

SPATIAL AND TEMPORARY DISTRIBUTION OF PHYTO AND BACTERIOPLANKTON COMMUNITIES IN WESTERN MEDITERRANEAN SEA. ANNUAL CYCLES AND TIME SERIES EVOLUTION.

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Abstract

The main problem in making an appropriate description of spatial and temporal cycles of phyto and bacterioplankton is the lack of long-term studies and a wide spatial distribution. We analyze data from samples collected under RADMED monitoring program implemented by the Spanish Institute of Oceanography. Stations distributed along the Spanish coast are sampled four times a year (one per season) (fig1), from the Straits of Gibraltar to Barcelona, including Balearic islands. The seasonal cycle and time evolution of phytoplankton communities are analysed to the light of environmental information provided by this multidisciplinary program.

Keywords: Western Mediterranean, Phytoplankton, Bacteria, Monitoring, Time Series

Material and methods

The samples collected were fixed with lugol, and analyzed by inverted microscopy for identification and taxonomic composition of microphytoplankton. We focus on the study of large groups (diatoms, dinoflagellates and small flagellates). To study the smaller fraction of the phytoplankton, pico and nanoplankton and cyanobacteria (*Synechococcus* and *Prorhodococcus*) samples were fixed on board with glutaraldehyde and immediately frozen in liquid nitrogen. The determination of the abundance of picoplankton organisms was conducted with a FACSCalibur flow cytometer (Becton & Dickinson) with a laser emission of 488 nm. At each station, samples are taken at standard depths (0, 10, 20, 50, 75, and 100). In the case of microphytoplankton, which analysis requires a strong effort, samples were only taken in areas of platform, while cytometry samples were analyzed both on platform and slope.

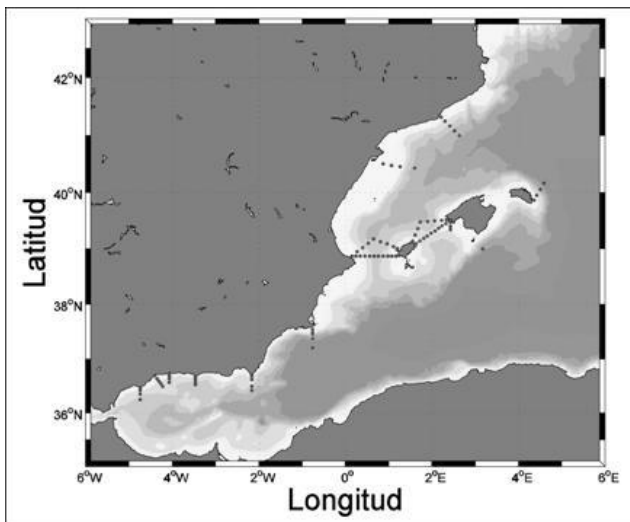


Fig. 1. RADMED monitoring program stations

The number of samples considered varies depending on the region, since there are data from previous monitoring programs to RADMED included in this study. In all stations studied, we have picoplankton cytometry and microscopy data in the period RADMED (2007-2009), while the series for microphytoplankton microscopy are longer in some areas as Alborán, in which we also have microphytoplankton data for the periods 1994-2002 and 2002-2009 and in Balearic islands from 1994 to 2000.

Results and Conclusions

Preliminary results show an increase in picophytoplankton concentration from platform to slope, reflecting offshore oligotrophic conditions. Picophytoplankton maximum abundances deepen with higher latitudes. In all the regions studied, the annual maximum is in autumn-winter, coinciding with the end of the stratification period. Regarding to microplankton composition, in all the regions we observe a dominance of diatoms and small flagellates, being more abundant in southern regions such as the Alboran Sea (fig.2), with a maximum in spring, when nutrient concentration is higher. They also describes

south-north gradient with the highest abundances in the Alboran Sea area and a decrease northward accompanied by greater depth of the peak of maximum abundance.

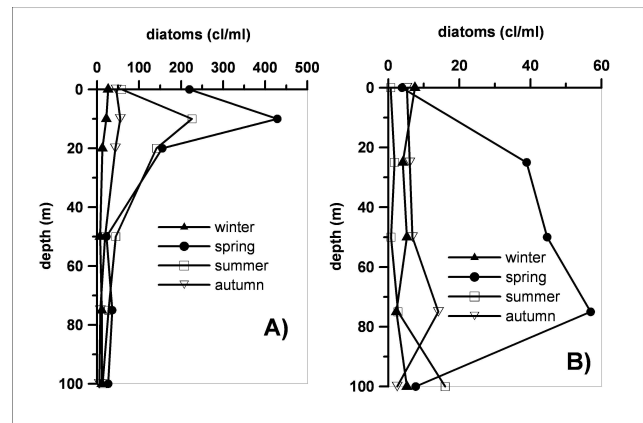


Fig. 2. Diatom mean seasonal concentration in (a) Alboran Sea and in (b) Palma de Mallorca (Balearic Islands)

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