Imperial College London

MAG Data Release Report 2204

24 Oct 2022 (report covers data release for 1-30 Apr 2022)

Report Version	1	L2 ground processing software version:	V2.20
MAG PI	Tim Horbury t.horbury@imperial.ac.uk		
MAG IM	Helen O'Brien h.obrien@imperial.ac.uk		

Data Summary

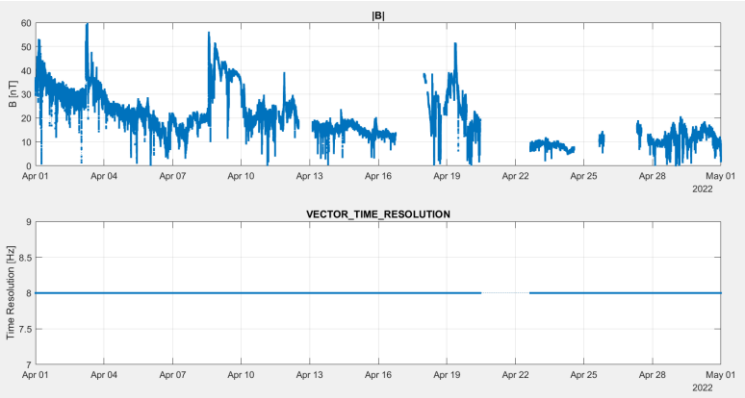
MAG was on for the period 1-20 and 22-30 April 2022. MAG was off from the 20th of April 2022 at 11:17:55 to the 22nd of April 2022 at 15:41:28, due to a FDIR event on the SC. After the reboot, the offset was disturbed, therefore the 22nd and 23rd of April will not be released.

Spacecraft noise was observed particularly in IBS data for several periods (there was significant noise for a total of 121 hours in the period 1-30 Apr 2022). 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 17th and 26th of April 2022 cannot be released: SC noise was high for the whole day

The spacecraft started the month at 0.35AU and on the 30th it was at 0.68AU from the Sun.

Normal Mode

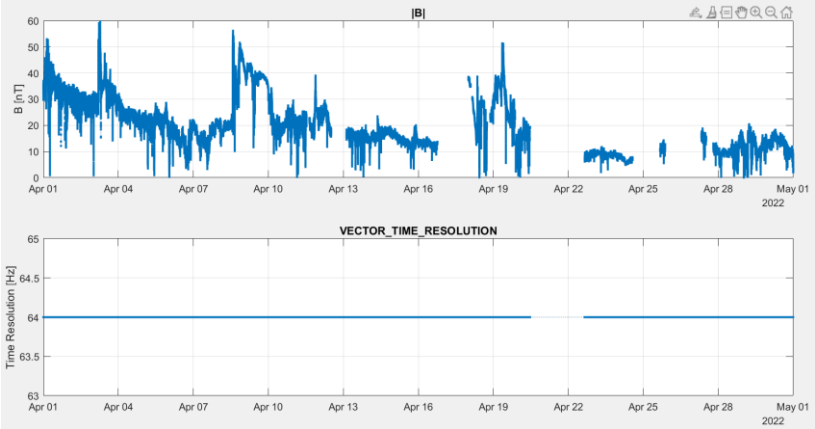


MAG was on with 8Hz cadence normal mode data returned, for exceptions see below.

Operations	1-30 April	Science phase throughout period, normal data returned
Operational Events of Note	MAG turns off on the 20th of April 2022 at 11:17:55 and turns back on, on the 22nd of April 2022 at 15:41:28 for a FDIR event.	

Data Gaps greater than one minute:
NaNs have been introduced during the noisiest periods because the data was highly disturbed. See Appendix for details.
Gaps are discontinuously present in the data from the 4th to the 18th of April. Their duration varies from few seconds to 39 mins. The reason for these gaps is bad weather at the ground stations. A single packet on the 4th of April is lost for unknown reason.

