GRACE Science Data System Monthly Report
February 2005

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Satellite Science Relevant Events:

- Nominal operation in Science Mode throughout the month except on
  - February 10: Orbit maintenance maneuver, no K-band data for about 4,5 hours.
  - February 20: Hang up of the GRACE-2 accelerometer Interface Control Unit (ICU). After commanding an ADC (Analogue Digital Converter) reset the ICU resumed nominal operation. Nevertheless, about 4 hours of ACC data were lost.
  - During upload of IPU (Instrument Processing Unit) software B148 to GRACE-2 on February 21-24 and to GRACE-1 on February 28 the maximum number of tracked GPS satellites was set to 6. See also section “Level-1 Data Processing”.
  - Two mode drops to Coarse Pointing Mode occurred on February 22 (GRACE-2) and February 24 (GRACE-1), respectively.
- On February 4 the Inertial Measurement Unit on GRACE-2 has been switched-off in order to increase the power margin. This does not affect the science operations.
- Upload and activation of reference attitude software package V5 on GRACE-1 (February 9) and GRACE-2 (February 3) led to a clear reduction of thruster actuation.
- The GRACE-1 Brouwer mean orbital elements on March 01, 2005 00:00:00 are as follows:

  A [m] = 6846105.956

  E [-] = 0.001906

  I [º] = 89.029369

  The satellites separation was 245 km on February 28 with a rate of -1.00 km/d. Next orbit maintenance maneuver will be needed in about 3 months.

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

GRACE-1 Housekeeping:	99.9 %
GRACE-1 Science:	100.0 %
GRACE-2 Housekeeping:	99.6 %
GRACE-2 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.

Notes:

- On days 2005-02-21, 2005-02-22 and 2005-02-23 Build 150 IPU software was uploaded to GRACE-B, which requires many IPU reboots and the Maximum number of GPS satellites tracked for OD was set to 6 (nominal = 10) during the upload. The lower number of GPS satellites tracked resulted in higher formal clock errors. The rejection criteria for the formal clock error was raised to 20 cm (from 10 cm) to let 30-50 % of the KBR1B data back in.
- On day 2005-02-24 an IPU upload flash test was performed on GRACE-A with maximum number of GPS satellites tracked set to 6. For the rejection criteria for the formal clock error was raised to 20 cm (from 10 cm) on GRACE-A.
- Extra vigilance is suggested when using the days mentioned above for science analysis

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_2005-02-01_X_01.dat	24.0	17280	1.55	-4.8	4.3	1
KBR1B_2005-02-02_X_01.dat	23.9	17197	1.72	-3.9	5.0	2
KBR1B_2005-02-03_X_01.dat	23.6	16984	1.54	-4.4	3.5	3
KBR1B_2005-02-04_X_01.dat	24.0	17280	1.56	-4.2	4.5	1
KBR1B_2005-02-05_X_01.dat	23.9	17203	1.59	-4.0	3.8	2
KBR1B_2005-02-06_X_01.dat	24.0	17266	1.67	-4.7	5.5	2
KBR1B_2005-02-07_X_01.dat	24.0	17266	1.77	-6.3	4.1	2
KBR1B_2005-02-08_X_01.dat	23.8	17131	1.56	-3.9	4.4	3
KBR1B_2005-02-09_X_01.dat	23.6	16958	1.81	-3.7	5.3	2
KBR1B_2005-02-10_X_01.dat	18.6	12251	1.87	-3.5	4.8	2
KBR1B_2005-02-11_X_01.dat	24.0	17280	1.60	-5.2	4.4	1
KBR1B_2005-02-12_X_01.dat	24.0	17198	1.48	-4.9	3.1	1
KBR1B_2005-02-13_X_01.dat	23.4	16771	1.41	-3.3	4.0	3
KBR1B_2005-02-14_X_01.dat	23.7	17063	1.33	-3.9	4.0	3
KBR1B_2005-02-15_X_01.dat	23.9	17185	1.45	-3.6	4.2	3
KBR1B_2005-02-16_X_01.dat	24.0	17250	1.50	-5.2	3.8	1
KBR1B_2005-02-17_X_01.dat	23.9	17217	1.46	-4.7	5.2	4
KBR1B_2005-02-18_X_01.dat	23.9	17175	1.93	-4.2	6.2	2
KBR1B_2005-02-19_X_01.dat	23.9	17188	1.35	-3.7	4.1	1
KBR1B_2005-02-20_X_01.dat	24.0	17260	1.33	-3.7	3.0	1
KBR1B_2005-02-21_X_01.dat	23.4	16864	1.69	-5.7	4.4	3
KBR1B_2005-02-22_X_01.dat	21.9	15777	2.73	-9.2	7.4	6
KBR1B_2005-02-23_X_01.dat	22.4	16139	2.38	-5.9	15.2	7
KBR1B_2005-02-24_X_01.dat	22.9	16472	2.22	-5.0	9.3	4
KBR1B_2005-02-25_X_01.dat	24.0	17280	1.76	-5.2	5.7	1
KBR1B_2005-02-26_X_01.dat	not yet processed					
…						
KBR1B_2005-02-28_X_01.dat	not yet processed					

- Level-1B barotropic sea level products (OCN1B) and de-aliasing products (AOD1B) until February 28 were calculated by GFZ and archived at GRACE-ISDC.

Level-2 Data Processing:

- 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:

- GFZ has provided 16 monthly and 1 mean GRACE gravity fields to ISDC and PO.DAAC. The monthly fields cover the period between February 2003 and July 2004. The mean field is called EIGEN-GRACE03S and is based on 376 days of L1B data. All fields are evaluated up to degree and order 150 and are constrained by Kaula´s rule starting at degree and order 70 (monthly fields) and 120 (mean field), respectively. Most important change w.r.t. EIGEN-GRACE02S is the use of updated background models (EIGEN-GRACE02S, FES2004). Calibrated errors and an updated L2 release note are available, too.

  An application of EIGEN-GRACE03S monthly fields can found in R. Schmidt, F. Flechtner, A. Güntner, R. König, Ul. Meyer, K.-H. Neumayer, S. Petrovic, Ch. Reigber, P. Schwintzer, and S.-Y. Zhu, Time-Variable Gravity from GRACE and Hydrology, Advances in Geosciences, in preparation.

Miscellaneous:

- Selected and reviewed presentations from the July 2004 Joint CHAMP/GRACE Science Meeting will be published in a special issue of EGU´s ´Advances of Geosciences´.
- 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.