GRACE Follow-On

Science Data System Newsletter

Report: Oct / Nov 2020 (No. 16)

Contact: gracefo@jpl.nasa.gov

Felix Landerer[1], Frank Flechtner[2], Himanshu Save[3], Christoph Dahle[2], Michael Watkins[1]

[1] Jet propulsion Laboratory / California Institute of Technology, Pasadena, CA
[2] GFZ German Research Centre for Geosciences, Potsdam, Germany
[3] Center for Space Research, University of Texas, Austin, TX

GRACE Follow-On Science Data System: Highlights & Updates

- The **2021 GRACE/GRACE-FO Science Team Meeting** is scheduled to take place from Oct 5-8, 2021. As the current COVID-2019 situation is still evolving, we currently plan for in-person as well as remote participation options. Stay tuned for updates (visit https://grace.jpl.nasa.gov/events/ for more information).
- The following **SDS data products** are now available at NASA's Physical Oceanography Distributed Active Archive Center (PO.DAAC) and GFZ's Information System and Data Center (ISDC):
  - **Level-1** SDS data products through **Dec 2020.**
  - **Level-2** data products through **Nov 2020.**
- The following corresponding **Level-3 data** products (global, land, ocean, ice) are available:
  - JPL Tellus global mascon products: https://grace.jpl.nasa.gov/data/get-data/jpl_global_mascons/
  - GFZ GravIS land, ocean and ice products: http://gravis.gfz-potsdam.de/
  - UT-CSR global mascon solutions: http://www2.csr.utexas.edu/grace/RL06_mascons.html
- Do you have exciting new GRACE-FO results, a conference presentation or paper publication you would like to share? Please send a copy of your GRACE and GRACE-FO related publications to landerer@jpl.nasa.gov and flechtne@gfz-potsdam.de (please also consider a 1-slide highlight summary of the main findings).
  - GRACE-FO Mission reference paper:
    Landerer, F.W., Flechtner, F., et al., 2020, Extending the global mass change data record: GRACE Follow-On instrument and science data performance, Geophys. Res. Lett., https://doi.org/10.1029/2020GL088306.

Calendar & Upcoming Events:

- The 1. **Workshop of the Inter-Commission Committee on "Geodesy for Climate Research"** (ICCC) of the International Association of Geodesy (IAG). The meeting will take place March 29-31, 2021 as an online event, and participation is free of charge. More information can be found on the workshop website: https://iccc.iag-aig.org/iccc-workshops/ws21.
- The **EGU General Assembly 2021** will take place entirely online from 19 - 30 Apr, 2021. See https://www.egu21.eu/ to search for GRACE(-FO) related sessions.
- **GRACE / GRACE-FO Science Team Meeting 2021** will take place in Oct 5-8, 2021; as the current Covid-2019 situation is still evolving, we plan for in-person as well as remote participation options. Visit https://grace.jpl.nasa.gov/events/ for current status.

GRACE Follow-On: Mission Status

GRACE Follow-On: Orbit

The GRACE Follow-On orbital parameters on 20210118 (day 018) were as follows:

Sun Beta (deg)	10
Absolute Distance (km)	186.5
Drift (km/d)	0.13
Mean Altitude (>6378.1 km)	490.1
Decay Rate (GF1/GF2) (7d mean, m/d)	2.1 / 2.2

Science-relevant Mission Events & Plans:

- Both accelerometers (ACCs) are operating and collecting observations in their nominal mode, Normal Range Mode (NRM). GF1 ACC data are used to generate an ACC transplant data product which is provided as the ACT1B product and should be used to substitute the GF2 ACC measurements (please check the ACT-Readme document for details at PO.DAAC).
- Center-of-Mass offset determinations are performed approx. every 6 months.
- Additional calibration periods, spacecraft activities and events are highlighted in the Level-1 v04 notes and event log below.

Level-1, Level-2, Level-3 Data Products and Processing

Level-1 Data Processing & Delivery

- [2020-07-10]: JPL SDS Level-1 has updated the v04 LRI data processing to (1) improve the removal of LRI phase jumps, and to (2) reduce the noise of the time-of-flight (TOF) correction for range-acceleration to the level of 1 nm/s^2;
  Please see Level-1 Release Notes for details.
- Level-1 data products (current version: v04), which are available at NASA's Physical Oceanography Distributed Active Archive Center (PO.DAAC) and GFZ's Information System and Data Center (ISDC), are continuously updated approximately every 7 days. The Level-1 data includes all data required for the generation of Level-2 gravity field products. Please refer to Level-1 release notes, documentation, as well as to the Sequence-of-Events (SOE) logfile for important updates, comments and detailed description of the data, file formats, and conventions (PO.DAAC / ISDC).

