Comment on nhess-2022-210

Guy J.-P. Schumann (Referee)

Referee comment on "Bare-earth DEM generation from ArcticDEM and its use in flood simulation" by Yinxue Liu et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2022-210-RC2, 2022

This paper is a comparison of the ArcticDEM vs LiDAR for urban flood simulation which uses Helsinki as an example case.

The paper is generally well written and follows a clear structure. The methodology used is sound and fairly straightforward. The results are well presented.

This type of analysis is quite timely as there are at present substantial efforts and initiatives under way to get better accuracy global DEM data sets and a DEM like the ArcticDEM may become available sson for global low-lying lands.

In my opinion this paper can be accepted for publication after some minor points are addressed:

- Please verify that referring to DigitalGlobe is correct or should it be Maxar?

- It seems to me that the vertical error of the bare earth ArcticDEM in the urban area is about 0.5 m and the simulated water depth RMSE is almost double. If this is correct, could the authors comment on this in the context of whether this type of water depth RMSE in urban areas is still acceptable?

- It would be useful I think if the authors could comment on the resolvability of individual buildings within the ArcticDEM - I imagine some kind of density measure should allow a comparison between LiDAR DSM and ArcticDEM DSM, the results of which could explain the significant differences in water depth RMSE obtained. Maybe some kind of DSM

surface roughness measure comparison.

- Could the authors comment on how transferable their presented method and error statistics would be to other urban use cases.