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Water flux in forest soil estimated by Buckingham-Darcy Equation

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We applied Buckingham-Darcy equation with measured soil K-theta relationship to the topsoil(30 cm depth) and subsoil(90 cm depth) in upper- and lower-plot of the forest slope, and calculated the vertical soil water flux throughout a year to validate the annual soil water flux. The annual soil water flux was 530 mm for upper plot, smaller than the annual stream runoff rate of the study catchment(643 mm), and 982 mm for the lower plot, larger than the stream runoff rate. Both soil water fluxes were smaller than the annual precipitation of the study catchment(1282 mm). We considered that these fluxes represented the difference of the slope position between the plots and that they were reasonable as the vertical water flux in unsaturated soil below rooting zone.

Keywords: forest soil, soil water, water flux, Buckingham-Darcy Equation, K-theta relationship