2D and 3D modeling of the Kef basin, gravity analysis of the Kef area and surrounding regions, Northwest Tunisia.

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Abstract

The geology of the northern Atlas of Tunisia is characterized by NE-trending structures taking place as response to the NW compressive stress from Eocene to early Quaternary period. These structures were cutting by trough structures as evidenced by a series of grabens. These grabens were oriented orthogonally to the Atlasic deformation direction.

In order to characterize the subsurface structural makeup of this region and of the Kef basin in particular, we undertook a detailed gravity data analysis using publically available Bouguer gravity anomaly data and newly acquired 1 kilometer spaced data obtained by the National Office of Mines. The Bouguer gravity values show a gradual increase between almost -12 and 2 mGals within the Kef basin. The anomalies are represented by positive and negative responses separated by high gravity gradient interpreted as tectonic contacts shown in the derivatives gravity maps. The study area is dominated by two principal directions of faults NE-SW and NW-SE, the 2D modeling and the 3D inverse model indicate that the Kef basin contains at least 6-7 km of Cenozoic and Mesozoic sediments and this basin is bounded by set of faults oriented NE-SW, NW-SE and NS. A positive density region at 7.5 km situated northeast the basin is interpreted as NW-trending fault.

Key words: Gravity analysis, 2D and 3D modeling, Kef basin, northern Atlas foreland, Tunisia.