

### **Response to comment of Anonymous Referee #3**

I have to say that it is lack of a basic component that is to compare the results with the observations. Long term simulations without uncertainty analyses do not make much sense.

*We appreciate the reviewer's comments. We agree that "Long term simulations without uncertainty analyses do not make much sense." As a result, calibrations and validations of the VIC model have been carefully conducted prior to the current study; and the result has been published in the Wu et al. (2007). We also mentioned in Introduction "... our current study is a continuation of the study of Wu et al. (2007), with the emphasis on the analysis and application of the long-term VIC soil moisture simulation."*

*To address the issue of uncertainty in the VIC simulated soil moisture, the introduction of SMAPI to quantify drought events (rather than using the absolute soil moisture) could partially circumvent the uncertainty concern, as the effect of the systematical error in the simulated soil moisture could be reduced by removing the model mean from it. Also, we have done some quantitative comparisons between the identified drought events and the drought records that are officially released by the Chinese authorities. The result shows that these identified drought events are in good agreements with the corresponding records most of the case, especially for the most severe drought events.*

#### Reference:

Wu, Z. Y., Lu, G. H., Wen, L., Lin, C. A., Zhang, J. Y., and Yang, Y.: Thirty-five year (1971–2005) simulation of daily soil moisture using the variable infiltration capacity model over China, *Atmos. Ocean*, 45, 37–45, 2007.