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Hydrology and Earth System Sciences Discussions

Interactive comment on "The artificial water catchment "Chicken Creek" as an observatory for critical zone processes and structures" *by* W. Gerwin et al.

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Dear Referees,

First of all we would like to thank you for your comments on our paper. In particular, we appreciate the remarks regarding further research approaches using artificial systems e.g. for erosion studies or hydrological questions. We will discuss these studies in the revised version of our manuscript in a more detailed way and we will compare these approaches with the opportunities our artificial catchment is offering.

In your comments it was stated that the artificial catchment Chicken Creek offers several unique opportunities to investigate not only hydrological but also ecological as-

pects in a multidisciplinary approach. This is exactly what we would like to point out with this paper. We aimed to present this site to the scientific community as an absolutely new research tool in sense of a landscape laboratory which also can be used within the criticial zone observatories. Therefore, - and before focusing on detailed research questions - we wanted to show the concept that stands behind this idea and which also needs to incorporate many different scientific views (analytically as well as theoretically). We agree with all of you that this paper cannot be regarded as a scientific research paper in a conventional way. The paper presents only selected results of the ongoing research as the concept and the site itself are in the focus of this paper (not to forget that we are quite at the beginning of our measurements and that the overall research program is planned to last ten more years at least).

We believe that a more conceptual paper like this can act as the basis of a series of future papers presenting clear results from the investigations at the artificial watershed. In this context we would like to refer to the paper of Holländer et al. in this special issue ("Comparative predictions of discharge from an artificial catchment (Chicken Creek) using sparse data"; http://www.hydrol-earth-syst-sci-discuss.net/6/3199/2009/hessd-6-3199-2009.html) that can be seen as the first of a certainly growing number of upcoming further papers dealing with specific aspects of the development of the ecosystem at our research site.

When revising the manuscript we will closely follow your remarks concerning more information with regard to the inner structures of the site as far as possible. We will add further information about the substrate used for constructing the site. There will be details of the soil texture and the related soil physical properties. However, please bear in mind that the site was left to an undirected development. This means that we try to minimize destructive sampling to a minimal extent. Therefore, soil sampling is restricted to borehole investigations and only punctual profile analyses. In future geophysical investigations will show the development and changes of inner structures.

We will also discuss the further investigations in our Transregional Collaborative Re-

search Centre. This project is dealing with a large number of different ecological questions, not only hydrology and soil science but also biology, limnology and modelling. In addition, we will try to explain the concept for the central data sampling and modelling more carefully. A central structure and process model is under development in one of our subprojects and brings together all the spatial explicit information about structure genesis in our artificial catchment. In a first step, this model will be used for visualization and for the analysis of interactions between different structures.

The central role of the clay layer as aquiclude was discussed critically in the referees' comments. Of course, it is difficult to "prove" that this layer is really dense, but there are many hints as well as experiences from the mining company that the concept of the artificial watershed works properly. We will expand the description of the properties of this layer.

There are several specific further remarks to be considered. In general, we will try to follow your comments as close as possible. However, it will not be possible to present complete data sets of the hydrological behaviour of the site as we are still at the very beginning of our studies. Especially because of its unique character we have to keep in mind that validation of all produced data is not trivial and that we therefore have to act quite conservative with the publication of data. Moreover, we would not like to focus only on selected phenomena like the role of surface run-off even if they are doubtless of great importance. As mentioned above it is not planned to publish a "traditional" result oriented paper but a more conceptual description of the site. Nevertheless, we hope you agree that this paper has the potential to be the initial part of a series following papers and that a revised paper is acceptable for publication in HESS.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 1769, 2009.