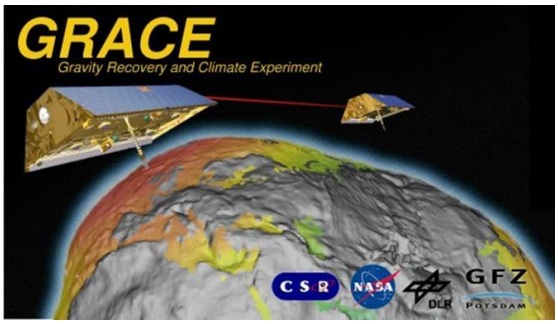
GRACE Science Data System Monthly Report
January 2011



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Highlights:

- JPL has generated and delivered RL04 Level-2 products for November 2010.
- CSR, GFZ and JPL have generated and delivered RL04 Level-2 products for December 2010. Data up to and including December 27, 2010 was used for these solutions. Please see Level-1 Data Processing Notes for further details.
- The next GRACE Science Team Meeting will be held in Austin, Texas, from August 8-10, 2011. Please visit http://www.csr.utexas.edu/grace/GSTM/ site regularly 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 February 1, 2011 00:00:00 are as follows:

  A [m] = 6835042231
  E [-] = 0.001438
  I [º] = 89.012881
- The satellites separation was 174 km on February 1, 2011 with a rate of -1.16 km/d. Next orbit maintenance maneuver planned for beginning of February.

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 2010-12-19 at 13:40 heater table G was uploaded to GRACE-A in order to reduce the battery load. As a result, at 17:00 the X-SRF (Science Reference Frame) and Y-SRF ACC (accelerometer) biases started to drift due to changing temperature of the ACC.
    - On 2010-12-28, the GRACE-B ACC was turned off at 02:46 to reduce the battery load.
    - For 2011-01-01 see notes 2010-12-19 and 2010-12-28
    - On 2011-01-02 at 06:16, after a GRACE-A IPU reboot, the accelerometer measurements were anomalous and can not be recovered. A power cycle of the GRACE-A ACC at 2011-01-03 11:55 restored nominal ACC data. The ACC1B data during this time period is either missing or corrupted and can not be used. At 18:31:04 the GRACE-B KBR measurement was corrupted until a commanded restart tracker command at 2011-01-03 23:12:25. KBR1B data during this time interval is corrupted and can not be used.
    - For 2011-01-02 see notes 2010-12-19 and 2010-12-28
    - For 2011-01-03 see notes 2010-12-19, 2010-12-28 and 2011-01-02
    - For 2011-01-04 till 2011-01-13 see notes 2010-12-19 and 2010-12-28
    - On 2011-01-14 16:23:54.55 the MI monitor for GRACE-A issued a restart command, after which the KBR data was corrupted. A commanded restart tracker at 15-JAN-2011 10:11:04.4500 restored nominal KBR data. The KBR1B data during this interval is missing because of the GRACE-A KBR data corruption
    - For 2011-01-15 see notes 2010-12-19, 2010-12-28 and 2011-01-14
    - For 2011-01-16 till 2011-01-24 see notes 2010-12-19 and 2010-12-28
    - On 2011-01-25 the reheating of the GRACE-A spacecraft was started causing the GRACE-A ACC biases to drift. The ACC biases stabilized on 2011-02-03 00:00:00.

The GRACE-A ACC1B during this interval can not be used in the nominal gravity field determination process. Drifts in the ACC1B data need to be accommodated for use in the gravity field determination process.

- For 2011-01-25 till 2011-01-31 see notes 2010-12-28 and 2011-01-25
- The GRACE-B ACC was restarted on 2010-02-07 (see notes 2010-12-28), and has been operating nominally since then. The prospects of the January 2011 gravity field are under evaluation.

