

JPL Level-2 GRACE Products - Release Notes Version 6.0

Christopher M. McCullough, David N. Wiese, & Dah-Ning Yuan

January 17, 2019

1 Overview

The following note accompanies the JPL GRACE Level-2 products, version 6.0. It replaces any preceding release notes associated with the version 6.0 product release. For each month, there are typically 6 available products, as listed below where **YYYY** corresponds to a 4 digit year and **DDD** corresponds to a 3 digit day of year (for details see the Level-2 User Handbook [1]).

GAA-2_YYYYDDD-YYYYDDD_GRAC_JPLEM_BC01_0600

The average of the ‘atm’ coefficients from the AOD1B RL06 product, for degree/order 180, over the same time span as the computed monthly solution. While the file contains values for degrees 0 and 1, these harmonic coefficients are not used in the JPL Level-2 data processing. Note that the averaging is computed over entire days, regardless of whether the full day (as opposed to a partial day) was included in the Level-2 data processing. For further details, see the RL06 AOD1B Product Description Document [2].

GAB-2_YYYYDDD-YYYYDDD_GRAC_JPLEM_BC01_0600

The average of the ‘ocn’ coefficients from the AOD1B RL06 product, for degree/order 180, over the same time span as the computed monthly solution. While the file contains values for degrees 0 and 1, these harmonic coefficients are not used in the JPL Level-2 data processing. Note that the averaging is computed over entire days, regardless of whether the full day (as opposed to a partial day) was included in the Level-2 data processing. For further details, see the RL06 AOD1B Product Description Document [2].

GAC-2_YYYYDDD-YYYYDDD_GRAC_JPLEM_BC01_0600

The average of the ‘glo’ coefficients from the AOD1B RL06 product, for degree/order 180, over the same time span as the computed monthly solution. These harmonic coefficients are modeled in the background during Level-2 data processing. While the file contains values for degrees 0 and 1, these harmonic coefficients are not used in the JPL Level-2 data processing. Note that the averaging is computed over entire days, regardless of whether the full day (as opposed to a partial day) was included in the

Level-2 data processing. For further details, see the RL06 AOD1B Product Description Document [2].

GAD-2_YYYYDDD-YYYYDDD_GRAC_JPLEM_BC01_0600

The average of the ‘oba’ coefficients from the AOD1B RL06 product, for degree/order 180, over the same time span as the computed monthly solution. While the file contains values for degrees 0 and 1, these harmonic coefficients are not used in the JPL Level-2 data processing. Note that the averaging is computed over entire days, regardless of whether the full day (as opposed to a partial day) was included in the Level-2 data processing. For further details, see the RL06 AOD1B Product Description Document [2].

GSM-2_YYYYDDD-YYYYDDD_GRAC_JPLEM_BA01_0600

The unconstrained monthly gravity field solution, computed out to degree/order 60.

GSM-2_YYYYDDD-YYYYDDD_GRAC_JPLEM_BB01_0600

The unconstrained monthly gravity field solution, computed out to degree/order 96. Note that due to satellite ground track coverage, this solution may not always be published.

2 General Usage Notes

For typical months, those where satellite ground track coverage is sufficient, 60x60 (BA01) and 96x96 (BB01) solutions are provided. It is left to the user’s discretion which solution best suits their particular application. Additionally, it is suggested that a suitable smoothing technique is applied, examples of which are available in the literature. The uncertainties provided with the gravity field solutions have NOT been calibrated and represent only the formal uncertainties. Users who wish to replace the value of $C_{2,0}$ are provided the option of using the SLR determined $C_{2,0}$ values given in GRACE Technical Note - 11. See TN-11 for further details. Finally, GRACE is not sensitive to degree 1 harmonics (geocenter). Therefore if users desire degree 1 coefficients they can be derived or taken from other observational techniques. Further details are available in the literature.

3 Differences from RL05.1

There are some notable differences when comparing RL06 to the previous Level-2 product release, RL05.1. Users should be aware of these differences when comparing the harmonic solutions referred to in this document with those computed for RL05.1.

The first of which is the GSM filename format. This has been altered to ensure conformity with future GRACE-FO data releases. The new GSM filename format is described in detail in the Level-2 User Handbook [1].

