

Development of Hydrodynamic-Benthic-Ecosystem Model for Management of Nutrient Load into the Seto Inland Sea

Principal Investigator: Akihiko MORIMOTO

Institution: Ehime University, Matsuyama City, Ehime, JAPAN

Tel: 089-927-9674 / Fax:089-927-9846

E-mail: morimoto.akhiko.cl@ehime-u.ac.jp

Cooperated by: Kagawa University

[Abstract]

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Marine environmental problems such as red tide and hypoxia were occurred in the Seto Inland Sea during high economic growth period. To recover marine environment in the Seto Inland Sea, nutrient and organic matter loading have been controlled since 1970's. As a result, nutrient concentration decreased, and the Seto Inland Sea becomes "beautiful sea" as before. On the contrary, fish catch has decreased continuously. It is claimed that decreasing of fish catch is caused by oligotrophication in the Seto Inland Sea. Although impact assessment of oligotrophication to higher trophic ecosystem is necessary, we have to understand nutrient cycle in lower trophic ecosystem at first because we do not have much knowledge for nutrient cycle in the Seto Inland Sea. In the present study, 3-dimensional Hydrodynamic-Benthic-Ecosystem coupled model is developed to clarify contribution ratio of oceanic, benthic, and river originated nutrients to nutrient in the Seto Inland Sea quantitatively. It is found that from the developed model that contribution ratios of oceanic, benthic, and river originated nutrient to the nutrient in the Seto Inland Sea are 73%, 17%, and 10%, respectively. We conduct sensitive analysis to change of nutrient supply from the Pacific Ocean. If nutrient supply from the Pacific Ocean is increased by 34%, nutrient concentration in the Seto Inland Sea would be increased by 26%. If nutrient supply from rivers in Harima-Nada is increased by 70%, DIN concentration in Harima-Nada would be increased by more than 1  $\mu\text{M}$ . However, phytoplankton would not be change so much. The result is consistent with observed result in Harima-Nada.

[References]

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