DRAFTING ACCURATE AND PRECISE MAPS OF THE DEFLECTION OF THE VERTICAL COMPONENTS FOR EGYPT BASED ON HETEROGENEOUS GRAVITY FILED DATA

By
Dr. SAADIA MAHMOUD EL FATAIRY
Lecturer of Surveying, Surveying Department, Shoubra Faculty of Engineering, Zagazig University

1- Abstract:
Modeling the deflection of the vertical components in certain area, have always vital role whenever precise geodetic computation is needed. Therefore the objective of the current thesis was to draw accurate and precise maps of the two components of the deflection of the vertical from the computed values of the same, by the least-squares collocation technique (LSC), at a grid of 5' x 5' over the whole territory of Egypt, based on all the old and the recent available heterogeneous geodetic data related to the gravity field in the considered area.

Before applying the computational technique i.e., (LSC) to the available data, which are referred to different datums, these data where reduced to one and the same datum, the reduction was done by using several groups of transformation parameters between the datum of a specific collection of data and the unified datum (WGS84). The reduced rough data were filtered and then subjected to a process of smoothness before the prediction step. The well-known remove-restore technique was used for achieving the maximum smoothness of the data, by the aid of an appropriate high degree global harmonic model, tailored to the local Egyptian terrestrial data. A digital terrain model of Egypt was also used for the same purpose. The final results have shown a rather accurate and precise maps of both predicted components of the deflection of the vertical over the entire territory of Egypt (22°N ≤ φ ≤ 32°N; 25°E ≤ λ ≤ 36°E)