



29 August 2023 (report covers data release for 1-30 June 2022)

Report Version	3	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.

V1:

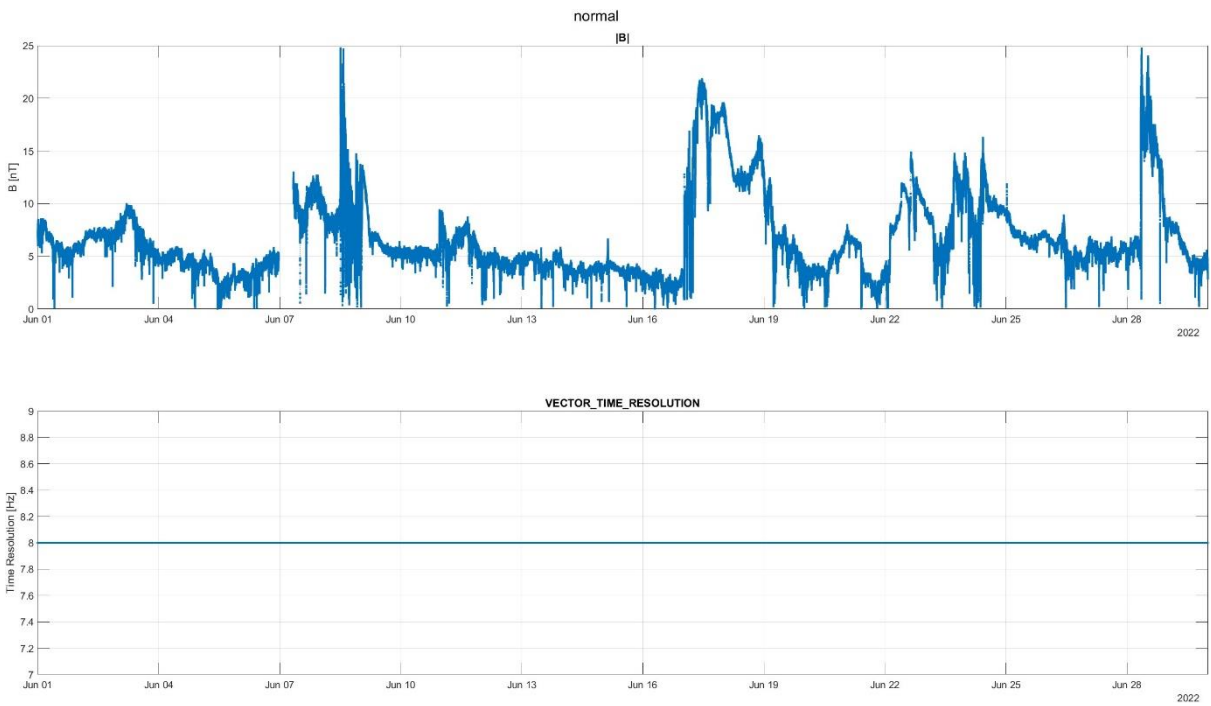
MAG was on for the period 1-30 June 2022. No burst mode data is available for the whole month.

On 06/06 the temperature set point for both IBS and OBS changed from -60 to -90 °C, influencing the offsets of both sensors. The data covering the transition between the temperatures has not been released as it is highly disturbed due to heater cycles instability.

Spacecraft noise was observed particularly in IBS data for several periods (there was significant noise for a total of 41 hours in the period 1-30 June 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 spacecraft started the month at 0.93AU and at the end it was at 1.01AU from the Sun.