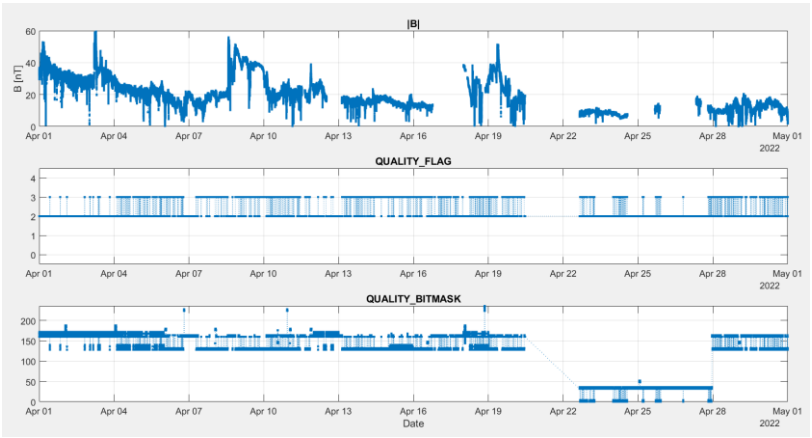
Burst Mode



Coverage is continuous, except for the period when MAG was off.

Coverage	From	To	Coverage
	01/04	30/04	24 hours per day 64 Hz

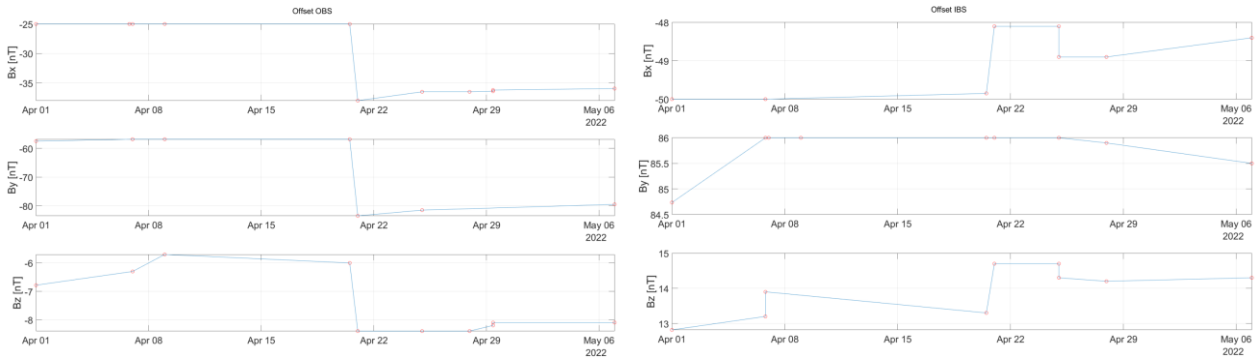
Quality bitmask



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
06/04/2022 19:11	Solar Array movement from 77 to 73 deg
10/04/2022 22:29	Solar Array movement from 73 to 70 deg
18/04/2022 20:11	Solar Array movement from 70 to 60 deg
25/04/2022 00:00	Battery top up event

Offset



1-30 April:

IBS and OBS offsets were affected by the solar arrays movement on the 6th of Apr and by the battery top up event on the 25th of Apr. These offsets have been quantified and removed from the L2 data. The offsets of both sensors have been affected by the reboot of the instrument, and OBS experienced the largest jump. The variation at OBS is: [-12.7 -26.3 -2.7]nT

OBS powered back on in Range 2, remained in R2 until 09:48 on 29 April – from comparison with IBS-OBS, step of 0.2nT in X and 0.1nT in Z observed.

Offset	Date	OBSX	OBSY	OBSZ	IBSX	IBSY	IBSZ	Comment
20220330	01/04/2022 00:00	-25	-57.4593	-6.7828	-50	84.7345	12.8172	Offset correction for data set up to 31 March
20220331	01/04/2022 00:00				-50			Offset correction for data from 1 April
20220322	06/04/2022 19:11	-25			-50		13.2	Pre SA movement from 77 to 73 deg
20220323	06/04/2022 19:12	-25			-50	86	13.9	Post SA movement from 77 to 73 deg
20220332	07/04/2022 00:00	-25	-56.8	-6.3		86		Change linear trend for OBSZ
20220333	09/04/2022 00:00	-25	-56.8	-5.7		86		Change linear trend for OBSZ
20220324	20/04/2022 12:00	-25	-56.8	-6	-49.85	86	13.3	MAG off
20220330	21/04/2022 00:00	-38.00	-83.50	-8.4	-48.1	86	14.7	MAG back on
20220326	25/04/2022 00:00			-8.4	-48.1	86	14.7	Pre battery top up event
20220327	25/04/2022 00:00	-36.50	-81.50	-8.4	-48.9	86	14.3	Post battery top up event
20220328	27/04/2022 22:45	-36.50		-8.4	-48.9	85.9	14.2	End of linear trend after battery top up event for IBS
20220329	29/04/2022 09:48	-36.40		-8.2				Pre OBS range change from 2 to 3
20220401	29/04/2022 09:48	-36.20		-8.1				Post OBS range change from 2 to 3
20220330	06/05/2022 23:09				-48.4	85.5	14.3	Pre SA movement from 56 to 30 deg
20220402	06/05/2022 23:13	-35.95	-79.50	-8.1	-48.4	85.5	14.3	Post SA movement from 56 to 30 deg

