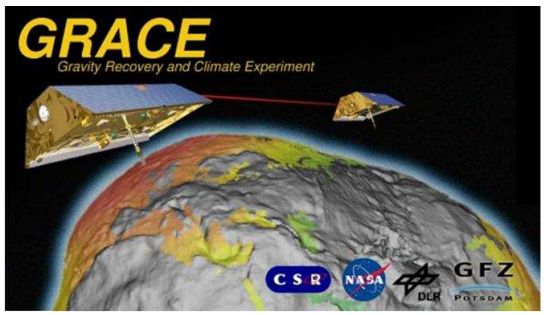
GRACE Science Data System Monthly Report November 2007



Prepared by:
Frank Flechtner GFZ flechtne@gfz-potsdam.de

Contributions by:
Srinivas Bettadpur UTCSR srinivas@csr.utexas.edu
Mike Watkins JPL michael.m.watkins@jpl.nasa.gov
Gerhard Kruizinga JPL gerhard.kruizinga@jpl.nasa.gov

Approved by:
Byron Tapley UTCSR tapley@csr.utexas.edu
Markus Rothacher GFZ rothacher@gfz-potsdam.de

Highlights:

- The GRACE Mission team has been selected to receive the 2007 William T. Pecora Award. The award is sponsored jointly by the Department of the Interior (DOI) and the National Aeronautics and Space Administration (NASA) and is presented annually to individuals or groups that make outstanding contributions toward understanding the Earth by means of remote sensing. The citation for the award is as follows:

  For the design, development, and successful operation of a new method of satellite-based measurements of the Earth's gravity resulting in significant contributions to the understanding of the changing global environment.

  The award has been presented to Byron Tapley during a ceremony at the AGU on December 10, 2007.
- Meanwhile the SDS centers found out, that the influence of the erroneous AOD1B products between June 23, 2006 and September 20, 2007, which already have been substituted in the archives, cannot be neglected. Especially over the oceans noticeable signals of up to some mm water-layer equivalent have been found. Therefore, the SDS will reprocess all GSM products in that period! It is expected that the new products will be made available beginning of next year. For further details please also refer to the October 2007 newsletter.
- CSR has generated and delivered RL04 Level-2 products for October 2007.
- GFZ has generated and delivered RL04 Level-2 products for May 2007 and September 2007, both already with correct AOD1B model noticeable at the additional header comment line

  CMMNT Generated with correct AOD1B RL04 product (see SDS Newsletter October 2007)
- JPL's RL04 Level-2 validation products are now up to date until July 2007. Note that the filename of the latest version 4.1 ends with "*JPLEM_0001_0004"!

  For further details see GRACE Level-2 Product Generation and Distribution Section below.

- Routinely generated statistics to monitor AOD1B RL04 product quality are now online available at http://www.gfz-potsdam.de/pb1/op/grace/results (follow link "GRACE Atmosphere and Ocean De-aliasing Statistics").

Satellite Science Relevant Events:

- Operation in Science Mode throughout the month except events mentioned in the Level-1 Data Processing Section below.
- The GRACE-1 Brouwer mean orbital elements on December 1, 2007 00:00:00 are as follows:

  A [m] = 6840042.506
  E [-] = 0.001781
  I [°] = 89.009809
- The satellites separation was 228 km on November 30, 2007 with a rate of +0.61 km/d. Next orbit maintenance maneuver won't be needed for some months.

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

GRACE-1 Housekeeping:	99.9 %
GRACE-1 Science:	100.0 %
GRACE-2 Housekeeping:	99.8 %
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 2007-11-08 23:00 GRACE-B KBR experienced a rare Missed Interrupt (MI). The MI was cleared by an IPU reboot at 2007-11-09 12:07:55. Previous experience suggest that GRACE-B MI are anomalous, therefore caution should be used when including the KBR1B data in the gravity field solution
  - On 2007-11-15 GRACE-B entered Coarse Pointing Mode at 14:27. Transition to Attitude Hold Mode (AHM) occurred at 2007-11-16 1:10. Nominal attitude (Science Mode) restored at: 2007-11-16 11:40. This event caused a total KBR1B data loss of 9 hrs and 22 min for 2007-11-15

