

# ANOMALIES (01.01.2008 - 31.12.2008)

On June 22 2003 the ERS-2 tape recorder became permanently unavailable due to a technical failure. The ERS-2 tape recorders were used to record the ERS-2 Low Rate mission globally. After eight years of continuous acquisition, this service was discontinued. The ERS-2 Low Rate mission is continued within the visibility of ESA ground stations over Europe, North Atlantic, the Arctic, Antarctica and western North America.

Additionally the DLR Antarctic Receiving Station at the O'Higgins base is providing GOME data in near-real time since 22 October 2003, allowing the monitoring of the ozone hole over the South Pole to resume; during year 2006 two new stations have been added Hobart (13 February 2006), and Singapore (18 October 2006). In 2007 the station of Chetumal (Mexico, 19 October 2007) has been added. In 2008 the station of Johannesburg (South Africa, 17 July 2008) has been added. Currently GOME data are acquired at the following ground stations:

Kiruna (Sweden), Maspalomas (Canary Islands, Spain), Gatineau and Prince Albert (Canada), McMurdo (Antarctica), Matera (Italy), Singapore, Beijing (China), Miami (USA), Chetumal (Mexico), Hobart (Tasmania), Johannesburg (South Africa), O'Higgins (Antarctica).

In 2008 padded frames (frame 20) occurred (February-September; from 18<sup>th</sup> December on) due to ATSR/IRR switch off. This feature disappeared after ATSR IRR switch on (3 February 2009, without heater and stirling coolers to minimize power consumption).

Special GOME operations such as the operational switch off/switch-on in time tag (on calendar days 04, 14, 24 each month) are continued after the unavailability of the tape recorders. Nevertheless due to the non completeness of data, analysis on cooler switchings and instrument switch-offs cannot be performed and detailed information is missing in the tables below.

Quarterly calibration is operated in the following way:

5 Calibration orbits are scheduled for 28 January, 28 April, 28 July, 28 October each calendar year started in October 2004.

The yearly report gives an overview on Lamp Failures as well as on nominally executed calibration lamp sequences. The

**listed are:**

- 1. single event upsets**
- 2. patches of the on-board software**
- 3. cooler switchings**
- 4. list of datagaps due to anomalies or special GOME instrument operations**
- 5. timeline interruption (operation in static nadir view)**
- 6. narrow swath timeline GMNNOT41**
- 7. commanding problems - incorrect timelines executions**
- 8. moon measurements**
- 9. lamp failures**
- 10. Calibration Lamp Sequences without Lamp Failure**
- 11. other events**

