Geophysical Research Abstracts
Vol. 18, EGU2016-1057, 2016
EGU General Assembly 2016

Automated Dual-Head Infiltrometer for Measuring Field Saturated Hydraulic Conductivity (Kfs)

Leonardo Rivera, Doug Cobos, and Gaylon Campbell
Decagon Devices, Inc., Pullman, United States (leo@decagon.com)

Traditional methods for determining field saturated hydraulic conductivity (Kfs) based on infiltration measurements require numerous factors to correct for three-dimensional flow. Analysis for determining Kfs employs numerically determined shape factors for ring radius, depth of ring insertion, ponding depth, and soil hydraulic properties. The correction factors for soil hydraulic properties are typically taken from a table based on soil capillary length. Significant error can occur in the calculation of Kfs when the correction factor is large and infiltration is low. Using a dual-head infiltration measurement and methods proposed by Reynolds and Elrick (1990) for analysis of steady flow from a ponded infiltration in a single ring, we can reduce the error by eliminating the need to use soil capillary length as a correction factor in analysis. This method has traditionally required constant monitoring and user intervention to change the water levels and can take hours to complete a single measurement. There is also a lag time after changing the water head setting, especially in low conductivity soils. An automated infiltrometer capable of producing variable hydraulic head conditions without actually varying the water depth has been developed in our lab. The infiltrometer has been used successfully to determine Kfs under field conditions and shows great promise to be an easy to use, accurate tool for measuring Kfs.