



Ponding time, hydraulic conductivity and sorptivity – experimental determination by a single ring infiltrometer with rain simulator

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The continuous rain simulator used with very precise dosing enables both simulation of characteristic rainfall as well as accurate determination of infiltration rate and automatic calculation of hydraulic conductivity of soils under natural conditions. As a part of the research of infiltration processes induced by characteristic rainfalls, the effects of stormy rainfalls were verified in the described project stage. Stormy rain with constant intensity was applied by rain simulator in a single ring infiltrometer. Samples were tested in the laboratory (soils and kaolinite) and directly in the field. During rain infiltration was measured ponding time. Theoretical base of the research comes from non-steady state unsaturated vertical infiltration, which process (in one-dimensional flow conditions) can be described by Richard's equation. Final simplified solution is provided by Philip's simplified infiltration equations. Hydraulic conductivity K was approximated from the analysis of time series of the process of vertical non-steady cumulative infiltration, going after ponding time. Sorptivity S was calculated by the numerical experiment with known values of stormy rain intensity, ponding time and hydraulic conductivity. Compared to traditional methods (single or double ring infiltrometer), soil hydro-physical characteristic (K , S) determined by this method is more reliable, informative and verified by ponding time.