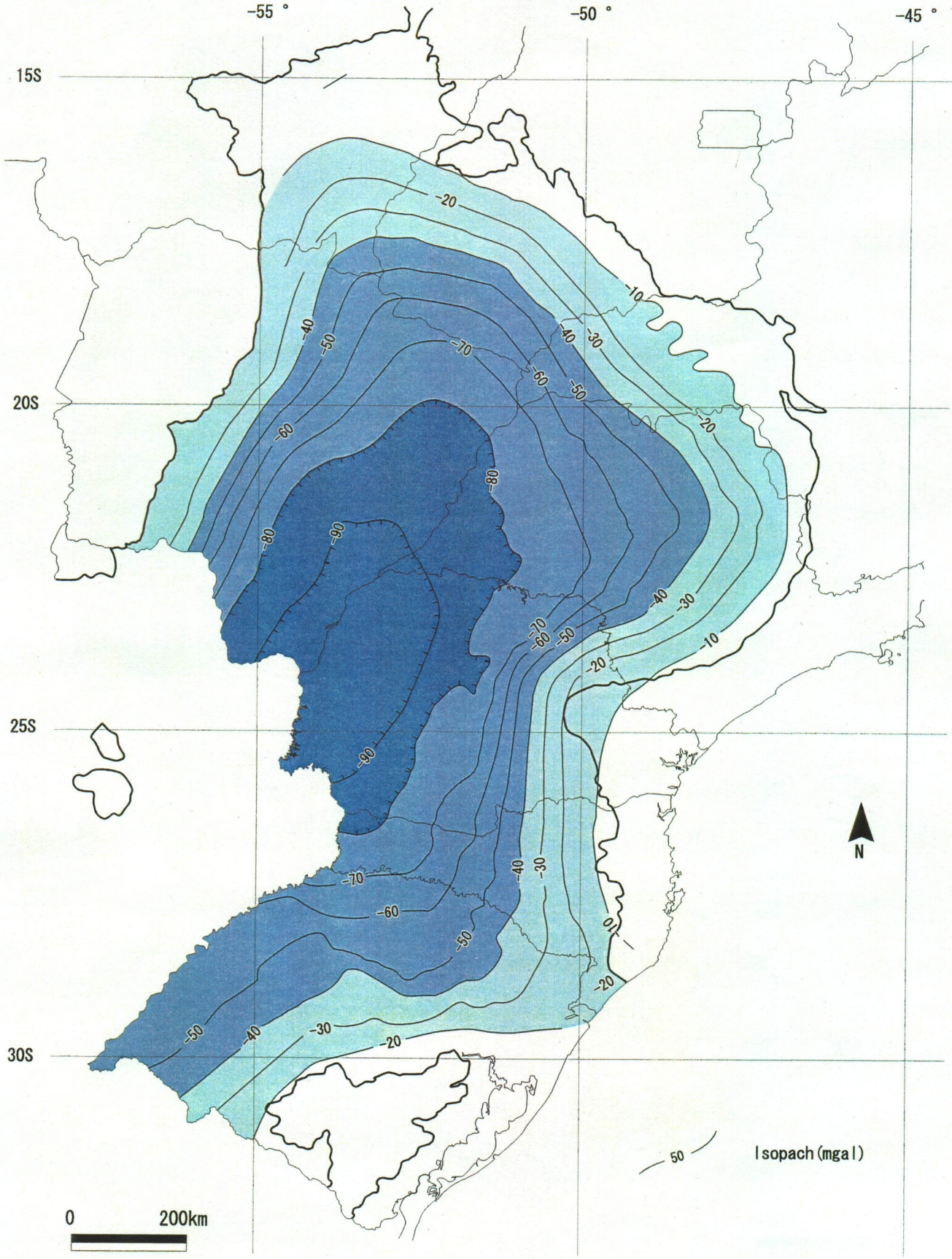

Fig. II-1-4-26 Anomaly calculated due to the Paraná basin, considering anomalies generated by sediments, igneous rocks, sills and "root" (M.C.L. Quintas, 1995)