**single event upsets:**

Date	reason
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03-04/02/08	GOME anomalous data during orbits 66860 - ~66883 High channel summation values for channels 2 and 4; this anomaly was cured with the operational time tag GMN11, switch off/on of GOME day 04/02/08, 13:00, data starting with
24/03/08	GOME anomalous data during orbit 67585, ~14:00i; ~15:00i; - 3xNack flag is set contiguously; scan mirror position is set to 261.8 deg continuously (no scanning); - incr of thermal environment related to scan mirror (scan mirror unit, scan motor, etc) this anomaly was cured with the operational time tag GMN11, switch off/on of GOME at 15:13; data starting with orbit 67586 are nominal again
16-17/04/08	GOME anomalous behavior during orbits 67915 - 67925, ~17:30 (16/04/08) 13:21 (17/04/08) - GOME high channel 1 summation values - GOME this anomaly was cured with the operational time tag GMN11, switch off/on; starting from orbit 67926 data are nominal again
14/05/08	GOME anomalous behavior during orbits 68309 - 68311, ~03:50 i; 08:23 i; FPA temperatures channel 2, Scan Mirror and Motor temperatures, Pre-Disp Prism, Sun Diffuser, Calibration Unit Temperatures, etc. out of range; this anomaly was cured with the operational time tag GMN11, switch off/on starting from orbit 68311 data are nominal again
25/07/08	GOME unpowered, start; 13:34:27, stop ca 16:27, orbits 69345-69347; FPA1 temperature, RTMi; and APM latch upcounters out of limits; MPS resumed at ca 21:12
04-05/08/08	GOME anomalous behavior during orbits 69491 of 04/08/2008 (UTC ca 18:00) until orbit 69497 of 05/08/2008 (UTC ca 03:20) - 3xNack flag set continuously; scan mirror position set to 261.8 deg continuously; scan motor temp. increased by ca 40 deg; scan unit temp. increased by ca 20 deg; scan mirror temp. increased by ca 10 deg; scan motor current value at 64322 BU, instead ca. 38000; - no narrow swath executed due to anomaly; this anomaly was cured with two GOME Power Cycle (GMN11) on 05/08/2008, at 03:13:16 and at 04:53:51; data of day 05/08/2008, ca 05:00, orbit 69498, are nominal again
27/08/08	GOME unpowered, start; at ~01:56, stop at ~ 07:30 (ERS-2 Unavailability Report 2008030), orbits 69811-69814; FPA1 temperature out of limits; MPS resumed at 10:33:51
04-05/09/08	GOME anomalous behavior during orbits 69935 of 04/09/2008 (UTC ca 18:00) until orbit 69940 of 05/09/2008 (UTC ca 02:00) - 3xNack flag set continuously; scan mirror position set to 261.8 deg continuously; scan motor temp. increased by ca 40 deg; scan unit temp. increased by ca 20 deg; scan mirror temp. increased by ca 10 deg; scan motor current value at 64292 BU, instead ca 38000 - no narrow swath executed due to anomaly; this anomaly was cured with two GOME Power Cycle (GMN11) on 05/09/2008, at 02:01:37, orbit 69940, data at ca 02:30, orbit 69940, are nominal again
15-16/10/08	GOME unpowered start at ~15:38:08 stop at ~18:22:11, orbits 70520-70521: autonomous switch-off; (ERS-2 Unavailability Report 2008036); GOME anomalous behavior during orbits 70523-70525 of 15/10/2008 (UTC ca 20:00 until end of the day) until orbit 70530 of 16/10/2008 (UTC ca 09:00) - 3xNack flag set continuously; scan mirror position set to 261.8 deg continuously; scan motor temp. increased by ca 10 deg; scan mirror temp. increased by ca 10 deg; scan motor current value at 65535 BU, instead ca. 38000; this anomaly was cured with GOME Power Cycle (GMN11) on 16/10/2008, at 08:55:15, orbit 70530, data at ca 09:30, orbit 70531, are nominal again
19-20/11/08	GOME anomaly started on 19/11/2008 at ~12:00, orbit 71019, due to the anomaly data were not received at the ground stations although GOME was in working mode as from ESOC; anomaly was cured with GOME Power Cycle (GMN11) on 20/11/2008, at 17:26:27, orbit 71037, data at ca 17:47, orbit 71037, are nominal again
30-31/12/08	GOME anomaly started on 30/12/2008 at ~01:46, orbit 71600, intermittent cover error flag; the anomaly was cured with GOME Power Cycle (GMN11) on 31/12/2008, at ~14:18, orbit 71621; last occurrence was observed at ca 13:05

**patches of the on-board software:** none

**cooler switchings:**

Date	coolers off/on	maximum detector warm up temperature [Kelvin]
05/02/08	09:20:29 off	FPA 1: 261.2
06/02/08	~17:16 on	FPA 2: 262.3 FPA 3: 262.3 FPA 4: 262.4
19/02/08	08:41 off 12:05 on	FPA 1: 276.2 FPA 2: 277.0 FPA 3: 281.9 FPA 4: 276.7

