Data mining in GRACE monthly solutions

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Monthly variations of GRACE solutions are subjected to undesired striping. The stripes are the result of data aliasing and are, in most cases, reduced by subsequent smoothing. The smoothing process degrades the spatial resolution of the monthly variations.

On the other hand, twelve years of monthly solutions from three processing centers provide a large data collection, which can be investigated by data mining algorithms.

The poster describes

1. How data mining techniques like thresholding and cluster analysis can be used to discriminate between spherical harmonics coefficients, which change significantly from month to month and those that do not.

2. In terms of accuracy and stability it compares full GRACE solutions with GRACE solutions, which solve only for the significantly changing coefficients.

3. It shows that the reduced GRACE solution degrades the accuracy only within the formal error bounds, while the stability of the reduced solution improves significantly.

Besides the usual de-aliasing the data mining based parameter reduction can help to reduce the striping in monthly changes of GRACE solutions.