Testing of evaluation methods applied to raw infiltration data measured at very heterogeneous mountain forest soils

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In order to obtain infiltration parameters and analytical expressions of the cumulative infiltration and infiltration rate, raw infiltration data are often evaluated using various infiltration equations. Knowledge about the evaluation variability of these equations in the specific case of extremely heterogeneous soils provides important information for many hydrological and engineering applications. This contribution presents an evaluation of measured data using five well-established physically-based equations and empirical equations, and makes a comparison of these procedures. Evaluation procedures were applied to datasets measured on three different sites of hydrologically important mountain podzols. A total of 47 single ring infiltration experiments were evaluated using these procedures. From the quality-of-fit perspective, all of the tested equations characterized most of the raw datasets properly. In a few cases, some of the physically-based equations led to poor fits of the datasets measured on the most heterogeneous site (characterized by the lowest depth of the organic horizon, and more bleached eluvial horizon than on the other tested sites). For the parameters evaluated on this site, the sorptivity estimates and the saturated hydraulic conductivity (K_s) estimates were distinctly different between the tested procedures.