- On 2007-11-15 GRACE-B entered Coarse Pointing Mode at 14:27. Transition to Attitude Hold Mode (AHM) occurred at 2007-11-16 1:10. Nominal attitude (Science Mode) restored at: 2007-11-16 11:40.
- 2007-11-16 see 2007-11-15. This event caused a total KBR1B data loss of 27 min for 2007-11-16.
- On 2007-11-22 GRACE-A experienced disabling of supplemental heater lines (DSHL) at 00:50 which caused temperature control on ACC to be stopped. The cool down of the ACC caused the ACC biases to change. Reheating started at 21:00:00. During the period where reheating of the ACC occurs, the ACC1B data is degraded due to exponential decay response of the ACC bias. Caution should be used when using the ACC1B from 00:50 till 24:00 for the gravity field determination process.
- On 2007-11-22 GRACE-A experienced disabling of supplemental heater lines (DSHL) at 00:50 which caused temperature control on ACC to be stopped. The cool down of the ACC caused the ACC biases to change. Reheating started at 21:00:00 During the period where reheating of the ACC occurs, the ACC1B data is degraded due to exponential decay response of the ACC bias. The ACC bias stabilized on 2007-08-26 00:00:00. Caution should be used when using the ACC1B during this interval for the gravity field determination process.

- **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_2007-11-01_X_01.dat	24.0	17237	2.00	-5.4	4.1	2
KBR1B_2007-11-02_X_01.dat	24.0	17239	1.90	-4.5	6.1	2
KBR1B_2007-11-03_X_01.dat	24.0	17260	1.74	-4.7	5.5	1
KBR1B_2007-11-04_X_01.dat	24.0	17280	2.27	-7.1	7.9	1
KBR1B_2007-11-05_X_01.dat	24.0	17260	2.03	-5.7	4.4	1
KBR1B_2007-11-06_X_01.dat	24.0	17260	1.67	-4.8	4.9	1
KBR1B_2007-11-07_X_01.dat	24.0	17236	1.75	-4.2	4.1	2
KBR1B_2007-11-08_X_01.dat	24.0	17194	1.61	-6.0	4.2	2

```
KBR1B_2007-11-09_X_01.dat  23.8  17086  1.91    -5.8    5.3  2
KBR1B_2007-11-10_X_01.dat  24.0  17280  2.07    -7.6    4.5  1
KBR1B_2007-11-11_X_01.dat  24.0  17238  1.76    -6.4    5.9  2
KBR1B_2007-11-12_X_01.dat  24.0  17260  2.12    -7.2    6.8  1
KBR1B_2007-11-13_X_01.dat  24.0  17240  1.88    -5.5    6.1  2
KBR1B_2007-11-14_X_01.dat  24.0  17260  2.04    -7.4    5.8  1
KBR1B_2007-11-15_X_01.dat  14.6  10514  1.96    -7.5    6.3  2
KBR1B_2007-11-16_X_01.dat  23.4  16871  1.70    -5.5    5.4  1
KBR1B_2007-11-17_X_01.dat  23.8  17145  1.84    -5.2    8.2  2
KBR1B_2007-11-18_X_01.dat  24.0  17280  2.12    -6.5    4.8  1
KBR1B_2007-11-19_X_01.dat  24.0  17260  2.22    -6.9    7.5  2
KBR1B_2007-11-20_X_01.dat  24.0  17261  1.68    -5.2    5.7  2
KBR1B_2007-11-21_X_01.dat  23.8  17145  1.83    -5.5    5.7  2
KBR1B_2007-11-22_X_01.dat  24.0  17280  1.91    -4.9    7.3  1
KBR1B_2007-11-23_X_01.dat  24.0  17280  2.07    -5.8    5.0  1
KBR1B_2007-11-24_X_01.dat  24.0  17280  2.06    -4.4    7.6  1
KBR1B_2007-11-25_X_01.dat  23.9  17200  1.46    -4.0    3.6  2
KBR1B_2007-11-26_X_01.dat  24.0  17280  1.81    -7.0    4.4  1
KBR1B_2007-11-27_X_01.dat  24.0  17280  1.72    -5.0    4.5  1
KBR1B_2007-11-28_X_01.dat  24.0  17280  1.78    -7.2    4.6  1
KBR1B_2007-11-29_X_01.dat  24.0  17280  1.92    -4.8    4.8  1
KBR1B_2007-11-30_X_01.dat  24.0  17251  1.78    -6.1    5.0  2
```

- Following JPL RL00 (yellow) and RL01 (green) L1B products are publicly available. June and July 2002 are not provided due to accelerometer problems.

