We sincerely thank Referee #1 for his/her careful review and constructive feedback and suggestions. We truly believe that the changes suggested by Referee #1 will enhance the quality of the manuscript. A point-by-point response is presented below.

1. what is the innovation of this paper?

Thanks for your comments, this paper focused on simulating the whole flooding evolution process of a serious levee breach-induced compound flooding by using a 2D hydro-inundation model. On the basis of the historical flooding event, this work revealed the compound effects of levee breach-induced fluvial flooding and heavy rain.

The main innovative aspects are

- It's the first time to investigate the dynamic compound flooding process and mechanism of heavy rain and levee breach-induced flooding.

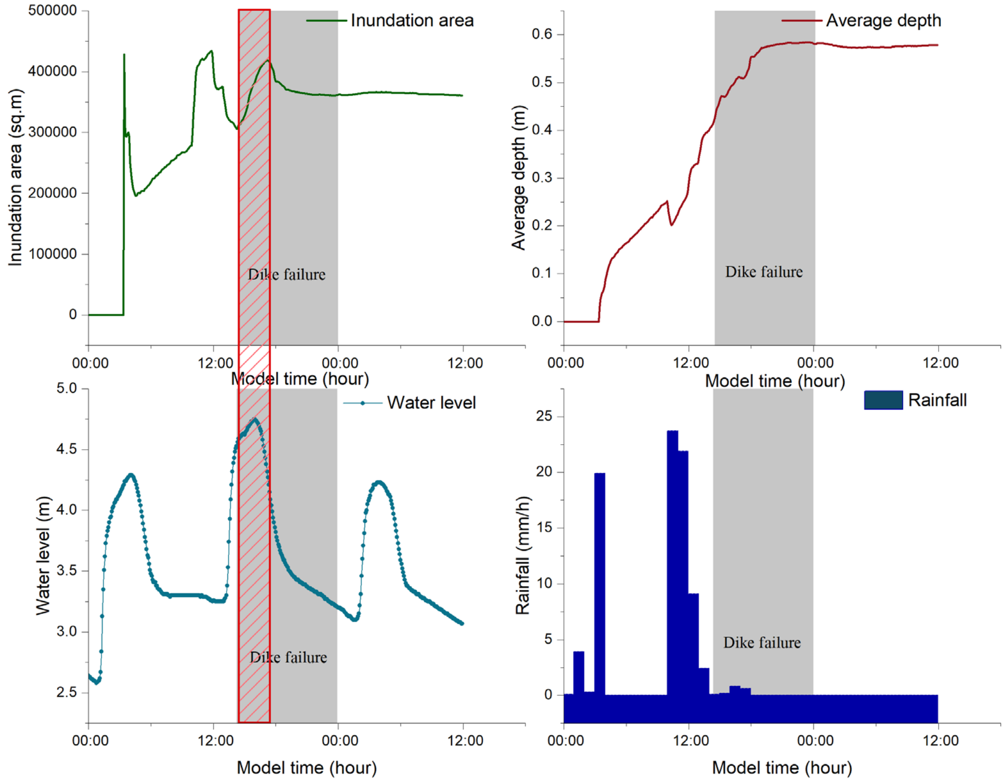
- Real-life cases of historical flooding events have been adequately investigated which can demonstrate the feasibility and robustness of the model.

2. It was mentioned that the critical time to minimize damage (should further take actions) is the first a few hours after levee breach; however, readers would perhaps anticipate this conclusion before reading this article.

Thanks for noting this. We obtained this conclusion from the simulating time-series of spreading flooding scenario, and from the figure below, we can find that the inundation area and the water depth continue to increase rapidly in the early 1-3 h after levee breaching, chiefly because of the water level increasing at the same time, however, during the falling tide period, the flooding diffusion tend to be slow.

We have added this discussion in **Abstract** and **Conclusion** as below:

"Second, within 1-3 h after the dike failure, the floodwaters spread rapidly, and the inundation area and average water depth reached the peak value; chiefly because of the water level increasing at the same time, however, during the falling tide period, the flooding diffusion tend to be slow. Thus, this is the key period for repairing the levee."



3. In addition, I'm not fully convinced by one of conclusion, which concludes that the model is strongly sensitive to roughness value, maybe it should further explain that why the flood extent not consistently increases with the increasing of the roughness value after levee breach (compares to the flood extent before levee breach)

Thanks for your suggestion, the sensitivity analysis result statement are inaccurate and we have revised the description and added the further explain in **Results** as below:

"Interestingly, there were differences in the sensitivity to the roughness before and after the levee breach for the flood inundation extent. The inundation area increased obviously as the roughness increased during the rainstorm, however, it is decreased slightly with an increase in the n value during the levee breach when the river flooding was the main force. The main reason which causing the sensitivity differences is the unlike formation mechanism of inundation extent between rainstorm and fluvial flooding."

Minor comments:

4. I feel parts of the introduction is concatenated with literatures (e.g. line 68 to 86), it would be nice to summarize the findings rather than simply list the findings one after another.

