



19 Feb 2023 (report covers data release for 1-31 May)

Report Version	2	L2 ground processing software version:	V2.26.1
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Data Summary

V2 updates 2024:

After an investigation by ESA, Airbus and Imperial, the unexplained spacecraft interference has been confirmed not to impact the science quality of the OBS data. Cleaning of data around thruster firings requires use of the contaminated IBS data so users should beware of data during these periods, which can be identified by the thruster flag. These now re-released periods have also been quality flagged to level 2, due to the effect on the IBS data, as IBS-OBS is also an important tool in offset determination. This SC interference had historically resulted in the data not being released for these periods. The MAG team is now working to re-release these previously retracted periods, please see the Appendix for the periods now released.

During this regeneration of the files with no SC interference gaps, a period with a thruster firing has also been updated. We were able to process a more accurate thruster profile, which we use to remove the thruster signature from the data. This was on the 31st of May between 23:30-00:00.

V1:

MAG was on for the period 1-31 May.

In May the solar arrays movement generated **offset changes** in the inboard and outboard sensors.

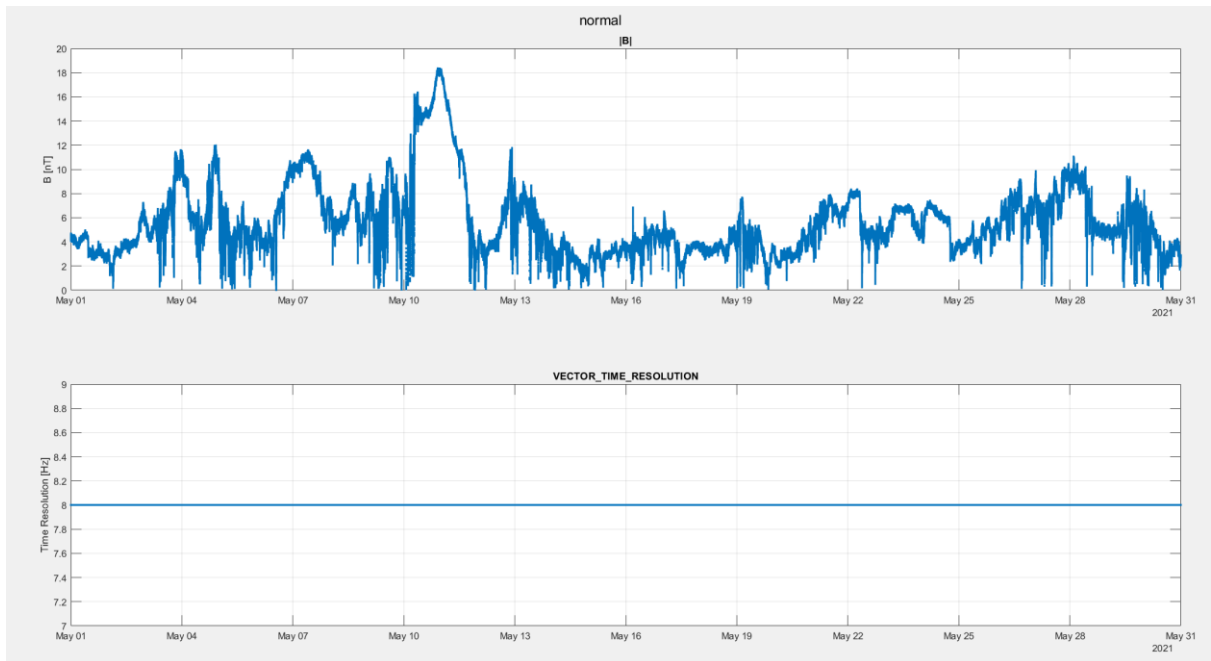
On **24 May**, there was a solar array current event which are not yet fully understood. MAG will continue to investigate and better quantify the impact of these events.

Spacecraft noise was observed particularly in IBS data for several periods (there was significant noise for a total of 120 hours during May). This noise is very clear in IBS, the source has not been identified. We can see evidence for it being there in OBS as well, and have not got algorithms to clean this from the data. The magnetic field data have been converted to NaNs when the noise in the data was particularly high. The full period of missing data is listed in the appendix of this report. If you have particular need for any data during these periods, please contact the MAG team and we see if the data maybe suitable for release for certain applications.

The 12th of May has not been released because the data have been all converted to NaNs.

The spacecraft started the month at 0.90AU and ended it at 0.95AU.

