



Quick-Look Gravity Solutions from GRACE

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Quick-Look gravity solutions from GRACE

The Quick-Look gravity solutions from GRACE are derived from Quick-Look GRACE data without significant loss of accuracy compared to the monthly gravity solutions (RL04) and with a latency of about one day.

Differences between quick-look and RL04 gravity solution

The main differences between Quick-Look and RL04 gravity solutions from GRACE are input data and data processes. The Center for Space Research's (CSR) RL04 gravity solutions are currently created via least-squares processing that reads a month's worth of GRACE Level 1B data using a boxcar window and produces a spherical harmonics averaged over that month. The CSR's Quick-Look gravity solutions are created via least-squares processing that reads 15- to 30-day quick-look GRACE Level 1 data using a Gaussian window with one-day moving window and produces a spherical harmonics. The Quick-Look solutions are stabilized using regularization (G13A-0628).

Input data for GRACE gravity solutions

Data type	Quick-Look	RL04
Accelerometer	Quick-look L1 (JPL)	Level 1B (JPL)
Attitude	Quick-look L1 (JPL)	Level 1B (JPL)
KBR	Quick-look L1 (JPL)	Level 1B (JPL)
GRACE GPS	Quick-look L1 Orbits (JPL)	Level 1B Phase (JPL)

GRACE de-aliasing products

	Quick-Look	RL04
Atmosphere	Surface pressure (NCEP) reduced to ECMWF topography	3D vertical integration (ECMWF)
Ocean	IB correction	baroclinic ocean model (OMCT)
Product delay	Five hours	Two weeks

Product description of Quick-Look solutions

- Two different types of Quick-Look solutions are currently generated. One is created using both GRACE trajectories and KBR data. Other is made using only KBR data. Based on long time series and comparison with a hydrology model, one of these will be selected.

