



Phytoplankton blooming off the Northern Tyrrhenian coastal site: experimental description.

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The Northern Tyrrhenian west coast centered on Civitavecchia shelf is characterized by an increment in maritime transport, tourism, fishery due to the port expansion and by the presence of a big power plant. For these reasons phytoplankton coastal blooms were studied. During 2017, spring and autumn blooms were analyzed through in situ measurements of chlorophyll-a (chl a) fluorescence and laboratory analysis. Coastal blooms were placed in relation to the seasonal fluctuation of environmental parameters such as sea-water temperature and salinity, coastal wind and currents, mainland inputs and PAR (Photosynthetically Active Radiation) acquired by the Civitavecchia Coastal Environment Monitoring System (C-CEMS).

The sampling plan consisted in 24 stations divided in 4 cross-shore transects, collected with weekly frequency during spring and autumn blooms. In one among all stations, seawater was sampled at 20m depth, and spectral signatures of in vivo fluorescence have been analyzed in laboratory with spectrofluorimetric technique.

The phytoplankton patches in the study area showed defined cycles in both spring and autumn blooms. The spring bloom started at the beginning of February, during which the phytoplankton biomass achieved a chl a concentration of 2 $\mu\text{g/l}$. In the next days the patches moved away from the coast, presenting the higher values in the offshore stations. The greatest levels of phytoplankton biomass were found between the end of February and the beginning of March. These patches were homogeneously distributed with a maximum value of chl a concentration of 4.5 $\mu\text{g/l}$ in correspondence of the offshore stations.

The following period was characterized by a decrement in biomass, which increased again up to 2.5 $\mu\text{g/l}$ in the middle of March. However this peak characterized mostly the coastal stations.

Autumn bloom presented lower values than the spring one, with a maximum chl a concentration of 1 $\mu\text{g/l}$ at deeper depths. This bloom showed 2 maximum peaks, occurred at the end of October and at the end of November, respectively.

Spectrofluorimetric data revealed a great variability both in concentration and composition of phytoplankton between spring and autumnal blooms: the highest values of phytoplankton biomass have been measured in early spring bloom, with dominant presence of diatoms; the autumnal bloom showed a less abundant biomass, with more heterogeneous composition.

This work gives a methodological contribution to the development of indicators for the achievement of GES referred to D1, D4, D5 of MSFD in the Latium region.