



Numerical analysis of geopotential differences derived from GRACE range-rates using lumped harmonic coefficients

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In this study lumped harmonic coefficients have been derived from geopotential differences as proxies for GRACE range-rate data. The main advantage of the approach is the simplicity of its formulation based on lumped harmonics that results in low computational workload. Since ground track variations result from passes of the satellites through repeat cycle (resonant) orbits, the resolution capability of GRACE deteriorates mainly in the longitudinal direction. By using lumped coefficients there is an easy way to identify the affected harmonic orders of the geopotential model. However, the major drawback of the method represents the transformation from precise range measurements into geopotential differences by means of dynamical quantities. Orbital errors infiltrate the solution and cause inhomogeneities in the accuracy of the derived global geopotential model. The method was tested so far with simulated and confined data sets.