Continental Scale hydro model inter-comparison for SWOT
Teleconference summary 2017 11 14

by Konstantinos M. Andreadis and Cédric H. David

In attendance
Konstantinos M. Andreadis
Sylvain Biancamaria,
Ayan Santos Fleischmann,
Rodrigo Paiva,
Dai Yamazaki,
Colby Fisher,
Ed Beighley,
Cedric David.

Meeting minutes
Cedric: presented preliminary analysis (simulation metrics and hydrographs) for 7 models at 14 stations. Focus was placed on 4 key stations at the confluence of primary branches of the Mississippi River. Most files provided were close to the agreed-upon format, and slightly reformatted for the analysis (in particular, the CSV files now have the river IDs instead of the gage code in the header). The processing toolbox benefited from new implementation by Kostas and is on Github (https://github.com/c-h-david/rrr) but needs some more changes. The need for overall summarizing statistics for all stations together was suggested to help streamline the results. There appears to be some issues with network connectivity when comparing the mean flow at one station that integrates much of the upstream discharge (Mississippi at Thebes), and perhaps this also highlights the need for more consistency in runoff datasets (VIC only vs VIC and Noah used).

Rodrigo: LISFLOOD might be underestimating discharge because channel capacity is underestimated and water stays on the floodplain

Kostas: This is something that might need to be played around with. Perhaps extend the cross section where flow is computed to surrounding flood plains.

Cedric: It is possible that RVIC might need some stations to be more appropriately snapped onto the river network (see Missouri at Hermann).

Colby: Yes, I might have made a mistake in the snapping process for this particular station.

Dai: additional comparison of channel and floodplain flow for three models (LISFLOOD, Cama-Flood, MGB) could be valuable.

Rodrigo: In MGB, linear reservoir is used prior to the routing in the floodplain.

Cedric: We might need to expand the explanation for the paper (without losing the reader with too many details)

Dai: We should perhaps check the sensitivity of discharge to model structure. CaMa-Flood uses a slightly different floodplain approach technique compared to MGB.

Kostas: Also of note is the 1-km resolution used in LISFLOOD which may impact results.

Rodrigo: We could consider showing the relative bias as well.

Cedric: Hydrographs legend! Need to change the legend based on the CSV header in the plots.

Ed: It's possible that HRR model results are spiky because I may have used an instantaneous value every day instead of the daily average. I need to check on that.

Sylvain: We might be seeing too much of the impact of dams in the hydrographs. Perhaps consider reaching out to USGS colleagues on the SWOT ST for recommendation of stations.

Cedric: That's a good idea. Are there USGS gauges with naturalized flow? My own search for gauges in the context of my 2015 WRR paper was already extensive, but focused on main stems contributing to the large Mississippi River, instead of smaller unmanaged streams.

Ed: The Ohio River gauges upstream of Metropolis are a good place for that. The River tends to behave well there. That's probably good enough for now. We're now looking at the outlet of the Ohio (at Metropolis), but there is a gauge upstream of where the Tennessee comes in where there is not much regulation on the Ohio and it's still a large enough basin

Dai: Also, we need to confirm that all models are using the same runoff inputs.

Cedric: Good suggestion. Let's talk about the paper in that context.

Cedric: You all have a rough draft of a manuscript. Introduction is missing, but model description is there (Section 2). Section 3 is the experimental design. Table with comparison of models and Table with Experimental Design. It would be helpful if all modelers helped refine these tables.

Rodrigo: We should add a line in table with state and output variables for each model.

Cedric: Great idea. Let's make this an action item. Need everybody to send variables for each model, as well as actual inputs used for these simulations. Also, we need one paragraph to explain how each team adapted the experimental design for their own simulation. And we might add a new Table 3 that summarizes that.

Cedric: What's the status on selecting a license for MGB?

Rodrigo: We're working on this, thanks for the reading material you sent.

Cedric: Some models ignored provided topography or used their own parameters entirely. That's fine, but we should be explicit in the paper. Maybe use new table with the inputs used by each model.

Cedric: So, what about our runoff issue? Who used what?

All: Kostas, Ed, Rodrigo, and Dai used the runoff files that had been put together by Dai and that used files from Noah instead of VIC. Cedric, Colby, and Aaron/Sylvain used outputs from VIC.

Cedric: Let's wait before we re-run simulations, and clarify the experimental design section in the paper.

Cedric: We'll also need to figure out authorship list reflecting the amount of work.

Sylvain: Before writing results section perhaps we need to agree on the overall message we'd like to convey to the reader.

Cedric: Absolutely! Also need to think about the science queastions.

Cedric: Who will make it to our AGU Happy Hour?

All: Everybody except from Rodrigo will be at AGU.

Action items

Change plot legends based on CSV header (Kostas).

Everybody sends state variables and output variables to add as a row in Table 1 (All, by Tue Nov 21).

Everybody writes a paragraph (150 words) about their adaptation of the experimental design for their simulations (All, by Tue Nov 21).

Provide feedback (tracked changes in Word, highlighted changes in Excel) on current manuscript draft and associated tables (All, by Tue Nov 21).

Combine all feedback and new material (Cedric, by Tue Dec 12)

Propose a draft for Table 3 (Cedric, by Tue Dec 12).