



Three dimensional structure of chlorophyll biomass in the senegalo-mauritanian upwelling

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Abstract

Chlorophyll (chl-a) is a fluorescent pigment assimilating photosynthetic plants. In the marine area, this pigment is mainly carried by phytoplankton. These species of strategy are too sensitive to environmental conditions fluctuations. However, they play a very important role on the marine ecosystem dynamic where they constitute the basis of trophic network. Survival and development of aquatic species highly depend on the microorganism existence. This study aims to understand the chlorophyll biomass structuring in the water column as well as this spatial and temporal distribution observed during "varget" oceanographic campaign in 1996, 1997, and 1999. The physical mixing layer, through the physics of the upwelling coast, as well as the depth of the euphotic layer, governs the surface enrichment in nutrients (minerals) and largely determines the biomass phytoplankton chl-a. The analysis of the used datasets shows that the upwelling was weak in 1997 from which the temperatures were high, whereas the year 1999 was characterized by a strong upwelling. Then, it results a high phytoplankton productivity illustrated here in terms of chl-a concentration. According to the depth and the maximum values of chl-a, we distinguish five (5) shapes of chl-a profiles but which differ in their structure on the vertical. These profiles can be classified in two groups. The group whose maximum is located in the subsurface and the one whose maximum is located in the surface (found only in 1999). The intensification of cold water resurgence in 1999 observed both in the times series of CUI SST (Coastal upwelling Index "based on the Sea Surface Temperature SST") as well the phytoplankton productivity expressed in terms of in-situ chl-a Concentration is probably one of consequences of La Niña during the period 1998-1999 over the tropical Atlantic ocean and particularly in Senegalese coasts.

Keywords: Chlorophyll, CTD profile, Upwelling, Phytoplankton, ENSO, El Niño, La Niña.



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