



Estimation and analysis of soil hydraulic properties through infiltration experiments: test of BEST method

X. Xu, G. Kiely, and C. Lewis

Centre for Hydrology, Micrometeorology and Climate Change, Department of Civil and Environmental Engineering,
University College Cork, Cork, Ireland (xuxianliww@gmail.com)

The BEST method (Beerkan Estimation of Soil Transfer parameters through infiltration experiments) appears promising and easy for field experiments of large scale to estimate not only the saturated hydraulic conductivity but also the water retention and hydraulic characteristics. However, few tests have been conducted to test it so far. This study involved BEST infiltration experiments in the field at three layers (surface, 15cm and 30cm) for each of three soils with different soil textures under grassland. The soil hydraulic properties determined using the BEST method identified contrasting characteristics between different soil textures: with higher saturated hydraulic conductivity under coarse texture and lower values under loam textures especially with soils of high compaction. Although the BEST method resulted in reasonable results and is promising, with BEST we encountered some anomalies when calculating hydraulic properties for some cases with too few data of points under the transient flow state. We show that the application of BEST field experiments requires a wide range of soil water content from initial to saturated states so as to have enough of the transient flow process. The vertical variation of soil hydraulic properties was significant, and the surface layer had a lower saturated hydraulic conductivity caused partly by compaction (high bulk density) or by the remnants of grass. Further research about the effects of compaction and grass components on soil hydraulic properties is needed.