This paper analyzes two methods for the generation of future flood hazard maps under climate change, along with a number of related issues. Even though the work focuses on a global-scale application of the CamaFLood model, the outcomes are relevant from a general point of view, given the importance of the topic. Overall the paper is well structured and generally well written, although some descriptions could be improved (see my comments). The analyses carried out are appropriate and well described. I think that the paper could be published after addressing a few minor issues that I am listing below.

Reply: We would like to thank the referee for his kind remarks. We will address all the comments in the revised manuscript, and comprehensive explanations are provided below.

L25: "...changes in flood risk..." I would correct in "changes in flood hazard"

Reply: As you pointed out, because we use flood risk incorrectly in the sentence, so we will revise it from risk to hazard.

“On the other hand, we confirmed that the lookup method can produce future-hazard maps that are consistent with the changes in flood hazard projected by CaMa-Flood simulations with input of GCMs runoff, indicating the possibility of obtaining reasonable inundation-area distribution.”

L29 "we discuss future changes at global scale..."

Reply: We will revise the sentence as referee #2 suggested.
L49-50: "To elucidate the potential impacts of flood disasters, a high-resolution map of potential disaster impacts must be developed, commonly named a hazard map." This is not fully correct. In flood risk literature, hazard is a component of risk but it is not a synonym of disaster impact (see for instance Ward et al, 2020). Perhaps you could replace with "To elucidate the potential impacts of flood disasters, high-resolution maps of disaster impacts must be developed."

Reply: In order to make an appropriate sentence that leads to the commonly named a hazard map, we will revise the sentence as referee #2 suggested. We will use the term "high-resolution inundation-depth maps"

L70-72 "Uses of large-domain flood-hazard maps include estimation of the affected population within an inundation area and determination of the impacts of flooding on GDP and urban areas in the current climate". This sentence should be reworded. In literature, the maps including impacts such as population and/or urban areas exposed are generally called flood risk maps

As you pointed out, the sentence was not clear and was not stated correctly, so we will revise as follows to clarify the meaning of "Large-domain flood-hazard maps were used for many purposes such as estimation of risks.” Specifically, we will revise it as follows.

“Large-domain flood-hazard maps was used for many purposes such as estimation of the affected population within an inundation area and determination of the impacts of flooding on GDP and urban areas in the current climate (Ward et al., 2020a).”

L72-74: Bernhofen et al (2018) compared six global flood models against satellite-derived flood maps, so adding a reference here would be appropriate in my view.
Reply: We agree with your point. We will add Bernhofen et al (2018) to the sentence as referee #2 suggested.

L80-81 this sentence should be modified, because several flood risk assessments have been carried out at scales from global to local

Reply: We will revise the sentence as follows. We will clarify that in this paper we described a global study. Also, we will clarify that flood risk has been studied, but flood hazard itself has not been sufficiently verified.

“While assessment of climatic and meteorological hazard under climate change (e.g. extreme temperatures, droughts and heavy-rainfall events) has been widely performed using direct output variables of general circulation models (GCMs), such as precipitation and temperature (Li et al., 2021, Lu et al., 2019), at present, no global high-resolution flood hazard (i.e. inundation depth) in a future has been sufficiently verified. Even though some studies assessed future flood risks (e.g. affected population and GDP) at the global scale (Ward et al., 2020b), it is important to analyze global future flood-hazard (i.e., inundation depth distributions), and also important to assess uncertainties such as those caused by different bias corrections.”

L147-154: I think that the description of the post-processing method needs more detailing. In particular I have some questions:

- My understanding is that the authors fitted a Gumbel distribution on each pixel of the Camaflood 6-arcmin grid, correct? Or do you use different areas for the fitting?

Reply: We will revise the sentence as follows to clarify that fitting a Gumbel distribution on each pixel of the Camaflood 6-arcmin grid.

“We fitted a Gumbel distribution on each of the Camaflood 6-arcmin grid.”
In lines 155-162 you state that water surface elevation is uniform within each 6-min unit catchment, so I assume that water level in upstream catchment are increased to the same water level of downstream catchment, right? If yes, please specify this in the text.

Reply: Referee #2’s understanding is correct. As referee #2 suggested that, we will revise the sentence as follows.

“To avoid this issue, if a reverse water slope was obtained in the water surface elevation distribution, we elevated the water surface elevation of upstream catchments to match those of downstream catchments.”

Can you also explain why this approach was not needed in previous studies based on CamaFlood?

Reply: We thank referee #2 for question. We would say the risk estimate of the previous studies could be improved by applying this reversal-slope modification approach. As described in the introduction, flood depth distribution itself had not been extensively evaluated in previous studies.

In addition, the purpose of applying reverse-slope revision is written more clearly as follows.

“If reverse-slope revision is not conducted, reverse slope occurring through fitting of Gumbel distributions remain and the inundation-depth distribution may not be physically reasonable. For this reason, a novel reverse-slope revision method was applied in this study in the purpose of revising the spatial inconstancy that is due to the distribution fitting at each unit-catchment scale (grid-scale).”

L218: Alfieri et al (2017) actually employed the lookup method, because they used historical flood hazard maps coupled with changes in frequency under future climate scenarios.
Reply: We will add Alfieri et al (2017) as a reference as follows.

“As the lookup method does not use GCM_Runoff_BC and thus avoids the uncertainties associated with bias correction, including questionable results of bias correction for extreme events (Alfieri et al., 2017; Huang et al., 2014), several previous studies have employed this technique (Hirabayashi et al., 2013; Hirabayashi et al., 2021). Alfieri et al., 2017 employed the lookup method, they estimated future affected population and damage by flood using historical flood hazard maps coupled with changes in frequency under future climate scenarios.”

L405-406: Based on the results, the authors could maybe draw the conclusion that standard bias-correction techniques of GCM data are not suitable for use in flood hazard estimation (having been developed for different types of climate studies), and that different bias-correction techniques should be used (i.e. more focused on extreme values)

Reply: We agree with referee #2 suggestion. In response to referee #2’ suggestion, we will revise the sentence in the section 4.1 as follows.

“This result implied that simple bias-correction techniques of GCM data, which is additive correction method to monthly mean runoff, may not be suitable for use in flood hazard estimation and that different bias-correction techniques should be tested (i.e. more focused on extreme values).”

Figure 8: Can you specify the unit of measure of the x axis in (d) and (e)?

Reply: We thank referee #2 for comment. We will specify the x axis in (d) and (e).
I do not fully understand this analysis. Combining historical hazard maps with future flood frequency is basically the lookup method, right? (e.g. assuming that present-day 100-year RP will become 50-year RP in the future). Based on the outcome of the paper, I would rather conclude (here and in Conclusions) that historical hazard maps can be used as an indication of future hazard only if changes in flood frequency are properly accounted for.

Reply: We thank referee #2 for comment. As you pointed out, in general, estimating future flood frequency change and combining it with historical multiple-frequency flood hazard map is a good solution to construct the future hazard map, and it can be said as “lookup method”. We added the below sentence in the end of the 1st paragraph of conclusion section:

“This implies that combining accurate historical hazard maps with information on future frequency changes of floods is considered optimal in general for generating future hazard map. Please note that the historical flood hazard map does not have to be r
eanalysis-based simulation using GFM, and the proposed method can be also applicable to gauge-based or machine-learning based historical hazard map.”

We’d like to note that the proposed look-up method applying extreme-value analysis at catchment-scale is beneficial at global scale studies since the frequency change varies from basin to basin and sub-basin to sub-basin.