Imperial College London

MAG Data Release Report 2306

23 October 2023 (report covers data release for 1 June – 30 June 2023)

Report Version	1	L2 ground processing software version:	V2.26.1
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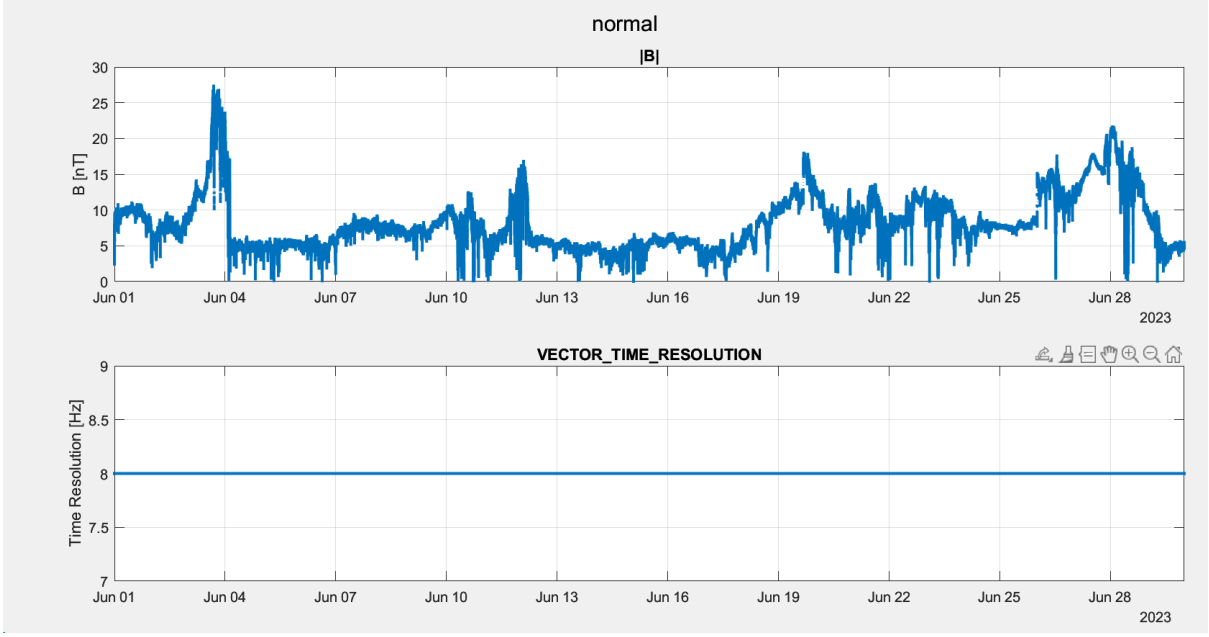
Data Summary

MAG was powered on for June. BM was available for 4 hours a day at 64 vectors/s apart from 19/06.

There is some evidence of residual MAG heater signal in the data on 09/06, which has been quality flagged, please see the relevant section below.

The spacecraft started the month at 0.82AU on the 1st of June and at the end of the month it was at 0.94AU from the Sun.

