Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)
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MIS21-P10 Room:Convention Hall Time:May 23 17:15-18:30

Stable isotopes of nitrate in natural mosses

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Natural mosses have been employed as reactive and accumulative indicators of atmospheric pollutants. Using the denitrifier method, the concentration, nitrogen and oxygen isotopes of moss nitrate were measured to elucidate the sources of nitrate trapped in natural mosses. Oven drying, not lyophilization, was recommended to dry mosses for moss nitrate analysis. Preliminary investigation suggested that moss nitrate can respond to nitrate availability in different habitats. Nitrate in terricolous mosses showed isotopic ratios as close to those of soil nitrate, reflecting the utilization of soil nitrate. Isotopic signatures of nitrate in corticolous and epilithic mosses could elucidate atmospheric nitrate sources and strength of anthropogenic NOx emission at urban-rural scales. However, mechanisms and isotopic effects of moss nitrate utilization must be further verified to enable the application of moss nitrate isotopes for source identification and partitioning.

Keywords: Nitrogen deposition, moss, nitrate, biomonitoring, stable isotopes, nitrate reductase