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Title : **GOCE L1b Data Quality Control Report**
March 2010

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DOCUMENT CHANGE RECORD

Issue	Date	Reason for Change	Changed Pages/Paragraphs
1.0	13/10/2010	First issue	
2.0	15/05/2012	Reprocessing EGG V5.0	All document

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1.   INTRODUCTION

1.1   Purpose and Scope

This document contains the Quality report for GOCE L1b data for March 2010.

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

http://earth.esa.int/GOCE/ → "Level 1b QC" → "Montlly"

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

2. DATA QUALITY OVERVIEW

2.1 Instrument data quality summary tables

Table 1 March 2010 EGG QC Status

Table 2 March 2010 SST QC Status

- GAP (details within Monthly Report)
- NOT USABLE
- Special Event
- Nominal
- Calibration
- EGG in Acquisition Mode
- Not yet released

2.2 EGG data – Available baselines

Baseline	EGG Processor	SST processor
Baseline D	EGG v5 (> 5.06) installed 31/03/2012	V02.18 Patch B Installed 20/01/2011
Baseline A	EGG v4 (<4.8) Installed 18/05/2010	V02.18 Patch B Installed 20/01/2011

Baseline may be verified by reading out the <Creator_Version> tag in the file header, e.g:

<Creator_Version>05.06</Creator_Version>

(for the latest baseline)

- EGG v5 reprocessed baseline is available through the GOCE Virtual On-line Archive

    ➔ http://eo-virtual-archive1.esa.int/Index.html

- EGG v4 is the older baseline. Products are still accessible through the GOCE Virtual On-line Archive

3. EGG DATA QUALITY: SPACECRAFT AND ENVIRONMENT RELATED EVENTS

3.1 Summary

For the reference period, the following events are highlighted:

- Routine Mission Operations were resumed on February 28th after February Spacecraft anomaly started on Feb 12th.

- Gradiometer transition to Science Mode was achieved on March 2[nd,] no EGG science data available for March 1st and 2nd.

- EGG Instrument Calibration was performed on March 4th. EGG data are not produced during Calibration Operations.

- A spacecraft anomaly occurred on March 20, leading to a gap of 197 seconds in the EGG datasets.

- Minor special events are recorded on 21 Mar and 24 Mar.

3.2 Gradiometer in Acquisition Mode

Gradiometer was in Acquisition Mode on March 2nd

- From: 2010-03-02 02:27:35

- To: 2010-03-02 11:35:18

And was in acquisition mode on March 24th

- From: 2010-03-24 12:10:15

- To: 2010-03-24 14:39:15

The following products have EGG in Acquisition Mode.

Products with Gradiometer in Acquisition mode	Gradiometer Mode
GO_CONS_EGG_NOM_1b_20100302T022735_20100302T035718_0001	**Acquisition**
GO_CONS_EGG_NOM_1b_20100302T035718_20100302T052701_0001	**Acquisition**
GO_CONS_EGG_NOM_1b_20100302T052701_20100302T065645_0001	**Acquisition**
GO_CONS_EGG_NOM_1b_20100302T065645_20100302T082628_0001	**Acquisition**
GO_CONS_EGG_NOM_1b_20100302T082628_20100302T095612_0001	**Acquisition**
GO_CONS_EGG_NOM_1b_20100302T095612_20100302T112555_0001	**Acquisition**
GO_CONS_EGG_NOM_1b_20100302T112555_20100302T125539_0001	**Acquisition**

Table 3 Products in acquisition mode on March 2nd

Products with Gradiometer in Acquisition mode	Gradiometer Mode
GO_CONS_EGG_NOM_1b_20100324T124921_20100324T141905_0001	**Acquisition**
GO_CONS_EGG_NOM_1b_20100324T141905_20100324T154849_0001	**Acquisition**

Table 4 Products in acquisition mode on March 24th

3.3   March 02: Transition to Science mode

After the GOCE anomaly of February 2010, the EGG instrument was brought from acquisition to science mode on 2nd of March at 11:35:18 and the DFACS mode transition brought from DFM_PREP to DFM_COARSE and then from DFM_COARSE to DFM_FINE.