KBR Performance Statistics

- [see Appendix 1A (p. 5)]

Level-1 Data Product Availability

- [see Appendix 1B (p. 7) for GRACE-FO Level-1 data]
- [see Appendix 1C (p. 7) for de-aliasing AOD1B model data]

Level-1 Release Notes & Sequence of Events

- [see Appendix 1D (p. 7)]

Level-2 Data Processing & Delivery

Level-2 Data availability

- Level-2 Release 06 data have been processed at JPL, GFZ and CSR and are archived at JPL PO.DAAC and GFZ ISDC. The Level-2 products include the monthly gravity fields from the three mission Science Data System centers (JPL, GFZ, CSR), as well as the corresponding atmosphere and ocean dealiasing (AOD) background model data.
- Please refer to the Level-2 Release Notes and documentation description of the data for file formats, updates, conventions, as well as important processing recommendations (PO.DAAC / ISDC).
- [see Appendix 2A (p. 7) for overview tables on data availability].

Level-2 Ancillary Products and Comments

- TN-14 contains C20 & C30 estimates derived from SLR and using Level-2 RL06 standards, updated in synch with Level-2 monthly releases. It is recommended to replace the native GRACE & GRACE-FO C20 & C30 coefficients with this product (Loomis et al., 2019).
- TN-13[a,b,c] contains geocenter estimates using the methods of Swenson et al. (2010) and Sun et al. (2016), and is updated in synch with Level-2 monthly releases. It is

recommended to augment the GRACE / GRACE-FO geocenter with this product for surface mass change estimation.

Level-3 Data Processing & Delivery

- SDS Level-3 monthly global grids of mass changes are generated by JPL and available at PO.DAAC.

Resources and Links:

Data Archives (Level 1-3):

- JPL/NASA PO.DAAC (http://podaac.jpl.nasa.gov)
- GFZ ISDC (https://isdc.gfz-potsdam.de/grace-fo-isdc)

Miscellaneous Links:

- For GRACE Follow-On mission updates and news, please visit https://gracefo.jpl.nasa.gov and http://gfz-potsdam.de/en/grace-fo.
- The proceedings of previous GRACE / GRACE-FO Science Team Meetings are available at https://www.gfz-potsdam.de/en/grace/.
- **GRACE and GRACE-FO related publications** are available via searchable databases:
    - http://www-app2.gfz-potsdam.de/pb1/op/grace/references/sort_date.html
    - https://grace.jpl.nasa.gov/publications/
    - If you are missing a publication please send an e-mail to Frank Flechtner (flechtne@gfz-potsdam.de) and contact the JPL team via https://grace.jpl.nasa.gov/about/feedback/.

