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Moho topography and lithospheric gravity anomalies for the Central Asian Orogenic Belt from satellite gravity gradients

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The Central Asian Orogenic Belt (CAOB) is a Paleozoic accretionary orogen surrounded by the Siberian Craton to the north and the North China and Tarim Cratons to the south. A new 3-D forward gravity model of the CAOB crust is proposed using the Gravity Field and Steady-State Ocean Circulation Explorer (GOCE), which determines the topography of the Moho, the geometry, and the density distribution of the deeper parts of the CAOB and its surroundings. The model is constrained by geological data, available seismic studies and preliminary inversion of the vertical gravity component of DTU10. The isostatic implications of the differences between the seismic Moho and the resulting 3-D gravity Moho is discussed, complemented by the analysis of the lithostatic load distribution at the upper mantle level. The correlation between the contrasting tectonic domains and the thickness of the crust reveals the inheritance of Paleozoic and Mesozoic geodynamics, particularly the magmatic provinces and the orocline which preserve their crustal features. Finally, this study is complemented by the analysis of lower crust and upper mantle gravity anomalies combining the different components of the GOCE satellite gravity gradient tensor corrected from the effects of topography masses. Curvature, horizontal gradient, total gradient, analytic signal and Euler deconvolution of the gravity gradient tensor are computed and these methods are compared in order to evaluate their relevance to estimate source location.