



04 August 2023 (report covers data release for 1 February – 28 February 2023)

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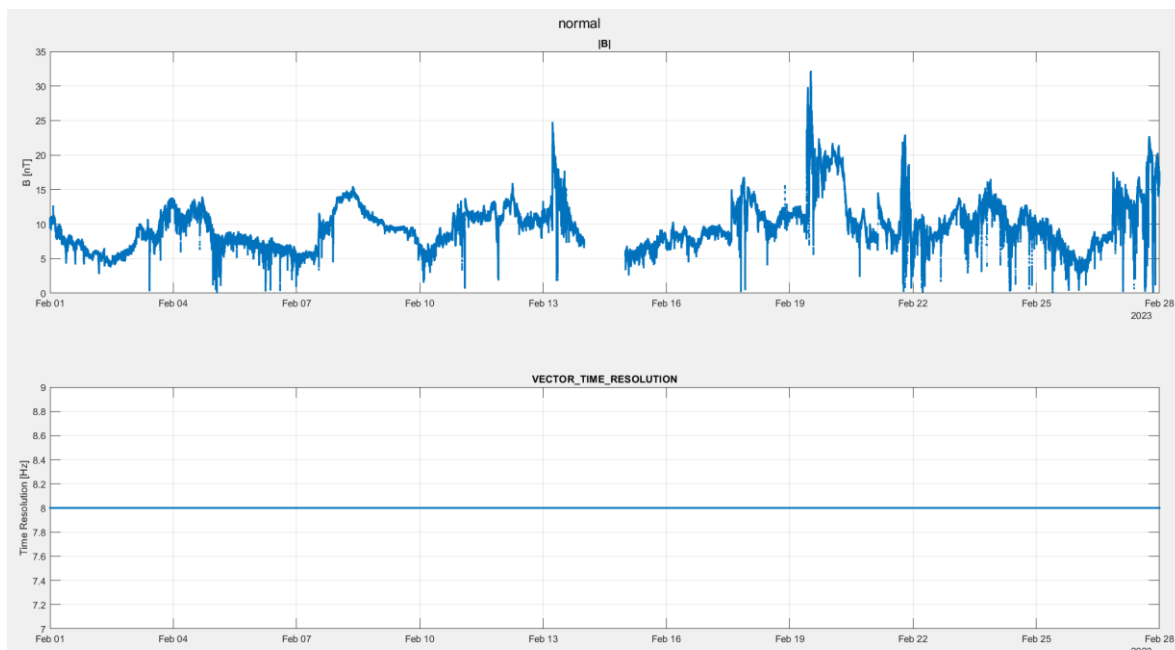
Data Summary

MAG was powered on for February. Following the SSMM FDIR triggered payload switch off in January, the sensors temperatures were raised to -60C, rather than the nominal -90C. At 14/02 01:35 the temperatures were lowered back to the nominal temperature of -90C. The offsets were disturbed by this temperature change, and during the calibration process this disturbance was not able to be characterised with sufficient accuracy. Therefore, the data 24 hours after the temperature change has not been released. Please contact the team if you have a special need for this data. There was a CME event on 19/02. There is some evidence of residual MAG heater signal in the data on 28/02, please see the relevant section below.

BM is available at 128 vectors/s from 02-28/02 with BM being available at 64 vectors/s on 01/02.

The spacecraft started the month at 0.91AU on the 1st of February and at the end of the month it was at 0.74AU from the Sun.

