



25 August 2023 (report covers data release for 1 March – 31 March 2023)

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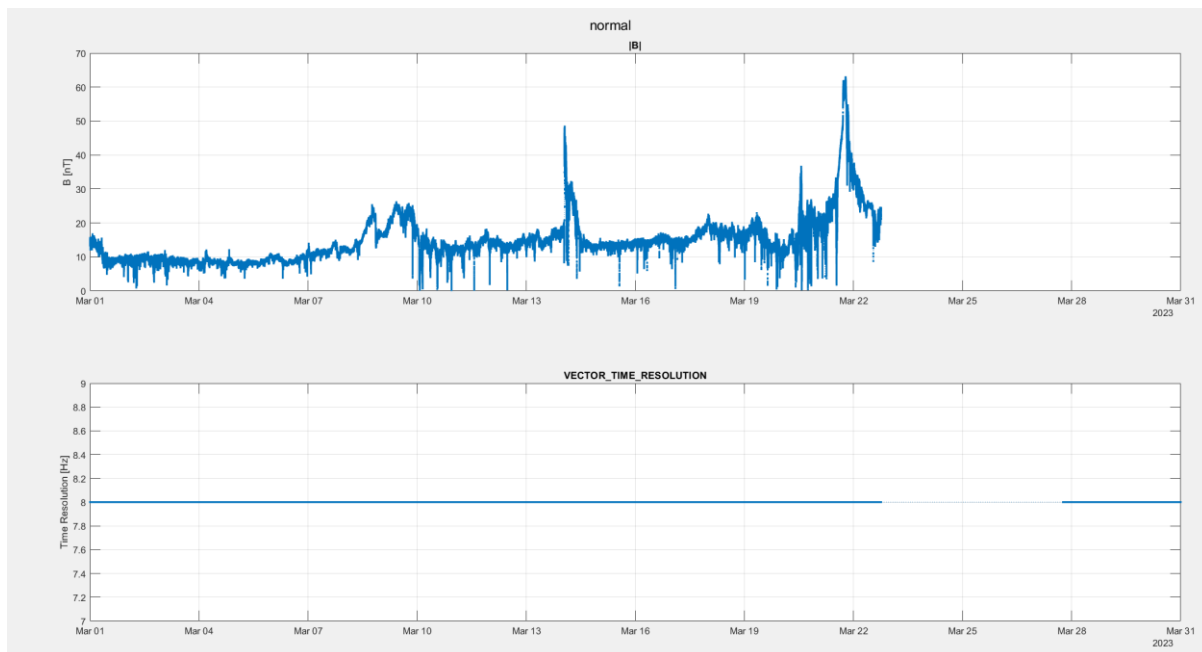
Data Summary

MAG was powered on for March, except for the 24-27th due to a SSMM FDIR triggered payload switch off at 10:45:20 24/03/2023. Due to the SSMM being restarted, science data was also lost from 18:16 22/03/2023 up until the MAG OFF. Following the payload switch off, at 24/03/2023 11:00 the sensors temperatures were raised to -60C, rather than the nominal -90C. At 30/03/2023 01:45 the temperatures were lowered back to the nominal temperature of -90C. The offsets were disturbed by this temperature change and the MAG OFF. During the calibration process this disturbance was not able to be characterised with sufficient accuracy, therefore the data from the MAG ON to the end of the month has not been released. Please contact the team if you have a special need for this data. There were CME events on the 14<sup>th</sup> and 21<sup>st</sup>.

BM is available at 128 vectors/s from 01-13/03, and 21-23/03 with BM being available at 64 vectors/s 14-20/03.

The spacecraft started the month at 0.73AU on the 1<sup>st</sup> of March and at the end of the month it was at 0.37AU from the Sun.

