

Interactive comment on “HESS Opinions “Integration of groundwater and surface water research: an interdisciplinary problem?”” by R. Barthel

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Thank you for the very interesting and encouraging comments and the stimulating criticism. I am not quite sure how to interpret the first paragraph, though; its first part sounds like a full support of my ideas, the second much less so. I will therefore not comment very much on this first paragraph and focus on the following.

First comment, second paragraph: The referee is right, I am limiting my discussion to rivers and streams, thus “neglecting” lakes, lagoons and the sea etc.. The reasons for this are explained in section 3.1. In general, the paper contains a lot of simplification,

C1125

reducing complex topics to very simple statements, in order to make the point avoiding lengthy discussions. A discussion, whether or not limnology or oceanography should be considered parts of hydrology is an interesting one – but lies outside my scope. It would be great if there would be just one “hydrology community” working jointly on the science of water, but this might be not realistic. Anyway, I reduced my discussion to the surface water (stream/river) – groundwater aspect of it and I think this is appropriate. I would, however, be very pleased to see similar discussions for other areas within water research. I also admit that largely ignoring the water quality aspect is problematic (I had much more of this in my first drafts), but considering this to its full extend would increase the complexity of the subject drastically. At the same time, this complexity is not needed to make the points that I would like to make, which is simply to state that we should always acknowledge that other people have different perspectives, even if we assume that they have the same as we have.

The second (and third) comment of the reviewer is/are centered around “research being on the move”. Again, I am not quite sure whether this paragraph is foremost criticism or foremost support of my ideas. I am not quite sure if developing integration from the small scale and to slowly extend it to larger scales is really working. It has always seemed to be the hope of hydrologists that solving problems on small scales will eventually lead to solutions on bigger scales. But again, I don’t think that this paragraph is expressing general criticism of my thoughts (and thus asking for changes in my manuscript), I interpret it more as a follow-up or extension of my discussion.

Final comment: Yes, I agree that integration is on the move, but not as fast as it should – thus this paper. Again, I agree that on small scales more efforts are made and those efforts are more successful, thus my focus on larger scales. Whether or not baseflow can be measured – would yield a very interesting discussion. The baseflow, in the way the term is generally used, cannot be measured at least not in a spatially and temporally discrete way (my opinion). Integrating knowledge in one model (e.g. HGS which the reviewer mentions) is not the integration I am talking about. I am talking

C1126

about the integration of different perspectives on a problem and its solutions. Fully coupled models like HGS might foster integration in general, but there might be a long way to go until they are widely used in all parts of the community.

Final paragraph: The examples might be not well embedded, but I consider them necessary (see my reply to referee #1). The recharge problem is definitely a simple sign problem, it is foremost a communication problem and a problem resulting from too few people dealing with the deeper vadose zone on larger scales (see Barthel 2006). I used the term “shallow” to describe the connection between groundwater and surface water in a provocative way. What I was trying to say, and I probably have to improve that, is that a surface hydrologist who dedicated his entire scientific work to hillslopes (very often this might be younger scientists) might have a biased perspective on groundwater: deep, regional, confined aquifers might be much less interesting for him/her than the shallow unconfined local aquifer at his hillslope.

Reviewer 4 raises a lot of very interesting questions and adds many important aspects to the discussion but as I said before, I regard this rather as a follow-up discussion or an external extension of my manuscript, than as a request to revise the paper. Some minor changes are however needed to better explain the scope of the paper and to avoid misunderstanding.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 2011, 2014.