Comparison of filtering/de-striping methods for GRACE gravity-field solutions

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A problem that arises when investigating the spatial representation of the monthly gravity-field solutions from the Gravity Recovery and Climate Experiment (GRACE) space mission is the presence of north-south oriented striped noise. This is a result of the high inclination of the GRACE spacecrafts ($89.5°$) and the configuration of the GRACE satellites, resulting in less-dense sampling in the east-west direction.

We compare the results from the application of three different post-processing filters to the GRACE gravity-field solutions, and their ability to reduce the characteristic "striping". These are: (1) a statistical filter, where temporal trends inferred from the time series of the GRACE solution Stokes coefficients are tested for their statistical reliability, (2) an order-dependent filter, as applied by Swenson and Wahr (2006), and (3), an anisotropic moving average filter applied to the solutions in the spatial domain. We discuss the similarities and limitations of each filter, and their benefits for various aspects of GRACE analysis.

Swenson and Wahr (2006). Post-processing removal of correlated errors in GRACE data Geophysical Research Letters, 33(L08402), 10.1029/2005GL025285.