While the full suite of background models are available in the JPL Processing Standards Document [4], a few main model differences from RL05.1 are of note. First, the Atmosphere and Ocean De-Aliasing Product (AOD1B) has been updated to RL06, where a complete

overview is given in [2]. Finally, the mean pole has been changed from the IERS2010 conventions to a linear mean pole model. The use of a linear mean pole model in RL06 negates the need for the correction recommended by Wahr et. al. [3], which was applicable for RL05 solutions. For further details and a more complete overview of the processing, see the Processing Standards Document [4].

4 Gravity Field Solutions

Gravity field solutions are outlined in Table 1. Each solution gives a general GSM filename (with a Linux glob string inserted for the solution mnemonic), the first date included in the solution, the last date included in the solution, the total number of days included in the solution (accounting for any days that were skipped), the spherical harmonic solution sizes available, and comments associated with each solution (for solution specific annotations).

Table 1: Overview of gravity field solutions (GSM file-names are given using Linux glob strings).

Gravity Field Solution	Span Start	Span End	Number of Days	Degree/Order	Comments
GSM-2_2002094-2002120_GRAC_JPLEM_????_0600	2002-04-04	2002-04-30	24	60x60, 96x96	(1)
GSM-2_2002122-2002138_GRAC_JPLEM_????_0600	2002-05-02	2002-05-18	15	60x60, 96x96	(1)
GSM-2_2002213-2002243_GRAC_JPLEM_????_0600	2002-08-01	2002-08-31	30	60x60, 96x96	(1)
GSM-2_2002244-2002273_GRAC_JPLEM_????_0600	2002-09-01	2002-09-30	29	60x60, 96x96	(1)
GSM-2_2002274-2002304_GRAC_JPLEM_????_0600	2002-10-01	2002-10-31	30	60x60, 96x96	(1)
GSM-2_2002305-2002334_GRAC_JPLEM_????_0600	2002-11-01	2002-11-30	29	60x60, 96x96	(1)
GSM-2_2002335-2002365_GRAC_JPLEM_????_0600	2002-12-01	2002-12-31	27	60x60, 96x96	(1)
GSM-2_2003001-2003031_GRAC_JPLEM_????_0600	2003-01-01	2003-01-31	27	60x60, 96x96	(1)
GSM-2_2003032-2003059_GRAC_JPLEM_????_0600	2003-02-01	2003-02-28	24	60x60, 96x96	(1)
GSM-2_2003060-2003090_GRAC_JPLEM_????_0600	2003-03-01	2003-03-31	28	60x60, 96x96	(1)
GSM-2_2003091-2003120_GRAC_JPLEM_????_0600	2003-04-01	2003-04-30	28	60x60, 96x96	(1)
GSM-2_2003121-2003141_GRAC_JPLEM_????_0600	2003-05-01	2003-05-21	20	60x60, 96x96	(1)
GSM-2_2003182-2003212_GRAC_JPLEM_????_0600	2003-07-01	2003-07-31	30	60x60, 96x96	(1)
GSM-2_2003213-2003243_GRAC_JPLEM_????_0600	2003-08-01	2003-08-31	30	60x60, 96x96	(1)
GSM-2_2003244-2003273_GRAC_JPLEM_????_0600	2003-09-01	2003-09-30	29	60x60, 96x96	(1)
GSM-2_2003274-2003303_GRAC_JPLEM_????_0600	2003-10-01	2003-10-30	29	60x60, 96x96	(1)
GSM-2_2003305-2003334_GRAC_JPLEM_????_0600	2003-11-01	2003-11-30	29	60x60, 96x96	(1)
GSM-2_2003335-2003365_GRAC_JPLEM_????_0600	2003-12-01	2003-12-31	30	60x60, 96x96	(1)
GSM-2_2004001-2004013_GRAC_JPLEM_????_0600	2004-01-01	2004-01-13	12	60x60, 96x96	(1)
GSM-2_2004035-2004060_GRAC_JPLEM_????_0600	2004-02-04	2004-02-29	25	60x60, 96x96	(1)
GSM-2_2004061-2004091_GRAC_JPLEM_????_0600	2004-03-01	2004-03-31	30	60x60, 96x96	(1)
GSM-2_2004092-2004121_GRAC_JPLEM_????_0600	2004-04-01	2004-04-30	27	60x60, 96x96	(1)
GSM-2_2004122-2004152_GRAC_JPLEM_????_0600	2004-05-01	2004-05-31	30	60x60, 96x96	(1)
GSM-2_2004153-2004182_GRAC_JPLEM_????_0600	2004-06-01	2004-06-30	29	60x60, 96x96	(1)
GSM-2_2004183-2004213_GRAC_JPLEM_????_0600	2004-07-01	2004-07-31	30	60x60	(1), (3)
GSM-2_2004214-2004244_GRAC_JPLEM_????_0600	2004-08-01	2004-08-31	30	60x60	(1), (3)
GSM-2_2004245-2004274_GRAC_JPLEM_????_0600	2004-09-01	2004-09-30	29	60x60	(1), (3)

