



On the impact of using high-resolution atmosphere models for GRACE de-aliasing

Wei You (1), Jürgen Kusche (1), Ehsan Forootan (1), Annette Eicker (1), Christoph Bollmeyer (2), and Christian Ohlwein (2)

(1) Institute of Geodesy and Geoinformation, Bonn University, Bonn, North Rhine-Westphalia, Germany, (2) Meteorological Institute, Bonn University, Bonn, North Rhine-Westphalia, Germany

The accurate reduction of atmospheric mass change has an important impact on the quality of temporal gravity and mass change recovery using GRACE (Gravity Recovery and Climate Experiment) observations, both at longer (signal separation) and shorter (de-aliasing) time-scales. This impact will be even more important for GRACE-FO and future satellite gravimetry missions such as ESA's NGGM. Any major improvement of temporal gravity field models will likely necessitate improvements of the atmospheric de-aliasing models. The state-of-the-art methodology of atmospheric de-aliasing uses ECMWFop (European Centre for Medium-Range Weather Forecasts operational analysis) or ERA-Interim reanalysis data with spatial resolution of about 0.5° or 0.75° and 2-D or 3-D integration methods to compute atmosphere de-aliasing models. Yet it is suspected that this resolution may lead to errors, for example, due to insufficient orographic representation in mountainous regions. In this study, we focus on using high-resolution regional meteorological models like COSMO-EU (CONsortium for Small-Scale MOdelling) or the COSMO-REA6 reanalysis with spatial resolution of about 0.0625° or 0.055° , together with ERA-Interim to determine atmosphere de-aliasing models by 2-D and 3-D integration methods. The quality of the atmospheric de-aliasing models, derived from different input fields and integration techniques will be assessed. In particular, the impact of spatial resolution on the recovery of GRACE gravity fields will be evaluated.