

Interactive comment on “Characterizing coarse-resolution watershed soil moisture heterogeneity using fine-scale simulations” by W. J. Riley and C. Shen

Anonymous Referee #2

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General comments: It is interesting to characterize the soil moisture heterogeneity. This paper discussed the soil moisture heterogeneity in coarse-resolution based on the hydrological model simulation in fine-scale. The method is clear and the results are significant.

Special comments: 1. Some sentences are too long, such as “We applied a watershed-scale hydrological model (PAWS+CLM) that has been previously tested in several watersheds and developed simple, relatively accurate ($R^2 \sim 0.7\text{--}0.8$) reduced order models for the relationship between mean and higher-order moments of near-surface soil moisture during the nonfrozen periods over five years.” It is not easy to understand.

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2.P1968, L2, “than” is redundant.

3.P1968, L3, two “and” is used, which makes confusion.

4.P1984, L5, “were stressed” may be “were unstressed”.

5.The figures can be reorganized and make the topic focus on the relations between $\mu\theta$ and $\sigma\theta$, $s\theta$, $k\theta$. Therefore, Fig.2, Fig.3, Fig.8, Fig.A2 are redundant and the related discussion can be rewrote. Fig. A1 and Fig.A3 should be kept.

6.Is “C1+C2gET” used to surrogate the relation between $\mu\theta$ and $\sigma\theta$? How about the relations between $\mu\theta$ and $s\theta$, $k\theta$? And are C1 and C2 consistent or different for different gridcells?

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