Gravity Field Solution		Span Start	Span End	Number of Days	Degree/Order	Comments
GSM-2_2004275-2004305_GRAC_JPLEM_????_0600	2004-10-01	2004-10-31	30	60x60	(1), (3)	
GSM-2_2004306-2004335_GRAC_JPLEM_????_0600	2004-11-01	2004-11-30	29	60x60, 96x96	(1)	
GSM-2_2004336-2004366_GRAC_JPLEM_????_0600	2004-12-01	2004-12-31	27	60x60, 96x96	(1)	
GSM-2_2005001-2005031_GRAC_JPLEM_????_0600	2005-01-01	2005-01-31	30	60x60, 96x96	(1)	
GSM-2_2005032-2005059_GRAC_JPLEM_????_0600	2005-02-01	2005-02-28	27	60x60, 96x96	(1)	
GSM-2_2005060-2005090_GRAC_JPLEM_????_0600	2005-03-01	2005-03-31	27	60x60, 96x96	(1)	
GSM-2_2005091-2005120_GRAC_JPLEM_????_0600	2005-04-01	2005-04-30	29	60x60, 96x96	(1)	
GSM-2_2005121-2005151_GRAC_JPLEM_????_0600	2005-05-01	2005-05-31	30	60x60, 96x96	(1)	
GSM-2_2005152-2005181_GRAC_JPLEM_????_0600	2005-06-01	2005-06-30	29	60x60, 96x96	(1)	
GSM-2_2005182-2005212_GRAC_JPLEM_????_0600	2005-07-01	2005-07-31	30	60x60, 96x96	(1)	
GSM-2_2005213-2005243_GRAC_JPLEM_????_0600	2005-08-01	2005-08-31	30	60x60, 96x96	(1)	
GSM-2_2005244-2005273_GRAC_JPLEM_????_0600	2005-09-01	2005-09-30	29	60x60, 96x96	(1)	
GSM-2_2005274-2005304_GRAC_JPLEM_????_0600	2005-10-01	2005-10-31	30	60x60, 96x96	(1)	
GSM-2_2005305-2005334_GRAC_JPLEM_????_0600	2005-11-01	2005-11-30	29	60x60, 96x96	(1)	
GSM-2_2005335-2005365_GRAC_JPLEM_????_0600	2005-12-01	2005-12-31	26	60x60, 96x96	(1)	
GSM-2_2006001-2006031_GRAC_JPLEM_????_0600	2006-01-01	2006-01-31	30	60x60, 96x96	(1)	
GSM-2_2006032-2006059_GRAC_JPLEM_????_0600	2006-02-01	2006-02-28	27	60x60, 96x96	(1)	
GSM-2_2006060-2006090_GRAC_JPLEM_????_0600	2006-03-01	2006-03-31	30	60x60, 96x96	(1)	
GSM-2_2006091-2006120_GRAC_JPLEM_????_0600	2006-04-01	2006-04-30	29	60x60, 96x96	(1)	
GSM-2_2006121-2006151_GRAC_JPLEM_????_0600	2006-05-01	2006-05-31	30	60x60, 96x96	(1)	
GSM-2_2006152-2006181_GRAC_JPLEM_????_0600	2006-06-01	2006-06-30	26	60x60, 96x96	(1)	
GSM-2_2006182-2006212_GRAC_JPLEM_????_0600	2006-07-01	2006-07-31	30	60x60, 96x96	(1)	
GSM-2_2006213-2006243_GRAC_JPLEM_????_0600	2006-08-01	2006-08-31	30	60x60, 96x96	(1)	
GSM-2_2006244-2006273_GRAC_JPLEM_????_0600	2006-09-01	2006-09-30	29	60x60, 96x96	(1)	
GSM-2_2006274-2006304_GRAC_JPLEM_????_0600	2006-10-01	2006-10-31	30	60x60, 96x96	(1)	
GSM-2_2006305-2006334_GRAC_JPLEM_????_0600	2006-11-01	2006-11-30	29	60x60, 96x96	(1)	
GSM-2_2006335-2006365_GRAC_JPLEM_????_0600	2006-12-01	2006-12-31	28	60x60, 96x96	(1)	
GSM-2_2007001-2007031_GRAC_JPLEM_????_0600	2007-01-01	2007-01-31	30	60x60, 96x96	(1)	
GSM-2_2007032-2007059_GRAC_JPLEM_????_0600	2007-02-01	2007-02-28	27	60x60, 96x96	(1)	
GSM-2_2007060-2007090_GRAC_JPLEM_????_0600	2007-03-01	2007-03-31	30	60x60, 96x96	(1)	

