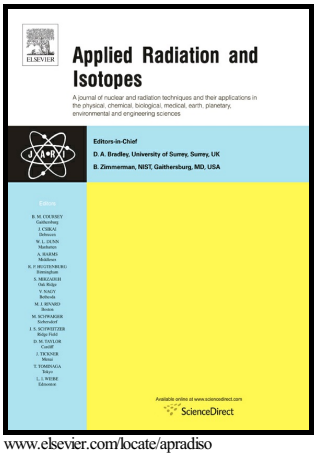

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ABSTRACT

An exploration method has been developed to understand the relation between the radiometric measurements and the subsurface petroleum accumulations, where subtle anomalous patterns of radiation flux are detected over subsurface hydrocarbon basins. This technique is mainly based on utilizing the aerial gamma-ray spectral data in the prospecting for petroleum in stratigraphic and structural traps. Al-Laqitah area, Central Eastern Desert, Egypt, was selected to apply this method on its recorded aerial gamma-ray spectrometric survey data. The method presented in this work may play a major role in making these measurements an effective contributor for finding oil and gas resources. Thorium normalization, as an exploration technique, was applied on the Foreland sedimentary cover of Al-Laqitah area to prospect the possible subsurface hydrocarbon accumulations. The DRAD arithmetic means, plus the three times standard deviations(X+3S) for the data set were computed. Any single DRAD value, within the boundary of rock units, greater than this quantity that possesses a probability of 99.87% represents a valid anomaly that is not caused by random variations in the background values. The application of these criteria has led to the identification of nine zones over the investigated area that are statistically valid. These might indicate a prospective possibility for feasible subsurface hydrocarbon accumulations and oil-bearing pay zones at Al-Laqitah area.

Keywords: DRAD, Gamma-ray and Hydrocarbon prospection.

1. INTRODUCTION

Al-Laqitah area is located at the central part of the Eastern Desert of Egypt, and enclosed between latitudes 25° 47' 50" and 25° 55' 00" N, and longitudes 33° 00' 00" and 33° 22' 50" E (Fig. 1). The topography of the area is not highly rugged and formed of a moderate hilly terrain that rises gradually in altitude eastwards. The geomorphology is closely connected with the geological structures and lithology of the rocks. The trends of most wadis are generally controlled by the structural elements and rock types (Nigm, et al., 2015).