

Interactive comment on “Improving simulation of soil moisture in China using a multiple meteorological forcing ensemble approach” by J.-G. Liu and Z.-H. Xie

Anonymous Referee #2

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This study investigates the use of 4 different meteorological forcing datasets on the CLM3.5 model over China for improving the representation of soil moisture. The four resulting soil moisture datasets are then merged together using either a simple arithmetical averaging or a Bayesian model averaging. It is mostly written in good English (although I am not a native English speaker), the abstract is clear and the title describes well the content of the manuscript. My main criticism is that I found the science content of the manuscript to be a little modest. I believe that some points could be enhanced before it deserves publication. It would be of interest to have a proper analysis or at least more discussions on the 4 different meteorological forcing used (e.g., known

C1367

problems, consistency over time...). Also, as illustrated on figure 3 (do correct me if I am wrong), it seems that without CLM3.5_JRA you BMA would be completely different (the mean also) and very far from the observations (?) In this case how confident are you about the quality of your BMA (if it is mainly driven by one simulation)?

1. Introduction

P. 3468, L.25, 'that trigger', How? Would it be more correct to say that these events are forced over time by the land surface conditions (and not triggered by the land surface conditions)?

3 Experiment design and ensemble approach

3.1 Experiment Design

P.3474, Although I do not have the correct answer, I am not sure if it is the best way to initialise your model. Maybe it could be done for each atmospheric forcing data set (?)

3.2 Ensemble approach

P. 3475, L.11-15: Please rephrase sentence

P. 3475, Eq.(8): Please explain symbol between the shape and the scale parameters

4 Results

4.1 Spatial distribution and temporal variation

P. 3476, L.9-13: Please rephrase first paragraph

P. 3476, L.23-24: Would it be possible to refer to the regions defined in Table I and figure 2 instead?

P. 3477 L.29-30 & 3478 L.1 : Please rephrase sentence

P. 3478, Soil moisture variability represents the time-integrated impacts of antecedent meteorological forcing on the hydrological state of the soil system within your model.

C1368

The fact that the model overestimates the observations of soil moisture should be more related to model deficiencies (soil texture, structure...). A quantitative description of the 4 datasets used to force the model might help the reader to understand this overestimation.

4.2 Statistical differences [...] First paragraph: also, the distance between the point recorded 'REF' and the others points representing the model is the centered normalized RMS difference between the model and in situ patterns

Figure 1: Please refer to Table 2 in the caption for a description of the 8 subdivisions (subdivision III is not easily readable).

Figure 2: Please add a), b) [...] g) on the figure for a better comprehension.

Figures 3-4-5: Please simplify x- and y-axis for a better readability.

Figure 10: Please increase the maximum value of the SDV axis so all the symbols are within the Taylor diagram (e.g. for Fig.10.c)

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