GRACE Science Data System Monthly Report
January 2004

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Reminder: The GRACE mission is still in validation phase. Therefore this newsletter, as well as the GRACE data products, are for the Science Team´s use only.

Satellite Science Relevant Events:

- The satellites collected nominal science data until January 13. From January 14 until the end of the month, there was no K-Band Ranging data collected – which means that the gravity field models will not be developed until the K-Band ranging was restored on February 03. Science data continues to be collected since returning to mode.
- The events of January 14 started with multiple mode drops to CMCPM (Cess/Magnetometer Coarse Pointing Mode) once every orbit related to a performance anomaly in GRACE-1 SCA head #1, resulting in sharply increased fuel consumption. During the early investigation, GRACE-1 was yawed by 180 degrees to conserve fuel, resulting in the loss of K-band link. While the root cause remains under investigation, GRACE-1 was turned around again on February 03, thus restoring the K-band link. Additional operational measures were put into place to mitigate against a recurrence of a similar anomaly.
- The K-band Sampler Unit temperature set point was raised on January 13, to put this unit under tighter thermal control for stability.
- Updated Star Camera Software was activated on GRACE-2 on January 19 to improve the SCA performance.
- On January 22 the Instrument Processing Unit (IPU) was switched from main to redundant.
- On January 29, a near simultaneous center of mass (CoM) calibration took place on both GRACE satellites. The duration of the experiment was twice the normal, and the equatorial components were shifted by 10° northwards to mitigate the effects of accelerometer twangs. The data analysis for calculation of the CoM offset is still underway, but preliminary analysis indicates that both CoM are within the nominal operating range.
- The GRACE-1 Brower mean orbital elements on Feb. 01, 2004 00:00:00 were as follows:
  A [m] = 472933.160
  E [-] = 0.001893
  I [º] = 89.011850
  The satellites maintained a 237 km separation, with a change rate of near to 0 km/day

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

GRACE-1 Housekeeping:	99.26 %
GRACE-1 Science:	99.06 %
GRACE-2 Housekeeping:	99.76 %
GRACE-2 Science:	100.00 %

Level-1 Data Processing:

- Level-1B instrument data have been processed at JPL and archived at GRACE-ISDC and JPL PO.DAAC. Due to 180 degree yaw maneuver on January 15 not all products are available for January 2004.

The following table gives a statistics of the available KBR1B products. The columns in the table are:

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_2004-01-01_X_00.dat	24.0	17210	2.51	-12.8	12.4	2
KBR1B_2004-01-02_X_00.dat	23.5	16909	1.73	-4.0	3.7	3
KBR1B_2004-01-03_X_00.dat	24.0	17260	1.92	-4.7	5.8	1
KBR1B_2004-01-04_X_00.dat	24.0	17260	1.66	-3.3	4.3	1
KBR1B_2004-01-05_X_00.dat	24.0	17260	1.77	-3.7	4.1	1
KBR1B_2004-01-06_X_00.dat	24.0	17260	1.56	-4.4	5.2	1
KBR1B_2004-01-07_X_00.dat	23.9	17181	1.98	-4.4	6.4	2
KBR1B_2004-01-08_X_00.dat	24.0	17240	1.90	-6.8	6.4	1
KBR1B_2004-01-09_X_00.dat	23.8	17071	1.74	-4.5	4.3	4
KBR1B_2004-01-10_X_00.dat	24.0	17280	1.62	-5.0	4.5	1
KBR1B_2004-01-11_X_00.dat	23.6	17003	1.76	-4.0	5.2	2
KBR1B_2004-01-12_X_00.dat	24.0	17260	1.81	-5.5	5.3	1
KBR1B_2004-01-13_X_00.dat	24.0	17238	2.29	-7.5	6.4	1
KBR1B_2004-01-14_X_00.dat	17.4	12485	8.67	-40.9	34.9	4
KBR1B_2004-01-15_X_00.dat	3.0	1800	11.23	-29.6	20.1	2
KBR1B_2004-01-16_X_00.dat	--- not available due to slewed ---					
…						
…						
KBR1B_2004-01-31_X_00.dat	--- GRACE-1 orientation ----					

- Additionally all level-1B barotropic sea level products (OCN1B) and de-aliasing products (AOD1B) have been calculated by GFZ and archived at GRACE-ISDC.

Level-2 Data Processing:

- Due to non-availability of KBR data between January 16 and 31 no monthly gravity field solution for January 2004 has been derived so far.
- All 3 L2 centers at CSR, JPL and GFZ concentrated on improvements in the gravity model product quality and catching up on the remaining monthly fields data processing

GRACE Product Distribution:

On January 26 a second release of monthly gravity fields has been made available to the GRACE Science Team. All products are available at JPL PO.DAAC (http://podaac.jpl.nasa.gov/grace) and GFZ ISDC (http://isdc.gfz-potsdam.de/grace). The status on January 26 was as follows:

CSR satellite only monthly solutions (GSM):

GSM-2_0031_2002104-2002138_UTCSR_0000_0001	April/May 2002
GSM-2_0028_2002213-2002243_UTCSR_0000_0001	August 2002
GSM-2_0026_2002305-2002334_UTCSR_0000_0001	November 2002
GSM-2_0022_2003035-2003059_UTCSR_0000_0001	February 2003
GSM-2_0031_2003060-2003090_UTCSR_0000_0001	March 2003
GSM-2_0028_2003091-2003119_UTCSR_0000_0001	April 2003
GSM-2_0027_2003112-2003139_UTCSR_0000_0001	April/May 2003
GSM-2_0030_2003182-2003212_UTCSR_0000_0001	July 2003
GSM-2_0030_2003213-2003243_UTCSR_0000_0001	August 2003
GSM-2_0027_2003244-2003273_UTCSR_0000_0001	September 2003
GSM-2_0031_2003274-2003304_UTCSR_0000_0001	October 2003

CSR satellite plus terrestrial data combination mean field (GCM):

GCM-2_0111_2002096-2002332_UTCSR_0000_0000	April 02 – Nov. 03

GFZ satellite only monthly solutions (GSM):

GSM-2_0025_2002214-2002243_EIGEN_G----_0001	August 2002
GSM-2_0023_2003214-2003242_EIGEN_G----_0001	August 2003

GFZ satellite only mean field (GSM):

GSM-2_0066_2002214-2003242_EIGEN_G----_0001	Aug. 02 – Aug. 03

Corresponding GFZ and CSR Level-2 release notes have been provided on the ISDC and PO.DAAC web sites.

Miscellaneous:

- Joint CHAMP and GRACE Science Team Meeting is scheduled for July 6-8, 2004 at GFZ Potsdam with registration, poster mounting and ice breaker party on July 5, afternoon to evening
- Level-1B data distribution to the Science Team is planned for mid February 2004