GRACE Science Data System Monthly Report
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Highlights:

- CSR RL01 and GFZ RL03 L2 products for September 2006 have been provided to the archives.
- GRACE Science Team Meeting registration and abstract submission is now open: http://www.csr.utexas.edu/grace/GSTM.

Satellite Science Relevant Events:

- Nominal operation in Science Mode throughout the month, except that
  - GRACE-A experienced several Missed Interrupts (MI) throughout the month so that in total about 30 hours of KBR1B data deemed unreliable. For details, see Section "Level-1 Processing" below.
  - Between September 27 07:45 and October 06 07:57 a dual Ka-band tracking test was executed to understand the MI behavior and to observe whether or not the Ka-band anomalous SNR is present on an extra enabled channel for Ka-band tracking (PRN52). Therefore the Instrument Processing Unit (IPU) was set for this interval to track a maximum of only 9 GPS satellites (instead of 10). Analysis of this test is still ongoing.
  - On October 6 at 08:00 on request of the radio occultation group the occultation parameter setting has been modified: the distance above the earth limb at which the GPS satellite is acquired has been increased from 120 to 150 km.
  - On October 11 at 07:00 and on October 12 at 06:30, in order to avoid an autonomous reboot of the onboard computer (OBDH) after approximately 280 days, a (warm) boot has been commanded for GRACE-2 and for GRACE-1, respectively. The next OBDH

boots on will be required in July 2007.

- On October 17 GRACE-A and GRACE-B executed center of mass calibration operations. Therefore KBR1B data between 01:20 and 13:58 may be unreliable.
- On October 20 at 07:15 the occultation parameter setting has been modified again in order to see more occultation events: the viewing angle has been increased by 5 deg. (to 55 deg. as on CHAMP).

- The GRACE-1 Brouwer mean orbital elements on November 01, 2006 00:00:00 are as follows:

  A [m] = 6841780.203
  E [-] = 0.001538
  I [º] = 89.015608

  The satellites separation was 222 km on October 31, 2006 with a rate of -0.67 km/d. Orbit maintenance maneuver will be performed beginning of January 2007.

Level-0 raw data dump reception statistics at DLR ground stations Weilheim and Neustrelitz:

GRACE-1 Housekeeping:	99.7 %
GRACE-1 Science:	100.0 %
GRACE-2 Housekeeping:	99.7 %
GRACE-2 Science:	100.0 %

Level-1 Data Processing:

- Level-1B Release 01 instrument data have been processed at JPL and archived at GRACE-ISDC and JPL PO.DAAC.
- Notes:
  - On 2006-10-01 GRACE-A at 20:29:14 a jump occurred in the KBR ionospheric combination K-0.75Ka. A natural IPU reboot at 20:54:15 cleared this situation. During this interval the formal error on the GRACE-A CLK1B solution is between 40 and 100 cm. Therefore the KBR1B data from 20:29:14 till 21:00:00 was edited and resulted in a total KBR1B data loss of 35 minutes.
  - On 2006-10-03 at 08:23:01 and 8:26:07 GRACE-A experienced two anomalous missed interrupts. The primary Ka phase (PRN 50) showed a once per revolution signature in the ionospheric combination but the amplitude was 3 times the nominal

value. The secondary Ka phase (PRN 52) had no once per revolution signature in the KBR ionspheric combination K-0.75Ka, but a bias jump occurred at the time of the second missed interrupt (MI). The KBR1B product was made using the secondary Ka phase (PRN 52). The KBR1B data is deemed unreliable from 08:23:01 till 23:59:59.

