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Hydrology and Earth System Sciences Discussions

Interactive comment on "Physical models for class-room teaching in hydrology" *by* A. Rodhe

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Many thanks for good comments! I have tried to consider all of them. My actions are inserted into the Referees comments below. Allan Rodhe

Referee 1 General comments The objective of the manuscript is to describe physical models that can be used as teaching support in hydrology courses to illustrate saturated and unsaturated groundwater ïňĆow, run off generation or particle tracking. Simple models are presented which are likely to help students understanding basic hydrological processes. As suggested in the speciïňĄc comments however, some explanations/deïňĄnitions can be confusing and should be reformulated. The conclusion should also better follow from arguments developed in the body of the manuscript.

SpeciïňĄc comments

Page 4139 line 10: the explanation might be confusing. When the sponge stands up, some pores are at a higher level than when lying but lack the necessary negative pressure to retain water.

action: Text changed to "When "lying", no pores are exposed to a more negative pressure head than the thickness of the sponge, in this case -4 cm. When "standing", the pores in the uppermost part are exposed to a negative pressure head equal to the length of the sponge (-10 cm), causing drainage of large pores in the upper part."

Page 4142 line 2: the storage coefiňĄcient, also called storativity, is the volume of water released from an aquifer per unit surface area per unit decrease in the hydraulic head. It is equal to the speciïňĄc yield only for unconïňĄned aquifers.

action: Text changed to "The storage coefficient (for unconfined aquifers equal to the specific yield) is easily determined by measuring the change of the groundwater level for a certain change in storage, e.g., for a certain extracted volume of water."

Pages 4145 and 4146, sections 3.1.5 and 3.1.6: good experimental setup to illustrate the concept of recharge and discharge areas. Page 4151 line 20: the problem of misconceptions of the public about water occurrences is different from the problem of effective teaching of hydrology which is the subject of the manuscript.

action: The concluding remarks have been slightly reformulated and some references on misconceptions have been deleted in order to reduce the emphasis on misconceptions.

New text:

Many processes in soil water and groundwater flow and storage can be shown during a lecture with equipment of various degrees of sophistication. The equipment and demonstrations described in this article have been developed for use at the basic level university teaching in hydrology. They have also been successfully used in popular science lectures and lectures for school classes at different levels. One specific possibility

when using the models is to identify and discuss misconceptions on water's occurrence and flow in the landscape. Such misconceptions are quite common (e.g. Dickerson et al. 2005) and discussing them is an important part of the teaching process (Reinfried et al. 2012). It is my experience that the physical models and demonstrations give a good base for discussions with the students and a pedagogically valuable variety in the means of lecturing. Training and preparation are needed for the lecturer, but it is well worth this effort considering the deeper understanding of the processes that can be obtained, not only for the students but also for the teacher.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 4135, 2012.