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**Title** : **GOCE L1b Data Quality Control Report  
July 2011**

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## DOCUMENT CHANGE RECORD

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## 1. INTRODUCTION

### 1.1 Purpose and Scope

This document contains the Quality report for GOCE L1b data for July 2011.

The latest version of this document is available on the GOCE Data Quality portal at:

<http://earth.esa.int/GOCE/> → “Level 1b QC” → “Monthly”

The GOCE Data Quality portal is the principal source for any quality-related information on GOCE products.

<http://earth.esa.int/GOCE/> → “Level 1b QC”.

### 1.2 Glossary

The following acronyms and abbreviations have been used in this report.

ABBREVIATION	MEANING
EGG	Electrostatic Gravity Gradiometer
DFACS	Drag Free and Attitude control system
SST-I	Satellite-to-satellite tracking instrument
CTR	Control Voltages
STR	Star Tracker
Trace SD	Trace Spectral Density
ICM	Inverse Calibration Matrix
GAR	Gradiometer Angular Rates
FPM	Fine Pointing Mode

## 2. JULY 2011 OVERVIEW

- Anomalous oscillation found in gradients and IAQ datasets with impacts on trace at UTC 01/07/2011 03:57:13.
- Anomalous oscillation found in Uyy component of the gravity gradients tensor at UTC 10/07/2011 03:25:29 with impacts on trace.
- Gradients anomaly with impacts on trace at UTC 15/07/2011 05:45:45.
- S/C Anomaly: ADC register check test from UTC 21/07/2011 07:29:06 to 14:49:06. Gradients oscillations found at the start/stop times of the test due to load and restore of recombination matrices.

## 3. JULY 2011 DATA QUALITY ANALYSIS

### 3.1 Anomalous oscillation in gradients on 01<sup>st</sup> of July

The Gravity gradients trace spectral density is not nominal, during the 01<sup>st</sup> July reference period. Trace SD is reported in **Error! Reference source not found.**, below.

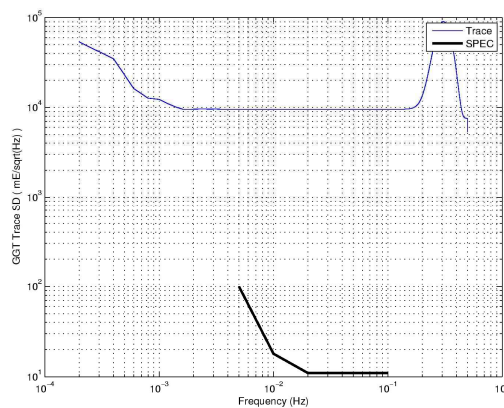


Figure 1 Current trace PSD (right), compared with previous days (left).

The not nominal behaviour of the trace PSD is due to an anomalous oscillation which affects the gradients time series occurred on 01<sup>st</sup> of July at 03:57:13:

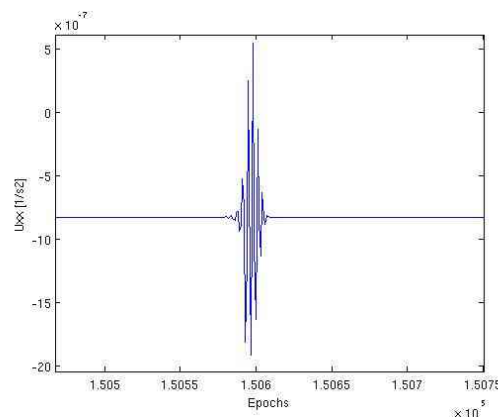
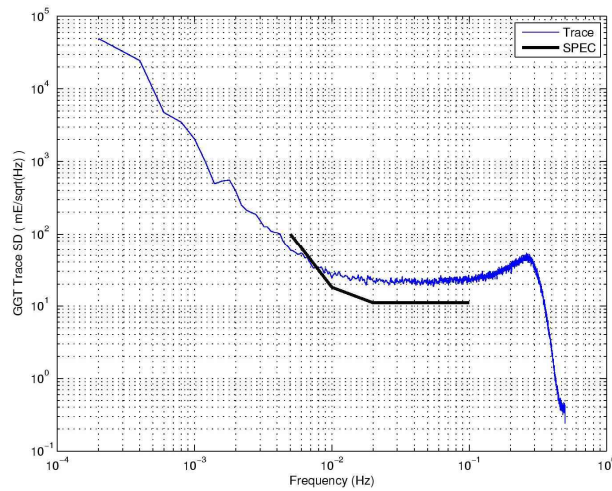


