

Biogeosciences Discuss., referee comment RC1
<https://doi.org/10.5194/bg-2021-273-RC1>, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on bg-2021-273

Anonymous Referee #1

Referee comment on "Modeling interactions between tides, storm surges, and river discharges in the Kapuas River delta" by Joko Sampurno et al., Biogeosciences Discuss., <https://doi.org/10.5194/bg-2021-273-RC1>, 2021

The manuscript describes the results of the numerical simulations of the Kapuas River's hydrodynamics and its interaction with the Karimata Strait Tides and wind surges based on SLIM model. Several extreme events scenarios were simulated assessing the consequences of the extreme water level along the Kapuas Kecil river. The main branch of the Kapuas River was differentiated into 3 regions based on the behavior of the maximum water levels (MXWL) along the stream. The manuscript addresses relevant questions and is characterized by a fluent language. The authors have done a large work in preparation of the setup and its validation. However, the analysis of the results is not always performed correctly (e.g., the differentiation into the zones is done based on only MXVL behavior in a setup with a full forcing, without accounting of the river bed area). Also, it can be significantly improved without too much additional work. Therefore, I would suggest a major revision, please, find the detailed comments below.

Page 2, 63: can better represent.

Page 5:

Tidal forcing: The source of the tidal signal at the open boundary is missing. How many harmonics did you use?

Wind forcing: The link/source to/of the observed wind velocity is missing. By the way, at which height are the wind data provided by ERA5 and meteorological station?

River forcing: Not clear when the observational data are available and for which rivers.

Please, clarify.

Setup: If it is possible, please, create a Table, where you describe all experiments (discharge rate, wind forcing).

Page 6, 165: What about P1 harmonic? It should be important for the area. Please, give some information about higher harmonics – MO3 and MK3, they would show how well your wetting/drying scheme is working.

Page 6, 180-189: Please, provide the coordinates of the stations.

Page 7, 195-206: I doubt very much about MXVL analysis and zones defining procedure, especially if we consider mixed energy region. Such behavior of MXWL may signalize about larger river bed area and not about tidal impact. You can, for example, find a difference between MXVL and mean level within the tidal cycle at each location. If this difference is small, it means that the behavior of MXVL can be largely explained by a variation in river bed area. Another strategy is to run experiment with only river forcing and then find a difference between MXVL levels in experiments with tidal and river forcing and with only river forcing.

Page 8, 253: 'we simulated it but did not show the result here' -> 'not shown'

Figure 5: DISCHARGE-> Discharge. The axis font size is too small. 'Note that the Kapuas discharge.' – I would remove this sentence from the caption.

Figure 7: The phases and amplitudes diverge larger from the observational data than they do at the river mouth. What do you think is major reason for that?

Tables A1, A2: The ->the, 'Mouth'->'mouth'. Please, add P1, MO3, MK3. Please, add coordinates of the stations.

Figure 8: I think should be re-drawn, see the comments above.

Figure 9: Honestly, I do not understand the dynamical processes behind such a variation in MXVL in first zone (0-4km) within different wind scenarios. It looks artificial. Can you give some explanation? I think it would be very helpful and also add a value to the paper,

if you include the maps for each wind scenario for the considered area. You can show the MXWL (within the tidal cycle) difference for the run with wind and tidal+river forcing and with only tidal+river forcing.

Figure 12: The axis font is hard to read, it is too small. Just a curiosity: what will be with the results, if you decrease 2 times h^* ?