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Tectonics and Petroleum Systems of the Southern Gulf of Mexico (North Cuba)

A recent seismic survey from Northern Cuba-South Eastern Gulf of Mexico, combined with geological and geochemical data from Cuba, reveals the structural evolution and the petroleum potential of this region since the Jurassic.

A rifting phase during the Lower-Middle Jurassic (up to the Callovian) was associated with the opening of the Gulf of Mexico and the Proto Caribbean. Carbonates and evaporites were then deposited throughout the northern margin of the proto Caribbean, while the synrift system continued in the Yucatan-Florida Strait up to the late Berriasian. Carbonates developed in this domain during the whole Cretaceous subsidence episode.

The Cuban fold and thrust belt and the adjacent foreland basin formed during the Maestrichian-Early Tertiary, when the Great Caribbean Arc obliquely collided with the Florida paleo-margin. The climax of orogeny during the Middle Eocene created the present Cuba fold and thrust belt. Reactivation of former normal faults probably induced by the flexure is observed in the foreland domain.

The most likely level of detachment in the Cuban thrust sheets is the Callovian-Oxfordian salt and evaporitic unit, the oldest formation involved. After the main tectonic event, the convergence between the North American and the Caribbean plates shifted towards the Eastern Caribbean along the Caribbean Arc. However, some faults and structures as well as Mesozoic Carbonate banks were reactivated by compression during the Neogene.

The synrift and post rift petroleum systems and especially the reservoir facies distribution and potential traps are discussed in the light of this structural evolution.