Reviewer 1:

We appreciate the positive and constructive criticism and we look forward for further comments in case we have not sufficiently responded.

Comment 1:

There is no discussion section and the conclusions are quite short. While I appreciate the authors comment in each section on the issues at hand, a general discussion regarding the models and implication of this study are important. It is left to the reader to draw conclusions themselves. For example - out ability to model anything in the hydrological cycle below freezing seems absent! Issues like this are brushed under the rug or simply stated.

Answer:
We agree that is was absolutely needed to divide results and discussions. We hope this made it clearer and that the main issues are presented more explicit.

Comment 2:

I am wondering how "fair" this model inter-comparison is considering that the catchment had not achieved a "steady state" (if there is such a thing) at the onset of experimentation. While I agree that natural variability precludes the idea of steady state, having an artificial catchment wet-up and achieve some sort of equilibrium before the models were applied, I believe, would have been a more appropriate method of assessing model efficacy. While there is no explicit discussion section in the paper (see additional comments), this is an important point, and the modellers are implicitly misled by the nature of this system and its transitional state.

Answer:
We agree that the catchment is not in a steady state condition. The catchment and its conception are described in Gerwin et al. (this issue). The hydrological behaviour during the first years can be found in Gerwin et al. (submitted). The hydrological regime is driven by development of the groundwater and erosion (see also figure 1 and 7). Raising groundwater tables and large surface runoff are not problems for hydrological models. The paper shows that the impact of the vegetation during the first three years is very small on the water budget (section 4.1). Therefore, we think that the transient catchment behaviour has not a large impact on the quality of the predictions.

Gerwin, W, Schaaf, W., Biemelt, D., Fischer, A., Winter, S., Hüttl, R.F.: The artificial catchment “Chicken Creek” (Lusatia, Germany) - a landscape laboratory for interdisciplinary studies of initial ecosystem development. Ecological Engineering, submitted.

Comment 3:

I would argue that 6ha is not the largest experimental catchment worldwide. There are other reclaimed mine sites with areas greater than 6ha set up as research watersheds. I would suggest the authors expand their literature search or simply state the site description.

Answer:
Our catchment is certainly not the largest experimental catchment worldwide but the largest <u>artificial</u> catchment. All other artificial catchments mentioned on page 4 last paragraph are much smaller. The fact that it has been “constructed” eliminates the problem of invisible

losses into the parent rock material. The only losses or flux uncertainties are those into the atmosphere. All other uncertainties are the errors of the various measurements. To our knowledge there are no larger experimental areas with this kind of features.

Comment 4:

Is there any way that the conceptualization of catchment features be brought into a table. The processes are sorted nicely into tables, but the actual conceptualization in tabular format would help as section 3.4 is a bit clumsy.

Answer:
We rewrote the section 3.4 and put the main information into a table.

Comment 5:

How were evaporative losses from the lake considered? In general, the "validation data collected from the catchment are poor and sparse considering the small size. I'm somewhat surprised by this as there are natural experimental catchments with excellent data sets that could have provided a better test of the models and the modellers. However, I understand the element of mystery is essential in this work.

Answer:
The lake is not considered at all for the prediction. All results were compared as inflows into the lake (see chapter 4 page 3222/3223). We account for the evaporation looses from the lake using the Penman equation by calculating the outflow of the catchment into the lake based on the measured outflow from the lake. The evaporation data were compared to lake level changes.

Comment 6:

I am unsure as to the utility of examining potential evapotranspiration (PET), as it is not a true hydrological flux, and one could argue a false hydrological concept. Actual ET on the other hand is a critical hydrological flux to measure accurately. That said, this research is hampered by the fact that actual ET was not monitored via eddy covariance, lysimeters, or other techniques, but estimated via an antiquated technique. This is a serious shortcoming as it almost appears that the experiment was set up by modellers (with a focus on the input-output relations and a lack of soil moisture, AET, snow storage, etc., data). More discussion on this issue is warranted.

Answer:
We include the results form the master thesis by Nenov (carried out at BTU Cottbus in 2009). The continuous data by the Black approach were compared with some AET data by the Bowen Ratio method. The comparison showed a good agreement of the AET during summer months but and underestimation of AET during the windy seasons of spring and autumn. We agree that the lack of data on evaporative losses is a shortcoming. This weakness is according to our knowledge a rather frequent in case of PUB's. To gather the needed data in the unfunded period of the catchment construction was a very difficult act of balance. The funding of this DFG projects was only then possible when the catchment was already constructed. Looking for funding of such a (financially) large scale experiment having only a smart plan in mind but no facts on the table would have with a probability failed. So, we have to live with data shortage, not only in case of PET and AET.

Comment 7:

p. 3229. Some would argue that the slope of the recession curve has much physical meaning (see Kirchner 2009, WRR). I am unsure why the authors are so quick to dismiss its lack of physical interpretation or meaning.

Answer:
Obviously the slope of the recession curve has a physical meaning, but the point is that we don't know how to estimate it without measuring discharge. The recession curve is a parameter that represents a catchment behaviour that is difficult to relate to measurable catchment characteristics (other than discharge), and therefore it is hard to estimate a priori a value for m.

Editorial notes:

We appreciate the editorial notes of reviewer 1. All notes have been included.