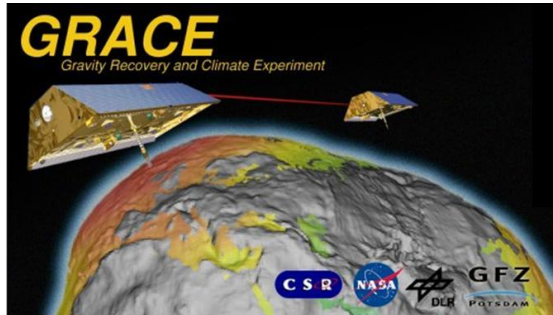


GRACE Science Data System Monthly Report

December 2013



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

Highlights:

- CSR has generated and delivered RL05 Level-2 products for December 2013.
- JPL has generated and delivered RL05 Level-2 products for November and December 2013
- GFZ has generated RL05a Level-2 products for November and December 2013 and April, May and August till December 2002. Unfortunately, these products have not yet passed quality control. Further information will be provided in the next Newsletter.
- The next GRACE Science Team Meeting is planned at GFZ in Potsdam between September 29 and October 2, 2014. Further information will follow in summer.

Satellite Science Relevant Events:

- Operations in Science Mode throughout the month except for the periods highlighted in the L1B Data Processing section below.
- The actual mission status can be monitored at http://www.csr.utexas.edu/grace/operations/mission_status/.
- The GRACE-1 Brouwer mean orbital elements on December 31, 2013 00:00:00 are as follows:
A [m] = 6803495.163
E [-] = 0.001327
I [°] = 89.015951
- The satellites separation was 252 km on December 28, 2013 with a rate of 0.10 km/d. The next orbit maneuver will be needed about mid of March 2014.

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 02 instrument data have been processed at JPL and archived at GFZ ISDC and JPL PO.DAAC. Please refer to the statistics below.
- RL02 Notes:
 - On 2013-12-24 at 21:01:14 the GRACE-B ACC and KBR were powered off autonomously due to a low voltage event. The GRACE-B ACC was powered back on at 2013-12-25 01:30:48 and the GRACE-B KBR was powered back on at 2013-12-28 14:53:54. During this period no KBR1B data is available.
 - 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_2013-12-01_X_02.dat	24.0	17280	0.86	-2.8	6.5	1	
KBR1B_2013-12-02_X_02.dat	23.7	17070	0.42	-2.3	1.2	3	
KBR1B_2013-12-03_X_02.dat	23.9	17235	0.60	-2.9	2.3	3	
KBR1B_2013-12-04_X_02.dat	23.8	17145	0.42	-1.7	1.2	2	
KBR1B_2013-12-05_X_02.dat	24.0	17280	0.39	-1.0	1.6	1	
KBR1B_2013-12-06_X_02.dat	23.8	17124	0.67	-1.9	3.7	3	
KBR1B_2013-12-07_X_02.dat	24.0	17280	0.57	-1.1	3.1	1	
KBR1B_2013-12-08_X_02.dat	23.8	17145	0.59	-2.9	1.9	2	
KBR1B_2013-12-09_X_02.dat	24.0	17280	0.52	-2.5	2.3	1	
KBR1B_2013-12-10_X_02.dat	24.0	17280	0.61	-2.6	2.0	1	
KBR1B_2013-12-11_X_02.dat	24.0	17249	0.57	-2.8	2.3	2	
KBR1B_2013-12-12_X_02.dat	24.0	17280	0.48	-2.3	1.3	1	

KBR1B_2013-12-13_X_02.dat	24.0	17280	0.64	-2.9	3.1	1
KBR1B_2013-12-14_X_02.dat	24.0	17280	1.07	-6.6	2.5	1
KBR1B_2013-12-15_X_02.dat	24.0	17280	0.94	-2.0	6.2	1
KBR1B_2013-12-16_X_02.dat	24.0	17280	0.86	-5.6	2.6	1
KBR1B_2013-12-17_X_02.dat	24.0	17280	0.53	-2.8	1.5	1
KBR1B_2013-12-18_X_02.dat	24.0	17280	0.58	-2.1	3.2	1
KBR1B_2013-12-19_X_02.dat	24.0	17280	0.64	-2.2	2.9	1
KBR1B_2013-12-20_X_02.dat	24.0	17280	0.30	-1.2	1.0	1
KBR1B_2013-12-21_X_02.dat	24.0	17280	0.58	-3.0	2.1	1
KBR1B_2013-12-22_X_02.dat	24.0	17280	0.36	-1.3	1.3	1
KBR1B_2013-12-23_X_02.dat	24.0	17252	0.77	-5.1	1.5	2
KBR1B_2013-12-24_X_02.dat	20.9	15070	0.38	-1.2	1.1	3
KBR1B_2013-12-25_X_02.dat	0.0	0	0.00	0.0	0.0	0
KBR1B_2013-12-26_X_02.dat	0.0	0	0.00	0.0	0.0	0
KBR1B_2013-12-27_X_02.dat	0.0	0	0.00	0.0	0.0	0
KBR1B_2013-12-28_X_02.dat	9.2	6594	0.34	-1.2	1.2	1
KBR1B_2013-12-29_X_02.dat	24.0	17280	0.40	-2.1	1.1	1
KBR1B_2013-12-30_X_02.dat	24.0	17280	0.52	-2.2	1.8	1
KBR1B_2013-12-31_X_02.dat	24.0	17280	0.39	-1.2	1.2	1