Appendix

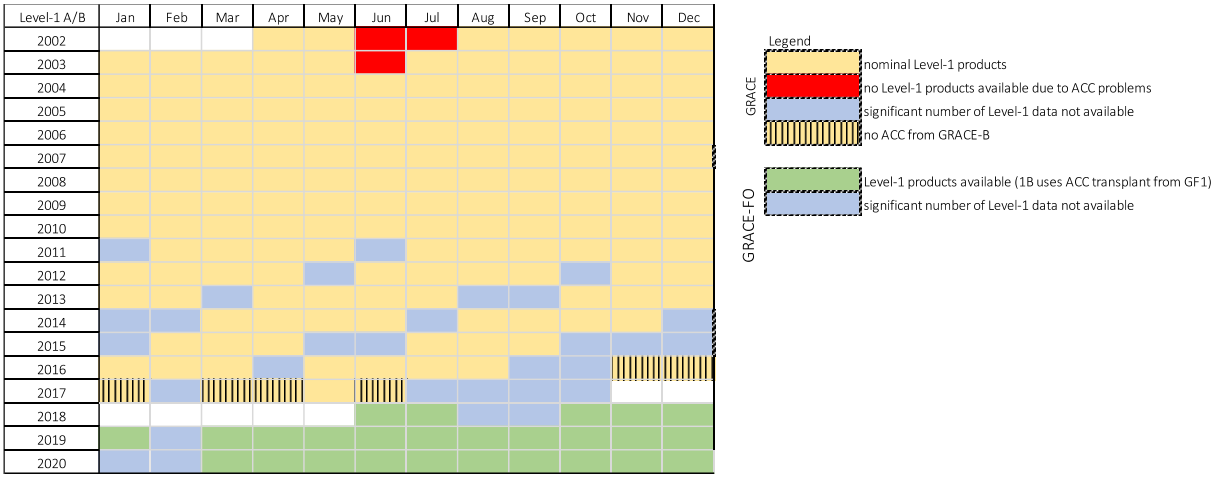
1.A - KBR Performance Statistics

KBR QUALITY ASSESSMENT
Key to columns in the table below
1) KBR1B product name
2) Total arc length with data (hours)
3) Number of observations used in KBR-GPS range residual calculation
4) KBR-GPS range residual RMS (mm)
5) Minimum KBR-GPS range residual (mm)
6) Maximum KBR-GPS range residual (mm)
7) Number of continuous segments in the KBR product

