We would like to thank Referee #1 for his positive, thoughtful and constructive comments. Here, we will proceed to the responses to questions and comments and outlined the changes made point by point below.

1. *Flood observations of this provenance over 20 years are not good enough to be skillful in the characterisation of flood hazard at this scale. Just because a flood hasn't been recorded since the year 2000, doesn't mean a flood did not happen (within the time period, or indeed before or after it). All your model has therefore done is replicate where DFO/EM-DAT has recorded floods in the past 20 years, having been trained on where DFO/EM-DAT has recorded floods in the past 20 years.*

Response:

In flood susceptibility mapping, collecting historical flood events is a crucial step, given the fact that the mapping of flood susceptibility is based on the statistical assumption that future flood will happen in areas having the same conditions which produced them in the past (Costache and Dieu Tien, 2019). Although there is no flood inventory map that can record all floods that have occurred in all years to date, a certain number and accuracy of flood points is sufficient for predicting flood susceptibility. As examples, Bahram Choubin et al. obtained the 51 flood location points identified between the years 2010 to 2017 for an ensemble prediction of flood susceptibility (Choubin et al., 2019). Seyed Vahid Razavi Termeh et al. used the 51 flood locations which were recorded during 2001-2012 for mapping the flood susceptibility in Jahrom Basin (Termeh et al., 2018). The DFO dataset, used in this study, was provided from news, governmental, instrumental, and remote sensing sources, and shows accurate geographical locations flood disasters. This dataset is supported by NASA, the Japanese Space Agency, and the European Space Agency, and is widely used worldwide (Li et al., 2019a). Therefore, the data quality of the DFO dataset is considered to be acceptable. In the current study, a total of 1500 flood points during 2000-2020 were obtained from the DFO dataset. In order to align the time scale of the occurrence of the used flood points with the time scale of precipitation data as much as possible, we therefore only obtained flood points from the year 2000 onwards.

2. *The skill score (AUC) is extremely high, but it is skillfully replicating something that is neither useful nor interesting: GIGO.*

Response:

The AUC has been widely used to evaluate the accuracy of the models in machine learning based flood susceptibility mapping studies (Li et al., 2019b; Costache and Dieu Tien, 2019; Termeh et al., 2018; Choubin et al., 2019). The high values of the AUC in this study can show that the good performance of the model and the reliability of results. Based on this, we can do the next step of analysis, which is the focus of this paper.

3. *It is therefore not clear how any of the data produced in this study advance our understanding of flood hazard, or present novel methods capable of doing so.*

Response:

Based on the 1500 flood points and 11 flood conditioning factors, the flood susceptibility map of the Belt and Road region was obtained by a machine learning model (SVM) in this study. This map provides a clear spatial distribution of flood susceptibility in the Belt and Road region. In addition, based on this map, we introduced the FSCI to quantify the degree of flood susceptibility in 7 sub-regions and 66 countries and regions along the Belt and Road, which has not been quantified in this way in previous flood susceptibility studies. For the FSCI, it can be used to quantify the hazard susceptibility of an area of a certain size, such as an administrative unit or a watershed. Thus, the FSCI has the potential to be applied in future studies.

Indeed, this study is not a study that explores the mechanism of flood occurrence. Our aim is to quantify and analyze the spatial distribution pattern of flood susceptibility and the degree of flood risk of countries along the Belt and Road through reliable models and historical disaster data. Therefore, we further analyzed the spatial distribution characteristics and patterns of flood susceptibility in the seven sub-regions, which provides a reliable scientific reference for flood prevention and mitigation in the Belt and Road region. The above results are described in detail in sections 4.2 and 4.3 of the manuscript.

4. *The writing is generally of poor quality – for which I am sympathetic to the authors – but it does make the manuscript difficult and/or unpleasant to read in some places.*

Response:

I am sorry that this article did not give you a good reading experience. As per your comments, we hired a professional language editor to improve the manuscript of its grammatical, typological, and structural problems in the revised article.

5. *The paper is too long, containing much superflueous information, much of which is*

incorrect anyway (for instance, claiming the GDP ($2.3bn) of a region spanning 3 continents being roughly equivalent to that of a small English market town).

Response:

Although it is regrettable that there is such an error in the manuscript, it does come from the description of Zhang et al. (Zhang, 2018). We made the following changes to the description in the manuscript.

- It contains a population of about 4.4 billion people accounting for 63% of the world totals.

