Hydrology and
Earth System
Sciences
Discussions

Interactive comment on "Statistical analysis and modelling of surface runoff from arable fields" *by* P. Fiener et al.

P. Fiener et al.

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Editor: The Key Words should not repeat words already included in the title

Reply: We are grateful for this important technical comment. We changed the keywords as follows: - infiltration - rain excess - soil use - prediction - tillage

Editor: Why should the sand content be negatively related to the initial abstraction?

Reply: We extended the explanation of the sand effect:

"The influence of sand content was opposite to what might be expected (e.g. from the influence of texture in the SCS CN model) although our model is still in general agreement with the assessment of coarse textured soils by the CN model due to the

fact that stones had a much larger influence than sand and because the CN model does not explicitly distinguish between the effects of stones and sand. There is little systematic research on the effect of sand on runoff, which impedes the interpretation of this result. It is remarkable, however, that the influence of sand only promoted early runoff but not later runoff (Fig. 3. 4). Likely, the increasing sand content decreased aggregate stability (Boix-Fayos et al., 2001) and increased slaking forces (Auerswald, 1995) due to the usually dry soil surface of sandy soils. Both promote the breakdown of aggregates and thus accelerate sealing and decrease depression storage on the soil surface (Mohamoud et al., 1990)."

Editor: By runoff volume, you presumably mean the total volume of runoff over a given time period. This total volume is normally obtained from the runoff rate and the time period.

Reply: We changed the terms to "accumulated runoff volume" and "instantaneous runoff rate" to make clear that our runoff rate is not equivalent to the ratio of accumulated volume and accumulated time but has a higher temporal resolution.

Editor: A clear explanation is requires of the reason for the model being able to predict more accurately the runoff volume than the runoff rate.

Reply: We extended our explanation: "The measured instantaneous runoff rates per minute are subject to random errors that level out when rates over a longer period of time are combined in the calculation of the accumulated runoff volume while systematic errors (bias) of the rate measurements are also retained in the runoff volume. The difference in performance of rates and volume thus is due to the influence random error."

Editor: What is g(p) in Equation (2)? Be consistent when referring to Equations.

Reply: We added the explanation for g in Equation (2) and we put g in italics in Equation (3)

Editor: Sometime you use "Eq" and at other instances "equation"

Reply: We deleted Eq and used "equation" consistently