



High-latitude local gravity field recovery from CHAMP with least-squares collocation

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The CHAMP mission successfully improved the knowledge of the global gravity field by one order of magnitude compared to pre-CHAMP solutions like e.g. EGM96. The orbit of the satellite was chosen to be near polar and with a very low eccentricity (~ 0.01). Due to this configuration and the constant data sampling of 30 seconds the data distribution in high-latitude areas is denser than in equator regions.

Using the energy balance approach potential values along the orbit are determined and due to its pointwise nature the approach can be used for local calculations. Since the data is non-uniformly distributed and on orbit height least-squares collocation will be applied for gridding and downward continuation which will also enable the combination with e.g. terrestrial data.

Since in a global solution data in high-latitude areas need to be down-weighted in order to avoid a bias in the solution, a global solution cannot use the full potential of the available data in e.g. Arctic, Antarctic and northern Canada and therefore an improvement in a local solution is anticipated.