

Use of Sulfur-35 for Measuring of Mean Residence Time of Water in a Forested Catchment

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Environmental tracers have provided valuable information on hydrological processes, such as flow paths of storm events, groundwater movement, and biogeochemical reactions occurring along flow paths. For example, tritium and carbon-14 have been used for studying hydrological processes about time scale. However, these environmental traces are inadequate for studying hydrological processes in small and headwater catchments on time scales of a year or less, because of their time scales (e.g., years to thousands of years). In this study, we used a short-lived radioactive isotope of sulfur-35 (half life = 87 days) for measuring the mean residence time of water in Korean natural forested catchment. The sulfur-35 activity of sulfate in water provided an estimate of the residence time of atmospherically deposited sulfate. We also found that biogeochemical reactions such as absorption and adsorption/desorption in soil and groundwater are important to measure the residence time of water in a forested catchment. Acknowledgement: This study was supported by a grant (code: 1-8-2) from Sustainable Water Resources Research Center of 21st Century Frontier Research Program.