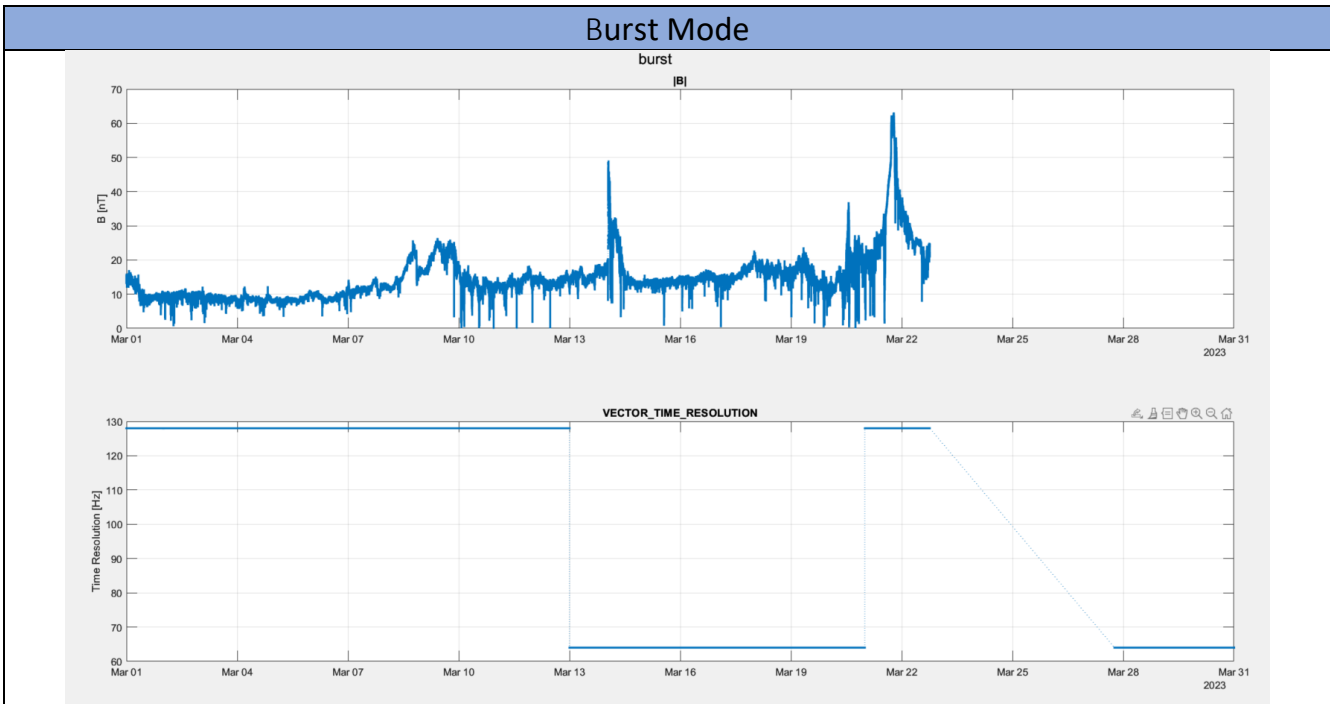
Normal Mode



Operations	1 March– 31 March	Science phase throughout period except for MAG OFF 24-27th, normal data produced.
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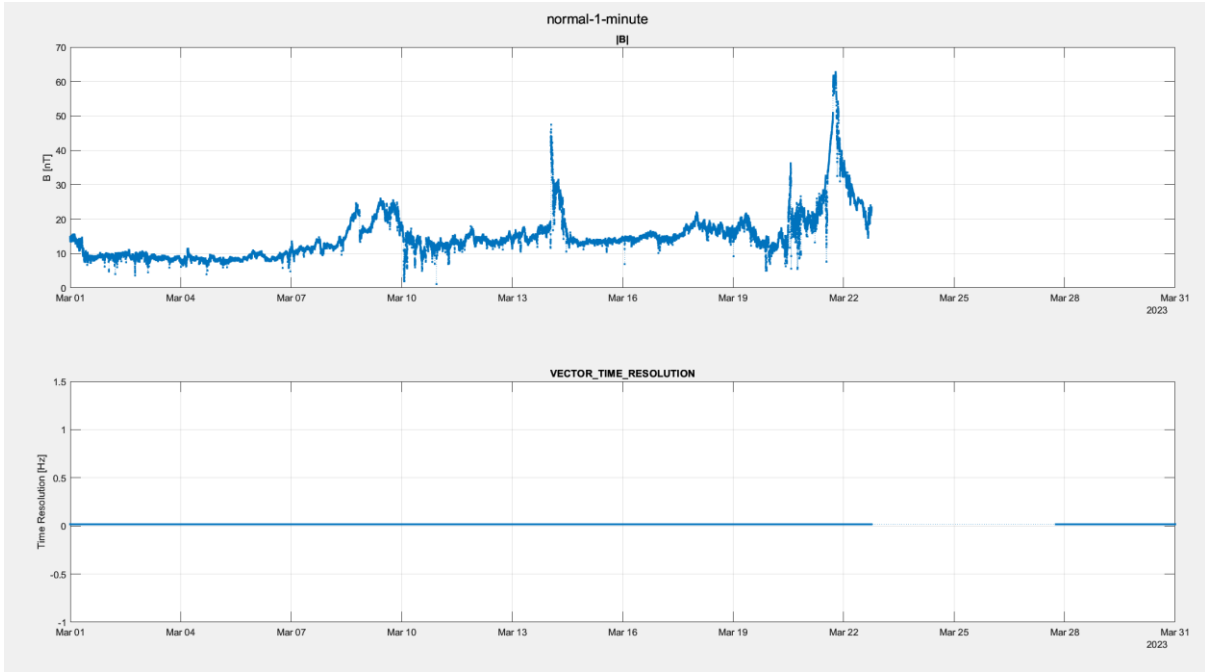
Operational Events of Note	24/03/2023 11:00 Sensor temperature set point changed from -60C to -90C 30/03/2023 01:45 Sensor temperature set point changed from -90C to -60C
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Normal mode data is produced from the burst mode stream when it is available, 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.

