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.

1. The author must constructively change the abstract in terms of adding error analysis values in terms of **PBIAS** to the result. The Author needs to write consistently.

In the abstract, we present the DEM analysis using root mean square error (RMSE) and will revise it to include the PBIAS results. Additionally, we will incorporate the PBIAS equation into Section 4.1.3, Evaluation of DEMs using the ICESat-2 ATL08 Benchmark, and add the PBIAS results to Table 6, which summarizes the statistical metrics comparing 10 DEM products against the ICESat-2 benchmark.

$$PBIAS = 100\ x \left[\frac{\sum_{i=1}^{n} (Y_i - \hat{Y}_i)}{\sum_{i-1}^{n} \hat{Y}_i} \right]$$

Where $\hat{Y}i$ represents ICESat-2 ATL08 elevation, Yi denotes the elevation for each DEM (i.e., LDD DEM, JICA, merged LDD-JICA DEM, ASTEM GDEM V3, SRTM DEM, MERIT DEM, FABDEM v1-2 DEM, GLO30 DEM, TanDEM-X, and TanDEM-EDEM), and n is the number of observations.

The ideal value of PBIAS is 0: positive values indicate that the DEM products are biased toward overestimating compared to the ICESat-2 ATL08 benchmark, while negative values indicate a bias toward underestimation.

Table 6: Table of statistical metrics, comparing 10 DEM products against the ICESat-2 benchmark. The resulting averages are computed across the datasets in study area.

DEM product	Statistical method				
	ME (m.)	MAE (m.)	MSE (m.)	RMSE (m.)	PBIAS (-)
LDD	-1.3	1.64	5.45	2.33	-34.76
JICA	-0.65	1.04	3.51	1.87	-17.00
merged LDD-JICA	-0.68	1.08	3.74	1.93	-15.38
ASTER	4.77	5.57	44.28	6.65	47.71
SRTM	2.04	2.58	12.92	3.59	27.99
MERIT	1.56	1.79	6.76	2.6	22.99
GlO30	0.84	1.3	5.89	2.43	13.87
FABDEMv1-2	0.25	0.8	3.79	1.95	4.59
TanDEM-X	0.94	1.73	13.29	3.65	15.24
TanDEM-EDEM	0.91	1.43	7.74	2.78	14.84

2. The author must mention where they got data and the frequency of data. Statistical analysis of data must be given in Tabular format (Like Table no 1, 10.1061/(ASCE)IR.1943-4774.0001689).

Regarding the reference from Table 1 (10.1061/(ASCE)IR.1943-4774.0001689), it provides statistics on runoff data.

Table 1. Descriptive statistics of runoff data for 0° slope

Statistical parameters	Training set (252)	Testing set (108)	Total data set (360)
	Rainfall intensity 1 L/min		
Min	0.01	0.03	0.01
Max	1.07	1.07	1.07
Mean	0.511	0.593	0.536
Kurtosis	−0.763	−0.874	−0.842
Skewness	0.211	−0.090	0.127
SD	0.283	0.297	0.289

However, this paper focuses on DEM products and the impact of the DEM on hydraulic modeling, as explained in Table 2. We will include a detailed statistical analysis of the DEM products, which will be added in the appendix, as shown in the table below.

DEM product	Statistical Parameters				
	Min	Max	Mean	Standard Deviation	Median
ICESat-2 ATL08	-7.00	218.42	5.29	6.81	2.49
LDD	-9.41	254.27	4.34	7.75	1.51
JICA	-22.97	239.31	4.20	5.48	1.95
merged LDD-JICA	-16.00	378.73	5.21	8.26	1.87
ASTER	-2.00	267.93	6.23	8.23	2.85
SRTM	-34.97	262.17	8.02	8.47	5.25
MERIT	-1.29	257.32	7.53	8.17	4.34
GlO30	-15.93	271.15	6.87	8.30	4.15
FABDEMv1-2	-14.99	267.93	6.22	8.23	2.85
TanDEM-X	-7.00	274.93	7.06	8.48	4.24
TanDEM-EDEM	-36.91	271.26	6.93	8.35	4.13

3. Fig 2: it should be clearly described in terms of scientific manner.

We will revise and incorporate this description into the manuscript, as illustrated in the figure below:

