Interpretation of Hydrocarbon Migration Pathways Using Latest Developments in Machine Learning—Green Canyon, Gulf of Mexico

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ABSTRACT

The Genesis oilfield is located in Green Canyon, Gulf of Mexico, in the flex trend along the current day GOM (Gulf of Mexico) upper slope. Production is currently taking place in the Pleistocene Neb3 amalgamated channel complex, flanked by a salt diapir. We reinvestigate hydrocarbon charge and seal effectiveness using the latest machine learning (ML) algorithms. Hydrocarbon migration pathways traditionally show up on seismic data as vertically continuous noise trails, with associated pockmark morphology and AVO anomalies amongst others. Previously, the tried and tested method for detecting hydrocarbon migration pathways was to train a supervised neural network. This method falls in the category of shallow neural networks with one hidden layer. The new method examines effectiveness of applying several hidden layers, in a so called deep network. Previously, data quality and poor imaging presented challenges with trying to validate true hydrocarbon migration pathways versus noise. The new method aims at eliminating these false positives.