



## **Estimable functions derived from gridded GRACE gravity fields**

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The mapping of earth gravity field models onto a regular grid is a frequent requirement for assimilating geo-scientific models. Due to the spatial resolution of the input data, such a mapping demands that the derived quantities on the grid are estimable functions. Only strict consideration of this side condition allows for reasonable subsequent processing of the gridded gravity information and their variance/covariance information, such as for testing hypotheses or computing hybrid models. Using the ITG-Grace03 gravity field model we construct general purpose models on the sphere, which are complete with respect to space as well as the frequency domain. The smoothness of the potential field, the formulation of a priori information as stochastic process on the sphere and the separability of the solution space into independent subspaces forms the key components of our approach. This complete model can be used for data assimilation with other geo-scientific models, but allows also for each linear functional a strict quantification of the influence of measurements in contrast to the a priori information. Therefore, this approach opens the possibility to assess arbitrary filters and design efficient filters in the space domain.