The Earth’s gravity field is determined by diverse but complementary measurement methods like terrestrial gravimetric observations, SLR, altimetry or the CHAMP, GRACE, and GOCE missions. This variety of available data sources offers the opportunity to process a new global gravity field model that incorporates the individual advantages of the different observation types, leading to essential improvements compared to former models.

The derivation of our combined models is based on the fusion of the normal equations of each data type, resulting from observation equations with respect to spherical harmonic coefficients. The homogenization of data and processing standards is an important requirement before the actual combination. Furthermore, an optimum weighting strategy of the respective constituents of the combined system is fundamental.

Preceding gravity models processed by the GOCO consortium were based on solely satellite data. The first released model GOCO01S incorporates two months of GOCE gradiometry data and the current GRACE-only ITG-Grace2010s model and resolves the gravity field to degree and order 224. GOCO02S represents an update including further GOCE data as well as SLR data which aims to enhance spectral resolution and accuracy, and the very low degrees of the gravity field spectrum respectively.

The evolution of the consecutive models will be presented, discussed and validated by external gravity information. Furthermore, the processing status of a new GRACE-only model will be outlined. Besides, the next methodological steps towards an integration of terrestrial data leading to further improvements especially in the short wavelengths of the global gravity field will be investigated and published.