- On 2006-10-04 the anomalous MI on GRACE-A from 2006-10-03 was cleared at 07:22:25. The KBR1B product was made using the secondary Ka phase (PRN 52). The KBR1B data is deemed unreliable from 00:00:00 till 07:22:25.
- On 2006-10-08 GRACE-A experienced at 10:43:45 a bias jump in the KBR ionospheric combination K-0.75Ka. A natural IPU reboot at 13:55:05 cleared this situation. The KBR1B data is deemed unreliable between 10:45:45 and 13:55:05.
- On 2006-10-10 GRACE-A experienced at 07:00:39 a bias jump in the KBR ionospheric combination K-0.75Ka. A natural IPU reboot at 10:23:55 cleared this situation. The KBR1B data is deemed unreliable between 07:00:39 and 10:23:55.
- On 2006-10-17 GRACE-A and GRACE-B executed center of mass calibration operations between 01:20 and 13:58. The KBR1B data may be unreliable during this interval.
- In calendar weeks 42 and 43 for the first time in the mission no KBR1B data points lost for a whole week!

- KBR statistics:
  A) KBR1B product name
  B) Total arc length with data (hours)
  C) Number of observations used in residual calculation
  D) KBR-GPS range residual RMS (cm)
  E) minimum KBR-GPS range residual (cm)
  F) maximum KBR-GPS range residual (cm)
  G) number of continuous segments in the KBR product

A	B	C	D	E	F	G
KBR1B_2006-09-29_X_01.dat	24.0	17280	1.87	-5.4	4.8	1
KBR1B_2006-09-30_X_01.dat	24.0	17280	1.42	-4.1	3.7	1
KBR1B_2006-10-01_X_01.dat	23.1	16668	1.48	-3.6	4.3	4
KBR1B_2006-10-02_X_01.dat	23.8	17127	1.75	-6.1	5.3	2
KBR1B_2006-10-03_X_01.dat	24.0	17244	4.12	-10.9	9.8	1
KBR1B_2006-10-04_X_01.dat	24.0	17253	2.78	-7.0	7.8	2
KBR1B_2006-10-05_X_01.dat	24.0	17280	1.61	-5.1	4.2	1

KBR1B_2006-10-06_X_01.dat	24.0	17251	1.46	-5.7	4.9	2
KBR1B_2006-10-07_X_01.dat	24.0	17280	1.75	-4.6	3.5	1
KBR1B_2006-10-08_X_01.dat	23.7	17066	2.69	-11.0	6.2	2
KBR1B_2006-10-09_X_01.dat	24.0	17280	1.63	-3.8	6.0	1
KBR1B_2006-10-10_X_01.dat	23.8	17126	1.81	-5.2	5.2	2
KBR1B_2006-10-11_X_01.dat	24.0	17280	1.35	-3.2	4.0	1
KBR1B_2006-10-12_X_01.dat	24.0	17280	1.56	-5.2	3.2	1
KBR1B_2006-10-13_X_01.dat	24.0	17280	1.36	-3.7	4.5	1
KBR1B_2006-10-14_X_01.dat	24.0	17280	1.76	-5.3	5.1	1
KBR1B_2006-10-15_X_01.dat	23.9	17236	1.56	-5.0	3.9	3
KBR1B_2006-10-16_X_01.dat	24.0	17280	1.29	-2.8	4.1	1
KBR1B_2006-10-17_X_01.dat	24.0	17280	1.79	-3.6	4.7	1
KBR1B_2006-10-18_X_01.dat	24.0	17280	1.57	-5.0	6.0	1
KBR1B_2006-10-19_X_01.dat	24.0	17280	1.66	-6.3	4.1	1
KBR1B_2006-10-20_X_01.dat	24.0	17280	1.71	-4.2	5.1	1
KBR1B_2006-10-21_X_01.dat	24.0	17280	1.37	-5.4	3.7	1
KBR1B_2006-10-22_X_01.dat	24.0	17280	1.38	-4.0	3.3	1
KBR1B_2006-10-23_X_01.dat	24.0	17280	1.49	-3.9	4.4	1
KBR1B_2006-10-24_X_01.dat	24.0	17280	1.86	-6.7	6.6	1
KBR1B_2006-10-25_X_01.dat	24.0	17280	1.77	-5.5	5.5	1
KBR1B_2006-10-26_X_01.dat	24.0	17280	1.60	-4.6	4.2	1
KBR1B_2006-10-27_X_01.dat	24.0	17280	1.38	-3.2	3.4	1
KBR1B_2006-10-28_X_01.dat	24.0	17280	1.40	-4.0	3.6	1
KBR1B_2006-10-29_X_01.dat	24.0	17280	1.19	-4.4	3.1	1
KBR1B_2006-10-30_X_01.dat	24.0	17280	1.63	-4.5	4.3	1
KBR1B_2006-10-31_X_01.dat	24.0	17280	1.63	-4.4	6.1	1

