



GRACE and GRACE-FO Level 2 RL07 data processing at JPL

Matthias Ellmer, David Wiese, Da Kuang, Felix
Landerer, Carmen Blackwood, Christopher
McCullough, Dah-Ning Yuan, Eugene Fahnestock, and
Athina Peidou

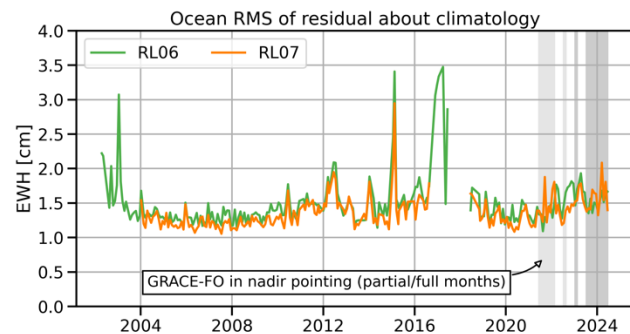
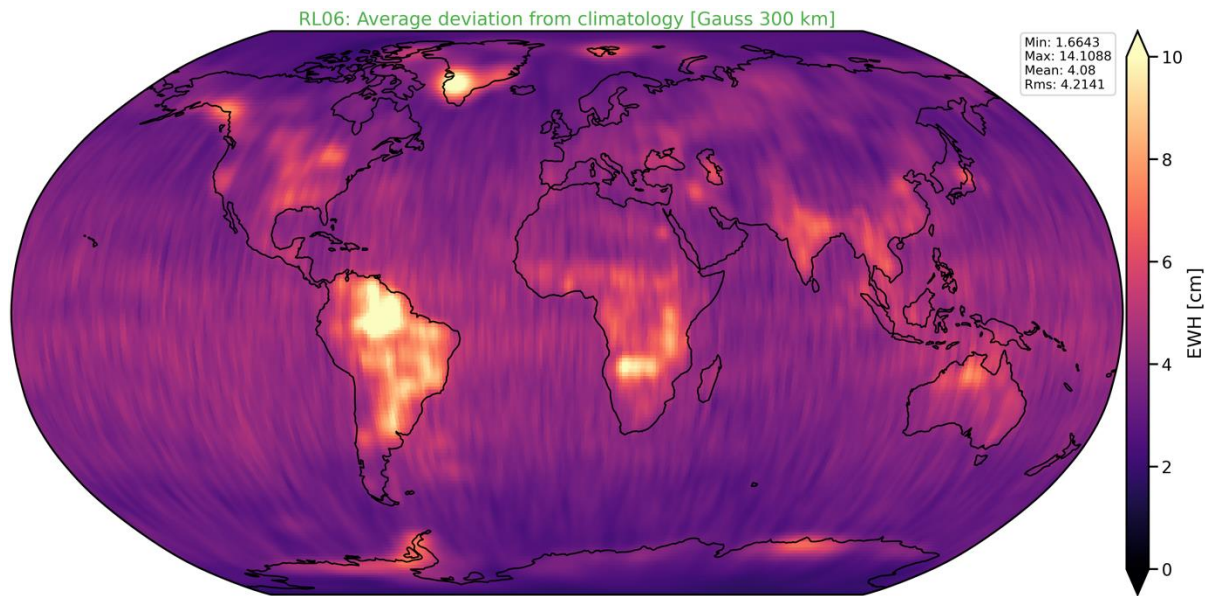
matthias.ellmer@jpl.nasa.gov