Appendix

Appendix A: NANs periods of the month

This table shows the NaN periods which have been introduced in the data due to SC interference. The disturbance observed in the IBS-OBS data set is large that we cannot quantify the impact on OBS, therefore we have set this data to NaN. If you have a need to see this data, please get in contact with the MAG team and we can discuss this with you.

StartTime	EndTime	Comment
06/04/2022 19:11	06/04/2022 19:13	SA movement from 77 to 73 deg
10/04/2022 22:19	10/04/2022 22:21	SA movement from 73 to 70 deg
11/04/2022 12:43	11/04/2022 15:23	SC interference
11/04/2022 21:53	11/04/2022 22:54	SC interference
12/04/2022 12:26	13/04/2022 03:00	SC interference
16/04/2022 18:24	18/04/2022 00:00	SC interference
18/04/2022 02:15	18/04/2022 03:47	SC interference
18/04/2022 17:57	18/04/2022 21:00	SC interference
18/04/2022 20:11	18/04/2022 20:14	SA movement from 70 to 60 deg
24/04/2022 13:50	25/04/2022 16:03	SC interference
25/04/2022 21:00	27/04/2022 07:45	SC interference
27/04/2022 12:25	27/04/2022 19:10	SC interference
28/04/2022 03:04	28/04/2022 03:31	SC interference

Appendix B: Files within this release

Filename
solo_L2_mag-rtn-burst_20220401_V01.cdf
solo_L2_mag-rtn-burst_20220402_V01.cdf
solo_L2_mag-rtn-burst_20220403_V01.cdf
solo_L2_mag-rtn-burst_20220404_V01.cdf
solo_L2_mag-rtn-burst_20220405_V01.cdf
solo_L2_mag-rtn-burst_20220406_V01.cdf
solo_L2_mag-rtn-burst_20220407_V01.cdf
solo_L2_mag-rtn-burst_20220408_V01.cdf
solo_L2_mag-rtn-burst_20220409_V01.cdf
solo_L2_mag-rtn-burst_20220410_V01.cdf
solo_L2_mag-rtn-burst_20220411_V01.cdf
solo_L2_mag-rtn-burst_20220412_V01.cdf
solo_L2_mag-rtn-burst_20220413_V01.cdf
solo_L2_mag-rtn-burst_20220414_V01.cdf
solo_L2_mag-rtn-burst_20220415_V01.cdf
solo_L2_mag-rtn-burst_20220416_V01.cdf
solo_L2_mag-rtn-burst_20220418_V01.cdf
solo_L2_mag-rtn-burst_20220419_V01.cdf
solo_L2_mag-rtn-burst_20220420_V01.cdf
solo_L2_mag-rtn-burst_20220424_V01.cdf
solo_L2_mag-rtn-burst_20220425_V01.cdf
solo_L2_mag-rtn-burst_20220427_V01.cdf
solo_L2_mag-rtn-burst_20220428_V01.cdf
solo_L2_mag-rtn-burst_20220429_V01.cdf
solo_L2_mag-rtn-burst_20220430_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220401_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220402_V01.cdf

