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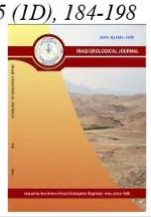

Lineaments Tracing of Magnetic Sources Depending on the Aeromagnetic Data: Case Study in Salman Basin and Surrounding Areas, Southern Desert of Iraq

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Abstract

This study deals with the processing and analysis of aeromagnetic data for an area covering the region of Salman Basin within AL- Muthanna, Iraq. The objective of this study is to use the available satellite images and aeromagnetic data to investigate the boundaries of geological structures. For further understanding of the tectonic of the study area, the Centre for Exploration Targeting Grid Analysis extension which is available in Oasis montaj software was applied to the data. It is proposed that it provides unbiased results, but to check the results Tilt Derivative or local phase derivative is used where the zero-contour line of the tilt derivative strongly delineates the edges of structures. Also, the drainage pattern for the basin is done using Geographic Information System and Digital Elevation Model raster to see if the drainage is affected by the subsurface lineaments that are determined using the Centre for Exploration Targeting technique. As a result, the deep main linear features follow the general trend of the main faults that formed the Salman Basin. The new lineaments were discovered using the Exploration Targeting grid analysis, zero contour of. There are two systems of lineaments in the present study area. The first set is taken the NW-NE direction perpendicular to the extensional structures, while the second set has the NS-EW direction.

Keywords: Aeromagnetic methods; Lineaments; Salman basin; Iraq

1. Introduction

The magnetic method is one of the most useful techniques for figuring out surface and subsurface geologic structures. The aeromagnetic analysis is used to help explain issues such as regional geological structure, illustration of rock boundaries and edges, location of possible areas of rock differentiation, and mineralization (Eldosouky et al., 2017). The magnetic susceptibility of sedimentary rocks is the lowest, while that of metamorphic and acidic molten rock's middle and essential volcanic rock, is the highest (Kearey et al., 2002). When magnetic anomalies are observed over sedimentary territory, they are frequently created by fundamental basement (volcanic and/or metamorphic) rocks or volcanic structures such as meddling plugs, dykes, sills, magma flows, and volcanic centers (Gunn, 1997). Lineament detection can help the mapping of geological structures (Yeomans et al., 2019). Lineaments are prolonged mappable straight or curvilinear highlights of a surface whose segments adjust in straight or about straight connections and maybe the expression of subsurface folds, breaks, or faults.

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