

Data Synthesis For The Carson Basin, Offshore Newfoundland: Results Of 4-D Petroleum System Modelling

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ABSTRACT

Carson Basin, a lesser-known basin on the eastern edge of Grand Banks of Newfoundland, was subject of a three-year study at the Geological Survey of Canada Atlantic. Four wells along its westernmost edge penetrated a section from Triassic to Neogene in age. The wells demonstrate that the basin contains a thick Cenozoic and Mesozoic sedimentary section in a shelf-slope setting. In most of the basin, a major unconformity, the Avalon Unconformity, separates Cenomanian and younger rocks from Triassic to Aptian strata. Reservoir rocks, sealing shales and likely source rocks are present both above and below the Avalon Unconformity. Structural traps were formed by rifting events and by salt movements, stratigraphic traps are present as for example zero depositional edges. Hydrocarbon shows were not found within the wells.

As the best way to integrate new and existing information, we built a petroleum system computer model of Carson Basin based on, and constrained by, biostratigraphy, geophysical data, geology and geochemistry. This model was run through the simulator of the program Petromod8 (IES, Germany) resulting in a coherent history of the basin and its petroleum generation in four dimensions. The simulation is based on geothermal gradient for source rock burial, the Arrhenius equation for hydrocarbon generation and Darcy's Law for migration. Hydrocarbon was generated in significant amounts, as shown by the simulation, even without taking rifting heat flow into account, and accumulated mainly in stratigraphic traps.