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An improved methodology for precise geoid/quasigeoid modelling

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The paper describes recent development of the computational procedure useful for precise local quasigeoid modelling. The overall methodology is primarily based on a solution of the so-called gravimetric boundary value problem for an ellipsoidal domain (exterior to an oblate spheroid), which means that gravity disturbances on the ellipsoid are used in quality of input data. The problem of a difference between the Earth's topography and the chosen ellipsoidal surface is solved iteratively, by analytical continuation of the gravity disturbances to the computational ellipsoid.
The methodology covers an interpolation technique of the discrete gravity data, which, considering a priori adopted covariance function, provides the best linear unbiased estimate of the respective quantity, numerical integration technique developed on the surface of ellipsoid in the spectral domain, an iterative procedure of analytical continuation in ellipsoidal coordinates, remove and restore of the atmospheric masses, an estimate of the far-zones contribution (in a case of regional data coverage) and the restore step of the obtained disturbing gravity potential to the target height anomaly. All the computational steps of the procedure are modest in the consumption of compute resources, thus the methodology can be used on a common personal computer, free of any accuracy or resolution penalty.
Finally, the performance of the developed methodology is demonstrated on the real-case examples related to the territories of France (Auvergne regional quasigeoid) and the Czech Republic.