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Characteristics of Primary Production in a Eutrophicated Bay

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Abstract

The primary production of phytoplanktons produces organic matter in high concentrations at Hakata bay in Japan, a eutrophicated bay, even during the winter season in spite of low water temperatures. It is considered that phytoplanktons have any biological capabilities to keep activities of photosynthesis under the unfavorable conditions, and this fact affects the water quality of the bay. In this study, the characteristics of primary production were analyzed with a simple box-typed ecosystem model. We introduced the concept of efficiency for the absorption of sunlight energy to our simulation to explain the growth of phytoplanktons under the condition of low sunlight intensity. As a result of this simulation with a box model, we found that efficiency of primary production in winter is higher than that in summer. It was suggested that the organic pollution comes from the stable concentrations of dissolved organic carbon (DOC) throughout the year, DOC of which is originated from the primary production of phytoplanktons corresponding biologically to the seasonal change of ambient conditions.