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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Simulation of the radiative effect of haze on urban hydrological cycle using reanalysis data in Beijing" *by* Tom V. Kokkonen et al.

Anonymous Referee #1

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The authors evaluated a reanalysis data and a hydrological model with observational data and examined the effects of haze impact on the surface hydrology. The examination of how haze impacts on local scale urban hydrological cycle is particularly interesting. But I have some concerns about the connection between two parts. There also needs some clarifications about the approach and the hydrological model. My specific comments are as below. I recommend a major revision before the paper can be accepted for a publication in ACP.

1. Part 1, Introduction

The authors did not describe the ways how urban pollution can impact on the hydro-

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Discussion paper

logical cycle. On Page 2, 2nd paragraph, the authors mentioned the air temperature change by urban pollution, but the focus of the paper is how urban pollution impacts on hydrological cycle. It is necessary to provide some background about how precipitation or water on ground are connected with pollution in atmosphere.

In the introduction, it needs to be clear that the pollution effects on precipitation are not considered, which would add the uncertainty to the study. It seems to me that the paper only considers the effects induced by changed surface temperature. Pollution can change temperature profile in atmosphere and serve as cloud condensation nuclei to affect precipitation rate and then surface hydrology. But all of these are not considered and the paper needs to be clear about it.

Last paragraph of this section: need to be clear about which method is used for each objective.

2. Section 2

It is not clear that what are the physical parameters for model input and outputs. Although Table shows some input variables, those are just symbols and their physical meaning is not provided. Most importantly, there is no information about how aerosols/pollution would impact temperature, runoff, and soil infiltration in the model? This is very important to understand what mechanisms are included for pollution impact runoff and soil infiltration. For the hydrological model, is precipitation rate changed by any factors? Is it just an input, not an output?

3. Section 3

It is not clear to me how section 3.1 and 3.2 are relevant or connected. Or are they just separated results without much connection? Why not run the model validated in Section 3.1 to look at the effect of haze on surface water in Section 3.2? In this way, the connection between the two sections is clear.

Some symbols are used without being defined in the text, such as P, K,. . .

4. Section 4

Please use physical terms, not symbols in the conclusion text.

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