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Data Release: ICME Catalog At Mercury

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Supporting Information for “Interplanetary Coronal Mass Ejections from MESSENGER orbital observations at Mercury ” in the JOURNAL OF GEOPHYSICAL RESEARCH - SPACE PHYSICS

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Introduction

This interplanetary coronal mass ejection (ICME) catalog lists all 61 ICMEs observed by the MESSENGER Magnetometer (MAG) starting on 23 March 2011 and extending through 17 September 2014 that met the strict identification criteria described in the manuscript. The catalog includes ICME shock and magnetic ejecta (ME) arrival and end times at Mercury, Mercury’s heliocentric distance, average magnetic field magnitude ($|B|$) before and after the shock, maximum and mean $|B|$ for the entire ICME (sheath and ME), as well as for the ME and sheath, separately. For each of the ICMEs we also list the approximate launch time and coronal speed of the most likely CME counterpart at the Sun from SOHO LASCO and STEREO COR coronagraph observations, as well as the estimated average transit speed from the Sun to Mercury. One CME launch time is marked with a question mark indicating uncertain

identification of the CME counterpart to the ICME observed at Mercury, while another is marked with “NaN” to indicate that no suitable CME launch time was identified for that particular ICME. Four ME arrival times are also assigned “NaN” values as the ME arrival for those events was too ambiguous to discern. For one event, the mean and maximum sheath magnetic field values are also assigned “NaN” due to the coincidence of the ICME shock arrival time and Mercury’s bow shock crossing.

Table S1 - description of columns.

Each row of data describes an ICME event observed at Mercury.

1. Column “Year”, year the CME was launched from the Sun.
2. Column “DOY”, day of year the CME was launched from the Sun.
3. Column “HH”, hour the CME was launched from the Sun.
4. Column “MM”, minute the CME was launched from the Sun.
5. Column “CORONAL SPEED”, approximate coronal speed (in km/s) of the CME.
6. Column “Year”, year the ICME shock arrived at MESSENGER.
7. Column “DOY”, day of year the ICME shock arrived at MESSENGER.
8. Column “HH”, hour the ICME shock arrived at MESSENGER.
9. Column “MM”, minute the ICME shock arrived at MESSENGER.
10. Column “SS”, second the ICME shock arrived at MESSENGER.
11. Column “Year”, year the ME arrived at MESSENGER.
12. Column “DOY”, day of year the ME arrived at MESSENGER.
13. Column “HH”, hour the ME arrived at MESSENGER.
14. Column “MM”, minute the ME arrived at MESSENGER.
15. Column “SS”, second the ME arrived at MESSENGER.
16. Column “Year”, year the ICME ended at MESSENGER.
17. Column “DOY”, day of year the ICME ended at MESSENGER.
18. Column “HH”, hour the ICME ended at MESSENGER.
19. Column “MM”, minute the ICME ended at MESSENGER.
20. Column “SS”, second the ICME ended at MESSENGER.
21. Column “Shock Transit Speed”, average shock transit speed (in km/s) from Sun to Mercury.
22. Column “ME Transit Speed”, average ME transit speed (in km/s) from Sun to Mercury.
23. Column “Mercury heliocentric distance”, Sun-Mercury distance (in AU) at the time of ICME observation.
24. Column “Mean |B| before shock”, mean magnetic field magnitude (in nT) measured by MAG over a 1-min period before the ICME shock.
25. Column “Mean |B| after shock”, mean magnetic field magnitude (in nT) measured by MAG over a 1-min period after the ICME shock.
26. Column “Max |B|”, maximum magnetic field magnitude (in nT) measured by MAG over the entire ICME duration at MESSENGER.
27. Column “Mean |B|”, mean magnetic field magnitude (in nT) measured by MAG over the entire ICME duration at MESSENGER.

28. Column “ME max |B|”, maximum magnetic field magnitude (in nT) measured by MAG in the ME.
29. Column “ME mean |B|”, mean magnetic field magnitude (in nT) measured by MAG in the ME.
30. Column “Sheath max |B|”, maximum magnetic field magnitude (in nT) measured by MAG in the ICME sheath.
31. Column “Sheath mean |B|”, mean magnetic field magnitude (in nT) measured by MAG in the ICME sheath.