- **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_2010-12-31_X_01.dat	23.8	17145	0.26	-0.8	1.1	2
KBR1B_2011-01-01_X_01.dat	23.6	16986	0.31	-0.9	0.9	4
KBR1B_2011-01-02_X_01.dat	23.7	17101	3972.32	-14721.0	14714.5	4
KBR1B_2011-01-03_X_01.dat	23.8	17125	18557.46	-33307.4	33299.9	3
KBR1B_2011-01-04_X_01.dat	23.8	17145	0.24	-1.1	0.7	2
KBR1B_2011-01-05_X_01.dat	23.9	17204	0.37	-1.1	1.2	2
KBR1B_2011-01-06_X_01.dat	23.7	17070	0.27	-0.9	1.0	3
KBR1B_2011-01-07_X_01.dat	24.0	17280	0.33	-1.2	1.0	1
KBR1B_2011-01-08_X_01.dat	24.0	17280	0.27	-1.2	0.9	1
KBR1B_2011-01-09_X_01.dat	24.0	17254	0.27	-0.9	1.0	2
KBR1B_2011-01-10_X_01.dat	23.8	17145	0.38	-1.0	1.3	2
KBR1B_2011-01-11_X_01.dat	23.7	17100	0.29	-0.8	1.0	4
KBR1B_2011-01-12_X_01.dat	23.9	17201	0.32	-1.4	1.2	2
KBR1B_2011-01-13_X_01.dat	24.0	17280	0.22	-1.0	0.8	1
KBR1B_2011-01-14_X_01.dat	16.4	11804	0.28	-0.9	0.8	1
KBR1B_2011-01-15_X_01.dat	13.8	9925	0.24	-0.6	0.9	1
KBR1B_2011-01-16_X_01.dat	24.0	17280	0.23	-1.0	0.8	1
KBR1B_2011-01-17_X_01.dat	24.0	17280	0.23	-0.7	0.8	1
KBR1B_2011-01-18_X_01.dat	24.0	17280	0.22	-1.1	0.7	1
KBR1B_2011-01-19_X_01.dat	23.9	17194	0.22	-0.7	0.6	2

KBR1B_2011-01-20_X_01.dat	23.9	17205	0.26	-1.1	0.8	2
KBR1B_2011-01-21_X_01.dat	24.0	17280	0.23	-0.7	0.8	1
KBR1B_2011-01-22_X_01.dat	24.0	17280	0.20	-0.7	0.8	1
KBR1B_2011-01-23_X_01.dat	24.0	17280	0.23	-1.1	0.8	1
KBR1B_2011-01-24_X_01.dat	24.0	17280	0.22	-0.8	0.8	1
KBR1B_2011-01-25_X_01.dat	23.8	17122	0.23	-0.6	0.7	3
KBR1B_2011-01-26_X_01.dat	24.0	17280	0.24	-0.7	0.7	1
KBR1B_2011-01-27_X_01.dat	24.0	17257	0.28	-0.9	0.9	2
KBR1B_2011-01-28_X_01.dat	24.0	17280	0.23	-0.7	0.7	1
KBR1B_2011-01-29_X_01.dat	24.0	17256	0.27	-0.9	1.1	2
KBR1B_2011-01-30_X_01.dat	24.0	17280	0.23	-0.8	0.8	1
KBR1B_2011-01-31_X_01.dat	23.8	17145	0.23	-0.8	1.1	2

- 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												
2010												

- The L1B Read software has been updated to accommodate 64-bit machines but the software will also work on 32 bit machines. Please change RELEASE_2008-03-20 to RELEASE_2010-03-31 available at http://podaac.jpl.nasa.gov/grace/data_access.html.
- 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 February 7, 2011 and extended to 1976-2000 (see newsletter for December 2008). Quality statistics for Release 04 products are online available at http://www-app2.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												
2010												
2011												

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 are available for August 2002 until December 2010. July 2004 until October 2004 and December 2006 are also available as constrained solutions (*GK2-*, reason is GRACE 4d repeat orbit and GPS anomaly on GRACE-B, respectively). October 2008 until September 2010 are also available as unconstrained solutions up to degree and order 60 (*GM60*, reason is GRACE 7d repeat orbit). 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										**M60**	**M60**	**M60**
2009	**M60**	**M60**	**M60**	**M60**	**M60**	**M60**	**M60**	**M60**	**M60**	**M60**	**M60**	**M60**
2010	**M60**	**M60**	**M60**	**M60**	**M60**	**M60**	**M60**	**M60**	**M60**			

  - **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 December 2010. 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												
2010												

- **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 December 2010. 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												
2010												

- 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 Proceedings of the Grace Science Team Meeting at GFZ in Potsdam on 11/12 November 2010 are online available at http://www.gfz-potsdam.de/portal/gfz/Neuestes/Veranstaltungen/Tagungen+und+Konferenzen/2010-Conferences/GSTM-2010/proceedings
- The following acknowledgement shall be added to any new GRACE related publication (paper, poster etc.): *Acknowledgement: We would like to thank the German Space Operations Center (GSOC) of the German Aerospace Center (DLR) for providing continuously and*

nearly 100% of the raw telemetry data of the twin GRACE satellites.

- A list of GRACE related publications which can be sorted by author or date is available at http://www-app2.gfz-potsdam.de/pb1/op/grace/ under item “Publications” (current status: 713 papers). This list maybe still 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.