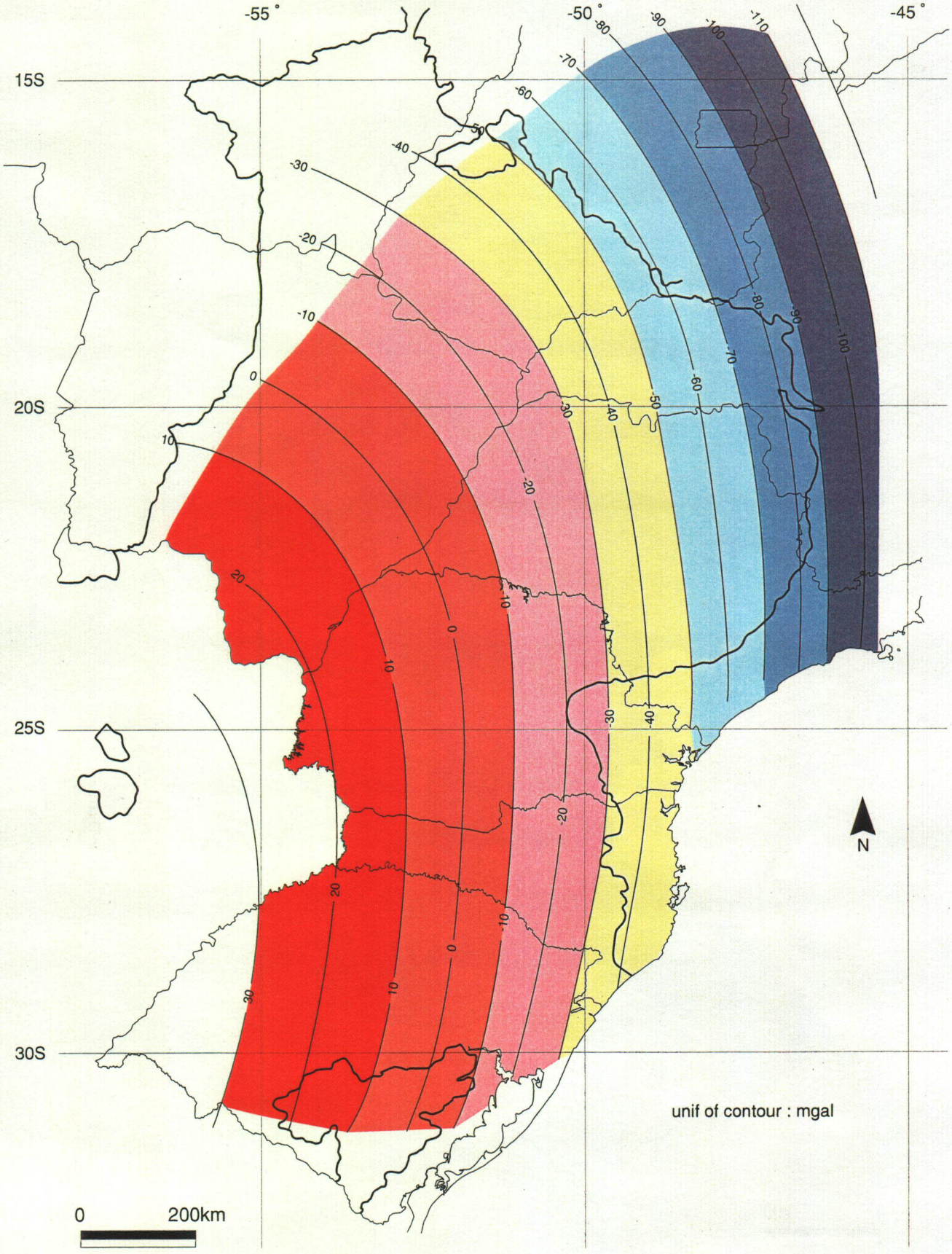

Fig. II-1-4-27 Gravimetric trend anomaly generated by the second order polynomial (M.C.L. Quintas, 1995)