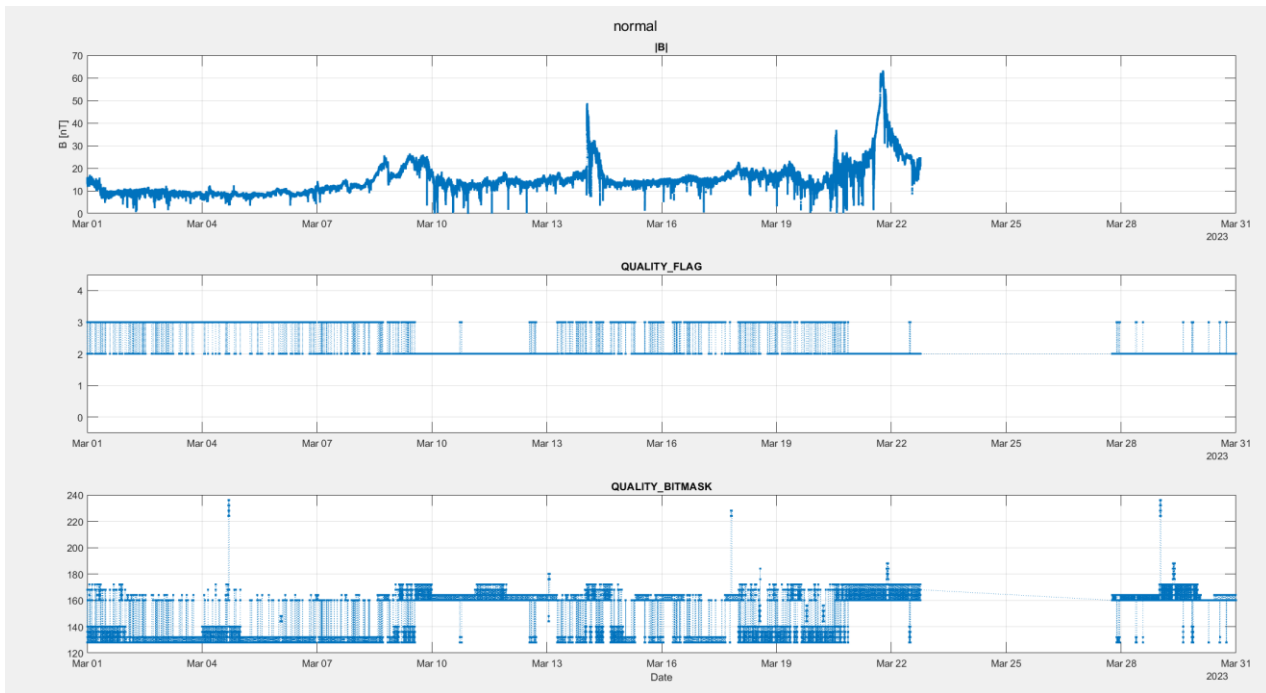


Coverage	From	To	Coverage
	01/03	13/03	24h of 128 vectors/s
	21/03	23/03	24h of 128 vectors/s
	14/03	20/03	24h of 64 vectors/s

### Normal – 1min



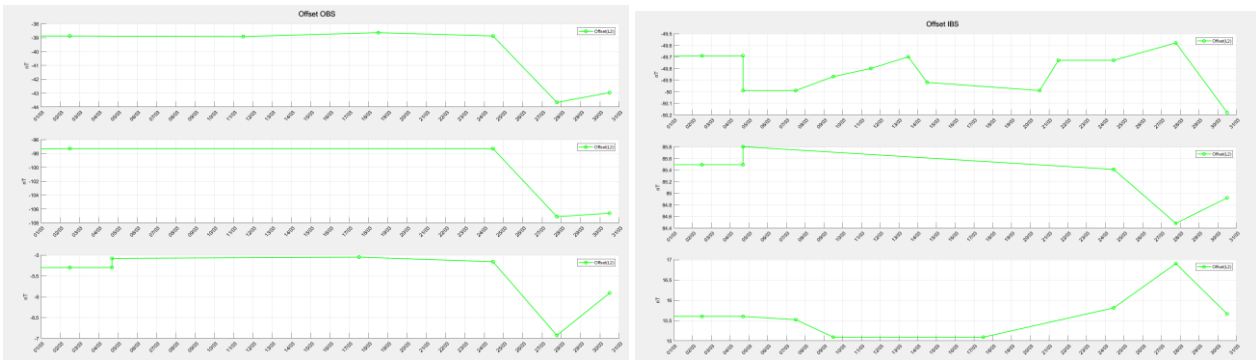
### Quality bitmask



Quality bit mask events

SC events which disturb the field	<ol style="list-style-type: none"> <li>1. Solar array movements (solar array angle is changed, and then remains at new angle due to sun-SC distance thermal constraints)</li> <li>2. High gain antenna movements</li> <li>3. Battery Top Up</li> </ol>		
SC related issues	StartTime	EndTime	Comment
	17/03/2023 19:28	18/03/2023 10:47	SA event affecting OBS

