Quality Control of GOCE Level 1b data products

Marco Meloni¹, Alberto Bigazzi¹, Bjoern Frommknecht², Rune Floberghagen ², Michael Fehringer³

¹ Serco SpA, c/o ESA-ESRIN, Via G. Galilei, Frascati, Italy
² European Space Agency, Frascati, Italy
³ European Space Agency, Noordwijk, The Netherlands

Abstract:
A Quality Control Function is included in GOCE’s Payload Data Ground Segment (PDGS), assessing GOCE L1b data quality. Routine operational procedures are in place for systematic data quality assessment, targeted to instruments and satellite data as well, such as Gravity Gradients (EGG), Drag-Free Control data (DFACS), Satellite-to-Satellite Tracking data (SST) and Star Tracker data (STR). Anomaly and outliers detection, gaps detection, consistency checks between Science and DFACS channels are performed systematically on all products generated by the GOCE processing Facility (PDS). Reports from these analyses are automatically generated and published through a web server.

QC and the GOCE Mission:

The GOCE quality control consist in a series of routine operational procedures for systematic data quality assessment for:
- Gradiometer Instrument (EGG),
- Satellite-to-Satellite Tracking (SST-I),
- Drag-Free and Attitude Control (DFACS),
- Star Tracker (STR)

The QC can be summarized as follows:
- Ensure that the products delivered to the users fit for their intended scientific applications taking into account the constraints of the operational processing (e.g.: fast delivery)
- Investigate any anomaly in the data processing or in the instrument performances and perform the needed corrective actions
- Provide a regular reporting on the instrument status and data availability and quality
- Implement and maintain the operational processor and calibration chain in the Ground Segment
- Guarantee the periodic in-flight calibration of the products
- Support the reprocessing and the validation activities

GOCE L1b Product Quality:

Goce Overall Quality Indicator

TRACE Error Spectral Density

Events That Do Not Influence the Trace SD

Effects of spacecraft manoeuvres

On-line daily and monthly reporting:

Daily Reports:
09:00 Cest/08:00 UTC: Sst products, daily, Quality of SST products
11:00 Cest/10:00 UTC: EGG products, daily, Quality of EGG products
15:00 Cest/14:00 UTC: bb reports shared by month
17:00 Cest/16:00 UTC: Reports: Collection of anomalies and a list of general interest

Anomaly Detection

L1b Quality assessment from 31 December 2009
- 3 days of ICM calibration.
- 8 days affected by Beam Out events (spacecraft related event), with no impacts on performance.
- Two periods (marked in shaded grey) where no data were available due to issues on the space segment.
- Number of missing epochs:
  - 14 EGG missing epochs / 229 Days.
  - 11 SST missing epochs / 229 days.

http://earth.esa.int/GOCE