Integration of Seismic Attributes and Well Logs for Prediction of Reliable Porosity Cube: A Case Study

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Abstract

Introduction: Porosity prediction in space away from the well is essential to characterize reservoir effectively. Precise prediction of porosity is a challenging task because of the relationship with conventional seismic attributes. Based on the seismic data, different seismic volume attributes are calculated. The most correlative attributes for the prediction of porosity is sweetness based on the correlation coefficient investigation. Linear regression is generated and applied on seismic to have a porosity cube. **Methods, Procedures, Process:** Currently, there are numerous methods using seismic attribute transforms (Russel et al., 1997; Liu and Liu, 1998; Hampson et al., 2001; Leiphart and Hart, 2001; Walls et al., 2002). The authors adopted a method that combines seismic attribute and probabilistic Neural Network (PNN) to find a suitable relationship for predicting porosity. The flow of the approach undertaken is as follows: i) First, a relationship between porosity and seismic attributes has been derived using Neural Network. ii) Best attribute is selected, and linear regression is generated. iii) Linear regression is applied on seismic and wells to have porosity cube and predicted porosity log. iv) Cross-validation between original and predicted porosity log has been done **Results, Observations, Conclusions:** Best results are achieved by adopting suitable attribute extraction and matching them with petrophysical evaluation. There is a high correlation between sweetness attributes and porosity that has been identified through neural network. Predicated porosity is also cross validated with original porosity. It also depicts porosity saturation away from wells. **Novel/Additive Information:** The correlation of seismic attributes with porosity logs through neural network helps to select best attribute that have positive correlation with porosity log. It also aids in predicting porosity in space away from wells.