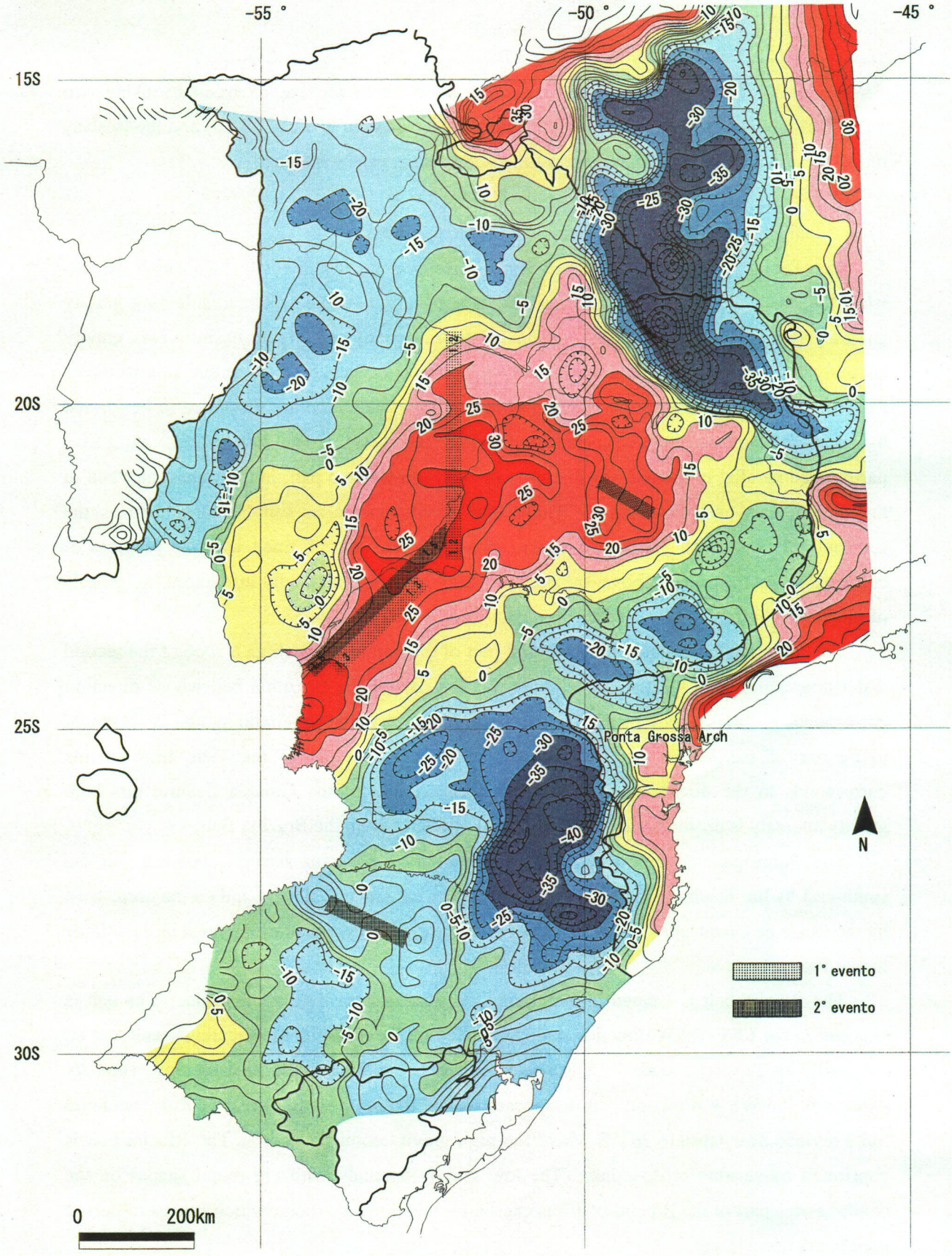

Fig. II-1-4-28 Residual anomaly substracted the second order trend anomaly from the Bouguer anomaly indicating zones of major attenuations related with two distensible events (M.C.L. Quintas, 1995)

gravity anomaly.

