Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

MIS023-P08 会場:コンベンションホール 時間:5 月 22 日 16:15-18:45

森林流域における蛇紋岩通過時における渓流水中硝酸イオンの有機化
Conversion of nitrate to dissolved organic nitrogen in stream water through serpentinite bedrock in a forested watershed

智和 正明[1*], 井手 淳一郎[2], 東　直子[1], 丸野　亮子[1], 大槻　恭一[1]
Masaaki Chiwa[1*], Jun'ichiro Ide[2], Naoko Higashi[1], Ryoko Maruno[1], Kyoichi Otsuki[1]

[1] 九州大学演習林, [2] 山梨大学国際流域環境研究センター
[1]Kyushu University Forest, [2]International Research Center for River

The concentration of NO_3^- in stream water has been elevated in forested watersheds due to chronic atmospheric nitrogen (N) deposition over the last few decades. N saturation in forested ecosystems, defined as an excess of N deposition supply over biotic demand, results in significant N leaching from forested watersheds. Recent studies, however, indicated that chronic high N deposition has had variable effects on stream water NO_3^- concentrations across the northeastern United States. This is because many factors affect NO_3^- leaching from forested watershed.

In this study, to test the hypothesis that passing groundwater though different bedrock causes a marked difference in the nitrate (NO_3^-) concentration in baseflow stream water, two nearly adjacent watersheds, site O (serpentinite and chlorite schist: NO_3^- 55 micro mol L^{-1}) and site S (amphibolite: NO_3^- 113 micro mol L^{-1}), were investigated and the underlying mechanism affecting NO_3^- concentration as groundwater passes though bedrock was identified. The conversion of NO_3^- to dissolved organic nitrogen (DON) in groundwater as it through bedrock could be the primary reason for the lowered NO_3^- concentration at site O. Plausible mechanisms could be NO_3^- reduction to nitrite (NO_2^-) by reduced metals, such as iron, chromium, and nickel found in serpentinite bedrock and the subsequent reaction of NO_2^- with dissolved organic matter to produce DON. The results from this initial study showed that certain bedrocks can reduce NO_3^- concentrations in stream water by converting groundwater NO_3^- to DON.

キーワード: 窒素飽和, 窒素流出, 有機化, 森林流域, 蛇紋岩
Keywords: Nitrogen saturation, Nitrogen leaching, Conversion, Forested watershed, Serpentinite