Thank you very much for your suggestion, the Introduction has been changed as below:

A number of approaches for levee breach-induced flood modeling were developed. Some previous studies have investigated the breach mechanism and the hydrological process of dike failure flooding, Vorogushyn (2010) proposed an Inundation Hazard Assessment Model (IHAM), which coupled a 1D hydrodynamic model of river channel routing, a probabilistic dike breach model, and a 2D raster-based inundation model. Cannata et al. (2011) used a GIS-based approach to simplify a 2D dam break simulation. Recent advances have been made in the application of methodologies for predicting the dike failure -induced flooding, Yin et al. (2020) predicted dike failures and flood inundations in Shanghai, China, under various emission scenarios using an interdisciplinary process-based approach.

Similarly, numerous studies analyzed the compound effects of various flood hazards at different scales (Ganguli et al., 2020). Most previous study focus on calculating the joint flood risk probability. For instance, Lian et al (2013) evaluated the joint probability of rainfall and tidal level both exceeding their threshold values through the copula and then analysis the combined effect of them on flood risk in a complex river network in a coastal city in China. Moftakhari et al (2017) proposed a bivariate flood hazard assessment approach to account for compound flooding from river flow and coastal water level. Bevacqua et al (2019) predicted the increasing probability of compound flooding from precipitation and storm surges in Europe under anthropogenic climate change. At a global scale, Couasnon (2020) and Eilander (2020) explored the compound flood potential resulting from storm surges and riverine floods.

5. Line 25-26: 'In low-elevation areas, temporary drainage measures and flood defenses are equally important'. This has neither studied and nor proved in the paper.

Thank you very much for your comment, we have added explanation in discussion as below:

"However, the water does not drain rapidly only by infiltration or evaporation especially in low-elevation areas such as farmland, some waterlogging even lasted for more than 12 h (Figure 4), resulting in loss of farmland with high vulnerability. Therefore, in addition to repairing the levee, it is necessary to remove the flood water in time using drainage measures, such as water pumps."

6. Line 66: what is the economic damage in this area?

Thanks for your comments, sorry, we cannot find any official reports of the economic damage of this flooding events, and from the field investigation we knew that the government did not assess the property losses of local residents.

7. How does the model control the levee height during the breaching process in section 2.3?

Thanks for your comments, we first overlay the remaining intact levee height onto the original bare-earth DEM (remove the 15m levee breach), due to the model cannot change the topography boundary during the running time, so we control the levee height by changing the relative water level, namely before the levee breach, the relative water level is 0 because of there was no flooding, while during the levee breaching period, the relative water level is the historical river water level, so that the flood spread from the breach section.

8. Line 184: what does 'remaining' mean? Does it mean the height of floodwall was decreased to 4.9-5m?

Thanks for your comments, the 'remaining' means the remaining intact floodwall without the breach section, and the levee height was about 5 m above Wusong Datum.

We have added the description in section 2.3 in more detail:

"The leveel height and location were obtained from the Shanghai Municipal Institute of Surveying and Mapping. The height of remaining intact floodwall without the breach section (about 5 m above Wusong Datum) were then overlaid onto the original bare-earth DEM using the raster calculator in ArcGIS 10.6 software."

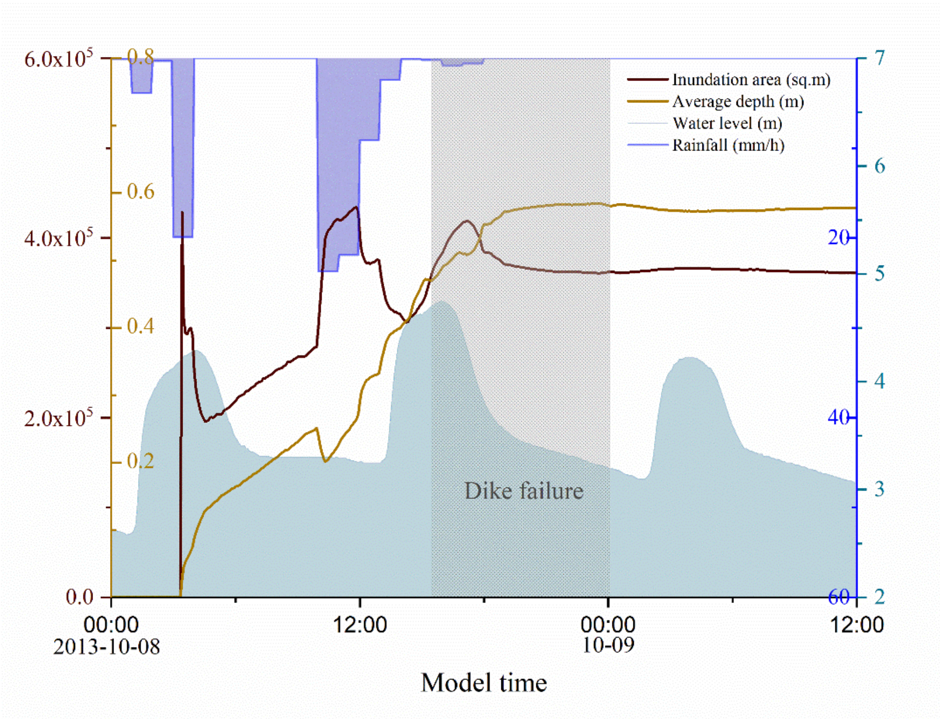
9. Line 269: the assumed evapotranspiration value is based on what?

