

NEW INSIGHTS ON TECTONIC FRAMEWORK OF POTIGUAR BASIN, BASED ON POTENTIAL FIELD DATA

Oliveira, K.M.L.¹, Castelo Branco, R.M.G.¹, de Castro, D.L.², Oliveira, D.C.², Nepomuceno Filho, F.¹, Souza, A.C.B.¹, Almeida, N.M.^{1,3}, Normando, M.N.¹, Barbosa, T.H.S.¹.

¹Federal University of Ceará; ²Federal University of Rio Grande do Norte; ³Instituto Federal do Rio Grande do Norte

ABSTRACT: This research presents the internal geometry of the northwestern edge of Potiguar Basin (Fazenda Belém oil field - NE Ceará State), and its structural framework based on magnetic and gravity anomalous patterns and density distribution in depth derived from 2D gravity modeling. To achieve this goal we used older magnetic airborne survey and new terrestrial gravity data. Interpretation of magnetic and gravity anomalies was based on data processing and depth analysis techniques, which provided a geological map of the crustal domains concealed in this part of the basin. Thus, the number, location and internal geometry of gravity and magnetic sources were used to generate the initial geophysical model constrained by 2D Euler solutions of magnetic and gravity data. The study area shows structural lineaments characterized by lineaments in the NE-SW direction with E-W and NW-SE inflexions. The spatial arrangement of geophysical domains is related to distribution of deep crustal lineaments, which are associated with continuity of the main Brasiliano shear zones. The Jaguaribe shear zone is not well marked on the surface, but appears well pronounced on subsurface as shown in geophysical maps and models. The Ponta Grossa and Fazenda Belém lineaments, in turn, present similar characteristics and seem to limit possible grabenforms structures westernmost edge of Potiguar basin. Another lineament with expression and depth similar to others presents well marked by 2D Euler deconvolution in northwest of Ponta Grossa lineament and was named Fazenda Retiro Grande lineament. 2D gravity modeling in three profiles point out the geometry of western edge of the Potiguar basin, which could be grabenforms felled areas, with implications on the westward continuity of the Fazenda Belém petroleum system. The shallower alignments located in the SE sector are interpreted as faults or intrabasin discontinuities, which may represent reactivations of the main shear zones. Finally, an evolutionary tectonic model of Fazenda Belém oil field is proposed comparing our results and previous geological studies. This study indicates that a few faults that occur in the NW edge of Potiguar Basin and form graben boundaries, oblique to the main transform margin, have the same orientation, kinematics and geometry as the main rift faults. Thus, our final model suggests that the grabenlike depocenter could be the westernmost expression of the NE Brazilian Rift System that generated a series of rift basins along the Borborema Province in the Early Cretaceous. However, it is still necessary to identify rift sequence deposited within this depocenter to confirm that Fazenda Belém grabenlike structure is coeval to the Neocomian Potiguar Rift ~100 km far to the east. This work provides new insights that can contribute to a better understanding of the process of continental rifts and transform margin evolution.

KEYWORDS: GRAVITY 2D MODELING; GEOPHYSICAL MAPPING; EQUATORIAL MARGIN.