ABSTRACT

A historical overview of trophic status in Jiaozhou Bay, China

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This paper systematically analyzes the historical evolution and ecological effects of nutrient status in Jiaozhou Bay in the past 40 years since reform and opening up. The results showed that the DIN concentration increased continually in Jiaozhou Bay before the late 2000s, while the DIP and DSi concentrations decreased slightly and then increased rapidly in the same period. Since the late 2000s, the concentrations of nutrients decreased rapidly in Jiaozhou Bay. The nutrient limitation shifted from nitrogen limitation in the early 1980s to silicon limitation in the 1990s, and finally to phosphorus limitation in recent years. The annual average concentration of chlorophyll a has been fluctuating around 3 μg/L before 2015 in Jiaozhou Bay, but it has decreased in recent years. The zooplankton biomass increased significantly in the last two decades compared with that in the previous two decades. Analysis found that the increase in nutrient fluxes and reduction of sea area of the bay were the main reasons for the increase of nutrient concentrations before the late 2000s; whereas in recent years, the implementation of comprehensive environmental remediation measures was the main reason for the reduction of N and P fluxes to Jiaozhou Bay. Before 2010, shellfish culture was the main factor controlling the phytoplankton biomass in Jiaozhou Bay. However, the decrease of dissolved inorganic phosphorus concentration and the increase of zooplankton biomass were the main reasons for the decline of chlorophyll concentration in recent years.