As the result of the analysis of the basement structure of the Paraná basin by using two individual methods, the thermodynamic model (ε) by Royden & Keen (1980) and the isostasy model (residual gravity anomaly), almost the same results can be obtained.

2) Residual Gravity Anomaly and Geological Structure Province

The Paraguay belt corresponds to the low residual gravity anomaly belt which extends from the north to the south with long length and narrow width. Remarkable low gravity anomaly (Goiania flexure) is observed in the north-eastern part of the basin. This gravity anomaly is a part of the Brazilia belt and suggests the existence of the suture line to Goias massif. Goias massif, Amazon craton and Rio de La Plata craton are presumed to be formed by multi-collision in the subsidence zone (Fig. II-1-4-29). The low gravity anomalies partrranged parallel in the NE-SW direction in the north-western part, in the central part and in the eastern part of Paraná basin. These low gravity anomalies can be considered as the segments of crust, with 150 km to 400km in length, which are formed with the progress of collisions. As mentioned above, the process of the basement markedly influenced the genesis of the Paraná basin that is caused by expansion and cooling of mantle.

The high gravity anomaly in the central part of the Paraná basin (high ε zone of the second distebsible activity) is located in the south-western part of the Brazilian belt whose direction corresponds to the direction of the Tiete tectonic line in the NW-SE direction, and is presumed to be one of the feeders of flood basalt. Since the direction of the Tiete tectonic line corresponds to the direction of the south-western margin of the Goiania flexure, this high gravity anomaly is presumed to be the structural influence from the Brazilia Belt.

The Paranapanema block of the central part of the Paraná basin is bounded on the south-east by the Jakchinga fault, in the north-east by the Goiania flexure and on the north-west by the Oeste de Goias arch. This block is considered to be a segment of the crust in the middle to late Proterozoic.

The Ribeira belt is located in the eastern marginal part of the Paraná basin. The belt is exposed in the ENE-WSW direction and is bounded on the south by the Jacutinga fault and on the north by Lancinha fault. Concerning the gravity anomaly, the unstable low anomaly extends in the WSW direction. It disappears around the north-western part of Rio Grande do Sul Province near latitude 28° S where the high gravity anomaly zone is The Ribeira belt is confirmed by seismic prospecting. The low gravity anomaly with big round shapes on the south-eastern part of the Ribeira belt was caused by acid volcanic rocks, which consist of part of the Paraná flood basalt.

The high gravity anomaly (high ε zone) near the north-western part of Rio Grande do Sul Province (latitude 28° S) in the WNW-ESE direction is located in the area where the Ribeira

