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Fractal Theory Modeling for Interpreting Nuclear and Electrical Well Logging Data and Establishing Lithological Cross Section In Basaltic Environment (Case Study from Southern Syria)

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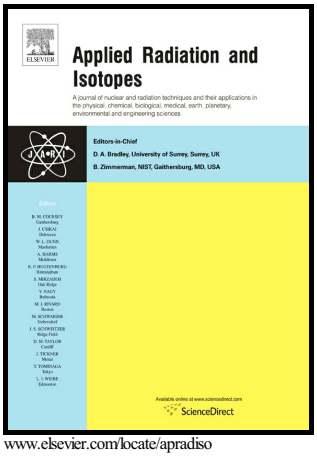

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Fractal Theory Modeling for Interpreting Nuclear and Electrical Well Logging Data and Establishing Lithological Cross Section In Basaltic Environment (Case Study from Southern Syria)

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Abstract

Fractal theory modeling technique is newly proposed in this research for interpreting the combination of nuclear well logging, including natural gamma ray, density and neutron-porosity, and the electrical well logging of long and short normal, for establishing the lithological cross section in basaltic environments. The logging data of Kodana well, localized in Southern Syria are used for testing and applying the proposed technique. The established cross section clearly shows the distribution and the identification of four kinds of basalt which are hard massive basalt, hard basalt, pyroclastic basalt and the alteration basalt products, clay. The concentration- Number (C-N) fractal modeling technique is successfully applied on the Kodana well logging data in southern Syria, and can be used efficiently when several wells with much well logging data with a high number of variables are required to be interpreted.

Key.words: Fractal modeling technique, Nuclear well logging, Electrical well logging, Basalt, Syria.

Introduction

Different well logging techniques have been developed and widely used for petroleum purposes (Schlumberger, 1991; Chang et al., 1997; Rogers et al., 1992; Baldwin et al., 1990) which benefit from the advanced computerized technologies. These advanced technologies have been rapidly extended for mining and lithological descriptions, where they have proven to be very valuable. Statistical techniques have been already proposed for lithological determination from geophysical borehole logs, such as principal component, discrimination function, factor analysis technique, and cluster analysis. Such developed methods are incorporated in computer programs for data interpretation (Borsaru et al., 2006; Asfahani, 2011; Asfahani and Abdul Ghani, 2012;

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