Figure 2 Uxx anomaly. The same anomaly affects Uyy and Uzz

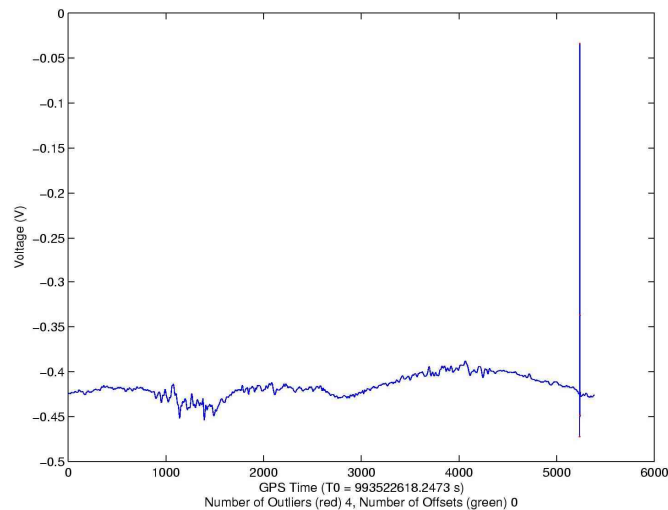
The oscillation has peak to peak amplitude of  $\sim 25e-7$  1/s<sup>2</sup>. The trace not considering the anomalous event is nominal as reported below:



**Figure 3 Trace PSD not considering the anomaly**

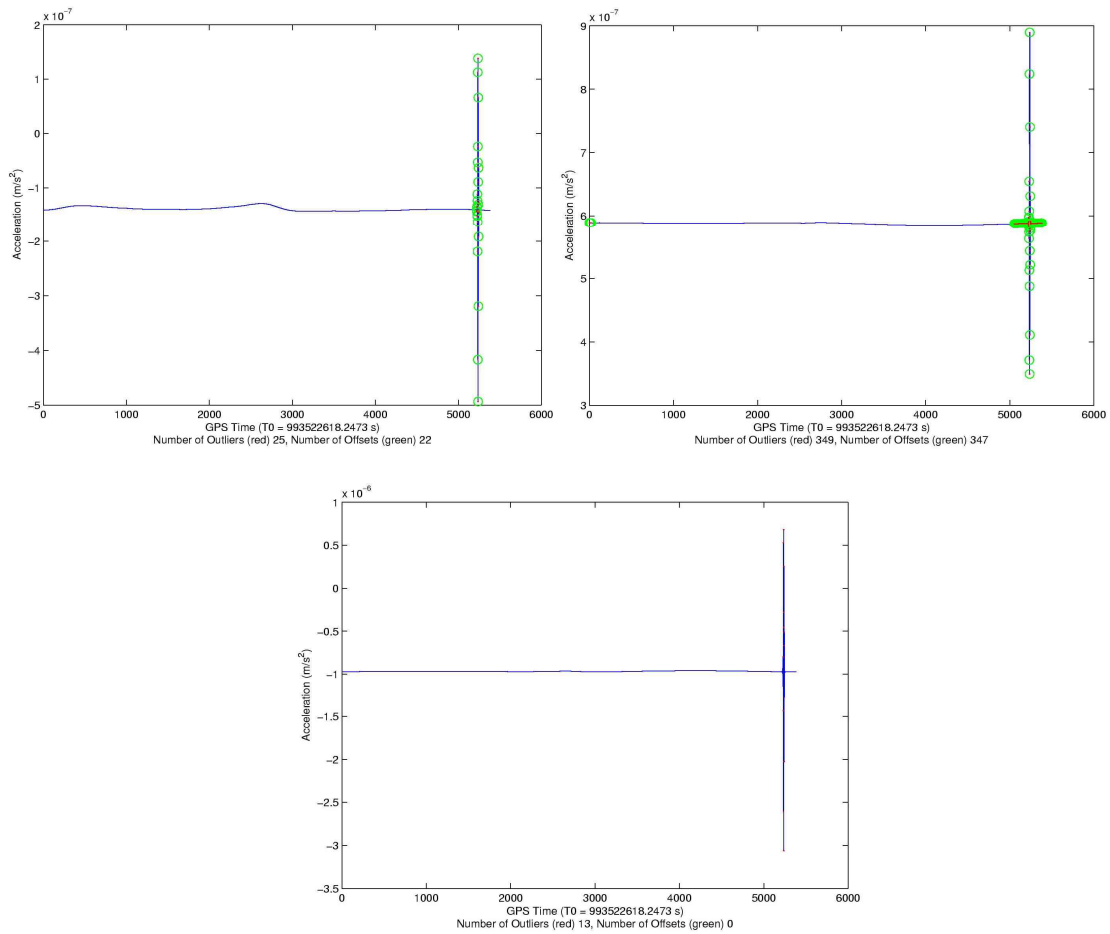
The anomaly affects also the following CTR components (figure 4 reports the components A3 Z1 for example):

