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Estimation of the mean residence time of shallow groundwater by using stable isotopes in a small drainage basin in the Tatun Volcanic Group, Taiwan

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Deuterium excess (d=δD-8δ^{18}O), represents a kinetic effect produced when water evaporates and can be used as an indication of different sources of air masses, were measured in precipitation, stream water, and groundwater, for 2 years periods in a small headwater catchment (Macao) in the Tatun Volcanic Group (TVG), Taiwan. The values of d and δ18O were used to estimate the mean residence time (MRT) of the shallow groundwater of the region. The preliminary results show that the average MRT of the shallow groundwater is around 70-84 days during the winter while it is around 120 days in the summer. The seasonal variations in the d value of precipitation arises from changes in isotopic water vapor composition associated with seasonal activity of the Asian monsoon which resulted in the variations of the mean residence time of the region.

Keywords: The mean residence time, Deuterium excess, Stable isotopes, Groundwater, TVG