L1B data	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002												
2003												
2004												
2005												
2006												
2007												

- L1B De-aliasing Products Status (for details see AOD1B Product Description Document):
  - Release 01: Generation has been stopped June 30, 2007.
  - Release 03: Generation has been stopped January 31, 2007.
  - Release 04: Generation for period September 21, 2007 until December 1, 2007.

    Note: Products for June 23, 2006 until September 20, 2007 have been reprocessed due

to wrong S2 tide correction in OMCT output data. This error primarily affected the C22/S22 AOD1B RL04 coefficients in the mentioned period. New (correct) products can be recognized by the product create start and stop times which shall have a November 2007 time stamp. For further details see October 2007 newsletter.

- Quality statistics for Release 04 products are online available at http://www.gfz-potsdam.de/pb1/op/grace/results (follow link "GRACE Atmosphere and Ocean De-aliasing Statistics).
- Following AOD1B products are publicly available (yellow: RL01, RL03 and RL04; green: RL01 and RL04, blue: RL04 only):

AOD1B	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002												
2003												
2004												
2005												
2006												
2007												

Level-2 Product Generation and Distribution:

- Besides historical CSR RL01, GFZ RL03 and JPL RL02 time-series (see below) and more experimental releases which are only available to the GRACE Science Team the following RL04 L2 products are presently available to the public (green: available, green striped: will be reprocessed shortly, yellow: in preparation; red: missing due to accelerometer data problems)

  - GFZ: GSM solutions for August 2002 until September 2007. July 2004 until October 2004 and December 2006 are also available as constrained solutions (*GK2-*). Corresponding background GAA, GAB, GAC and GAD products and calibrated errors (GSM*.txt) have been provided too. Details are listed in the GFZ L2 Release Notes.
    Note: As mentioned in the "Highlights Section" all GSM RL04 between June 2006 and August 2007 (except May 2007) will be reprocessed soon.

GFZ RL04	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002												
2003												
2004							**GK2**	**GK2**	**GK2**	**GK2**		
2005												
2006												**GK2**
2007												

  - CSR: GSM solutions along with the GAC and GAD background model files and

calibrated errors (GSM*.txt) are available for the period April 2002 until October 2007. Details are listed in the CSR L2 Release Notes.

Note: As mentioned in the "Highlights Section" all GSM RL04 between June 2006 and September 2007 will be reprocessed soon.

CSR RL04	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002												
2003												
2004												
2005												
2006												
2007												

- JPL: GSM version 4.1 labeled "*JPLEM_0001_0004" along with the GAC and GAD background model files and calibrated errors (GSM*.txt) are available for the period April 2002 until July 2007. Details are listed in the JPL L2 Release Notes.

  Note: As mentioned in the "Highlights Section" all GSM RL04 between June 2006 and July 2007 will be reprocessed soon.

JPL RL04	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002												
2003												
2004												
2005												
2006												
2007												

- GFZ has stopped RL03 processing (Feb 2003 until Jan 2007 available at the archives. For further details refer to the GFZ RL03 release notes for Level-2 products).
- CSR has stopped RL01 processing. (Apr. 2002 until Dec 2006 available at the archives. For further details refer to the CSR RL01 release notes for Level-2 products).
- JPL has stopped RL02 processing (January 2003 until November 2005 available at the archives. For further details refer to the JPL RL02 release notes for Level-2 products).
- TN05 containing C20 estimates derived from SLR and using GRACE RL04 standards is periodically updated.

Miscellaneous:

- 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 .
- Secure PDFs of oral and poster presentations from the Joint International GRACE Science Team Meeting and German Special Priority Program “Mass Transport and Mass Distribution in the Earth System” Symposium which took place at GFZ Potsdam between October 15 and 17, 2007 are online available at http://www.massentransporte.de/index.php?id=151 .