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Unvealing the geodynamic context of geologic structures with satellite gravity

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The crustal structure in North Central Africa bears many uncertainties, starting with crustal thickness. This area comprises two large stable units, the West African Craton and the Sahara Metacraton. Large compositional crustal inhomogeneities are associated to collision belts and rifts. The understanding of these linear or arched lines, which reach lengths well over 1000 km, is only partial, and an essential parameter, the crustal thickness, is missing. We focus on the gravity and gradient fields of these belts, which show marked anomalies in the geophysical observations. One arched line is found in Chad, linking two separate volcanic provinces, the Tibesti and Cameroon. It is presently unknown whether this 1200 km long line is a collision belt or a rift, either one implying an opposite geodynamic context at time of formation. We investigate the possible models that explain the observed potential fields in order to define the depth of the density anomalies and from this to infer the geodynamic context of formation. Essential to our study are the gradient observations of GOCE and the EGM08 gravity field.