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Adaptive topographic-isostatic mass correction for gravity data

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Processing of gravity data for modelling of lithospheric density anomalies always includes a topographic mass correction. Depending on the focus of the study isostatic corrections are also applied. The calculation time of the mass correction is dominated by the spatial resolution of the topographic grids. Especially satellite data does not need corrections with high resolution data. However, the choice of the best spatial resolution in terms of accuracy and calculation time is unclear. We developed an algorithm based on a triangulated polyhedral body which resamples the topography based on an adaptive approach to calculate gravity. It also calculates an error estimation of the resampling and the resampled grid itself. The resampling depends on its gravity effect at the station and not only distance. Therefore, the algorithm takes also the shape of topography into account and makes it possible to use a high-resolution topographic grid and calculate the gravity effect in a fraction of time. This is also applied for the correction of the isostatic compensation. We show examples for local and global gravity datasets. In addition, we exploit the information of chosen grid resampling to assess the sensitivity of the surfaces to the gravity data.