02/04/08	07:52:53 off 09:28:11 on	FPA 1: 272.2 FPA 2: 272.9 FPA 3: 272.3 FPA 4: 272.8
25/07/08	13:34:27 off 17:56:29 on	FPA 1: 276.3 FPA 2: 277.2 FPA 3: 276.9 FPA 4: 277.2
27/08/08	~01:56 off 09:06:54 on	FPA 1: 276.1 FPA 2: 276.6 FPA 3: 279.3 FPA 4: 276.7
15/09/08 16/09/08	10:52:23 off 13:42:12 on	FPA 1: 251.2 FPA 2: 251.7 FPA 3: 251.4 FPA 4: 252.0
18/09/08	before 15:50:23 1/2 off 16:00:26 on	FPA 1: 262.3 FPA 2: 262.8 FPA 3: 262.3 FPA 4: 262.9
23/09/08	before 16:32:19 off 16:44:08 on	FPA 1: 262.2 FPA 2: 262.8 FPA 3: 262.3 FPA 4: 262.9
15/10/08	before 15:38:08 off 20:16:27 on	FPA 1: 273.1 FPA 2: 274.0 FPA 3: 273.7 FPA 4: 274.0
25/11/08	before 10:26:13 off 12:08:35 on	FPA 1: 275.9 FPA 2: 276.6 FPA 3: 276.2 FPA 4: 276.5
20/12/08 21/12/08	1/2~:22:08 (20/12/08) off 10:11:45 (21/12/08) on	FPA 1: 267.6 FPA 2: 268.5 FPA 3: 268.4 FPA 4: 268.6
31/12/2008	~ 14:20:45 off 14:20:58 on	FPA 1: 245.6 FPA 2: 245.8 FPA 3: 245.5 FPA 4: 245.9

**list of datagaps due to anomalies or special GOME instrument operations:** (For detailed information see monthly performance)

Date	Orbit	duration (GOME off/start of nominal operations)	reason
05-06/02/08	66895 - 66913	09:20:29 (05/02/08) - 17:03:18 (06/02/08)	data gap due to ERS2 unavailability (see unavailability report ER2- UNA2008/007)

16/02/08	67049	03:05:15 - 03:17:06	anomalous long science dump at GS, i <sub>c</sub> /2 no data processing possible
19/02/08	67095	08:41 - 10:11	data gap due to GOME switch-off because of i <sub>c</sub> /2 ATSR ICU power cycled (see unavailability report ER2-UNA2008/009)
27/02/08	67208	05:41:22 - 05:51:12	anomalous long science data dump at GS, no data processing possible
18/03/08	67501	16:50:33 - 17:00:04	anomalous long science dump at SG, i <sub>c</sub> /2 no data processing possible
02/04/08	67710	07:52:53 - 09:14:31	data gap due to instrument switch-off (see unavailability report ER2-UNA2008/013)
11/04/08	67843	13:55:59 - 16:13:13	data gap due to instrument unpowered i <sub>c</sub> /2 (FPA1 temperatures out of range) i <sub>c</sub> /2 (see unavailability report ER2-UNA2008/015)
25/07/08	69345 - 69346	13:50:37 - 15:08:00	data gap due to instrument switch-off (see unavailability report ERS2-UNA2008/027)
27/08/08	69811 - 69814	~01:56 - ~ 07:30	data gap due to instrument switch-off (see unavailability report ERS2-UNA2008/030)
15-16/09/08	70088 - 70103	10:52:23 (15/09/08) - 13:28:34 (16/09/08)	data gap due to ATSR-2 /GOME planned unavailability (see unavailability report ERS-2-UNA2008/033)
18/09/08	70129 - 70134	07:39:15 - 15:45:46	data gap due to ATSR-2 /GOME planned unavailability (see unavailability report ERS-2-UNA2008034)
23/09/08	70201 - 70206	08:21:12 - 16:29:28	data gap due to ATSR-2 /GOME planned unavailability (see unavailability report i <sub>c</sub> /2 ERS-2 2008035)
15/10/08	70520 - 70521	15:38:08 - 18:22:11	Autonomous switch-off i <sub>c</sub> /2 (ERS-2 Unavailability Report 2008036)
19/11/08 - 20/11/08	71019 - 71037	~12:00 (19/11/08) - i <sub>c</sub> /2 i <sub>c</sub> /2 i <sub>c</sub> /2 i <sub>c</sub> /2 i <sub>c</sub> /2 i <sub>c</sub> /2 i <sub>c</sub> /2 i <sub>c</sub> /2 i <sub>c</sub> /2 i <sub>c</sub> /2 i <sub>c</sub> /2 i <sub>c</sub> /2 i <sub>c</sub> /2 i <sub>c</sub> /2 i <sub>c</sub> /2 i <sub>c</sub> /2 17:26 (20/11/08)	Data gap due to GOME anomaly
25/11/08	71103	~08:40 - ~10:30	Data gap due to ERS2 planned unavailability (see unavailability report ERS-2-UNA2008041)
20-21/12/08	71469 - 71475	22:08:10 (20/12/08) - i <sub>c</sub> /2 i <sub>c</sub> /2 i <sub>c</sub> /2 i <sub>c</sub> /2 i <sub>c</sub> /2 08:28:44 (21/12/08)	Data gap due to GOME unpowered (see unavailability report ER-UNA-2008042)

