

## Response to Reviewer #2:

First of all, we would like to thank reviewer #2 for his/her comments on the paper. Their effort has helped us to improve the manuscript and we appreciate you agreeing to review the paper during these challenging times. Here, we provide point-by-point responses to each of reviewer 2's comments.

<b>Reviewer 2 comments</b>	<b>Author response</b>
<p>What could be added is a discussion of how the model parameterisation affects the conclusions. Such a discussion is started on page 14 but could be more comprehensive.</p>	<p>We agree with the reviewer comment here, and reviewer #1 had similar comments. In our previous work (Schreiner-McGraw and Ajami, 2020), we performed a limited set of simulations to test the impact of saprolite layer parameterization, the most hydrologically active zone in the subsurface, on simulated water budget. The parameterization of this geologic layer did not significantly impact the propagation of uncertainty in precipitation into the groundwater. Please see figure 11 in Schreiner-McGraw and Ajami, 2020.</p> <p>Our previous experiments were limited in scope by the high computational demands of running ParFlow.CLM. Unfortunately, that limitation applies to this current experiment as well and has prevented us from being able to use parameter uncertainty approaches such as the Generalized Likelihood Uncertainty Estimation (GLUE) to evaluate the full impact of model parameterization on our results.</p> <p>Model parameterization and geologic setting, however, likely play a role in how uncertainty in meteorological forcings will propagate into groundwater. In the revised manuscript, we will expand upon this discussion. For example, our simulations are performed in a mountain region underlain by fractured, low permeability bedrock. Previous work has shown that groundwater in these regions responds quickly to changes in precipitation (Pfister et al., 2017), and would likely impact the results. In the revised manuscript we will</p>

	include discussion of how the geologic setting of our study site, and parameterization choices that we made are likely to impact the study results.
In terms of presentation, although the paper is generally well written, it is repetitive in places and the flow of arguments could be sharpened.	Thank you for the reminder. We will aim to improve the communication in the revised manuscript. We will improve our topic sentences for paragraphs to highlight the purpose of each discussion, and help with the flow of arguments. Finally, we will search for repetitive sentences and remove text to make the manuscript more concise.

**References:**

Pfister, L., Martínez-Carreras, N., Hissler, C., Klaus, J., Carrer, G. E., Stewart, M. K., and McDonnell, J. J. (2017). Bedrock geology controls on catchment storage, mixing, and release: A comparative analysis of 16 nested catchments. *Hydrological Processes*, 31(10), 1828–1845. <https://doi.org/10.1002/hyp.11134>

Schreiner-McGraw, A.P. and Ajami, H. 2020. Impact of uncertainty in precipitation datasets on the hydrologic budget of an integrated hydrologic model in mountainous terrain. *Water Resources Research*, 56(12), doi: 10.1029/2020WR027639