The effect of this transition is evident in all datasets like for example the CTR, as reported below:
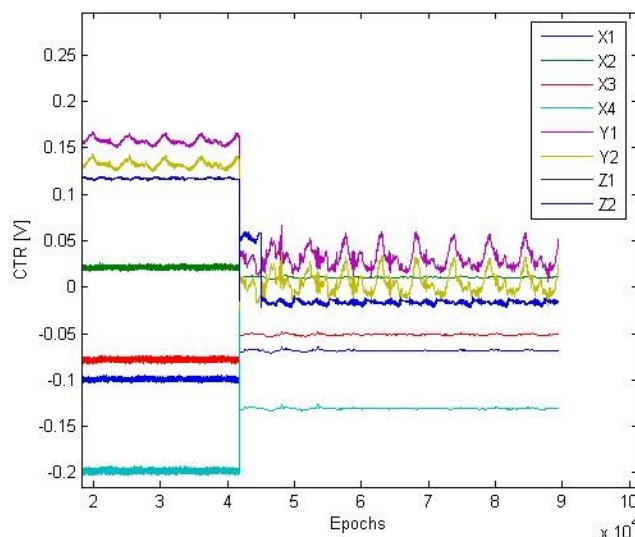

Figure 1 A1 CTR components in the transition from EGG Acquisition to Science mode at UTC 02/03 11:35:18

3.4   Instrument Calibration on 04/03/2010

Special Spacecraft Operations for Instrument Calibration were performed on 4th March 2010, from

- 20100304T081741

to

- 20100305T081318

EGG_NOM_1b data are unavailable during this period, i.e. between products:

- GO_CONS_EGG_NOM_1b_20100304T064758_20100304T081741

and

- GO_CONS_EGG_NOM_1b_20100305T081318_20100305T094301

Due to the new processor logic, the following products before and after the calibration, have incomplete GGT and IAQ datasets:

GO_CONS_EGG_NOM_1b_20100304T051814_20100304T064758
GO_CONS_EGG_NOM_1b_20100304T064758_20100304T081741
Calibration
GO_CONS_EGG_NOM_1b_20100302T022735_20100302T035718
GO_CONS_EGG_NOM_1b_20100302T035718_20100302T052701

3.5 GOCE Anomaly on 20th March

3.5.1 EGG V4

GOCE anomaly occurred due to EGG GAIEU-A Watchdog triggering.
This anomaly led to a gap of 197 seconds in EGG datasets
- from UTC 03:26:59
- to UTC 03:30:16
affecting the product
GO_CONS_EGG_NOM_1b_20100320T023840_20100320T040823
with consequent, expected, Kalman filter reinitialization. The same gap is present also in L0 datasets and nothing can be done at PDGS level to avoid the effect.

The effect of the reinitialization is reported in the figure below, visible in gradients time series but in the other datasets as well:
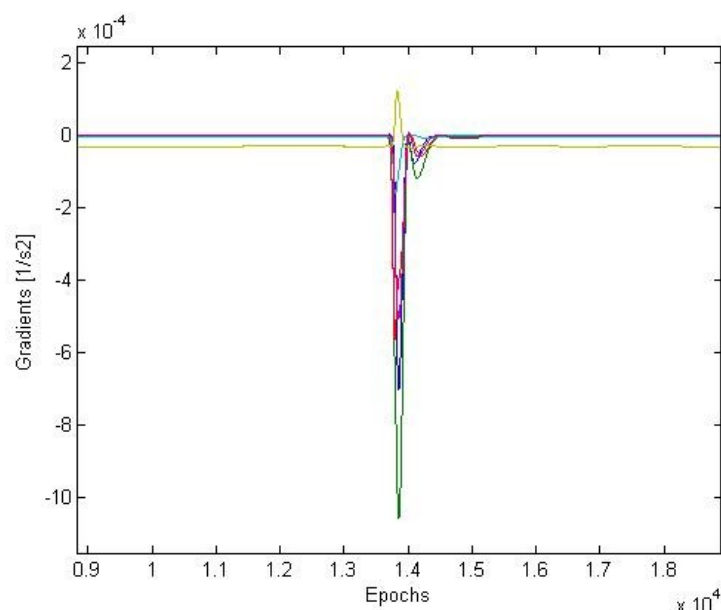

Figure 2 Kalman filter reinitialization after the anomaly at UTC 20/03 03:37:45

3.5.2 EGG V5

Due to the new logic of the EGG processor implemented in V5, there is no more Kalman filter reinitialization after the anomaly but incomplete GGT and IAQ datasets affecting the following products:

GO_CONS_EGG_NOM_1b_20100319T233912_20100320T010856

GO_CONS_EGG_NOM_1b_20100320T010856_20100320T023840

GO_CONS_EGG_NOM_1b_20100320T023840_20100320T040823

GO_CONS_EGG_NOM_1b_20100320T040823_20100320T053807

3.6   21 Mar: Gradiometer reconfiguration (special event)

During this reference period the reloading of non-default parameters to the gradiometer after the anomaly of 20 March (see paragraph 2.5) was performed.