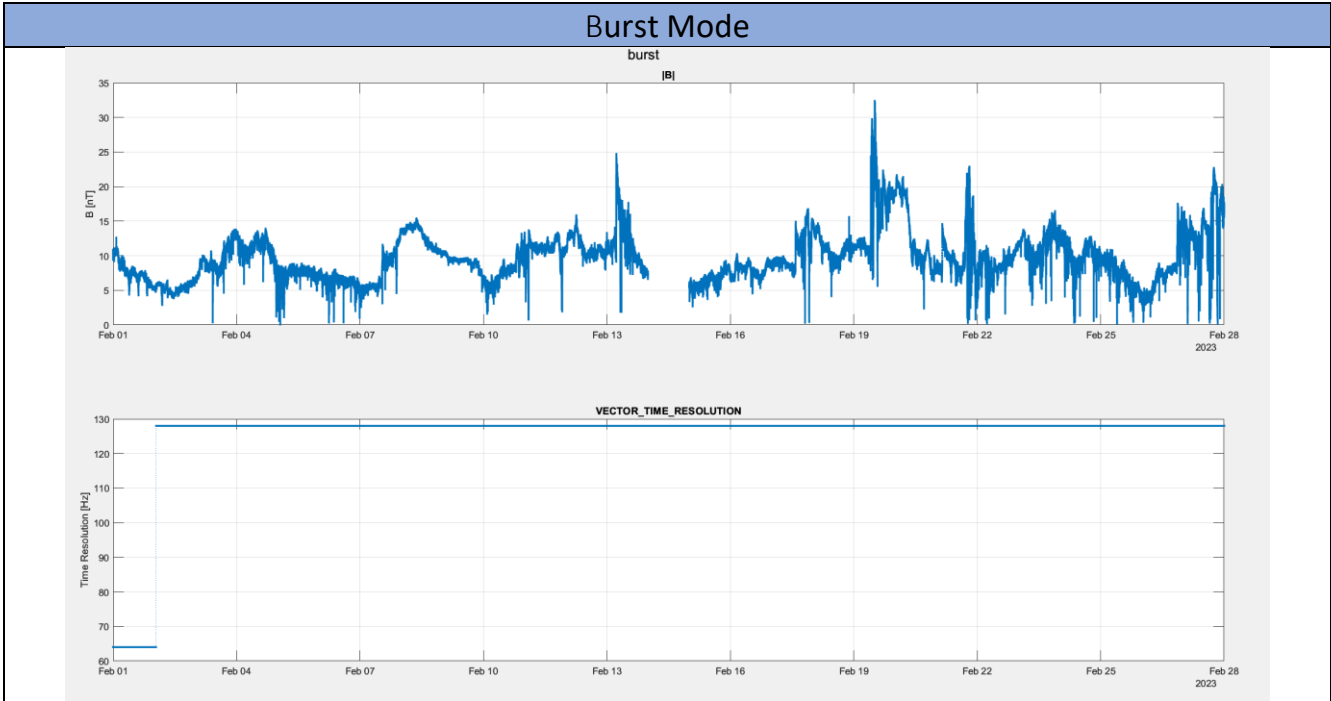
Normal Mode



Operations	1 February – 28 February	Science phase throughout period, normal data produced.
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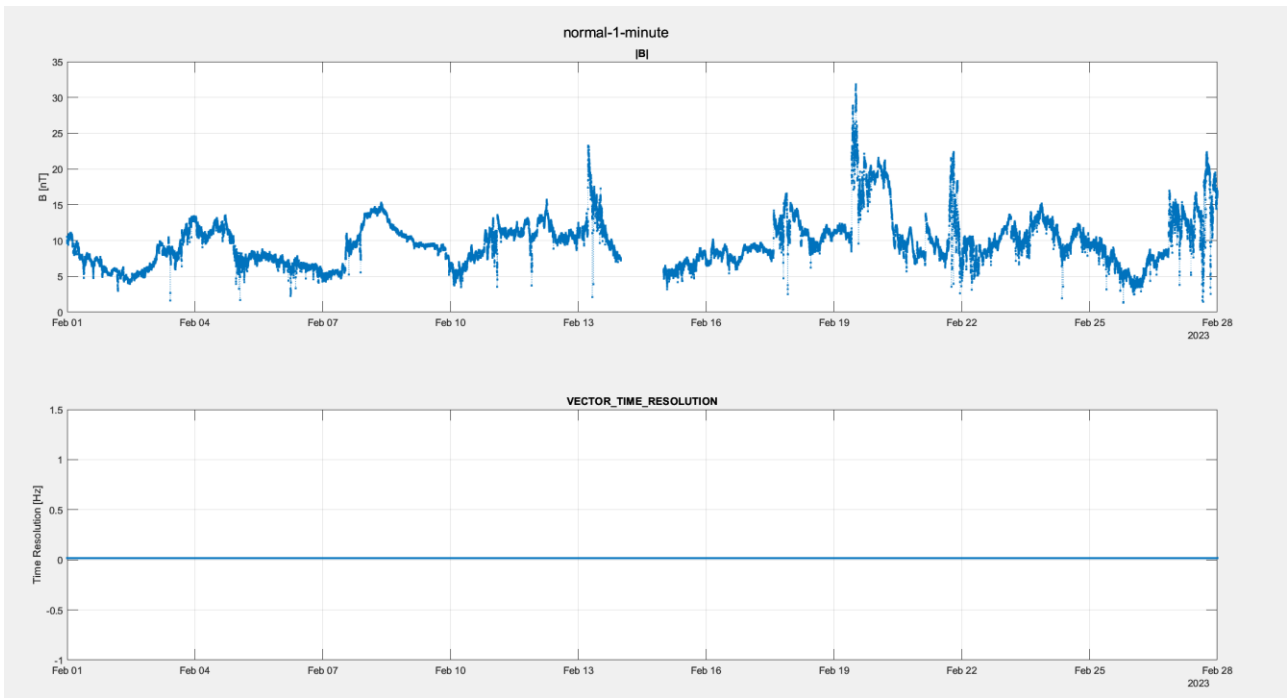
Operational Events of Note	14/02 01:35 Sensor temperature set point changed from -60C to -90C
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Normal mode data is produced from the burst mode stream when it is available, as is the case this month. This can produce small changes in the time sampling of the data over the transition; these are smaller than the cadence of 1/8 of a second.

