Distribution of Depositional Facies and Reservoir Properties from Middle Cretaceous Carbonates of the Cordoba Platform, Veracruz, Mexico

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The Albian-Cenomanian Orizaba Formation is an oil and gas-producing unit within the Cordoba Platform of the Veracruz Basin, Mexico. Hydrocarbons are produced on the eastern side of the Cordoba platform from fractured carbonates located within NW-SE Laramide structures with forelimbs that dip toward thrust faults at Miralejos, Copite, Mata Pionche, and Mecayucan fields.

Three conceptual models explain the variations in depositional environments. Broad dolomitized peritidal/shallow lagoon environments characterize the lower part of the Orizaba. To the west, sabkha evaporites are separated from marine limestones by a barrier of rudist reefs. Skeletal banks and small rudist patch reefs are also concentrated along the eastern margin on the platform.

Skeletal banks and ooid shoals developed adjacent to steep shelf margins in the middle of the formation. Turbidites and debris flows with mixed shallow and deep-water faunas were characteristic of the slope setting and comprise a characteristic facies that is common at Copite and Miralejos fields.

The upper part of the formation was characterized by abundant rudist reef growth that decreased to the north where it was gradually replaced by skeletal banks. Deeper-water facies increase in thickness at the top of the formation as one proceeds northward. This change reflects a carbonate slope that steepened to the north.

Geostatistical parameters were used to populate integrated petrophysical and facies models at Mecayucan Field. The resultant static reservoir model successfully predicts the presence of water within porous skeletal banks, which are located between gas and oil production throughout the field.