Normal Mode



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

Operations	1-30 June	Science phase throughout period, normal data returned
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Operational Events of Note	None
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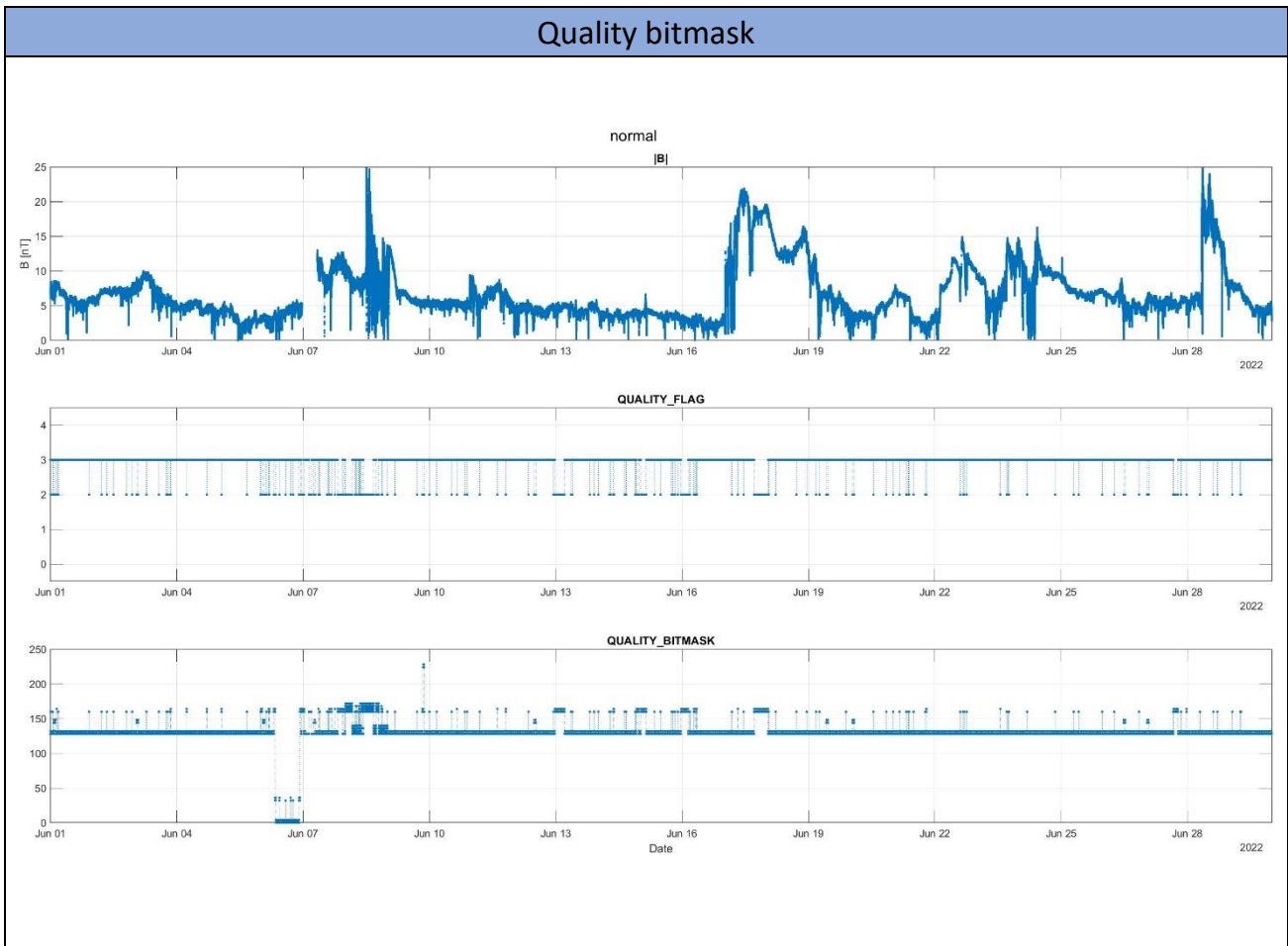
Data Gaps greater than one minute:

NaNs have been introduced during the noisiest periods because the data was highly disturbed. See Appendix for details.

