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Alternative methodology to derive GRACE de-aliasing products

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Monthly and long-term mean GRACE gravity field solutions provided by the GRACE Science Data System (SDS) are corrected (de-aliased) for short-term (6-hourly) atmospheric and oceanic mass variations. These de-aliasing products are routinely calculated at GFZ Potsdam based on ECMWF (European Centre for Medium-Range Weather Forecasts) meteorological fields and a baroclinic ocean model (OMCT, Ocean Model for Circulation and Tides) provided by TU Dresden. The atmospheric and oceanic variability is deduced by subtraction of a mean field from the 6-hourly time series of the given atmospheric and oceanic mass distribution. Assuming that these standard de-aliasing products are correct (as well as other time-variable signals that are considered by a priori models such as tides of the oceans and the solid Earth), the time-variable signals derived from the monthly GRACE gravity models time series will be mainly due to unmodelled seasonal variations in the continental hydrological water cycle (as it can be observed from current GRACE data analysis results) and other smaller effects such as secular gravity changes from post-glacial rebound.

An open question in the context of de-aliasing is the principle of using a fixed *yearly* mean reference field to calculate the GRACE de-aliasing products over the whole mission period. The basic idea of this method is to make the long-term mean variability zero so that the resulting GRACE monthly gravity field solutions describe the seasonal hydrological variability. Thus, a 2-year mean for the pre-launch mission period of 2001 and 2002 is used in the present SDS de-aliasing products. But, this more or less artificial reference could add (aliasing) errors when computing the *monthly* GRACE gravity models and the derived mass variations, especially with increasing mission life time. As an alternative the atmospheric and oceanic variability could be referenced to a mean over each particular month, corresponding to the horizon of the GRACE data used to compute the monthly model, thus being much more representative than any

long-term mean field.

We will present an alternative methodology based on monthly mean fields to derive GRACE de-aliasing products and the corresponding hydrological and oceanic variability. The difference w.r.t. the standard SDS method will be demonstrated by selected GRACE monthly gravity field solutions.