Hydrol. Earth Syst. Sci. Discuss., 10, C5569–C5574, 2013
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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Predicting natural streamflows in regulated snowmelt-driven watersheds using regionalization methods" *by* D. Kim and J. Kaluarachchi

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First of all, we appreciate your comments on our manuscript. We are happy to respond to your comments. Our response is following as per your comment.

1. We agree the book provides comprehensive information related to ungauged basin modeling. We will refer to this book and will highlight key work from this work in the manuscript in areas appropriate for our work.

2. We will make appropriate revisions in the manuscript where we could improve readability of the FDC method.

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3. We agree to your comment that the snow distribution is not necessary to simulate streamflow since it can be an output when using zoning or distributed modeling. Even in our approach, it is not used because we spatially averaged air temperature and precipitation with PRISM data for a watershed. Therefore, we cannot confirm that data requirement for deterministic modeling is always high. Also, zoning a watershed can enhance model performance and simulate the snow cover distribution as you commented. In this work, however, we need more inputs the partitioned zones if we decide to take this approach. Or else, we need to use appropriate assumptions and parameters to obtain the inputs from available data. In other words, if we propose to use elevation-based zoning approach, the lack of data together with the assumption that may have to be made to make the simulation will produce high uncertainty in the results. The question is the tradeoff associated with high uncertainty/less robust with zoning vs. use of simple tank model across the watershed. The reason for using the simple tank model in this study is to avoid such uncertainty. Also the entire river basin was not modeled; instead selected watersheds that are not regulated for flow were considered. These watersheds are located primarily in the upper basin where the elevations are high but not necessarily of high variability compared to the 2200 m different across the entire river basin. This is also another justification for using the simple tank model for each of these watersheds. We will however update the discussion to mention the option of using zoning if adequate data were available and the corresponding advantages to consider elevation-area variability. We will also state the limitation of the use of a simple tank model and the reasoning for use of the model given the limited data.

4. Our approach does not generalize that the FDC method is better than deterministic models. The tank model used in the study is simple to reduce the number of parameters. Also, different deterministic models can have better performance than the FDC model. The emphasis here is that the FDC can be a simple approach when high precision is not required. The comparison with the tank model is to give the readers the level of precision to be expected from the FDC method in scenarios studied here. We

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will update the manuscript to reflect this emphasis.

5. The scales and readability of Figures 3, 4, and 5 are corrected by adjusting font size and tick marks as attached files. We will adjust font size to improve readability of every figure in the manuscript.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 9435, 2013.

