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# Global long-wavelength topographically corrected and topo-density contrast stripped gravity anomalies

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The constant average topographical density is commonly assumed when modeling globally the topographical correction and the far-zone contribution of the topography-generated gravitational field. Recently, lateral topographical density distribution models have been used more often in detailed modeling of the near-zone contribution while only the constant average topographical density 2670 kg/m3 is adopted for the far-zone contribution assuming that the effect of the anomalous density variations on the gravitational field from the far-zone topography is negligible. In polar regions with the continental ice sheet and over the areas with the variable geological structures, however, this assumption does not hold. Therefore, we expect that the currently available global crustal model CRUST 2.0 allow computing the far-zone contributions more realistically taking into account the ice, sediment and upper crust density contrasts within the topography. In this study, we compile global maps of the topographical corrections to gravity anomalies using the CRUST 2.0 model. The topographical corrections are applied to the EGM2008 gravity anomalies in two successive steps. First, the gravitational contribution of the topography of constant average density is subtracted. Then the ice, sediment and upper crust stripping corrections are applied to the topographically corrected gravity anomalies. The Global Geopotential Model (GGM) coefficients taken from the EGM2008 complete to degree and order 180 are used to compute the gravity anomalies. The $5\times5$ arc-min global elevation data from the ETOPO5 (provided by the NOAA's National Geophysical Data Centre) are used to generate the Global Elevation Model (GEM) coefficients. These coefficients are utilized to compute the topographical correction with a spectral resolution complete to degree and order 180. The discrete data of the ice thickness with a $2\times2$ arc-deg geographical resolution from the CRUST 2.0 model are used to generate the Global Ice Thickness Model (GITM) coefficients. The GITM and GEM coefficients are utilized to compute globally the ice stripping correction with a spectral resolution complete to degree and order 90. The mean value of the ice density contrast -1757 kg/m3 (i.e., difference between the mean ice density 913 kg/m3 and the average topographical density 2670 kg/m3) is adopted. The $2\times2$ arc-deg global data of the sediment thickness and density from the CRUST 2.0 model are used to compute globally in a spatial representation the sediment stripping correction. The $2\times2$ arc-deg global data of the upper crust thickness and density from the CRUST 2.0 model are finally used to compute globally in a spatial representation the stripping correction due to the remaining CRUST 2.0 upper crust anomalous density variations within the topography. The density contrasts of sediment and upper crust are defined relative to the average topographical density of 2670 kg/m3. All data are evaluated and presented on a 1x1 arc-deg grid at the Earth's surface.