

GOCE Satellite and Mission Performance

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- In **nominal ops since end September 2009**. Commissioning phase long due to need for orbit decay to an altitude where proper drag-free operation was possible (impact of low solar activity).
- Satellite **operations proceeding well**, with **two hiccups**.
- **Level 1b data** (gravity gradients, orbit, attitude, accelerometer and GPS data) available **since May 2010**.
- **Level 2 data**, including first generation gravity field models, available **since 29 June 2010**.
- Now in **5th global mapping cycle** (6 needed for nominal mission).
- **Data release** is progressing, **lag w.r.t. sampling is about 6 months**.
- **Data is accessible through ESA's user services** standard catalogue tools as well as on a **Virtual Online Archive** (in the "cloud"). The latter is the more efficient way of accessing data. Registration is straightforward.
- **Model coefficients** also available through **ICGEM**.

Data availability (as of today)



- **Level 1b:** November 2009 – April 2010 + commissioning phase data
- **Level 2:** Gravity field solution based on 2 months of data, time series products for November 2009 – April 2010 + precise orbits for commissioning phase
- **Time lag:** about 6 months (needed for proper validation, small corrections, etc.)
- Quality reports available at <http://earth.esa.int/goce>

- All data freely available!

earthnet online
European Space Agency

ESA Earth Home Missions Data Products Resources Applications

EO Data Access

ESA Missions

- CryoSat
- SMOS
- GOCE
- Envisat
- ERS
- Proba
- ESA Earth Observation Campaigns Data
- ESA Future Missions
- ESA/EUMETSAT Missions

Third Party Missions

- Overview
- Current Missions
- Historical Missions
- Potential Missions

Services

- Site Map
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GOCE daily reports EGG

Legend:

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

2010

Nov	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
Oct	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
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May	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Apr	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
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Feb	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
Jan	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

2009

Dec	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
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GOCE in depth

- News
- Overview
- Satellite Design
- Instruments
- Resources

Key Resources

- GOCE User Toolbox (GUT)
- GOCE Data Overview
- GOCE High Level Processing Facility - GOCE Standards (pdf)
- GOCE Level 2 Product Data Handbook (pdf)
- GOCE instruments positioning [pdf]
- Gravity in detail
- Geoid Applications
- GOCE SSTI-A ANTEX
- GOCE Lib QC

Related Articles

- ESA's low-flying gravity-detector was weighty technology challenge
- Building ESA's gravity mapping mission posed hi-tech challenge

