

Detecting habitats considering the mesozooplankton size structure and environmental conditions in the Gulf of Lion, NW Mediterranean.

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The size structures of zooplankton communities in the Gulf of Lion, NW Mediterranean Sea, were studied in May 2010 and January 2011. The integrated physical and biological measurements provided 3D view with high spatial resolutions of the physical and biological variables and their correlations over the entire Gulf of Lion. The effects of physical processes such as freshwater input, coastal upwelling and water column mixing by winds, on phytoplankton and zooplankton distributions were analyzed using these data. During the winter season, strong northerly winds mixed the water column and the vertical distributions of biological variables were uniform over most of the gulf while there were local hot spots with high chlorophylla(Chl-a) concentrations in front of the Rhône mouths and in coastal areas. During the spring season, light winds and water column stratification suppressed vertical mixing and the Rhône River freshwater plume spread over a large part of the gulf. The nutrients delivered by the freshwater input promoted the high primary production in the surface layer. Associated to these high phytoplankton biomasses, a thin layer of high particle concentrations was found in the pycnocline. Three habitats were distinguished based on statistical analysis performed on biological and physical variables. The first is the coastal area characterized by shallow waters, high chl-a concentrations and steep normalized biomass size spectrum (NBSS), the second is the area affected by the Rhône with a high stratification and high NBSS slope, and the third is the continental shelf with a deep mixed layer, relatively low particle concentrations and medium NBSS slope. Defining habitats to include the zooplankton compartment in trophodynamic studies and to design new sampling strategies is discussed.