

ACG035-P05

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The nutrient load from a drainage basin of different land cover

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The nutrient load from a drainage basin by rainfall or snowmelt is a key factor to affect the ecosystem in rivers, lakes and on the coast. In this study, we investigated the nutrient loading processes in the Saromabetsu river basin, facing a brackish lake, Lake Saroma. We separated river water into new and old waters for the runoff event of the 2009 typhoon by using three chemical tracers, O18, D and SiO₂. As a result, it was found that the peak discharge in the typhoon runoff event is occupied by the same amount of new and old waters. By calculating the nutrient concentration of new and old waters, we considered how the farmland affects the river water quality. In order to examine the farmland effect, during non rainfalls, we sampled river water and measured discharge at 10 points along the main and tributaries' channels. The simultaneous soil moisture measurement on the basin slope suggests that the new water is transported by the unsaturated throughflow in the surface soil layer. The old water was supplied probably by the piston groundwater flow, because the O18 and D values did not then change. The separation of new and old waters suggested that the throughflow has the NO₃-N concentration of 1.3mg/L. Meanwhile, the NO₃-N concentration of the soil water was nearly 0 mg/L in forest and 2 ? 8 mg/L in grassland. So the river water pollution could occur mainly by the throughflow generated at farmland. The NO₃-N concentration of the river water during non rainfalls was correlated with the rate of the farmland area in the drainage basin upstream of the sampling points.

Keywords: nutrient load, ecosystem, typhoon runoff event, unsaturated throughflow, piston groundwater flow