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Deep structure study of the salt body of Jbel Rheouis (central tunisia) from geological and gravity data

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Jbel Rheouis situated in south west of Sidi Bouzid, central Tunisia, is a complex structure located at a tectonic node between N-S, NE-SW and NW-SE corridors.

It was considered as a diapir containing the most complete series of The Upper Triassic formation in Central Tunisia.

The good quality of preserved fossils markers especially at the limestone levels made it possible for Burollet (1952) to propose a lithostratigraphic description of the Rheouis Formation.
This stratigraphy was clarified by Soussi and Abbes (2004) basing on new paleontological, palynological and outcrops detailed mapping data. Thus, they assigned the base of this outcrops series to Carnian and its top to Rhaetian.

Using these geological and lithostratigraphic data we suspects that the base of the Rheouis formation formed by black limestone can be correlated to the Rehach limestone in the South of Tunisia where this level is laying on a clayey sandstones level identified as the Lower Triassic outcrops.

In this concept, this study intend to investigate the Rheouis structure and to identify it's nature basing on the intra salt structures identification and the nature of the Lower Triassic sediments buried beneath the Black limestones, using a combination of geological, lithostratigraphic and geophysical (gravity) data.

The gravity data used in this work were obtained from the ONM with a mesh of 1Km /1Km. All the data were merged and reduced using the 1967 International gravity formula.
Free air and Bouguer gravity correction were made using sea level as a datum and 2.4 g/cm^3 as a reduction density.

The Bouguer anomaly map shows a variation in anomaly values range from -12.5 mGal to -4.5 mGal with a contrasted anomaly distribution. This map present 5 gravity maxima and 4 gravity minima where the major direction of those maxima and minima are N-S, NE-SW and NW-SE.
The presence of a relative positive anomaly concentrated J.Rheouis can be explained by a mass excess probably due to the uplift of the Paleozoic and Precambrian basement beneath J.Rheouis.

The choice of an appropriate Regional field was based on the combination of spectral analysis, polynomial regression and upward continuation techniques.

The obtained residual gravity anomaly field is globally similar to the Bouguer gravity field, however a detailed investigation of this map indicates that the gravity minima and maxima are more pronounced and the amplitudes are more indicative of the gravity anomalies caused by density variations within the study area.

The Residual anomaly map outlines 5 gravity maxima and 5 gravity minima which were better located using the vertical derivative method.
Magnitude of the horizontal derivatives, TDX and TILT maps outlines also the location of lineaments affected the study area which can be linked to the N-S and NE-SW corridors. Those Faults are damped in the edge of J.Rheouis .

Using these results we can produce a proposal presenting the extent of the Triassic outcrops at the depth along 24 Km^2.

Finally, combining the geological and geophysical data allowed as to establish a 2.5D gravity model basing on observed gravity data and a geological cross section. In this model we proposed a Lower Triassic body laying beneath the Rheouis formation with a density of 2.38 and an average thickness of 1300m.