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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Evaluation of Low Impact Development and Nature-Based Solutions for stormwater management: a fully distributed modelling approach" *by* Yangzi Qiu et al.

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Dear referee #3,

We would like to thank you for your interactive comment.

We noticed that your short summary of our paper does not mention at all to that our evaluation LID/NBS effects is based on a fully distributed modelling approach, whereas we believe is a research novelty. This may explain why you did not see any scientific merit to our paper, which obviously has nothing to do with a technical memorandum. We are willing to improve the English of our manuscript. We also confess not being

familiar with expressions like "very harder".

Below you will find our point-by-point answers to your comments:

Q1- Uncertainty of the model, the simulations, model structure, X-band radar, downscaling etc etc... the values and ratio, how can 0.1 cms change be really evaluated given the total discharge.

Our paper did not aim to give a detailed presentation of Multi-Hydro and multifractal downscaling. However, the section 2.3 provides a synthetic presentation of them with the support of a dozen of references to detailed presentations, as well as with some more specialised sessions (e.g. Sect. 2.6 "Modelling set-up"). Most your questions are discussed there, particularly the modular structure of Multi-Hydro and the fact that Multi-Hydro has been validated on many catchments by the co-authors. Furthermore, our paper presents a detailed and successful validation of the baseline scenario on the studied catchment (Sect. 3.1).

Firstly, the 0.1 cms can absolutely be simulated by Multi-Hydro, whose accuracy is better than 1.5x10-4 cms.

Secondly, the 0.1 cms discharge difference between the porous pavement scenario and baseline scenario at the highest rainfall peak of event 05/10/2015 in the sub-catchment (SUB3) is small, but nevertheless represents about 20% of the peak of the baseline scenario and not negligible with respect to those of the largest sub-catchment SUB1 and of the whole catchment. Indeed, they involve factors in the range of 4-7 (see more details in Fig.1, enclosed).

Q2- Validity of the model

We already mentioned that this model has been validated on various basins (see references in Sect. 2.3), as well as on the baseline scenario (Sect. 3.1).

Q3- Feasibility of the nature-based low impact study (it is feasible to have so much change in this region...how much does it cost?!)

Our paper being focused on research questions, we were interested to analyse large LID/NBS implementation to possibly have largely modified basin responses. Scenarios were therefore based on a maximal implementation with respect to given physical properties of LID/NBS and site conditions. There is no difficulty to (randomly) select only a proportion of them to take into account other factors such as costs, social acceptance etc.,

Q4- Context is missing. Lots of work done on water sensitive cities from years ago. Also, similar works have been done using X-band radar (at least I know of Rotterdam and I am sure it should be more cases around the world).

We will better highlight that the originality of our paper is to be focused on space-time variability of both data and modelling. We are surprised by the statement that “similar works have been done using X-band radar” without any publication reference. Furthermore, the claim to be sure about the Rotterdam radar surprises us a lot, because our group, as partner of the EU RainGain project, is well aware of the successes and operational difficulties met by this radar.

Anyhow, we will greatly appreciate receiving references on the use of X-band radar data for analysing the performance of LID/NBS scenarios.

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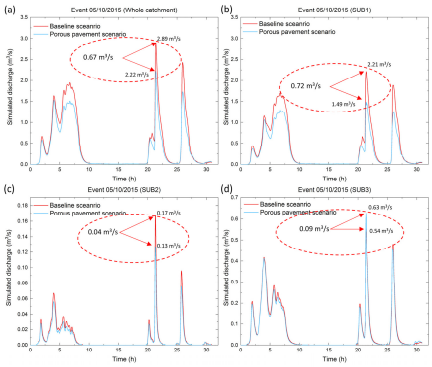

Figure 1: Presentation of the simulated hydrographs in whole catchment and in three sub-catchments (a: whole catchment, b: SUB1, c: SUB2, d: SUB3) for the scenario of baseline and porous pavement for the event 05/10/2015.

Fig. 1.