

Geosci. Model Dev. Discuss., referee comment RC2
<https://doi.org/10.5194/gmd-2021-97-RC2>, 2021
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Comment on gmd-2021-97

Anonymous Referee #2

Referee comment on "GMD Perspective: the quest to improve the evaluation of groundwater representation in continental to global scale models" by Tom Gleeson et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2021-97-RC2>, 2021

The review is very thorough and exhaustive, and I completely agree with the importance of improving the representation of groundwater in model at all scales and I understand the need to transfer knowledge across scale.

The paper is very nicely written and I especially appreciated the discussion starting at line 549 about how critical is to use different types of observations (9 are included here) to better evaluate models.

The first type of observation mentioned refers to the importance of moving away from using averages and highlight how critical is to use transient of observations representing depth to groundwater.

The only suggestion I have is to eventually add a table that summarize the main characteristics of the existing models at the continental and global scale. They are all referenced in the paper but I believe a table would be helpful for readers eventually less familiar with all the ongoing model development.

Thank you for the opportunity to review the paper!

Minor comments:

Line 92: what do you mean by "teleconnections"?

Line 211-213: this sentence is not very clear

Line 339-340: What do you mean by "when only using observations for model evaluation"? I imagine this refers to observations not being used for model development, is that correct?