



Marine primary productivity and associated ecosystem indices in the Canary upwelling system

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Abstract

The Canary current upwelling system is one of the most productive marine coastal marine regions of the world, and sustains among the largest coastal fisheries. The importance of its tridimensional structure, and the way primary production is used in the system determines the functioning of the whole food web. In the Senegalese upwelling, and specially in its coastal part, where light and nutrients rapidly decrease because of the biological activity itself, a precise knowledge of the vertical structure of the phytoplankton biomass is required, whatever the way the production is estimated. The computation of the primary production can be done either by direct in-situ measurements or through an indirect estimation of the phytoplankton biomass and the knowledge of the photosynthetic light efficiency of the organisms. We present two different methods to estimate the primary production in coastal upwelling ecosystems: first by the measurement of the ocean color from space combined with in-situ measurements of vertical profiles of biomass, second by the use of biochemical models of productivity coupled with ocean circulation models. Despite the fact that this later models need to estimate the average quantity of nutrients reaching the euphotic layer in order to estimate a biomass of planctonikalgae, both use bio-optical models of photosynthetic efficiency. We show here the advantages of both approaches and the derivation of practical integrated indices of biomass and primary production.



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