Geophysical Research Abstracts
Vol. 16, EGU2014-424, 2014
EGU General Assembly 2014

FRACTAL THEORY FOR PERMEABILITY PREDICTION, VENEZUELAN AND USA WELLS

Milagrosa Aldana, Dignorah Altamiranda, and Ana Cabrera
Simón Bolívar University, Venezuela, Bolivarian Republic Of (milaldana2002@yahoo.es)

Inferring petrophysical parameters such as permeability, porosity, water saturation, capillary pressure, etc, from the analysis of well logs or other available core data has always been of critical importance in the oil industry. Permeability in particular, which is considered to be a complex parameter, has been inferred using both empirical and theoretical techniques. The main goal of this work is to predict permeability values on different wells using Fractal Theory, based on a method proposed by Pape et al. (1999). This approach uses the relationship between permeability and the geometric form of the pore space of the rock. This method is based on the modified equation of Kozeny-Carman and a fractal pattern, which allows determining permeability as a function of the cementation exponent, porosity and the fractal dimension. Data from wells located in Venezuela and the United States of America are analyzed. Employing data of porosity and permeability obtained from core samples, and applying the Fractal Theory method, we calculated the prediction equations for each well. At the beginning, this was achieved by training with 50% of the data available for each well. Afterwards, these equations were tested inferring over 100% of the data to analyze possible trends in their distribution. This procedure gave excellent results in all the wells in spite of their geographic distance, generating permeability models with the potential to accurately predict permeability logs in the remaining parts of the well for which there are no core samples, using even porority logs. Additionally, empirical models were used to determine permeability and the results were compared with those obtained by applying the fractal method. The results indicated that, although there are empirical equations that give a proper adjustment, the prediction results obtained using fractal theory give a better fit to the core reference data.