The influence of offshore lineaments at the structural framework of Campos Basin, SE Brazil and their effect on the pre-salt units

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Abstract

The Campos Basin is located on the Brazilian coast, and its basement includes rocks from the Ribeira and Araçuai belts. The predominant Neoproterozoic structural pattern of these units, NE towards the south and NW in the north, was inherited by the structural framework of the basin basement, through the oblique rifting reactivations. However, E-W and NW-SE oriented structures are also locally observed. In other Brazilian southeastern basins, such as the Espírito Santo and the Santos basins, it was observed that the onshore lineaments have a direct influence on the structural control of depocenters and on depositional architecture of sediments in the offshore areas. For the Campos Basin, studies suggest that offshore grabens and structural highs and lows may be influenced by pre-existing NW-SE and NE-SW structures observed onshore, such as the Alegre and Vitória-Colatina lineaments, with N25W orientation. The same can be observed for E-W and WNW-ESE lineaments, formed during the extensional rifting phase, such as the Araruama Transfer Zone. As the basement structural framework plays a crucial role in controlling pre-salt interval sedimentation, a comprehensive understanding of the offshore lineaments in the Campos Basin is essential to discuss the impact on basement topography and its effects on pre-salt units. In this context, the present work aims to identify the main lineaments related to the basement structural framework and their effect on the pre-salt units. For the development of this study, georeferenced onshore lineaments were compiled in ArcGis Pro software, where they were analyzed together with offshore lineaments. The offshore lineaments were interpreted on the basement structural contour map, a product of the Campos Project, of which this study is part. The interpretation of these lineaments can be compared to previously published articles, which can initiate a discussion about the possible temporal hierarchical extrapolation between the different proposed deformation phases from onshore to offshore in the Campos Basin. After that, lineaments will be chosen to analyze in 3D seismic data their influence on pre-salt units. Petrel software will be used for the structural and stratigraphic interpretation of the 3D seismic data. Regarding the preliminary results, the main onshore lineaments proposed on previous published articles, N30E, N45E, N30W, and E-W directions, with strike variations. The NE-SW lineaments are the longest, typically exceeding 3 km in length, while the NW-SE lineaments tend to have shorter lengths in general. The interpretation of the lineaments from the basement structural contour map is still ongoing to analyze their influence on the pre-salt units.