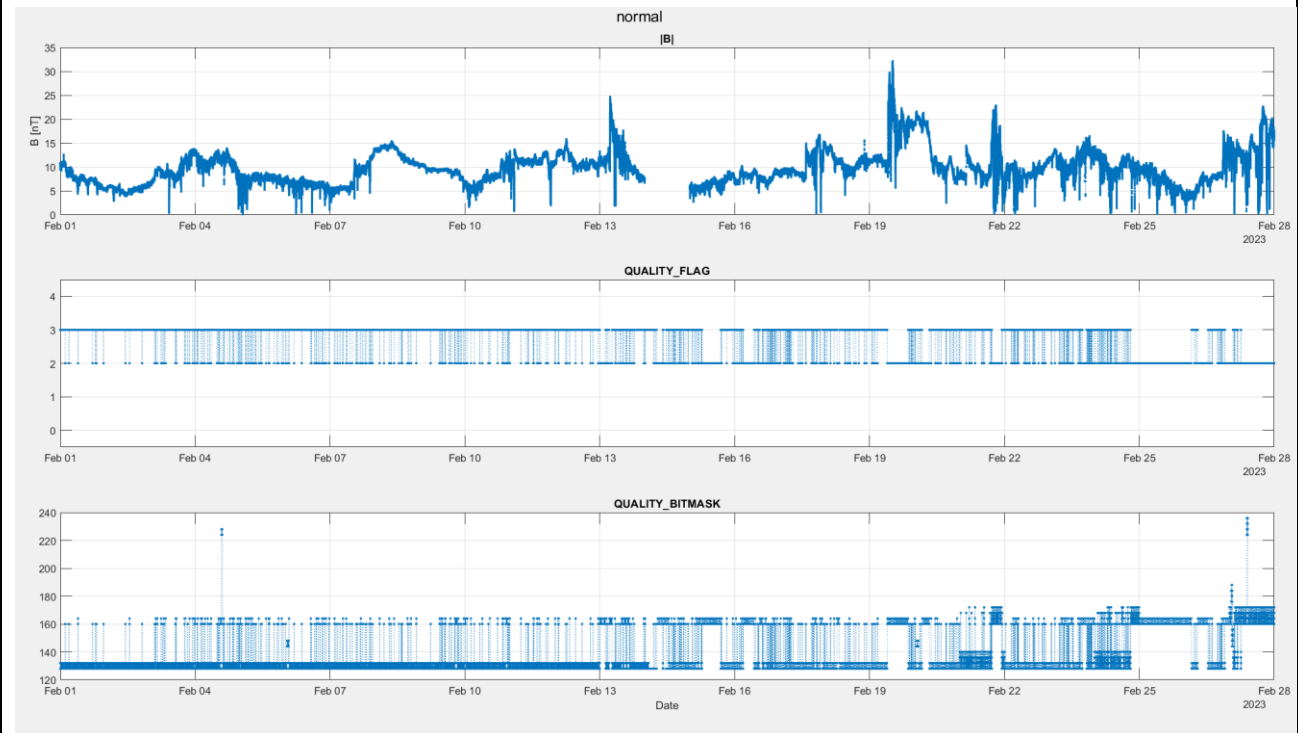


Coverage	From	To	Coverage
	02/02	28/02	24h of 128 vectors/s
	01/02	01/02	24h of 64 vectors/s