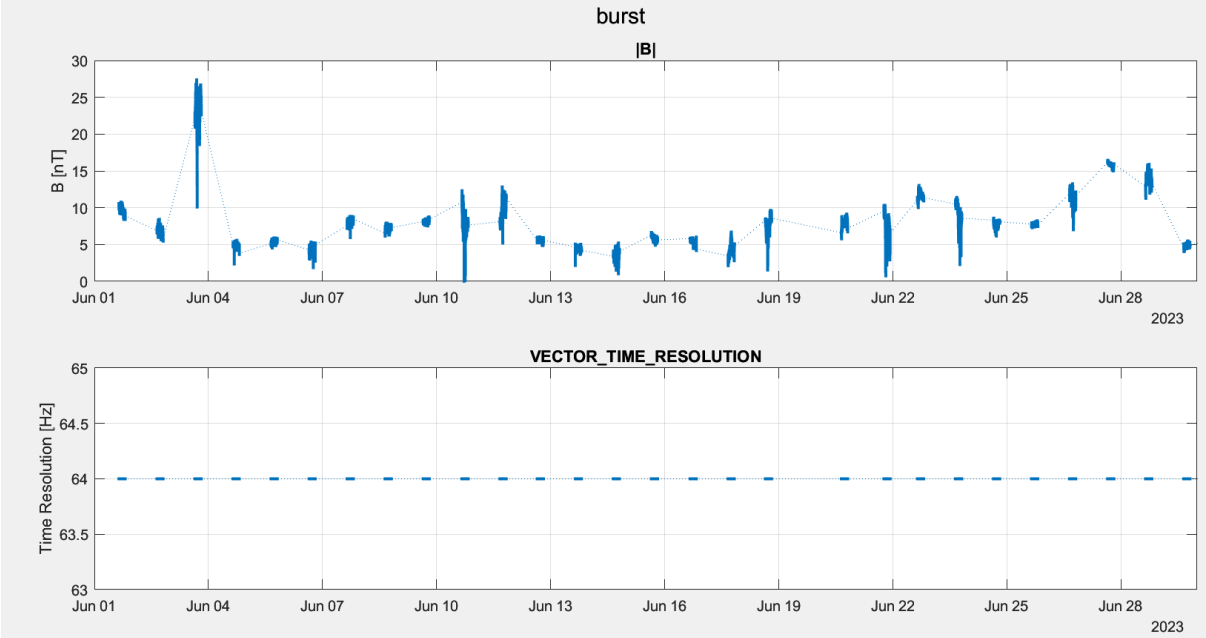
Normal Mode



Operations	1 June – 30 June	Science phase throughout period, normal data produced.
Operational Events of Note		

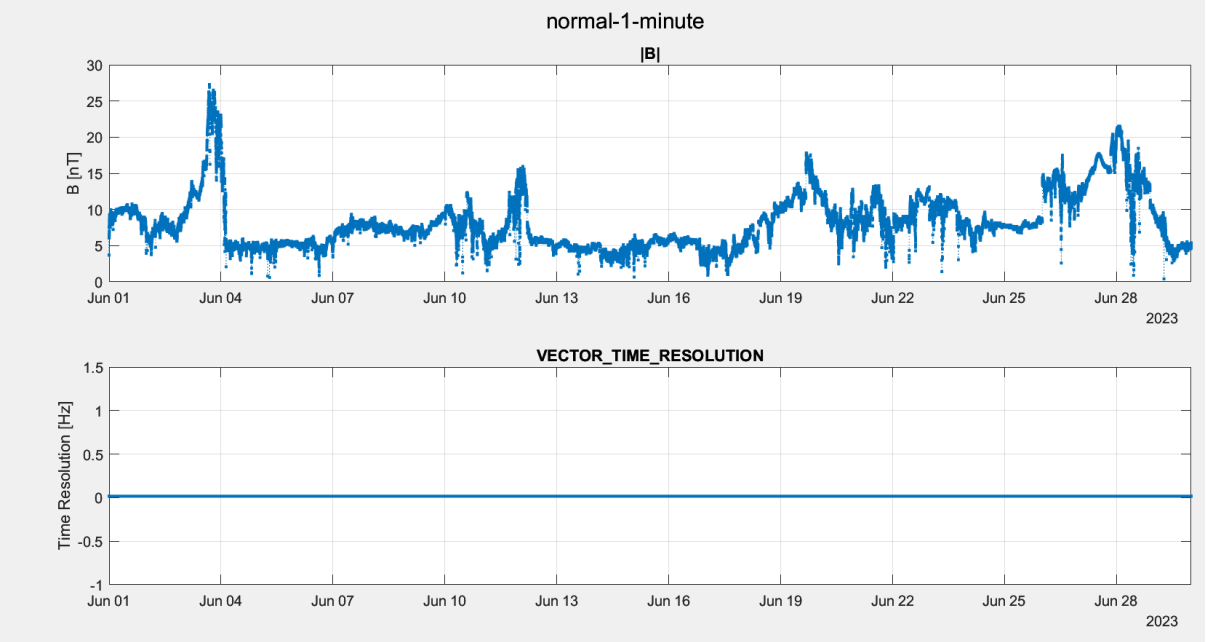
Normal mode data is produced from the burst mode stream when it is available for a full day, as is the case this month. This can produce small changes in the time sampling of the data over the transition; these are smaller than the cadence of 1/8 of a second.

