

Geological and geophysical analysis of the northern portion of the Araçuaí Belt, MG - BA

Raissa Felix de Alvarenga^{*1}, Maria Silvia Carvalho Barbosa², Eliza Inez Nunes Peixoto², Joney Justo Da Silva², Luis Artur Souza Oliveira², Fernando Antônio de Oliveira², Pedro Lourenço dos Reis², Rafaela Elizabete Araújo Maia², UFOP, SGA Student Chapter.

Copyright 2021, SBGf - Brazilian Society of Geophysics.
This paper was prepared for presentation during the 17th International Congress of the Brazilian Geophysical Society held in Rio de Janeiro, Brazil, 16-19 August 2021.
Contents of this paper were reviewed by the Technical Committee of the 17th International Congress of the Brazilian Geophysical Society and do not necessarily represent any position of the SBGf, its officers or members. Electronic reproduction or storage of any part of this paper for commercial purposes without the written consent of the Brazilian Geophysical Society is prohibited.

Summary

The understanding of the interaction between cratons and their surroundings allows reconstructing the geological and tectonic history of many regions of interest around the globe. This study was developed on the São Francisco Craton and the Araçuaí Belt, located in the east of Brazil, in the states of Minas Gerais and Bahia. The boundary between the craton and its orogeny belt remains yet to be determined in a scientific consensus. Thus, the study contributed to the comprehension of the structural framework that comprises the entire region. The methodology consisted in producing and interpreting regional geophysical maps, looking for remarkable structural features, namely the Rio Pardo Salience and the Itapebi and Chapada Acauã Shear Zones, located in the Araçuaí Orogen. Each of these areas were surveyed quantitatively and qualitatively, in order to characterize the São Francisco Craton limit in these portions. Each region was further divided into domains and tectonic compartments, tracing geophysical profiles so three-dimensional models of subsurface structures could be generated, allowing the investigation of geological contacts, craton boundaries and other relevant structures.

Results and Conclusions

The geophysical analysis performed from processing and interpreting the data generated from potential methods (aerial magnetometric survey, provided by the senior geophysicist Antonino Borges – CPRM and gravimetric survey from the project TOPEX/POSEIDON) proved to be effective at highlighting the contrast of in-depth lithology and features, consistent with the structural framework of the region. Gravimetric methods were employed to ascertain the crust-mantle boundary and the deep faults in the shear zones, while magnetometric methods were useful in delimitating the main structural lineaments and characterizing the lithology. The limit between the São Francisco Craton and its mobile belt was studied from the integration of gravimetric (Bouguer and Free-air maps) and magnetometric data (Analytical Signal Amplitude - ASA maps).

The boundary of the craton is shaped as an arc (Figure 1) and it continues in depth, with the presence of denser material inside the concavity, corroborating with the structure framework described by Alkmim *et al.* (2007) that suggests the orogen originated as an accretionary wedge with further crustal thickening. In the shear zones,

one can see high amplitude and high wavelength anomalies and lineaments with NS, NW-SE and WE direction, while low amplitude anomalies were noticed in basins or in regions of very deep magnetization, as the Analytical Signal Amplitude map displayed (Figure 2).

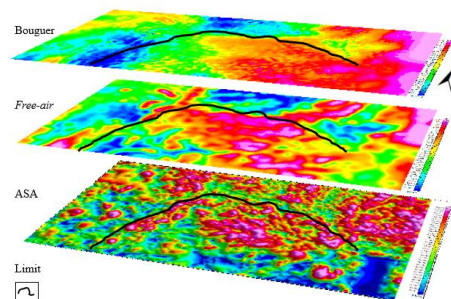


Figure 1 – Integration of gravimetric and magnetometric data.

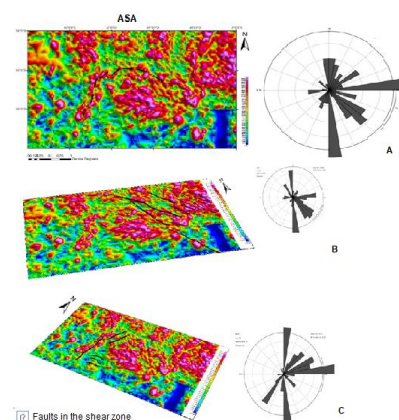


Figure 2 – Magnetometric map showing regions of interest. A) Rio Pardo Salience B) Itapebi C) Chapada Acauã Shear Zone

Therefore, this study was important to add new data for the analysis of geological phenomena, considering the study area has a thick and extensive coverage of Cenozoic sediments, which prevents the accurate geological mapping of the region. The generated maps allowed viewing the internal structural framework and lithology, contributing to a better understanding of the tectonic evolution of the area.

Acknowledgements

The authors would like to thank Antonino Borges (*in memoriam*) for the data and inspiration.

References

Alkmim, F.F., Pedrosa-Soares, A.C., Noce, C.M. & Cruz, S.C.P. 2007. Sobre a Evolução Tectônica do Orógeno Araçuaí-Congo Ocidental. *Geonomos*, 15.