



The combined satellite-only global gravity field model GOCO02S

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The main objective of the GOCO consortium is to combine satellite and ground-based observations in order to compute a global gravity field model. Benefit can be taken from their individual strengths and favourable features, and in parallel specific deficiencies can be reduced, leading to an Earth's gravity field model with high spatial resolution and accuracy.

The combination strategy is based on the superposition of normal equations, which are obtained by observation equations of spherical harmonic coefficients. Key issues are the homogenization of all included data types, the use of consistent processing standards and reference models, as well as the methodology on data combination in terms of optimum weighting of each observation component.

The new series of global gravity models computed by the GOCO consortium started with the release of the satellite-only model GOCO01S in July 2010. The model has a resolution of degree and order 224 and is composed by two months of GOCE gradiometry data and the most recent GRACE-only model ITG-Grace2010s, which contains seven years of observations. The low to medium degrees of GOCO01S are primarily determined by GRACE, whereas the GOCE gradiometry measurements start to significantly contribute at degree 100. Beyond degree 150, the combined model is dominated by GOCE.

We will present a new satellite-only model GOCO02S, which will incorporate at least eight months of GOCE gradients (November 2009 to July 2010). This will lead to further improvements regarding spatial resolution and accuracy. Optionally, also SLR normal equations shall be included to further improve the very low degrees. The combined global gravity field model will be discussed and validated by external gravity field models, GPS-leveling observations, and dynamic ocean topography estimates. Further, by comparison with GOCO01S, the improvement when including a larger amount of GOCE data will be demonstrated.