Burst Mode

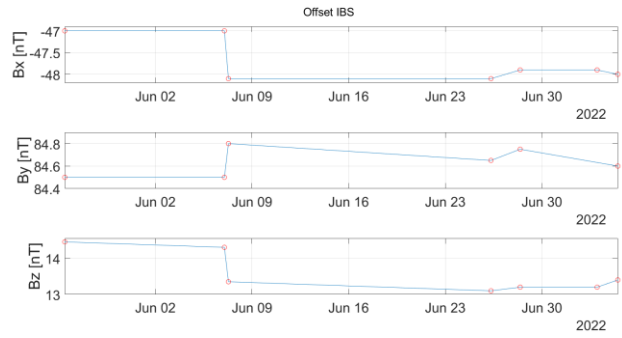
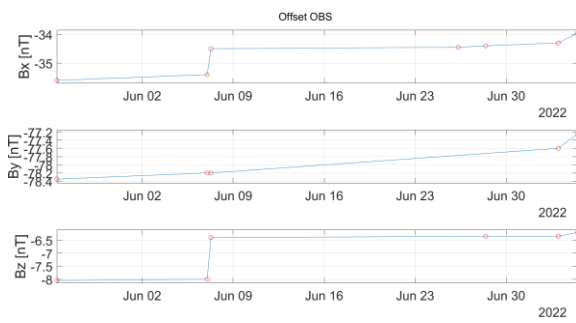
No BM available in June

Coverage	From	To	Coverage
	01/06	30/06	No BM



Quality bit mask events													
SC events which disturb the field	<ol style="list-style-type: none"> 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	<table border="1"> <thead> <tr> <th>Time</th> <th>Reason</th> </tr> </thead> <tbody> <tr> <td>01/06/2022 04:40-03/06 08:10</td> <td>HGA movement</td> </tr> <tr> <td>06/06 00:00</td> <td>Battery top up event</td> </tr> <tr> <td>06/06 23:25</td> <td>IBS and OBS temperature set point change</td> </tr> <tr> <td>09/06</td> <td>Solar array relubrication</td> </tr> <tr> <td>30/06</td> <td>Solar array relubrication</td> </tr> </tbody> </table>	Time	Reason	01/06/2022 04:40-03/06 08:10	HGA movement	06/06 00:00	Battery top up event	06/06 23:25	IBS and OBS temperature set point change	09/06	Solar array relubrication	30/06	Solar array relubrication
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Offset



1-30 Jun:

Both sensor offsets changed when the temperature set points changed. After that, OBS offsets linearly increased.

Offset	Date	OBSX	OBSY	OBSZ	IBSX	IBSY	IBSZ	Comment
220504	26/05/2022 10:29	-35.60	-78.35	-8.05	-47	84.5	14.45	Post SA movement from 30 to 0 deg
220504	07/06/2022 00:00	-35.40	-78.2	-8	-47	84.5	14.3	Pre change sensor temperature
220601	07/06/2022 07:00	-34.50	-78.2	-6.4	-48.1	84.8	13.35	Post change sensor temperature
220602	26/06/2022 07:30	-34.45			-48.1	84.65	13.1	Change linear trend both
220603	28/06/2022 10:15	-34.40		-6.35	-47.9	84.75	13.2	Change linear trend both
220604	04/07/2022 00:00	-34.30	-77.6	-6.35	-47.9		13.2	Pre TCM
220605	05/07/2022 12:00	-33.95	-77.25	-6.2	-48	84.6	13.4	Post TCM

SC Interference Re-Release

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.

Appendix

Appendix – Periods now released

StartTime	EndTime	Comment
06/06/2022 23:25	07/06/2022 08:00	Offset disturbance caused change in temp set point
08/06/2022 00:00	08/06/2022 04:00	SC interference
08/06/2022 14:00	08/06/2022 15:30	SC interference
09/06/2022 20:23	09/06/2022 20:30	SA lubrication
12/06/2022 23:45	13/06/2022 05:00	SC interference
14/06/2022 22:00	14/06/2022 22:30	SC interference
15/06/2022 00:30	15/06/2022 03:30	SC interference
16/06/2022 00:00	16/06/2022 03:30	SC interference
17/06/2022 17:00	18/06/2022 01:00	SC interference
27/06/2022 16:15	27/06/2022 18:10	SC interference
30/06/2022 16:15	30/06/2022 20:28	SA lubrication

Appendix B: Files within this release

Filename
solo_L2_mag-rtn-normal-1-minute_20220601_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220602_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220603_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220604_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220605_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220606_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220607_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220608_V01.cdf
solo_L2_mag-rtn-normal-1-minute_20220609_V01.cdf
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