- A3 Z1-2
- A4 X1-4 Z1-2
- A5 X1-4
- A6 Z1-2



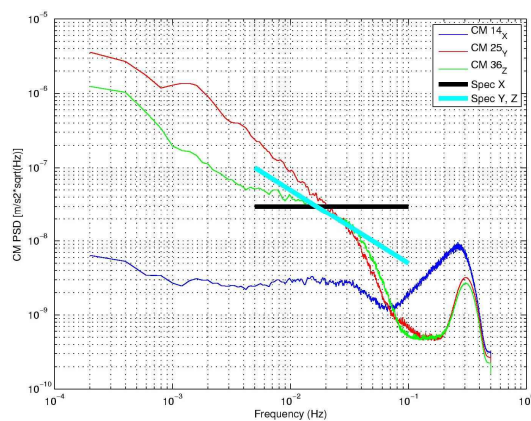
**Figure 4 The anomaly in CTR component A3\_Z1**

Below the effect of the anomaly in DM accelerations components 14\_X 25\_Y and 36\_Z which enters in the computation of the diagonal components of the gravity gradients tensor:



**Figure 5 DM components 14\_x (upper left) 25\_Y (upper right) and 36\_Z (center)**

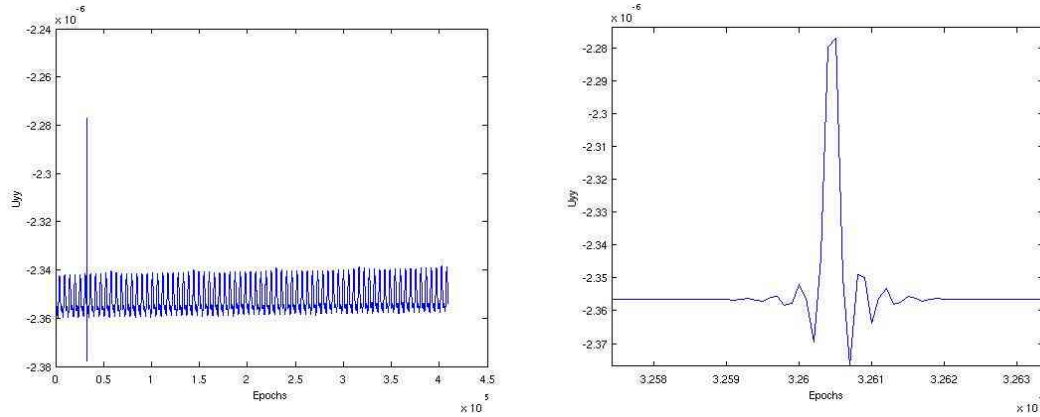
The CM PSDs show that during the reference period the three components have a non nominal behaviour at high frequencies due to the anomaly of 01<sup>st</sup> of July.