Burst Mode

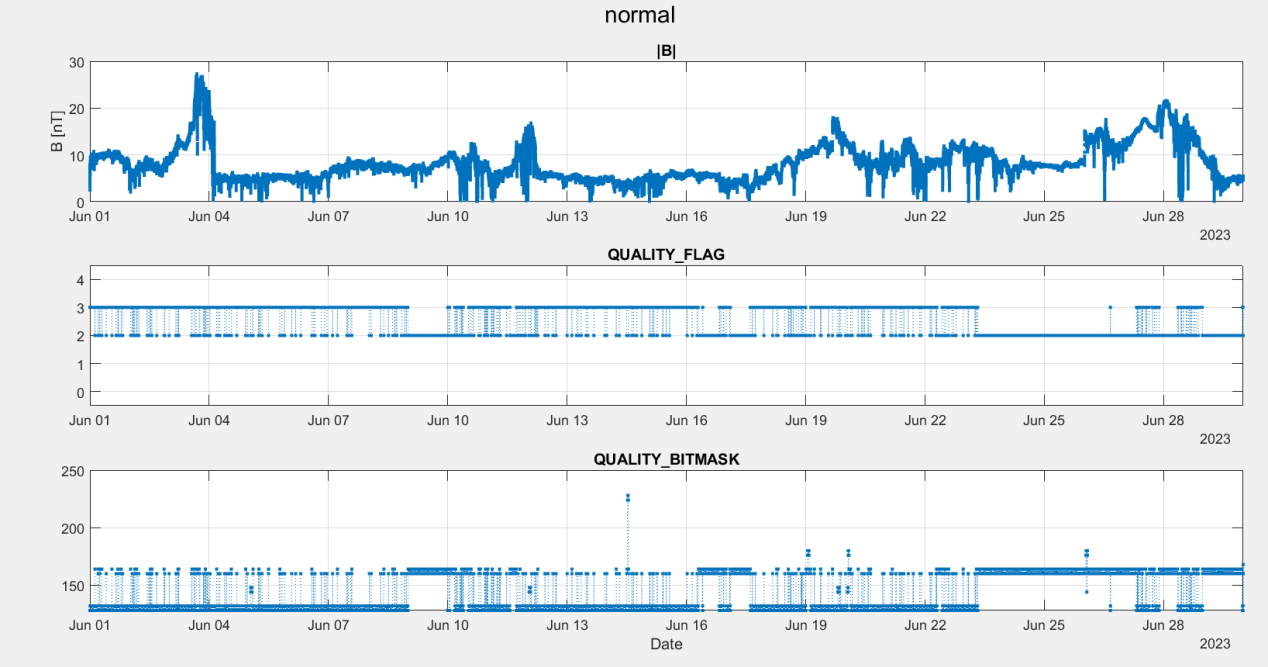


Coverage	From	To	Coverage
	01/06	31/06	4h per day of 64 vectors/s except for 19/06

Normal – 1min



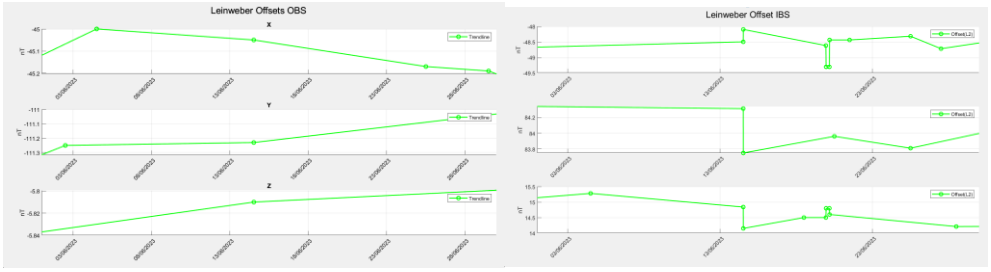
Quality bitmask



Quality bit mask events

SC events which disturb the field	1. Solar array movements (solar array angle is changed, and then remains at new angle due to sun-SC distance thermal constraints) 2. High gain antenna movements 3. Battery Top Up
SC related issues	N/A

