

Clarification and Evaluation of nutrient circulation in coastal areas by a pelagic-benthic coupled ecosystem model

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Recently, the fishery damage problems such as mortality of bivalves and fading laver due to environmental degradation have been reported. It is caused by losing balance of nutrient circulation due to a change of coastal environment and appear as generation of red tides or hypoxia conditions. In order to restore the sea which can provide the abundant harvest sustainably, the analyses of the causes of the environmental degradation and the implementation of an effective policy are required.

Quantitative analysis of the nutrient circulation and effect evaluation by a simulation model contribute to determine the policy. Here, we developed a pelagic-benthic coupled ecosystem model for coastal areas. A multi-level model which could reproduce the estuarine circulation, the exchange of sea water in and out of area, is included in the model. It is also simulated that an ecosystem model which could reproduce the interaction between the quality of water, bottom sediment, the marine creatures and their chemical and biological processes. The nitrogen, phosphorus and carbon fluxes by their processes are calculated.

Using the model, it were investigated for the hypoxia generation mechanisms, the variation of the nutrient circulation and the problem of it for Ariake Bay, Mikawa Bay, Harima-nada Sea and Mitsu Bay.