

Earth Syst. Dynam. Discuss., author comment AC2
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Reply on RC2

Si Chen et al.

Author comment on "Impact of urbanization on thermal environment of Chengdu-Chongqing Urban Agglomeration under complex terrain" by Si Chen et al., Earth Syst. Dynam. Discuss., <https://doi.org/10.5194/esd-2021-22-AC2>, 2021

Response to Reviewers#2

Dear Prof. Takebayashi, Hideki

Thank you very much for your time involved in reviewing the manuscript and your very encouraging comments on the merits. To facilitate this discussion, we first retype your comments in *italic font* and then present our responses to the comments.

Comment 1: *"In this study, the changes in the thermal environment when the topography and land use were changed were calculated by WRF."*

Response 1: We appreciate your clear and detailed feedback and hope that the explanation has fully addressed all your concerns.

Comment 2: *"In the model verification in Section 3.1, the cross-correlation of the different variables shown in Fig. 4 is not important, and the bias, RMSE, and correlation coefficient of the observed and calculated values in each valuable should be evaluated. Please present the observation points in Fig. 1, explain the outline of the observation, and discuss the calculation accuracy."*

Response 2: We revised as suggested. We add the Fig.1 (d) in Fig. 1 on the distribution of nearly 2400 meteorological observations stations from the China Meteorological Administration. Please refer to Fig.1. Limited by the observation conditions, we only compared the simulated 2m temperature with the observed temperature, and calculated their bias (Fig.4b), RMSE (Fig.4d) and correlation coefficient (Fig.4f).

Comment 3: *"It is considered that the wind system has changed due to changes in topography. In particular, consider the effect of mountain and valley wind circulation on the thermal environment. The authors stated that the topography further changes the heat island effect. It must be discussed whether this is a general finding. This appears to be happened a result of setting conditions by the authors. If so, this study is just a case study, and it should not be published as an academic research paper."*

Response 3: Thank you for your comments. Complex terrain affects the wind system and atmospheric circulation through dynamic process. The mountain and valley wind circulation along urban agglomeration has a great impact on the thermal environment. The Chengdu Chongqing urban agglomeration we studied is in Sichuan Basin and belongs to concave landform. The heat accumulated in the basin under complex terrain during the day is not easy to lose, which will make the heat in the basin higher than that in suburban and mountainous area. The purpose of the experiment is to explore the impact of topographic factors and urbanization factors on the heat island effect, and the impact of the superposition of the two on the urban heat island effect. The results show that the complex terrain further enhance the urban heat island effect located in the expansion area of complex terrain. We further discussed whether the future implementation of planning to protect the ecological environment and mitigate the impact of urban expansion on the climate will be effective, in order to provide help for the government's planning policies in the future.

We would like to take this opportunity to thank you for all your time involved and this great opportunity for us to improve the manuscript. We hope you will find this revised version satisfactory.

Sincerely,

Si Chen, Zhenghui Xie, et al.

Please also note the supplement to this comment:

<https://esd.copernicus.org/preprints/esd-2021-22/esd-2021-22-AC2-supplement.pdf>