Evaluating the Heat Pulse Method for Measuring Soil Water Flux. (S01-ochsner160409-Oral)

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Abstract:

The goal of this study was to evaluate the heat pulse method for measuring soil water flux. In the heat pulse method, soil water flux is estimated based on the convection-induced distortion of the temperature field around a line heat source. We conducted laboratory experiments with thermo-TDR probes embedded in repacked columns of sand, sandy loam, and silt loam soil. The columns were subjected to water fluxes ranging from ~0.04 cm/hr to ~40 cm/hr. For each flow rate, heat pulses were introduced using the thermo-TDR probes and the resulting temperature increases above, below, and beside the heater were measured using thermocouples connected to a datalogger. This temperature increase data may be analyzed in a variety of ways to estimate the water flux. We will compare the estimated and actual water fluxes for several flux estimation techniques. We will describe the conditions under which these heat pulse techniques should be effective for measuring soil water flux.

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