The authors present an interesting work on the assessment of flood risk under different warming period. The work is well designed and relevant to the theme of the special issue. After an anonymous review, the changes made in the original manuscript and the responses to comments have improved the manuscript considerably. It is therefore recommended for publication. However, several aspects need to be addressed and several points clarified in order to continue to improve the quality of the article. I summarize my comments below:

Response: *Thanks for your advice. You provided good suggestions to help us improve*

the research and explain our findings. We would like to outline our revision point by point in the following sections.

1. Introduction

• Lines 24-26, the high incidence and severity of floods demonstrates the need for research. Damage data can be increased and updated based on the latest reports.

Response: Thanks for the constructive comments made by the referee. We have updated the data based on the latest reports published by international organizations. In the revised manuscript, Lines 24-26 has been revised to "Between 2000 and 2019, 7348 disaster events were recorded worldwide, resulting in 1.23 million deaths, \$2.97 trillion USD in economic losses and over 4 billion people affected, with a surge in the number of climate-related disasters, of which floods were the most frequent, accounting for 44% of all disasters. (CRED and UNDRR, 2020; WMO, 2021)."

Reference:

WMO: Atlas of Mortality and Economic Losses from Weather, Climate and Water Extremes (1970-2019), WMO, https://library.wmo.int/index.php?lvl=notice_display& id=21930#.Yj6D3-dBxI0., last access: 26 March 2022, 2021.

CRED, and UNDRR: The human cost of disasters: an overview of the last 20 years (2000-2019), https://www.undrr.org/publication/human-cost-disasters-overview-last-20-years -2000-2019., last access: 26 March 2022, 2020.

• Lines 31-32, same as above. It is recommended to update the data and

references.

Response: Thanks for the constructive comments made by the referee. We have updated the data based on the latest statistical report from the China Meteorological Administration. Lines 31-32 has been revised to "Over the last ten years, the mean annual direct economic loss due to floods in China has exceeded \$25 billion USD, and the affected population has exceeded 100 million with more than 1000 deaths (Song, 2019; Chen et al., 2022)."

Reference:

Chen, Y., Wang, L., Zhao, J., Zhang, Y., Zhao, S., Li, W., Zou, X., Jiang, Y., Shi, S., Hong, J., Li, D., Wang, Y., Hou, W., Zhu, X., Dai, T., Cai, W., Guo, Y., Zhong, H., and Wang, Q.: Climatic Characteristics and Major Meteorological Events over China in 2021, Meteorological Monthly, https://doi.org/10.7519/j.issn.1000-0526.2022.022501, 2022. Song L: China meteorological disaster yearbook 2019: Beijing, China, China Meteorological Press, China, 2019.

• The IPCC Sixth Assessment Report has been released. It is suggested to add relevant content to the second paragraph.

Response: Thanks for the constructive comments made by the referee. In the revised manuscript, the key findings of the IPCC Sixth Assessment Report have been added to the revised draft, namely: "The IPCC's Sixth Assessment Report indicates that global surface temperature was 1.09°C higher in 2011–2020 than 1850–1900 and that global warming will reach 1.5°C in the near-term, which will cause unavoidable increases in multiple climate hazards and present multiple risks to ecosystems and humans (IPCC, 2021; IPCC, 2022). "

Reference:

IPCC: Climate change 2021: the physical science basis, Cambridge University Press, UK, 2021.

IPCC: Climate change 2022–Impacts, adaptation and vulnerability, Cambridge University Press, UK, 2022.

2. Material and Methods

• Lines 67, why choose RCP4.5 and RCP8.5 scenarios?

Response: Thanks for the constructive comments made by the referee. In the revised manuscript, we have added the reasons for choosing the RCP4.5 and RCP8.5 scenarios in Section 2. Materials and Methods.

• Lines 129-133, add figures of destructive power of floods.

Response: Thanks for the constructive comments made by the referee. In the revised manuscript, we have shown the destructive power of different levels of floods in Figure *S1* of supplementary materials.

• Line 134, adding descriptions and figures, combined with the previous suggestion can help the reader understand the content.

Response: Thanks for the constructive comments made by the referee. In the revised manuscript, lines 141-143 has been revised to "The exposures of the social economy were obtained from the SSPs data described in the data sources section. The annual population and GDP data were obtained based on linear interpolation method, and then the average values of population and GDP at different global warming periods under different scenarios were calculated to represent the exposure (Fig.S2; Fig. S3)".

3. Results

• Lines 148-149, notes on figure names should follow the text rather than being stacked together. Same below.

Response: *Thanks for the constructive comments made by the referee. In the revised manuscript, notes on figures follow the text to make it more readable.*

• Figure 2, The colors in the picture are difficult to distinguish. It should look like Figures 4 and 6 below.

Response: Thanks for the constructive comments made by the referee. In the revised manuscript, we have redrawn Figures 2 and S4 with different colors to make them legible.

- 4. Discussion
- Lines 279-281, according to Equation (3), the last element is the

environmental correction parameter, which is 0.5552 and 0.5640 respectively. Line282 mentions that "Because the vulnerability and the environmental correction parameter would be basically unchanged" is incorrect. Am I understanding this correctly?

Response: Thanks for the constructive comments made by the referee. Sorry for the mistake. The statement " the vulnerability and the environmental correction parameter would be basically unchanged " is correct. The environmental correction parameter in Lines 286-291 should be 0.5552. In the revised manuscript, this part has been amended to "According to Equation (3), for 1.5° C of global warming, the population affected (units: million) and the direct economic losses (units: US\$ billion) caused by severe floods in Northeast China would be $0.2880 \approx 30.73\% \times 129.8462 \times 0.0130 \times 0.5552$ and $1.0518 \approx 11.83\% \times 1231.8067 \times 0.0130 \times 0.5552$, respectively. For 2° C of global warming, the population affected and the direct economic losses caused by severe floods would be $0.3615 \approx 30.73\% \times 145.1178 \times 0.0146 \times 0.5552$ and $2.4794 \approx 11.83\% \times 2585.6269 \times 0.0146 \times 0.5552$, respectively."