, Ceyhan) and domestic wastewaters of the Mersin and Iskenderun cities. In recent decades, eutrophication phenomena have increased in the river-fed shallow zone of Mersin Bay. This study aims to assess eutrophication and water quality of the Mersin bay, covering the region extending from Mersin city coastal zone up to the east of Seyhan river mouth (Fig. 1).

Results

Six field surveys were conducted by R/V BILIM during the September, 2008-August, 2009 period within the framework of the (TÜBİTAK-106G66) project. Hydrographic data were obtained by a CTD probe coupled to a 12-bottle Rozette system. Chemical results were obtained by the conventional methods [1-3]. Concentrations of nutrients, organic matter (POM) biomass (CHL-a) were markedly high in the shallow nearshore zone during the year; light transparency was very low, due to large river discharges and limited ventilation of the nearshore zone by open sea (Fig. 1, 2). POC/PON ratio generally ranged between 7 and 8. Surface nitrate and PO_4 values were as low as 0.1-0.2 and 0.02-0.05 μM , respectively, in the bay offshore waters, consistent with NE Mediterranean open water values [1-3]. The nitrate/phosphate (N/P) molar ratio increased from levels of 8-15 in offshore waters to 35-50 in the nearshore zone fed by nitrate-replete river discharges. Thus, the N/P ratio is mainly dominated by nitrate changes in the P-depleted surface waters. Surface CHL concentrations, as low as 0.02 $\mu\text{g/L}$ in offshore waters, increased markedly up to 2 $\mu\text{g/L}$ level in the river-fed nearshore waters. Particulate-P values were as high as 0.36-0.40 μM in polluted shallow zone, decreasing to very low levels of 0.01-0.02 μM in offshore waters of the bay.

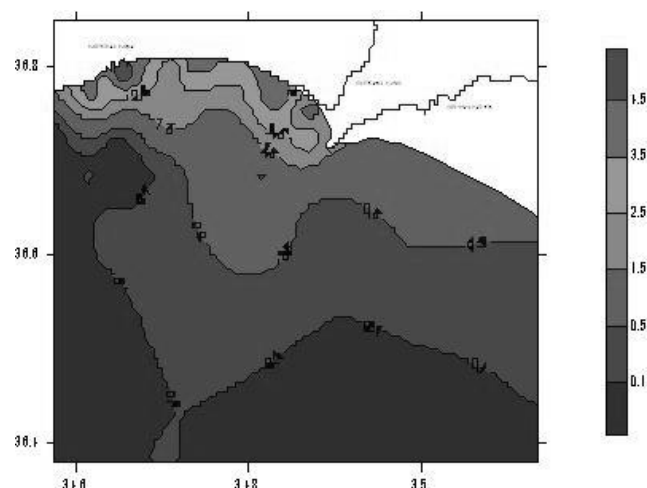


Fig. 1. Monitoring of Mersin Gulf Eutrophication: Surficial distribution of pollutant parameters (April 2009) Nitrates (NO_3+NO_2 (μM))

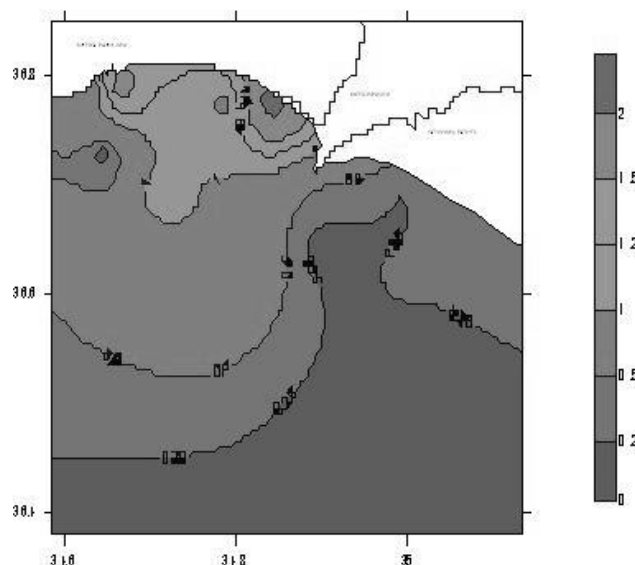


Fig. 2. Monitoring of Mersin Gulf Eutrophication: Surficial distribution of pollutant parameters (April 2009) total Chl-a ($\mu\text{g/L}$)

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