

## RESEARCH ON THE EVALUATION FOR THE DISTRIBUTION OF CHLOROPHYLL-A USING REMOTE SENSING IN THE SEMI-ENCLOSED BAY

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Shido Bay is the one of the representative semi-enclosed bay, Seto-Inland Sea, Japan. There are many spawning and nursery grounds of valuable marine resources. But recently, variable marine environmental problems have been caused by red tide, severe gather up sand resources and the increase to the pollutional load with urbanization of the coastal area. Therefore, the activities carried on the land area often widely affect the marine condition from coastal to offshore area. We've conducted the field experiments, it was found that the tidal current, horizontal and vertical distribution of water density, chlorophyll-a concentration, bottom topography, biological condition and dissolved oxygen consumption rate by sediment are important factors to evaluate the characteristics of fishery grounds. The authors propose a more appropriate system for evaluate to the distribution of the chlorophyll-a by combining three kinds of technology, remote sensing, 3-dimensional numerical model, and geographic information system, namely fusion system. 3-dimensional numerical model predicts the spatial distribution of the chlorophyll-a at every moment. Remote sensing provides the distribution of chlorophyll-a to this model as an initial condition all over the study area. Also, authors assess the calculated results of numerical model and discuss the suitability of the bay as fish farm with referencing other data, for example topography, tidal residual current etc., on GIS system. We can say that this fusion system is necessary to do decision making for managing fish farm and keeping sound marine environment.

Over Shido Bay, the tidal currents coming from north and south create a re-circulating flow pattern influenced by geographic effect at mouth of the bay. A useful evaluation method to estimate the distribution of chlorophyll-a concentration is proposed by using 3-dimensional numerical model with taking the effect of the tidal residual current and the biochemistry reaction in semi-enclosed bay into consideration. By using satellite data, we estimate the distribution of the chlorophyll-a over Shido Bay, and this result is applied to numerical simulation model as initial condition and the future distribution of the chlorophyll-a concentration is calculated. Moreover, we validate the model by comparing the calculated result from the numerical model and the estimated distribution from satellite data. Both of them show good agreement. We say that this monitoring and predicting system provides sound results to estimate carrying capacity of aquaculture grounds.

In future, we are going to improve this model to make clearer the mechanism and to explain the dynamics of marine pollute more in detail.

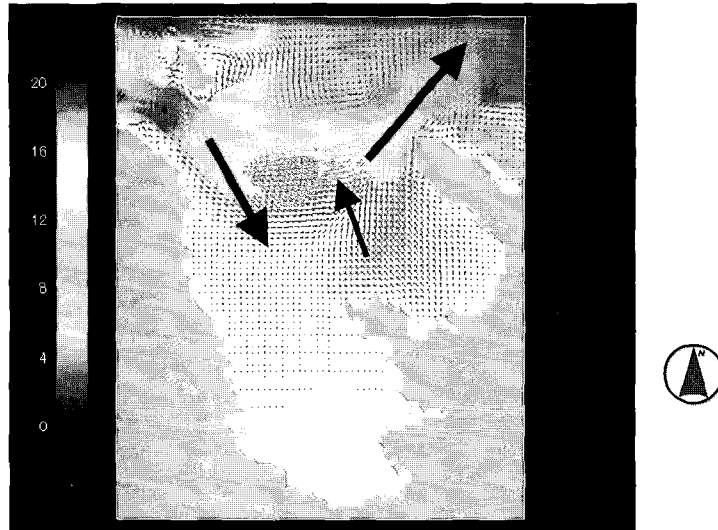


Fig. 1 Calculated tidal residual current at surface layer (m/sec)

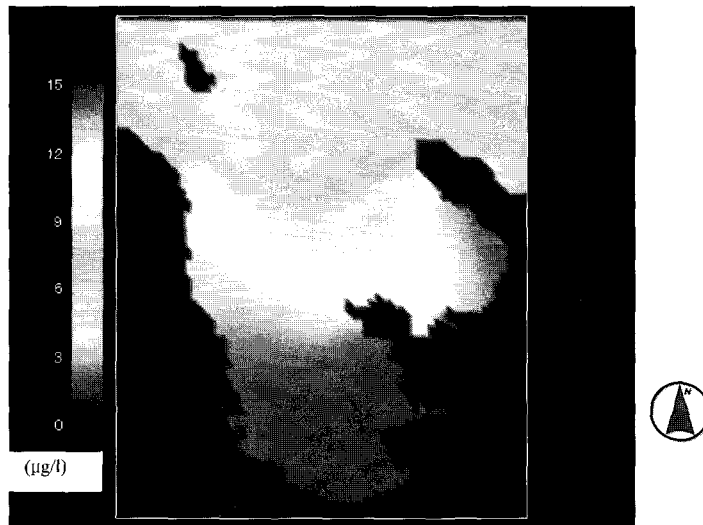


Fig. 2 Computed distribution of chlorophyll-a after 30days. Chlorophyll-a concentration (17th Sep., 2003) estimated from satellite data is applied to numerical model as an initial data.

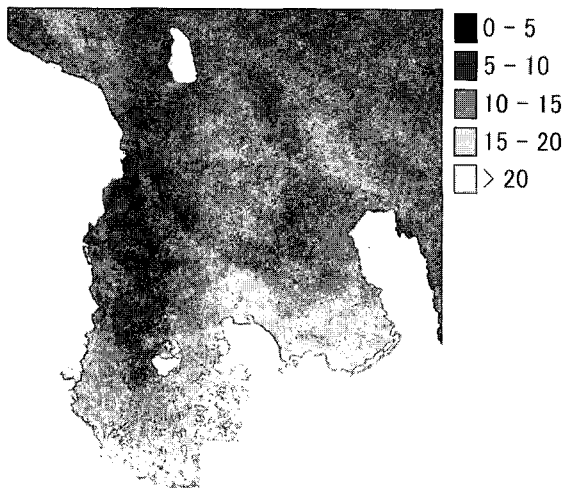


Fig. 3 Observed distribution of chlorophyll-a concentration using satellite data (3rd Sep., 2003) .