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Interactive comment on "Sensitivity of urban boundary layer dynamics to surface characteristics of built terrains" *by* Jiyun Song and Zhi-Hua Wang

Anonymous Referee #2

Received and published: 11 March 2016

The paper has incorporated reviewer's comments and addressed various issues/concerns raised by the reviewer. Firstly, the scientific values of the paper extend beyond the novel method presented here. There are many different land surface models coupled to the atmosphere (not just within the urban context) with large number of input parameters To access the sensitivity of high dimensional input parameter space, it is often a formidable task. Therefore, the application of subset simulation based on Markov Chain Monte Carlo in the context of evaluating urban land surface models or other numerical models will be promising. Secondly, sensitivity tests that take advantage of MCMC of handling small probability events can be potentially related to quantifying risks associated with these events. i.e. risks in urban environment

due to extreme events, such as a heat wave. This opens the possibility of combining atmosphere-coupled urban land surface model to risk assessment, which will potentially be useful in fully assessing the impact of climate extremes. Thirdly, the implications from the results of sensitivity test of this paper will be significant. One reason is that as mentioned in the paper, which is to inform the urban planners in terms of building green roofs. Another reason is that the results from sensitivity test shed light into better parameterizations of the parameters used in urban land surface models. Since land surface models often rely on parameterizations of turbulent momentum, heat and vapor fluxes, the high sensitivity of the convective boundary layer dynamics to turbulence parameterization in the urban land surface model provides further motivation to derive better representations of turbulence. Overall, the novel approach and results presented here will impact a broad range of audience. Therefore, I recommend acceptance of this paper.