Gravity Field Solution		Span Start	Span End	Number of Days	Degree/Order	Comments
GSM-2_2007091-2007120_GRAC_JPLEM_????_0600	2007-04-01	2007-04-30	29	60x60, 96x96	(1)	
GSM-2_2007121-2007151_GRAC_JPLEM_????_0600	2007-05-01	2007-05-31	30	60x60, 96x96	(1)	
GSM-2_2007152-2007181_GRAC_JPLEM_????_0600	2007-06-01	2007-06-30	29	60x60, 96x96	(1)	
GSM-2_2007182-2007212_GRAC_JPLEM_????_0600	2007-07-01	2007-07-31	30	60x60, 96x96	(1)	
GSM-2_2007213-2007243_GRAC_JPLEM_????_0600	2007-08-01	2007-08-31	30	60x60, 96x96	(1)	
GSM-2_2007244-2007273_GRAC_JPLEM_????_0600	2007-09-01	2007-09-30	29	60x60, 96x96	(1)	
GSM-2_2007274-2007304_GRAC_JPLEM_????_0600	2007-10-01	2007-10-31	30	60x60, 96x96	(1)	
GSM-2_2007305-2007334_GRAC_JPLEM_????_0600	2007-11-01	2007-11-30	29	60x60, 96x96	(1)	
GSM-2_2007335-2007365_GRAC_JPLEM_????_0600	2007-12-01	2007-12-31	30	60x60, 96x96	(1)	
GSM-2_2008001-2008031_GRAC_JPLEM_????_0600	2008-01-01	2008-01-31	30	60x60, 96x96	(1)	
GSM-2_2008032-2008060_GRAC_JPLEM_????_0600	2008-02-01	2008-02-29	28	60x60, 96x96	(1)	
GSM-2_2008061-2008091_GRAC_JPLEM_????_0600	2008-03-01	2008-03-31	30	60x60, 96x96	(1)	
GSM-2_2008092-2008121_GRAC_JPLEM_????_0600	2008-04-01	2008-04-30	29	60x60, 96x96	(1)	
GSM-2_2008122-2008152_GRAC_JPLEM_????_0600	2008-05-01	2008-05-31	30	60x60, 96x96	(1)	
GSM-2_2008153-2008182_GRAC_JPLEM_????_0600	2008-06-01	2008-06-30	29	60x60, 96x96	(1)	
GSM-2_2008183-2008213_GRAC_JPLEM_????_0600	2008-07-01	2008-07-31	30	60x60, 96x96	(1)	
GSM-2_2008214-2008244_GRAC_JPLEM_????_0600	2008-08-01	2008-08-31	30	60x60, 96x96	(1)	
GSM-2_2008245-2008274_GRAC_JPLEM_????_0600	2008-09-01	2008-09-30	29	60x60, 96x96	(1)	
GSM-2_2008275-2008305_GRAC_JPLEM_????_0600	2008-10-01	2008-10-31	30	60x60, 96x96	(1)	
GSM-2_2008306-2008335_GRAC_JPLEM_????_0600	2008-11-01	2008-11-30	29	60x60, 96x96	(1)	
GSM-2_2008336-2008366_GRAC_JPLEM_????_0600	2008-12-01	2008-12-31	30	60x60, 96x96	(1)	
GSM-2_2009001-2009031_GRAC_JPLEM_????_0600	2009-01-01	2009-01-31	30	60x60, 96x96	(1)	
GSM-2_2009032-2009059_GRAC_JPLEM_????_0600	2009-02-01	2009-02-28	27	60x60, 96x96	(1)	
GSM-2_2009060-2009090_GRAC_JPLEM_????_0600	2009-03-01	2009-03-31	30	60x60, 96x96	(1)	
GSM-2_2009091-2009120_GRAC_JPLEM_????_0600	2009-04-01	2009-04-30	29	60x60, 96x96	(1)	
GSM-2_2009121-2009151_GRAC_JPLEM_????_0600	2009-05-01	2009-05-31	30	60x60, 96x96	(1)	
GSM-2_2009152-2009181_GRAC_JPLEM_????_0600	2009-06-01	2009-06-30	29	60x60, 96x96	(1)	
GSM-2_2009182-2009212_GRAC_JPLEM_????_0600	2009-07-01	2009-07-31	30	60x60, 96x96	(1)	
GSM-2_2009213-2009243_GRAC_JPLEM_????_0600	2009-08-01	2009-08-31	30	60x60, 96x96	(1)	
GSM-2_2009244-2009273_GRAC_JPLEM_????_0600	2009-09-01	2009-09-30	29	60x60, 96x96	(1)	

