

Interactive comment on “Reliable, robust and realistic: the three R’s of next-generation land surface modelling” by I. C. Prentice et al.

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This is a timely and thought-provoking review, and I support its publication in ACP. Prior to final publication, however, I would recommend that the authors consider the following four comments:

1. The "Three R's" of the title are never formally defined. It would be useful to do so near the beginning of the paper so that the reader can understand how these terms are applied in the paper and what the authors view as the critical distinctions between the three.
2. The authors might also provide guidance on how the modeling community would know when any of these "R's" has been achieved. The paper calls for cross-disciplinary
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collaboration and for balance between complexity and robustness, but as LSMs grow "inevitably more complex" it would seem that the community could use more specific guidelines on how to achieve this balance, or at least some select examples of what a successful balance would look like.

3. Though I find the paper to be quite useful in its constituent parts, the authors lose me in the conclusions. Having reviewed so many past efforts and present trends in land surface modeling, can the authors say anything more concrete? The only specific action statement in the conclusions is that models should be tested against large scale observations, which seems simultaneously obvious and somewhat at odds with the more nuanced approaches to model evaluation, benchmarking, and constraints that are reviewed in previous sections. I'd appreciate it if the authors used their pulpit to conclude with some more specific and potentially controversial recommendations for the community.

4. Figure 6 and/or the header paragraph for Section 6 need to be expanded. As it stands the figure includes a number of features that aren't explained. It also appears that the figure isn't entirely relevant to the remainder of Section 6, as I don't see any link to the issues described in 6.1, and the sole link to section 6.2 is the box that says "Data Assimilation." I encourage the authors to rethink this figure and how it relates to the text.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 24811, 2014.