

# Oxygen and hydrogen isotopic variations during infiltration precipitation in soil water zone and artificial soil column.

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In studies of processes from infiltration of precipitation to recharge of groundwater, understanding of soil water behavior is important. Natural tracer technique with oxygen and hydrogen isotope ratios of water is useful to explain the soil water behavior. However, such kind of research has not yet enough, and even the method of soil water extraction has not been well defined. Therefore, in this study, oxygen and hydrogen isotopic ratios of soil water obtained by the vacuum distillation method are studied about natural soil as well as an artificial soil column. The observation was done through before to after precipitation.

The change in the isotopic ratio of soil water caused by infiltration of precipitation can not be explained by simple two-component mixing of the precipitation and the soil water before the precipitation, and it is estimated that several factors are involved. In vadose-unsaturated zone, evaporation effect is observed, in unsaturated-saturated zone, difference in the isotopic ratio is found between freely moving water and water bound to mineral surface, and in saturated zone, evaporation-condensation process is observed under near equilibrium.

In infiltration of artificial precipitation in the soil column, the mixture of artificial precipitation and the soil water were observed at very shallow unsaturated zone, and the soil water of the saturated zone maintained the initial isotopic ratio. At the surface of the column after artificial precipitation, the isotopic ratio change higher by evaporation effect. Since then, isotopic ratios gradually change lower caused by isotopic exchange to vapor from saturated zone soil water or and atmospheric water vapor.