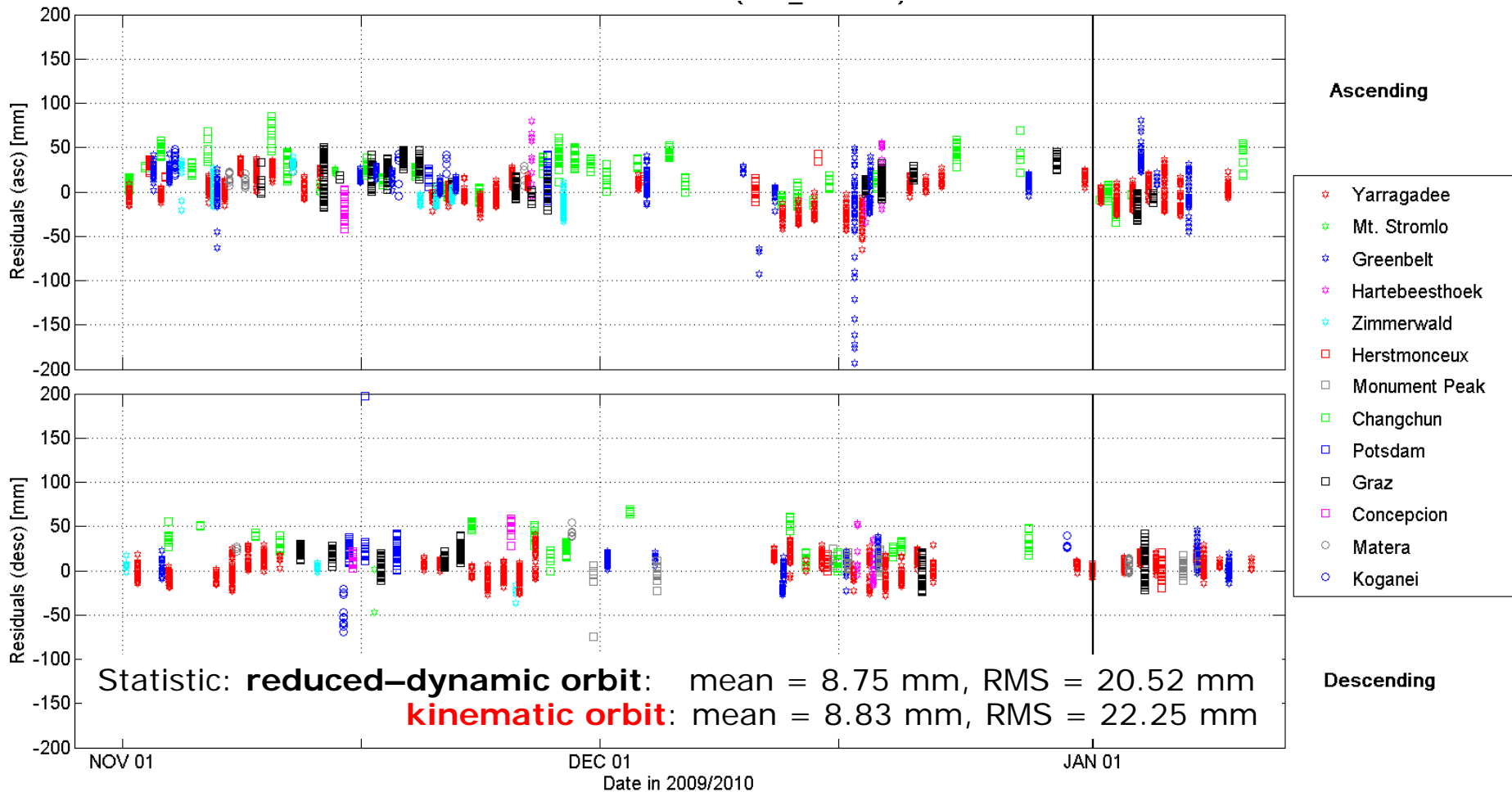
Related Links

- Thales Alenia Space
- EADS Astrium
- Onera
- Eurockot

A few GOCE "goodies" - Orbits



