# GRACE Science Data System Monthly Report
# May 2004


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

**Note:** Deadline for abstract submission for Joint CHAMP and GRACE Science Team Meeting is now past. The deadline for Registration and Housing at preferential group rates is June 4, 2004.

**Satellite Events Relevant to Science**:

- Software upload for the Instruments Processing Unit (IPU) was successfully completed on both satellites. Both satellites have been using Build-148 software since Feb 2003. The un-used side on each instrument, until the upload, carried the now-obsolete Build-147. On both satellites, Build-149 Software replaces the Build-147 version – and the satellites will operate with Build 149 from here on. The side that contains Build-148 will now become the back-up side of the instrument.
- This software upload makes the IPU, and hence the satellite operations more robust and reliable – and reduces the severity of disruptions to science data collection. In the event of having to switch sides on the IPU instrument in future, equally good quality science data will continue to be available.
- New science data monitoring software at GSOC has now become active, with the result that anomalous science instrument states can be now detected and corrected much sooner than before.
- Extra satellite monitoring passes had been requested, to support rapid reaction, during a period in May when the geometry of the Star Cameras relative to the solar illumination was the same as during the disruptive events of Jan 14, 2004. However, this phase passed un-eventfully, with no disruption in operations.
- The two-line elements for GRACE-1 and GRACE-2 were as follows on June 01, 2004

```
1 27391U 02012A  04152.69379571  .00002134  00000-0  70985-4 0  6929
2 27391  89.0175 247.5423 0020410  58.0383 302.2920 15.30453919123087

1 27392U 02012B  04152.69415312  .00001897  00000-0  62916-4 0  6777
2 27392  89.0166 247.5412 0021630  59.9976 300.3418 15.30454274123085
```

The satellites separation is 233 km (June 01) with a rate of -0.75 km/d. The next orbit maintenance maneuver will be necessary in two to three months.

## GRACE Products & Distribution Items:

- Three new monthly gravity fields are now available. These are

  GSM-2_0013_2004001-2004013_UTCSR_0000_0001 (Jan 2004, 70x70)
  GSM-2_0026_2004035-2004060_UTCSR_0000_0001 (Feb 2004, 120x120)
  GSM-2_0031_2004061-2004091_UTCSR_0000_0001 (Mar 2004, 120x120)

- Proceedings from the October 2003 GRACE Science Team Meeting should be soon available at the archives. The file package is large (75 Mb without movies, 150 Mb with). If you would like to receive this package on a CD, please email grace@csr.utexas.edu.
- A GRACE-related bibliography is now available at PO.DAAC and ISDC, at URL http://podaac.jpl.nasa.gov/grace/bibliography. Recent papers and presentations related to GRACE are cited there, and where permissible, presentation documents are also included. There is also a form for the users to submit more citations – *and the Science Team is encouraged to actively participate by contributing more references*. You can provide a citation only, or you can add a link to your own e-documents & web pages, or you can provide the paper or presentation itself in a PDF format. If you wish to upload a PDF document, please contact Kelley Case (Kelley.E.Case@jpl.nasa.gov).
- Reading software for binary OCN1B products is available at the two archives since April 15 (README, shell script, test data set).

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

| | |
|---|---|
| GRACE-1 Housekeeping: | 99.5 % |
| GRACE-1 Science: | 100.0 % |
| GRACE-2 Housekeeping: | 99.5 % |
| GRACE-2 Science: | 100.0 % |

**Level-1 Data Processing:**

- Level-1B instrument data have been processed at JPL and archived at GRACE-ISDC and JPL PO.DAAC.

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_2004-05-01_X_00.dat | 23.9 | 17194 | 2.13 | -5.4 | 5.1 | 2 |

```
KBR1B_2004-05-02_X_00.dat  24.0  17265  2.25    -5.5    6.3  2
KBR1B_2004-05-03_X_00.dat  24.0  17280  2.38    -6.7    8.0  1
KBR1B_2004-05-04_X_00.dat  23.6  16974  2.57    -8.0    7.5  5
KBR1B_2004-05-05_X_00.dat  24.0  17280  2.75    -5.9    9.0  1
KBR1B_2004-05-06_X_00.dat  24.0  17280  2.51    -6.8    6.8  1
KBR1B_2004-05-07_X_00.dat  24.0  17280  2.43    -6.8    5.1  1
KBR1B_2004-05-08_X_00.dat  24.0  17280  2.76    -6.5    7.2  1
KBR1B_2004-05-09_X_00.dat  23.9  17199  1.95    -4.4    5.5  2
KBR1B_2004-05-10_X_00.dat  22.9  16523  2.63    -6.2    6.6  4
KBR1B_2004-05-11_X_00.dat  23.4  16868  3.16    -8.5   12.2  4
KBR1B_2004-05-12_X_00.dat  23.9  17185  3.29   -11.4    8.7  2
KBR1B_2004-05-13_X_00.dat  22.9  16445  3.74   -10.0    8.4  6
KBR1B_2004-05-14_X_00.dat  23.3  16679  2.66    -9.3    7.9  5

KBR1B May 15 to present   --- not yet processed ----
```

Notes: For days 2004-05-10 -> 2004-05-14 the MaxSat setting for the IPU was 6 instead of 10. As a consequence the formal error estimates of the GRACE-B clock were higher than normal. Therefore we raised the maximum formal error from 10 cm to 15 cm to reduce significant KBR1B data loss. Therefore you can observe that the KBR-GPS RMS is higher than normal. The RMS mainly increased because of the many IPU reboots required for the IPU software upload to GRACE-B.

Additionally all level-1B barotropic sea level products (OCN1B) and de-aliasing products (AOD1B) until May 25 have been 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.

**Miscellaneous:**

- The keyword GRACE appeared in 26 abstracts submitted at the Spring 2004 Joint Assembly of the AGU/CGU in Montreal, during May 17-21. Papers were presented on interpretation of the variability from GRACE monthly estimates; and on the combination of GRACE-derived mean gravity fields with regional gravity and altimetric data for the determination of high resolution, local geoid.
- Hydrology user workshop (March 21, 2004) material is now available (since April 10) at http://www.ess.uci.edu/~famiglietti/grace.
- 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.