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Does Not Contain CUI

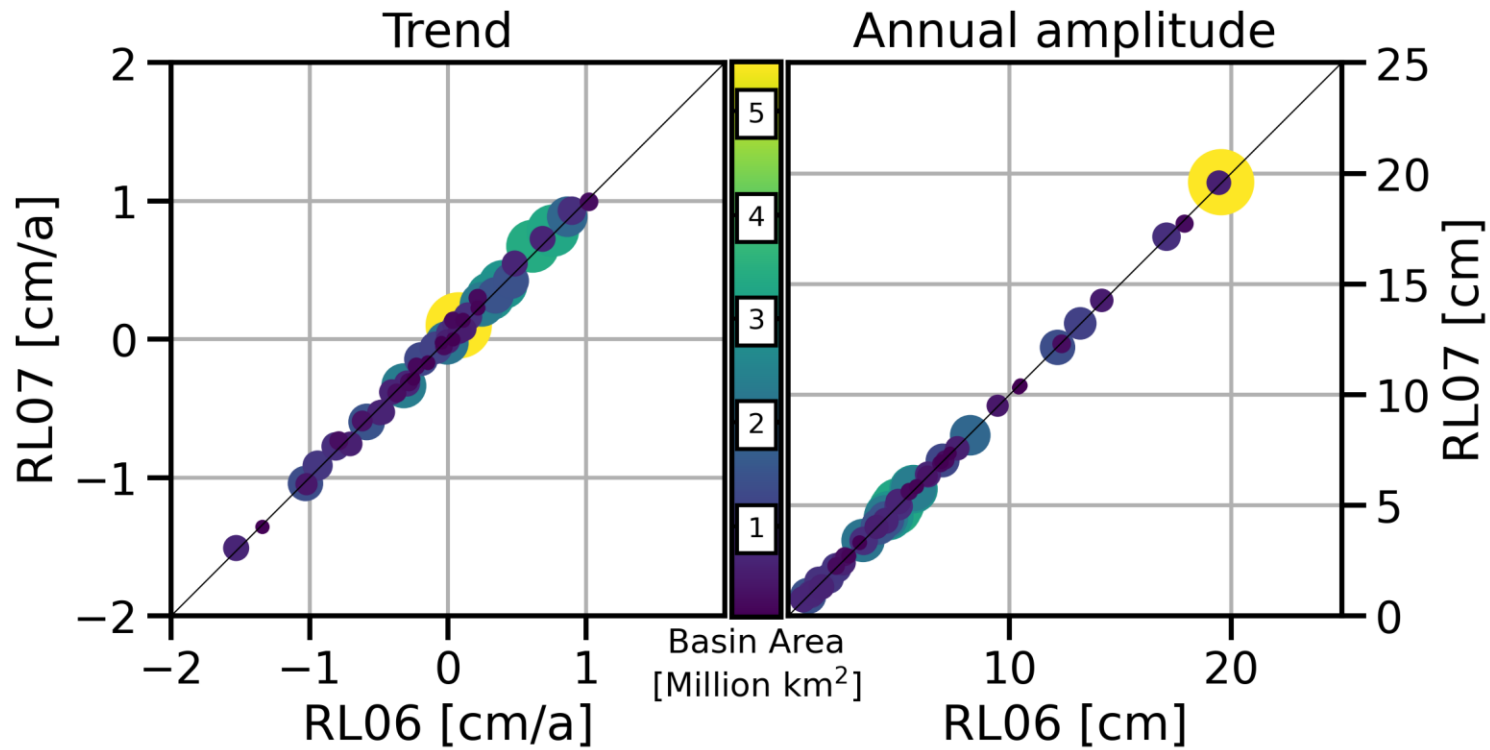
Reduced noise – RMS of residual about climatology



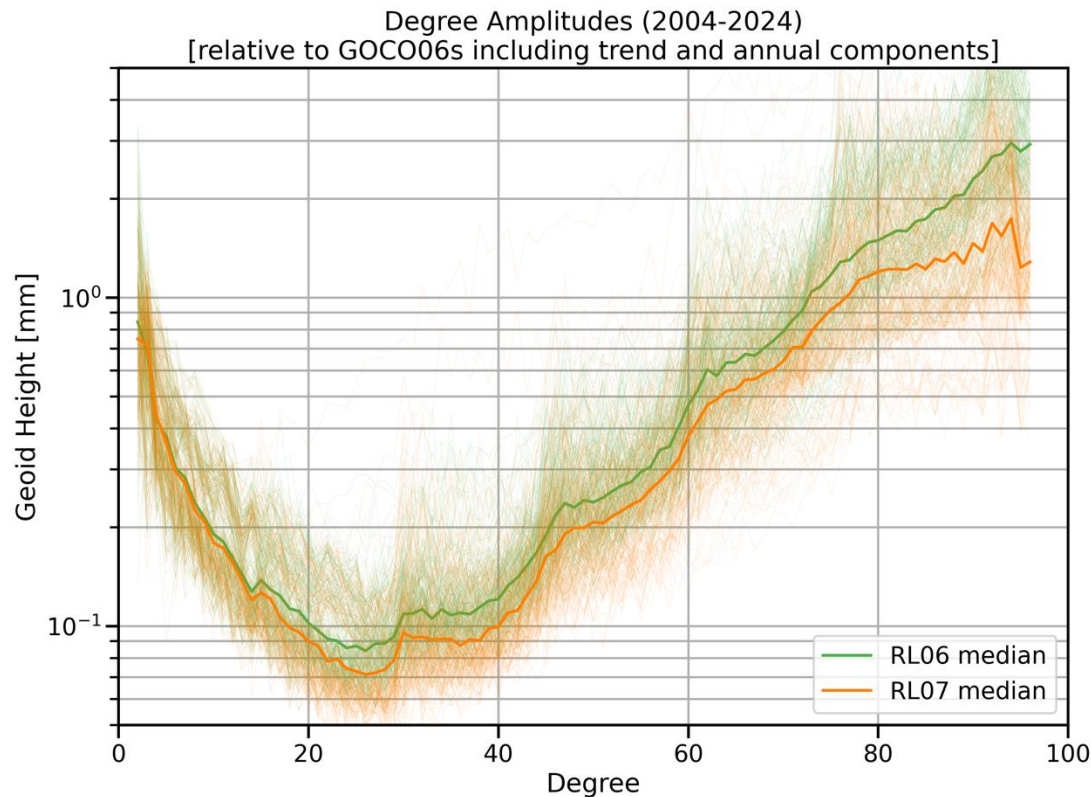
Area	Mean RL06	Mean RL07	Reduction
Global	4.1 cm	3.7 cm	9%
Oceans	3.8 cm	3.3 cm	12%
Land	4.7 cm	4.4 cm	6%