Normal Mode

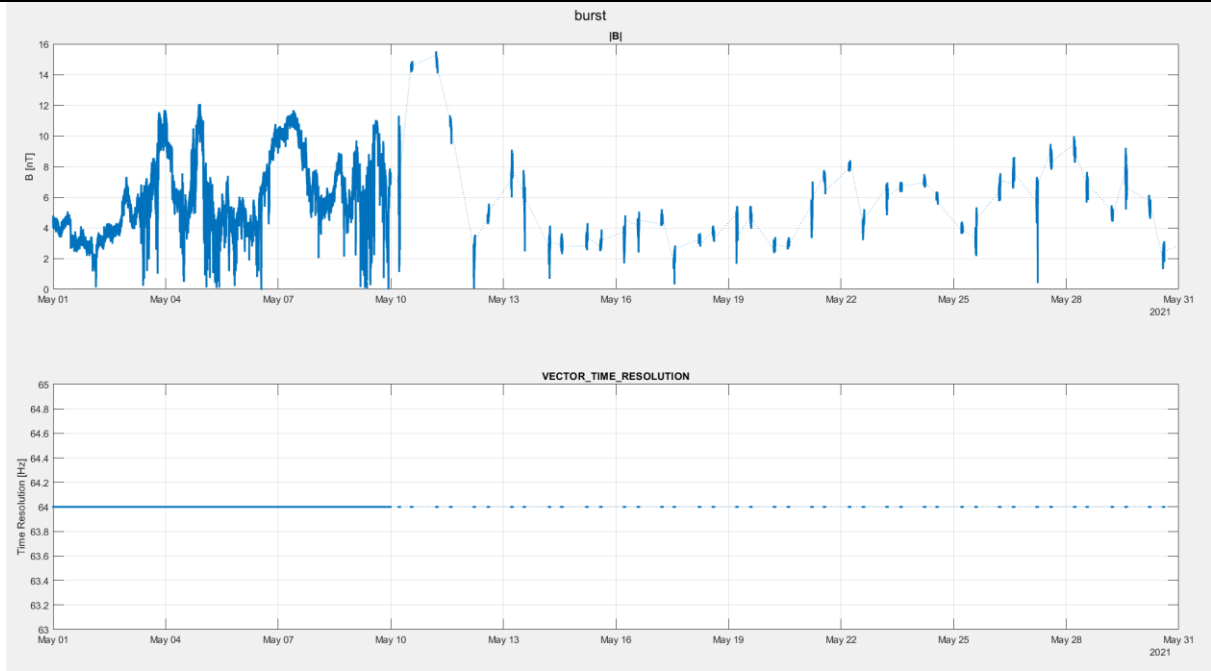


For whole month, MAG was on with 8Hz cadence normal mode data returned, for exceptions see below.

Operations	1-31 May	Cruise phase throughout period
Operational Events of Note	None	

Data Gaps greater than one minute:

Burst Mode



Coverage continuous. Data at 64 Hz cadence.

Coverage	From	To	Coverage
	1/05	09/05	24 hours 64 Hz
	10/05	31/05	2 x 1 hours of 64 Hz per day to fill the two EMC windows

Quality bitmask



Quality bit mask events

SC events which disturb the field

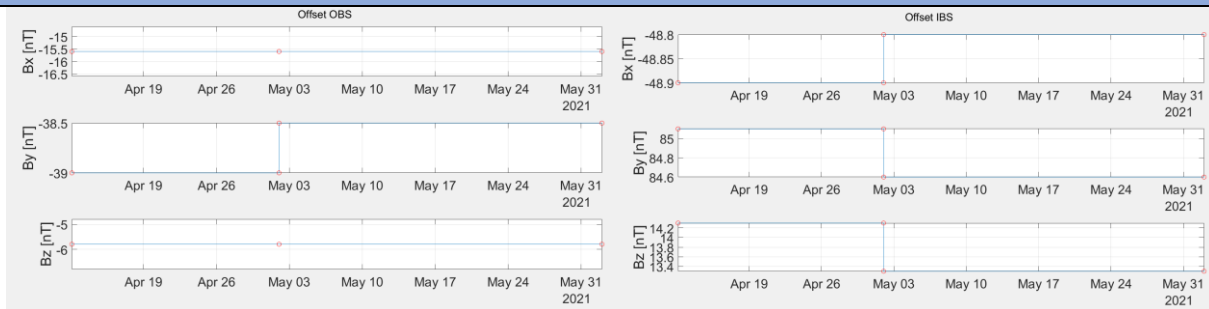
1. Thruster firings
2. Solar array lubrications (solar array is moved 15 degrees, then returned to original position)
3. Solar array movements (solar array angle is changed, and then remains at new angle due to sun-SC distance thermal constraints)
4. High gain antenna movements

SC related issues

Time	Reason
02/05/2021 00:10	SA movement from 30 to 0 deg
25/05/2021 8:57	SA lubrication
24/05/2021 00:05	SA current event

The MAG heater profiles for the 1st – 2nd and 30th - 31st of March could not be accurately determined, thus signals having the same periodicity as the MAG heater switching can be noticed in the data: please, check the quality bitmask, bit 3, for the MAG heater ON times.

Offset



1-31 May:

Both IBS and OBS offsets have been modified by the solar array movement on the 2nd of May. These offsets have been quantified and removed from the L2 data.