Offsets



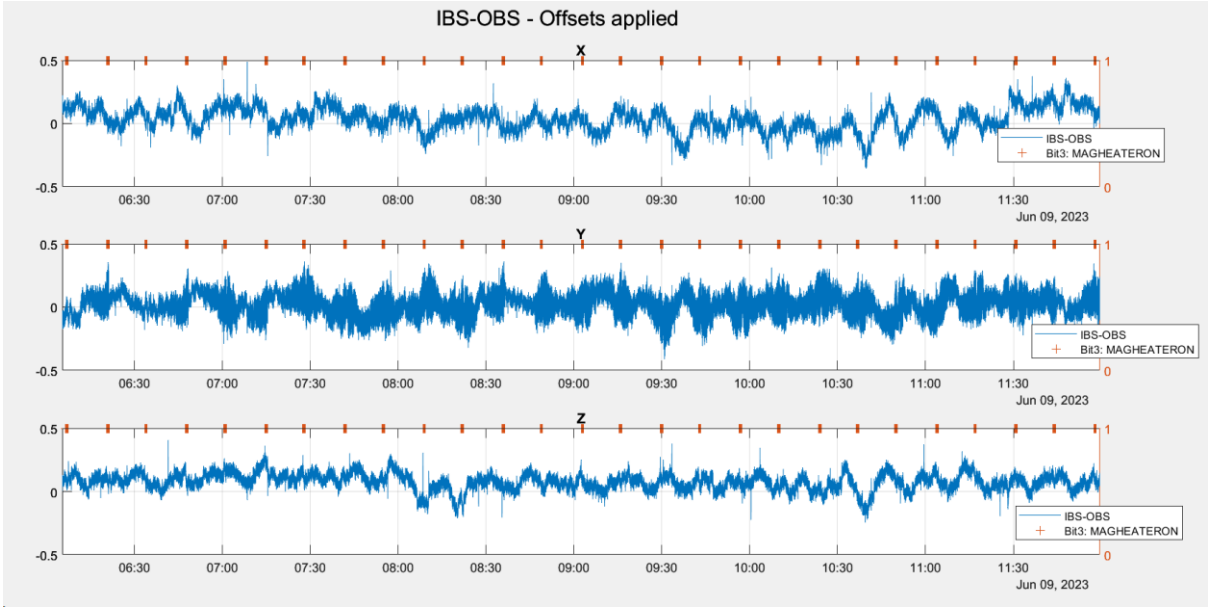
1 June – 30 June:
The OBS Y offsets are following a linear recovery after the MAG reboot in April, and the OBS X & Y are stable. The IBS offsets were disturbed by HGA and SA events. Between these events, the OBS & IBS offset linearly changed, and the trend has been chosen accordingly.

OffsetNumber	Date	OBSX	OBSY	OBSZ	IBSX	IBSY	IBSZ	Comment
220958	30/05/2023 12:00	-45.17	-111.38	-5.84	-48.69	84.34	15.08	Offset from may
220960	02/06/2023 12:00		-111.25					OBS Y trend from solar orbiter offset method
220961	04/06/2023 12:00	-45					15.28	IBS Z ,OBS X trend from solar orbiter offset method
220962	14/06/2023 12:29	-45.05	-111.23		-48.5	84.31	14.84	SA event
220963	14/06/2023 12:35			-5.81	-48.1	83.75	14.15	SA event
220965	18/06/2023 12:00						14.5	IBS Z trend from solar orbiter offset method
220966	19/06/2023 22:39				-48.62		14.5	HGA
220967	19/06/2023 22:59				-49.31		14.8	HGA
220968	20/06/2023 04:09				-49.31		14.8	HGA
220969	20/06/2023 04:29				-48.44		14.6	HGA
220970	20/06/2023 12:00					83.96		IBS Y trend from solar orbiter offset method
220971	21/06/2023 12:00				-48.44			IBS X trend from solar orbiter offset method
220974	25/06/2023 12:00	-45.17			-48.32	83.81		IBS X,Y OBS X trend from solar orbiter offset method
220975	27/06/2023 12:00				-48.72			IBS X trend from solar orbiter offset method