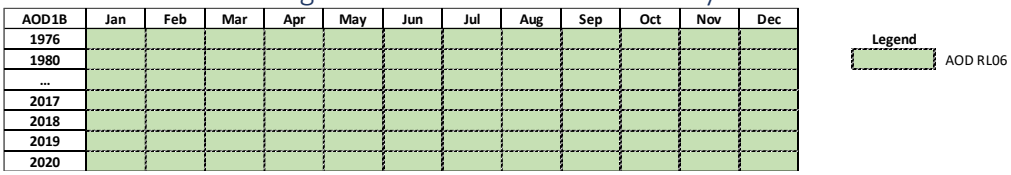
KBR1B_2020-11-01_Y_04.dat	24.0	17280	2.97	-12.6	8.6	1
KBR1B_2020-11-02_Y_04.dat	24.0	17280	2.79	-6.0	12.1	1
KBR1B_2020-11-03_Y_04.dat	24.0	17138	3.57	-5.9	20.8	1
KBR1B_2020-11-04_Y_04.dat	24.0	17081	3.86	-17.4	17.9	2
KBR1B_2020-11-05_Y_04.dat	24.0	16900	3.06	-11.9	12.5	3
KBR1B_2020-11-06_Y_04.dat	24.0	17280	3.18	-9.3	22.2	1
KBR1B_2020-11-07_Y_04.dat	24.0	17280	3.63	-10.9	27.3	1
KBR1B_2020-11-08_Y_04.dat	24.0	17064	3.38	-17.4	19.9	3
KBR1B_2020-11-09_Y_04.dat	24.0	17091	3.64	-21.4	9.5	2
KBR1B_2020-11-10_Y_04.dat	24.0	17067	4.81	-36.6	16.6	2
KBR1B_2020-11-11_Y_04.dat	24.0	16817	4.07	-12.0	24.8	4
KBR1B_2020-11-12_Y_04.dat	24.0	17003	3.48	-18.2	13.1	4
KBR1B_2020-11-13_Y_04.dat	24.0	16972	3.58	-24.0	16.9	3
KBR1B_2020-11-14_Y_04.dat	24.0	17280	3.16	-14.0	10.0	1
KBR1B_2020-11-15_Y_04.dat	24.0	17280	3.62	-15.4	10.9	1
KBR1B_2020-11-16_Y_04.dat	24.0	17051	4.08	-23.8	16.2	2
KBR1B_2020-11-17_Y_04.dat	24.0	16907	2.69	-7.6	14.8	4
KBR1B_2020-11-18_Y_04.dat	24.0	17159	2.60	-9.8	13.4	2
KBR1B_2020-11-19_Y_04.dat	24.0	17280	2.83	-12.7	11.8	1
KBR1B_2020-11-20_Y_04.dat	24.0	17151	2.58	-13.4	9.5	2
KBR1B_2020-11-21_Y_04.dat	24.0	17020	3.68	-12.2	18.2	3
KBR1B_2020-11-22_Y_04.dat	24.0	17280	4.58	-34.3	10.3	1
KBR1B_2020-11-23_Y_04.dat	24.0	17173	3.23	-10.2	14.7	2
KBR1B_2020-11-24_Y_04.dat	24.0	16666	3.31	-24.6	9.7	8
KBR1B_2020-11-25_Y_04.dat	24.0	17280	3.25	-14.1	14.8	1
KBR1B_2020-11-26_Y_04.dat	24.0	17280	3.22	-14.3	10.5	1
KBR1B_2020-11-27_Y_04.dat	24.0	17061	4.84	-23.3	23.9	2
KBR1B_2020-11-28_Y_04.dat	24.0	17199	3.32	-12.0	11.9	2
KBR1B_2020-11-29_Y_04.dat	24.0	17157	4.66	-17.4	29.7	2
KBR1B_2020-11-30_Y_04.dat	24.0	17120	3.44	-18.7	8.9	7
KBR1B_2020-12-01_Y_04.dat	24.0	17209	2.76	-11.2	12.4	5
KBR1B_2020-12-02_Y_04.dat	24.0	16908	3.69	-8.2	19.5	4
KBR1B_2020-12-03_Y_04.dat	24.0	17280	2.54	-9.6	9.3	1
KBR1B_2020-12-04_Y_04.dat	24.0	17280	3.94	-23.7	18.3	1
KBR1B_2020-12-05_Y_04.dat	24.0	17280	4.61	-30.2	17.0	1
KBR1B_2020-12-06_Y_04.dat	24.0	17123	3.05	-18.6	9.0	2
KBR1B_2020-12-07_Y_04.dat	24.0	17280	5.10	-23.7	22.6	1
KBR1B_2020-12-08_Y_04.dat	24.0	17280	4.74	-25.7	14.1	1
KBR1B_2020-12-09_Y_04.dat	24.0	17155	4.61	-23.7	24.8	2
KBR1B_2020-12-10_Y_04.dat	24.0	17280	3.79	-13.2	12.1	1
KBR1B_2020-12-11_Y_04.dat	24.0	17280	2.96	-10.3	10.9	1
KBR1B_2020-12-12_Y_04.dat	24.0	17280	3.46	-14.2	18.4	1
KBR1B_2020-12-13_Y_04.dat	24.0	17280	2.80	-10.1	14.0	1
KBR1B_2020-12-14_Y_04.dat	24.0	17280	3.87	-12.6	19.8	1
KBR1B_2020-12-15_Y_04.dat	24.0	17141	7.21	-42.5	30.4	2
KBR1B_2020-12-16_Y_04.dat	24.0	17280	4.64	-16.2	15.4	1
KBR1B_2020-12-17_Y_04.dat	24.0	17280	4.03	-16.3	15.5	1
KBR1B_2020-12-18_Y_04.dat	24.0	17280	5.95	-13.1	45.1	1
KBR1B_2020-12-19_Y_04.dat	24.0	17147	3.56	-15.4	14.6	2
KBR1B_2020-12-20_Y_04.dat	24.0	17280	3.96	-15.6	12.8	1
KBR1B_2020-12-21_Y_04.dat	24.0	17123	3.39	-17.2	11.5	2
KBR1B_2020-12-22_Y_04.dat	24.0	17280	3.25	-11.9	13.1	1
KBR1B_2020-12-23_Y_04.dat	24.0	17090	2.92	-16.2	11.8	2
KBR1B_2020-12-24_Y_04.dat	24.0	17117	3.00	-8.0	11.6	2
KBR1B_2020-12-25_Y_04.dat	24.0	17039	7.09	-26.3	52.7	2
KBR1B_2020-12-26_Y_04.dat	24.0	16895	3.90	-15.6	19.6	3
KBR1B_2020-12-27_Y_04.dat	24.0	17280	3.72	-18.5	16.8	1
KBR1B_2020-12-28_Y_04.dat	24.0	17082	4.15	-20.6	20.5	3
KBR1B_2020-12-29_Y_04.dat	24.0	17280	2.70	-6.8	13.7	1
KBR1B_2020-12-30_Y_04.dat	24.0	17280	3.18	-19.2	10.9	1
KBR1B_2020-12-31_Y_04.dat	24.0	17280	2.74	-11.4	16.7	1

1.B – Level-1 GRACE-FO Data Availability

Table 1: Current version: Level-1 v04.



1.C – Level-1 De-aliasing Model AOD1B Data Availability



- For more information on the AOD de-aliasing AOD1B model please visit https://www.gfz-potsdam.de/en/aod1b/.

