



GRACE RL03-v2 monthly time series of solutions from CNES/GRGS

Jean-Michel Lemoine (1), Stéphane Bourgoigne (2), Sean Bruinsma (1), Pascal Gégout (3), Franck Reinquin (1), and Richard Biancale (1)

(1) CNES/GRGS, DCT/SI/GS, Toulouse, France, (2) Géode&Cie, Toulouse, France, (3) CNRS, UMR5563/GET, Toulouse, France

Based on GRACE GPS and KBR Level-1B.v2 data, as well as on LAGEOS-1/2 SLR data, CNES/GRGS has published in 2014 the third full re-iteration of its GRACE gravity field solutions. This monthly time series of solutions, named RL03-v1, complete to spherical harmonics degree/order 80, has displayed interesting performances in terms of spatial resolution and signal amplitude compared to JPL/GFZ/CSR RL05. This is due to a careful selection of the background models (FES2014 ocean tides, ECMWF ERA-interim (atmosphere) and TUGO (non IB-ocean) "dealiasing" models every 3 hours) and to the choice of an original method for gravity field inversion : truncated SVD. Identically to the previous CNES/GRGS releases, no additional filtering of the solutions is necessary before using them.

Some problems have however been identified in CNES/GRGS RL03-v1:

- an erroneous mass signal located in two small circular rings close to the Earth's poles, leading to the recommendation not to use RL03-v1 above 82° latitudes North and South;
- a weakness in the sectorials due to an excessive downweighting of the GRACE GPS observations.

These two problems have been understood and addressed, leading to the computation of a corrected time series of solutions, RL03-v2.

The corrective steps have been:

- to strengthen the determination of the very low degrees by adding Starlette and Stella SLR data to the normal equations;
- to increase the weight of the GRACE GPS observations;
- to adopt a two steps approach for the computation of the solutions: first a Choleski inversion for the low degrees, followed by a truncated SVD solution.

The identification of these problems will be discussed and the performance of the new time series evaluated.