



Application of active distribute temperature sensing and fiber optic as sensors to determinate the unsaturated hydraulic conductivity curve

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The development of methodologies for the characterization of soil water content through the use of distribute temperature sensing and fiber optic cable has allowed for modelling with high temporal and spatial accuracy water movement in soils. One of the advantage of using fiber optic as a sensor, compared with the traditional point water probes, is the possibility to measure the variable continuously along the cable every 0.125 m (up to a cable length of 1500) and every second.

Traditionally, applications based on fiber optic as a soil water sensor apply the active heated fiber optic technique AHFO to follow the evolution soil water content during and after irrigation events or for hydrologic characterization. However, this paper accomplishes an original experience by using AHFO as a sensor to characterize the soil hydraulic conductivity curve in subsaturated conditions.

The non lineal nature between the hidraulic conductivity curve and soil water, showing high slope in the range close to saturation) favors the AHFO a most suitable sensor due to its ability to measure the variable at small time and length intervals. Thus, it is possible to obtain accurate and a large number of data to be used to estimate the hydraulic conductivity curve from de water flow general equation by numerical methods. Results are promising and showed the feasibility of this technique to estimate the hydraulic conductivity curve for subsaturated soils .