

Interactive comment on “Efficiently modelling urban heat storage: an interface conduction scheme in the aTEB urban land surface model” by Mathew J. Lipson et al.

Anonymous Referee #1

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This paper presents a new heat conduction scheme which can be implemented in the urban land surface models and compares it with a well-established and widely used scheme in current land surface models. The study is interesting and in the scope of the Geoscientific Model Development. The author(s) made a reasonable effort and the research was carefully conducted. I think that this paper could be published promptly because the new proposed scheme and the discussions in the paper are helpful for the developers and users of the urban land surface models. However, there are some flaws in the manuscript, which I think that the authors should consider to revise before the manuscript is finally accepted.

Major: 1. One of my major concerns is about the structure of the manuscript. I feel a

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little confused when I read through the manuscript and had to go back and forth for a few times. I think it is clearer that if the authors can restructure section 2, into which part of section 3 and 4 can be moved. The new section 2 serves as a Methods section, where the authors introduce the two conduction schemes, the aTEB model, modeling setup, idealized method, as well as the data used. Then section 3 and section 4 serve as results sections to discuss about the idealized results and observational results.

2. The authors use two methods to assess the performance of the two schemes: idealized environment and observational datasets. When using observational dataset, the improvement in Qs and other fluxes when changing from half-layer scheme to interface scheme are rather small ($< 5 \text{ W m}^{-2}$). I wonder whether the magnitudes of these improvements are statistically significant? Could the authors provide any statistics to prove that?

Minor: 1. Page 2 Line 3: “the alternate method” -> “the alternative method” 2. Captions in Figure 4 and Figure 5: (a) flux density and (b) normalized error. I suppose the authors mean: (top panel) flux density and (bottom panel) normalized error

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