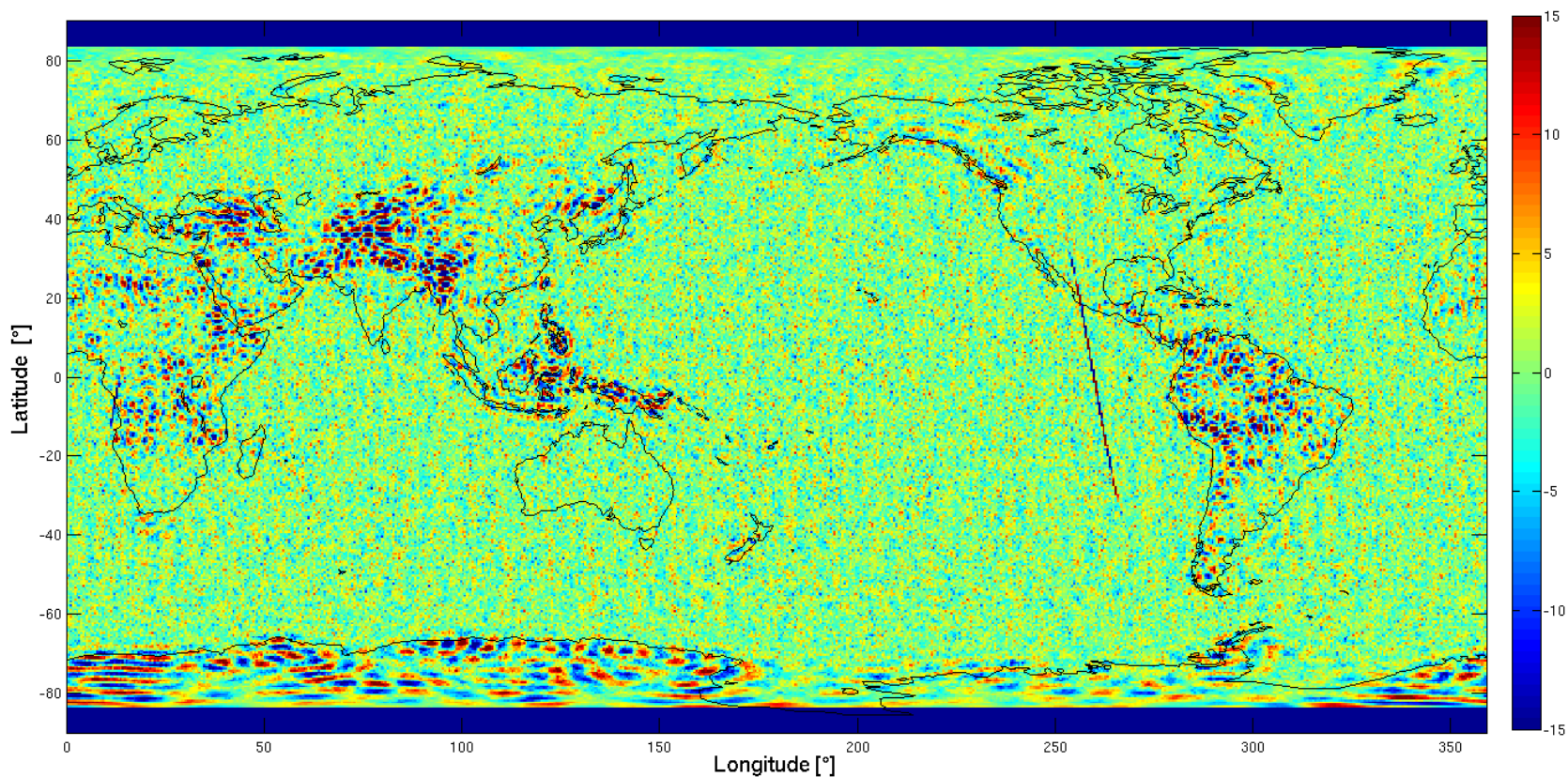
Range residuals between computed range from SLR station to satellite position from **kinematic** orbit and observed range with laser system [mm]



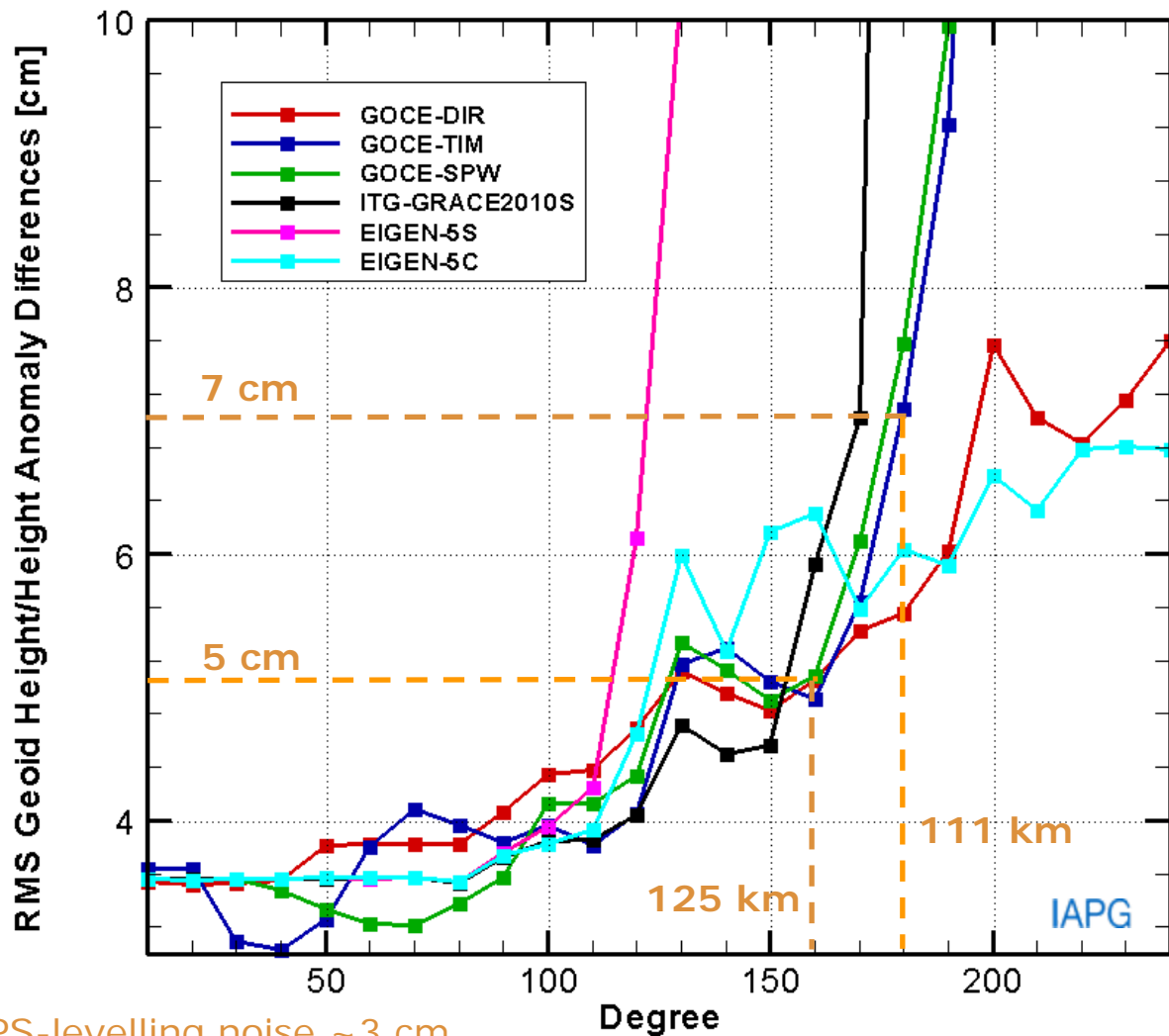
A few GOCE “goodies” – Gravity Gradients

