

Development and Application of Geographic Information System for Cuban North Western Play.

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Abstract

This paper describes the use of Geographic Information System (GIS) technology as a tool for oil and gas exploration. The main benefit of the technology is to be able to perform complex and sophisticated searches of large and diverse data sets to highlight exploration play targets.

This technology involves the integration of mapping and data base functions (geology, geophysics, geochemistry, and geomorphology) so a geologist can combine complex geographic and data sets into overlay and composite maps.

The play is a useful analytical idea that allows the analysis to be sensitive to the physical processes involved in the entrapment of oil and gas and in the discovery of oil and gas accumulations.

The study area is located in the northern Havana and northwest Matanzas provinces about 1900 km². The area is characterized by an alpine tectonic style with intense overthrusting (involving sections from the Upper Jurassic to Middle Eocene). Overthrusting events had a decisive influence on hydrocarbon maturation, generation and migration and also the formation of reservoir, traps and seals.

The main reservoir rocks related to the discovered oilfields in the continental margin are referred to the Placetas and Camajuaní tectonostratigraphic unit (fractured carbonates of Upper Jurassic – Cretaceous age). Further reservoir rocks are also present in the Zaza Terrane in fractured ophiolites (mainly gabbros and serpentinites) and volcanic rocks (basalts).

Numerical probabilistic methods coupled with Monte Carlo simulations, exploratory data analysis and mathematical simulation is applied as pattern recognition with logic – combinatory method and image processing (SPOT) with computer mapping and data analysis.

These applications provide the tool needed to define new strategies and technologies for conducting and automating the complex task common to exploration play analysis.