This operation led to an effect of a change of values between before and after the event, that is evident for the Y1 and Y2 components of all the six accelerometers as reported in the figures below, while is less evident for the other components of CTR time series:
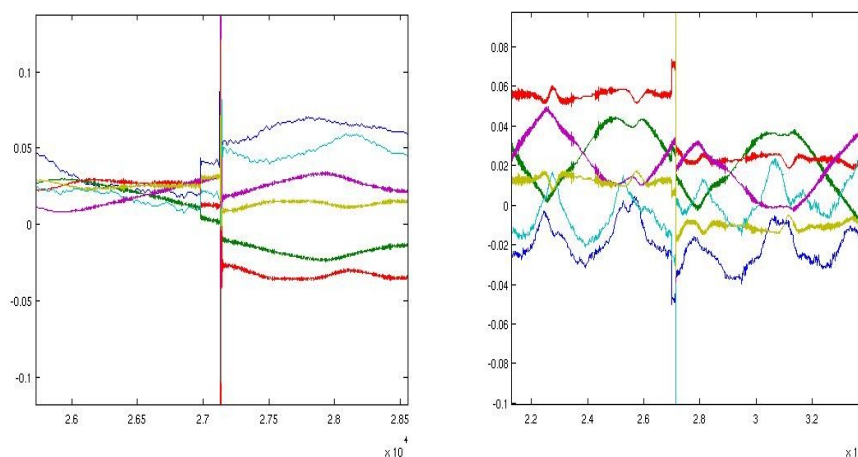

Figure 3 CTR components Y1 (left) and Y2 (right) for all the six accelerometers with the event at UTC 21/03 11:34

The same event is evident also in angular rates time series components Y and Z as reported below:
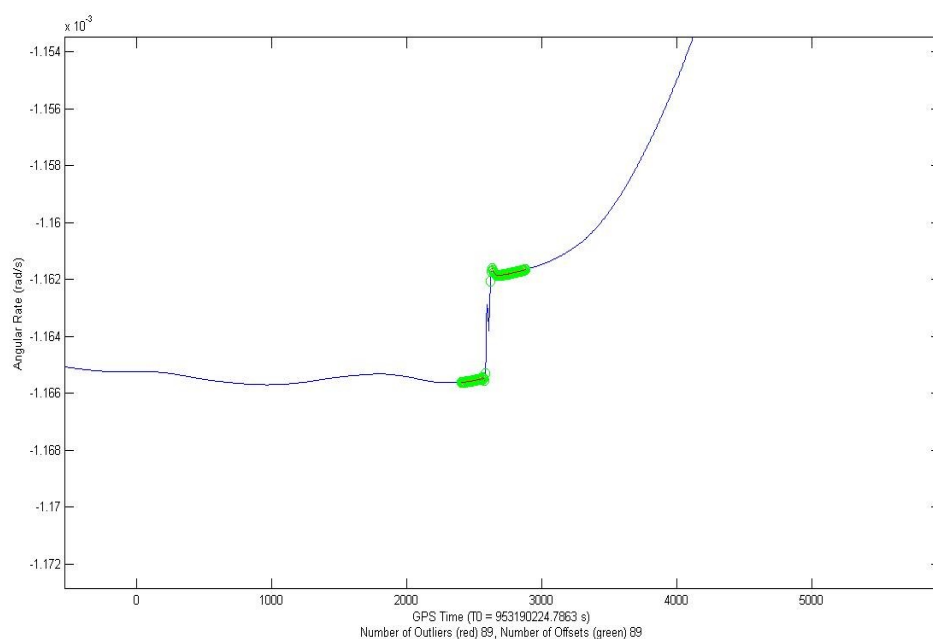
Figure 4 GAR time series component Y 21 March with highlighted the event at UTC 21/03 11:34

The oscillation is also present in Gradients time series; this led to a bad trace PSD as reported below:
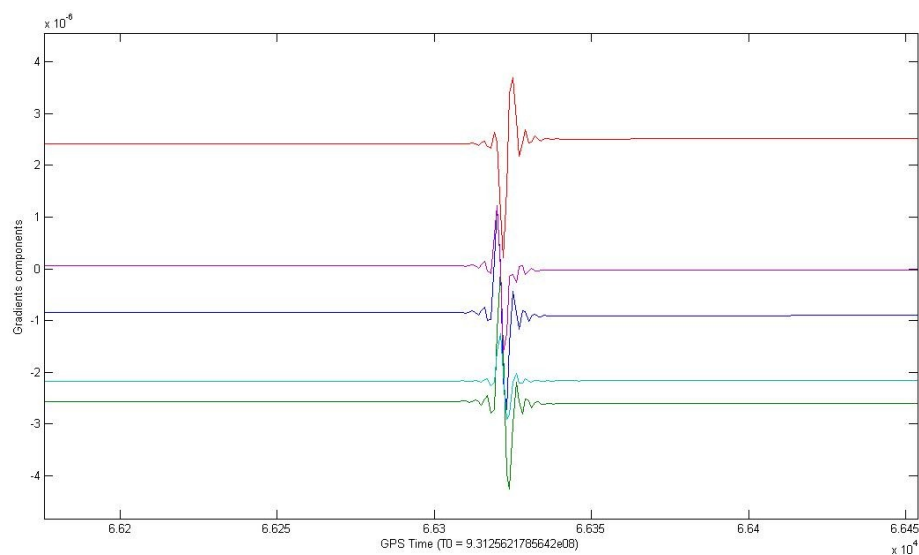