Gravity Field Solution

	Span Start	Span End	Number of Days	Degree/Order	Comments
GSM-2_2009274-2009304_GRAC_JPLEM_????_0600	2009-10-01	2009-10-31	30	60x60, 96x96	(1)
GSM-2_2009305-2009334_GRAC_JPLEM_????_0600	2009-11-01	2009-11-30	29	60x60, 96x96	(1)
GSM-2_2009335-2009365_GRAC_JPLEM_????_0600	2009-12-01	2009-12-31	30	60x60, 96x96	(1)
GSM-2_2010001-2010031_GRAC_JPLEM_????_0600	2010-01-01	2010-01-31	30	60x60, 96x96	(1)
GSM-2_2010032-2010059_GRAC_JPLEM_????_0600	2010-02-01	2010-02-28	27	60x60, 96x96	(1)
GSM-2_2010060-2010090_GRAC_JPLEM_????_0600	2010-03-01	2010-03-31	30	60x60, 96x96	(1)
GSM-2_2010091-2010120_GRAC_JPLEM_????_0600	2010-04-01	2010-04-30	29	60x60, 96x96	(1)
GSM-2_2010121-2010151_GRAC_JPLEM_????_0600	2010-05-01	2010-05-31	30	60x60, 96x96	(1)
GSM-2_2010152-2010181_GRAC_JPLEM_????_0600	2010-06-01	2010-06-30	22	60x60, 96x96	(1)
GSM-2_2010182-2010212_GRAC_JPLEM_????_0600	2010-07-01	2010-07-31	30	60x60, 96x96	(1)
GSM-2_2010213-2010243_GRAC_JPLEM_????_0600	2010-08-01	2010-08-31	30	60x60, 96x96	(1)
GSM-2_2010244-2010273_GRAC_JPLEM_????_0600	2010-09-01	2010-09-30	29	60x60, 96x96	(1)
GSM-2_2010274-2010304_GRAC_JPLEM_????_0600	2010-10-01	2010-10-31	30	60x60, 96x96	(1)
GSM-2_2010305-2010334_GRAC_JPLEM_????_0600	2010-11-01	2010-11-30	29	60x60, 96x96	(1)
GSM-2_2010335-2010361_GRAC_JPLEM_????_0600	2010-12-01	2010-12-27	26	60x60, 96x96	(1)
GSM-2_2011039-2011059_GRAC_JPLEM_????_0600	2011-02-08	2011-02-28	20	60x60, 96x96	(1)
GSM-2_2011060-2011090_GRAC_JPLEM_????_0600	2011-03-01	2011-03-31	30	60x60, 96x96	(1)
GSM-2_2011091-2011120_GRAC_JPLEM_????_0600	2011-04-01	2011-04-30	29	60x60, 96x96	(1)
GSM-2_2011121-2011151_GRAC_JPLEM_????_0600	2011-05-01	2011-05-31	30	60x60, 96x96	(1)
GSM-2_2011186-2011212_GRAC_JPLEM_????_0600	2011-07-05	2011-07-31	26	60x60, 96x96	(1)
GSM-2_2011213-2011243_GRAC_JPLEM_????_0600	2011-08-01	2011-08-31	30	60x60, 96x96	(1)
GSM-2_2011244-2011273_GRAC_JPLEM_????_0600	2011-09-01	2011-09-30	29	60x60, 96x96	(1)
GSM-2_2011274-2011304_GRAC_JPLEM_????_0600	2011-10-01	2011-10-31	30	60x60, 96x96	(1)
GSM-2_2011290-2011320_GRAC_JPLEM_????_0600	2011-10-17	2011-11-16	30	60x60, 96x96	(1)
GSM-2_2011351-2012015_GRAC_JPLEM_????_0600	2011-12-17	2012-01-15	29	60x60, 96x96	(1)
GSM-2_2012001-2012031_GRAC_JPLEM_????_0600	2012-01-01	2012-01-31	30	60x60, 96x96	(1)
GSM-2_2012032-2012060_GRAC_JPLEM_????_0600	2012-02-01	2012-02-29	28	60x60, 96x96	(1)
GSM-2_2012061-2012091_GRAC_JPLEM_????_0600	2012-03-01	2012-03-31	30	60x60, 96x96	(1)
GSM-2_2012080-2012110_GRAC_JPLEM_????_0600	2012-03-20	2012-04-19	30	60x60	(1), (4)
GSM-2_2012153-2012182_GRAC_JPLEM_????_0600	2012-06-01	2012-06-30	29	60x60	(1), (4)

