

Source Rock Logging Evaluation in Bengal Bay

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ABSTRACT

The Bengal Bay lies in the northwest of Myanmar, after years of oil and gas exploration, two gas fields Mya and Shwe have been discovered in the deepwater area, preliminarily confirmed that there was large oil and gas exploration potential in this area. Hydrocarbon source rocks controls the distribution of oil and gas, the evaluation for development scale and the quality is one of the most important problems in the oil and gas geological research. Core analysis is the most direct and accurate information for source rock evaluation, which can provide the accurate indicator data for types and abundance of hydrocarbon source rock. Because of the high cost of drilling in a deepwater area, there may be bias for source rock evaluation from limited core samples. It is bound to cover up the local high (or low) abundance of Source rock evaluation. Uncertainties exist for the understanding of layer development and degree of hydrocarbon source rock, so it is urgent to set up a fast and accurate evaluation method for hydrocarbon source rocks. Predecessors' research results show that the logging data have high vertical resolution and continuous accurate data, and because of the hydrocarbon source rocks having unique physical and chemical properties, thus there are obvious logging response characteristics. By using of sensitive well logging curves for hydrocarbon source rocks, the longitudinal continuous hydrocarbon source rocks of the index data can be obtained. After analyzing data calibration, the accuracy is higher. And it is economic and fast. According to the correlation analysis of data, five sensitive curves, namely, GR, DT, RHOB, NPHI and Res were adopted. By combining MRGC (Multi Resolution Graph -based Clustering) with KNN (K on his Neighbor), calculation model for TOC (Total Carbon Content) was set up. Through comparing the actual data with the model calculation results, it was verified that the model calculation result was good, which is better than the conventional multiple linear regression method and Δ LgR method. Based on the single well calculation, the model was extended to various drilling wells in the study area, and the multiple longitudinal continuous and high precision TOC data was acquired, providing the basis for efficient fast evaluation for hydrocarbon source rocks. Geological analysis shows that the calculation TOC accord well with geological understanding from sedimentary environment. Also it is in good consistency with the oil and gas discovery, so the source rock evaluation method is a reliable method which can provide direct evidence for oil and gas exploration.