Offsets



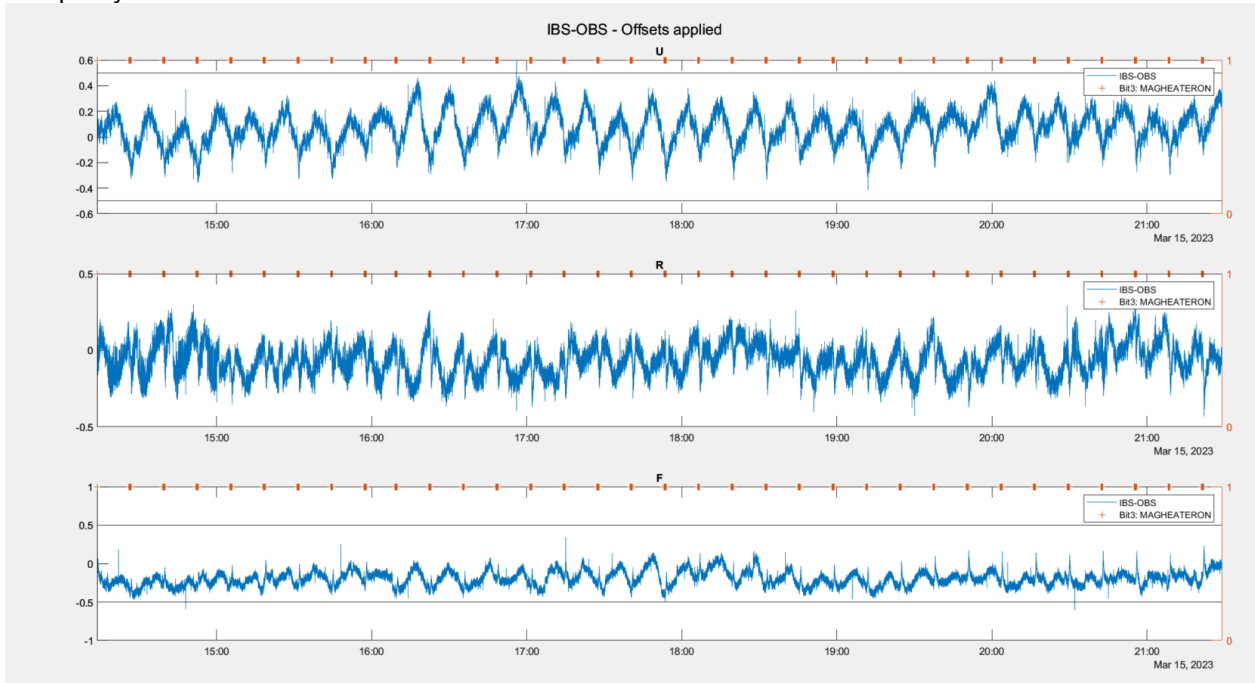
1 Mar – 31 Mar:

The OBS and IBS changed on the 27<sup>th</sup> as expected due to the MAG OFF event. The OBS offsets followed a linear trend throughout the rest of the month, with the IBS & OBS Z offset being affected by a solar array (SA) event on the 4<sup>th</sup>. Between these events, the offset linearly changed, and the trend has been chosen accordingly.

OffsetNumber	Date	OBSX	OBSY	OBSZ	IBSX	IBSY	IBSZ	Comment
220977	27/02/2023 09:10	-39.33	-97.39	-5.3	-49.15	85.25	15.6	SA event start
220978	27/02/2023 10:23	-38.88			-49.69	85.49		SA event end
220979	02/03/2023 12:00	-38.88	-97.3					OBS X,Y trend
220980	04/03/2023 16:30			-5.3	-49.69	85.49		SA event start
220981	04/03/2023 16:31			-5.08	-49.99	85.8	15.6	SA event end
220982	07/03/2023 12:00				-49.99		15.52	Trend in IBS Y,Z
220983	09/03/2023 12:00				-49.87		15.09	Trend in IBS Y,Z
220984	11/03/2023 12:00	-38.92			-49.8			Trend in OBX, IBS X
220985	13/03/2023 12:00				-49.7			Trend IBSX
220986	14/03/2023 12:00				-49.92			Trend IBSX
220987	17/03/2023 12:00			-5.05			15.09	Trend in OBZ after temperature change
220988	18/03/2023 12:00	-38.64						Trend OBS X
220989	20/03/2023 12:00				-49.99			Trend IBSX
220990	21/03/2023 12:00				-49.73			Trend IBSX
220991	24/03/2023 10:45	-38.88	-97.3	-5.16	-49.73	85.41	15.81	Offsets set pre MAG OFF
220992	27/03/2023 18:18	-43.67	-107.11	-6.93	-49.58	84.48	16.9	Recovery post MAG OFF
220993	30/03/2023 12:00	-42.96	-106.61	-5.91	-50.18	84.92	15.66	Recovery post MAG OFF

