Improvement of the regional quasigeoid model in Slovakia using the combined global gravity field models

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The practical computation of the regional quasigeoid model combines the terrestrial gravity data and the global gravity field model. The contribution of terrestrial gravity data is determined by the integration kernel of truncated surface integral. Remainder of the neglected integration can be estimated using the truncated series of the spherical harmonic coefficients of the global gravity field model. However, to minimize the errors in quasigeoid determination provided that the maximal degree and order of the spherical harmonic coefficients is 360, one can search for the optimal size of the spherical cap and the best modification of the integration kernel. In this study, the regional quasigeoid models in Slovakia computed using the combined global gravity field models EGM96, EIGEN-CG01C, EIGEN-CG03C and EIGEN-GL04C are compared. Moreover, for every solution the optimal spherical cap for the detailed gravity data integration is investigated, varying from $0.1°$ to $3.0°$, and the original spherical Stokes' function and its spheroidal modification is tested. The best quality GPS/levelling points have been selected as a reference for our testing.