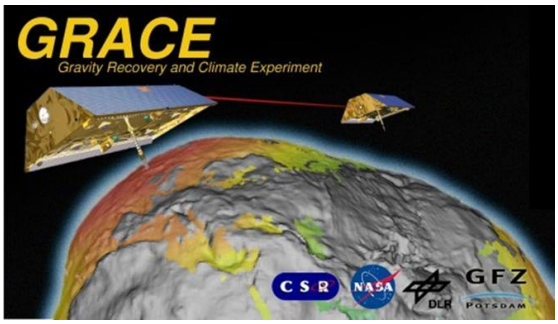
GRACE Science Data System Monthly Report
May 2009



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Highlights:

- CSR has generated and delivered RL04 Level-2 products for April 2009, GFZ for March 2009.
- New GGM03S and GGM03C mean gravity fields are available. These fields being based on four years of data from CSR's RL04 processing and have the following filenames:
  - GSM-2_2003001-2006365_1461_UTCSR_0180_0004 (GGM03S)
  - GCM-2_2003001-2006365_1461_UTCSR_0360_0004 (GGM03C)
- GRACE Technical Note #02 which provides recommendations for a-priori bias and scale parameters for Level-1B accelerometer data will be updated soon. Please visit the documentation pages at the archives regularly.
- The next GRACE Science Team Meeting will take place on November 5/6 at CSR in Austin. Please continue to visit http://www.csr.utexas.edu/grace/GSTM/ for further details

Satellite Science Relevant Events:

- Operations in Science Mode throughout the month except for the periods highlighted in the L1B Data Processing section below.
- The GRACE-1 Brouwer mean orbital elements on June 1, 2009 00:00:00 are as follows:

  A [m] = 6838291.207
  E [-] = 0.001690
  I [º] = 89.018107
- The satellites separation was 226 km on June 1, 2009 with a rate of -.66 km/d. Orbit maintenance maneuver will not be needed for some months.

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

GRACE-A Housekeeping:	100.0 %	GRACE-B Housekeeping:	100.0 %
GRACE-A Science:	100.0 %	GRACE-B 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. Please refer to the statistics below.
- **Notes:**
    - On 2009-04-30 GRACE-A experienced an onboard computer reboot at 11:27. As a consequence the ACC heaters were disabled which resulted in a bias change of the linear and angular accelerations. After the heaters are enabled the biases return back asymptotically to their values prior to the reboot event. The GRACE-A ACC1B data during this reheating period can not be used in the nominal gravity field determination process and should not be included. The ACC bias values returned to their nominal values on 2009-05-05 00:00:00
    - For 2009-05-01 see note 2009-04-30
    - For 2009-05-02 see note 2009-04-30
    - For 2009-05-03 see note 2009-04-30
    - For 2009-05-04 see note 2009-04-30
    - On 2009-05-19 18:47:45 an ACC bias jump occurred on GRACE-B in the Science Reference Frame linear Y-axis and in the angular Z-axis. The ACC1B data was corrected by adding a bias of 6.136215224796615e-9 m/sec^2 prior to 18:47:45. The angular Z-axis was not corrected. The linear ACC1B data are considered nominal and should be used in the level-2 gravity field determination processing.
    - On 2009-05-19 22:13:40 an ACC bias jump occurred on GRACE-A in the Science Reference Frame linear Y-axis and in the angular Z-axis. The ACC1B data was corrected by adding a bias of -13.5122994256817e-9 m/sec^2 prior to 22:13:40. The angular Z-axis was not corrected. The linear ACC1B data are considered nominal and should be used in the level-2 gravity field determination processing.
    - On 2009-05-25 23:44:03 an ACC bias jump occurred on GRACE-B in the Science Reference Frame linear Y-axis and in the angular Z-axis. The ACC1B data was corrected by adding a bias of 9.309582181790951e-9 m/sec^2 prior to 23:44:03. The angular Z-axis was not corrected. The linear ACC1B data are considered nominal

and should be used in the level-2 gravity field determination processing.

- Since 2009-05-01 the Precision Orbit Determination uses double difference ambiguity bias fixing between the individual spacecraft and ground stations (No bias fixing between spacecraft). The orbit quality shows a significant improvement as can be seen in the KBR-GPS range residual RMS. Prior to 2009-05-01 the average was about 1.5 cm and currently the average value is 0.4 cm. An improvement is also seen in the clock alignment statistics.

