

New Contribution to IPC's Bouguer Map for the Gap Area of Mosul and Duhok Region/Northern Iraq

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The surveyed area covering about 8000 km² in the north of Iraq is divided into three regions (Zakho, Mosul-Duhok and Aqra regions) with elevations ranges between 250 to 1910m above sea level. The study area is located within low and high folded zones including a number of important anticlines (Kand, Dahkan, Alqush, Shaikhan, Duhok, Bekher, Atrush, Birifka, Chia Gara, Maten, Aqra, Piris and Perat mountains). A total of 868 gravity points were measured and corrected. A terrain correction grid was calculated using 30-meter Digital Elevation Model (DEM) using Oasis Montaj program with grids of 45 and 5m cell sizes for regional and local, respectively. Total terrain correction values are ranged from 0.00 to 82.28 mGals with an average of 33.03mGal. Those values were, then, added to the complete Bouguer Anomaly values. The Bouguer anomaly map for the study area was drawn with similar parameters which are previously applied to produce the IPC's map and tied with it. The present gravity map shows well correlation with the old results, and the regional trend with a gradual, uniform decrease towards the northeast is appeared. The isostatic residual map is indicated the presence of overcompensated regions near Chia Gara and Mateen anticlines and extends to Aqra region with negative value reaching to -20 mGal. By contrast, there are under compensation at the south regions with positive isostatic anomalies about 80 mGal. The compensation zero line in the study area is appeared around the bigger structures (Chia Gara, Mateen, Mangesh, Aqra, Piris and Perat). The Moho discontinuity depth was calculated from topographical and Bouguer anomaly grids for the study area using Oasis montaj software to acquire the crustal thickness map. Furthermore, upper mantle anomalies in the study area were determined by upward continuing of isostatic residual anomaly field to 45 km and then subtracted from previous isostatic residual anomaly (upward continued to 35 km). Gravity data were analyzed by several qualitative techniques for the isolation of the regional and residual anomalies. The optimum upward continuation level produced was 14 km that applied to obtain the residual and regional anomaly maps of the study area.