Interactive comment on "Scaling down hyporheic exchange flows: from catchments to reaches" *by* Chiara Magliozzi et al.

Anonymous Referee #2

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General Comments:

This manuscript provides a qualitative review of factors controlling hyporheic exchange flow processes at different scales, including catchment to reaches. I believe the review is well structured by discussing hyporheic flow processes by a set of most relevant controls and by moving from catchment to reach scale. However, when reading the title (scaling down . . .), I was more expecting an article where the focus is on how to "use and transfer" of what is learned at the larger scale to the lower scale. The very extensive chapters 3 – 5 cover in detail literature on controls at a specific scale – I am fine with that part, also because I very much like the illustrations and figures. While chapter 6 is trying to address the issue of scales and scaling, I still think that the aspect of "scaling down" is not really covered and so the title of the manuscript is somehow misleading. When describing the case study, authors actually start from small-scale

description and then somehow speculate on the behaviour at the larger scale – however, this speculation to my mind is not supported by any evidence/measurements. In this sense, the title and the intention of providing means in scaling hyporheic exchange flows through scales remains a bit vague and weak. In my opinion also the statement in the outlook on what has been provided in the paper (p27,l28-30) remains at least partly un-shown. As the motivation for this review was that in other recent reviews a scale hierarchical approach has been missing (p2,l15ff), this aspect should be a strong and well presented topic. In summary, I here see a large potential for improvements. In addition, it remains unclear in the paper why authors intended to use a "scaling down" approach, why not addressing the topic by using a scaling up approach and trying to address how to transfer process knowledge that is mainly acquired at the reach scale, to the larger scales? At least in the case study an attempt was made to go this direction?

Detailled comments:

P2,l30: I count five types

P3,L7: HEF has been defined before p1,l26

P3,l27: citation Grabowski is missing in the lit (as this was the only one I checked and which was missing, please check your complete lit)

P9, l11: I do not understand this sentence – in my understanding, during dry conditions, groundwater (base flow) is the only or dominant contribution to stream flow.

P15,l25: reference to section 4, however we here are in section 4

P16,l9ff: in the introduction authors mention to focus on water flow and to ignore solute transport and chemical reacions, why do they address denitrification and nutrient uptake here – cnon-consistent.

P19,l28: What are hyporheic wavelength??

P25,l2: Reference missing

P27,l11: how does the method of Fryirs work?

P27,l29f: Where is this actually shown specifically? (see general comments)

In summary, I feel major revision are required along the lined discussed under general comments.

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