

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2
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Comment on hess-2022-109

Anonymous Referee #2

Referee comment on "The role of catchment characteristics, sewer network, SWMM model parameters in urban catchment management based on stormwater flooding: modelling, sensitivity analysis, risk assessment" by Bartosz Szeląg et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-109-RC2>, 2022

This manuscript presents a computation method for creating an innovative simulator to analyse how stormwater networks operate and evaluate modernisation requirements, based on the specific flood volume. Large sections of the manuscript are based on previously published research. It seems that this resulted in a very complex manuscript that is hard to follow (e.g., many crucial information is in supplementary material; in line 151 the authors mention 11 modules, although 9 modules are presented afterwards). The used research methods and results are interesting; however, the manuscript should be further improved with a better representation of the employed methods and results. I would strongly advise consistent use of terminology throughout the text. I provide specific comments below:

Specific comments:

Title: The title is long, unclear and very descriptive. Furthermore, it does not reflect the main contribution of this research, which I believe is: "In our study, a novel algorithm for creating a simulator to predict specific flood volume is developed."

Line 42: »One of the main factors leading to hydraulic overloads is associated with the wearing of storm sewers resulting in increased roughness.« Please provide a reference for this statement.

Line 46: You comment that the frequency of stormwater flooding has a typically qualitative character. Can you please explain this? In my opinion, it has a quantitative character, as can be found in the mentioned standards.

Line 65: You state that model calibration consists of two stages: sensitivity analysis and uncertainty. This might be true in mechanistic modelling. However, this is not the case for data-driven methods, which can be also used for model calibration. Please refine this statement.

Line 70: »Sensitivity analysis is limited to sub-catchments, and so it is impossible to predict the impact of catchment characteristics on calculation results.« This sentence is unclear. Since the catchment consists of sub-catchment they should reflect the characteristics of the catchment. Please clarify.

Line 84: "The calibration of such a model is simpler in comparison to hydrodynamic models due to the fact that a number of advanced statistical methods are already implemented in computing packages.« Aren't all of these hydrodynamic models? Please clarify.

Line 145: "A failure was defined as exceedance of certain specific flood volume which points out that modernisation of the stormwater network is necessary." Maybe replacing old pipes with bigger ones is not the only and the most efficient solution. Perhaps a different rainwater management approach should be used (e.g., SUDS). Please rephrase accordingly.

Line 146: I apologize if I missed this information somewhere earlier. At this point, we do not know yet what a "unit" is/represents. Please add an explanation.

Line 151: "The proposed computation algorithm consists of 11 modules.« It is unclear, which are the 11 modules. In Figure 2 we only see 9 modules. Section 3 also ends with Subsection 3.8. (Module 9). Please clarify.

Line 169: Please add an explanation of what is "zero-one".

Line 185: Please provide an explanation of what is C.

Lines 180 and 188: Rainfall data for periods 2010 – 2019 and 2010 – 2018 are mentioned. Is this actually the same time period and is this just a mistake? Please clarify.

Line 238: Please better explain the meaning of numbers: 200, 5000, and 9.

Line 319 and 313: If the terms "failure" and "breakdown" are referring to the flooding of the stormwater system, I would propose that you use the same and most clear word everywhere.

Line 323: Please clarify what is MC.

Line 349: Please use the same abbreviation for the likelihood function in Figs. S3- S10, and Section 3.3.

Lines (371-374): It is not clear how equations 9-12 were derived. Please provide an explanation.

Line 384: You refer to Fig. 3, but it seems you are referring to Fig. 4. Please check.

Line 505 – 507: "However, to date, there has been no statistical model that would take into account both hydrodynamic model parameters as well as catchment and stormwater network characteristics.« Please clarify, aren't the parameters of the hydrodynamic models reflecting (i.e., are the same as) catchment and stormwater network characteristics?

Line 548: Please clarify what are lower and upper parts.

Lines 553, 554: You refer to the proposed algorithm as a tool. Please use one word consistently. As mentioned before, it would be beneficial to reconsider the article title accordingly.

Discussion and Conclusions: Some of the results presented in this article are expected and not so novel for the urban drainage modelling community (e.g., impervious area leads to an increase of flooding).

Technical comments:

Line 123: I propose changing dm^3 to L.

Line 153: typo: "manhole ordinates"?

Line 175: I would propose you use either a logistic or logic model through the text. Using different words for the same thing does not contribute to the clarity of the text.

Line 457: typo: space after the dot is missing.