



Could be hydrological model parameters inferred from a soil texture?

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Hydrological modelling of the runoff response to the causal rainfall on the small catchment or individual plot scale is an important part of designing the water management measures in the landscape. Classic methods based on CN and unit hydrograph are implemented in number of models (HEC-HMS, WMS, etc.). This approach is also being implemented in the Atlas environment. Expanding the use of physically-based approach still faces number of ambiguities. Obtaining parameters of hydrological models may be a difficult task. Measurement of physically based parameters is often time consuming and costly. On the other side, obtaining parameters by calibration require long term time series of data which are often not available in appropriate quality. In contrast to other soil properties, soil texture is relatively easy to obtain. In this contribution we present an attempt to link soil texture to surface runoff model parameters. Serie of artificial rainfall experiments on 4 m² plot with disturbed soil of various texture was undertaken. Besides soil texture the experiments differ in terms of rainfall intensity and slope. Episodic rainfall-runoff model smoderp2d was used to model those experiments. Parameters of Philip's infiltration, required by the model, were calculated directly for each single experiment. Manning-Strickler formula is used in simplified solution of the kinematic wave equation to express the momentum. Manning-Strickler (MS) formula, which is usually used to 1D channel flow calculations, is used to model the surface sheet flow. Roughness coefficient, which express the effect of current state of soil aggregates, texture and vegetation, is important parameter of MS formula. Roughness coefficient and other two parameters, related to surface slope and water level height were optimised. Response sensitivity of the runoff on these parameters is presented. The set of parameters were further used in infer uncertainty in runoff for a given soil texture class. In addition, we would like to present the new development of the model smoderp2d which were recently integrated in the GRASS GIS and QGIS open source software packages.

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