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Discussions

Interactive comment on "Flexible vector-based spatial configurations in land models" *by* Shervan Gharari et al.

Anonymous Referee #2

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The paper titled "Flexible vector-based spatial configurations in land models" uses a new spatial configuration approach with the VIC model that is based on the group response unit concept. The main goals in the paper are to first introduce a method to defining heterogeneity in VIC and then to assess the added value of multiple spatial configurations over the Bow River basin at Banff. The paper is a novel contribution and will be an excellent addition to the land surface/hydrologic modeling community. However, there are multiple issues that I describe below that should be addressed before publication.

* The abstract is too long. I strongly suggest reducing the size of the abstract by 20%-40%.

* I don't really understand the difference between GRU and HRU in this study; from my

understanding a GRU is composed of many HRUs. For example, a sub-basin (GRU) will have multiple HRUs. But based on what is being done here, these GRUs are just the classic GIS partitioning happening and thus very similar to the original definition of a HRU. Maybe I am misunderstanding something. In any case, please clarify the use of the GRU term here.

* Figures 1 and 2 - These two figures are not very informativeâĂŤespecially Figure 1. I would remove them. Maybe some of these ideas could be merged into an improved (or split) Figure 3.

* Figure 3 - You should have a, b, c, d coded on the panels themselves. Panel c is very unclear. I think this whole figure is critical to understand the implementation and thus should be improved (and perhaps split into two).

* Figure 6 - The 3 dimensionality of this figure is unnecessary and frankly confusing. The 2d surface is more than enough to get the point across.

* Figure 8 - Again, the 2d surface would be much better here.

* Line 122 - Only using tmin, tmax, precipitation, and wind speed is only one option in the earlier VIC versions. One could also still use longwave in, shortwave in, among others.

* Line 153 - Although I am certainly a fan of "killing the grid", it is not entirely true that "resolution loses its meaning" with the introduced approach. You still have an effective spatial resolution which is governed by the level of details that needs to exist in your polygons. Of course the advantage here is that you can have the size of those polygons vary as a function of space; however, you will still have the concept of an effective spatial resolution present. I'd suggest thinking more carefully of what moving to a polygon based approach really means and how it can be "upscaled" in more informative ways than the classic coarsening of the grid.

* Check for typos; there appear to be a few throughout the text (e.g., VIV-GRU on line

182)

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