Cryosat-2 LRM Data for Regional Marine Gravity Modeling

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Although not part of the basic mission objectives the use of Cryosat-2 Low Resolution Mode (LRM) data acquired over ocean is of great interest for geodetic applications, such as gravity field modeling. Due to its long repeat cycle of 369 days, the ground track separation of Cryosat-2 is very dense (∼8km at the equator) - comparable to what was achieved by the two geodetic mission phases of ERS-1 (168 day repeat cycle) and much denser than for Jason and Envisat (315/80 km track separation). Thus, for the first time since 1995, precise altimetry profiles with high spatial resolution are available for great parts of the globe.

In this contribution sea surface height (SSH) profiles of Cryosat-2 are used to compute high resolution regional gravity models over oceans. In combination with sea surface topography information, the SSH is used to extract geoid heights which serve as input data for the estimation of the unknown model coefficients. The model approach uses spherical base functions, i.e. spherical scaling and wavelet functions in order to describe corrections to a given background model (e.g. GOCO02S). In addition, it comprises a multi-resolution representation (MRR) of the gravity field, allowing a decomposition of the signal to a number of detail signals each related to a specific frequency band.

The presentation gives a short introduction on the Cryosat-2 mission and data sets as well as on the approach used for regional gravity modeling. Gravity field results for selected regions and with different spatial resolution will be shown and compared to existing models.