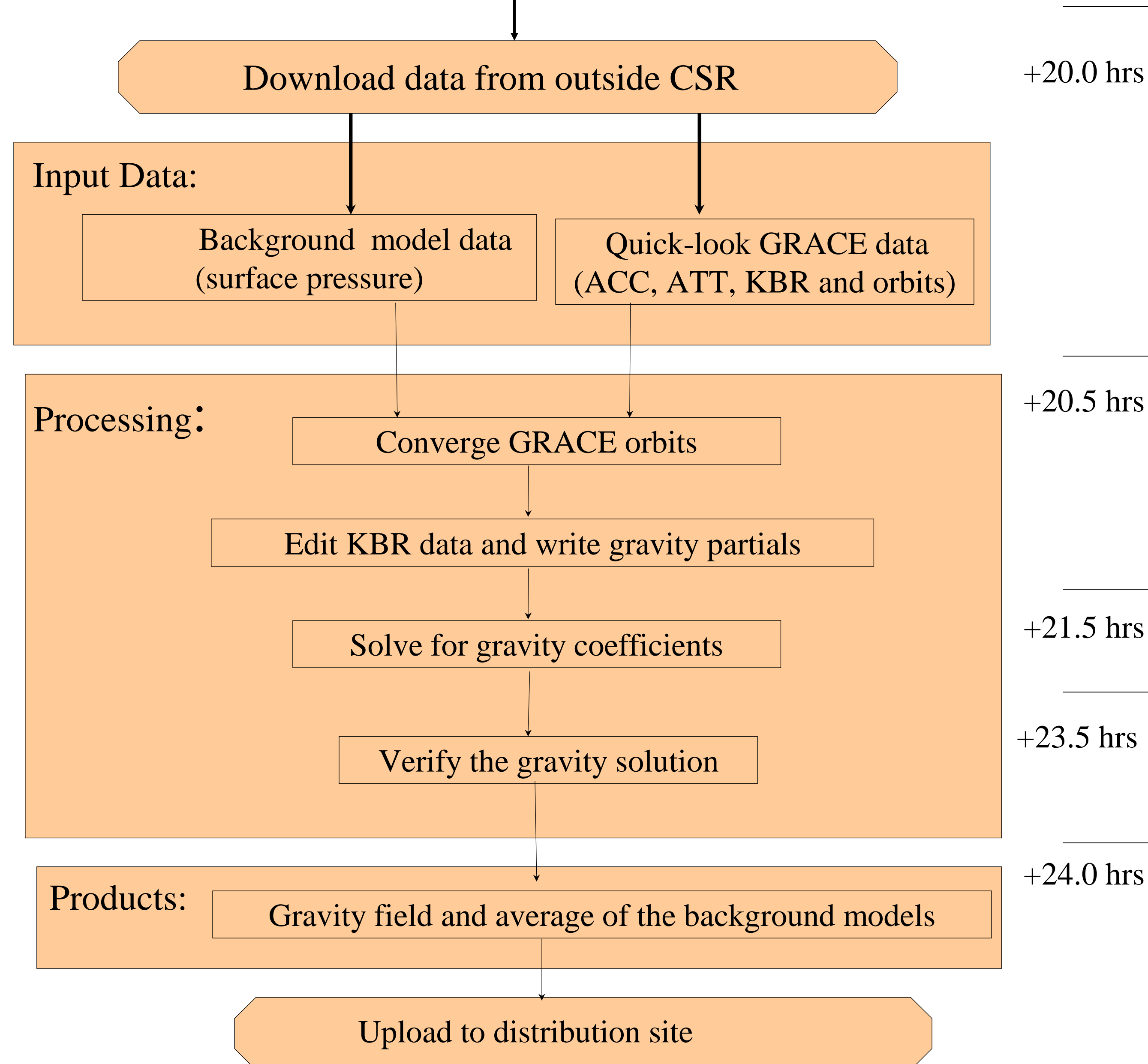
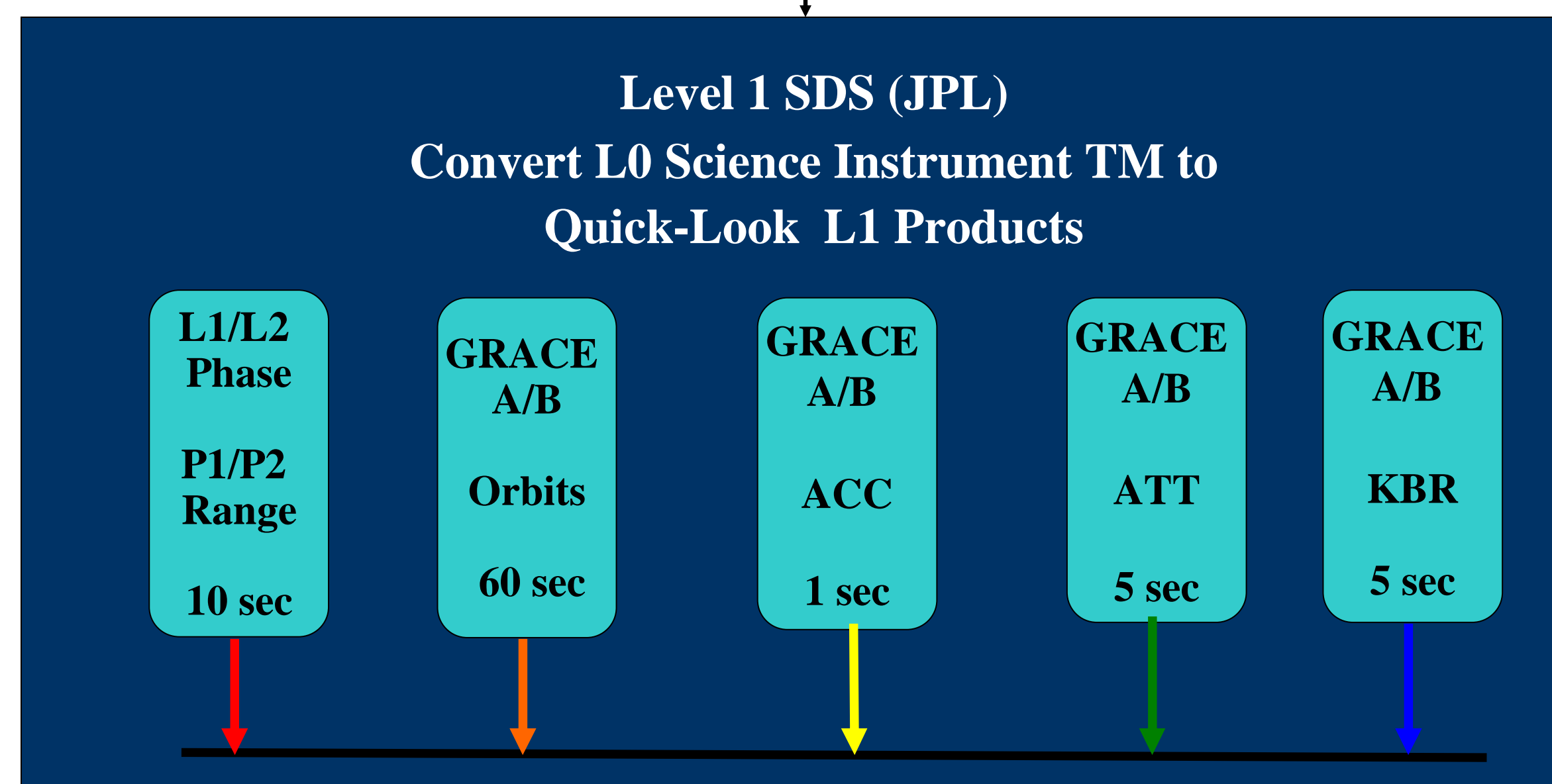
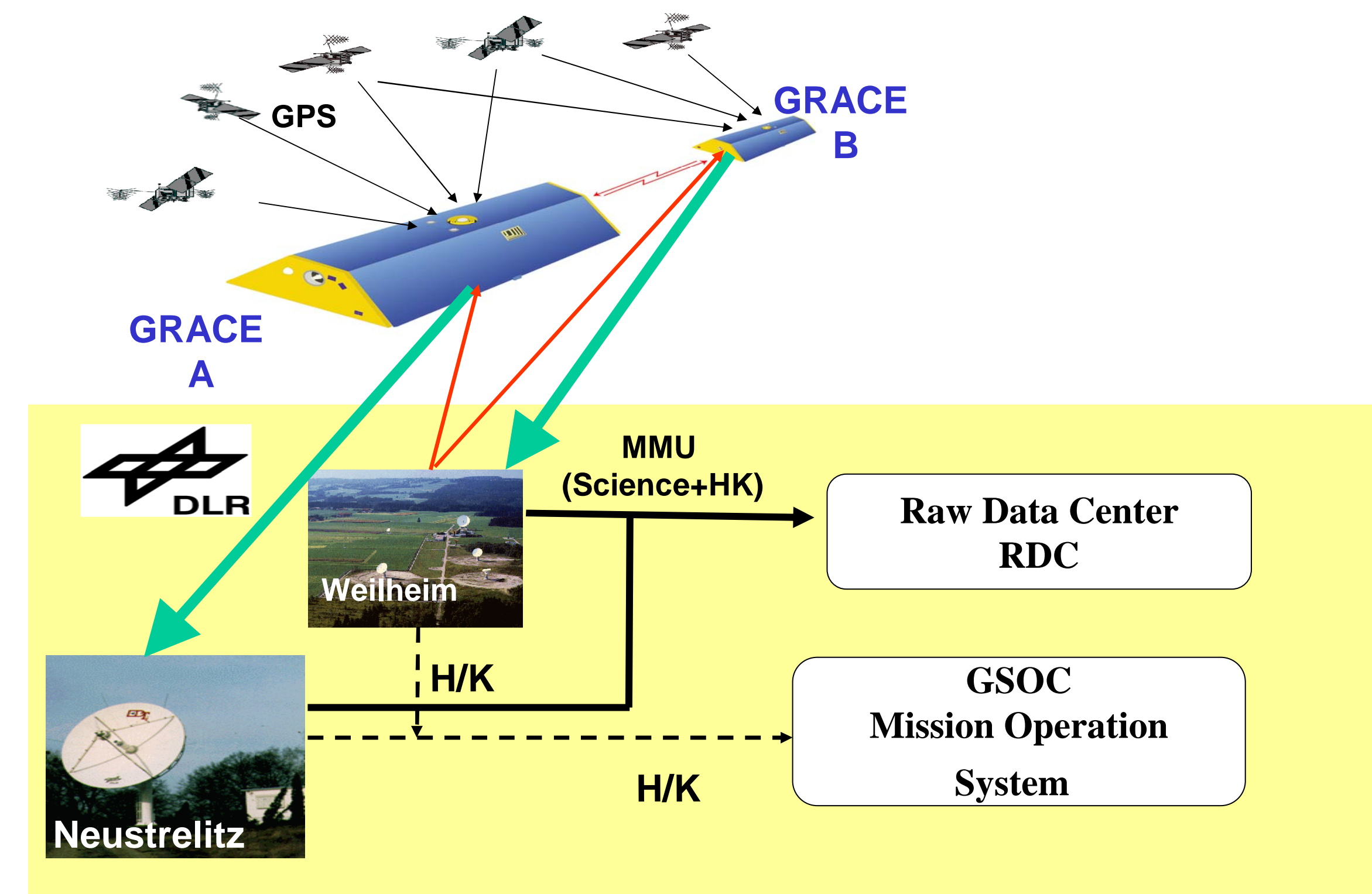
- The dynamical models used in the Quick-Look gravity solution are same as those used in the RL04 solution except for de-aliasing products.

