Accepted Manuscript

The integration of gravity, magnetic and seismic data in delineating the sedimentary basins of northern Sinai and deducing their structural controls

El Sayed Ibrahim Selim

PII: S1367-9120(15)30118-8
DOI: http://dx.doi.org/10.1016/j.jseaes.2015.10.012
Reference: JAES 2541

To appear in: *Journal of Asian Earth Sciences*

Received Date: 22 June 2015
Revised Date: 6 October 2015
Accepted Date: 20 October 2015

Please cite this article as: Selim, E.S.I., The integration of gravity, magnetic and seismic data in delineating the sedimentary basins of northern Sinai and deducing their structural controls, *Journal of Asian Earth Sciences* (2015), doi: http://dx.doi.org/10.1016/j.jseaes.2015.10.012

THE INTEGRATION OF GRAVITY, MAGNETIC AND SEISMIC DATA IN DELINEATING THE SEDIMENTARY BASINS OF NORTHERN SINAI AND DEDUCING THEIR STRUCTURAL CONTROLS

El Sayed Ibrahim Selim

Geology Department, Faculty of Science, Damietta University, Egypt.

E-mail: sselim@du.edu.eg & sayedselim2003@yahoo.com

Abstract: The Sinai Peninsula is a part of the Sinai sub-plate that located between the southeast Nubian-Arabian shield and the southeastern Mediterranean northward. The main objectives of this investigation are to deduce the main sedimentary basin and its subdivisions, identify the subsurface structural framework that affects the study area and determine the thickness of sedimentary cover of the basement surface. The total intensity magnetic map, Bouguer gravity map and seismic data were used to achieve the study aims. Structural interpretation of the gravity and magnetic data were done by applying advanced processing techniques. These techniques include; Reduce to the pole (RTP), Power spectrum, Tile derivative and Analytical Signal techniques were applied on gravity and magnetic data. Two dimensional gravity and magnetic modeling and interpretation of seismic sections were done to determine the thickness of sedimentary cover of the study area. The integration of our interpretation suggests that, the northern Sinai area consists of elongated troughs that contain many high structural trends. Four major structural trends have been identified, that, reflecting the influence of district regional tectonic movements. These trends are: 1) NE-SW trend; 2) NNW-SSE trend; 3) ENE-WSW trend and 4) WNW-ESE trend. There are also many minor trends, E-W, NW-SE and N-S structural trends. The main sedimentary basin of North Sinai is divided into four sub-basins; 1) Northern Maghara; 2) Northeastern Sinai; 3) Northwestern Sinai and 4) Central Sinai basin. The sedimentary cover ranges between 2 km and 7 km in the northern part of the study area.