Gravity Field Solution		Span Start	Span End	Number of Days	Degree/Order	Comments
GSM-2_2012183-2012213_GRAC_JPLEM_????_0600	2012-07-01	2012-07-31	30	60x60	(1), (4)	
GSM-2_2012214-2012244_GRAC_JPLEM_????_0600	2012-08-01	2012-08-31	30	60x60, 96x96	(1)	
GSM-2_2012245-2012268_GRAC_JPLEM_????_0600	2012-09-01	2012-09-24	23	60x60, 96x96	(1)	
GSM-2_2012311-2012335_GRAC_JPLEM_????_0600	2012-11-06	2012-11-30	24	60x60, 96x96	(1)	
GSM-2_2012336-2012366_GRAC_JPLEM_????_0600	2012-12-01	2012-12-31	29	60x60, 96x96	(1)	
GSM-2_2013001-2013031_GRAC_JPLEM_????_0600	2013-01-01	2013-01-31	30	60x60, 96x96	(1)	
GSM-2_2013032-2013057_GRAC_JPLEM_????_0600	2013-02-01	2013-02-26	25	60x60, 96x96	(1)	
GSM-2_2013101-2013120_GRAC_JPLEM_????_0600	2013-04-11	2013-04-30	19	60x60, 96x96	(1)	
GSM-2_2013121-2013151_GRAC_JPLEM_????_0600	2013-05-01	2013-05-31	30	60x60, 96x96	(1)	
GSM-2_2013152-2013181_GRAC_JPLEM_????_0600	2013-06-01	2013-06-30	29	60x60, 96x96	(1)	
GSM-2_2013182-2013212_GRAC_JPLEM_????_0600	2013-07-01	2013-07-31	30	60x60, 96x96	(1)	
GSM-2_2013274-2013304_GRAC_JPLEM_????_0600	2013-10-01	2013-10-31	30	60x60, 96x96	(1)	
GSM-2_2013305-2013334_GRAC_JPLEM_????_0600	2013-11-01	2013-11-30	29	60x60, 96x96	(1)	
GSM-2_2013335-2013365_GRAC_JPLEM_????_0600	2013-12-01	2013-12-31	28	60x60, 96x96	(1)	
GSM-2_2014001-2014017_GRAC_JPLEM_????_0600	2014-01-01	2014-01-17	16	60x60, 96x96	(1)	
GSM-2_2014060-2014090_GRAC_JPLEM_????_0600	2014-03-01	2014-03-31	30	60x60, 96x96	(1)	
GSM-2_2014091-2014120_GRAC_JPLEM_????_0600	2014-04-01	2014-04-30	29	60x60, 96x96	(1)	
GSM-2_2014121-2014151_GRAC_JPLEM_????_0600	2014-05-01	2014-05-31	30	60x60, 96x96	(1)	
GSM-2_2014152-2014175_GRAC_JPLEM_????_0600	2014-06-01	2014-06-24	23	60x60, 96x96	(1)	
GSM-2_2014213-2014243_GRAC_JPLEM_????_0600	2014-08-01	2014-08-31	30	60x60, 96x96	(1)	
GSM-2_2014244-2014273_GRAC_JPLEM_????_0600	2014-09-01	2014-09-30	29	60x60, 96x96	(1)	
GSM-2_2014274-2014304_GRAC_JPLEM_????_0600	2014-10-01	2014-10-31	30	60x60, 96x96	(1)	
GSM-2_2014305-2014336_GRAC_JPLEM_????_0600	2014-11-01	2014-12-02	31	60x60, 96x96	(1)	
GSM-2_2015013-2015031_GRAC_JPLEM_????_0600	2015-01-13	2015-01-31	18	60x30, 60x60	(1), (5)	
GSM-2_2015032-2015059_GRAC_JPLEM_????_0600	2015-02-01	2015-02-28	27	60x30, 60x60	(1), (5)	
GSM-2_2015060-2015090_GRAC_JPLEM_????_0600	2015-03-01	2015-03-31	30	60x60, 96x96	(1)	
GSM-2_2015091-2015120_GRAC_JPLEM_????_0600	2015-04-01	2015-04-30	29	60x60, 96x96	(1)	
GSM-2_2015102-2015131_GRAC_JPLEM_????_0600	2015-04-12	2015-05-11	29	60x60, 96x96	(1)	
GSM-2_2015180-2015212_GRAC_JPLEM_????_0600	2015-06-29	2015-07-31	27	60x60, 96x96	(1)	
GSM-2_2015213-2015243_GRAC_JPLEM_????_0600	2015-08-01	2015-08-31	30	60x60, 96x96	(1)	

