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Stochastic modelling of non-tidal atmospheric and oceanic dealiasing models for GFZ GRACE/GRACE-FO Level-2 processing

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The central hypothesis of the Research Unit (RU) New Refined Observations of Climate Change from Spaceborne Gravity Missions (NEROGRAV), funded for the second three years phase by the German Research Foundation DFG, reads: only by concurrently improving and better understanding of sensor data, background models, and processing strategies of satellite gravimetry, the resolution, accuracy, and long-term consistency of mass transport series from satellite gravimetry can be significantly increased; and only in that case the potential of future technological sensor developments can be fully exploited.

In continuation of the first RU phase, the individual project Improved Stochastic Modeling in GRACE/GRACE-FO Real Data Processing (ISTORE-2) aims for completion of the optimized stochastic modeling for GRACE and GRACE-FO gravity field determination. This includes stochastic modelling of the non-tidal atmospheric and oceanic dealiasing (AOD) models which was recently implemented into the GRACE/GRACE-FO Level-2 processing at the German Research Centre for Geosciences (GFZ). In this context, we co-estimate AOD model coefficients using AOD error variance-covariance matrices (VCMs) in terms of constraint matrices.

This presentation provides an overview of the main processing steps together with AOD error analyses and different test cases for the AOD VCMs. In particular, we investigate the impact of taking into account not only static but also temporal correlations of the AOD models. Results are presented in terms of gravity field solutions for selected test months in the spectral and spatial domain.