We sincerely thank the reviewers for their valuable comments and suggestions, which have significantly contributed to improving the manuscript. Below, we have reproduced the reviewers' comments in black font, followed by our responses in **blue font**.

Reviewer 1

Thank you for incorporating the review remarks. Especially for changing the abstract and the title. It is much clearer now.

Some minor/technical points
Abstract: ICESat: there are now two sentences with similar content, p. 1 l. 19-21. Please unify these.

We agree and have revised it on line 19 to 20.

p.13 l. 272: not valid for ATL03 any more: in "… this study are ATL03 and ATL08" used. A separate table like Table 3 is therefore also unnecessary.

Table 3 summarizes the ICESat-2 products, including data collection periods and reference datums, and therefore should not be removed.

p. 15 l. 305: depicted in ->accessible at

We agree and have revised it on line 283.

Revise of Sec. 5.3:
Section 5.3 is still very technical/repetitive and therefore difficult to understand in its message. Exemplarily:
p.38 l.656f: However, the Model flood map effectively detects the GISTDA flood map as well. -> choice of word: The meaning of "detect" is not clear to me. Do you mean that the model map "represents well" the GISTDA flood map ? (please scan Sec. 5.2 by this wording.)

We agree and have revised from detect to corresponds well in Section 5.3

p. 38 l.657f. : not clear how you can conclude this from the measures "that the Model flood map exhibits improved accuracy in comparison to the GISTDA flood map." -> Do you have a better flood map or other experiences?

In this research, we used high-resolution flood maps from the WorldWater project (up to 10 m), as well as multi-source satellite-derived flood maps from GISTDA. These flood maps

Figures should be in portrait format. Please turn all Figures in the manuscript into this format. It was fine.

Reviewer 2

General Comments
This paper, entitled "Enhancing the Performance of 1D-2D Flood Models Using Satellite Laser Altimetry and Multi-Mission Surface Water Extent Maps from Earth Observation (EO) Data" by Theerapol Charoensuk, discusses how to improve 1D-2D flood modeling accuracy by validating DEMs with ICESat-2 data and comparing model-predicted inundations against satellite-derived flood extent maps. The paper has clear methodological steps and demonstrates practical value by comparing modelled flood extents with satellite-derived inundation data. The attempt to incorporate ICESat-2 for DEM validation and to benchmark flood maps is timely and relevant. The manuscript would benefit from further discussion on the surprising result that a globally derived FABDEM (with coarser nominal resolution) seems to outperform the locally acquired LiDAR DEM product in certain respects.

In addition, the choice of the acronym "SWE" for surface water extent may cause confusion with the more commonly known usage, "snow water equivalent." With a more detailed discussion of how and why the global FABDEM can outperform an apparently high-resolution local DEM, plus a reconsideration of the acronym used for flood inundation layers, the manuscript will be substantially clearer. The two major issues are as follows.

(1) Discussion of Why a Global DEM (FABDEM) Outperforms a More Detailed Local DEM
A core finding in your study is that the coarser-resolution FABDEM outperforms—or at least equals—the merged LDD-JICA DEM (derived in part from airborne LiDAR) for certain evaluation metrics. This is somewhat counterintuitive, given that airborne LiDAR typically achieves very high resolution and accuracy. Readers will want a deeper explanation as to why this may have occurred. Potential factors include:
• ICESat-2 Footprint and Sampling: If the ICESat-2 ATL08 data used for validation has footprints or sampling intervals that favor broader-scale features, a coarser DEM may align

better with the reference data.

• Local DEM Data Quality: Airborne LiDAR can theoretically be very precise, but if data collection or processing was suboptimal, it could introduce errors. Factors like incomplete vegetation filtering, outdated surveys, or vertical datum mismatches might degrade its performance.

It would be beneficial to elaborate on each of these points to clarify whether you attribute FABDEM's advantage mainly to differences in how building and vegetation heights were removed, to possible systematic bias in the local DEM, or to the nature of the ICESat-2 validation approach itself. Additionally, highlight any limitations in your current processing steps that may have contributed to this unexpected outcome.

We agree and have revised it in Section 6.1 line 650 - 665

(2) "SWE" Acronym for Surface Water Extent
In many hydrologic and cryosphere studies, SWE commonly stands for "Snow Water Equivalent." Using the same acronym to denote "Surface Water Extent" could confuse readers. It might be preferable to adopt an alternative abbreviation such as IE (Inundation Extent), WSE (Water Surface Extent), or another unambiguous term.

Although you clearly define "SWE" in the text as surface water extent, using a more standard term for inundation areas would improve clarity. Please consider replacing the acronym throughout the manuscript and figures with a term that would not conflict with "snow water equivalent."

Thank you for your suggestion. We understand the potential for confusion between the acronym "SWE" (Surface Water Extent) and "Snow Water Equivalent." However, in this manuscript, SWE is consistently defined as Surface Water Extent, and it is also clearly distinguished from WSE (Water Surface Elevation). As this definition is consistently used throughout the manuscript and figures, we prefer to retain the term "SWE" for clarity within the context of our research.