Many thanks to the reviewer. Some comments are contributive to this manuscript. The following illustrates answers to the questions by the reviewer.

A. Questions in the general comment:

Q1: First, the motivation of the paper is not clear. Does it target single-frequency users of GNSS and try to give lessons for the future use of the system? Does it aim to compare BDS B1 frequency results with the L1 SPP frequency of the GPS? Or, does it aim to compare the findings of the study with those of the BDS studies which were previously published? Neither a literature review nor comparisons of results to previous studies are provided relating to the above questions. the motivation of the study is not clearly stated in the abstract ad in the introduction

A: The findings in this study could contribute to the prediction of BDS positioning accuracy under different classified geomagnetic storms, and it could be beneficial to other systems such as BDS-3 as well. The motivation is now explicitly mentioned in the Abstract. Actually, the motivation was previously mentioned in the Conclusions.

The topic and results presented in this manuscript are novel and new, therefore, there was no existing literature exactly related to the topic. All the existing literature corresponds to the cause of the geomagnetic storms and the effects of geomagnetic storms on the GNSS applications. The state of the art literature review related to the topic of this manuscript is mentioned in the introduction.

Q2: the sampling strategy is not discussed well in the beginning and the weaknesses related to those are stated in the conclusion! Was that possible to adopt a better sampling strategy from the rich IGS network!?

A: The strategy was explained in Section 2, but as suggested one more sentence about the sampling strategy of the data is now added in Section 2. It is to be noted that this manuscript aims to study the effects of geomagnetic storms on the BDS application in China and its surrounding area. Therefore, only MGEX network for China area was applied to get the BDS observation. The earliest period to get the BDS observation is from 2015. In addition, the traditional IGS network only provided GPS and GLONASS observations before they moved data from MGEX to IGS.

Q3: the authors determined that some days with strong storms do not affect positioning accuracy but the authors do not refer to literature and include discussion for possible underlying facts. These are serious weaknesses of the paper and need to be improved for the next submission.

A: This was just the important finding in this manuscript, it is not necessary consequence that strong storm must have effects on the positioning accuracy. The possible reasons for this finding is discussed in the manuscript. But it should be noted that the causes during geomagnetic storms could be quite complicated and this is not the aim of this manuscript. The main aim of this manuscript is to study the effects of the main phase of different classified geomagnetic storms on the performance of BDS B1 SPP in China area. The manuscript aims to give statistical results of those effects, and reach valuable conclusions for the related studies

and further GNSS applications. As suggested, a relevant literature is now added in the manuscript.

B. Questions in attachment:

Q1: What is the real motivation of this study?
A: The answer is in the answer to A.Q1.

Q2: What is meant by this sentence?
A: This means that the positioning accuracy during similar classes of storms (for example strong storms) need not be at the same level and that there is no positive linear correlation between storm level and positioning accuracy.

Q3: what is the accuracy of kinematic positioning anyway?
A: the kinematic positioning accuracy was degraded during storms, the repeatability of it reached 12.8, 8.1 and 26.1cm in ENU directions.

Q4: What are those papers?
A: the answer is in the answer to A.Q1. The study in this manuscript was performed for the first time and there is no existing literature. The grammar here means negative.

Q5: not clear
A: comparing with other positioning modes, SPP is more obviously affected by ionospheric delays.

Q6: why solar cycle 24?
A: Because the earliest period for collecting BDS data is in solar cycle 24. We cannot get BDS observations in the China area for other cycles.

Q7: why this period selected?
A: the answer is the same as to B.Q6!

Q8. What software was used?
A: we developed our software with the fundamentals of SPP.

Q9: station coordinates in Cartesian coordinate system do not relate to the coordinates ENU?
A: Right! we showed the processing in the whole paragraph. Coordinates from SPP was compared with those in the SINEX files. The conversion to local site coordinate frame was then performed and the positioning errors are finally given in the three directions. The statistics was made based on the positioning errors. We thought the processing is well known in the GNSS community. But thanks anyway. Some more information is now illustrated in this context.

Q10: this bit here not clear!?

A: The paragraph is organized well and presented clearly. The paragraph illustrates the solutions of BDS B1 SPP during different classes of storms and give basic descriptions to the figures.

Q11: why not the storm fall into the main phase? &
why does the disturbance caused by the storm not fall into the main phase given with vertical read dashed lines?

A: This can be attributed to the fact that the Dst values are lower and the geomagnetic disturbance remained intense throughout.

Q12: LT local time?

A: Yes, LT is local time. The term was used in the Introduction part, please see line 18 in the original manuscript.

Q13: I don't think the GPS community will understand the lines 104 through 107! Add some more explanation (i.e. related to space weather indices)

A: The explanation was made combining the space weather indices such as F10.7cm radio flux. The values for the F10.7cm radio flux were checked by space weather indices.

Q14: did you also use it for the analysis?

A: The results by BNC were used in the analysis, please see Figure 4 and 6.

Q15: how?

A: The conclusion can be found from Table 4—7.

Q16: MJD is not appropriate to compare these!!

A: Only one MJD term was used in the text and also indicated by Year and DOY. See line 142-143 in the original manuscript. It is clear. The corresponding Year and DOY to MJD was also shown in Table 2.

Q17: Then what!?

A: The sentence is clear and all right.

Q18: comparison to GPS literature would be useful to assess the above given figures. & how about comparison to available studies? Both GPS and BDS? (in line 180)

A: That seems a good idea. But as expressed in the last two sentences in A.Q3, the idea might be the further study.

Q19: the reader is not able to associate the large deviatioins with doys having storms unless MJD with high storms are denoted before! &
why not use GPS doys instead?

A: Using MJD is right for the table shown, the related Year and DOY to each MJD are also

shown in Table 2.

Q20: why? Reference.
A: A reference was added as suggested.

Q21: did you check Kp index for the above given GPS day?
A: Yes, there are similar phenomena for Kp indices during those days. But we used Dst instead of Kp owing to the much better time resolution and accuracy of Dst to indicate geomagnetic storms.

Q22: describe space weather indices prior to this paragraph!
A: We think the location of description of space weather indices is all right and logical.

Q23: why? Refer to literature!
A: The conclusions were made based on all materials (the figures and tables) and discussions in the manuscript. No literature is needed.

Q24: this could even be done here!
A: The answer is the same with that in B.Q18.

Q25: then why not a proper sampling scheme adopted?
A: We did not have BDS data in China area for solar cycle 25 during the preparation of this manuscript. The solar cycle 25 is just beginning! Please also find the answer in A.Q2 and B.Q6.

Q26: kp indiex is more frequently referred by the GPS community to spot days with high geomagnetic activity.
A: Kp is the mean of K index, which is not enough to indicate geomagnetic activities. Actually, in space physics community, Dst or SYM-H is the right one for the study of geomagnetic activities. We recommend Dst or SYM-H can be used in GNSS community in future study. Actually, there are some uses of Dst or SYM-H by GNSS scholars (see references herein).