We would appreciate all the constructive comments by the anonymous referees. We have substantially revised the paper and improved the English expression. All the modification can be found in the revised manuscript. The responses in detail to RC2 are listed below.

This paper aims to determine an optimal water use strategy for urban cooling in Beijing by coupling a novel water use scheme into WRF and conducting summertime simulations. The topic does read interesting and the paper well fits the scope of HESS; however, the presentation of current manuscript, which has great room to improve, does hinder the my understanding of some key points of this work.

As such, the authors are suggested to improve the manuscript by considering the following concerns:

Q1: As numerous WRF simulations have been done in Beijing, I have less concerns about the model performance per se; instead, I would encourage the authors to investigate more if the consideration of urban water use could effectively improve the WRF simulations in Beijing

A: we have validated urban water usage scheme in offline model (take CLM as an example), it shows better results (latent/sensible heat flux) in Figure 6, this process cannot be missed in land surface model.

Q2. It is very unclear how the optimisation of water use is done in section 3.3, which, however, should be one of the key contributions the paper attempted to make. I suggest to incorporate sections 2.1 into 3.3, so the optimal strategy part could be more coherently presented.

A: We revised this manuscript as suggested, and detail the part of optimization. See section 3.3

Q3. Presentation is a major issue: grammatical errors and typos are pervasive; figures in general miss appropriate caption and proper legends. A small portion of the issues are given below as examples: - L58: "role" –> "roles" - L101: "nonmatter" –> "no matter" - L115: "he specific" –> "the specific" - caption of Figure 1: "it's coupling" –> "its coupling"; the full name of WRF is unnecessarily given twice; - caption of Figure 4: "moister" –> "moisture". - units: watts should be in uppercase, i.e., "W". - in English, the words and punctuations should be separated by spaces. e.g., in "model(CLM4.5)", a space should be added between "model" and "(". - ...

A: Errors above have been revised.

Q4:

(1) Other specific comments: Figure 1, What is 'time judge'? - Why is the road sparkling only activated during summer night? And when is summer? When is night? (when kdown==0?) - What is "imperative layer" in the "Urban Canopy" circle of panel b?

A: According to "Cleaning quality and operation requirements of urban road cleaning (DB11/T 353-2014)" (revised in L114), road sprinkling should be finished before 5:00 a.m. I think this action is to avoid disturbing traffic. although road sprinkling was seen in daytime.

In the model we can judge summer and night according to model time.

imperative layer here mainly means the imperative road in this manuscript. Description added in L105.

(2) Section 2.3, Unclear what experiments were actually carried out in this work.

A: A new table added to detail the experiments and more description in section 2.2. See Table 2

from L144.

Table 1. Descriptions of experiments designs

Experiments	Area	Water amount	Descriptions
Raw experiment	/	/	No urban irrigation and no road sprinkling
Urban irrigation experiments	City centers	0.1, 0.4, 0.7, 1, 1.3, 1.6 and 1.9 times of the estimated urban irrigation in each part of city	Urban irrigation in city center with different water amount
	Suburb areas		Urban irrigation in suburb areas with different water amount
	Rural areas		Urban irrigation in rural areas with different water amount
Road sprinkling experiments	City centers	0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9 and 1 times of the maximum water-holding capacity of impervious layer	Road sprinkling in city center with different water amount
	Suburb areas		Road sprinkling in suburb areas with different water amount
	Rural areas		Road sprinkling in rural areas with different water amount

(3)L165: Please provide more details on the construction of 4-day climate ensemble

A: Revised, see L152-154. "A climate summer time periods from 2000 to 2017 were averaged to 4 days which represent the climatic May, June, July and August. Firstly, we found out all data for May from 2000 to 2017. Then, averaged all these data to one day which represented climatic May. At last, climatic June, July and August were got by repeating above two steps."

(4)L175, This term "atmospheric stochastic processes" is confusing: either provide examples or reword it.

A: reword to "random processes in the atmosphere" L160

(5) Figure 11a: the regression for results of city center looks problematic

A: I rechecked them, it's correct, it showed like that because one-point deviates from other points larger.

(6) Table 4: it's unclear what the "units" row (the first row) indicate

A: the first raw are conversion factors. We regard the estimated water amount in each part of city (city center, suburb and rural area) as the standard one unit. The optimized results are standard values, so the actual water amount can be got by multiply the conversion factors. To avoid misunderstanding we reword to "conversion factor". See Table 4 in L336