

MONTHLY AND REGIONAL VARIABILITY OF THE PHYTOPLANKTON ABSORPTION IN THE CILICIAN BASIN

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Abstract

Cilician Basin is located at the North Eastern end of the Mediterranean Sea. Basin is known as oligotrophic area, however some part of the area is getting large amount of river input and relatively long shelf areas. The particle absorption measurements have done both on river plumes and offshore areas in different seasons in year 2005. Besides, monthly samples have collected from the METU-IMS time series station (36:26.463N 34:21.606E). The monthly variability and the regional variability of the phytoplankton absorption curves have extracted from the total absorption measurements (1,2,3). Results shown, that the shape of the curves and magnitude of the peaks are changing spatially and seasonally.

Keywords : *Phytoplankton, Eastern Mediterranean, Pigments.*

Methodology

Particle samples have collected by filtering sea water over GF/F filters getting with 5 lt Niskin bottles. Separation of the pigmented and non-pigmented (detritus) fraction of the total particulate matter done by extracting the filters with methanol (HPLC grade). Measurements have done, Helios Single beam 2 nm resolution spectrophotometer (1,2,3).

Regional Differentiations (Offshore Mediterranean and Coastal Mediterranean)

Mediterranean offshore waters and Mediterranean coastal (Usually estuarine region) water samples have compared. Most of the measured phytoplankton absorption measurements are utilized among 78 samples. As a result 61 samples for offshore, and 17 samples for coastal are used. Comparison of these regions has done by averaging the all data collected from the concerned basin and normalized the averaged values to the highest absorption (at 440 nm). The comparison of these curves is showing that the chl *a* concentration is higher in the coastal then the offshore waters. Signature of the chl *a* is the absorption peak at the 675 nm (1). However, beside this well known feature, the shape of the curves are much more important. Actually both curves are similar to each other, whereas small variations are indicating the differences between the regions. Phytoplankton groups are the reason of these variations. Offshore waters of the Mediterranean are different from the coastal region by the first peak around 415 nm and nearly straight line between 550-650 nm, and a small shoulder around 490 nm. Coastal Mediterranean has clear peak at 440 nm and a shoulder occurring between 600 and 650 nm (Figure 1).

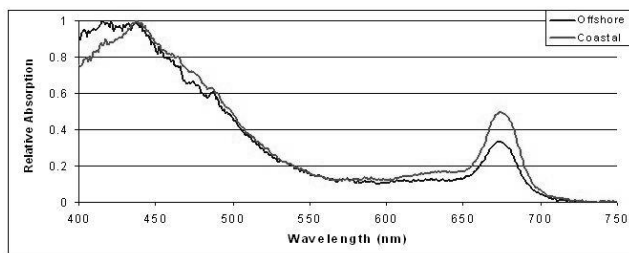


Fig. 1. Comparison of the mean normalized absorption coefficients of the regions.

Seasonal Variability of the Phytoplankton Absorption.

The seasonal variability is not really observed. However, there are similarities within the six months periods. Between April and September, and between October to March, the absorption curves have shown similar shapes. According to these results, instead of a seasonal variability, like classical autumn, winter, spring or summer blooms, only one period should be observed. These results are also in good agreement with the HPLC chlorophyll *a* measurements done at the same station parallel to the particle absorption measurements (Figure 2).

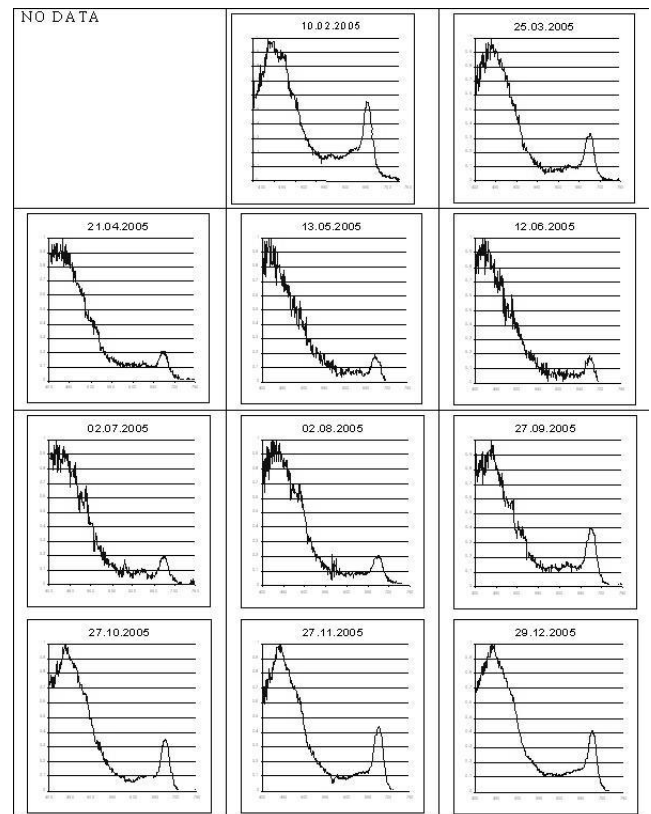


Fig. 2. Monthly normalized phytoplankton absorption curves.

References

- 1 - Kishino, M., N. Takahashi, N. Okami, and S. Ichimura, 1985: Estimation of the spectral absorption coefficients of phytoplankton in the sea. *Bulletin of Marine Science* 37, 634-642.
- 2 - Kishino M. 1995. Interrelationships between light and phytoplankton in the sea. Pp. 73-92. From: Richard W. Spinard, Kendall L. Carder, and Mary Jane Perry. *Ocean Optics*. Oxford monographs on geology and geophysics; no. 25). Oxford University Press, Inc. ISBN 0-19-506843-2. 283 pages. 1994.
- 3 - Mitchell Gregg, B., Mati Kahru, John Wielland, and Malgorzata Stramska. Determination of spectral, dissolved material and phytoplankton for discrete water samples. From: Mueller, J.L. and G.S. Fargion,[Eds.], 2002: *Ocean Optics Protocols for Satellite Ocean Color Sensor Validation*, Revision 3. NASA Tech. Memo. 2002-210004, NASA Goddard Space Flight Center, Greenbelt, Maryland, 308pp.