Hydrol. Earth Syst. Sci. Discuss., 6, C487–C489, 2009
www.hydrol-earth-syst-sci-discuss.net/6/C487/2009/

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.

E. Zehe (Referee)

e.zehe@bv.tum.de

Received and published: 29 April 2009

The presented manuscript introduces the artificial watershed Chicken Creek, describes the project background and gives a very first overview of hydrological observations. It appears to me more like a progress report of a very interesting project. However, as a reviewer comment in HESS has to judge research papers, not research projects, I regret to tell that this manuscript contains not enough of either data analysis/interpretation nor model results in the present form. The paper needs much more "scientific flesh" to be acceptable from a scientific point of view. I am not sure whether this can be achieved within the usual time frame of major revisions. I therefore recom-

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

mend rejection of the article with encouragement to resubmission. The author should consider the following points when revising their paper.

Major points - I see that the project can be very valuable. However, the time scales for establishment of an ecosystem is much longer, than the project duration. The key hypothesis that initial form constrains development of the critical zone is a) not very surprising and b) can not be tested with the presented approach. This would require at least comparision of two concurring initial forms/watersheds, that fit into this general climate & landscape setting and their evolution. The authors should discuss more thoroughly what can be achieved within this such a project and what not.

- I furthermore miss a thorough discussion of crucial technical details and a thorough discussion of pro and cons of artificial research watersheds when compared to intensively monitored research catchments (Panola, Weiherbach, Maimai, Schaefertal, Loehnersbach, Wernersbach). Just refering to Ellenbergs and colleaques work in the Schoenbuch in such a general way is not enough of a scientific background.

- I miss a clear discussion of the difficulties of setting up a synthetic catchment! How can you be sure that you really control systems boundary and initial heterogeneity of the subsurface, which is most most difficult already at the Lysimeter scale. A thorough explanatation why the hillslope has been setup the way it is, would enlarge credibility in technical soundness and provide essential information for the reader to judge your work. - I miss a discussion of the sampling strategy, why manual sampling, is there any experimental design behind the setup (from a statistical point of view)?

- The presented initial results of the water balance are of course interesting but way too thin for a scientific paper. A geo-statistical comparison of groundwater well data and rainfall data would for instance shed light on how rainfall forcing translates into variability of subsurface response. This would help to understand how much initial subsurface heterogeneity is present in the system. This would help the reader understanding how well you might achieve the goal of setting up a watershed in a controlled way.

HESSD

6, C487–C489, 2009

- Why only showing one single rainfall runoff event and this even not completely (I miss the recession part). A little regression analysis would tell us more about the watershed behavior. A simple analysis of event runoff, compared with initial conditions, would further help characterising the system. These simple statistical measures could be compared to observations of a nearby microscale catchment to see how far this system is away from the present behavior of the landscape.

- Just using potential evaporation in the water balance is simply too easy at this scale. - How is surface runoff separated from total discharge? - Please be precise about the reasons for overland flow formation (e.g. crusting) - which is rather astonishing - does crusting happen, if so, please explain the underlying reasons. Or is hydrophobicity the reason for these behavior. Do you expect this to be typical for this disturbed landscape?

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