solo_L2_mag-rtn-normal-1-minute_20220403_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220404_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220405_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220406_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220407_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220408_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220409_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220410_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220411_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220412_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220413_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220414_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220415_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220416_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220418_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220419_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220420_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220424_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220425_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220427_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220428_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220429_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220430_V01.cdf
solo_L2_mag-rtn-normal_20220401_V01.cdf
solo_L2_mag-rtn-normal_20220402_V01.cdf
solo_L2_mag-rtn-normal_20220403_V01.cdf
solo_L2_mag-rtn-normal_20220404_V01.cdf
solo_L2_mag-rtn-normal_20220405_V01.cdf
solo_L2_mag-rtn-normal_20220406_V01.cdf
solo_L2_mag-rtn-normal_20220407_V01.cdf
solo_L2_mag-rtn-normal_20220408_V01.cdf
solo_L2_mag-rtn-normal_20220409_V01.cdf
solo_L2_mag-rtn-normal_20220410_V01.cdf
solo_L2_mag-rtn-normal_20220411_V01.cdf
solo_L2_mag-rtn-normal_20220412_V01.cdf
solo_L2_mag-rtn-normal_20220413_V01.cdf
solo_L2_mag-rtn-normal_20220414_V01.cdf
solo_L2_mag-rtn-normal_20220415_V01.cdf
solo_L2_mag-rtn-normal_20220416_V01.cdf
solo_L2_mag-rtn-normal_20220418_V01.cdf
solo_L2_mag-rtn-normal_20220419_V01.cdf
solo_L2_mag-rtn-normal_20220420_V01.cdf
solo_L2_mag-rtn-normal_20220424_V01.cdf
solo_L2_mag-rtn-normal_20220425_V01.cdf

solo_L2_mag-rtn-normal_20220427_V01.cdf
solo_L2_mag-rtn-normal_20220428_V01.cdf
solo_L2_mag-rtn-normal_20220429_V01.cdf
solo_L2_mag-rtn-normal_20220430_V01.cdf
solo_L2_mag-srf-burst_20220401_V01.cdf
solo_L2_mag-srf-burst_20220402_V01.cdf
solo_L2_mag-srf-burst_20220403_V01.cdf
solo_L2_mag-srf-burst_20220404_V01.cdf
solo_L2_mag-srf-burst_20220405_V01.cdf
solo_L2_mag-srf-burst_20220406_V01.cdf
solo_L2_mag-srf-burst_20220407_V01.cdf
solo_L2_mag-srf-burst_20220408_V01.cdf
solo_L2_mag-srf-burst_20220409_V01.cdf
solo_L2_mag-srf-burst_20220410_V01.cdf
solo_L2_mag-srf-burst_20220411_V01.cdf
solo_L2_mag-srf-burst_20220412_V01.cdf
solo_L2_mag-srf-burst_20220413_V01.cdf
solo_L2_mag-srf-burst_20220414_V01.cdf
solo_L2_mag-srf-burst_20220415_V01.cdf
solo_L2_mag-srf-burst_20220416_V01.cdf
solo_L2_mag-srf-burst_20220418_V01.cdf
solo_L2_mag-srf-burst_20220419_V01.cdf
solo_L2_mag-srf-burst_20220420_V01.cdf
solo_L2_mag-srf-burst_20220424_V01.cdf
solo_L2_mag-srf-burst_20220425_V01.cdf
solo_L2_mag-srf-burst_20220427_V01.cdf
solo_L2_mag-srf-burst_20220428_V01.cdf
solo_L2_mag-srf-burst_20220429_V01.cdf
solo_L2_mag-srf-burst_20220430_V01.cdf
solo_L2_mag-srf-normal_20220401_V01.cdf
solo_L2_mag-srf-normal_20220402_V01.cdf
solo_L2_mag-srf-normal_20220403_V01.cdf
solo_L2_mag-srf-normal_20220404_V01.cdf
solo_L2_mag-srf-normal_20220405_V01.cdf
solo_L2_mag-srf-normal_20220406_V01.cdf
solo_L2_mag-srf-normal_20220407_V01.cdf
solo_L2_mag-srf-normal_20220408_V01.cdf
solo_L2_mag-srf-normal_20220409_V01.cdf
solo_L2_mag-srf-normal_20220410_V01.cdf
solo_L2_mag-srf-normal_20220411_V01.cdf
solo_L2_mag-srf-normal_20220412_V01.cdf
solo_L2_mag-srf-normal_20220413_V01.cdf
solo_L2_mag-srf-normal_20220414_V01.cdf
solo_L2_mag-srf-normal_20220415_V01.cdf

solo_L2_mag-srf-normal_20220416_V01.cdf
solo_L2_mag-srf-normal_20220418_V01.cdf
solo_L2_mag-srf-normal_20220419_V01.cdf
solo_L2_mag-srf-normal_20220420_V01.cdf
solo_L2_mag-srf-normal_20220424_V01.cdf
solo_L2_mag-srf-normal_20220425_V01.cdf
solo_L2_mag-srf-normal_20220427_V01.cdf
solo_L2_mag-srf-normal_20220428_V01.cdf
solo_L2_mag-srf-normal_20220429_V01.cdf
solo_L2_mag-srf-normal_20220430_V01.cdf