



Curvature analysis of satellite gradients – A meaningful tool for tectonic interpretation?

Jörg Ebbing, Folker Pappa, and Wolfgang Szwillus

Christian-Albrechts-University Kiel, Geophysics, Geosciences, Kiel, Germany (jebbing@geophysik.uni-kiel.de)

Curvature analysis of gravity gradients has become a standard in interpreting airborne data. Airborne gravity gradients are known for their high sensitivity to near-surface sources and for interpretation curvature components like the shape index are used. For example, the shape index is relating the non-vertical and vertical components of the gravity tensor to the geometry of an ideal surface, which describes the main characteristics of the subsurface. Gravity gradients at satellite height are relatively smooth and, even though they are useful for inverse and forward modelling, not well suited for a direct interpretation of geology or tectonic features. Therefore, these data are often downward continued to a near-surface level to enhance geological structures. We show examples of a global analysis of gravity gradients at satellite height. After the contribution of topography is removed, the shape index shows the main tectonic setting of the world with surprising accuracy. Interestingly, most domains of similar lithospheric age show similar characteristics, with exceptions like the Siberian or Congo Craton. We extend our analysis to Antarctica, where we account as well for the ice masses in order to provide insights in whether Antarctica lithosphere is more heterogeneous than previously assumed.