

Abstract



المملكة العربية السعودية
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دراسة الهيكل التركيبي تحت مدينة الرياض باستخدام معطيات الجاذبية
والمغناطيسية الجوية

An Investigation of the Structural Framework beneath Riyadh city
Using Gravity and Aeromagnetic Evidence

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قدمت هذه الرسالة استكمالاً لمتطلبات درجة الماجستير في

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Due to the lack of geophysical studies in Riyadh region based on gravity and aeromagnetic data, hence, this study is aimed to process 32081 readings for gravity collected by Aramco. These data were calibrated based on Argas geophysical survey as a reference network. Complete Bouger anomaly maps, Free-air anomaly, and residual isostatic intensity maps were produced. Four detailed gravity models for Riyadh E-W were achieved and indicated depths to the basement. In addition, wadi Nisah model showed that the thickness of surficial sediments reaches 200 m which is in good agreement with the drilled wells in the area. The model indicates also extension of some hidden faults.

Total magnetic Intensity Reduced to the Pole (RTP), horizontal and vertical derivative maps indicate some subsurface geological structures. In this study, a salt layer above the basement rocks directly extends from north to south was discovered. Moreover, some faults showed the contact between northern and southern Al-Rayn terrane, whereas other faults follow the trend of Najd fault system.

Results obtained from gravity and aeromagnetic indicate that faults caused Nissah trough are initiated in the basement rocks which lead to the lowering of sedimentary rocks which are believed to preserved Biyadh, Bwaib and Yamamah formations in Wadi from being eroded.