Geoscientific
Model Development
Discussions

Interactive comment on "The multiscale Routing Model mRM v1.0: simple river routing at resolutions from 1 to 50 km" *by* Stephan Thober et al.

Anonymous Referee #1

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1 General remarks

The study presents the mRM which specialized in the routing of main channel flow. It is using an adaptive time step and scales well for different resolutions. It is able to upscale river flow networks and parameters to the input data resolution by itself and thus provides a very user friendly tool for the computation of river discharge from different models.

The manuscript is very well written and structured. The reported analysis convincingly support the conclusions. Limitations (e.g. missing floodplain processes) are listed

together with future plans. For LSMs without a native routing scheme, the mRM is definitely an interesting tool although the apparent limitation of using only total runoff instead of the different components might limit its applicability somewhat. It would be nice if the authors could add a short paragraph about the resolution limit on the coarse side. Large scale earth system models are usually much coarser than 50km and focus on routing the discharge into the correct ocean basin rather than using it for evaluation. Would this tool be applicable at such resolutions as well?

2 Specific remarks

- P2L12: I don't understand this sentence. I guess you mean you provide a framework for those LSMs without a native river routing scheme to compute river discharge and compare it to observations? Please rephrase.

- P17L1: Would this mean that using mRM with a LSM that generates multiple runoff components, e.g. fast runoff, baseflow..., that mRM would have to be applied separately for each of them with a component specific celerity? Please clarify.

- P17L1: REMO does separate runoff into two components: surface runoff and drainage. How are they treated for this study? Are they just combined to total runoff?

- P17L25: The statement seems a bit unfair. As just said REMO does compute different runoff components and (according to the output variable list) they should be available from the ENSEMBLES database. Also, ENSEMBLES is not exactly the newest project out there. Why not using data from the EURO-CORDEX Project which would allow to draw conclusions about REMO that would be much more up to date. ESGF has the variables total runoff (mrro) and surface runoff (mrros)

available (drainage (mross) would just be mrro – mrros for this model). Having said this, I like to stress that this does not compromise the manuscript in any way as the REMO analysis is just an example for the functionality of tmRM. Thus, no changes are necessary here.

- P21L26: Is this a left-over from an earlier submission? A bit early to thank for constructive comments before knowing what you get ;) . Still, I appreciate the attitude. Btw, at least I was contacted by a different editor and also I cannot see Paul Dirmeyer in the Editorial Board of GMD.

3 Technical remarks

- P1L12: are they really identical? I guess you mean similar, right?

- P1L14: everything is basically comparable. Do you mean similar again?