Water isotopes and weathering fluxes from catchments in the Zambales ophiolite region, Luzon, Philippines

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The relationship between water residence times and weathering fluxes in small tropical catchments are relatively understudied [1]. Combining hydrometeorologic data with stable water isotopes and weathering solute measurements provides an approach to assess the role of weathering derived from out-of-equilibrium rainwater from large storms versus equilibrium-controlled weathering related to long fluid residence times during baseflow. We present new data from three adjacent small catchments (2.6 to 3.4 km^2) in the Zambales Ophiolite region, Luzon, Philippines. Previous work from nearby catchments and modern weathering flux compilations suggest that the Luzon arc produces some of the highest area-normalized weathering rates in the world [2, 3]. In 2018-19 (14 months) weekly water samples were collected and analyzed for major cations and anions, as well as δD and $\delta^{18}O$ by laser spectroscopy. Sampling during the wet season includes daily resolution over major storm events. Combined with discharge measurements, rainfall δD and $\delta^{18}O$ data, and suspended sediment flux data from a complementary study, we analyze seasonal changes in erosion-weathering relationships, calculate the young water fraction of the annual discharge and assess the role of silicate versus carbonate weathering in weathering fluxes. We observe δD-$\delta^{18}O$ relationships with shallower slopes and less total variability than rainfall, and intermittent streamflow in one catchment during the dry season, demonstrating that inter-catchment exchange by groundwater flow may influence differences in weatering fluxes derived from adjacent catchments.

[1] Ibarra et al. (2016) *Geochim. Cosmochim. Acta,* **190**, 265-293. [2] Li et al. (2016) *Earth Planet. Sci. Lett.*, **443**, 59-69. [3] Schopka et al. (2011) *Geochim. Cosmochim. Acta,* **75**, 879-1002.