Spatial Variability of Water Flow Through Undisturbed Soil Columns. (S01-gimenez085416-Oral)

Authors:

- D.Gimenez - *Rutgers, The State University of New Jersey*
- L.Pozdnyakova - *Rutgers, The State of New Jersey*
- S.Raturi - *Rutgers, The State University of New Jersey*

Abstract:

Experimental results have shown that flow through soil samples is highly variable, but studies on the spatial properties of flow are rare. Particularly important for understanding the interplay between soil structure and flow variability is the characterization of the spatial structure of flow at various pressure potentials. Recent advances in modeling the spatial structure of geophysical properties have focused on the distribution of their increments, i.e., differences in the values of a property measured at points separated by a constant distance (lag). The objective of this work was to analyze the spatial structure of water flow through soil using various models of the distribution of increments. Water was uniformly applied to the surface of large soil columns (0.3 m in diameter and 0.5 m long) while the lower boundary was controlled with a suction table. Pressure potential and water content were measured along the columns and used to determine steady state flow at several water application rates. Steady state outflow was collected in 110 individual cells. The spatial distribution of the increments at several lags was analyzed with various models. The performance of selected models will be discussed with emphasis on the scale dependence of model parameters.

Corresponding Author Information:

Daniel Gimenez
Department of Environmental Sciences,
Rutgers, The State University of New Jersey
14 College Farm Road
New Brunswick, NJ 08901

phone: (732) 932 9477
fax: (732) 932 8644
e-mail:
gimenez@envsci.rutgers.edu

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