

General comments:

This paper discusses the development of an equation to describe the effects of wind on the rainfall-runoff process in areas with high rise buildings, developed using a CFD method and validated using scale model-based experiments. It appears to be well-structured and well-written, with referencing of relevant material and limitations clearly stated and accounted for where appropriate.

The paper appears to be appropriate for, and of interest to the readers of, HESS. I suggest below some changes that I believe are needed before publication, but most of these are fairly minor in nature. Please find some specific comments and technical comments below.

Specific comments:

Although this method appears to be novel, a recent work by Yoo et al. (2021) in the Journal of Hydrology, titled "Change of rainfall-runoff processes in urban areas due to high-rise buildings", covers some of the same material. I think that it is vital to acknowledge this early on in the work (e.g. in the introduction) and explain how this paper is still novel. Some comparison of the results from the two studies would also be of interest, where the results are comparable (perhaps added in the discussion section).

Reply: Thank you for your suggestion. we have explained how our manuscript is still novel compared to the recent work by Yoo et al. (2021) in the revised version as follows:

"Yoo et al. (2021) reveals the impact of high-rise buildings on runoff hydrograph through a newly improved hydrological model and a laboratory experiment. However, their work ignores the infiltration and focuses on changes of peak flow mainly caused by changes of flow path in high-rise building areas. The paper does not elucidate the effect of wind on runoff generation in high-rise building areas at the physical level." Please refer to line 60-63.

Since the two papers have different focuses, the results are hardly comparable.

Technical comments:

Line 17 (abstract): Main result 2 here does not mention the angle, although this is mentioned in the conclusions, so that it may be of interest to add here too.

Reply: It has been added (see line 18). Thank you.

Line 49: ϵ is shown here (and throughout the paper) instead of the symbol itself.

Reply: It has been corrected. Thank you.

Line 191: I think "cube" should be "cuboid", as not all sides are of equal length.

Reply: Yes, you are right. It has been corrected in the revised version of the paper. Thank you.

Lines 274 and 276 (Figure 4 and 5): The individual lines of the plots are hard to see here. Can the line width and/or plotting symbol size be reduced to make these plots clearer?

Reply: We have redrawn the picture as your suggestion. Thank you.

Lines 314 and 331 (Figures 8 and 9 captions): A bit more explanation is required here. For example what exactly do “Location x” and “Location y” mean? I think “x” means different things on different plots, but “y” is always along the vertical direction? It would be good to clarify this.

Reply: Location x means horizontal position while Location y means vertical position. The figures show the values of the relevant variable at different positions in two-dimensional plane space. The explanation has been added in the revised version of the manuscript. Thank you.

Line 348: “spatial” should be “spatially”.

Reply: It has been corrected. Thank you.

Line 362 (Figure 13 caption): The caption states that the Figure shows uncertainty, but it does not look like this is what the plot shows. Can this be checked?

Reply: The caption has been revised as “The rainfall intensity atop the scale model under different wind speeds for rainfall 1 of three replicate trials”. Thank you.

Line 370: I think there is a missing word after “impervious”.

Reply: Yes, you are right. it should be “impervious building walls”. Thank you.