Notes on paper- “Explaining the thick crust in Parana basin, Brazil, with satellite GOCE gravity observations” Mariani(2013)

Introduction-

* Gravity residual in Parana basin points to density anomalies not contained in the previously published crustal model, and located either in the crust or mantle, according to the involved wavelengths of the residual gravity signal.

The gravity fields derived from GOCE-

* Can use GOCE data to derive gravity strength at any given height and will be accurate to a good degree.

Seismologic models of crustal thickness variation-

* The CRUST2.0 is a model based on the compilation of existing data (Laske et al., 2000) with a resolution of 2 by 2, which brakes the crust into seven layers, comprising two layers of sediments (soft and hard sediments), and three crustal layers: upper, middle and lower crust. The other three levels are topography, ice, and water depth.

Gravity modelling-

* Modelling the three layers of the Parana crust this implies that with respect to the standard crustal column, the sedimentary rocks of the Parana basin add up to a mass deficit, notwithstanding the presence of the basalt layer.
* Hidden mass in the crustal column. Seismic Moho is deeper than Gravity derived Moho.
* The discrepancy is another way of showing that there must be a dense mass at crustal level, that is located above the deep seismologic Moho, and produces the positive gravity signal that results in an apparent uplift of the Moho below the basin from the inversion process.

Underplating below flood basalt-

* Introduce surplus mass at crustal level, below known layers. Has two effects: it is the source to the positive gravity residual, and it constitutes the extra load which we need in the isostatic model to push the Moho downwards.

Discussion-

* Overall taken two lines of investigations: the first considers the gravity field, the second the isostatic state.

Conclusions-

* Possible isostatic flexure in the area.
* Gravity only model but compares to seismic models.