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Interactive comment on "Incoming data quality control in high-resolution urban climate simulation: Hong Kong-Shenzhen area urban climate simulation as a case study using WRF/Noah LSM/SLUCM model (Version 3.7.1)" *by* Zhiqiang Li et al.

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Dear Reviewer,

We appreciate you for spending time to review our paper and providing some valuable comments. It is your valuable and insightful comments that led to possible improvements in the current version. We have carefully considered the comments and tried our best efforts to address every one of them. However, some revisions may still not

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meet your high standards. The authors welcome further constructive comments if any. We provided the point-to-point response first and will provide the updated version of the paper after proofreading complete. Below we provide the point-by-point responses. All modifications in the manuscript have been highlighted in red.

Sincerely,

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[General Comment] In this work, the authors examined the influence of urban land surface data accuracy on the urban climate modeling quality. They compared the modeled results from simulations using the WRF ARW/Noah LSM/SLUCM model with and without a refinement by the urban land surface dataset. They clearly showed the high-quality land surface input data influence the modeling results that provide more distinct spatial details. They also proposed some explanation of how urban land surface data accuracy affected urban climate modeling accuracy. The paper is well written. I have given my comments below. Mostly minor.

Response: Thank you very much for your valuable comments. We are delighted that you agree with the views of this paper.

[Comment 1] Abstract, “The reliability of modeling results using the developed high resolution urban land surface datasets is significantly improved compared to modeling results using the original land surface dataset in this region.” I agree that the modeling results provide more distinct spatial details. Please elaborate what are the significant improvements in the reliability of the modeling results. This point is not clear in the

abstract and main text.

Response: Thank you very much for the comments. We compared the model result with station observation and MODIS land surface temperature. We use the temporal comparison of spatial variation (TCSV), Perkins skill score (PSS), and PDF of difference (PDFD) to evaluate the model results. Most of the results show improvements in the Case-USLD. Indeed, the most significant improvement in modeling results by the incoming data quality control is that the model produced more distinct spatial details in the fine grids. Actually, urban climate modeling is a meteorological downscaling application that is employed to produce the fine-scale spatial and temporal details from the coarse resolution's meteorological data (Hong et al., 2014). It is, therefore, the critical indicator for the urban climate to precisely construct the fine-scale details at their utmost in the interested area (Lo et al., 2008). In this study, we conducted two meteorological downscaling cases by the dynamical limited area model with the same lateral boundary condition of coarse-resolution data and two different land surface data to compare which case constructs more fine details in the interested area. From the dynamical meteorological downscaling point of view, Case-USLD has a significant improvement in the performance of modeling results than the Case-NCAR. We added the content in the abstract and Section 4 to emphasize the points aforementioned [Pg13, Ln11-21] and changed the wording [Pg1, Ln25].

[Comment 2] Page 6, line 7, "As evidenced by Figure 5, both simulation results using the original and refined land surface data reproduced the diurnal and monthly patterns as the ones of observation." Would it refer to Figure 6?

Response: Thank you very much for reminding us. Revised accordingly, [Pg6, Ln8].

[Comment 3] There are questions about the improvements in the model simulations. (1) Page 6, Line 16, "Compared to Case-NCAR, the PSS annual mean values of Case-ULSD improved by 1.0%, 3.2%, and 5.5% in the 2-meters air temperature, surface temperature, and 10-meters wind speed, respectively. On the contrary, the PSS an-

nual mean values of CaseULSD deteriorated 5.6% and 2.7% in relative humidity and precipitation, respectively, than the ones of Case-NCAR." (2) Page 7, line 4, "Compared to Case5 NCAR, the annual mean values of the specified interval of the PDFD of Case-ULSD improved 2% in surface temperature and precipitation." For the annual mean values of these factors, could the authors further elaborate what are the improvements (e.g. reliability) in their modeling results?

Response: Thank you very much for the comments. In this study, it is another interesting finding that the high-quality land surface did not make a positive effect on the modeling results. We also conducted a discussion for this finding in Section 4 [Pg12, Ln17 – Pg13, Ln10]. For responding to this question, we just changed the wording (replace "reliability" with "performance").

[Comment 4] Page 11, "From our findings, the IDQC indeed improved the modeling results at the spatial dimension, creating substantially more spatial details in simulation results." I agree this work provide more spatial details in simulation results. However, did the authors compare their spatial results to the measurements?

Response: Thank you very much for the comment. Yes, we spatially compared the modeling results of two cases with the observation by the PSS and PDFD, which include the wind speed, air temperature, relative humidity, precipitation, and surface skin temperature.

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