



Combination of time series of excitation functions by introducing operator software impact (OSI) parameters

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Each GRACE processing center (GFZ, CSR, JPL, IGG, GRGS, ...) provides sets of spherical harmonic coefficients of the gravity potential. The second degree coefficients can be transferred into excitation functions of the mass term. Usually these time series are considered as uncorrelated signals, although they are derived from the same GRACE measurements.

Our combination strategy is formulated within a linear Gauss Markov model, where the excitation function values are treated as observations and the parameters are the epoch-wise combined values derived by weighted linear combination so that the design matrix shows a block-structure of unit matrices. In our first approach the variance-covariance-matrix of the combined system is then extended by unknown variance components for each individual time series. In an alternative approach we consider the re-application of observations through off-diagonal elements in the variance-covariance matrix as introduced by Kutterer et al. (2009). Assuming convergence of the algorithm, the time-series can be combined considering the common data background as well as the operator-software-impact (OSI) introduced by the individual excitation function provider.