

Dear Professor Gregor,

Thanks for your comments. We carefully revised the manuscript according to the comments from you and the reviewers. The changes to the manuscript were marked and annotated in the uploaded pdf file. We also include our specific responses to the two reviewers as follows.

Reviewer 1:

1. The smartphone location data needs to be explained further. As the most important data indicator in this study, readers need to know what exact service(s) provided by Tencent may generate location requests. In other words, a table including all Tencent' s LBS helps readers infer the "underground" relationship between the anomaly scores and the storm events.

Response: We included a table on page 5 to describe the common, though not all, applications that generate Tencent location requests.

2. Is the correlation between peak rainfall intensity and anomaly score statistically significant in Figure 7(c)? This should be addressed.

Response: Indeed. As shown by Fig. 7c, there are only three cities, Haikou, Harbin, and Jilin, showing linear relationship between peak rainfall intensity and anomaly score. Because for the three cities, the linear regression is statistically significant at the level of 0.05. We actually preformed the linear regression analysis for every city, however, the p-values for the other five cities are more than 0.05. So, there are no linear fit lines for them in Fig. 7c.

Corresponding revision can be found on page 19 line 5-8

3. The different association between rainfall events and the NLR anomalies should be explained. The impact by the government spending on urban infrastructure, such as drainage systems, as well as the climate zone at different cities can be mentioned in the discussion section.

Response: Thanks for the comment. We added a short discussion on the possible connection with the urban infrastructure level and climatic condition on page 19 line 14-22.

Reviewer 2:

1, Why did the author choose Tencent Big Data portal? The author need to briefly introduce the difference between Tencent big data platform and other platforms.

Response: Tencent has the largest social community in China. The 2018 annual report of Tencent wrote they have more than one billion monthly active users, which we believe the location request data generated by such a large group of users can provide good proxy for understanding human responses to rainstorms. Another reason for which we used this data source is that, the location request data are generated by users from multiple mobile apps (e.g. WeChat, QQ, DiDi, Meituan-Dianping, etc.). Such a large app ecosystem can capture more comprehensive user activity dataset than any single social platform. Please find our specific revision on page 5 line 7-12, and the Table 2 that listed the common apps.

2, *There are many advantages to using the NLR data. Meanwhile, is s there a disadvantage to using the NLR data? The author need to briefly introduce the disadvantage, and to trigger readers' thinking.*

Response: Yes, indeed. We added a short discussion on the limitation of the data on page 21 line 19-25.

Best regards,

Yunyan Du and all co-authors