Gravity Data Contribution for Petroleum Exploration - Northern Tunisian Atlas

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Abstract

The improvement of up to date exploration techniques has enhanced explorationists understanding and developed the effectiveness of exploration. Gravity is a successful process of choice to assist with this endeavor. Besides, the growing intricacy of the hydrocarbon targets is the driving power behind the judicious integration of seismic and non-seismic methods into the subsurface geological modeling process together with the availability of high quality numerical data, would enable explorationists to interpret all together seismic and non-seismic datasets. This paper reports the results using gravity data for hydrocarbon exploration in Northern Western Tunisia that allow the identification of structural elements that constitute important aspects in hydrocarbon trapping style.

The region of study pertains to the larger Atlassic domain of Tunisia A detailed high-resolution land gravity survey was carried out over the northern and central Tunisia, The comparison between Surface geology and Bouguer anomaly maps helps show that over Cretaceous outcrops, in general, gravity Bouguer anomaly response is positive. Tertiary series are associated to low Bouguer anomaly responses. The Quaternary series are associated to low, or even the lowest gravity responses. Low gravity response of synclines and troughs contrasts clearly with higher response of anticline structures. Homogenized Gravity data (Bouguer anomaly distribution with the processed data : upward continuations, residual anomalies, derivatives, Euler deconvolution) help recognizing four local positive anomalies which may be of interest on the field of petroleum exploration even if a prospect in oil industry is tied to a minimum of criteria. All around the area of study, the important positive anomalies are associated to J. Boudinar Srtucture, J. Maiza Structure, J. Rhazouane and Krib Region. Available seismic data integrated and subsequent subsurface geology interpretations aided by borehole data help classifying the computed anomalies based on size as well as definition and quality of petroleum systems throughout the region. The gravity information supports well the existing geological model and concepts; it indicates the possibility of prospective zones outside the area of currently available seismic data. These features merit further attention.