Comment on angeo-2021-5

Anonymous Referee #1

Referee comment on "Statistical study of the main phase of different classes of geomagnetic storms on BDS B1 frequency standard point positioning in China and its surrounding area" by Junchen Xue et al., Ann. Geophys. Discuss., https://doi.org/10.5194/angeo-2021-5-RC1, 2021

The paper analyzes the BeiDou B1 frequency standard point positioning in China and its surrounding area during selected magnetic storm events from 2015 to 2018 and they pointed out that positioning accuracy was deteriorated during the storm. The positioning error was larger for stronger magnetic storms. The root mean square error (RMSE) in position for the different magnetic storms in the East, North and Up directions were also presented. This topic has been discussed previously in the literature and the original contribution of this paper is the fact that the data were from Beidou B1 frequency. Some improvements and clarifications need to be done before the paper could be accepted to Annales Geophysicae. Please see the below comments. - The authors just analyzed the Bias and the bias RMSE (Figures 1-3 and Tables 4 â□□ 6). They did not provide the precision of the positioning, that come from the Covariance matrix; - Would be quite important also to show the precision from the adjustment, as well as the quality control of the adjustment; - Why the standard deviation was not shown? The coordinate obtained has an uncertainty, which in some cases may even be greater than discrepancy. In this case, it appears that the uncertainty (standard deviation) was considered to be zero or disregarded. Not being zero, the standard deviation impacts in the coordinate accuracy; - What is the Klobuchar model contribution to the positioning error since it corrects about 40 to 50% of the ionospheric effect? A discussion or even some quantitative values should be presented in the paper; - Figure 2: there is no data for LHAZ between day 86 and day 87 during the moderate storm. Mention this fact and explain the reason of this lack of data; - Figure 4: I would expect it to be explored in the paper; - Figures 1 to 3: plot in the top the simultaneous DST or even better, if available, the SYM H (instead of Dst) that has a time resolution of 1 minute; - Explain in details what could be the ionospheric activity at low latitudes mentioned at line 145 and include the explanation in the paper; - The title should include recovery phase since results from this storm phase are also presented. As a suggestion, even though it is too large (try to shorten it) : â□□Performance of BDS B1 frequency standard point positioning during the main and recovery phases of different classes of geomagnetic storms in China and its surrounding areaâ□□; - Are there severe storms according to Astafyeva et al., 2014 classification (Dst>> caused 019 include here

the Aarons paper (see reference below) * 104 check if there is Solar Radio Burst (SRB) around 01 LT since SRBs can cause positioning errors 119 What is the effect of different versions of the receiver hardware on the positioning calculations? 125 Table 4 â□□ Table 6 (just missing one space) 131 1 â□□ 4 m (just missing one space) 138 range of 1 â□□ 3 m (just missing one space) 148 same of line 104: check the possibility of Solar Radio Burst (SRB) occurrence 163 complicated >>> complex * Aarons J (1991) The role of the ring current in the generation or inhibition of equatorial F-layer irregularities during magnetic storms. Radio Sci 26:1131â□□1149