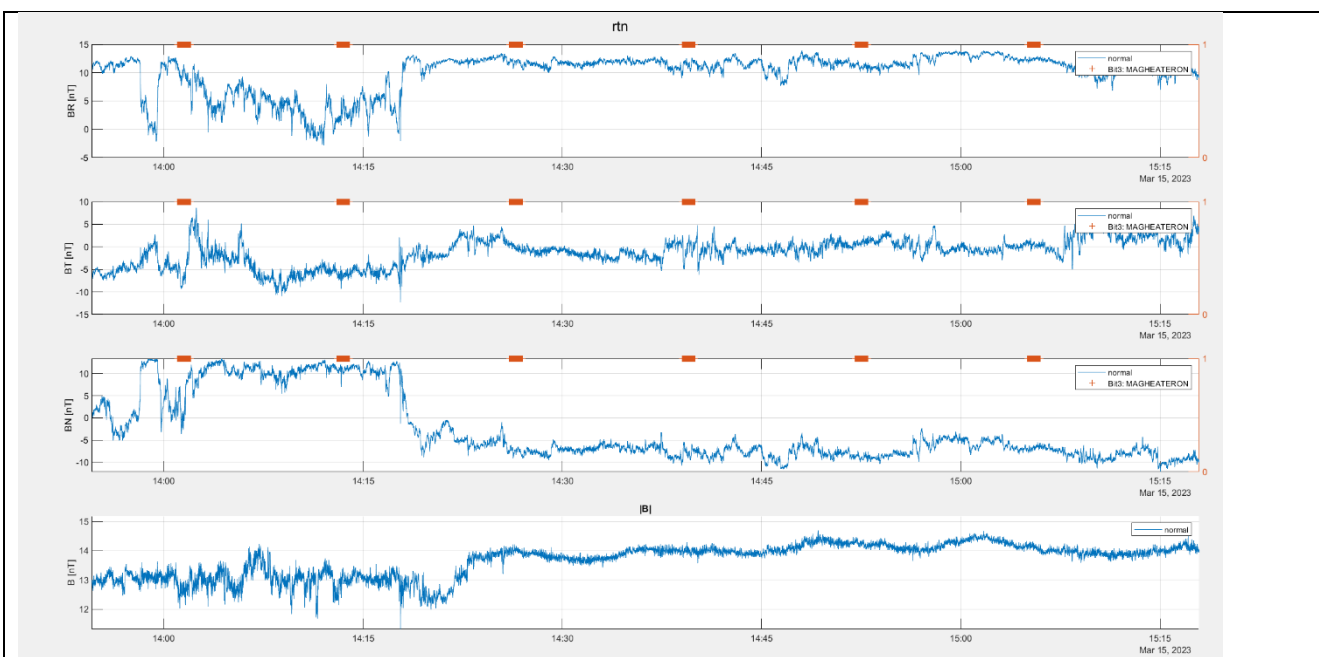
## Residual MAG heater signal in data

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. 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 March 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 15-16/03) 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_20230301_V01.cdf
solo_L2_mag-rtn-burst_20230302_V01.cdf
solo_L2_mag-rtn-burst_20230303_V01.cdf
solo_L2_mag-rtn-burst_20230304_V01.cdf
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solo_L2_mag-rtn-burst_20230306_V01.cdf
solo_L2_mag-rtn-burst_20230307_V01.cdf
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