

NUMERICAL ECOSYSTEM MODEL OF RED TIDE IN OSAKA BAY INCLUDING SILICATE

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Because large volume of nutrients is loaded to Osaka Bay, Japan, from Yodo River, a red tide occurs every year there. Decreasing of loaded silicate from a river causes a shift in dominance of a red tide species from diatoms to non-diatoms in a coastal sea. It is called the silicate deficiency hypothesis that is due to dam construction in rivers. It is considered that such kind of phenomenon occurs in Osaka Bay. As silicate is trapped in Yodo River and Lake Biwa, silicate concentration in Osaka Bay is lower than other areas of the Seto Inland Sea. Then a red tide of non-diatoms has dominated from 1960. Recently, because of recovering of volume of loaded silicate, diatoms dominate again in Osaka Bay.

In this study, to clarify the relation between variation of volume of loaded silicate to the dominant red tide species, the numerical ecosystem model included silicate is developed. The study area is the mouth of Yodo River. The surface layer to the depth of 5m is presumed the box. The compartments are dissolved inorganic nitrogen, phosphorus and silicate, diatoms, non-diatoms, zooplankton, detritus and dissolved organic nitrogen and phosphorus. Boundary condition data were obtained by a commercial ferryboat. At first the dominance of diatoms in August 1996 is reproduced by the calculation. And then we will analyze a relation between the variation of loaded silicate to the red tide species by the calculation in 1980, 1900 and 2000.