**Figure 6 CM PSDs**

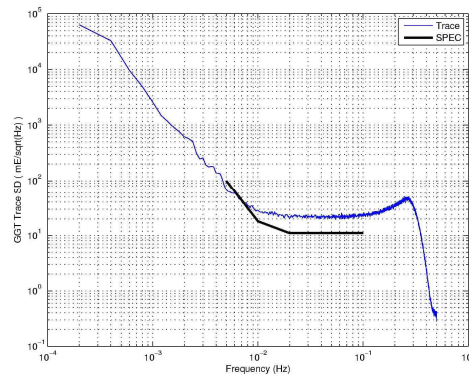
### 3.2 Uyy oscillation on 10<sup>th</sup> July

An anomalous oscillation occurred in Uyy time series at UTC 10/07 03:25:29, as reported below:



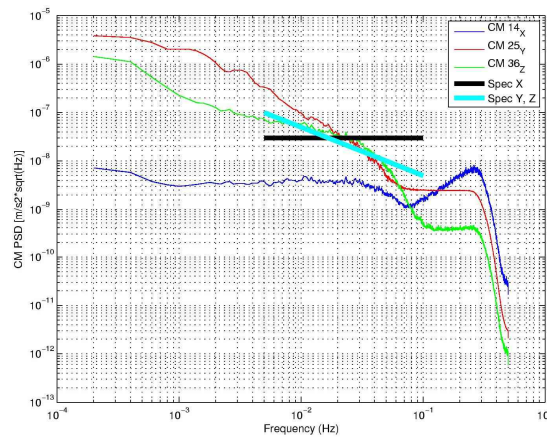
**Figure 7 Uyy anomaly and its zoom**

The trace PSD is nominal with STR1 in the loop, not considering the anomalous oscillation:



**Figure 8 Trace PSD not considering the anomalous oscillation. STR1 in the loop**

The CM 14\_X and 36\_Z PSDs have the expected behaviour, while the component 25\_Y has non nominal behaviour in the upper part of the MBW due to an oscillation in the time series at the same time of the anomaly in Uyy component.

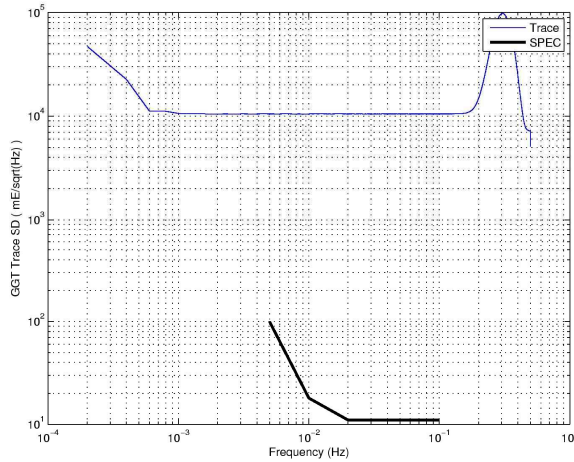


**Figure 9 CM PSDs**



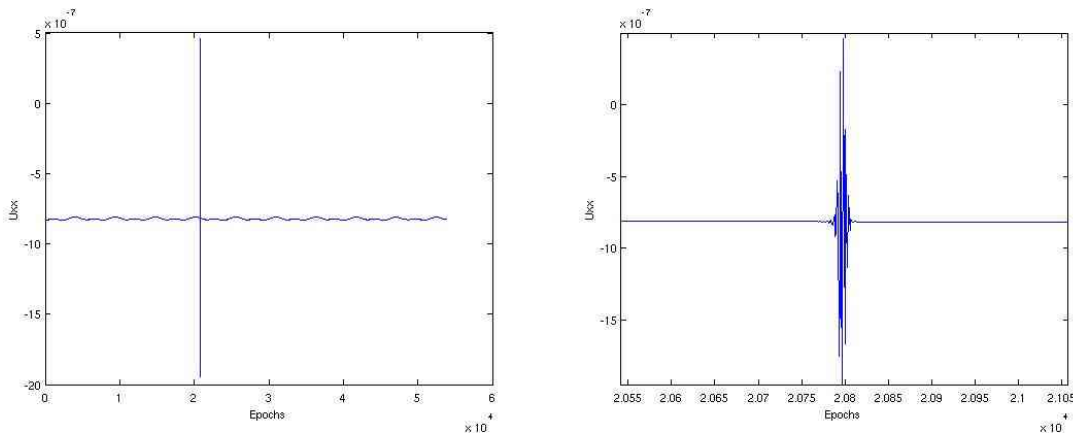
### 3.3 Gradients anomaly on 15<sup>th</sup> July

The Gravity gradients trace spectral density is not nominal during the 15<sup>th</sup> July time period. Trace SD is reported in Figure 10.