- Computed from D/O 60 fields
- Destriped, 300km Gaussian smoothing
- Reduced static field and fit of bias, trend, annual, semi-annual
- For Ocean: 350km land mask buffer

Basin mass balances highly consistent with RL06

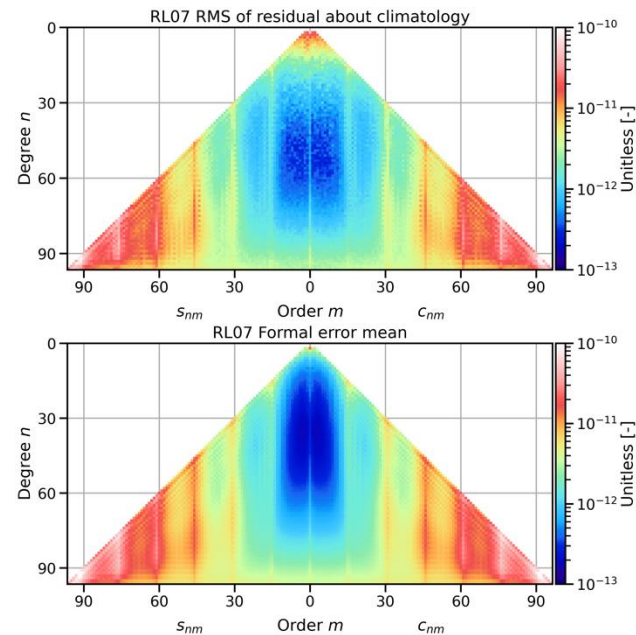
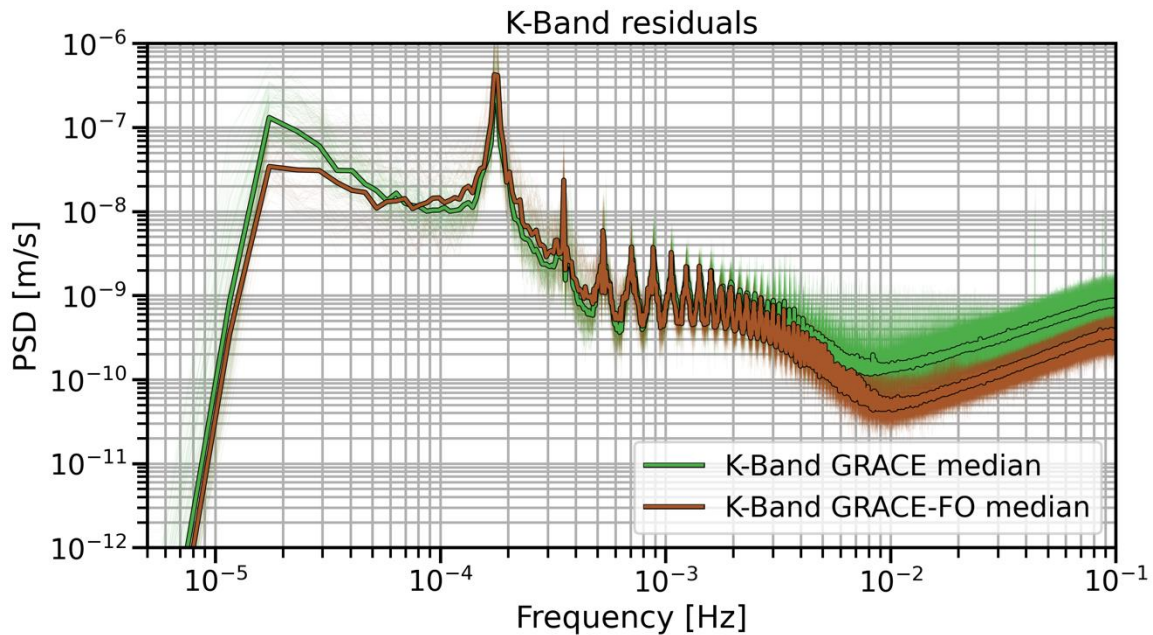


