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A catalog of CME-ICME lineup events

An accurate assessment of our current space weather modeling is necessary due to progress in space weather research. Any validation framework needs suitable qualitative data for consistent validation procedures. The qualitative data also contributes to the refinement of the model and hence better forecasting ability. In alignment with this objective specifically for CME events, we present a newly prepared dataset of CME-ICME lineup events. This dataset includes in-situ observations from various spacecraft like Messenger, Venus Express, Maven, Stereo-A/B, Solar Orbiter, Bepi Colombo, Parker Solar Probe, Wind, etc, with detailed CME analysis performed by Space Weather Database of Notifications, Knowledge, Information (DONKI) developed at the Community Coordinated Modeling Center (CCMC). Apart from CME-ICME information, the dataset also possesses the necessary information about Probabilistic Drag Based Model (P-DBM) quantities. The dataset is publicly available to provide a valuable resource for model validation and to compare the performance with other available CME propagation models.

Our work offers a unique opportunity to refine CME propagation models, as ICMEs have been observed at multiple targets across a wide range of heliocentric distances. By utilizing this dataset, researchers can better understand the dynamics of CME propagation and improve the forecasting methods.

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