Comment on angeo-2021-24
Anonymous Referee #2

Referee comment on "Venus's induced magnetosphere during active solar wind conditions at BepiColombo's Venus 1 flyby" by Martin Volwerk et al., Ann. Geophys. Discuss., https://doi.org/10.5194/angeo-2021-24-RC2, 2021

-------------- General comments:

The manuscript "Venus's induced magnetosphere during active solar wind conditions at BepiColombo's Venus 1 flyby" by Volwerk et al. presents highly interesting and unique measurements from Venus' long magnetotail made by the BepiColombo spacecraft.

The figures in the paper show the measured magnetic field, ion and electron measurements in a very clear and informative way. Moreover, the authors interpret the data and put the observation into a wider context by discussing and comparing observations with the previous plasma and field observations from the Venus magnetotail.

The paper is logically structured, and text is clearly written. In addition to the presentation of the data, the work is valuable also because it is foreseen that in the future the presented observations will motivate global modelling works.

Some more details should, however, be provided before the work is ready for publishing, please see below.

-------------- Individual scientific remarks:

* Please describe in more details what can be seen in Figure 11:

  - The authors state that the black arrows show the direction of the magnetic field, but they look rather like directions of the IMF.

  - Fig. 11d) and 11e): Colour bars are hardly visible. Is the yellow region a constant velocity surface? Does the mostly green colour region show the speed of the solar wind on the ecliptic plane?

* A brief piece of information. The analysed flyby is exciting also because the observations may include effects of an ICME. Interestingly, such a situation when an ICME hits Venus has been analysed, and also simulated, already when the VEX observations has been analysed (Dimmock et al., JGR, 2018).
Technical corrections/suggestions:

* [Fig. 8] When the authors refer to the time range between purple, green, cyan and red lines show in Fig. 8, they use the term “box” although there are no purple, green, cyan and red boxes but just lines. This terminology could be clearer.

* “ASPERA-4-IMA” is typically written as “ASPERA-4IMA” and “ASPERA-4-ELS” as “ASPERA-4ELS”.

* [l. 223] Here “...magnetotail flapping in the near-Venus tail around ~ (1.5,0.1,0.5) RV ...” the x position should probably be “(-1.5,0.1,0.5)” i.e. the X_VSO should be negative in order the position would be on the night side.

* [l. 247-248] Similarly, this “... VEX near X ~ 1.5RV and BepiColombo near X ~ 15 RV,...” should probably read as “... VEX near X ~ -1.5 RV and BepiColombo near X ~ -15RV,...”. Also, in Fig. 9. figure caption this “...near ~ (1.5,0.1,0.5) observed...” should probably read as “...near ~ (-1.5, 0.1, 0.5) observed...”

* [l. 259] The value of F would be good to express in SI units, i.e. as “F = 20 nT”.

* [l. 309] “thetime” -> “the time”

* [Fig. 11 figure caption] “Ocotber” -> “October”

* [l. 381] “as welll” -> “as well”