Main highlights



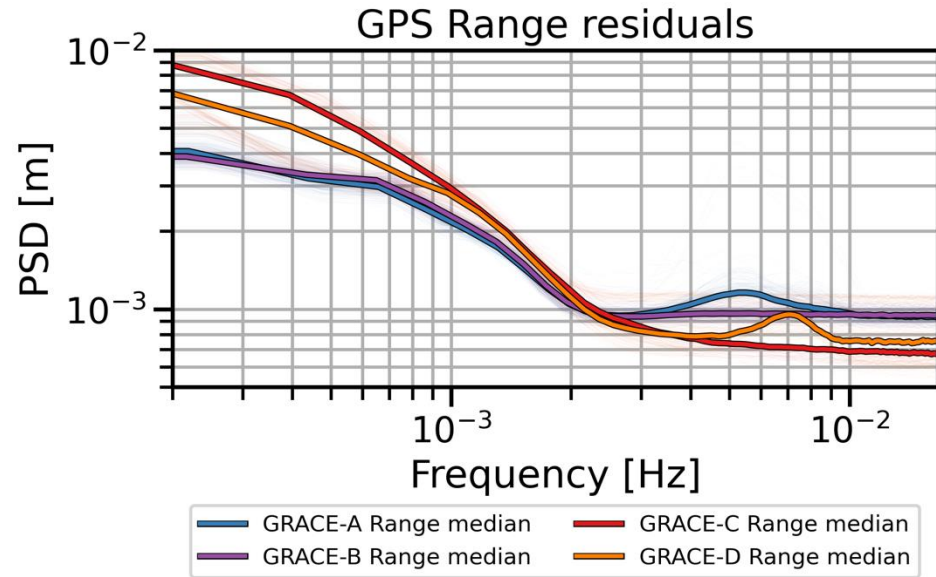
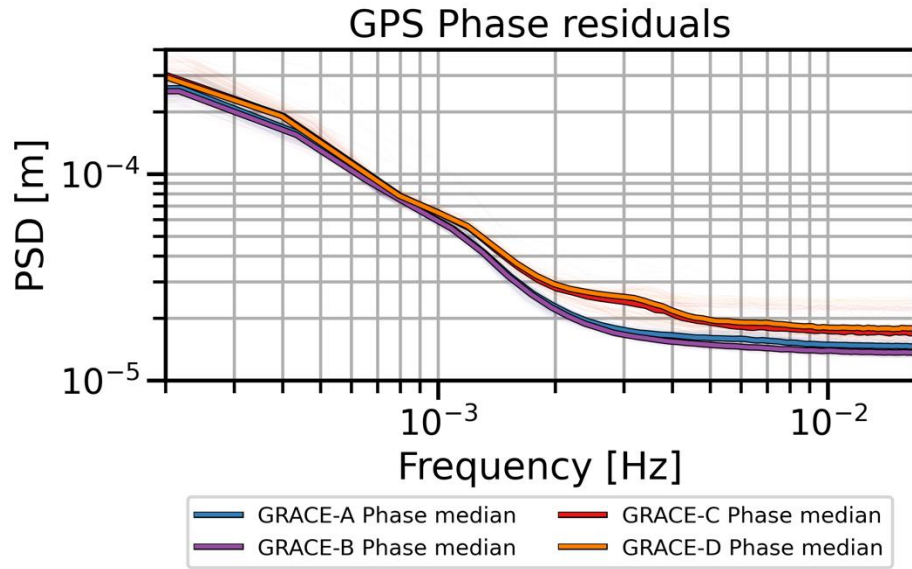
- Consistent signal content and localization between RL06 and RL07
- Noise in unfiltered solutions is effectively reduced above degree 15
- RL07 C20 agrees better with TN14

