

Evaluation of forest-derived nitrate flux from the river to the sea by using triple oxygen isotope of nitrate

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Terrestrial nitrate from river water and groundwater to coastal seas is an important nutrient source for coastal ecosystems. Recent accelerated depositions of atmospheric nitrate transported from the East Asia may stimulate leaching of nitrate from the forest and thus alter nutrient dynamics of coastal ecosystems. In this study, we have evaluated quantitative effect of forest-derived nitrate on total nitrate flux from the Kita River into Obama Bay using the nitrate triple oxygen isotope. Total flux of nitrate from the Kita River changed seasonally : lower in summer (from May to August) and higher in winter (from November to February). We divided this nitrate flux into two sources of forest-derived nitrate and others by means of two-source mixing of O nitrate. As a result, forest-derived nitrate occupied 21-93% of total nitrate flux in summer and 49-84% in winter. Furthermore, regardless of the season, 81-96% of forest-derived nitrate was accounted for nitrate generated by nitrification in the forest. These results mean that nitrogen saturation status of the forest ecosystem in the Kita River watershed dominate the riverine flux and may alter nutrient levels of Obama Bay.

Keywords: Nitrate deposition, Nitrate flux, Triple oxygen isotope, Land-Ocean interaction