Gravity Field Solution		Span Start	Span End	Number of Days	Degree/Order	Comments
GSM-2_2015244-2015270_GRAC_JPLEM_????_0600	2015-09-01	2015-09-27	26	60x60, 96x96	(1)	
GSM-2_2015346-2016003_GRAC_JPLEM_????_0600	2015-12-12	2016-01-03	22	60x60, 96x96	(1)	
GSM-2_2016004-2016028_GRAC_JPLEM_????_0600	2016-01-04	2016-01-28	24	60x60, 96x96	(1)	
GSM-2_2016029-2016060_GRAC_JPLEM_????_0600	2016-01-29	2016-02-29	31	60x60, 96x96	(1)	
GSM-2_2016061-2016091_GRAC_JPLEM_????_0600	2016-03-01	2016-03-31	30	60x60, 96x96	(1)	
GSM-2_2016129-2016152_GRAC_JPLEM_????_0600	2016-05-08	2016-05-31	23	60x60, 96x96	(1)	
GSM-2_2016153-2016182_GRAC_JPLEM_????_0600	2016-06-01	2016-06-30	29	60x60, 96x96	(1)	
GSM-2_2016183-2016211_GRAC_JPLEM_????_0600	2016-07-01	2016-07-29	28	60x60, 96x96	(1)	
GSM-2_2016221-2016247_GRAC_JPLEM_????_0600	2016-08-08	2016-09-03	26	60x60, 96x96	(1)	
GSM-2_2016319-2016345_GRAC_JPLEM_????_0600	2016-11-14	2016-12-10	26	60x60, 96x96	(2), (6)	
GSM-2_2016346-2017006_GRAC_JPLEM_????_0600	2016-12-11	2017-01-06	26	60x60, 96x96	(2), (6)	
GSM-2_2017007-2017034_GRAC_JPLEM_????_0600	2017-01-07	2017-02-03	27	60x60, 96x96	(2), (6)	
GSM-2_2017076-2017104_GRAC_JPLEM_????_0600	2017-03-17	2017-04-14	28	60x60, 96x96	(2), (6)	
GSM-2_2017100-2017128_GRAC_JPLEM_????_0600	2017-04-10	2017-05-08	28	60x60, 96x96	(2), (6)	
GSM-2_2017122-2017142_GRAC_JPLEM_????_0600	2017-05-02	2017-05-22	20	60x60, 96x96	(2)	
GSM-2_2017143-2017180_GRAC_JPLEM_????_0600	2017-05-23	2017-06-29	37	60x60, 96x96	(2), (6)	