Following JPL RL02 L1B products are publicly available (green). June and July 2002 and June 2003 (red) are not provided due to accelerometer problems. For several months a significant number of Level-1 data is not available (blue): January and June 2011 (accelerometer data), May and October 2012 and March and August 2013 (accelerometer and K-Band data). RL00 and RL01 production has stopped with December 2004 and April 2012, respectively. See also corresponding newsletters.

L1B data	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002												
2003												
2004												
2005												
2006												
2007												
2008												
2009												
2010												
2011												
2012												
2013												

- 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 <ftp://podaac.jpl.nasa.gov/allData/grace/sw/>.

- Level-1B Release 01 generation has stopped with 30 April 2012.
- 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 April 30, 2012 and extended to 1976-2000 (see newsletter for December 2008). Generation has been stopped April 30, 2012.
 - Release 05: Generated for 1 January 2001 till 23 February 2014. Further information is available at <http://www.gfz-potsdam.de/AOD1B>.
 - Following AOD1B products are publicly available (yellow: RL01, RL03 and RL04; green: RL01 and RL04, blue: RL04 only, 'x' RL05):

AOD1B	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976												
...												
1999												
2000												
2001	x	x	x	x	x	x	x	x	x	x	x	x
2002	x	x	x	x	x	x	x	x	x	x	x	x
2003	x	x	x	x	x	x	x	x	x	x	x	x
2004	x	x	x	x	x	x	x	x	x	x	x	x
2005	x	x	x	x	x	x	x	x	x	x	x	x
2006	x	x	x	x	x	x	x	x	x	x	x	x
2007	x	x	x	x	x	x	x	x	x	x	x	x
2008	x	x	x	x	x	x	x	x	x	x	x	x
2009	x	x	x	x	x	x	x	x	x	x	x	x
2010	x	x	x	x	x	x	x	x	x	x	x	x
2011	x	x	x	x	x	x	x	x	x	x	x	x
2012	x	x	x	x	x	x	x	x	x	x	x	x
2013	x	x	x	x	x	x	x	x	x	x	x	x
2014	x	x										

Level-2 Product Generation and Distribution:

Besides historical RL00 till RL04 and GFZ's RL05 time-series (see below) the following RL05 L2 products are presently available to the public (green: available, yellow: in preparation; red: missing due to accelerometer data or accelerometer and K-band data problems):

- **GFZ RL05a:** GSM solutions are available for January 2003 until October 2013. 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.

- **JPL RL05:** GSM solutions 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 2013. Details are listed in the JPL L2 Release Notes.

JPL RL05	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002												
2003												
2004												
2005												
2006												
2007												
2008												
2009												
2010												
2011												
2012												
2013												

- GFZ has stopped RL05 processing end of July 2013 (now substituted by RL05a). For further details see Newsletter October 2013.
- GFZ and CSR have stopped RL04 processing end of April 2012
- JPL has stopped RL04 processing end of January 2012
- 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/TN07 containing C20 estimates derived from SLR and using GRACE RL04/RL05 standards is periodically updated.

Miscellaneous:

- The GRACE Science Team Meeting 2013 has taken place 23-25 October 2013 at UTCSR. Proceedings are available at <http://www.csr.utexas.edu/grace/GSTM/proceedings.html>.
- Lecture material from the 2011 summer school of the DFG Special Priority Program "Mass transport and mass distribution in the system Earth" can be downloaded at www.massentransporte.de. Before using, please read the agreements on the cover page.
- 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.gfz-potsdam.de/en/research/organizational-units/departments-of-the-gfz/department-1/global-geomonitoring-and-gravity-field/topics/development-operation-and-analysis-of-gravity-field-satellite-missions/grace/grace-related-publications/>, alternatively the list can be accessed via <http://www.gfz-potsdam.de/en/grace> and one further click on 'GRACE related publications' in the left column. The current status is 1141 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>.