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High Resolution Gravity Field Recovery from Future Satellite Formation Flights

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The concept of satellite formation flights for investigating the Earth's gravity field is discussed. Various proposals have been made in the past and simulation tests have been successfully performed, in most cases to moderate upper spherical harmonic (SH) degrees. In this contribution we will focus on the improvement of the static gravity field for different upper spherical harmonic indices (Nmax = 60, 90 and 180) testing different formation flight configurations. They include the *GRACE*-type as a reference configuration, the *pendulum*-type, the *radial wheel*-type and the *inclined wheel*-type. An additional satellite formation flight configuration which has not been investigated in detail yet is the *GRACE-pendulum*-type formation. We restrict the mission period of our simulation scenarios to one month to limit the computation costs. The results of this investigation are represented in the spectral and spatial domains, i.e. difference degree variances of the geoid heights, accumulated geoid errors and formal standard errors of the recovered SH coefficients. The results of this research demonstrate that satellite formation flights can provide not only gravity field improvements in the medium wavelength band but they can contribute also to higher degrees.

Keywords. Gravity field recovery. Satellite formation flights.