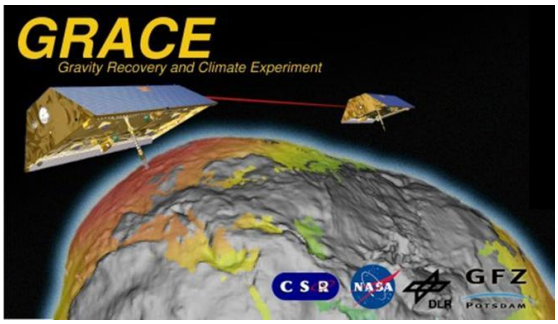
GRACE Science Data System Monthly Report
July 2009



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Highlights:

- CSR has generated and delivered RL04 Level-2 products for June 2009, GFZ for May 2009.

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 August 1, 2009 00:00:00 are as follows:
  A [m] = 6838104.778
  E [-] = 0.001451
  I [º] = 89.018629
- The satellites separation was 183 km on August 1, 2009 with a rate of +0.91 km/d. Orbit maintenance maneuver will be needed end of July.

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

GRACE-A Housekeeping:	99.5 %	GRACE-B Housekeeping:	99.8 %
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 2009-07-04 20:19:24.45 GRACE-A experienced an anomaly in the IPU (Instrument Processing Unit) resulting in very low read out of the K, Ka and GPS SNR (Signal to Noise Ratio) values and a corruption of the phase observables. The IPU was restored to nominal operations after an IPU reboot on 2009-07-05 03:30:40. The KBR and GPS during the anomaly were unrecoverable and are lost. In total 7 hrs and 15 minutes of KBR1B data was lost.
    - For 2009-07-05 see note 2009-07-04
    - On 2009-07-20 at 21:33 GRACE-A experienced a mode drop to coarse pointing after a hang-up of the IPU. The spacecraft recovered to science pointing mode at 21:43 after a second IPU reboot. In total 26 minutes of KBR1B were lost.
    - 2009-07-28 GRACE-B performed orbital maintenance maneuver OTM-7 from 13:09:57 till 13:11:28: The KBR1B data is available during the maneuver but deemed unreliable +/- 5 min around the maneuver. During the maneuver the ACC data are saturated and were removed for the ACC1B data generation.
    - On 2009-07-31 at 14:04 GRACE-A experienced a mode drop to coarse pointing mode due to erroneous star camera data. The spacecraft re-covered to nominal operations after a commanded IPU reboot at 16:53. In total 2 hours and 49 minutes of KBR1B data were lost.
- **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_2009-07-01_X_01.dat	24.0	17280	0.48	-2.3	1.5	1
KBR1B_2009-07-02_X_01.dat	24.0	17280	0.50	-1.5	2.7	1
KBR1B_2009-07-03_X_01.dat	24.0	17280	0.36	-1.4	1.0	1
KBR1B_2009-07-04_X_01.dat	20.2	14553	0.49	-2.2	2.1	1

