

Response to Anonymous Referee #4

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: *“On page 5, Lines 25-26: “No-Topography (Fig. 1c)”, that is smoothing the mountainous terrain around the CCUA. I don’t understand what does this (smoothing) means? How this is being processed? From Fig. 1c, it seems the topography surrounding CCUA has been removed (especially the Plateau), am I right?”*

Response 1: Yes, the high-altitude mountains around CCUA have been removed, which makes the terrain of the whole simulation area smoother. The purpose is to compare the climate effects with and without complex terrain.

Comment 2: *“1. Page 2, lines 27-29: ‘The forced initial field data simulated in the model was the re-analyzed data of operational global analysis and forecast data, which are on 0.25×0.25-degree grids, prepared operationally every six hours, from National Centers for Environmental Prediction.’ A reference is needed.”*

Response 2: Revised as suggested.

Comment 3: *“2. Page 3, Lines 31-32: ‘the land use types of the dataset were reclassified into 17 categories’ The default category of USGS for WRF is 24 (or 28 if lakes are considered). How are the 17 categories being processed in WRF?”*

Response 3: Due to the slight difference between the LUCC data classification of CAS geographic resource platform (IGSNRR) and USGS classification standard, in order to meet the classification standard in WRF model, we must reclassify the data of IGSNRR according to USGS.

Firstly, we should refer to the naming method and data content format of "index file" and "binary file" under the existing "/" WRF/geog/landuse/" folder to make the binary file required for the WRF model of corresponding new land use data. The specific method is to re classify the “TIFF grid data” of IGSNRR according to the classification standard of USGS, then make the “TIFF data” into “ASCII file”, use ArcGIS software for reclassification,; The next job is to convert the “ASCII file” into “binary file” through FORTRAN, and put the binary file into the new corresponding path as followed; After that, we change the path in namelist.wps file to the new path, and finally conduct simulation experiment and analysis.

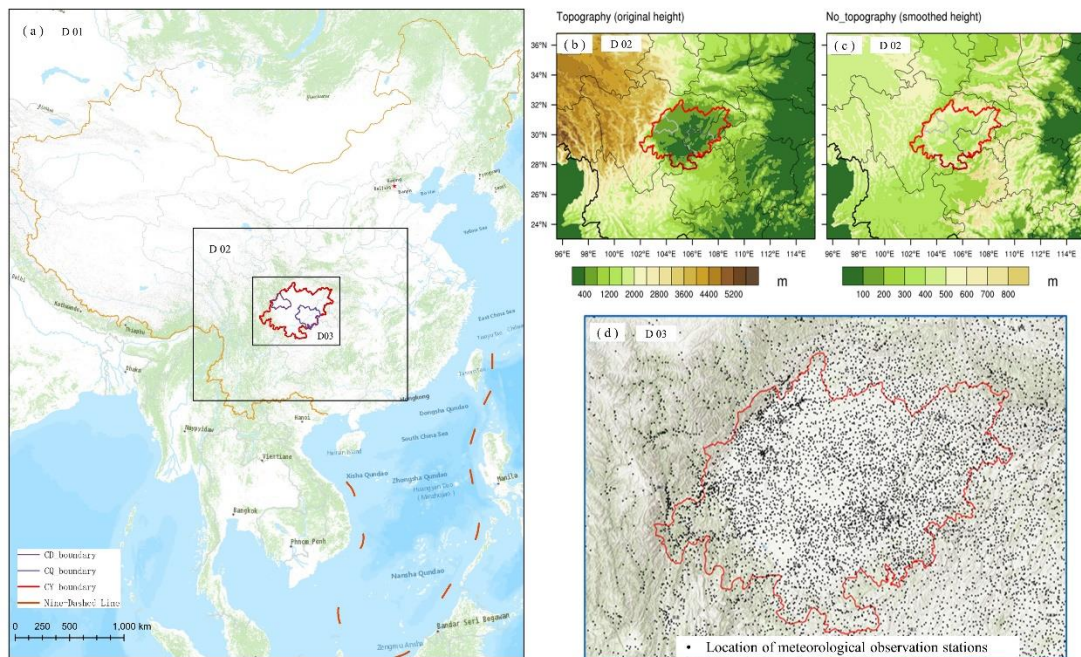
In addition, because of the CCUA is in subtropical climate area, there are no following land cover types: “mixed dryland/irrigated cropland and pasture, cropland / Woodland mosaic, savanna, deciduous needleleaf forest, evergreen broadleaf forest, evergreen needleleaf forest, herbaceous tundra and wooded tundra”, but this will not affect the operation of WRF.

Comment 4: “3. Lines 30-34: Please remove the space after ‘(’ in the cited references.”

Response 4: Revised as suggested.

Comment 5: “4. Fig.1. The value of the color scale of Fig. 1b is missing. Fig. 1d, the quality is too low to show anything.”

Response 5: We had added the value of the color scale of Fig. 1b. We improved the image quality of Fig. 1d and added icons to help understand.



Comment 6: “5. Fig.4. Please check the caption! Please show the difference between the results based on USGS and IGSNRR. Are there any results based on MODIS landcover? It would be interesting to show the difference between results based on MODIS, USGS, and IGSNRR, which could show the importance of using IGSNRR. This could also show hits to readers in their future work.”

Response 6: Thanks for your suggestions. Because this study mainly focuses on exploring the impact of urbanization in complex terrain environment on local geothermal environment, we chose IGSNRR data which is more suitable for local CUA. In fact, as the data from different sources can show the changes of urban land use types, the results of simulation experiment analysis can support our research conclusions.

For your concern about the difference between the simulation results of land use and landcover data from “USGS” and “MODIS” and even more other land use data with the results from “IGSNRR” data, we will accept your suggestion and conduct a special study in the later stage to explore the impact of different land use data on the heat island effect of urbanization. Thank you very much for your sincere advice. Please look forward to it.

Comment 7: “6. Figs. 8&9, what does ‘daily’ mean? Do you mean the average during the daytime?”

Response 7: Yes, the ‘daily’ means the average variable during the daytime.

Comment 8: “7. Fig.9. I would rather use negative values to indicate cooling.”

Response 8: Revised as suggested, please refer to Fig. 9.

Comment 9: “8. Fig. 10. What does ‘trends’ mean? What are the unites?”

Response 8: 'trends' means the daily average change of TSK, T and PBLH. The unit of TSK and T is Celsius (°C), the coordinate axis is on the left; The unit of PBLH is meter (m), and the coordinate axis is on the right.

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.