



Characteristics of official and experimental GRACE time series by GFZ and CSR – with applications to polar signals

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The Release-05 monthly solutions by the three centers of the GRACE Science and Data System are a significant improvement with respect to the previous Release 4. Meanwhile, previous assessments have revealed different noise levels between the solutions by CSR, GFZ and JPL, and also different amplitudes of interannual signal in the solutions by GFZ as compared to the two other centers. Encouraged by the science community, GFZ and CSR have kindly provided additional sets of time series. GFZ has reprocessed the RL05 monthly solutions (up to degree and order 90) with revised processing. CSR has made available monthly solutions with standard processing up to degree and order 96, in addition to their solutions up to degree and order 60.

We compare these different time series with respect to their signal and noise content and analyze them on global and regional scale. For the regional scale our special interest is paid on Antarctica and on revealing polar signals such as ice mass trends and GIA. Following the necessity of destriping, an optimal choice for the setup of the Swenson & Wahr filter approach is evaluated to adapt to the specific signal and noise level in Antarctica. Furthermore we analyze the potential benefit of mixed time series solutions in order to combine the strengths of the solutions available.

Concerning the question for an optimal maximum degree we suggest that for resolving large polar ice mass changes, it would be beneficial to provide gravity field variations even beyond degree 90.