Reply, Reviewer 1

We are grateful to the reviewer for a careful reading of the manuscript. We give point-to-point replies below. Our answers to the original Reviewer comments are given in italic.

Line 80 and lines 105-108: “the Tao solar wind model” In the absence of good solar wind plasma data it is necessary to use some model in order to make calculations (e.g., for the Alfvén velocity). Many papers use the Tao model (I have done it myself). Most likely is for the back-tracing of the solar wind the error in the timing not too bad, but can the authors give an indication how well the model worked, for example by showing the magnetic field as measured and as propagated? This in order to check the timing. If I recall correctly, at comet 67P the error was several hours.

The Tao model data available to us only have a time resolution of 10 min, so already there is a large uncertainty in the timing, likely comparable to the timing error. Any statistical results from the Tao model should therefore be taken with considerable caution anyway, and any correlations are probably only valid on long time scales. The stronger evidence for a connection between SLAMS and a high Mach number is the measured low background magnetic field strength. The model calculations of the Mach number should only be seen as additional circumstantial evidence, and a proper measurements of the Mach number will have to wait for the BepiColombo mission. We will add a discussion to the paper along these lines.

Line 169: “The example shown in Figure 1 has a wave period of around 0.3 s, which can be compared to the approximate periods of 3-4 s, and 2 s for the ’Wave field’, and ’Boundary’ examples, respectively.” I am not sure what the authors want to say here. Indeed, one can compare 0.3 s waves with the other values that are given. But what conclusion is one to get from this comparison? That the structures look alike? Maybe a few words more on what is meant here.

For the ‘Higher frequency’ type, we have made note of several events that fulfilled the SLAMS search criterion, but seem to be steepened waves with frequencies not ordinarily associated with the Mercury analogs to terrestrial 30-s waves. As we pointed out in line 93, these analogs typically have periods of 1-20 s. We here point out that the frequencies of ’Wave field’, and ’Boundary’ types are consistent with this, and that higher-frequency events may warrant their own sub-group. It is possible that they are associated with Mercury analogs to terrestrial 3 s waves [e.g. Blanco-Cano, et al., 1999], rather than the 30 s waves. We will add a short discussion on this.

Line 177: “SLAMS 170” This is probably a typo, or do the authors want to say something with the number 170?

Yes, this is a typo.

Lines 190-191: “it is anyway unlikely that the Mercury SLAMS would have the same dependence on the amplitude.” Here I am confused, why would the SLAMS not have the same dependence? Later in the discussion section the authors are showing how the Hermean SLAMS and the Earth SLAMS are very much the same, albeit that the Hermean are much shorter.

We meant that the detailed dependence of velocity in the solar wind frame on amplitude is unlikely to be the same as at Earth, since the plasma parameters at the two planets are rather different. It is therefore difficult to know how the results of Mann et al. [1994] can be used to convert temporal scale sizes at Mercury to spatial ones. We will clarify this.

Figure 9: This almost looks like a double peaked distribution around ~30 and ~60 degrees. I am not sure if this could be anything significant, but it could have something to do with the non-linear growth rate peaking around these angles. This might go too far to discuss in this paper, as it would need a full discussion of the dispersion and non-linear growth of waves.

It is difficult to know if the tendency for a double peak is significant. We will mention the possibility in the discussion, but will point out that this is speculation, and needs verification with further statistics, hopefully available with BepiColombo.

Typos

We will take note of these in the revision.

Note that in line 296, 'Figure 10' should be changed to 'Figure 9'.

References

Blanco-Cano, X., Le, G., & Russell, C. T. (1999). Identification of foreshock waves with 3-s periods. Journal of Geophysical Research: Space Physics, 104(A3), 4643-4656.

Mann, G., Lühr, H., and Baumjohann, W.: Statistical analysis of short large-amplitude magnetic field structures in the vicinity of the quasiparallel bow shock, Journal of Geophysical Research: Space Physics, 99, 13 315–13 323, 1994.