

RESPONSE

We thank the Editor for the opportunity to revise our manuscript. We provide a revised version of the article according to the response given to comments from Referees 1 and 2. The new version of the document incorporates significant improvements in content clarity, data accuracy, and overall structure, enhancing the readability and comprehensiveness of the information presented. We detail the content changes, reorganization and updates and summarise how they address the points made by the referees.

1. Content Changes (new texts and a new Figure 6). The title and abstract have been revised. New information was added in the Introduction (Section 1). Detailed explanations have been developed in the new Section 4. The Conclusions have been revised. (*generally shown in bold in the revised version*).

- *Title and abstract:* The new title is more concise and emphasises the longitudinal observations near 1 AU. The revised abstract simplifies and narrows down the focus to the specific event of July 2007, emphasising the longitudinal in-situ observations and their implications on understanding solar wind interactions. The detailed comparative and modelling discussions in the old version have been streamlined for clarity and conciseness in the new version.
- *Introduction:* The added text discusses the size distribution of magnetic flux-ropes and their interactions with CIRs and CMEs. It references studies showing how small-scale transients in the slow solar wind form plasmoids through magnetic reconnection. Observations reveal flux-rope transients in the Heliospheric Current Sheet and their layered structures. Multi-spacecraft studies indicate the evolution of these structures across heliospheric longitudes. Additionally, STEREO and Parker Solar Probe observations detail the sequential release of density blobs and flux-ropes through magnetic reconnection at the helmet streamer tip.
- *Section 4.1 'Modeling and Predictions from Remote Sensing Observations'* with a new figure and texts. **Figure 6** presents Carrington maps during Rotation 2058, illustrating the event's context. Maps derived from photospheric field synoptic charts using a PFSS model show simulated coronal holes, global magnetic field configuration, and associated radial flow. During the solar minimum, the toward sector connects to the northern solar magnetic hemisphere, while the away sector connects to the southern. The relevant coronal hole plasma parcel for in-situ observations aligns with the coronal hole from the Northern hemisphere on July 1, 2007. Despite the lack of a side view, adjacent heliospheric longitude observations inform the disturbances' behavior.
- *Section 4.2 'Comparative Observations Across Spacecraft'* with new texts. The in-situ measurements suggest the MCLs observed by different spacecraft may not be the same structure but could be sequential streamer blobs released 12 hours apart. The 12-hour arrival difference at STEREO-A and STEREO-B supports this scenario. Comparative analysis across STEREO-A, OMNI (Earth), and STEREO-B with small longitudinal separation reveals the interaction of MCLs with the CIR. The MCLs have major axes in the ecliptic plane and their cross-sections are compressed along the HCS. Observations suggest radial evolution of MIRs, with HSS catching up with MCLs from STEREO-A to Earth and STEREO-B.
- *Conclusions.* The new version is much more concise and focused on the near-ecliptic observations, removing extensive discussions about comparisons with Ulysses data and detailed modelling results. It maintains the key findings and conclusions but presents them in a more streamlined manner.

2. Reorganisation and Updates. There has been some reorganisation of sections and a few texts moved for better flow (*generally not shown in bold in the revised version, may appear both in red and blue in the difference between files produced by the diff/latex algorithm*).

- *Created a new Section 2.1 'Spacecraft Data and Configuration' (to include texts previously in the Introduction);*
- *Renumbered subsequent sections accordingly: Sections 2.1 and 2.2 became 2.2 and 2.3.*
- *Renamed/replaced Section 3 'Analysis of Combined MCL-CIR Structures: MIRs', which now contains the first half of Section 2.3 (moved to become subsection 3.1 'Interaction Regions') and texts from 3.2 without Ulysses (3.2 renamed 'Length Scale and Expansion Speed'). **Except for the relevant passages of 3.2, all Section 3 'Comparison with Ulysses' has been removed.***
- *Created a new Section 4 'Multi-Spacecraft Analysis of Dynamics and Evolution', which now contains new texts and Figure 6 and the second half of Section 2.3.*
- *Updated Figures 1-5 : Figure 1 updated without Ulysses; Figures 2-5 mostly to correct for updated, less confusing, labels.*
- *Created a new Figure 6, and the old Figure 6 became the new Figure 8.*
- *Simplified Tables 1, 2 and 3, removing the information about Ulysses.*
- *Updated values in Table 1 to correct position data from 4 July 2007.*

3. Additional answers to points made by referees. We confirm the changes promised in our initial responses and summarise the complementary additions and changes made to address their points.

Referee 1:

- We have followed Referee 1's last suggestion in point 8 to not include the Ulysses and CCMC modelling (section 3, pp.15-23, subsections 3.1, 3.3, 3.4 and 3.5, Ulysses aspects in 3.2), keeping the near-ecliptic length-scale analysis of 3.2 only. Most of the points made by the Referee 1 (1,2,3,5 and 6) corresponded to aspects of Section 3.
- Point 4 is addressed with Figure 6 and the new texts in Section 4.1, which provides more context for the event.
- Point 7 and the remaining comments in point 8 are addressed with new texts in Section 4.2. In particular, we refer to Figure 7 and have commented in the text that "Taking the family of tracks highlighted as an example, it is not clear that one can observe a set of density perturbations with a 12-hour interval beyond 60° of elongation."

Referee 2:

- Points 1-3, and 6: references added as suggested, sentence corrected (see our first response).
- Points 4-5 for Figures 2-5: to avoid confusion, we have relabelled the start of CIR with 'CIR' (in place of FW2) and added FW2 in the Figure for STEREO-A only.
- Point 7 was answered in our first response.
- Points 8-9: these points corresponded to aspects of Section 3 removed, but to remain open to discussions, we have added a brief sentence in the conclusions regarding the works done by Megan Maunder (2023) in her PhD thesis (currently embargoed until the end of the year): "Connecting these two events has posed challenges (Maunder, 2023)."