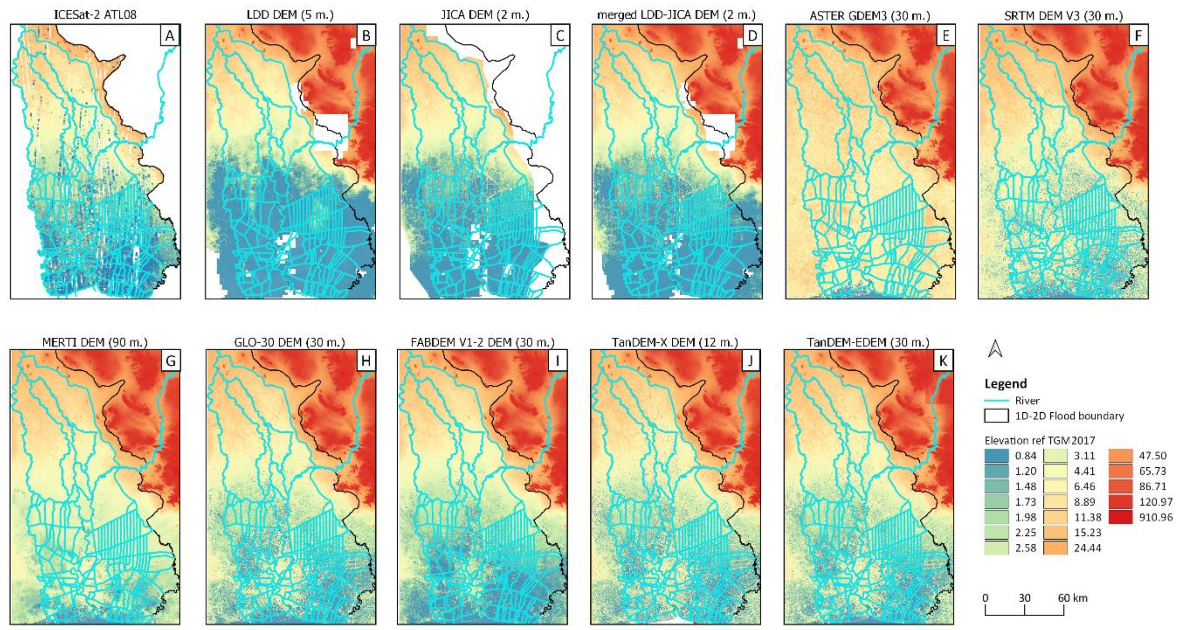


Figure 2: ICESat-2 ATL08 and DEM products, including: A) ICESat-2 ATL08 surface elevation, B) Land Development Department (LDD) DEM, C) JICA DEM, D) Merged LDD.JICA DEM, E) ASTER GDEM Version 3, F) SRTM DEM Version 3, G) MERIT DEM, H) GLO-30 DEM, I) FABDEM v1.2 DEM, J) TanDEM-X DEM, and K) TanDEM-EDM.

4. For better understanding, Please add more recent literature (2024) regarding the bidirectional flood models using satellite laser altimetry.

Although recent literature from 2024 is limited, we will revise the manuscript to include references from Nandam and Patel, 2024, which evaluated the suitability of global DEMs for hydrodynamic modeling in data-scarce regions using satellite laser altimetry, and Frias et al., 2024, which enhanced the accuracy of 2D hydraulic models through DEM correction using machine learning and satellite laser altimetry. These studies will be cited in the introduction.

5. Please modify the objective section for a clear understanding, i.e., the novelty part should be mentioned.

We will revise the manuscript. We believe that our paper has two novel aspects: (1) Comprehensive DEM evaluation against ICESat-2 benchmark for the Thailand domain. (2) Systematic comparison of simulated 2D inundation patterns with inundation patterns derived from satellite EO flooding patterns.

6. There are so many techniques in the recent world for the flood model; why does the author use a specified Method for research purposes? Is there any specific reason for this?

Currently, numerous techniques exist to enhance the performance of 1D-2D flood models. However, the accuracy of simulated floods heavily depends on the quality of the DEM data, making it essential to validate DEMs before use. Land use is constantly changing, and surveying DEMs is both time-consuming and expensive. Global DEM products offer a viable alternative, as they are often freely available and up-to-date, but they still require validation prior to implementation. ICESat-2, which continues to operate and measure surface elevation, provides valuable data for validating DEMs.

