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Water balance and mass balance in a mountainous river basin, Northern Japan Alps

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Abstract

We have investigated the water balance and mass balance for four years in Maekawa River basin on the eastern slope of Mt. Norikura-dake. In this region, the precipitation frequency is high from the rainy season to the autumn. The maximum base-flow discharge occurs in the spring snowmelt season. The pH and electric conductivity of the river water decline rapidly with the beginning of the snowmelt runoff and temporarily decrease when the discharge increases temporarily in the rainy season or during a typhoon event. The Cl^- concentration of the river water increases in the early stage of snowmelt season since there is a considerable amount of sea salt in the snow. In addition, the NO_3^- concentration of the river water increases when the rainfall increases the discharge. The major ion concentration of the river water, except Cl^- and NO_3^- almost synchronizes with the change in the electric conductivity. In the mass balance of cations, the runoff rate from the river basin considerably exceeds the atmospheric deposition rate to the river basin. This is because there is extremely much elution of ions from new volcanic rocks and soils. Further, the atmospheric deposition rate of NO_3^- is larger bigger with the biological consumption in the river basin than the runoff rate from the basin.