GOCE - EIGEN5C (N=360)
Binned averages V_{zz} (EGG_TRF_2)
31 October 2009 - 11 January 2010

Color scale: -15 mE to +15 mE

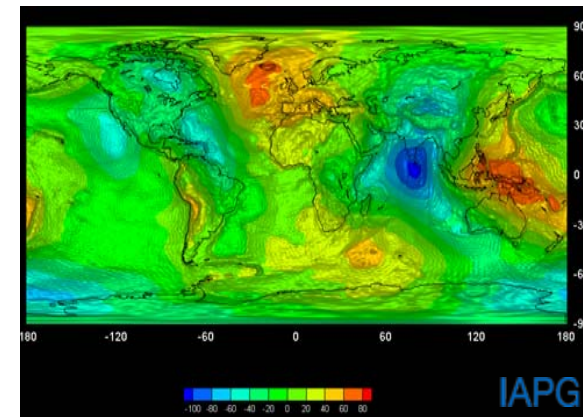


A few GOCE "goodies" – Geoid



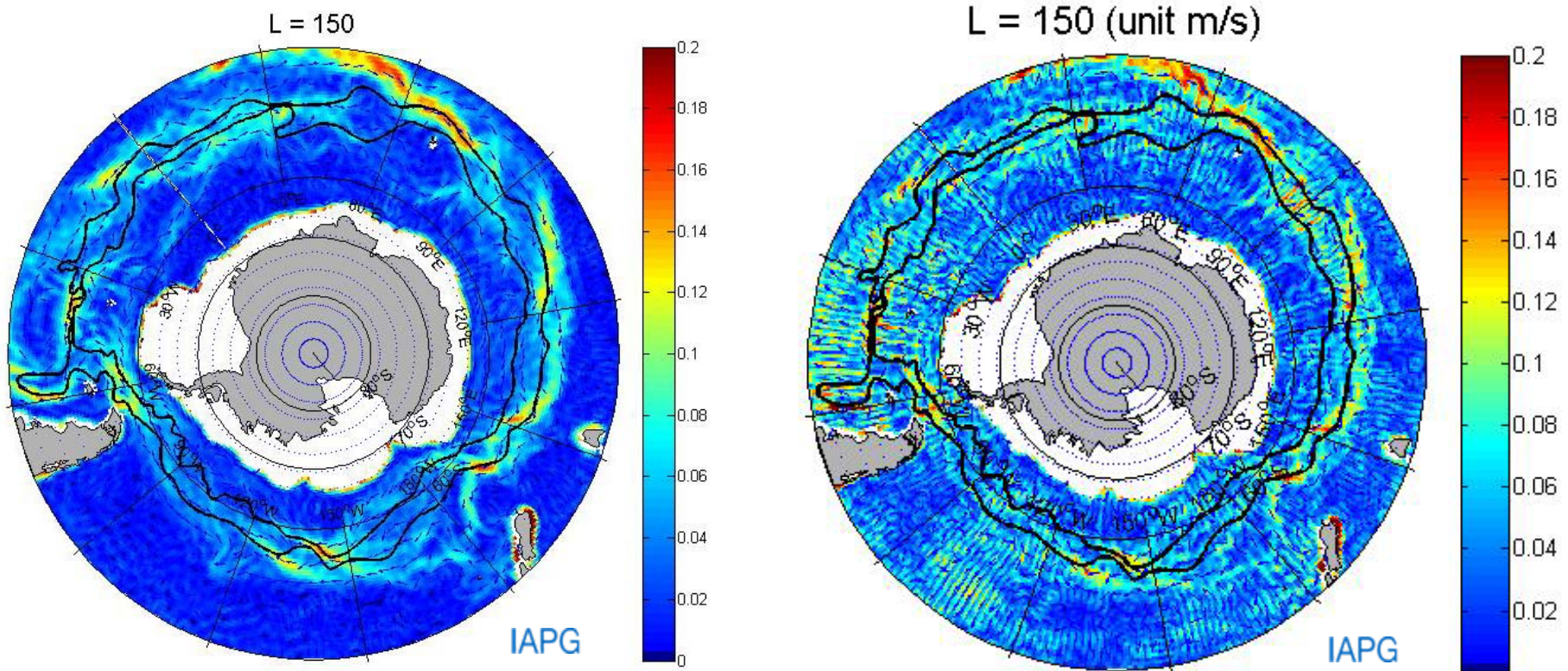
GPS-Levelling geoid height differences in Germany:

RMS geoid difference versus cut-off degree.



A few GOCE "goodies" – DOT

Mean geostrophic velocities based on GRACE/GOCE combined model (GOCO01S) and pure GRACE model (ITG-GRACE2010S)



Source: Albertella et al, GEOTOP Project

Two anomalies have impacted operations



- **12 February 2010:** Application software crash on main on-board computer due to suspected floating point trap. Automatic reboot on **redundant computer** worked well, but recovery attempt of A-side on 25 February failed. Running on redundant computer since then.
- **8 July 2010:** Temporary **loss of software telemetry generated on redundant computer** due to oscillation in communication between processor module and telemetry module. **Recovery on 30 August**, i.e. 7 weeks of operation mostly in “blind”. Root cause has been found in oscillating behaviour of the particular type of receivers used in said communication link. Such oscillations are induced when one branch of the link is connected to a floating potential, such as a powered-off telemetry module.
- **Good news:** Computer A not “entirely dead”. Procedure in place to revive unit in case of further problems on side B.
- **No other hardware problems on the satellite, nor signs of aging.**

- **26 Sept:** back at nominal orbit altitude of 254.9 km.
- **27 Sep:** Resumption of nominal operations.
- Since then **no further problems!**
- **Next set of gravity field solutions** expected in February 2011. Preliminary versions will be presented at AGU Fall.

- Current **atmospheric drag situation:** 3 mN, which represents a slight increase w.r.t. solar minimum. However, this drag level is easily accommodated by the ion thrusters, and ESA will maintain the current altitude until end of nominal mission.

- **Extended mission** until end 2012 has been proposed (approval expected on 24 November).
- **Consumables** on-board for ops until end 2013 or longer...

- GOCE is back in operation after a “summer vacation”.
 - The data products are of excellent quality.
 - ESA is targeting an extension of the mission.
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- Next rendez-vous: 4th International GOCE User Workshop, 31 March – 1 April 2011 at Technical University of Munich.