**Figure 10 Current trace PSD (right), compared with previous day (left).**

The non nominal behaviour of the trace is caused by an oscillation in gradients data at UTC 15/07 05:45:45 as reported below (only U<sub>xx</sub> is reported but the effect is clearly visible in the other two diagonal components):

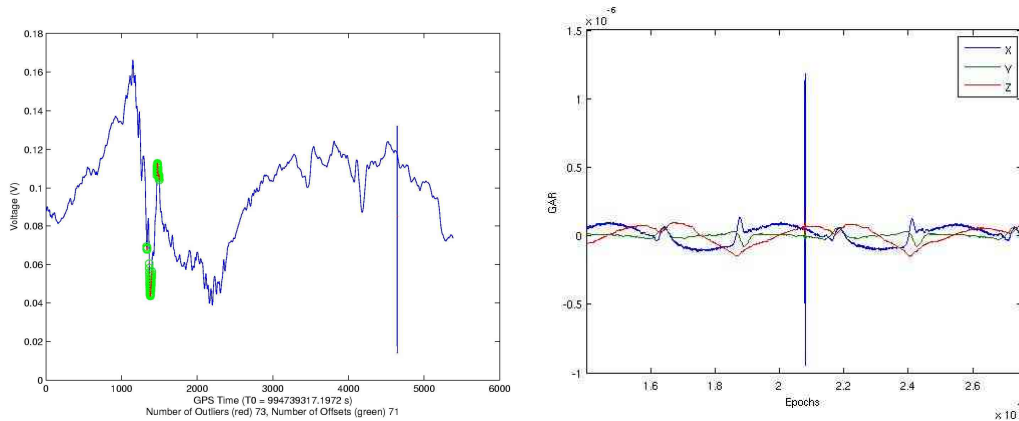


**Figure 11 U<sub>xx</sub> anomaly (left) and its zoom (right)**

The anomaly is found also in the following CTR components and in GAR datasets:

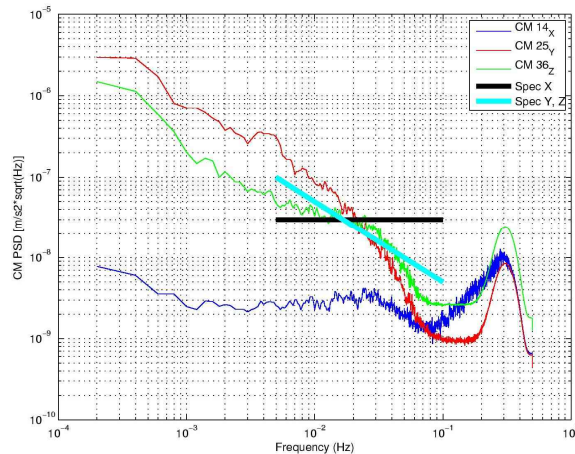
- A4 Z1-2
- A5 X1-4, Y1-2 and Z1-2
- A6 X1-4 and Z1-2

Below the oscillation of the component A5 Z2 is reported:



**Figure 12 A5\_Z2 anomaly (left) and the same effect in the GAR datasets (right)**

The CM PSDs are not nominal in the upper part of the MBW during the reference period due to the anomalous oscillation of 15/07.



**Figure 13 CM PSDs**

### 3.4 S/C Anomaly: ADC register check tests

A special test on the gradiometer was performed on 21<sup>st</sup> July between 07:29:06 and 14:49:06. The ADC register check was disabled temporarily (as performed end of June), this time including a dump of some memory areas to confirm disabling of the checking. The on-board default recombination matrices were used for this test to better see the science health noise. Gradients oscillations are visible at the start/stop times of the test due to load and restore of recombination matrices.

Data during the test, between

GO\_CONS\_EGG\_NOM\_1b\_20110721T070144\_20110721T083127

And

GO\_CONS\_EGG\_NOM\_1b\_20110721T143022\_20110721T160006

May have degraded performance.