Level 2 improvements – Full observation covariance



- Following the approach introduced by TU Graz
- Suppresses high frequency noise in solutions
- Estimated separately for KBR, LRI, and GPS data
- Improves covariance realism

Level 2 improvements – Full observation covariance



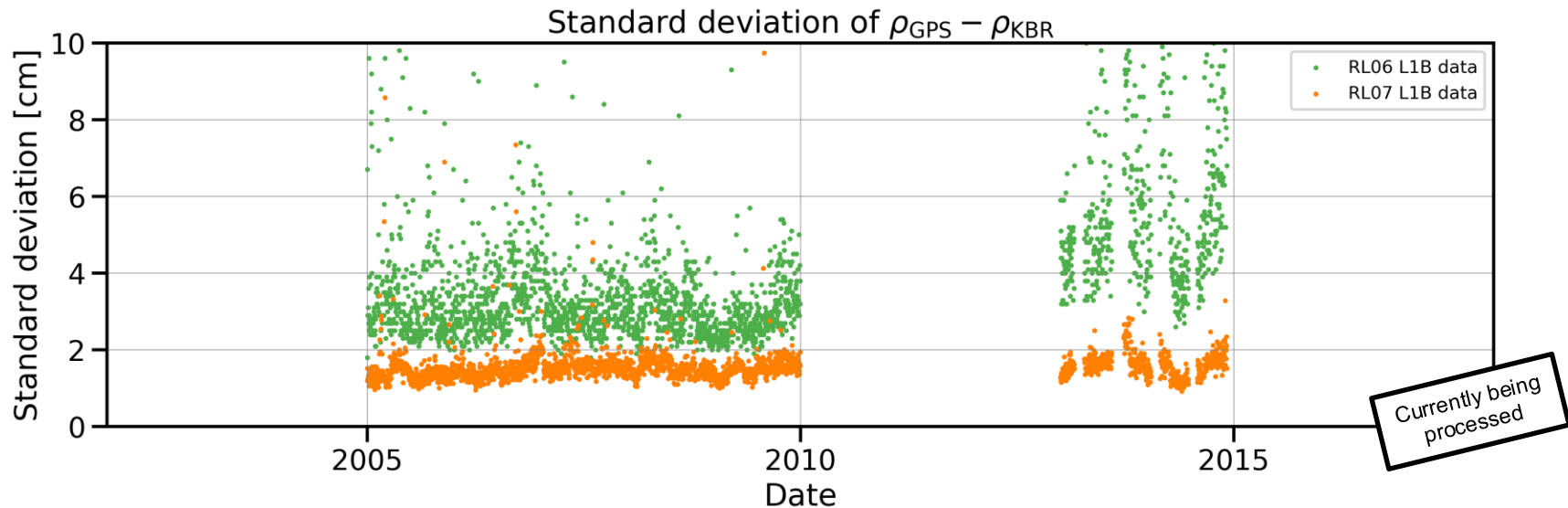
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Frames and models

Reference System	Realization
Frame	ICRF3, ITRF2020
Planetary ephemeris	JPL DE-440
Earth Orientation Parameters	JPL FLINN (IGS20 reprocessing)
GNSS ephemeris + clock	JPL FLINN (IGS20 reprocessing)
Force model	Realization
Background Gravity Field	GOCO06s*
Non-tidal Atmosphere and Ocean	AOD1B RL07
Solid Earth Tides	IERS 2010
Ocean Tides	GOT5.6 ellipsoidal*
Air Tides	TIME22*
Solid Earth Pole Tide	IERS 2010
Ocean Pole Tide	IERS 2010* + linear mean pole
Third Body Effects	JPL DE-440
General Relativity	-

Bold indicates update, * pending further consideration

IGS20 Reprocessing of Level 1 data



- Level 1 data for GRACE and GRACE-FO is being reprocessed consistently for a V05 release
- New Precise Orbit Determination and newly estimated antenna maps, in FLINN IGS20 frame realization
- New transplant product for GRACE single accelerometer months using lessons learned from GRACE-FO
- Complete re-processing of Level 1B data to follow, final archival GRACE reprocessing



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