**Timeline Interruption (operations in static nadir view):**

Date	Orbit No.	duration	reason
15/01/08	66596	12:26:29 - 13:35:04	GOME in Nadir Static View (see ER2-UNA-2008/002) due to PL synchronization
21/04/08	67988	18:02:19 - 19:19:05	GOME in Nadir Static View (see ER2-UNA 2008/0017) due to PL synchronization
16/06/08	68785	10:18:20 - 11:33:13	GOME in Nadir Static View (see ER2-UNA 2008/022) due to PL synchronization
20/06/08	68847	18:14:55 - 19:30:19	GOME in Nadir Static View (see ER2-UNA 2008/023) due to PL synchronization
29/06/08	68977	20:22:55 - 21:28:13	GOME in Nadir Static View (see ER2-UNA 2008/025) due to PL synchronization
01/09/08	69889	11:58:57 - 12:58:06	GOME in Nadir Static View (see ER2-UNA 2008/031) Timeline stopped/activated
14/11/08	70952 - 70953	19:32:53 - 21:03:16	GOME in Nadir Static View (see ER2-UNA 2008/038) due to PL synchronization
18/11/08	71008 - 71009	17:49:54 - 18:56:59	GOME in Nadir Static View (see ER2-UNA 2008/039) due to PL synchronization
20/11/08	71037	17:47:50 - 17:53:58	GOME in Nadir Static View (ESOC communication) Timeline stopped/activated
31/12/08	71621	before 14:20:45 - 14:20:58	GOME in Nadir Static View (ESOC communication)

**Narrow Swath Timeline GMNNOT41**

Date	Orbit No.	Duration
04-05/01/08	66440 - 66453	~14:00 (04/01/08) - ~11:30 (05/01/08)
14-15/01/08	66583 - 66595	~12:00 (14/01/08) - ~10:00 (15/01/08)
24-25/01/08	66726 - 66739	~14:00 (24/01/08) - ~11:00 (25/01/08)
04-05/02/08	66884 - 66895	~14:00 (04/02/08) - ~09:00 (05/02/08)
14-15/02/08	67026 - 67039	~12:30 (14/02/08) - ~10:00 (15/02/08)
24-25/02/08	67170 - 67183	~14:00 (24/02/08) - ~11:00 (25/02/08)
04-05/03/07	62062 - 62076	~18:00 (04/03/07) - ~15:30 (05/03/07)
14-15/03/07	62204 - 62217	~16:00 (14/03/07) - ~13:30 (15/03/07)
24-25/03/07	62348 - 62361	~17:30 (24/03/07) - ~15:00 (25/03/07)
04-05/04/08	67746 - 67759	~20:00 (04/04/08) - ~17:30 (05/04/08)
14-15/04/08	67890 - 67902	~21:00 (14/04/08) - ~18:30 (15/04/08)
24-25/04/08	68032 - 68045	~19:30 (24/04/08) - ~17:00 (25/04/08)
04-05/05/08	68176 - 68189	~21:00 (04/05/08) - ~18:00 (05/05/08)
14-15/05/08	68318 - 68331	~18:30 (14/05/08) - ~17:00 (15/05/08)
24-25/05/08	68462 - 68475	~20:00 (24/05/08) - ~18:00 (25/05/08)
04-05/06/08	68620 - 68633	~21:00 (04/06/08) - ~19:00 (05/06/08)
14-15/06/08	68762 - 68775	~19:00 (14/06/08) - ~17:00 (15/06/08)

