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福岡市都市近郊の窒素飽和が下流域の河川水質に及ぼす影響評価
Effects of nitrogen-saturated forests on downstream water quality in Fukuoka City

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Nitrogen is often limiting nutrient for plant growth and is mainly supplied from atmosphere. Forests can act as a filter for atmospherically deposited nitrogen and maintain background concentration levels of nitrogen in streams. However, recent increases in atmospheric nitrogen deposition have resulted in a shift from net-nitrogen retention to high levels of net-nitrogen loss from forested, resulting in high nitrogen concentration stream water.

In the Tatara River Basin, Fukuoka City, nitrogen retention capacity of upland forests has decreased and nitrate concentrations in downstream water have been increasing (Chiwa et al., 2012). This study analyzed NO_3^--δ^{15}N, NO_3^--δ18O in addition to NO_3^- concentrations in stream water in the Tatara River Basin to assess the impact of nitrogen saturation forest on downstream water quality.

In northern part of the basin, NO_3^- concentrations of upstream were lower than downstream. In contrast, in southern part of the basin, NO_3^- concentrations in upstream were lower than downstream. NO_3^--δ^{15}N in upstream was significantly lower than downstream in both northern and southern parts of the basin. In contrast, little difference of NO_3^--δ^{18}O was observed between upstream and downstream in both parts. It has been known that the value of δ^{15}N and δ^{18}O ratio due to human wastewater is 10 to 20 ‰ and -5 to 7 ‰, respectively (Kendall and others, 1995). Therefore, the different trends in NO_3^- concentrations from upstream to downstream between two parts could be caused by different amounts of human sewage to the downstream between two parts.

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