Geophysical Research Abstracts,
Vol. 10, EGU2008-A-00856, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-00856
EGU General Assembly 2008

Estimation of porosity maps using seismic multiatributes and neural networks: A case study

R. Rodriguez (1), J. Urrutia (1).
(1) Institute of Geophysiscs UNAM, Mexico.

The study focus in the Ebano-Panuco basin of northeastern Mexico, which is being explored for hydrocarbon reservoirs. These reservoirs are in limestones and there is interest in determining porosity and permeability in the carbonate sequences. The porosity maps presented in this study are estimated from application of multiattribute and neural networks techniques, which combine geophysics logs and 3-D seismic data by means of statistical relationships.

The multiattribute analysis is a process to predict a volume of any underground petrophysical measurement from well-log and seismic data. The data consist of a series of target logs from wells which tie a 3-D seismic volume. The target logs are neutron porosity logs. From the 3-D seismic volume a series of sample attributes is calculated. The objective of this study is to derive a set of attributes and the target log values. The selected set is determined by a process of forward stepwise regression.

The analysis can be linear or nonlinear. In the linear mode the method consists of a series of weights derived by least-square minimization. In the nonlinear mode, a neural network is trained using the select attributes as inputs. In this case we used a probabilistic neural network PNN.

The method is applied to a real data set from PEMEX. For better reservoir characterization the porosity distribution was estimated using both techniques. The case shown a continues improvement in the prediction of the porosity from the multiattribute to the neural network analysis. The improvement is in the training and the validation, which are important indicators of the reliability of the results. The neural network showed an improvement in resolution over the multiattribute analysis. The final maps provide

more realistic results of the porosity distribution.