24-25/06/08	68905 - 68919	~ 20:00 (24/06/08) - ~18:00 (25/06/08)
04-05/07/08	69047- 69061	~18:30 (04/07/08) - ~17:00 (05/07/08)
14-15/07/08	69192 - 69205	~20:00 (14/07/08) - ~17:30 (15/07/08)
24-25/07/08	69334 - 69349	~ 18:00 (24/07/08) - ~19:00 (25/07/08)
05/08/08	69497 - 69505	~03:30 - ~19:00
14-15/08/08	69636 - 69649	~21:00 (14/08/08) - ~18:30 (15/08/08)
24-25/08/08	69780 - 69791	~ 19:00 (24/08/08) - ~17:00 (25/08/08)
05/09/08	69940 - 69949	~02:00 - ~17:30
14-15/09/08	70080 - 70088	~21:00 (14/09/08) - ~10:30 (15/09/08)
24-25/09/08	70222 - 70235	~ 19:00 (24/09/08) - ~17:30 (25/09/08)
04-05/10/08	70364 -70377	~17:00 (04/10/08) - ~15:00 (05/10/08)
14-15/10/08	70506 - 70521	~15:00 (14/10/08) - ~15:30 (15/10/08)
24-25/10/08	70648 - 70662	~13:00 (24/10/08) - ~12:30 (25/10/08)
04-05/11/08	70806 -70819	~14:30 (04/11/08) - ~12:00 (05/11/08)
14-15/11/08	70948 - 70961	~12:30 (14/11/08) - ~10:30 (15/11/08)
24-25/10/08	71092 - 71103	~14:00 (24/11/08) - ~08:00 (25/11/08)
04-05/12/08	71234 -71249	~12:00 (04/12/08) - ~13:00 (05/12/08)
14-15/12/08	71378 - 71391	~13:30 (14/12/08) - ~11:00 (15/12/08)
24-25/12/08	71522 - 71535	~15:00 (24/12/08) - ~12:30 (25/12/08)

**Commanding Problems & Incorrect Timelines Executions:**

20/04/08	67970	Polar View Time duration longer than expected; Geolocation track during this time was not on Nominal Swath @ 960 Km
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**Moon Measurements: none**

**Lamp Failures:**

Date	Lamp Failure / Orbit	remark
30/01/08	Lamp Failure (no. 238 - 239) Orbit 66812	Lamp Failures occurred during TML 3 (CAT) calibration sequences
19/02/08	Lamp Failure (no. 240) Orbit 67097	Lamp Failures during TST44, voltage decreased at ca 180 V (nominal would be 198 V)
29/07/08	Lamp Failure (no. 241 - 246) Orbit 69395 - 69397	Lamp Failures occurred during TML 3 (CAT) calibration sequences
23/09/08	Lamp Failure (no. 247) Orbit 70206	Lamp Failures set during TST44, voltage at ca. 179 V (nominal would be 198 V)
25/11/08	Lamp Failure (no. 248) Orbit 71105	Lamp Failures set during TST44, voltage at ca. 176 V (nominal would be 198 V)





27/08/08	69815	before 09:06:08 - 09:06:54 Calibration lamp sequence without lamp failure and without lamp instability
16/09/08	70104	13:40:21 - 13:42:12 Calibration lamp sequence without lamp failure and without lamp instability
18/09/08	70134	before 15:50:22 - 15:50:47 Calibration lamp instabilities: some values at ca. 179 V (nominal would be 198 V)
18/09/08	70134	15:58:33 - 16:00:26 Calibration lamp sequence without lamp failure and without lamp instability
23/09/08	70206	16:32:29 - 16:34:28 Calibration lamp sequence without lamp failure and without lamp instability
28/10/08	70706	15:03:47 - 15:13:42 Calibration lamp instabilities: some values at ca 177 V (nominal would be 198 V)
28/10/08	70707	16:13:19 - after 16:22:17 Calibration lamp instabilities: some values at ca 181 V (nominal would be 198 V)
28/10/08	70707	16:44:23 - 16:54:19 Calibration lamp instabilities: some values at ca 181 V (nominal would be 198 V)
28/10/08	70708	before 18:10:10 - 18:12:40 Calibration lamp instabilities: some values at ca 182 V (nominal would be 198 V)
28/10/08	70709	19:48:35 - 19:53:18 Calibration lamp sequence without lamp failure and without lamp instability
28/10/08	70709	20:05:35 - after 20:15:05 Calibration lamp sequence without lamp failure and without lamp instability
28/10/08	70710	before 21:21:27 - 21:33:57 Calibration lamp sequence without lamp failure and without lamp instability
28/10/08	70711	before 22:58:14 - 23:14:26 Calibration lamp instabilities: some values at ca 182 V (nominal would be 198 V)
25/11/08	71105	11:56:56 - 11:58:56 Calibration lamp instabilities: some values at ca 182 V (nominal would be 198 V)
21/12/08	71476	before 10:00:24 - 10:02:06 Calibration lamp instabilities: some values at ca. 180 V (nominal would be 198 V)
21/12/08	71476	10:09:47 - 10:11:44 Calibration lamp sequence without lamp failure and without lamp instability

