



The Paraná large igneous magmatism at surface and lower crustal levels

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The newest gravity data of the GOCE satellite mission (product-release 3) are essential in understanding lithospheric structures of the Paraná basin. We start modeling the sedimentary layers using data of sediment density: from bottom to surface, the first level belongs to Paleozoic sediments where density changes from 2400 to 2600 kg/m³ and isopachs reach 3500 m (Silva and Vianna, 1982), digitized by Melfi et al. (1988). Second layer is composed by basalt of Serra Geral Formation with a constant density of 2850 kg/m³ (Marques et al., 1984) with a thickness of about 1500 m. The top layer is located only in the northern part of basin, and corresponds to upper Cretaceous sediments of Bauru group. The latter is a less pronounced sedimentary basin of more than 250 m thickness, with a constant density of 2200 kg/m³ (Silva and Vianna, 1982). We use recent seismological (receiver function) data from South America (Lloyd et al., 2010) to constrain crustal thickness. We calculate the Bouguer residual anomaly taking into account the effect of sediments and the seismological crustal root. The results are very interesting because they reveal an excess load below the northern part of the Paraná basin in good agreement with the geographic position of the southern part of the Amazonian craton, the Guaporé block. We think that this reveals an underplating body, even if elastic wave properties confirmed this hypothesis only on few seismologic stations. The estimated gravity signal produced by the body is 120 or 50 mGal respectively, for a contrast density at Moho level of -500 and -300 kg/m³. The petrography of the rocks in the basin shows a poor presence of primitive shallow magmas, and a chemical bimodality of the Paraná basalts that suggest that the portion of underplated magmas is of 50-80 wt% of the total liquidus produced by the mantle melting.

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