

## ***Interactive comment on “***

## **Experimental validation of some basic assumptions used in physically based soil erosion models” by S. Wirtz et al.**

**S. Wirtz et al.**

stefanw-170182@t-online.de

Received and published: 14 April 2011

Thank you for the constructive comments. There are some very important points and we will implement the proposals of the ref.1.

C: The part of the introduction titled “Short history of shear stress, critical shear stress and transport capacity” seems poorly connected with the rest of the paper. It is very detailed in illustrating some equations employed in “physically-based models” but none of these models are employed and verified by the authors (see section 2.4 “Descriptors

C893

for soil detachment”). I suggest removing this part from the introduction and reporting a review of the rill erosion models in a separate section after the introduction, if this review can help in understanding the study presented in this paper.

A: This part is now a separate chapter. We still try to improve the coherence of the single parts of the introduction with the rest of the manuscript.

C: I think that some of the inconsistencies between the experimental results and the physically based model employed could also be the effect of uncertainty in experimental measurements, in model structure and in model parameters. I would appreciate to read the opinion of the authors about these potential sources of uncertainty.

A: This is a very important point so it is now also a part of the discussion in the manuscript: The inconsistencies between the experimental results and the physically based model assumptions can be caused by several points. We assume that the main reasons are weak points in model structure and model parameters. The physical definition of parameters is not clear, the calculation of the parameters bases on not proofed equations and different processes with high spatial and temporal variability are represented by one single parameter. Another point is the uncertainty in experimental measurements (Stroosnijder, 2005). Each measuring action changes the natural given conditions. In our experimental setup we keep the disturbance as small as possible, we prevent the unmeant mobilisation of soil material by the water jet, we do not construct big measuring dams into the rill. The only difficult action in this regard is the sampling and the measurement of the water depth so we do this quickly to reduce the disturbance to the absolutely needed amount. Our experimental results are confirmed by literature (e.g. Knapen et al., 2007) and we do not see any outliers. We know that we do not measure the reality but we are as close by as possible.

---

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 1247, 2011.

C894