

Continental Scale hydro model inter-comparison for SWOT Teleconference summary 2016 10 03

by Cédric H. David

In attendance

Ed Beighley,
Rodrigo Paiva,
Ayan Santos Fleischmann,
Walter Collischonn,
Christine Lion,
Guy Schumann,
George Allen,
Dai Yamazaki,
Cedric David

Meeting minutes

Cedric: presented the website for the project <http://rapid-hub.org/intercomparison.html>

Ed: looks great!

Ed: presented the preliminary HRR simulations over the Mississippi. The hydrographic network was re-derived from the HydroSHEDS conditioned DEM with a 100 grid cells (of 15 arc-seconds each) threshold and matches perfectly with the HydroSHEDS vector network. At this scale some actual river channels are not included and this has an influence on the parameters to use in modeling. Channel and land surface roughness coefficients used differ from experimental design table. Width and discharge data from Andreadis et al. (2013). Mean slope from preconditioned DEM. Total basin area in Andreadis et al. differs from HydroSHEDS, but this may not be an issue since the dataset was calibrated to match observations and since we're not using the area from Andreadis et al. for simulations. Length and areas computed using North America Albers Equal Area Conic. Correlations and bias computed. Missouri Basin is an issue: model overestimates reality which is also tampered by reservoirs.

Dai: Cedric, please add link to processed runoff data on website.

Cedric: Ed, what time zone did you use?

Ed: I wasn't sure, so I ended up using Universal Time.

Cedric: it isn't clear what the best approach is.

Rodrigo: presented the preliminary MGB simulations over the Mississippi that was done along with Ayan Fleischmann and Walter Collischonn. Summarized the existing capabilities of MGB. The land surface processes were not used for this particular study, per the proposed experimental design. 16,000 catchments and associated river reaches

(average size 10 km) were derived from HydroSHEDS preconditioned DEM. This means that some of the HydroSHEDS river reaches are not currently simulated by MGB. There is more runoff in the east than the west of the Mississippi Basin. Runoff is predominantly surface to the west, and subsurface to the east. Bankful width and depth from Andreadis et al. (2013). Bed elevation from HydroSHEDS DEM minus the bankful depth. Roughness in rivers is 0.03. Surface and baseflow parameters determined using Kirpich formula using slope and length of major tributaries. Two types of equations used: Inertial model of Bates et al. (2010), and constant parameter Muskingum Cunge. With inertial equations, default widths and depths from Andreadis et al. lead to flat hydrographs and enhanced flooding mechanisms. However, using the 95 percentile values leads to more meaningful results. With Muskingum Cunge, the problem is less evident. Also tried different time constants for routing.

Guy: without flood defenses and reservoirs your inundation results are not bad, that's what you would expect naturally. Since it seems the group decided to go for a more "natural" simulation, i.e. no reservoirs, to make everyone's life easier as Cedric noted, I think for this particular test case we don't need to worry about this but I agree that it is a very important issue. So in brief, does well also for inundation.

Action items

Cedric: add link to Dai's preprocessed runoff data on experimental design table.

Cedric: next phone call ~ Monday November 07.

Dai: will present CaMa-Flood results.