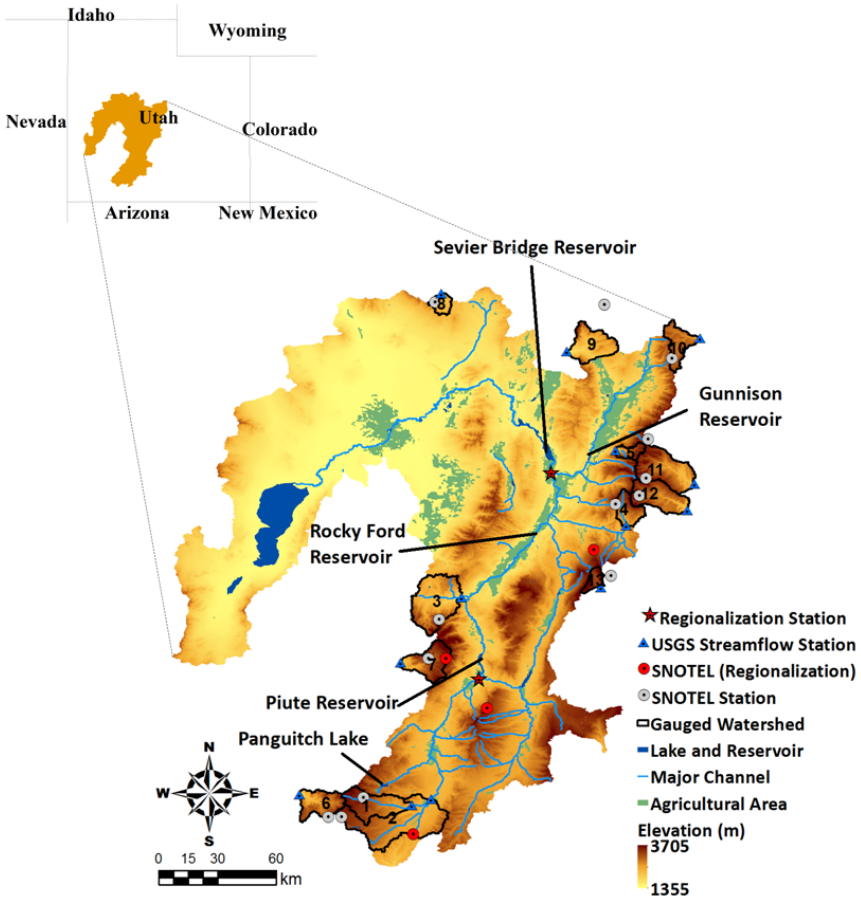

Fig. 1. Modified Figure 3

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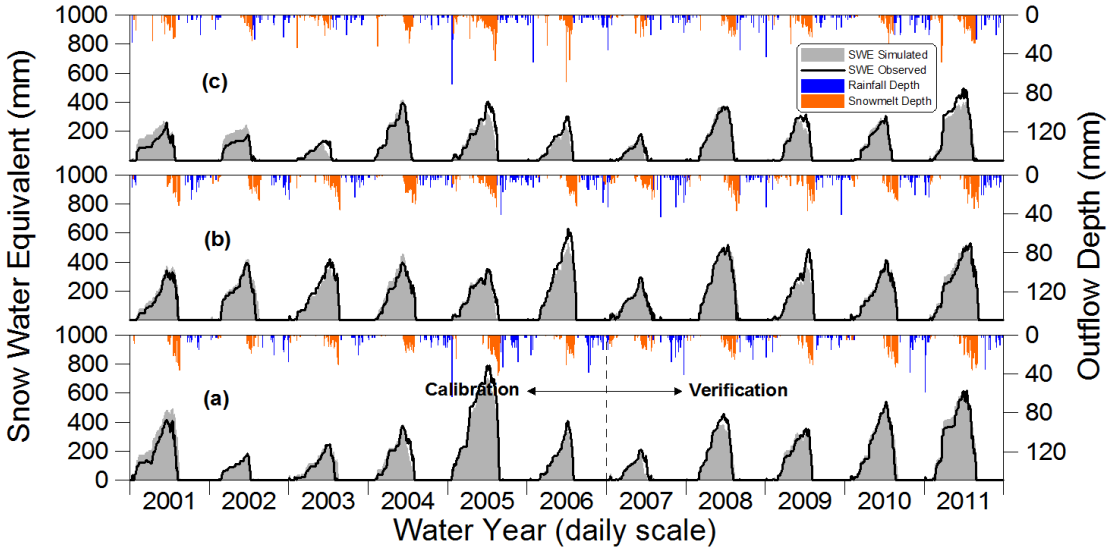

Fig. 2. Modified Figure 4

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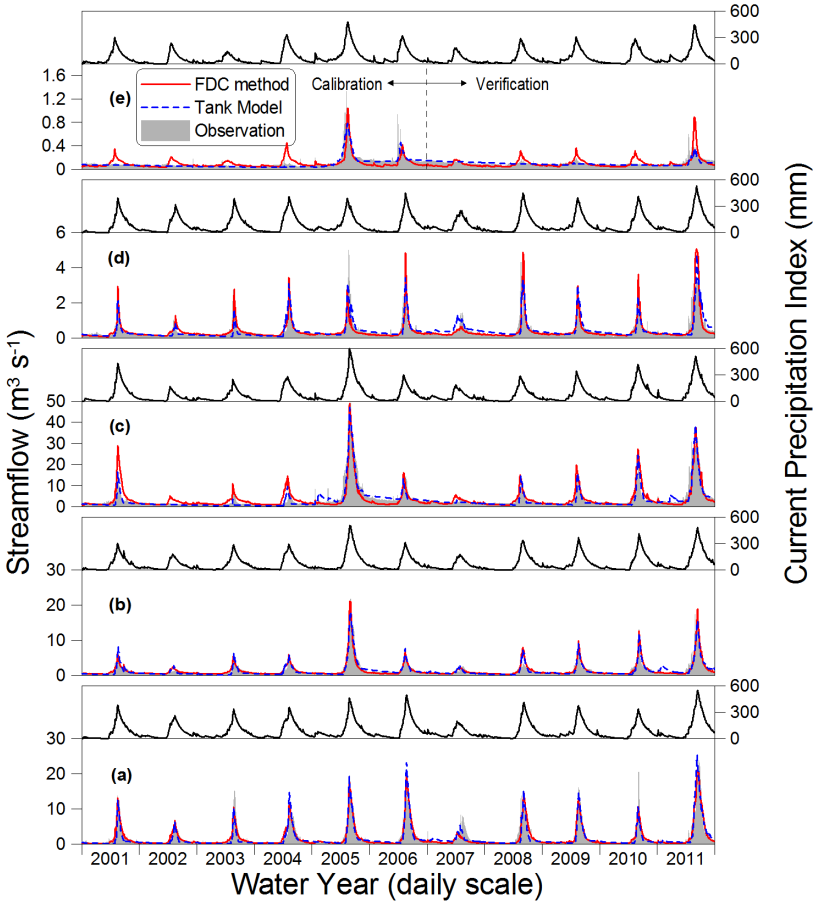

Fig. 3. Modified Figure 5

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