[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-P03]Approximate solutions for drawdown and wellbore flowrate due to constant-head pumping for flow with considering skin effect

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A variety of mathematical models describing groundwater flow due to constant-head pumping (CHP) in a confined aquifer had been proposed. The predicted drawdown or wellbore flowrate from the solution of the model may be overestimated or underestimated when a skin zone is present around the wellbore but neglected. If the skin has a finite thickness and the flow in the skin zone is included in the mathematical model, its solution is then referred to as two-zone solution (TZS). In contrast, it is named as skin-factor solution (SFS) if the skin properties are lumped as a factor in the model. The TZS is much more complicated and difficult to evaluate than the SFS. Therefore, this study aims at developing a novel SFS based on a steady-state groundwater equation with time-dependent outer boundary for CHP tests with a partially penetrating well in a confined aquifer. The results from this new SFS show good match in the drawdown and wellbore flowrate with the TZS. Moreover, the present SFS coupled with the simulated annealing algorithm is used to analyze field observed data from a CHP test for the estimation of the aquifer parameters. The result demonstrates that the new SFS has merits of good accuracy and less computing time in the parameter estimation.