

Reply to the 'Comment on egusphere-2026-3506' by Anonymous Referee #1, 28 Aug 2026

The manuscript by Tsurutani et al. gives a very detailed historic review of the naming of distinct solar wind structures, such as high-speed streams, stream interfaces, corotating interaction regions, etc. Indeed, there is some confusion and, I agree, CIR is frequently wrongly used in the literature. Hence, this paper is extremely helpful to clarify the term.

- Thank you.

However, while I think the historic review is needed for giving to the community more clarity about the terms SI, SIR, CIR, and HSS, I do not see the merit of introducing one extra category of “super-CIRs”. First, only a single event is reported which might be something rare (some future detections are discussed, but statistics is clearly missing). Similar authors, namely Meng et al. (2019), concluded that “No superstorms in this study were induced by corotating interaction regions.”

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- Okay we have deleted reference to an SCIR.
 - Meng et al. (2019) was published before Tsurutani et al. (2024) and thus the Meng et al. (2019) has been updated. In 2019, we had not recognized that this event was a CIR instead of an ICME. This is why the 2024 paper was published. Please note that Tsurutani and Meng were authors on both papers. The comments in the 2024 paper were put in to clarify and update the earlier paper.

The single event presented in Tsurutani et al. (2024) concluded: “We hypothesize that a shrinking coronal hole and magnetic reconnection caused the formation and release of the jet.” Hence, there is not a full analysis done for these conclusions.

*) E.g., no cross-check with EUV or white-light data was done; the jet could be as well a very narrow CME such as frequently observed streamer blowouts, which are strongly related to the edges of coronal holes. Edges of coronal holes are also strongly related to magnetic sector boundaries (see e.g., papers by Schwenn and Marsch in the 90s). We also know of small-scale CMEs within coronal holes as there are many closed loops (e.g., such as coronal bright points observed in SXR and EUV), which may undergo interchange reconnection and produce mini-CMEs. I just would like to make the point, that one should not forget the link to the solar perspective.

*) Moreover, the backmapping of the in-situ detected structure to exactly the edge of a contracting coronal hole, might also be debatable. Detecting edges of coronal holes is a subject on its own, with plenty of papers in the recent years concluding uncertainties. Tsurutani et al. (2024) used manually detected coronal holes. Extrapolations from magnetic field data are in a similar range uncertain. We are talking about uncertainties in the order of several degrees. We also know that coronal holes evolve, not very rapidly, but steadily. The entire evolution is related to interchange reconnection and small-scale ejecta – think of the numerous coronal blobs detected by Sheeley et al. – again, related to the magnetic sector boundaries and, hence, edges of coronal hole. We might ask, why we haven’t seen such cases as reported in Tsurutani et al. (2024) not in many more cases?

In that respect, some unexpected strong geomagnetic activities might also be due to the crossing of the heliospheric current sheet carrying high density structures propagating together or interacting with

CMEs – which I would call a merged interaction region (MIR): see paper by Burlaga et al. (2003). I would suggest checking the paper by Burlaga et al (2023) for the merged interaction regions and add also that term to the manuscript. It is useful to have that category covered as well, since these types of interacting structures are closely related to what is discussed in the manuscript.

- We have deleted reference to this event in the paper. Thank you for the detailed discussion.
- Please note that we were very concerned what this unusual interplanetary structure might be. So, we consulted a very experienced solar physicist to think about what it might or might not be. Our conclusion is what was written in the paper. There of course can never be a solar observation confirming a small chunk of reconnection material getting out into space and then propagating through interplanetary space to reach 1 AU. Just like we do not have detailed observations of the initial formation of a CME. It is our best hypothesis of what this unusual CIR might be.
- We now discuss the term MIR in the paper, as requested. It is different from CIRs and has been given different names in different papers. This should be helpful to the readership.

Concluding: I really enjoyed reading the paper from the historic perspective and agree with the authors; I suggest adding the term and explanation of MIRs to the manuscript; before introducing yet another category, one might show statistics first to see whether a new category is necessary.

- Okay. We have now discussed MIRs and the Burlaga et al. (2003) works. Actually, there is an earlier Burlaga et al. (1985) reference that we use rather than the one you suggested. But for magnetic storms people are using different terms. We mention some of them.