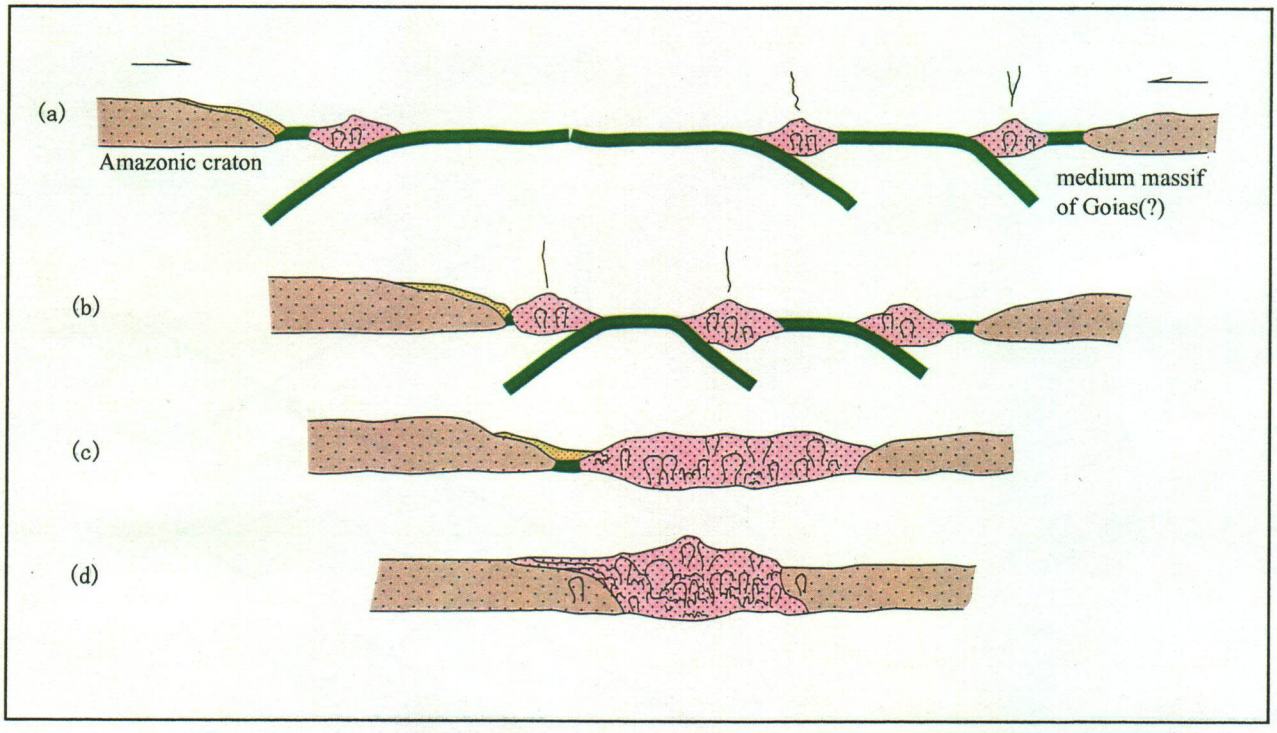

Fig. II-1-4-29 Hypothetical model for geotectonic evolution of segments adjacent to Paraguay belt, inferred by geological observations in south western Goias region (extracted from Pimental and Fuck, 1995)

This evolution can be subdivided into 4 stages: (a) establishment of volcanic arches with the extrusions of tholeiitic basalts and subsequent by intrusions of gabbroic-dioritic bodies; (b) extrusion of calc-alkalic volcanic sequences and intrusions of small bodies equivalent to the compositions; (c) Joining of two arches with intrusions of granitic and basaltic bodies; (d) Collision and joining continental masses and subsequent by granitic intrusions. post tectonic erosions and formation of

