

Palynofacies for Reservoir Evaluation: Methodology and Applications for Unconventional Plays

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9.29.2020 - 10.1.2020 - AAPG Annual Convention and Exhibition 2020, Online/Virtual

Abstract

Kerogen composition plays a key role in hydrocarbon generation and is therefore of great interest in subsurface analysis. The standard toolset for organic matter classification includes organic petrography, visual kerogen analysis and organic geochemistry. Palynofacies, however, while still underutilized in the hydrocarbon industry, also yields a great potential. Palynofacies is the analysis of the sedimentary organic matter in microscopic strew slides and was historically used for paleoenvironmental reconstruction (Tyson 1985 and Tyson 1993) and the detection of relative sea-level changes (Steffen & Gorin 1993). The same data can be utilized to analyze source rock potential by interpreting Liptinite-vitrinite-inertinite ratios (Dow 1982). In addition, Spore Color Index (SCI) and Thermal Alteration Index (TAI) can be used to estimate the maturity of sediments (Waples 1985). A standard palynological application can add age control. Palynofacies is linking sedimentology and biostratigraphy, while correlating well to organic petrography and organic geochemistry. The key to realizing its full value in geological problem-solving lies in integration with these data sets. Examples will be given to show the versatility of this method and its benefits to unconventional reservoir characterization.