



## **Optimum Gravity Interpolation Technique for Large Data Gaps: Case Study for Africa**

Hussein Abd-Elmotaal (1) and Norbert Kühtreiber (2)

(1) Minia University, Faculty of Engineering, Civil Engineering Department, Minia, Egypt (abdelmotaal@lycos.com), (2) Graz University of Technology, Institute of Geodesy, Graz, Austria (norbert.kuehtreiber@tugraz.at)

The gravity database for the IAG African Geoid Project contains significantly large data gaps. These large data gaps affect the interpolation precision of the reduced gravity anomalies needed for the determination of the gravimetric geoid for Africa. The aim of this paper is to develop an optimal interpolation technique that can be used for a proper gravity interpolation within large data gaps. A gap of 3x3 degrees has been artificially created within the gravity data set for Africa. The remaining data set has been used to interpolate the gravity values at the gap points; then a comparison between the interpolated and the data values has been carried-out to determine the accuracy of the used interpolation technique. The unequal weight least-squares prediction (with the optimum curvature parameter at the origin) with a tailored geopotential model for Africa, used to estimate an underlying grid at the gap area, has been proposed as the developed interpolation approach. For comparison purpose, the Kriging interpolation technique has also been tested. The window technique, suggested by Abd-Elmotaal and Kühtreiber (2003) to get rid of the double consideration of the topographic-isostatic masses within the data window in the framework of the remove-restore technique, has been used for the reduction process. A comparison between the data and interpolated values of the gravity at the gap points has been carried out. The results show that the developed interpolation technique gives better interpolation accuracy at the artificial data gap.