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Infiltration depth, rooting depth, and regolith flushing—A global perspective

Gonzalo Miguez-Macho[1] and Ying Fan[2]
[1]CRETUS, Fac. de Física, Universidade de Santiago de Compostela, Santiago de Compostela, Galicia, Spain (gonzalo.miguez@usc.es)
[2]Department of Earth and Planetary Sciences, Rutgers University, New Brunswick, NJ, USA (yingfan@eps.rutgers.edu)

How deep does the rain regularly infiltrate into the ground? Do plant roots follow? How much infiltration is pumped back to the atmosphere (short-circuiting) and how much passes below plant roots reaching the water table, flushing the regolith, recharging aquifers and rivers, and eventually reaching the ocean (long-circuiting) thus regulating global biogeochemical cycles and long-term climate? What is the depth that supplies evapotranspiration, and what is the regolith flush rate? What are the implications to global material and energy cycles? The answers depend on local climate–terrain–vegetation combinations. We use observations and high resolution numerical modeling at the global scale to shed light on multiscale causes–feedbacks among climate, drainage, substrate, and plant biomass that interactively create a global structure in the depths and rates of hydrologic plumbing of the Earth's critical zone, informing global models on critical depths and processes to include in Earth-system predictions.