220976	28/06/2023 12:00						14.21	IBS Z trend from solar orbiter offset method
220977	29/06/2023 12:00	-45.19						OBS X trend from solar orbiter offset method
220978	30/06/2023 12:00	45.23	-111	-5.8	-48.5	84	14.21	IBS X trend from solar orbiter offset method

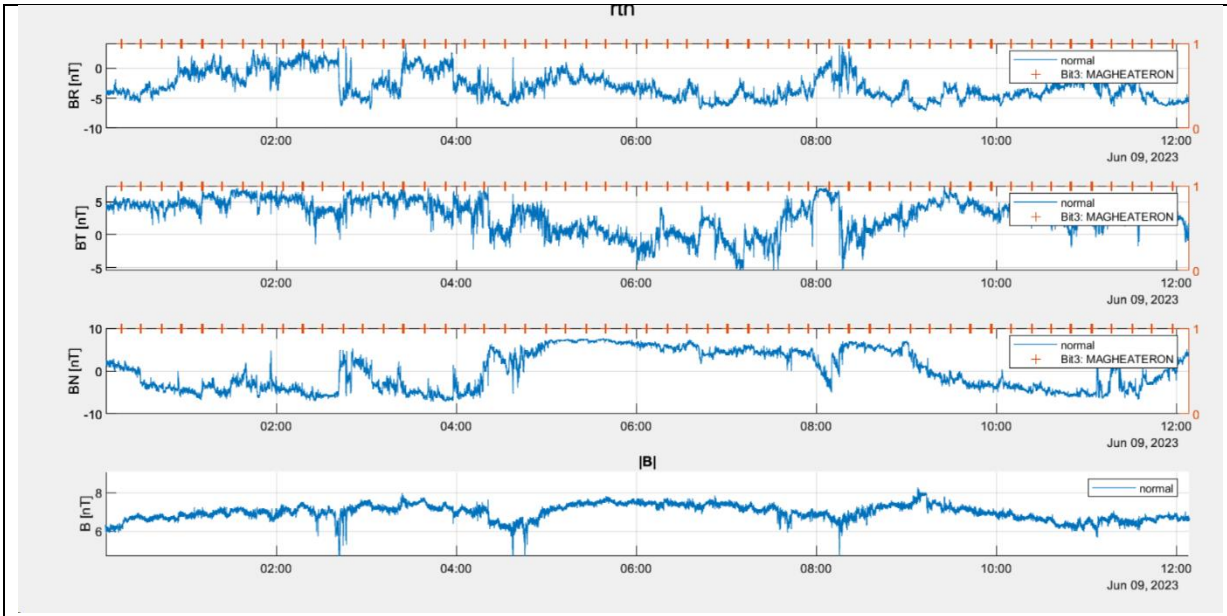
Residual MAG heater signal in data

Interference from the MAG heater is routinely characterised and removed from the data. This removal is not perfect, and there is evidence in the MAGIBS-MAGOBS data (shown below) that some residual level of signal is still present in the archive data on 09/06. The magnitude of this error in the released archive data will be less than the error presented below in IBS-OBS. The heater cycle is ~15 minutes, and heater on/off status is reported in the quality bitmask.



Example of heater generated interference as seen in the MAGIBS-MAGOBS time series for June 9 2023. Y axis is in nT.

Analysis was undertaken to look at the magnitude of the natural signal against the heater interference signature, and typically the natural signal is much higher than the error profile from the heater.
At very quiet times (particularly on 09/06) there is some evidence of the heater operation in the field magnitude:



When looking at the components, the heater signal is much less than the natural magnetic field.

Therefore, the data has been released with a quality flag.

Appendix

Appendix A: Files within this release

Filename
solo_L2_mag-rtn-burst_20230601_V01.cdf
solo_L2_mag-rtn-burst_20230602_V01.cdf
solo_L2_mag-rtn-burst_20230603_V01.cdf
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