

Study on the geochemical characteristics of gross rainfall, throughfall, and stemflow during individual rainfall event

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On the water cycle in forested mountainous area, it is very important to understand the geochemical characteristics of rainfall which becomes the origin of stream water and groundwater. Rainfall component is classified into gross rainfall, throughfall, and stemflow due to difference in the attainment route to the ground. In many previous studies for the chemical characteristics of rainwater, bulk sampling method generally has been applied for collection of water sample. However, some geochemical and hydrological researchers reported that chemical compositions in the rainfall were significantly varied during individual rainfall event. Therefore, it is necessary to understand the detailed chemical characteristics of rainwater, in order to investigate the small scale hydrological processes. To define the runoff process in mountainous catchments and relationship between rainfall chemistry and air mass as origin of rainwater, some geochemical and hydrological studies, such as dissolved ion chemistry and oxygen and hydrogen isotopic ratios, using precise time resolution gross rainfall and/or throughfall samples have been conducted. In contrast, there was little study for stemflow chemistry. Thus, additional information is required for stemflow studies.

In this study, we developed the new precise time resolution automatic rainwater sampler in order to investigate the geochemical characteristics of gross rainfall, throughfall, and stemflow. Additionally, these three rainfall components were collected in mountainous area at the same time using this sampling equipment. Collected samples were analyzed for dissolved ion chemistry and oxygen and hydrogen isotopic ratios. The influence on water chemistry derived from difference of attainment route among three rainfall components was considered. We expect to report the concept of new rainwater sampler and the geochemical characteristics in these rainfall components, and suggest the evolvability of this study.