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Geoid determination in Central Europe based on terrestrial data and GOCE observations

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The Federal Agency for Cartography and Geodesy (BKG) in Germany is in charge of the German quasigeoid as a reference surface for the German height system. A new quasigeoid GCG2011 for Germany was developed in collaboration with the colleagues from Institut für Erdmessung (IfE), Hannover university. GCG2011 is based on an extensive database of terrestrial gravity data. The case-study presented here refers to the BKG gravity solution of GCG2011. This approach is based on a point mass representation in combination with remove-compute-restore-technique for the determination of the geoid.

The dense spatial resolution of terrestrial observation data allows a reliable estimation of the short wavelengths of the gravity field. However, the longer wavelengths are more insecure. Here, recent gravity field missions, such as GOCE and GRACE, can help to improve the longer wavelength part. Our approach combines the benefits of the terrestrial and GOCE satellite observations in terms of accuracy and spatial resolution. The approach is introduced in detail and the results are discussed and evaluated.