

***Interactive comment on* “The Joint UK Land Environment Simulator (JULES), Model description – Part 1: Energy and water fluxes” by M. J. Best et al.**

Anonymous Referee #2

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Review result for Best et al., titled as "The Joint UK Land Environment Simulator (JULES), Model description - part 1: Energy and water fluxes." This is purely a description paper, containing no scientific finding. However, the paper is quite descriptive overall. Probably such kind of paper is only publishable on Geoscience Model Development. Below, I'd like to point out some minor issues that the authors may want to correct or improve. Most of them are just technical. Please note that I could not validate the correctness of the equations.

1. Even though this paper is a description of only JULES, the authors need to refer several other representative LSMs at least in the introduction.

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2. I would like to strongly suggest the authors to make a list of ALL tunable parameters of JULES with the default numbers or ranges, even though some are shown in Table 5 and 6. Because there has been increasing number of research on perturbed physics ensemble, many would be interested.
3. In general, please be more careful on the usage of symbols. For example, "C" is used for CO₂ concentration, heat capacity, conductivity, and water capacity. "T", "r/R", and "K" are confusing, too. Please avoid duplicate usage of same characters.
4. Related to the issue just above, definitions of symbols for all equations (like Table 4) would be highly useful and friendly for readers.
5. Particularly from Chapter 4, equation numbers are skipped. Please add them for all.
6. Eq.1: How is "C (Heat capacity associated with the surface material)" defined in case of the third option or above? Perhaps larger number of the capacity makes stronger "thermal inertia".
7. Eq.6: Who determined this equation of surface conductance? If any, reference is needed.
8. Eq.8: "D" is also used in Eq 15.
9. Eq.14: "A" is also used in Eq.7 and Eq.38.
10. Eq. 15: Reference is needed.
11. Eq. 16: Reference is needed.
12. Eq. 19: Reference is needed.
13. Eq. 22: This relationship was found by Yen, 1981.
14. Eq. 43: How is this equation derived? What is the basis of "10"?
15. P622L1: What is the basis of this equation of " $\lambda_{u_s}=1.58 + \dots$ "?

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16. Table 4: Please show the units of the symbols.

17. Fig.2: It seems 20cm and 50cm are the thresholds of creating additional layers. Why not explicitly write these?

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4, C341–C343, 2011

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