Hydrology and Earth System Sciences Discussions

Interactive comment on "A structure generator for modelling the initial sediment distribution of an artificial hydrologic catchment" *by* T. Maurer et al.

T. Maurer et al.

maurer@tu-cottbus.de

We want to thank the referees and Prof. Kelly for their detailed and helpful feedback. We fully comply with most of the comments with one important exception: The impression that this study is only of local importance and limited to our 6-ha study site. Obviously, we did not sufficiently explain the motivation and relevance of our modeling approach.

We used the artificial catchment 'Chicken Creek' with relatively well-defined conditions simply for developing a more general modeling idea. At this experimental site and within a special collaborative research center (SFB/TRR 38, Gerwin et al. 2009, Gerwin et al. 2011), a relatively large data base could be established during the critical

initial construction phase of a catchment. These conditions allow a better testing of novel ideas of structure model development than alternative natural catchments. Of course, the 'Chicken Creek' catchment is a unique experimental site. Nevertheless, our modeling approach is more general and in principle not restricted to this catchment: (i) The technological processes described in the structure generator model are ubiquitous: they are occuring everywhere where unconsolidated sediments are moved and dumped. This applies not only for most of the world's open cast mining areas, but also for landfills and construction sites, among other larger scale earth moving operations. The presented structure modeling approach can be adapted to any of the above situations. (ii) Furthermore, the presented study can lead the way for similar studies that are trying to link a structure generator approach with the functionality of an advanced geological modelling software. This is, of course, not limited to technogene structures, but can be adopted as a simplifying modeling of sediment structures that result from geomorphological process or for other geological settings possibly using results of more detailed geomorphological and geological process models. The paper of Michael et al. 2010, although focussing on turbidite fan modeling, has been an example for such a novel strategy. Other examples are in the field of 3D soil landscape modeling (e.g., Grunwald et al. 2000, Minasny and McBratney 2006).

References:

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 35(12): 1786-1796, doi:10.1016/j.ecoleng.2009.09.003, 2009.

Gerwin, W., Schaaf, W., Biemelt, D., Fischer, A., Winter, S., Veste, M., Hüttl, R.F.: Overview and first results of ecological monitoring at the artificial watershed Chicken Creek (Germany). Physics and Chemistry of the Earth 36(1-4): 61-73, 2011.

Grunwald, S., Barak, P., McSweeney, K., Lowery, B.: Soil landscape models at different

scales portrayed in virtual modelling language. Soil Science 165(8): 598-615, 2000.

Michael, H.A., Li, H., Boucher, A., Sun, T., Caers, J., Gorelick, S.M.: Combining geologic-process models and geostatistics for conditional simulation of 3-D subsurface heterogeneity. Water Resources Research 46, W05527, doi: 10.1029/2009WR008414, 2010.

Minasny, B., McBratney, A.B.: Mechanistic soil-landscape modeling as an approach to developing pedogenetic classifications. Geoderma 113: 138-149, 2006.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 4641, 2011.