



GOCE observations and geophysical constraints to better understand the lithosphere and geodynamical processes under the Paraná-Etendeka region: preliminary results of PERLA project

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In the light of the considerable progress made by the modern geodetic satellite mission GOCE, one of the challenges of the European Space Agency (ESA) is to improve knowledge of physical properties and geodynamic processes of the lithosphere and the Earth deep interior, and their relationship to Earth-surface changes. In this context we propose a study that aims to understand the two pieces of lithosphere underlying the Paraná-Etendeka conjugate margins (Brazil, and Angola-Namibia). It is essential to collect the geological and geophysical information about the thickness and the density of sedimentary layers, crustal thickness and mantle inhomogeneities. Our methodology integrates the geophysical database with the GOCE data, product of the innovative gravity satellite mission, that was concluded November 2013. Crustal thickness was obtained from all available seismological datasets. The density-depth relation of the shallow layers is modeled by geophysical data collected from literature and from the on-shore and off-shore drilling programs. Several compaction laws are used to estimate the density of each layer. This information is necessary to reduce the observations considering the gravity effect of all intracrustal known layers, to resolve the deep crustal structures (e.g. Moho and intracrustal bodies). A positive gravity anomaly is expected due to the magmatic activity of the Paraná-Etendeka province. The smaller-scale and shallow gravity anomaly should be due to the occurrence of the volcanic activity close to the alkaline-carbonatite complexes, while the large-scale anomaly is expected from the underplating of a wide denser body at the depth of the crustal mantle boundary. In the present work some preliminary results of the inversion of the residual gravity anomaly in terms of densities in the middle and shallow lithosphere under the Paraná-Etendeka region will be presented and interpreted.