

Analysis on DOC transformation in a forested catchment using carbon stable isotope signature

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In order to elucidate the production, consumption and transformation mechanisms of dissolved organic carbon (DOC) in temperate forested catchment, time and spatial variations in several parameters which characterize the DOC quality were surveyed in various hydrological processes in a headwater catchment in central Japan. Rain, through fall, soil waters in various depths, groundwater and streamwater were sampled since June 2006 to November 2008. Concentration, $d^{13}C$, fluorescence spectrum and UV absorbance of DOC were measured. We employed new method for measuring $d^{13}C$ -DOC using an IRMS and a CO₂ purifying system with a TOC analyzer. Combined discussions on the profiles of concentration, $d^{13}C$ and fluorescence characteristics provided following findings: 1) Microbial decomposition of DOC was commonly predominant for consumption in relatively shallower soil horizons (0 to 30 cm in depth) regardless of the soil moisture condition among the soil profiles at the different parts in hillslope, while adsorption was significant in the relatively dry soil profile. 2) During this process, persistent portions remained preferentially in the soil solution. 3) In the groundwater body, two different processes caused; protein-like dissolved organic carbon was added in the relatively oxygen rich part, and the $d^{13}C$ value decreased with the anoxic DOC decomposition in the oxygen poor part.