The Response of the groundwater to a rainstorm in the mountain body and material recycling in the forested watersheds

Noriko Yanase[1]; Sayaka Fukushima[2]; Kayo Matsushita[2]; Muneoki Yoh[3]

[1] Graduate School of Agriculture,TUAT
; [2] Environ.Sci.,Tokyo Univ.Agri.Tech.; [3] Tokyo Univ. Agri. Tech.

It is important to clarify the rainfall-runoff process in the forest watershed. Rainwater undergoes various reactions, for example, chemical weathering, mineralization of soil organic matters, nitrification and ion exchange, which determine the groundwater quality, in the mountain body.

In Tama hills, west part of Tokyo, the drastic rise up of water table of the piezo-meter during a rain storm event has been observed, in previous studies, concluded that this phenomenon caused by increased pore air pressure and spread pressure in the saturated zone inside of the mountain-body. And they have been suggested the evidence of 'Groundwater Ridge', which was formed by subsurface flow.

We focused on this phenomenon. Water chemistry was monitored during drastic rise up of water table of the piezo-meter caused by storm event from October 2004 to December 2006, because to clarify the groundwater flow-path in the forest watershed, we must know the mechanism of material transfer from ground level into mountain body. Those results are as follows;

+The speed where the water level of the well rises is almost corresponding to the saturated permeability of the mountain body inside.

+The water quality in the well diminishes as the water level rises, and the density rises as the water level attenuates.

From a point of view of analysis results, especially of SiO_2, drastic rising up of water table of the piezo-meter means not either 'Piston flow Model' in which the existing water is pushed out by the infiltrating rainfall nor 'Macropore Model' in which the quick soil water flow in macropore.

As a result of these observations, we propose a new concept that 'These phenomena is temporary vertical infiltration formed by gravity water connected unsaturated soil water', as 'Apparent Water Column'.