

Dear Topical Editor Jatin Kala and Chief-executive editor David Ham,

Thank you for handling the reviews of our proposed GMD Perspective article entitled "Improving the evaluation of groundwater modeled at continental to global scales".

The reviewer suggests accepting subject to minor revisions. This reviewer had three minor comments that we address below in blue, with relevant changes to Table 1 in the manuscript.

Warmly, Tom Gleeson, Thorsten Wagener and Petra Döll

Anonymous Referee #1

Authors have done an excellent job incorporating reviewers' comments. Adding Table 1 and proposing a new classification for large-scale groundwater models added significant value to the manuscript. Thank you for your huge efforts on compiling this information. I have three minor comments regarding Table 1 and I appreciate if authors can clarify these points.

Thank you for taking the time to review our manuscript again and your positive feedback on our revision. We clarify each of these points below.

1. Authors indicated that focused recharge processes in models such as HydroGeosphere and ParFlow are not incorporated. As the two-way exchange fluxes between the river cells and model grids are calculated, I wonder why authors indicated that focused recharge is not represented in these models. Does this relate to not explicitly representing river geometry in these models?

This is useful comment – we changed HydroGeoSphere and Parflow to directly representing focused recharge processes.

2. Models such as ParFlow are very flexible in representing subsurface heterogeneity and elastic storages are directly calculated. I wonder why authors indicate that confined condition is not represented in these models.

This is also a useful suggestion. Parflow is very flexible in this way and could be used to represent confined conditions. In the continental applications to date it has not been parameterized in this way so we changed the confined aquifer cells for Parflow and HydroGeoSphere to 'Potentially represented'.

3. One of the criteria in Table 1 is "Groundwater use" and it seems none of the models incorporate this component. Does groundwater use relate to pumping or groundwater evapotranspiration? Please clarify.

Thanks for this final useful suggestion. By groundwater use we did mean pumping so we have added this note to the bottom of the table “Groundwater use means groundwater pumping rather than via evapotranspiration.” In the previously submitted manuscript, PCRGLOB-WB was the only model that directly represented this, but we have added Parflow as representing this based on some recent papers.