

## Effect of atmospheric nitrogen compound to the stream water quality

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### Background and objectives

Anthropogenic NO<sub>x</sub> emission has been increasing especially in East Asia. Because of this, high concentration of NO<sub>3</sub><sup>-</sup> flows out in the streams of mountainous areas, which is known as nitrogen leaching. The concentration of NO<sub>3</sub><sup>-</sup> keeps increasing in the water of Hii River at Shimane Prefecture. Atmospheric NO<sub>3</sub><sup>-</sup> deposit from continental origin may contribute significantly to the increase in NO<sub>3</sub><sup>-</sup> concentration. This implies that atmospheric NO<sub>3</sub><sup>-</sup> deposit not only domestic origin but continental ones may deteriorate the quality of stream water in Japan. We measured δ<sup>18</sup>O-NO<sub>3</sub><sup>-</sup> of the stream water samples of Hii River to evaluate the origin of the nitrate in the stream water.

### Methods and Study Site

Water samples were collected twice a week in the stream at Hii River in Shimane Prefecture. The sampling period was about a year from August 2007 to August 2008. δ<sup>15</sup>N-NO<sub>3</sub><sup>-</sup> and δ<sup>18</sup>O-NO<sub>3</sub><sup>-</sup> were determined using the denitrifier method (Sigman et al, 2001; Casciotti et al., 2002). To discuss the details of the samples, we measured NO<sub>3</sub>-N, NH<sub>4</sub>-N and inorganic ion concentrations.

### Results and Discussion

NO<sub>3</sub><sup>-</sup> concentration is depended on discharge. High NO<sub>3</sub><sup>-</sup> concentrations of NO<sub>3</sub><sup>-</sup> intensively run off with the snow melting event.

δ<sup>18</sup>O-NO<sub>3</sub><sup>-</sup> and discharge had remarkably similar fluctuation pattern in the snowmelt season. NO<sub>3</sub><sup>-</sup> of rain origin was preserved in snow and ran off at snow melting. At the high discharge period, δ<sup>18</sup>O-NO<sub>3</sub><sup>-</sup> was also high which denotes that there is a direct discharge of the nitrate from the atmospheric deposition in the period.

**Keywords:** Nitrate, Stream water chemistry, Oxygen stable isotope of nitrate