Normal – 1min



Quality bitmask



Quality bit mask events

SC events which disturb the field	<ol style="list-style-type: none"> 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	StartTime	EndTime	Comment
	13/02/2023 00:05	13/02/2023 03:05	Battery top up event interference affecting IBS
	27/02/2023 09:00	28/02/2023 20:20	IBS temperature change due to SA event. Affects OBS as well
	27/02/2023 09:00	28/02/2023 20:20	SA event affecting IBS & OBS - temperature setpoint change

Offsets



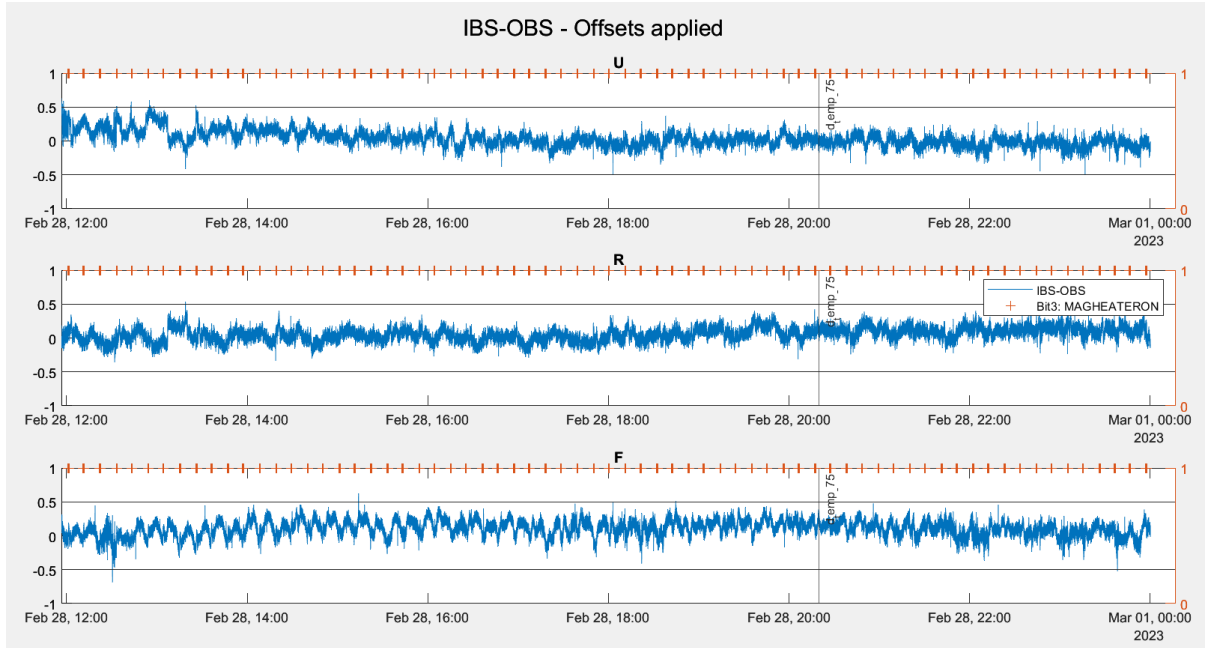
1 Feb – 28 Feb:

The OBS and IBS changed on the 14th as expected due to the sensor temperatures being lowered. The OBS offsets followed a linear trend throughout the rest of the month, with the OBS X offset being affected by a solar array (SA) event on the 27th. The IBS Y, Z offsets also changed due to the solar event on the 27th. Between these events, the offset linearly changed, and the trend has been chosen accordingly.

