

Interactive comment on “Combining surface reanalysis and remote sensing data for monitoring evapotranspiration” by M. Marshall et al.

Anonymous Referee #2

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This paper is divided into 3 steps: a) Evaluating the performances of two models on 8 eddy flux sites in Africa. b) Making a sensitivity analysis in order to understand which parameters are most relevant in the models' results. c) Building a hybrid model coupling terms of one model and terms of the other model. I would recommend publication because: 1) Steps a) and b) represent a critical analysis of two existing models and show how they perform in an area not yet well studied, but very important. 2) Step 3) represents an attempt to join the good qualities of both models making them enforcing each other. But, I agree with Joshua F. that: 1) Both the analysis of the two models and the results of the hybrid models, contain very large uncertainty propagating step by step. The uncertainty begins with input data (GLDAS), continues in models, and is also contained in the eddy flux measurement, in the several spatial and temporal

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aggregations. The main question is: how can you distinguish the uncertainty of data from the goodness of model prediction?

2) The paper is too much long, in some parts contorted, and entering in details that are not so much relevant from the main idea of the manuscript. This is a pity, because the main idea of the manuscript is somehow hidden.

I kindly ask to the authors, as a first thing, to make the paper shorter, without repeating the same concept for more than one time, and maybe using more subparagraphs, each one dedicated to a single clear concept. Why is the analysis done only for one (Berkeley) model? I would expect that the analysis would be done in parallel for both models. The authors speak of “analysis”, but this term is used in the paper many times, and without a clear meaning. I explain why: in the introduction (p1552 l24) , authors speak about the “first phase of the analysis” and it is not clear if the first phase is the comparison with data or comparison + sensitivity analysis. In the 2.4 (Statistical analysis), the authors speak about 3 phases of analysis, but the third one is already the hybrid model. In fact, in the paragraph 2.4 the purpose of phase 1 is described, the purpose of phase 2 is described, and the reader would expect the purpose of phase 3. . . but there is not. My suggestion is: Define what analysis is (I guess, comparison of the model with the results + sensitivity analysis), and state it clearly in the introduction.

I make comments paragraph by paragraph, without going into deeper detail, because, in my opinion, this process should be done after the manuscript is shorted, in another review.

Introduction. Acronym AMMA is undefined, the definition appears later in 2.3. I think that the two kinds of model should be described more briefly; I read that reviewers in past told to explain the critical points of both, but this task can be done in fewer words. Why do the authors use labels to give names to the two kinds of model? In this way that could extend the sentence at p1550 l8” “modeling approaches can be divided into two general categories: label1 and label2” so that the reader is already prepared. State

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in the introduction clearly, in a paragraph: "Purpose of the paper" Step 1 of the analysis with purpose "Step 2 of the analysis with purpose (so that this should not be repeated anymore in the paper)

Par 2.1 and 2.2 I think that a scheme can be of great help, for understanding the input, and how there are used for calculating the models' terms. These two paragraphs suffer from difficult readability. When a parameter is introduced for the first time, it should be with measure units, but some parameters are with, and some without. Par 2.3 Do not repeat the phases of analysis, use labels (e.g. modality1 and modality2) to give name to the two methods for sensitivity analysis (without synergies, and with). One technical question: how can you guarantee that the mean values of the fixed parameters are the best for that case? I think that, for the logical flow of ideas, the definition of the Hybrid models, should follow the presentation and interpretation of the analysis. Par 4 The discussion should be shorter, and following the structure of the previous parts of the manuscript, maybe divide it into sub paragraphs.

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