5 Solution Comments

- (1) The solution is parameterized using nominally 5 second KBR range-rate data and nominally 30 second GRACE GPS data. The solved for local/common parameters include the satellite initial states (solved per arc - nominally 1 day), accelerometer biases/rates in the GRACE SRF XYZ directions (solved per arc in the XZ directions and every 3 hours in the Y direction), a full accelerometer scale matrix (9 parameters solved per arc), GPS phase biases (solved per GPS satellite pass), and empirical biases/drifts/once per revolution sinusoids for the KBR range-rate data (solved every 90 minutes). The solved for global parameters include the spherical harmonic coefficients.
- (2) The solution is parameterized using nominally 5 second KBR range-rate data and nominally 30 second GRACE GPS data. The solved for local/common parameters include the satellite initial states (solved per arc - nominally 1 day), accelerometer biases/rates in the GRACE SRF XYZ directions (solved per arc in the XZ directions and every 3 hours in the Y direction), a full accelerometer scale matrix (9 parameters solved per arc), GPS phase biases (solved per GPS satellite pass), and empirical biases/drifts/once per revolution sinusoids for the KBR range-rate data (solved every 90 minutes). Additionally, to handle increased error due to the accelerometer transplant, bias and 1 cycle per revolution empirical accelerations in the normal and along track directions are solved for on GRACE-B only (solved every 90 minutes). The solved for global parameters include the spherical harmonic coefficients.
- (3) The GRACE satellites are passing through a 61 revolution/4 day repeat ground track which peaks in 2004-09. This causes reduced observability of the spherical harmonic coefficients and solution analysis may require more aggressive than normal post-processing.
- (4) The GRACE satellites are passing through a 46 revolution/3 day repeat ground track which peaks in 2012-05. This causes reduced observability of the spherical harmonic coefficients and solution analysis may require more aggressive than normal post-processing.
- (5) The GRACE satellites are passing through a 31 revolution/2 day repeat ground track which peaks in 2015-02. This causes reduced observability of the spherical harmonic coefficients and solution analysis may require more aggressive than normal post-processing. Due to the severity of this repeat cycle a supplementary 60x30 spherical harmonic solution is provided.
- (6) Accelerometer data for GRACE-B is unavailable and is derived using the accelerometer data from GRACE-A (accelerometer transplant). This month may exhibit higher amounts of noise and may require more aggressive than normal post-processing.

References

- [1] BETTADPUR, S. *Level-2 Gravity Field Product User Handbook*, 4.0 ed. Center for Space Research, The University of Texas at Austin, April 2018. GRACE 327-734.

- [2] DOBSLAW, H., BERGMANN-WOLF, I., DILL, R., POROPAT, L., AND FLECHTNER, F. *Product Description Document for AOD1B Release 05*. GFZ German Research Centre for Geosciences Department 1: Geodesy, December 2016. GRACE 327-750.
- [3] WAHR, J., NEREM, R. S., AND BETTADPUR, S. V. The pole tide and its effect on GRACE time-variable gravity measurements: Implications for estimates of surface mass variations. *Journal of Geophysical Research: Solid Earth* 120, 6 (June 2015), 4597–4615. doi: 10.1002/2015JB011986.
- [4] YUAN, D.-N. *JPL Level-2 Processing Standards Document For Level-2 Product Release 06*. Jet Propulsion Laboratory, California Institute of Technology, June 2018. GRACE 327-744.