Response to reviewer2

Suggestion:

The Results (Section 4) feel relatively weak as currently written. Although there are seven subsections, each one is only a short paragraph paired with a single figure or table. In particular, Tables 3–4 are not very informative because they just report mean metric values. Are there any additional details/information you'd like to share with the research community? To strengthen this section, please consider adding more analysis for the community. Also, it may help to look at recent, closely related papers and how they structure and deepen their Results section (more stratified evaluation, diagnostic plots, and interpretation rather than only summary averages).

Reply: Thank you for your constructive suggestion. A more detailed statistical analysis of the evaluation metrics has been added in Sections 4.6 and 4.7. Please see line 403-446.

Minor comments:

1. Section 2.1, "Figure 1. The study area. ⋯(a) the location of the study area⋯.", too wordy, please change to "Figure 1. (a) Location of the study area, outlined by the pink polygon. Satellite imagery is from Google Maps (c Google). (b) High-resolution digital elevation model (DEM) with building footprints and drainage pipelines, and three water-level monitoring stations.

    Reply: Thank you for your comments. The caption has been revised according the suggestion.

2. Section 2.2.1, how did you verify all data quality? Please provide more information.

    Reply: Thank you for your comment. All data used in this study were provided by relevant departments in Macau and they have verified the accuracy and reliability of the data. The DEM and building distribution information were verified through satellite imagery comparisons. In areas where satellite imagery was unclear, field surveys were conducted to verify the data.

3. Section 3.2, add references.

    Reply: Thank you for your comments. The references have been added. Please see line 154-164

4. The equations need to be centered.

    Reply: Thank you for your comment. In the HESS template, the default style for equation blocks is left-aligned. However, we will modify the equations to center-align them if needed, while ensuring that the formatting adheres to the provided template guidelines.

5. Line 185, add space between "sequential data" and reference citations.

    Reply: Thank you for your comment. The space between "sequential data" and the reference citations has been added as suggested.

6. Line195, "Where" should be "where", always be in lowercase in the explanation after equations. Section 3.1 title, physics, change to Physics

    Reply: Thank you for your comment. The changes have been made: "Where" has been corrected to "where" in lowercase, and the title in Section 3.1 has been updated to "Physics" with the proper capitalization.

7. Section 3.2.3, table 1: table's caption should be located above the table. The caption is written in an uncommonly used way, normally we don't say this table lists···. , which is used in the main text. For table 1, you can just say "Table 1. Definition and Description of Static Input Features which is related to terrain and drainage network characteristics." For table captions, please avoid "This table···" and write a standalone descriptive caption.

   Reply: Thank you for your comment. The table caption has been adjusted and is now placed above the table as recommended.

8. Section 3.3.2, add references for evaluation metrics, in Table 2, RMSE and MAE should have units. Also, I would recommend just a brief explanation of these range and best values in text rather than in a table.

   Reply: Thank you for your comment. References for the evaluation metrics have been added , and following your recommendation, we have moved the brief explanation of the metric ranges and best values to the main text instead of presenting them in the table.

9. Section 4.1, Figure 7, Figure captions should be standalone, i.e., descriptive enough to be understood without having to refer to the main text. Effective captions typically include the following elements: 1) a declarative title that summarizes the result or major finding of the data you are presenting in the figure; 2) a brief description of the methods necessary to understand the figure without having to refer to the main text; 3) statistical information. Instead of saying "Figure 7. Variation of performance metrics with tile size. This figure shows how different tile sizes (50 × 50 to 300 × 300 grid cells) affect model performance, with optimal results observed at a tile size of 100 × 100 grid cells, balancing accuracy and minimizing edge effects." I would recommend: "Figure 7. Sensitivity of model performance to tile size (50–300 m), with best overall scores at 100 m NSE (left), RMSE (middle), and MAE (right) are shown as a function of tile size. Each black marker corresponds to one model run for a given tile size evaluated on the same dataset. Higher NSE and lower RMSE/MAE indicate better performance." Please use the caption rule to revise all captions of figures and tables in the manuscript. Should not start with phrases like "this figure shows/illustrates/displays/demonstrates/compares···" in caption.

   Reply: Thank you for your comment. The caption of Figure 7 has been revised according to the recommended format to ensure it is fully standalone and descriptive. In addition, all figure and table captions throughout the manuscript have been carefully reviewed and updated following the caption rules, avoiding expressions such as "this figure shows/illustrates/displays/demonstrates/compares."

10. Section 4.3, Lines 348-350, The sentences starting with "The top row illustrates the spatial distribution···"Across the study area···" repeat what's already stated in the caption of Figure 9. I'd remove them from the main text.

    More generally, please scan the entire manuscript for other places where figure/table captions and the main text duplicate the same descriptive content.

    Reply: Thank you for your comment. The repeat sentences have been removed from the main text as suggested.

11. Section 6 "conclusions", should be "Conclusions". Also, consider adding 1–3 sentences at the end that briefly summarize (i) how generalizable the findings are, (ii) key limitations, and (iii) the recommended future research directions. Add units for MAE and RMSE values.

    Reply: Thank you for your comment. The units have been added. The limitations and

future research directions are discussed in the Discussion section. In accordance with the reviewer's suggestion, a brief statement on the generalizability of the findings has been added to the Conclusion as follows: Overall, the results indicate that the proposed framework effectively simulates urban inundation dynamics. The modeling strategy, which integrates spatiotemporal feature learning with a tiling-based training scheme, provides a practical solution for large-scale urban flood analysis under heterogeneous surface conditions.

12. References: please check the reference list carefully for consistency (e.g., some entries include full DOI links while others do not). Also, for dataset references, please include the access date (and version, if available) to improve traceability.

Reply: Thank you for your comment. The DOI links have been revised. And the data references have been indicated.

13. Since this paper proposes a deep learning model, please consider providing the training code and the data or data access instructions to improve transparency and reproducibility.

Reply: Thank you for your comment. The code has been uploaded to GitHub and is available at https://github.com/lwq777/coupled-CNN-and-ConvLSTM. Due to the large size of the dataset, it cannot be uploaded. If needed, please contact the corresponding author.