Authors indicated that they use MMS data when the orbit apogee was in the upstream solar wind. However, the FPI instrument was often shut down beyond 20 R_E in the solar wind even though the FGM instrument might have been in operation. So, I am a little doubtful about the statistics beyond 20 R_E. Have the authors checked whether for each event in their study there are simultaneous FPI measurements? Automated computer programs sometimes select the closest available data point when there is a gap in the data.

During the automatic search for the magnetic holes, the availability of FPI data was not one of the criteria. However, for all events found in the automated search FPI data was available, so there was no down-selection on plasma data.

In addition, the FPI instrument is not a solar wind monitor, and it is not optimized to measure cold plasmas such as the solar wind. Therefore, it tends to underestimate the solar wind density, while overestimating the temperature. Although this issue can perhaps be justified by the fact that it exists for all events; nonetheless, I think a statement must be added to the text where you introduce the data (~Line 48), reminding readers of this issue, and that the conclusions are drawn under such conditions.

Indeed, the referee makes a good point here, and this should have been mentioned in the paper. The FPI instrument has a "solar wind" mode, but that does not work perfectly for the ions. We have added two plasma specialists (Roberts and Varsani) to the author list and we describe the problem with the FPI instrument. From a recent paper by Owen Roberts it was shown, through comparison of FPI and OMNI data, that the electron density is well determined, whilst in general, the ion density is under estimated (although there are exceptions, as is clear from the events shown in the current paper and from the figures in the Roberts et al. paper).

Similarly, differences in density and velocity of electrons versus ions, and between burst versus fast mode data, as shown in the figures, are instrument effects. I suggest using ion moments to present the solar wind plasma density and velocity.

We have decided to not include the burst mode data, as these are not available for all events. The differences in density and velocities are instrumental effects, as mentioned above. However, from the statistical study between FPI and OMNI it follows that the electrons should be favoured.

After reading through the manuscript, it appears that the third category, "sign change", of magnetic holes are mostly foreshock events (e.g. HFAs, foreshock cavities). Are you suggesting a new term for these structures? Foreshock anomalies are not related to mirror mode waves and classifying them as magnetic holes seems like mixing two different types of plasma phenomena.

Indeed, as stated in the paper, we consider the "sign change" events as possible foreshock structures and thus in the end the possibility is brought up to not consider them as magnetic holes, reducing the occurrence rate of MHs. And no we are not suggesting a new term for these structures, that would be counter-productive for the space physics community in which a multitude of different names for the same structure leads more to confusion than clarification.

Line 46: Do you mean 2017/18?

Indeed, this should have been 2017/18

Line 64: "This resulted in 426 LMH", Please specify if these events are down selected from a larger dataset, or for how many of these events FPI data are available.

As mentioned above, for all 406 (not 426, that is a typo that was continued throughout the paper) FPI data was available. There was no down-selection based on the presence of FPI data.

Line 66-70: Are you using fast mode or burst mode data? I think it is the former. If that is the case, then it should be mentioned here explicitly. I also suggest removing the burst data that are overplotted on some of the figures. If data from both modes are used, then some explanation on how they are used together is expected here.

We have decided to only use the fast mode data as burst mode is not available for all 406 events. The partially available burst mode data do not add anything specific to the analysis.

Line 74 and Fig. 2: You display different types of LMHs in Fig. 2, but you have not introduced them yet. Maybe consider moving this figure to the end of the section.

Here, in the text we present the occurrence rate of the full selection of the 406 MHs and plot them as a function of distance from Earth. In the text is it said that the other colours are described further down, which we think we can expect the reader of the paper to understand.

Line 87-90: Have you considered including additional conditions similar to Criterion 4 in Madanian et al. (2020) in your search algorithm to exclude these structures?

No, we have not considered that, because in the end we characterize the "sign-change" category as foreshock structures, which is also clear from the examples that are shown.

Fig. 9 and the caption: These measurements are made in the magnetosheath, behind the bow shock, not in the foreshock.

Indeed, this event is rather strange, as from the ion spectrogram it looks like magnetosheath. The location of this event, however, is at (5, 22, 3) Re, a rather far distance ~23 Re to be in the magnetosheath. The solar wind is unremarkable at ~380 km/s (with little Vy and Vz) and ~3/cc density (OMNI) and the subsolar bow shock distance is ~14.5 Re. On the MMS website the locator software also puts the spacecraft in the magnetosheath. This has been corrected in the paper.

Fig. 10: As you described in the Introduction section, you are not interested in foreshock events. Figures 10 and 11 obviously show foreshock events. So what is the rationale for these figures? They don't seem to add much context to your objectives.

These two figures are there to show examples of third category, to show the reader what they look like.

Line 201: This time period is different than the one mentioned in the Introduction section? Did you include 2018/19 data?

This is a typo, and has been corrected in the text. The time period is like described at the beginning of the paper.

Line 205: The event breakdown in different categories does not quite add up to the total of 426 events.

As mentioned above, this typo has continued itself throughout the paper. There are 406 events.