

Reviewer #2 for the manuscript "Interpretation of the Cross Correlation Function of STEREO Solar Wind Velocities using a Global MHD Model" [Paper #2010JA015717] by Riley et al.

We are grateful for the reviewer's constructive comments and we have fully addressed them in our resubmitted manuscript. Below we reproduce the reviewer's entire comments (italics) and provide a complete response to each (regular text). Any significant modifications made to the manuscript are also explicitly provided here (in quotations).

I would like to begin by commending the authors on this paper, which impressed this reviewer as an excellent treatment of a complex and difficult subject - the spatial and temporal structure of the evolving 3D solar wind. The authors are to be particularly commended for their use of a combination of in-situ and modelling results - a powerful approach. I have only minor (and specific) points I wish to raise regarding this paper:

(1) Page 9 lines 145-146 and caption to figure 3. In one of the "short-lag" intervals the maximum cross-correlation is slightly higher than the background trend, in the other there is a sharp dip in maximum cross-correlation across the short-lag period. These intervals are discussed later in the paper, but it might add to the readability of the paper if these features were commented on briefly at this point.

Response: Agreed. We have added the following sentence to address this: "We note that during the first lull, the peak cross correlation coefficient was slightly higher than the surrounding values, but during the second lull, it was markedly lower."

(2) Page 11 lines 191-192: the statement "this approach for deriving solar wind speed is, at least currently, more accurate than can be obtained from the more self-consistent thermodynamic approach" is an interesting and potentially very important point - would the authors be willing to elaborate or speculate on why this might be so, given that the more accurate method relies on assumptions which are at least on the face of things at odds with observations.. I am certainly not requiring this to be done if such an explanation would unbalance the paper (though a reference could be useful), but could be of value.

Response: Agreed. This is a topic (to improve the thermodynamic solutions) that we're actively working on. However, to clarify the point made, we have added the following reference to this paragraph:

Riley(2010) The Three-Dimensional Structure of the Inner Heliosphere. Twelfth International Solar Wind Conference 1216, 323-328.

(3)Page 13, lines 227-239: clarification - is this western progression more or less than expected from a simple parker-spiral expansion of the streamlines of flow?

Response: In a Carrington frame, with no time dependant phenomena and not (latitudinal) spatial inhomogeneities, there would be no westward drift. This is, then, more than expected from a

Parker-like picture.

(4) Page 15 line 253 and page 16 lines 291-295: This is probably the most substantive comment I have on the paper. The authors comment on the causes of the two lulls, but do not state why the maximum cross-correlation went up slightly during one of them and down sharply during the other, apart from noting (page 13 lines 231-233) that the spacecraft were more widely separated in latitude during this interval (so far as I could see in the paper this was not elaborated on - it is possible I missed it, but in that case the point needs making more prominently!). It would be good to see this commented on more fully - perhaps in the conclusions, with perhaps some thoughts on the relative importance of temporal evolution of the streams and spatial in the production of these lags. I consider that this would both clarify the paper and increase its impact.

Response: We thank the reviewer for alerting us to this issue. Although any conclusions must be tentative, we agree that the variations in the peak cross-correlation coefficient could be used to infer something about the nature of the variations producing the lulls. To make this point, we have added the following text to the end of the paragraph ending at line 262 in the original submitted manuscript:

"The variations in the peak cross correlation coefficient during these lulls also provide some clues as to the nature of the processes producing them. In all three cases, the peak coefficient was as large, or slightly larger than surrounding values during the first lull, but was markedly lower during the second lull. This suggests a more transient, or non-steady component to the processes producing the second lull."

Other than these few points, the paper is excellent and I commend the authors.

Thank you! We appreciate your kind words.

In addition to these changes, and those recommended by the other reviewer, we have made a number of smaller corrections, correcting typos and generally improving the readability and clarity of the manuscript.

Again, we thank the reviewer for taking the time to review the manuscript and provide this constructive criticism.