- **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_2009-05-01_X_01.dat	24.0	17260	0.37	-1.3	1.3	1
KBR1B_2009-05-02_X_01.dat	24.0	17280	0.39	-1.3	1.2	1
KBR1B_2009-05-03_X_01.dat	24.0	17260	0.42	-1.3	1.3	1
KBR1B_2009-05-04_X_01.dat	24.0	17260	0.41	-1.4	1.4	1
KBR1B_2009-05-05_X_01.dat	23.8	17104	0.46	-1.9	1.9	3
KBR1B_2009-05-06_X_01.dat	24.0	17280	0.39	-2.5	1.0	1
KBR1B_2009-05-07_X_01.dat	24.0	17260	0.46	-1.9	1.5	1
KBR1B_2009-05-08_X_01.dat	24.0	17260	0.39	-2.0	1.6	1
KBR1B_2009-05-09_X_01.dat	23.9	17214	0.34	-1.1	1.2	3
KBR1B_2009-05-10_X_01.dat	24.0	17249	0.42	-1.5	1.4	2
KBR1B_2009-05-11_X_01.dat	24.0	17260	0.42	-1.3	1.6	1
KBR1B_2009-05-12_X_01.dat	24.0	17260	0.52	-1.5	3.0	1
KBR1B_2009-05-13_X_01.dat	24.0	17260	0.39	-1.8	1.0	1
KBR1B_2009-05-14_X_01.dat	24.0	17260	0.36	-1.3	1.1	1
KBR1B_2009-05-15_X_01.dat	24.0	17280	0.38	-1.2	1.4	1
KBR1B_2009-05-16_X_01.dat	24.0	17260	0.46	-1.3	2.5	1
KBR1B_2009-05-17_X_01.dat	24.0	17260	0.50	-1.8	2.2	1
KBR1B_2009-05-18_X_01.dat	24.0	17280	0.44	-2.1	1.5	1
KBR1B_2009-05-19_X_01.dat	24.0	17260	0.37	-1.3	1.1	1
KBR1B_2009-05-20_X_01.dat	24.0	17260	0.40	-1.9	1.5	1

```
KBR1B_2009-05-21_X_01.dat   24.0   17280   0.34     -1.7     1.1   1
KBR1B_2009-05-22_X_01.dat   24.0   17280   0.49     -2.3     2.3   1
KBR1B_2009-05-23_X_01.dat   24.0   17280   0.46     -2.0     1.5   1
KBR1B_2009-05-24_X_01.dat   24.0   17280   0.40     -1.3     1.7   1
KBR1B_2009-05-25_X_01.dat   24.0   17280   0.34     -1.1     1.6   1
KBR1B_2009-05-26_X_01.dat   24.0   17280   0.39     -1.2     1.6   1
KBR1B_2009-05-27_X_01.dat   24.0   17280   0.50     -2.1     1.5   1
KBR1B_2009-05-28_X_01.dat   24.0   17260   0.39     -1.8     1.3   1
KBR1B_2009-05-29_X_01.dat   24.0   17280   0.39     -1.1     1.5   1
KBR1B_2009-05-30_X_01.dat   24.0   17260   0.42     -1.4     1.5   1
KBR1B_2009-05-31_X_01.dat   24.0   17260   0.43     -1.5     1.5   1
```

- Following JPL RL00 (yellow) and RL01 (green) L1B products are publicly available. June and July 2002 (red) 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												
2008												
2009												

- The software to convert from GRACE GPS1x format to Rinex format has been updated to handle the presence of data from PRN32 since Feb. 26, 2008. Users should download and re-install the entire Level-1 Read software suite (RELEASE_2008-03-20) from the GRACE archives. This software is backwards compatible and can process all mission data.
- 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: Generated until June 2, 2009 and extended to 1976-2000 (see newsletter for December 2008).
    - 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
1976												
…												
1999												
2000												
2001												
2002												
2003												
2004												
2005												
2006												
2007												
2008												
2009												

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, yellow: in preparation; red: missing due to accelerometer data problems):

  - **GFZ:** GSM solutions for August 2002 until March 2009. 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.

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												
2008												
2009												

  - **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 April 2009. Details are listed in the CSR L2 Release Notes.

CSR RL04	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002												
2003												
2004												
2005												
2006												
2007												
2008												
2009												

- **JPL:** GSM version 4.1 labeled "*JPLEM_0001_0004" along with the GAA, GAB, GAC and GAD background model files and calibrated errors (GSM*.txt) are available for the period April 2002 until March 2009. Details are listed in the JPL L2 Release Notes.

JPL RL04	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002												
2003												
2004												
2005												
2006												
2007												
2008												
2009												

- 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:

- The GRACE Science Team Meeting proceedings (collection of presentations, PDF, 98 MB) are available online at http://www.csr.utexas.edu/grace/GSTM/proceedings.html.
- 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" (current status: 452 papers). This list is regularly updated and maybe incomplete. If you are missing a publication please send an e-mail to Frank Flechtner (flechtne@gfz-potsdam.de).
- 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.