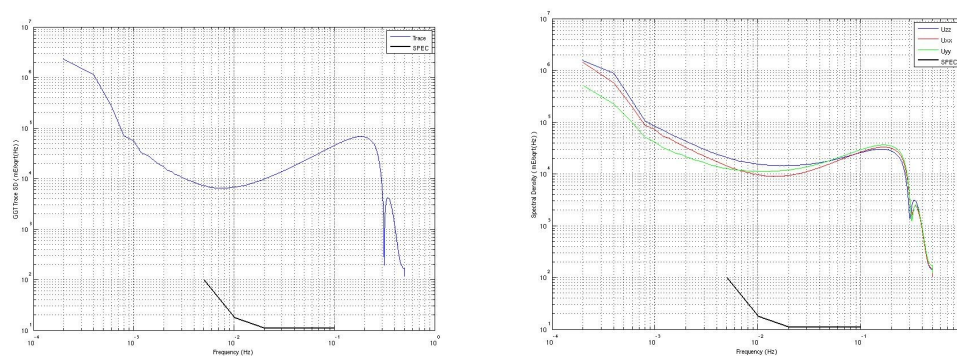**Figure 5 Gradients time series March 21th with the event at 11:34**

Figure 6 Trace (left) and individual gradients (right) PSDs 21 March

3.7   24 Mar EGG ASH-1 reconfiguration (special event)

During this reference period the following operations to reconfigure the EGG ASH-1 electrodes to nominal selection after the GOCE anomaly of 20 March (see paragraph 2.5) were performed:

- Transition to DFM_COARSE

- Loading of default Combination matrix for ASH1 and update of Detector Health and Saturation thresholds with the EGG in Acquisition Mode

- Transition back to DFM_FINE

In this reference period is evident the transition from science to acquisition to science mode in CTR time series. Below only the X1 component for all the six accelerometers is reported, but the effect is also in the others.
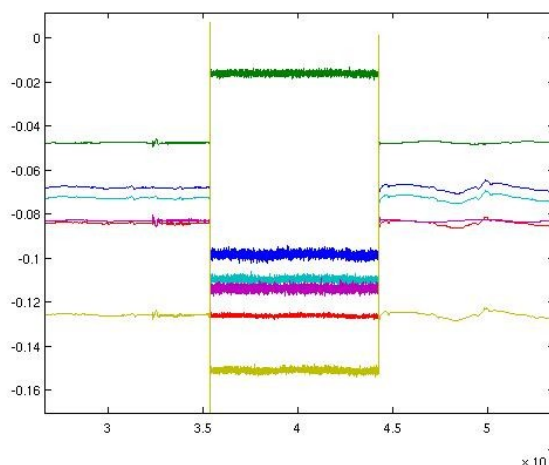

Figure 7 CTR X1 component time series March 24th with the two transitions, the first at UTC 12:10:15 and the second at UTC 14:39:15

The first transition is at UTC 12:10:15 while the second transition is at UTC time 14:39:15.

The trace for the period in which the instrument returns in science mode is reported below and presents a nominal behavior:
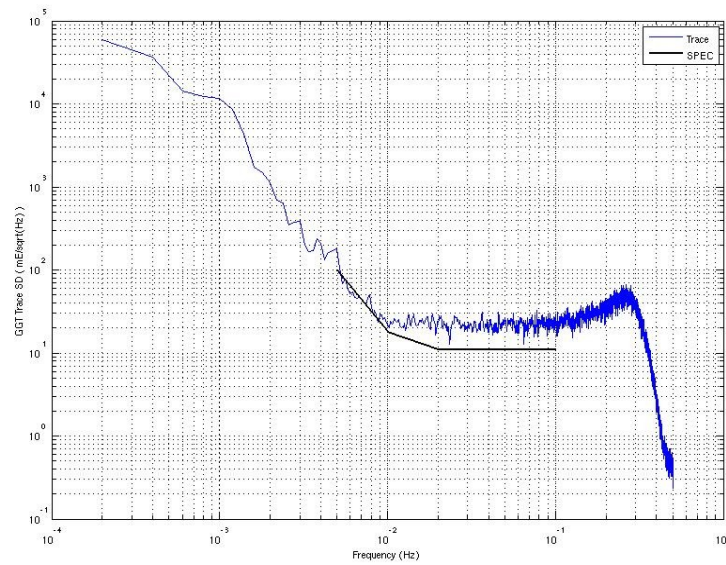

Figure 8 Trace PSD March 24th