Hydrol. Earth Syst. Sci. Discuss., 6, C3029–C3031, 2010
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Hydrology and Earth System Sciences Discussions

Interactive comment on "*HESS Opinions* "Hydrologists, bring out shovels and garden hoses and hit the dirt"" *by* M. G. Kleinhans et al.

Anonymous Referee #3

Received and published: 5 January 2010

The paper by Kleinhans et al. is a HESS Opinion piece / commentary. I am uncomfortable picking too many holes in it-as these are their opinions and I respect them as such. In general, I am completely on board with the notion that hydrologists should do more controlled laboratory (and field) experimentation. The comments below offer some constructive criticism for revising the manuscript prior to publication.

The commentary (in its present form) is only partly effective in conveying the authors' message. The commentary reads as rather long and rambling (sorry to be so frank)-I think that the authors could be much more effective if they were to significantly shorten the manuscript (by half perhaps) and keep it focused on a singular message. I'd suggest eliminating the somewhat distracting sections 2.1 and 2.1 and move directly to 2.3

following the outlining of the objectives. Section 3 is too vague to be useful-it would seem that given the background of the authors that they could provide some concrete examples where controlled laboratory experiments that have had a transformative effect on related sub-fields (there seem to be a multitude of studies in geomorphology-e.g. the artificial hillslopes of Rorke Bryan at University of Toronto and the many artificial channels where brained river development is examined (e.g. Trevor Hoey and many others). Indeed, this has already happened in many parts of hydrology. For instance, the lab model by Abdul and Gillham (1984; JoH) resulted in the demonstration of the capillary fringe, groundwater ridging mechanism. That paper had an immense impact on the field by showing in a controlled setting how large fractions of groundwater could contribute significantly to channel stormflow. It seems that to be useful, the commentary could/should contain a rather exhaustive list of such efforts; point out the status quo, what's wrong with the status quo and how they propose going beyond it. Of course, here, this all boils down to a low level of effort in lab experiments. Perhaps citing the many that have been done and showing hydrologists how these few efforts have been useful, could really help the paper? The Hopp et al (2009) paper that they cite did not do an exhaustive review in this regard. Kosugi, Sidle and Uchida at Kyoto have several papers where they represent macropore-ridden hillslopes in a plexiglass boxes (see recent WRR and JoH papers); Tim Burt at Durham had early papers in the 1980s with bench-scale scale models of British hillslopes; Peter Black at Syracuse had a series of Styrofoam watersheds of different shapes in an early WRR paper; Weizu Gu at the Nanjing Hydraulic Research Institute constructed the $\sim$700 m2 Hydrohill catchment to do controlled experiments on runoff mechanisms (published in 2001 in HP). It would strengthen the piece to perhaps speculate on why there has not been more uptake of these and other papers/ideas?

On more mundane matters, the paper has several typos and spelling mistakes (see for example p. 6595 "...Rodrigues-Iturbe and Ronaldo, 1997...)". The title could be improved and this could increase the citation of the paper. Perhaps "On the need for laboratory experiment in hydrology" or "Wither experimental hydrology?"?

Overall, I think that the paper could be a useful addition. It's uptake in the literature will be proportional to the revising and honing of the current text.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 6581, 2009.