

Interactive comment on “Using the nonlinear aquifer storage–discharge relationship to simulate the baseflow of glacier and snowmelt dominated basins in Northwest China” by R. Gan and Y. Luo

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Dear editors and reviewer,

The comment is appreciated. Accordingly, we have revised the manuscript. Following is the reply to the comment.

Anonymous Referee # 2

Comment: Dear Authors, thank you for adding evaluation indices which can be better used to evaluate model performance in low flow periods. Now it becomes very clear, that the two-linear and the one-nonlinear approach perform much better than the one-
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linear approach during low-flow periods. The differences in the evaluation indices for the two-linear and the one-nonlinear approach are very small, and often even higher values are achieved for the two-nonlinear approach. Therefore, it is not justified to conclude that the one-nonlinear approach performs better than the two-linear approach.

Response: No, it is not justified to make such a conclusion. We would conclude that the two-linear and the one-nonlinear approaches give much better performance than the one-linear approach based on the evaluation indices in this case study. Meanwhile, the differences in the evaluation indices for the two-linear and the one-nonlinear approach are very small, and often even higher values are achieved for the two-linear approach. The one-nonlinear reservoir approach has some advantages over the two-linear reservoir approach in parameterization. The two-linear reservoir approach has five parameters which need to be calibrated within the model (Luo et al., 2012). However, the one-nonlinear approach has only two parameters. And these parameters can be calibrated independent of the model through using the low-flow record and the discharge recession equation as in Wittenberg (1999).

We revised the conclusion section according to the comment.

References:

Luo, Y., Arnold, J., Allen, P., and Chen, X.: Baseflow simulation using SWAT model in an inland river basin in Tianshan Mountain, Northwest China, *Hydrol. Earth Syst. Sci.*, 16, 1259–1267, 2012.

Wittenberg, H.: Baseflow recession and recharge as nonlinear storage processes, *Hydrol. Process.*, 13, 715–726, 1999.

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