1.D - Level-1 Release Notes & Sequence of Events

See table below for current release period. All times in UTC:

2020-11-03	GRACE-D IPU reboot (commanded) at 00:02:30
	GRACE-C IPU reboot (commanded) at 00:06:30
	The above reboots (on 2020-11-03) were done to resume tracking to all GPS satellites after GPS PRN #6 had been temporarily disabled in the IPUs (starting at 2020-11-02 10:30) due to an announced period of unavailability.
2020-11-04	GRACE-C IPU reboot (spontaneous) at 21:26:20
2020-11-05	GRACE-D IPU reboot (commanded) at 00:45:30

	GRACE-C IPU reboot (commanded) at 00:49:30
	GRACE-C IPU reboot (spontaneous) at 22:33:50
	The early morning IPU reboots (near 2020-11-05 00:45) were done to resume tracking to all GPS satellites after GPS PRN #9 had been temporarily disabled in the IPUs (starting at 2020-11-04 11:10) due to an announced period of unavailability.
2020-11-08	GRACE-D IPU reboot (spontaneous) at 02:18:00
	GRACE-C IPU reboot (spontaneous) at 15:54:20
2020-11-09	GRACE-D IPU reboot (spontaneous) at 19:29:40
	GPS PRN#03 was disabled in the IPUs from 2020-11-09 14:15 to 2020-11-10 03:45 due to an announced period of unavailability.
2020-11-10	GRACE-C IPU reboot (commanded) at 03:55:40
	GRACE-D IPU reboot (commanded) at 03:50:30
	GPS PRN#32 was disabled in the IPUs from 2020-11-10 10:30 to 2020-11-11 00:01 due to an announced period of unavailability.
	GPS PRN#11 has been announced unusable until further notice and was disabled in the IPUs at 03:30.
2020-11-11	GRACE-D IPU reboot (commanded) at 03:05:30
	GRACE-C IPU reboot (commanded) at 03:09:20
	GRACE-C IPU reboot (spontaneous) at 21:55:00 - -
	GRACE-C A Missed Interrupt occurred after the reboot.
2020-11-12	A RestartTracker command sent at 02:45 resolved the issue.
	GPS PRN#30 was disabled in the IPUs from 2020-11-12 22:45 to 2020-11-13 12:16 due to an announced period of unavailability.
2020-11-13	GRACE-D IPU reboot (commanded) at 12:20:30
	GRACE-C IPU reboot (commanded) at 12:30:20
	GRACE-D IPU reboot (spontaneous) at 15:33:20
2020-11-16	Thruster calibration tests began today at 6:00 and continued until 25-Nov. During these tests the ACT thrusters were manually triggered for 1sec according to different profiles.
	GRACE-D IPU reboot (commanded) at 15:48:50 to resume nominal output of all IPU DSP channels
	GPS PRN#26 will be disabled in the IPUs from 18:00 to 2020-11-17 07:31 due to an announced period of unavailability.
2020-11-17	GRACE-D IPU reboot (commanded) at 07:35:40
	GRACE-C IPU reboot (commanded) at 07:40:40
	GRACE-C IPU reboot (spontaneous) at 08:42:00