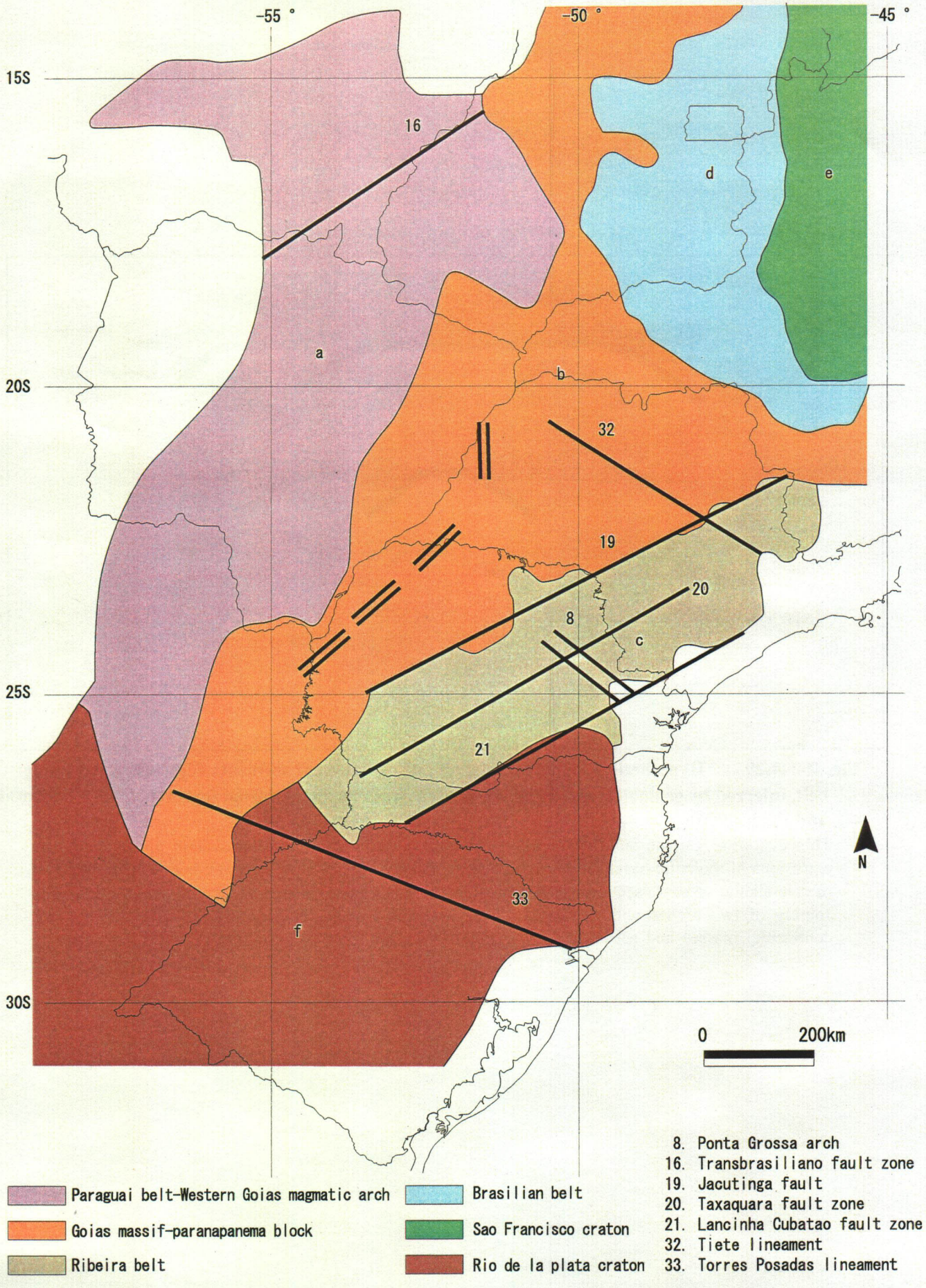

Fig. II-1-4-30 Tectonic provinces of basement rocks and lineaments inferred form residual gravimetric anomalies (M.C.L. Quintas, 1995)

belt ,the Paranapamera craton and the Rio de La Plata Craton meet. The Toles Posadas tectonic line (Reintz, 1949) pass through the area in the WNW-ESE. It is possible that the high gravity anomaly could be the junction of the three tectonic provinces mentioned above. The porous basalt lava flows are distreibuted there accompanied with the native copper mineralization. The area assumed to be one of the eruption center of the flood basalt magmatism.

The Ponta Grossa arch is a part of the Critiba microplate and Ribeira belt. In Usami et al. (1991), the β value around the arch indicates values from 1.1 to 1.25. They are not big values. The reason for the comparatively small values of β is considered to be that flood basalt activity was not accompanied by marked attenuation of the lithosphere. Many Complex in the NW – SE direction, it is presumed to be formed by the ruputure of Gondwana continent. The same arches as the Ponta Grossa arch can be observed in the Salado basin and Colorado basin of Argentine (Fig. II-1-4-23), in the central part of São Paulo Province, in the north-western part of Paraná Province, in the north-western part of Rio Grande do Sul Province, in the southern part of Rio Grande do Sul Province (San Gabriel) and in the southeastern part of Paraguay, which are characterized by many Complex and a high gravity anomaly.