Riverine classification based on surface water extent (SWE) from satellite data remains a significant challenge with limited literature available. In this study, we applied new techniques to address the issue.

7. The author must add statistical components/parameters of collected data in the case study section.

As explained in response to Question 2, we will include this information in the appendix.

8. Eq 3-6; please add a recent citation for reference purposes. [Read this paper: 10.1016/j.gsd.2024.101178, 10.1016/j.clwat.2024.100003, 10.1016/j.hydres.2024.04.006, 10.1007/978-981-15-5397-4_75, 10.1038/s41598-024-63490-1, 10.2166/wcc.2021.221]

References in the equations will be added.

9. A comparison statement (compare with other research articles) must be added in the result and discussion section to visualize the proposed research better.

We will revise the manuscript accordingly; however, the discussion and comparison with other research articles are already addressed in Section 6.1, Overall Results of DEM Analysis Workflow, where the results are compared with findings from other studies

10. The author must add future scope in the last portion of the manuscript.

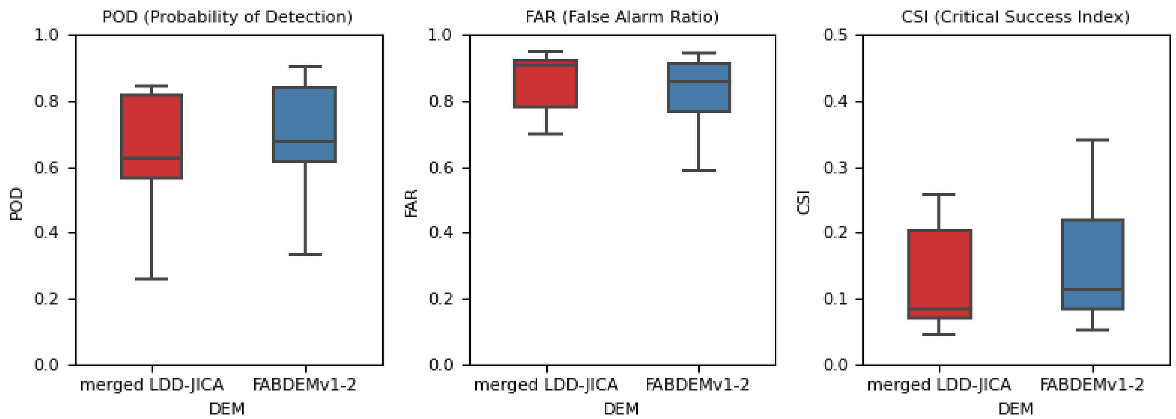
We will include a new section, Future Applications, in the manuscript to explore potential advancements and areas for further research.

11. The advantages and limitations of the proposed model must be added.

We will revise the manuscript, particularly the Discussion section, to thoroughly address both the advantages and limitations of the study.

12. For better analysis of the result, the author must add a Box plot, Taylor diagram, and ROC Curve

We will revise the manuscript add box plot in section 5.3 Results of the evaluation of flood inundation maps, as illustrated in the figure below:



13. The author must provide a flow chart and parameter table of proposed individual models.

We have explained the overall workflow in the manuscript, as shown in Figure 4, and we will revise it to enhance clarity and ensure it better aligns with the workflow process.