	GRACE-D IPU reboot (spontaneous) at 21:17:00
	GPS PRN #26 was disabled in the IPUs from 2020-11-16 18:00 to 2020-11-17 07:31 due to an announced period of unavailability. The commanded reboots just after 07:35 were done to resume tracking to all GPS satellites.
2020-11-18	GRACE-D IPU reboot (commanded) at 18:50:40 to restore GPS PRN #21
	GRACE-C IPU reboot (commanded) at 18:56:40 to restore GPS PRN #21
	GPS PRN #21 was disabled in the IPUs from 05:15 to 18:46 due to announced period of unavailability. The commanded reboots around 18:50 were done to resume tracking to all GPS satellites.
2020-11-20	GRACE-C IPU reboot (spontaneous) at 21:53:50
2020-11-21	GRACE-D IPU reboot (commanded) at 03:10:40
	GRACE-C IPU reboot (commanded) at 03:16:50
	GRACE-C IPU reboot (spontaneous) at 21:25:30
	GPS PRN #08 was disabled in the IPUs from 2020-11-20 11:00 to 2020-11-21 00:31 due to an announced period of unavailability. The commanded reboots around 03:10 were done to resume tracking to all GPS satellites.
2020-11-23	Thruster calibration tests began today at 8:20 and continued until 25-Nov. During these tests the ACT thrusters were manually triggered for 1sec according to different profiles. For the first part of the test the satellite was commanded into NOM-AH mode at 8:10. At 14:40 the nominal NOM_FP mode was restored.
	GPS PRN #08 was disabled in the IPUs from 2020-11-23 16:30 to 2020-11-24 06:01 due to an announced period of unavailability. The commanded reboots around 06:10 were done to resume tracking to all GPS satellites.
	GRACE-C IPU reboot (spontaneous) at 20:36:10
	GRACE-D Ongoing thruster calibration tests (23/25-Nov)
2020-11-24	GRACE-D IPU reboot (commanded) at 06:10:40
	GRACE-C IPU reboot (commanded) at 06:15:00
	GRACE-C IPU reboot (spontaneous) at 13:19:00
	GRACE-C IPU reboot (spontaneous) at 14:47:50
	GRACE-C A Missed Interrupt occurred after the reboot at 14:47:50. A RestartTracker command sent at 21:17:38 resolved the issue.
	GRACE-C IPU reboot (spontaneous) at 22:07:50
2020-11-25	GRACE-C Thruster calibration tests were completed at 10:26.
	GRACE-D Thruster calibration tests were completed at 14:26.

	LRI high rate diagnostic data was collected during the last part of the thruster calibration tests. The LRI was commanded to diagnostic mode at 08:20 and returned to science mode at 15:11
2020-11-27	GRACE-D IPU reboot (spontaneous) at 06:25:30
2020-11-28	GRACE-C IPU reboot (spontaneous) at 20:30:20
2020-11-29	GRACE-C IPU reboot (spontaneous) at 14:33:40
2020-11-30	GRACE-C IPU reboot (spontaneous) at 14:13:50
	GRACE-C A series of missed interrupts occured after the 14:13 reboot. A Restart tracer command sent at ~03:40 resolved the issue
2020-12-01	GRACE-C RestartTracker command sent at 03:44 to resolve missed interrupt
2020-12-02	GRACE-D IPU reboot (spontaneous) at 13:08:40
	GRACE-C IPU reboot (commanded) at 14:49:00 to re-enable PRN #14 and increase number of GPS tracked satellites to 11
	GRACE-C IPU reboot (spontaneous) at 20:37:40
2020-12-06	GRACE-D IPU reboot (spontaneous) at 07:14:20 -
2020-12-07	The sampling rate of a housekeeping telemetry packet SPID14002 was increased from once per 32 sec to 4 sec to support the data analysis for GRACE-C at 14:30 andfor GRACE-D at 03:05. -
2020-12-09	GRACE-D IPU reboot (commanded) at 12:11:20 (to resume nominal output of DSP channel #25 - the channel was stuck) -
	Four LRI reboots were commanded (11:45-11:54) in order to validate all four flight software images.
2020-12-10	GRACE-C A new TC to enable autonomous on-board Missed Interrupt Handling was uplinked to the IPU at 11:47. -
2020-12-15	GRACE-C The sampling rate of a housekeeping telemetry packet SPID14001 was increased to 1 sec. -
	GRACE-C IPU reboot (spontaneous) at 08:30:20
2020-12-18	GRACE-C The sampling rate of a housekeeping telemetry packet SPID14002 was set to 4 sec. -
2020-12-19	GRACE-C IPU reboot (spontaneous) at 08:54:10 -
2020-12-21	GRACE-D IPU reboot (commanded to resume nominal output on all channels - a channel was stuck) at 10:57:10 -
2020-12-23	GRACE-C IPU reboot (spontaneous) at 04:57:40 -
2020-12-24	GRACE-C IPU reboot (spontaneous) at 10:13:50 -
2020-12-25	GRACE-D IPU reboot (spontaneous) at 09:45:20
	GRACE-C IPU reboot (spontaneous) at 09:47:10
2020-12-26	GRACE-C IPU reboot (spontaneous) at 06:16:20

