

San Luis and Churuguara Carbonates (Onshore Venezuela): Analogs of the Offshore Perla Field?

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Abstract

Two Oligo-Miocene outcrops from the northern (San Luis) and southern (Churuguara) Falcón Basin are evaluated as potential analogs of the adjacent Perla Field of the Gulf of Venezuela. The northern flank is characterized by a prograding (few km) delta system interfingering with Lower Miocene carbonate deposits. Six transgressive-regressive sequences of third order, bounded by maximum regressive surfaces were recognized. These sequences were deposited during a major transgressive episode. Transgressive strata are characterized by meter-thick stratified branching coral-bearing beds within a micritic rich matrix, passing basinwards to centimeter to meter-thick packstone to rudstone textures dominated by coralline algae and larger foraminifera. Thus, the skeletal components underwent important transport and reworking. On the other hand, regressive deposits are constituted by prograding siliciclastics interbedded with seagrass-related carbonates passing basinwards to sparse, isolated coral mounds, which developed on a foredelta environment. It is noteworthy that siliciclastic inputs did not inhibit coral development. In the northern margin, the subsidence was controlled by planar normal faults without block-rotation. The southern flank (Churuguara) is represented by an Oligocene-Lower Miocene alternation of siliciclastic marine deposits integrated by black shales, turbidite sandstones and occasionally, glauconitic sandstones; with isolated carbonate banks dominated by reworked larger foraminifera and coralline algae. In Churuguara, the subsidence was controlled by a listric normal fault with block rotation, with sedimentary bodies dipping towards the fault. The Perla field is the most important gas reservoir in the offshore of Venezuela. It is constituted by a carbonate ramp dominated by rhodolithic coralline algae and larger foraminifera, where corals are a minor component and siliciclastics are very thin and mixed with carbonates. Therefore, the San Luis outcrop is not an appropriate depositional model for the overall Perla Field succession. In contrast, Churuguara outcrop has more large foraminifera rudstones and rhodoliths without proximal coral mounds and may be a partial analog of the non-reservoir distal ramps of Perla. However, both outcrop sections cannot be considered as adequate analogs of the Perla carbonate reservoir.