[EJ] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-HW Hydrology & Water Environment

[A-HW23]Residence time of groundwater / surface water and water / mass cycle processes in watershed

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The residence time of ground/ surface water is one of the most important parameters to understand hydrological and mass cycle processes in a watershed. However, residence time information of the water is still lacking to charactrize watersheds with steep topography underlain by young lithology, with a special concern of soil / gravel discharge, solute transport and hydro-geomorphological processes. Generally, we investigate the residence time of the water by applying radionuclides / noble gas tracers showing apparent age as 3H, 36Cl, CFCs and SF6, and/ or conservative tracers like stable isotopes, and need to understand a difference of residence time estimated by different type of tracers in various hydro-geological settings.

In this session, we compare the residence time of ground/ surface water and mass transport processes observed in various types of the watershed, and discuss issues to be solved and future perspectives on water age and mass cycle research topics.

[AHW23-P04]Numerical and approximate solutions for solute transport in a fractured rock for dispersion in fractional dimension

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The groundwater flow in the fractured formation may be in fractional dimension; however, the problems of solute transport in such a flow system have not been studied yet. This study develops a transport model to investigate the solute transport in a fractured rock with dispersion in fractional dimension. The finite-difference method is used to solve the model and the result is compared with existing analytical solutions. In addition, an approximate solution is also developed based on the steady-state transport equation and a moving boundary condition. The results show that the approximate solution gives very good prediction in the concentration distribution well under the conditions of short observed location, large dispersivity, and long operating time. The sensitivity analysis indicates that the solute concentration is very sensitive to the parameters such as retardation, injection rate, and flow dimension. We also find that a larger dispersion dimension would lead to solute concentration arriving the observation point earlier. Meanwhile, a smaller dispersion dimension yields more transfer mass near? the source.