



Impact of soil hydraulic parameter uncertainty on soil moisture modelling and its implications with respect to data assimilation

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A methodology is presented for quantifying the uncertainty on soil hydraulic parameters arising from within soil class variability and for assessing its impact on soil moisture modelling. This method differs from former research because (i) the construction of the parameter uncertainty does not rely on experimental data but on soil hydraulic parameters predicted with pedotransfer functions, (ii) all moments of the parameter probability distribution function are preserved and (iii) the dependence between the soil hydraulic parameters is taken into account. Results show that the soil hydraulic model parameters are not normally distributed and that this parameter uncertainty results in non-normal distributions of the modelled soil moisture. Especially when the soil is very dry, the deviation from the normal distribution will hamper the optimality of classical linear filters for data assimilation. As an extension of this research, we have shown that the central point of a soil class is useful for representing the soil hydraulic parameters corresponding to the average hydrologic behaviour.