Integration of Core and Seismic Data for 3D Depositional Environment and Reservoir Architecture Interpretation - Example from Offshore Vietnam

Dr. Erik Scott

Abstract

Determining the distribution and uncertainty of rock properties in a hydrocarbon reservoir is fundamental for building a robust 3D geological model for field development. Higher resolution 1D core information needs to be integrated with the lower resolution 3D seismic volumes with the appropriate appreciation of the scale, resolution and uncertainty of the data sets. Sub-centimeter scale resolution can be achieved from detailed core description with sedimentary structures, trace fossils, grain size distribution, bed thicknesses, bed boundary characteristics, and bed stacking patterns giving indications of sedimentary processes that can be combined to infer depositional environments in a 1D vertical arrangement. Utilizing analogs of modern day and ancient systems, models can be proposed for the 3D distribution of sedimentary body architecture and rock property distribution. These analog models serve as starting points that need to be modified to the local parameters developed from seismic data sets to build a field specific geological model. Understanding the resolution of the seismic data is necessary to determine what size and shape of the sedimentary bodies can be resolved to take the 1D depositional environments interpreted from core away from the well bore into 3D seismic space. The CRD field in the Nam Con Son Basin, offshore Vietnam serves as an example of this integration of core and seismic data sets for understanding reservoir distribution.

Erik Scott is the Principle Geologist for E&P Geoscience, LLC and an Adjunct Professor at Rice University in Houston, Texas. He works on a wide variety of projects in both energy exploration and production. Over his career, he has engaged in sedimentological studies of numerous areas that include the Gulf of Mexico, Alaska, North Sea, offshore West Africa, Southeast Asia, South America, onshore North America and the eastern Mediterranean. He received a Ph.D. in geology from Louisiana State University, studying under Dr. Arnold H. Bouma, with whom he investigated the influence of tectonics and structure on deep water sedimentation based on the turbidite outcrops in the Karoo Basin of South Africa.