

Variation factors of the coastal lagoon environment and ecosystem since the modern period in Hokkaido, Japan

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Although both human activity and natural climate change affect the aquatic environment and ecosystem of lagoon, most previous researches on lagoon eutrophication only discussed the effects of human-induced eutrophication. The effects of climate and sea-level changes have been comparatively less discussed. Thus, we reconstructed the environment and ecosystem changes since the mid 19 centuries in a seasonally frozen lagoon Mokoto-ko locates along the Okhotsk Sea coast in Hokkaido, northern Japan based on multi proxy analyses (CNS, XRF, and diatom) of sediment samples, to discover the impact of eutrophication and climate change on the lagoon ecosystem.

Mokoto-ko is seasonally ice-covered small lagoon, however, has a large 167 times catchment area. At present, Mokoto-ko is an eutrophic lagoon, and anoxic bottom water mass was observed. In January 2009, 1.8 m long sediment cores (09Mk-1C) was obtained from the northern part of basin using a push-in piston corer. There is the clear lamina layer throughout this core. Based on the sediment core analysis, eutrophication of lagoon Mokoto-ko started in late 1950s by phosphorus input, which is probably related with the development of dairy farming in the catchment area. On the other hand, lagoon environment and ecosystem showed drastic fluctuation. A sudden eutrophication and fresh water input of this lagoon has a strong relationship with heavy precipitation in its catchment. In this area, frequency of the heavy precipitation has good correlation with the phase of the Arctic Oscillation, meaning that Arctic Oscillation partially controlled the lagoon environment and ecosystem. In this presentation, impact of climate change on the lagoon ecosystem is discussed based on this periodical environmental change in addition to the impact of human activity.

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