



Improving the accuracy of GRACE solutions through EOF filtering of spherical harmonics

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One of the major problems one has to deal with when working with Gravity Recovery and Climate Experiment (GRACE) data is the increasing error spectrum at higher degrees in the provided Stokes coefficients, appearing as unphysical North-South striping patterns in the maps of equivalent water height (EWH). This phenomenon is commonly suppressed by application of a Gaussian smoothing filter, which unfortunately causes loss of signal and leakage between basins.

In this presentation we show how a significant amount of the striping can be removed by making use of the temporal characteristics of the error spectrum. The Stokes coefficients are decomposed using empirical orthogonal function analysis and the individual modes are tested for temporal noisiness. Maps of EWH are largely free of striping after filtering and the estimated error in the GRACE maps decreases significantly. Furthermore, we will show that this filtering method has only a marginal effect on trends and other predicted geophysical signals.