Reviewer Response – nhess-2023-93

Reviewer 1

Thank you for taking the time to review our manuscript and providing extremely detailed and positive feedback. We have not made any direct changes based on your comments, but have made some changes based on the suggestions of Reviewer 2 (see below).

Reviewer 2

We would like to thank the reviewer for spending the time to review our article. The points raised were good, and we have subsequently addressed below.

1. Title and overall

The overall manuscript definitely focused on the update of a DEM part in an existing GFM from MERIT to FABDEM and evaluated its effect on flood simulation performance. "GFM" here is specific to LISFLOO-FP in this study. The title "the next generation of Global Flood Models" may make readers expect broader evolution. Rather, questionnaire survey data is a unique validation as the authors emphasized in the manuscript. I would suggest a more specific title like "Assessing LISFLOOD-FP with the next generation digital elevation model FABDEM using village and remote sensing data in the Central Highlands of Vietnam".

Response: Thank you for your suggestion. We like your title suggestion and have changed the title to like "Assessing LISFLOOD-FP with the next generation Digital Elevation Model FABDEM using household survey and remote sensing data in the Central Highlands of Vietnam"

2. L. 296

Fig. 6(a&b) should be Figs. 7-9 (a&b)? Figure 6 shows the CSI index for FABDEM and MERIT simulations.

Response: Thank you for catching this mistake. This has prompted us to reorder the Figures as the CSI Index Figure was introduced after the maps, but was numbered preceding.

3. L. 369 to 374

Smoother inundation and gradual increase of flood depth in the MERIT GFM is solely based on larger windows in bias removal employed in MERI, or lower spatial resolution also contributes to it?

Response: This is an interesting question and difficult to know for sure. The kernel sizes in pixel terms used in some MERIT bias removal processes were the same as FABDEM, but with the resolution difference the effective distance of the bias removal in FABDEM is smaller.

4. Fig. 6

How can the authors obtain "Village data" and "Remote sensing data" for return periods longer than the ever-largest flood in the past? This is the most important figure to (potentially) support the conclusion that the FABDEM GFM performs over the MERIT GFM; therefore, I strongly recommend to clarify technical processes to plot this figure.

Response: The return period on the x-axis is from the flood model. Thank you for pointing out this ambiguity. We have added this clarification to the Figure caption. Not Fig. 6 is now Fig. 9.

5. L. 377 and Fig. 6

At lower return periods, the FABDEM GFM performed better over the MERIT GFM at Buon Triet, but the opposite at Thon 3. How can the authors conclude that the FABDEM GFM is superior to the MERIT GFM in this figure.

Response: We conclude FABDEM is superior in this case because the performance of the model is higher for a particular magnitude of flood. At Thon 3 MERIT outperformed FABDEM at lower return periods, but this is because the flood extent is substantially less sensitive to flow magnitude in the MERIT model (mainly because of the smoothness of the DEM). Thus it's not a reason to conclude the DEM is more accurate or better from a flood modelling perspective. In our experience of using MERIT DEM in other contexts it's likely that MERIT would struggle not to overestimate a low magnitude flood at Thon 3 when we see such low sensitivity to flow magnitude. In Buon Triet, the tributary to the north of the village is represented by the resolution improvement in GFM FABDEM, and floods at a higher AEP (i.e. more frequent flood) than GFM MERIT.

Other

We have also added an additional reference on Line 185. The study uses FABDEM in a hydrodynamic model. Reference is:

Iqbal, A., Mondal, M.S., Veerbeek, W., Khan, M.S.A., Hakvoort, H., 2023. Effectiveness of UAV-based DTM and satellite-based DEMs for local-level flood modeling in Jamuna floodplain. Journal of Flood Risk Management.. https://doi.org/10.1111/jfr3.12937