	GRACE-C IPU reboot (spontaneous) at 09:28:30
2020-12-27	GRACE-C STR-A reboot at 17:03 -
2020-12-28	GRACE-C IPU reboot (commanded) at 15:20:00
	GRACE-D IPU reboot (commanded) at 16:48:10 -
	GPS PRN#07 was announced usable again and was enabled in the IPUs at 15:15 (GF1) and 16:50 (GF2). Afterwards, the IPUs was restarted in order to resume tracking to all available GPS satellites.
	GRACE-C In order to support the analysis of ACC data:
	At 01:04 the sample rate of TM packet 14002 was increased from 4sec to 1sec.
	At 01:14 the LRI was commanded to the Diagnostic Mode.
	LRI high rate diagnostic data were being collected once per orbit. -
2020-12-29	GRACE-C At 00:03 LRI was commanded to the Auto Acquisition/Science Mode and the sample rate of TM packet 14002 was set back to 4sec. -

2.A – Level-2 Product and Data Availability

JPL, GFZ & CSR

- Current Level-2 version: RL06
- All centers provide GSM solutions
    - Please check the Level-2 Release Notes for further details
- JPL and GFZ provide corresponding monthly de-aliasing models [GAA, GAB, GAC, GAD]; CSR provides [GAC, GAD].

Table 2: GRACE and GRACE-FO Level-2 product availability.

Level-2 (JPL)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002				1	2			3	4	5	6	7
2003	8	9	10	11	12		13	14	15	16	17	18
2004	19	20	21	22	23	24	25	26	27	28	29	30
2005	31	32	33	34	35	36	37	38	39	40	41	42
2006	43	44	45	46	47	48	49	50	51	52	53	54
2007	55	56	57	58	59	60	61	62	63	64	65	66
2008	67	68	69	70	71	72	73	74	75	76	77	78
2009	79	80	81	82	83	84	85	86	87	88	89	90
2010	91	92	93	94	95	96	97	98	99	100	101	102
2011		103	104	105	106		107	108	109	110	111	112
2012	113	114	115	116		117	118	119	120		121	122
2013	123	124		125	126	127	128			129	130	131
2014	132		133	134	135	136		137	138	139	140	
2015	141	142	143	144	145		146	147	148			149
2016	150	151	152		153	154	155	156			157*+	158*+
2017	159*+		160*+	161*+	162*	163*+						
2018						1*+	2*+			3*+	4+	5+
2019	6+	7*+	8+	9+	10+	11+	12+	13+	14+	15+	16+	17+
2020	18+*	19+*	20+	21+	22+	23+	24+	25+	26+	27+	28+	

GRACE
Level-2 products
no Level-2 products available

GRACE-FO
Level-2 products available

Current Level-2 Release: RL06

\+ Level-2 products (with ACC transplant)
* partial / overlapping calendar-months

3.A – Level-3 Product and Data Availability

JPL, GFZ & CSR

- JPL provides Land (LND) and Ocean (OCN) global data grids for all three SDS centers (JPL, GFZ, CSR) via PO.DAAC.

Table 3: GRACE and GRACE-FO Level-3 product availability

Level-2 (JPL)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002				1	2			3	4	5	6	7
2003	8	9	10	11	12		13	14	15	16	17	18
2004	19	20	21	22	23	24	25	26	27	28	29	30
2005	31	32	33	34	35	36	37	38	39	40	41	42
2006	43	44	45	46	47	48	49	50	51	52	53	54
2007	55	56	57	58	59	60	61	62	63	64	65	66
2008	67	68	69	70	71	72	73	74	75	76	77	78
2009	79	80	81	82	83	84	85	86	87	88	89	90
2010	91	92	93	94	95	96	97	98	99	100	101	102
2011		103	104	105	106		107	108	109	110	111	112
2012	113	114	115	116		117	118	119	120		121	122
2013	123	124		125	126	127	128			129	130	131
2014	132		133	134	135	136		137	138	139	140	
2015	141	142	143	144	145		146	147	148			149
2016	150	151	152		153	154	155	156			157*+	158*+
2017	159*+		160*+	161*+	162*	163*+						
2018						1*+	2*+			3*+	4+	5+
2019	6+	7*+	8+	9+	10+	11+	12+	13+	14+	15+	16+	17+
2020	18+*	19+*	20+	21+	22+	23+	24+	25+	26+	27+	28+	

GRACE
Level-3 products
no Level-3 products available

GRACE-FO
Level-3 products available

Current Level-2 Release: RL06

\+ Level-3 products (with ACC transplant)
* partial / overlapping cal-months