Spatial Variability of Saturated Hydraulic Conductivity Derived From in situ Measurements of Air Permeability. (S01-iversen054909-Poster)

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Abstract:

The saturated hydraulic conductivity (Ks) is a governing and highly sensitive parameter in most distributed hydraulic models. At the same time the variability of Ks is often high and the measuring methods are often time-consuming. The objectives of the present study were to investigate the spatial correlation structure of air permeability (ka) and to present a predictive relationship between ka and Ks measured on large soil samples (20-cm diameter). The data included measurement on five different sandy soils where the in situ air permeability (ka,in situ) was measured in the Ap and B horizon in a grid using a portable air permeameter. In addition, undisturbed soil cores were sampled in both horizons at the five sites, and ka at the actual soil matric potential and Ks were measured in the laboratory. Measurements of ka,in situ showed that it was possible to describe the spatial structure of the parameter using the portable air permeameter. The result from the laboratory measurements indicated that a general log-log linear prediction relationship between air permeability and saturated hydraulic conductivity existed. Since massive measurement efforts will normally be required to get a satisfactorily representation of the spatial variability in Ks the use of ka,in situ to assess spatial variability in Ks appears a promising alternative.

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