# Comment on gmd-2022-259

Anonymous Referee #1

Referee comment on "LISFLOOD-FP 8.1: New GPU accelerated solvers for faster fluvial/pluvial flood simulations" by Mohammad Kazem Sharifian et al., Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2022-259-RC1, 2022

The manuscript titled "LISFLOOD-FP 8.1: New GPU accelerated solvers for faster fluvial/pluvial flood simulations" deals with the upgrade if the well-known LISFLOOD hydrodynamic simulator, using parallel programming and specifically the GPU capabilities in order to speed up the simulations. Except of the parallelization, the authors deomnstrate the use of a smart grid coarsening way, which also speeds up the simulations but with an accuracy sacrify. The paper is well written and well structured and characterized by novelties. I would suggest to be published after some minor technical corrections:

1) It is not consistent to compare all the numerical results (uniform, non-uniform 10^-3, non-uniform 10^-4) against the observed data. Since the non-uniform is an simplification of the uniform detailed grid, the latter should be the base of comparison and the observed values should be given as a supplementary material, not substantial for the core of the paper. The situation in which the non-uniform grid performs better than the uniform grid is rather a coincidence. I assume that the non-uniform grids introduce a kind of artificial diffusion, while similar results could be derived by the uniform grid with bigger values of Manning coefficients.

2) In L335-340 the authors state that a possible cause of the discrepancy between the modelled and the observed hydrograph is the low Reynolds numbers of the flow. However flow ranges between 20 and 100 m^3/s. With these values is impossible to have low Reynolds numbers in the channel. The authors probably mean the rainfall-driven overland flow in the catchment and not in the hydrographic network.

3) I really appreciate that the authors are not charatcerized by arrogancy and they give very rational conclusions avoiding global suggestions. However since the paper is mainly demonstrates new tools it might be better to give a more clear practice guidance for the modeller and how to handle every DTM resolution. A table with these suggestions might be good alternative which also highlights the main findings of the work.