Microgravity Inversion for 3D subsurface density modeling of Al-Ain Region, Abu Dhabi, United Arab Emirates.

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A microgravity survey was initiated by the United Arab Emirates University in order to estimate the 3D geological structure under Al-Ain city, Emirate of Abu Dhabi, United Arab Emirates (UAE). The geology of the city is predominated by karstic Carbonate formations that led to several geohazards in the past, pushing local authorities to take this problem very seriously. In this perspective, over 450 microgravity measurements were carried out between May and June 2017, covering an area of 1000 km^2 around Al-Ain city.
The gravity measurements helped to delineate the subsurface density distribution beneath the city using a microgravity 3D density inversion scheme. The inversion results allowed mapping the substructure of mount Hafeet in the south and detect low-density materials at the center of the city near the surface. This low-density material correlates with the Eocene-Oligocene Asmari formation, known to be karstic and cavernous at the bedrock outcrop, suggesting the presence of near surface karstic systems.

Keywords: Microgravity survey , 3D density Inversion, Al-Ain, Geobody Modeling, Low-density in Carbonates