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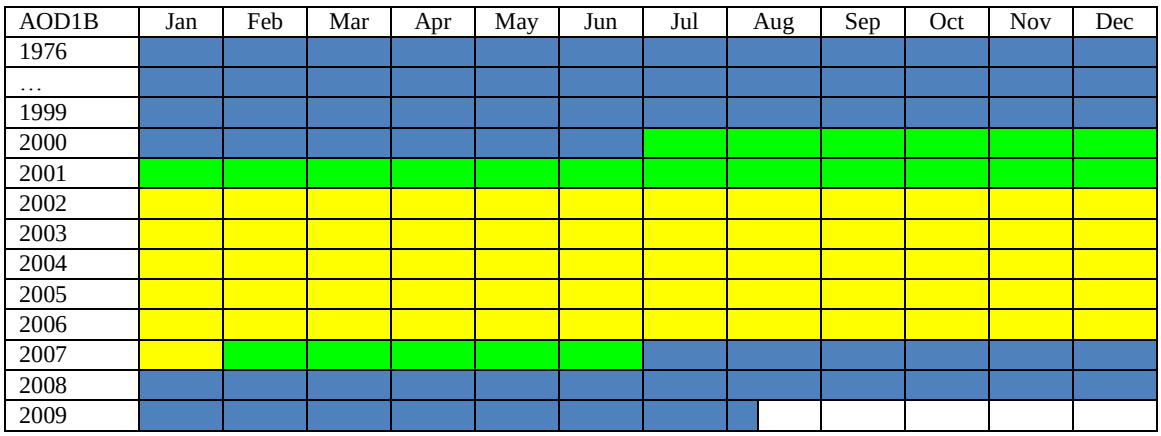
KBR1B_2009-07-05_X_01.dat  20.4  14724  0.57    -3.9    2.0  2
KBR1B_2009-07-06_X_01.dat  24.0  17257  0.42    -1.7    2.0  2
KBR1B_2009-07-07_X_01.dat  24.0  17248  0.44    -1.9    1.7  2
KBR1B_2009-07-08_X_01.dat  24.0  17280  0.41    -1.9    1.2  1
KBR1B_2009-07-09_X_01.dat  23.9  17205  0.44    -2.7    1.2  2
KBR1B_2009-07-10_X_01.dat  24.0  17280  0.40    -1.1    1.3  1
KBR1B_2009-07-11_X_01.dat  24.0  17280  0.41    -1.2    1.6  1
KBR1B_2009-07-12_X_01.dat  24.0  17280  0.41    -1.8    1.2  1
KBR1B_2009-07-13_X_01.dat  24.0  17280  0.39    -1.1    2.3  1
KBR1B_2009-07-14_X_01.dat  24.0  17280  0.35    -0.9    2.0  1
KBR1B_2009-07-15_X_01.dat  23.8  17145  0.39    -1.4    1.7  2
KBR1B_2009-07-16_X_01.dat  24.0  17280  0.48    -2.1    1.9  1
KBR1B_2009-07-17_X_01.dat  24.0  17280  0.36    -1.7    1.3  1
KBR1B_2009-07-18_X_01.dat  24.0  17251  0.40    -1.4    1.6  2
KBR1B_2009-07-19_X_01.dat  24.0  17280  0.43    -1.2    2.4  1
KBR1B_2009-07-20_X_01.dat  23.6  16965  0.42    -1.8    1.3  2
KBR1B_2009-07-21_X_01.dat  24.0  17280  0.45    -2.1    1.3  1
KBR1B_2009-07-22_X_01.dat  23.8  17126  0.47    -1.7    1.9  3
KBR1B_2009-07-23_X_01.dat  23.9  17205  0.47    -2.4    2.0  2
KBR1B_2009-07-24_X_01.dat  24.0  17280  0.45    -1.0    2.7  1
KBR1B_2009-07-25_X_01.dat  24.0  17258  0.37    -1.9    1.1  2
KBR1B_2009-07-26_X_01.dat  24.0  17257  0.36    -1.4    1.1  2
KBR1B_2009-07-27_X_01.dat  24.0  17280  0.46    -1.2    2.3  1
KBR1B_2009-07-28_X_01.dat  24.0  17280  0.41    -4.8    3.1  1
KBR1B_2009-07-29_X_01.dat  24.0  17280  0.53    -2.9    1.4  1
KBR1B_2009-07-30_X_01.dat  24.0  17280  0.40    -1.0    1.8  1
KBR1B_2009-07-31_X_01.dat  21.0  15115  0.83    -7.2    1.5  3
```

- 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 August 9, 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 May 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 June 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 May 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:

- Registration is now open for the next GRACE Science Team Meeting, to be held on November 5-6, 2009, in Austin (see http://www.csr.utexas.edu/grace/GSTM/). Attendees are urged to register as soon as they know they will be attending. The registration fee is US $125, payable as before with either checks or credit cards. Please note carefully the modes of payment in advance, and on site.
- 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.