Offset	Date	OBSX	OBSY	OBSZ	IBSX	IBSY	IBSZ	
146	12/04/2021 03:07	-15.6	-39	-5.8	-48.9	85.1	14.3	Post SA current event
146	02/05/2021 00:10	-15.6	-39	-5.8	-48.9	85.1	14.3	Pre SA movement from 30 to 0 deg
147	02/05/2021 00:15	-15.6	-38.5	-5.8	-48.8	84.6	13.3	Post SA movement from 30 to 0 deg
147	02/06/2021 00:00	-15.6	-38.5	-5.8	-48.8	84.6	13.3	Final offset

Appendix

SC Interference Re-Release
<p>After an investigation by ESA, Airbus and Imperial, the unexplained spacecraft interference (SC interference) has been confirmed not to impact the science quality of the OBS data, so this is no longer being removed from these periods. Cleaning of data around thruster firings requires use of the contaminated IBS data so users should beware of data during these periods, which can be identified by the thruster flag. These now re-released periods have also been quality flagged to level 2, due to the effect on the IBS data, as IBS-OBS is also an important tool in offset determination.</p>

Appendix – Periods now released.

StartTime	EndTime	Comment
06/05/2021 12:00	06/05/2021 15:00	Noise from SC mainly in By
10/05/2021 03:55	10/05/2021 04:10	Noise from SC mainly in By
10/05/2021 09:30	10/05/2021 14:00	Noise from SC mainly in By
11/05/2021 22:30	13/05/2021 03:30	Noise from SC mainly in By
13/05/2021 09:30	13/05/2021 10:30	Noise from SC mainly in By
13/05/2021 12:00	13/05/2021 14:00	Noise from SC mainly in By
13/05/2021 15:15	13/05/2021 15:45	Noise from SC mainly in By
13/05/2021 18:00	13/05/2021 21:00	Noise from SC mainly in By
14/05/2021 02:30	14/05/2021 14:00	Noise from SC mainly in By
14/05/2021 21:00	15/05/2021 07:30	Noise from SC mainly in By
15/05/2021 14:00	16/05/2021 02:30	Noise from SC mainly in By
16/05/2021 04:15	16/05/2021 04:45	Noise from SC mainly in By
16/05/2021 06:15	16/05/2021 10:00	Noise from SC mainly in By
16/05/2021 13:40	16/05/2021 22:30	Noise from SC mainly in By
17/05/2021 03:00	17/05/2021 11:30	Noise from SC mainly in By
17/05/2021 17:00	17/05/2021 17:15	Noise from SC mainly in By
23/05/2021 18:00	23/05/2021 23:00	Noise from SC mainly in By
26/05/2021 09:00	26/05/2021 12:00	Noise from SC mainly in By
29/05/2021 07:00	29/05/2021 15:00	Noise from SC mainly in By
31/05/2021 03:00	31/05/2021 06:00	Noise from SC mainly in By
31/05/2021 18:00	31/05/2021 19:30	Noise from SC mainly in By
12/05/2021 00:00	13/05/2021 00:00	Noise from SC mainly in By
13/05/2021 18:00	13/05/2021 21:00	Noise from SC mainly in By
14/05/2021 04:30	14/05/2021 14:00	Noise from SC mainly in By
14/05/2021 21:00	15/05/2021 07:30	Noise from SC mainly in By
16/05/2021 13:40	16/05/2021 22:30	Noise from SC mainly in By
17/05/2021 03:00	17/05/2021 11:30	Noise from SC mainly in By
31/05/2021 03:00	31/05/2021 06:00	Noise from SC mainly in By
31/05/2021 18:00	31/05/2021 19:30	Noise from SC mainly in By

Appendix – Files released

solo_L2_mag-rtn-burst_20210501_V03.cdf
solo_L2_mag-rtn-burst_20210502_V03.cdf
solo_L2_mag-rtn-burst_20210503_V03.cdf
solo_L2_mag-rtn-burst_20210504_V03.cdf
solo_L2_mag-rtn-burst_20210505_V03.cdf
solo_L2_mag-rtn-burst_20210506_V03.cdf
solo_L2_mag-rtn-burst_20210507_V03.cdf
solo_L2_mag-rtn-burst_20210508_V03.cdf
solo_L2_mag-rtn-burst_20210509_V03.cdf
solo_L2_mag-rtn-burst_20210510_V03.cdf
solo_L2_mag-rtn-burst_20210511_V03.cdf
solo_L2_mag-rtn-burst_20210512_V02.cdf
solo_L2_mag-rtn-burst_20210513_V03.cdf
solo_L2_mag-rtn-burst_20210514_V03.cdf
solo_L2_mag-rtn-burst_20210515_V03.cdf
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solo_L2_mag-rtn-normal-1-minute_20210502_V03.cdf
solo_L2_mag-rtn-normal-1-minute_20210503_V03.cdf
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