- Release 01 Level-1B barotropic sea level products (OCN1B) and de-aliasing products (AOD1B) were calculated by GFZ until October 31, 2006 and archived at GRACE-ISDC.
- Release 03 Level 1B de-aliasing products (AOD1B) based on OMCT (Ocean Model for Circulation and Tides) baroclinic ocean model for October 2006 will be generated soon.
- Release 04 Level 1B de-aliasing products (AOD1B) based on improved OMCT (updated thermodynamic sea ice model and new data set for surface salinity relaxation), mass-conserving approach and harmonized land/water masks has been processed for January 2001 until July 2006 and made available to the SDS processing centers for L2 reprocessing (see below).

Level-2 Data Processing:

- All 3 L2 centers at CSR, JPL and GFZ continued processing of release 01 (CSR), release 02 (JPL) and release 03 (GFZ) products.
- TN05 containing C20 estimates derived from SLR is periodically updated (maybe used to substitute C20 values of CSR RL01 products).
- Spurious slopes over land, which are due to the non-mass-conserving OMCT model output in AOD1B RL03 (used in JPL RL02 and GFZ RL03 L2 products), can and have to be corrected by re-adding the GAB product over land. A technical note TN04 was prepared and is available since May 10, 2006.
- All 3 L2 centers started tests for next round of reprocessing (improved background models (e.g. static gravity field, AOD1B RL04, FES2004, Ocean Pole Tide), more secular trends, full IERS2003 conventions, etc.). First results are expected at the next GSTM (see Section "Miscellaneous").

GRACE Product Distribution:

Besides more experimental releases which are only available to the GRACE Science Team the following L2 products are available to the public:

- GFZ RL03 L2 products are available for February 2003 until September 2006. Missing months are June 2003 and January 2004. July 2004 until October 2004 are also available as constrained solutions (*GK2-*). Corresponding background GAA, GAB and GAC products and calibrated errors (GSM*.txt) have been provided too. Details are listed in the GFZ L2 Release Notes.
- CSR RL01 unconstrained GSM solutions along with the GAC background model files and calibrated errors (GSM*.txt) are available for the period August 2002 – September 2006 (only June 2003 is missing due to accelerometer data problems). Details are listed in the CSR L2 Release Notes.
- JPL RL02 L2 products along with the GAB and GAC background model files and calibrated errors (GSM*.txt) are available for February 2003 until November 2005 except for June 2003 and August to October 2004. Details are listed in the JPL L2 Release Notes.

Miscellaneous:

- Next GRACE Science Team Meeting will be held in San Francisco at the Holiday Inn Golden Gateway on December 8/9, 2006. Meeting registration and abstract submission is now open.
- Last GRACE Science Team Meeting (GSTM) proceedings (October 2005) are available online (http://www.csr.utexas.edu/grace/GSTM).
- It was decided by the PI/Co-PI that papers from the Potsdam Joint CHAMP/GRACE Science Meeting in July 2004 shall be provided on the CHAMP and GRACE web pages if the authors agree. A corresponding questionnaire was circulated.
- A list of GRACE related publications which can be sorted by author or date is available at http://www.gfz-potsdam.de/pb1/op/grace/index_GRACE.html under item "Publications". This list will be regularly updated and maybe incomplete. If you are missing a publication please send an e-mail to Frank Flechtner.
- Science data users are encouraged to submit citations of their own and other works related with GRACE to the bibliography web page implemented at PO.DAAC: http://podaac.jpl.nasa.gov/grace/bibliography.html.
- The announcement of opportunity for the exploitation of GOCE data is available since October 10. If you are interested in free of charge GOCE and Third Party ESA Mission data products you are requested to submit a proposal until December 8. More information can be found at http://eopi.esa.int/GOCE.