

PRIMARY PRODUCTION IN SHELF WATERS OF THE CILICIAN BASIN

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Abstract

Primary production and phytoplankton composition have been studied seasonally between September 2008–April 2009 at two shelf stations in the Cilician basin of NE Mediterranean. Depth integrated primary production rates varied between 0.048 and 1.6 mgC.m⁻³.h⁻¹ at the two shelf stations (30 and 200 m deep). Picoplankton (0.2–2.0 mm) dominated primary production in winter, replaced by larger sized cells (>5 mm) in spring. Total chlorophyll-a concentrations decreased from a high level of 0.93 µg/L in the nearshore to a low level of 0.02 µg/L in offshore waters throughout the sampling period. Primary production data were consistent with total chlorophyll-a and particulate organic carbon measurements.

Keywords: Primary Production, Chlorophyll-a, Coastal Waters, Eastern Mediterranean

Introduction

The eastern Mediterranean waters are known to be ultra-oligotrophic [1], with PO₄ < 0.02 mM and NO₃ < 0.3 mM in the upper mixed layer in summer-autumn, chlorophyll-a being below 0.05 mg/L in the deep basin. The daily rates of primary production varied from 38.5 to 250 mgC m⁻² d⁻¹ in the Cilician basin in 1991 and 1992 [2]. Recent daily rates calculated for the offshore and near shore waters varied in the range 6.0±3.1 and 180±176 mgC m⁻³ d⁻¹ [3]. Typical phytoplankton blooms were observed during early spring (February - March), exhibiting a pronounced subsurface maximum below the thermocline during summer [2].

Material and Methods

Two shelf stations (the shallow one: 30 m deep; the other 200m), located in the Mersin Bay of the Cilician basin (Fig. 1) were visited in September 2008, February and April 2009. To measure total and size fractionated primary production, ¹⁴C added seawater samples were incubated *in situ* during midday for about 2-3 hours. Chlorophyll-a was measured by the conventional fluorometric method; particulate organic matter (POM) by a CHN analyzer, nutrients by a multichannel auto-analyzer, ¹⁴C counts by Perkin Elmer Tricarb 2810 TR scintillation counter.

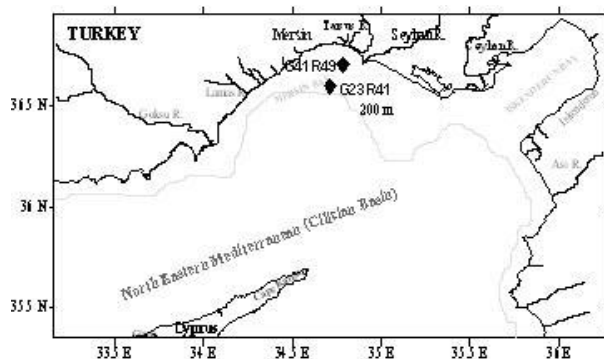


Fig. 1. Sampling stations visited in the Cilician basin

Results

In the Cilician basin, Primary Production (PP) rate was as low as 0.048 mgC.m⁻³.h⁻¹ in offshore, increasing to 1.6 mgC.m⁻³.h⁻¹ in near shore waters of Mersin Bay fed by river and domestic discharges. In the nutrient-depleted Cilician basin, PP was dominated by picoplankton (0.2–2.0 mm) in February and by larger cells (>5 mm) in April 2009. A highly significant correlation exists ($P = 0.01$ $n = 48$ $r = 0.604$) between total chlorophyll and PP rates. Total chlorophyll concentrations increased from a low level of 0.02 µg/L in the offshore to 0.9 µg/L levels in nearshore waters of the Mersin bay (Cilician basin) throughout the sampling period. POM data have also displayed similar spatial variations whereas the nitrate and phosphate were almost consumed in the upper layer due to limited inputs from external and internal sources.

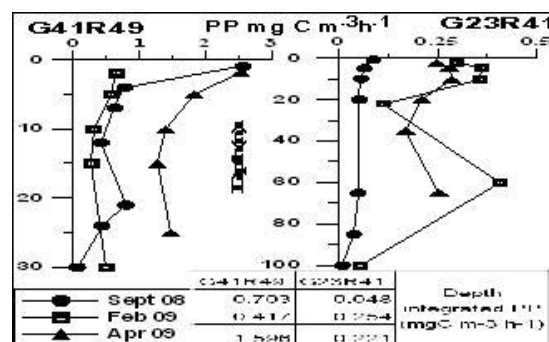


Fig. 2. Total PP rates (mgC.m⁻³.h⁻¹) measured in the Cilician basin in 2008–2009

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References

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