- The Quick-Look gravity solution is made using 15- to 30-day GRACE data with one-day moving window.

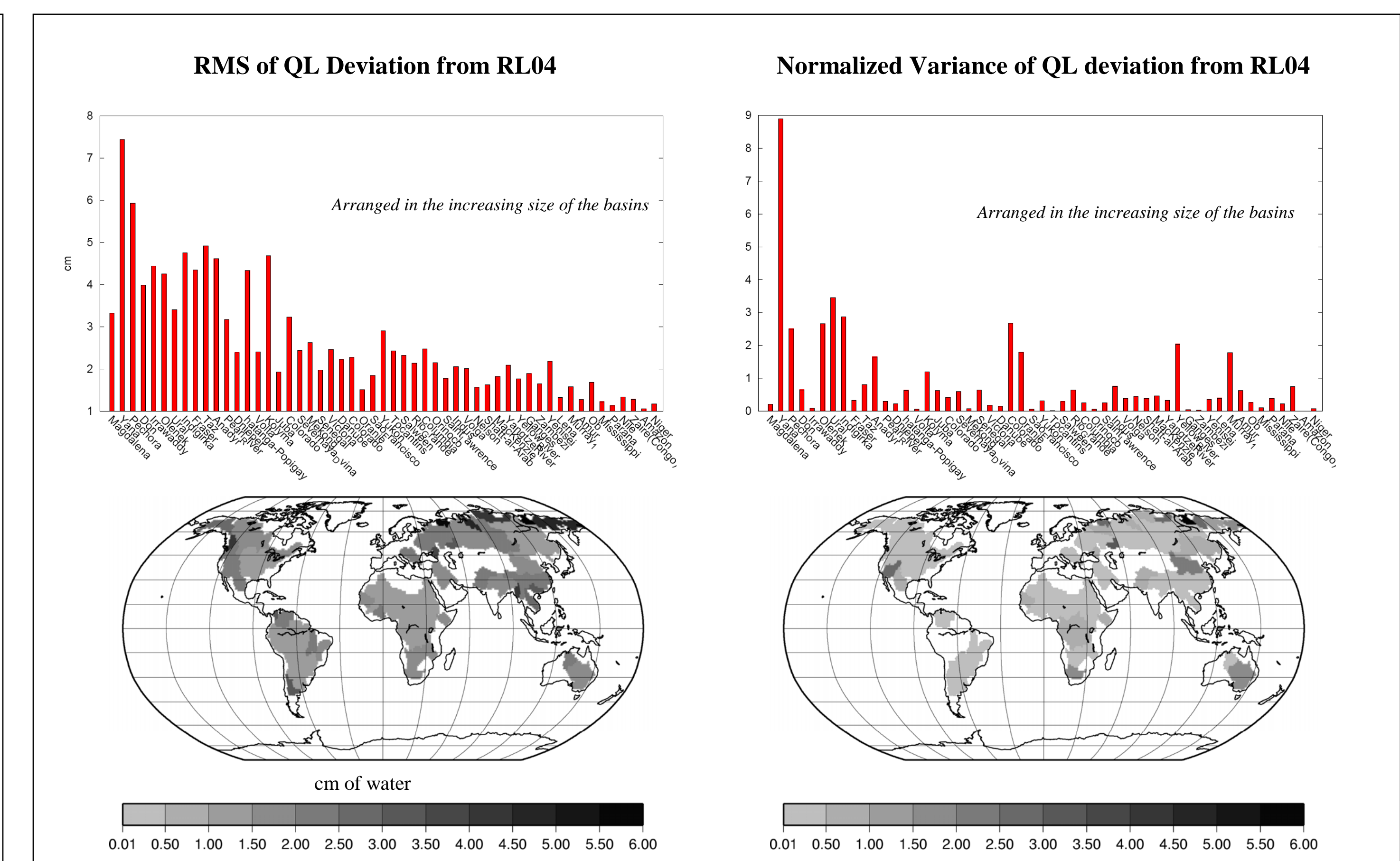
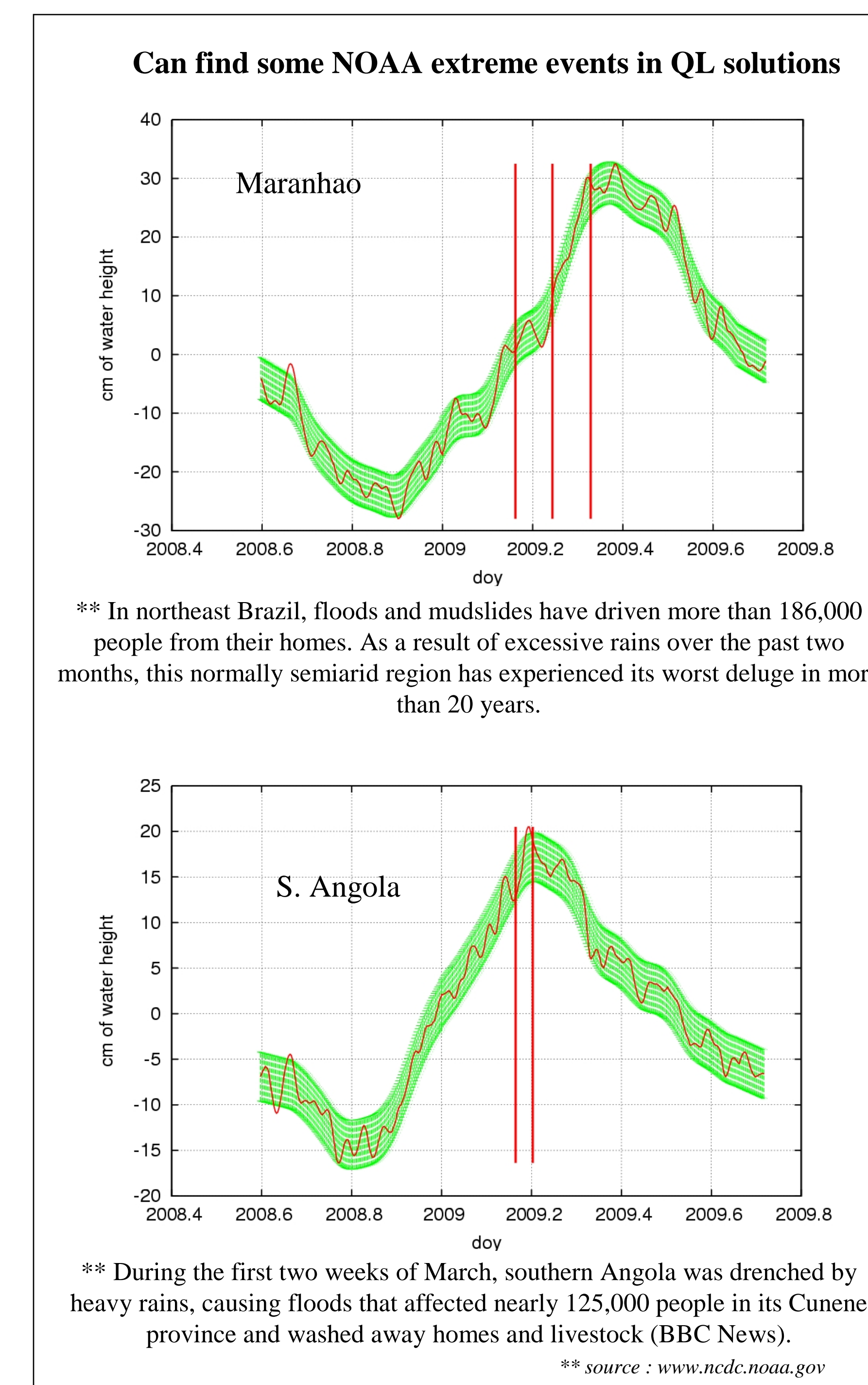
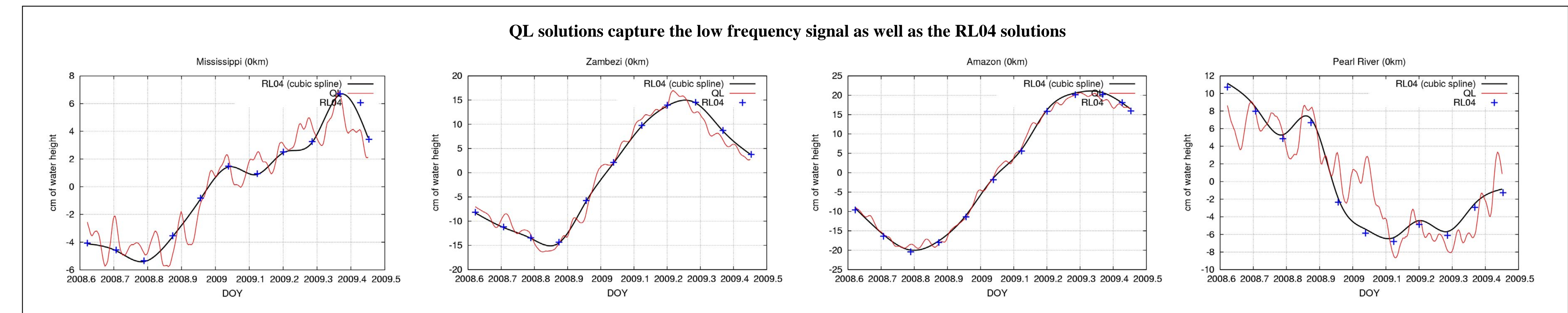
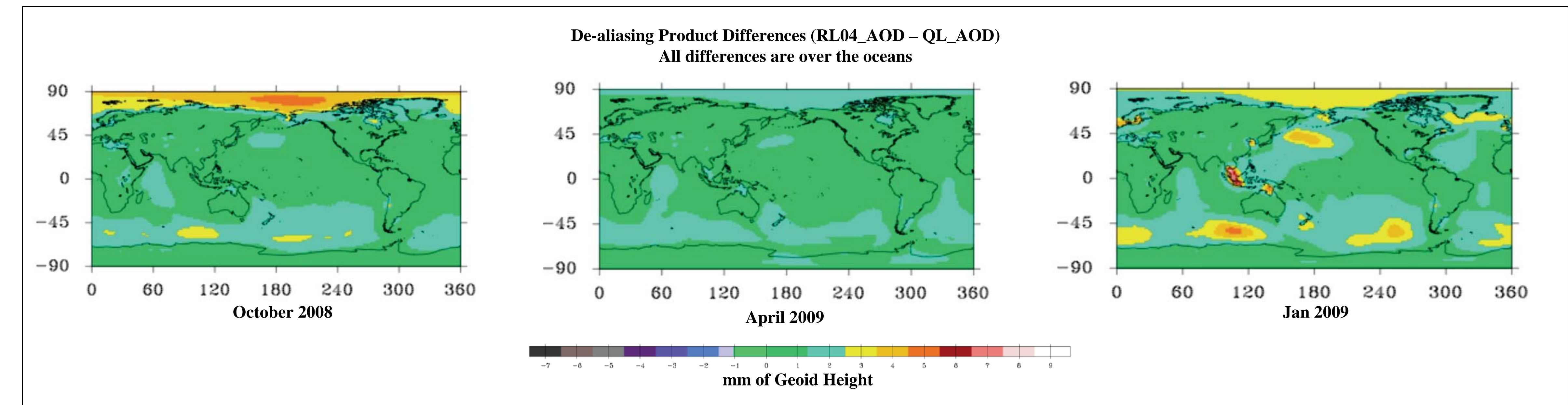
- The gravity field solution has a spectral resolution complete to degree and order 60.

- The time tag or epoch of the gravity field is the middle of the used data interval (such as 7.5 days before processing data of last date for 15-day solution).

- The Quick-Look solutions are presently verified using pre- and post-fit of KBR data, and comparing with RL04 solutions.



Process Validations



Summary

- Quick-look gravity solution from GRACE captures low frequency signal comparable to RL04
- Can see some sub-monthly signals in the quick-look solutions
- Variations in QL solutions w.r.t. RL04 are mostly within the error bounds for GRACE
- Need more investigation for sub-monthly signal and noise analysis
- The product latency of the quick-look solution is about one day with the field time tag of 8.5 days for 15-day solution (7.5 day processing latency plus one day data latency).
- The data processing for the quick-look solution is fully automatic.
- Product availability for science team around Jan 2010