

Geochemical studies on nitrate in groundwater using triple oxygen isotopes as tracers

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The stable isotopic composition of nitrate collected from both precipitation and spring waters in Rishiri Island, Japan, was measured to use the ^{17}O anomaly to trace the fate of atmospheric nitrate which deposited on a background forest ecosystem in eastern Asian region. While nitrate in precipitation have a large ^{17}O anomaly with $\delta^{17}\text{O}$ values ranging from +20 permil to +30 permil, those in groundwater have small ^{17}O anomalies ranging from +1.5 permil to 3.5 permil. We conclude that only less than 15 % of the nitrate in spring water originates directly from the atmosphere being processed in the soil, and a substantial portion of nitrate is of remineralized origin that undergo biologic processing in soil before being exported from the forest ecosystem.