6. *It is overloaded with references that are not needed, which are often unrelated to the point being made.*

Response:

Thank you for your reminder. We have checked the use of citations again in the revised article.

7. *I personally have never heard of the "Belt and Road region", and so would refer to the study area as something else (or make it less arbitrary). Indeed, there's no reason not to deploy this method globally, given its simplicity.*

Response:

To strengthen the ties between Asia, Europe, and Africa three continents, “The Belt and Road” Initiative was proposed by China in 2015. The Belt and Road region has been used as a specific study area in many studies (Zhou et al., 2021; Zhou et al., 2020; Shao et al., 2018; Jing et al., 2020; Dong et al., 2018). As the longest economic corridor around the world to date, the Belt and Road region is deeply threatened by floods. According the statistic, during 2000-2020, nearly half (44.9%) of global floods occurred in this region. Therefore, it is of great significance to determine the flood-prone areas in the Belt and Road region in advance and quantify the flood susceptibility level of each country and region for the flood prevention and mitigation.

References

Choubin, B., Moradi, E., Golshan, M., Adamowski, J., Sajedi-Hosseini, F., and Mosavi, A.: An ensemble prediction of flood susceptibility using multivariate discriminant analysis, classification and regression trees, and support vector machines, Science of the Total Environment, 651, 2087-2096, https://doi.org/10.1016/j.scitotenv.2018.10.064, 2019.

Costache, R. and Dieu Tien, B.: Spatial prediction of flood potential using new ensembles of bivariate statistics and artificial intelligence: A case study at the Putna river catchment of Romania, Science of the Total Environment, 691, 1098-1118, https://doi.org/10.1016/j.scitotenv.2019.07.197, 2019.

Dong, T. Y., Dong, W. J., Guo, Y., Chou, J. M., Yang, S. L., Tian, D., and Yan, D. D.: Future temperature changes over the critical Belt and Road region based on CMIP5 models, Adv. Clim. Chang. Res., 9, 57-65, https://doi.org/10.1016/j.accre.2018.01.003, 2018.

Jing, C., Tao, H., Jiang, T., Wang, Y. J., Zhai, J. Q., Cao, L. G., and Su, B. D.: Population, urbanization and economic scenarios over the Belt and Road region under the Shared Socioeconomic Pathways, Journal of Geographical Sciences, 30, 68-84, https://doi.org/10.1007/s11442-020-1715-x, 2020.

Li, X., Yan, D., Wang, K., Weng, B., Qin, T., and Liu, S.: Flood Risk Assessment of Global Watersheds Based on Multiple Machine Learning Models, Water, 11, 18, https://doi.org/10.3390/w11081654 2019a.

Li, X. N., Yan, D. H., Wang, K., Weng, B., Qin, T. L., and Liu, S. Y.: Flood Risk Assessment of Global Watersheds Based on Multiple Machine Learning Models, Water, 11, 18, https://doi.org/10.3390/w11081654, 2019b.

Shao, Z.-Z., Ma, Z.-J., Sheu, J.-B., and Gao, H. O.: Evaluation of large-scale transnational high-speed railway construction priority in the belt and road region, Transportation Research Part E-Logistics and Transportation Review, 117, 40-57, https://doi.org/10.1016/j.tre.2017.07.007, 2018.

Termeh, S. V. R., Kornejady, A., Pourghasemi, H. R., and Keesstra, S.: Flood susceptibility mapping using novel ensembles of adaptive neuro fuzzy inference system and metaheuristic algorithms, Science of the Total Environment, 615, 438-451, https://doi.org/10.1016/j.scitotenv.2017.09.262, 2018.

Zhang, J.: The Current Situation of the One Belt and One Road Initiative and Its Development Trend, Annual Report on the Development of the Indian Ocean Region (2017), https://doi.org/10.1007/978-981-13-2080-4_4, 2018.

Zhou, J., Jiang, T., Wang, Y., Su, B., Tao, H., Qin, J., and Zhai, J.: Spatiotemporal variations of aridity index over the Belt and Road region under the 1.5 degrees C and 2.0 degrees C warming scenarios, Journal of Geographical Sciences, 30, 37-52, https://doi.org/10.1007/s11442-020-1713-z, 2020.

Zhou, Y., Wang, T., Peng, R. C., and Hu, H. M.: Spatial-Temporal Characteristics and Factors of Agricultural Carbon Emissions in the Belt and Road Region of China, Polish Journal of Environmental Studies, 30, 2445-2457, https://doi.org/10.15244/pjoes/127414, 2021.