

Impact Mechanism of Nutrients on Regime Shift of Phytoplankton Community Structure in the Bohai Sea

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The on-going ecological and environmental problems in the Bohai Sea are serious, which could be a major bottleneck for the sustainable development around the Bohai Rim. The regime shift of phytoplankton community structure in the Bohai Sea is significantly different from those in other coastal waters. The characteristics are that regime shift of diatom to dinoflagellate ratio and dominant species change. This might be the main cause of frequent ecological disasters and serious decline of marine health in the Bohai Sea. Eutrophication together with imbalance of nutrient regimes of nitrogen and phosphorus might be the key reason account for the regime shift of phytoplankton community structure in the Bohai Sea. While, the driving processes of nutrient regime impact on the phytoplankton community regime shift are still weak in quantitative basis and mechanism in the Bohai Sea. The proposed study will engage multidisciplinary study combining collection and analysis upon historical data, site survey, field and laboratory incubation experiments, and numerical simulation. This project aims to clarify the relationship between nutrient regimes and phytoplankton community structure, and to reveal the nutrient dynamics and processes of the growth and competition between diatom and dinoflagellate in the Bohai Sea. Combined with ecological dynamics model, the molecular ecology technology combining phytoplankton ecology with biological enzyme activity and characteristic gene expression was applied to clarify the control mechanism on the nutrient-driving phytoplankton regime shift. The successful implementation of the proposed study is expected to have a strong scientific impact on the pollution prevention and restoration of ecosystem health in the Bohai Sea.

Keywords: Ecological dynamic model, Phytoplankton community structure, Eutrophicated bay