OffsetNumber	Date	OBSX	OBSY	OBSZ	IBSX	IBSY	IBSZ	Comment
220964	29/01/2023 12:00					84.3		IBSY linear trend
220965	30/01/2023 12:00		-97.77					OBSY linear trend
220966	31/01/2023 12:00			-6.7				OBSZ linear recovery
220967	01/02/2023 12:00					84.54		IBSY linear trend
220968	02/02/2023 12:00	-40.26		-6.65		84.54	16	OBSX,OBSZ,IBSY linear trend
220969	04/02/2023 13:59				-46.5		16	SA event
220970	04/02/2023 14:07				-47.1		16.4	SA event end
220972	07/02/2023 12:00		-97.77					OBS Y trend
220974	14/02/2023 01:35	-39.9	-97.6	-6.7	-47.89	84.5	16.4	Temp change start -60 to -90
220975	14/02/2023 06:50	-39.33		-5.3	-49.2	85.05	15.6	Temp change end -60 to -90
220976	16/02/2023 12:00		-97.67					OBS Y trend
220977	20/02/2023 12:00		-97.67					OBS Y trend
220978	23/02/2023 12:00		-97.39					OBS Y trend
220979	25/02/2023 12:00					85.09		IBS Y trend
220981	27/02/2023 09:10	-39.33			-49.15	85.25		SA event start
220982	27/02/2023 10:23	-38.88			-49.69	85.49		SA event end
220983	02/03/2023 12:00	-38.88	-97.39	-5.3	-49.69	85.49	15.6	OBS,IBS continuation of trends

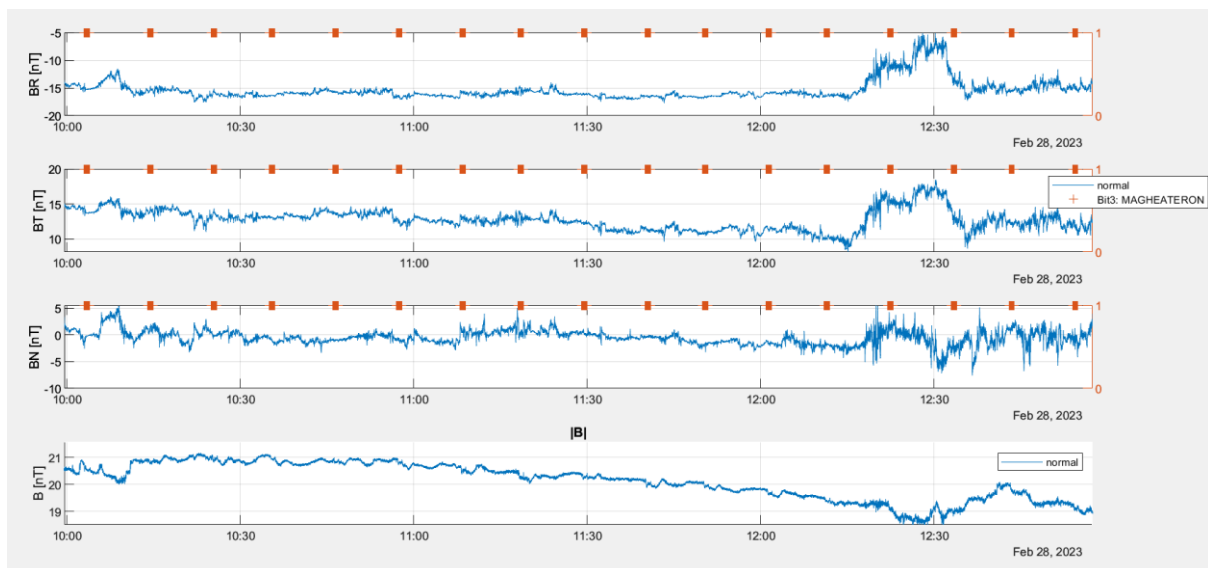
Residual MAG heater signal in data

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 after the solar array event on the 27th 9:10 which resulted in a change in the heater duty cycle. 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 February 28 2022. 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 28/02) 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.

Appendix

Appendix A: Files within this release

Filename
solo_L2_mag-rtn-burst_20230201_V01.cdf
solo_L2_mag-rtn-burst_20230202_V01.cdf
solo_L2_mag-rtn-burst_20230203_V01.cdf
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