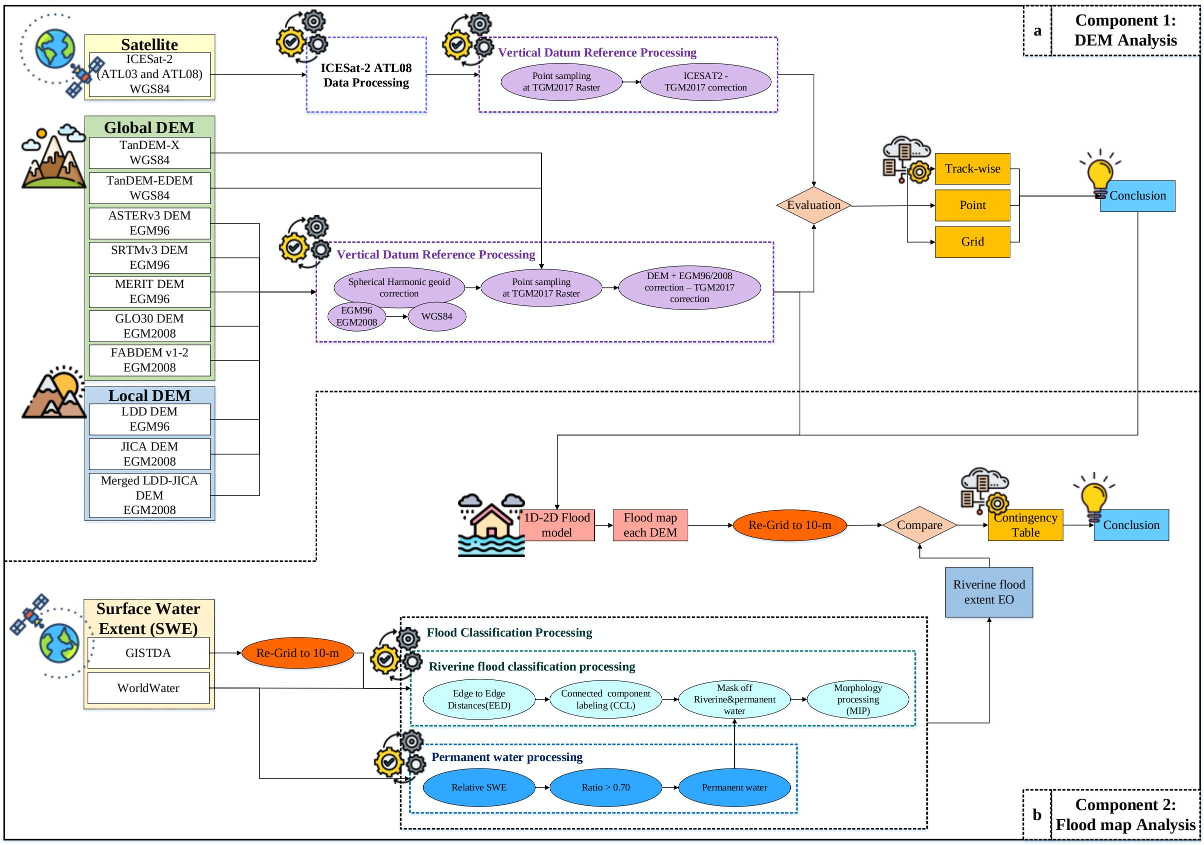


Figure 4: Overall Methodology: (a) Component 1: DEM Analysis – Involves processing ICESat-2 ATL08 data, applying vertical datum referencing, and evaluating DEMs against the ICESat-2 ATL08 benchmark through point, grid, and track-wise comparisons. (b) Component 2: Flood Map Analysis – Includes setting up the 1D-2D flood model, performing flood classification, and evaluating flood maps using appropriate methods.

14. The author considered different input constraints; is there any scientific reason for the same

For the DEM analysis, we selected a range of DEM products based on their resolution and data acquisition methods to identify the most suitable for the study area. The reasoning behind this is that DEM accuracy plays a crucial role in flood modeling, as elevation data influences water flow simulations and flood inundation predictions. We chose two DEMs for in-depth analysis: one from a local DEM survey conducted by a Thai agency, providing region-specific accuracy, and a global DEM derived from satellite data, offering broader coverage. By evaluating the flood maps generated from these different DEM sources, we aimed to determine which DEM provided the most reliable and accurate representation of the terrain and flood patterns in the study area, thus ensuring that the hydrodynamic models produced the most realistic flood inundation simulations.

Reference

Frias, M.C., Liu, S., Mo, X., Druce, D., Yamazaki, D., Folkmann, A., Nielsen, K., Bauer-gottwein, P., 2024. Improving 2D hydraulic modeling in floodplain areas with ICESat-2 data : A case study in Upstream Yellow River. EGU General Assembly 2024, Vienna, Austria, 14–19 Apr 2024, EGU24-14669, pp. 24–25. doi:https://doi.org/10.5194/egusphere-egu24-14669

Nandam, V., Patel, P.L., 2024. A framework to assess suitability of global digital elevation models for hydrodynamic modelling in data scarce regions. J. Hydrol. 630, 130654. doi:10.1016/j.jhydrol.2024.130654