



## **Gravity Investigations Of The Cyrenaica Platform And Adjacent Areas,**

### **Northeastern Libya**

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The Cyrenaica Platform, located in northeastern Libya, forms a promontory on the North African coast. It consists of two distinct tectonic provinces, the mobile Cyrenaican inverted basin to the north and the more stable Cyrenaican platform to the south. The present. This study represents a detailed investigation that aims to focus on the structure and regional tectonic setting of Cyrenaica and adjacent areas through a comprehensive quantitative and qualitative gravity analysis. Although this study is primarily gravity one, it incorporates other geophysical and geological information.

Over 67000 reduced gravity data points have been compiled to generate the Bouguer gravity anomaly map that represents the basic map used in the overall interpretations, as well as in generating more specialized gravity maps used in the detail gravity investigations. The gravity response of a 420 km, N-S geological profile, has been modeled to attain a fit between calculated and observed gravity. The depth information in the model was constrained by well data and the sedimentary densities were estimated from well log analysis. The Bouguer Gravity anomaly map clearly defines two distinct sets. First is a NW-SE trending faults that dominates the southwestern part of the area and is a representative of the Sirt Basin rift system. The second is a prominent E-W trending faults that dominates over the rest of the study area and defines the major structural elements of Cyrenaica platform.

Analysis of regional gravity anomalies provides a basis for modeling near-surface structures. In this study the various geophysical results were integrated with geological data to constrain a quantitative interpretation using a computer modeling routine. A change in the crustal thickness of about 2 km is well pronounced. In addition a series of steep faults that separates the unstable Al Jabal Al Akhdar from the more stable Ceyrinaica platform as well as other faults within the platform were well delineated.