## Other Events

Date	Orbit	remark
06/02/08 - 14/02/08	66913 - 67032	products with padded frames (Frame 20), science data channel4 due to the ATSR/IRR being switched off
19/02/2008	67090 - 67104	products with padded frames (Frame 20), science data channel4 due to the ATSR/IRR being switched off
10/03/08 -02/05/08	67376 - 68134	GOME North Polar View operations
04/04/08 - 11/04/08	67735 - 67848	products with padded frames (Frame 20), science data channel4 due to the ATSR/IRR being switched off
14/04/08 -18/04/08	67877 - 67948	products with padded frames (Frame 20), science data channel4 due to the ATSR/IRR being switched off
06/05/08	68199 - 68200	products with padded frames (Frame 20), science data channel4 due to the ATSR/IRR being switched off
21/05/08	68413 - 68415	products with padded frames (Frame 20), science data channel4 due to the ATSR/IRR being switched off
22/05/08	68427 - 68429	products with padded frames (Frame 20), science data channel4 due to the ATSR/IRR being switched off
23/05/08	68438, 68439, 68443	products with padded frames (Frame 20), science data channel4 due to the ATSR/IRR being switched off
25/05/08	68471 - 68473	products with padded frames (Frame 20), science data channel4 due to the ATSR/IRR being switched off
26/05/08	68484 - 68485	products with padded frames (Frame 20), science data channel4 due to the ATSR/IRR being switched off
27/05/08	68500 - 68501	products with padded frames (Frame 20), science data channel4 due to the ATSR/IRR being switched off
28/05/08	68513 - 68515	products with padded frames (Frame 20), science data channel4 due to the ATSR/IRR being switched off
29/05/08	68528 - 68532	products with padded frames (Frame 20), science data channel4 due to the ATSR/IRR being switched off
30/05/08	68542 - 68544	products with padded frames (Frame 20), science data channel4 due to the ATSR/IRR being switched off
31/05/08	68556 - 68557	products with padded frames (Frame 20), science data channel4 due to the ATSR/IRR being switched off



01/06/08 - 30/06/08		products with padded frames in channel 4 (Frame 20) (over a few orbits of a limited area over the North Pole)
01/07/08 - 31/07/08		products with padded frames in channel 4 (Frame 20) (over a few orbits of a limited area over the North Pole)
01/08/08 - 31/08/08		products with padded frames in channel 4 (Frame 20) (over a few orbits of a limited area over the North Pole)
01/09/08 - 15/09/08		products with padded frames in channel 4 (Frame 20) (over a few orbits of a limited area over the North Pole)
17/09/08 -16/10/08	70110 - 70539	GOME South Polar View operations (not visible in the period 5 -17 Sept and 17-31 Oct due to missing data)
09/11/08	70872	anomalous long science dump at GS, no data processing possible
10/11/08	70884	anomalous long science dump at GS, no data processing possible
06/12/08	71256	anomalous long science dump at GS, no data processing possible
18/12/08 - 31/12/08		products with padded frames in channel 4 (Frame 20) due to the ATSR/IRR being switched off