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Locally adapted space-wise grids from GOCE data

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GOCE data are usually translated into a spherical harmonic global model that can be used to generate various functionals of the Earth's gravitational field. An alternative representation of the information coming from GOCE is to project the observed along-track gradients onto a spherical grid at mean satellite altitude. This is the solution pursued in this work by exploiting the so called space-wise approach.
In particular, once the data are filtered along the orbit in order to reduce variance and correlation of the observation noise, a gridding procedure is implemented by least-squares collocation on local data patches. Crucial points are the new way in which data are subdivided and local covariances are modeled. Basically the idea is to consider clouds of observation points around each grid knot reducing as much as possible the data undersampling in order to catch their local information. Inside the point cloud a signal covariance model based on local degree variances is used.
The method has been applied on a subset of GOCE data. The resulting grid values are compared with those synthesized from a global model based on the same observation time span, showing the differences between the two representations.