Density versus Gravity Observations

A Thesis
Submitted to the Faculty of Engineering
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In Civil Engineering

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(SURVEYING)

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DEDICATION

This thesis is dedicated to ***MY PARENTS*** who have given me this opportunity of education and supported me throughout my life, and their prayer for my success.

Also

It is dedicated to ***MY BROTHERS, SISTER, AND WIFE*** who have encouraged and helped me to complete this work.

Also

Special dedication for **MY DAUGHTER** God gave me from months

Statement

This dissertation is submitted to Ain Shams University, Faculty of Engineering for the degree of M. Sc. in Civil Engineering.

The work included in this thesis was carried out by the author in the department of Public Works, Faculty of Engineering, Ain Shams University, from 2009 to 2014.

No part of the thesis has been submitted for a degree or a qualification at any other University or Institution.

The candidate confirms that the work submitted is his own and that appropriate credit has been given where reference has been made to the work of others.

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Abstract

Gravity meters measure all effects that make up the Earth's gravity field and many of these effects are caused by known sources, such as the Earth's rotation, distance from the Earth's center, topographic relief, and tidal variation. Gravity caused by these sources can be calculated using realistic Earth models and removed from the measured data, leaving gravity anomalies caused by unknown sources, that reflects the effect of the irregular underground distribution of rocks having different densities.

Microgravity investigations are widely applied at present for solving various environmental, geological problems, and archaeology because it is a very useful method especially it's a non-destructive technique, At the same time, development of modern generation of field gravimetric equipment ***(Gravimeter)*** allows to register promptly and digitally microGal ***(10^{-8} m/s^2)*** anomalies that offer a new challenge in this direction.

The Micro-Gravity method can be a relatively easy geophysical technique to interpretation. It requires only simple but precise data processing. It can be used in detection of subsurface cavities, such as crypts, cellars and tunnels.

Although a large amount of antiques in Egypt which estimated over one-third the antiques of the world, the use of micro-gravimetry in archaeology is still a novel concept, which has not been completely explored over the past years.

The Great Pyramid, one of the Seven Wonders, it is until now messier controversial especially in its construction theory prediction and internal components like passages and rooms. And there is an important question is ***"Are there other rooms inside the Great Pyramid not discovered yet?"***

Comparison between real gravity observations by gravimeter on pyramid and theoretical gravity modeling for it, may be answering the previous question.

Key words

Gravity anomaly, Density, Gravity interpretation and forward modeling.

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