Thanks for your comments, and we have added description about evapotranspiration value

"we assumed evapotranspiration of 3 mm/day, a value that which generates a good inundation prediction in the urbanized area (Yin et al., 2016; Yu and Coulthard, 2015)."

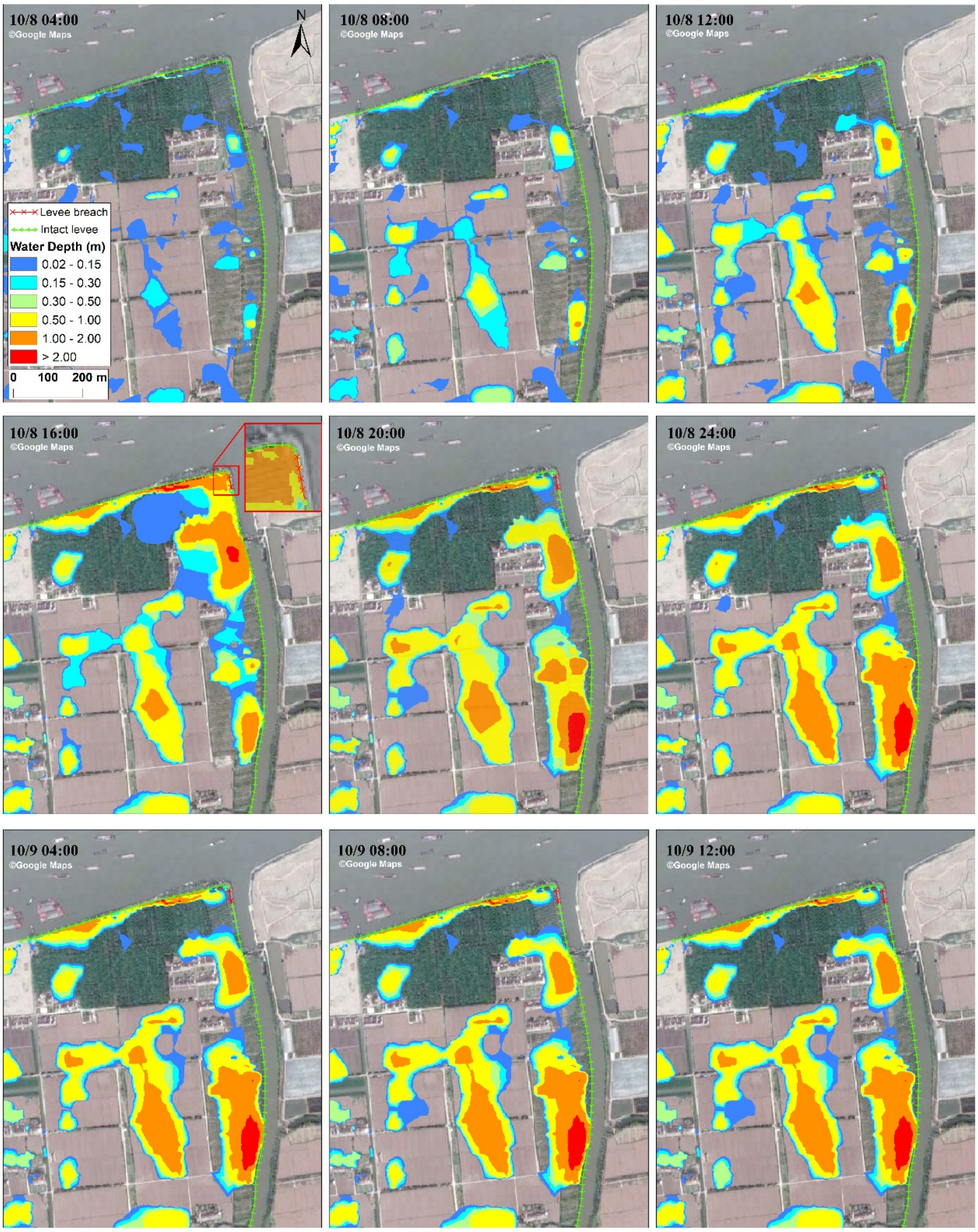
10. it would be better to combine figure 2 and 5, which can clearly show the inundation process due to rainfall and sustained high water level in the river.

Thanks for your suggestion, the figure 5 have been changed as below:



11. Line 321: maybe it's better to show the breach location or highlight waterfront area in Figure 4.

Thanks for your suggestion, we have added the breach location in figure 4:



12. Line 348: decreased from 0.6 to 0.55?

Thanks for noting this. It has been corrected.

13. In Figure 3, it seems that these six points are building locations, how about the roadway and farmland? This is not consistent to the text line 367-369.

Thanks for your suggestion, in Figure 3, we choose some representative sample of flood locations, and the water depth marks of these points are relatively clear. However, the water depth records of roads or farmland were all from investigates' dictation and lots of these locations were repaired after that event, so we didn't take too many reliable pictures.