

## Ongoing stress of transboundary air pollution: Assessment of effects of increasing nitrogen loading from the watershed on coastal ecosystem in Wakasa Bay

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Anthropogenic emissions of reactive nitrogen (N) due to fossil fuel combustion and modern agriculture practices have dramatically increased in global scale. In the Japanese watershed along the Sea of Japan, large amounts of reactive N emitted from northeastern Asia have deposited onto forest ecosystems, and thus N concentrations in river and groundwater have been increased year to year. Remotely modified N concentrations of terrestrial waters in local watersheds would affect coastal ecosystems. However, influence of N export from the watershed along the Sea of Japan on coastal ecosystem is still unclear. In this study, we assessed the effect of increasing nitrogen loadings from the watershed on coastal ecosystem in Obama Bay using the sediment cores. Mean sedimentation rates estimated from  $^{210}\text{Pb}_{\text{ex}}$  within the bay increased from  $0.13 \text{ g cm}^{-2} \text{ yr}^{-1}$  in 1960-1980 to  $0.55 \text{ g cm}^{-2} \text{ yr}^{-1}$  in 2000-2015. Corresponding to long-term increase of N concentrations in the rivers, nitrogen contents of the sediment cores that were mainly composed of marine autochthonous organic matter have also increased year to year. These results suggested that an increase of nitrogen loading from the watershed would promote production rates of autochthonous particulate organic materials. In addition to N-limited condition of the past, a drastic decrease of seagrass and seaweed might facilitate remarkable increase of sedimentation rates and nitrogen content.

Keywords: sedimentation rate, eutrophication, nitrogen deposition, Sea of Japan