
Upper Jurassic Carbonate Ramp, Northern Mexico: Oolite and Lagoonal Limestone Analogues for Oil Reservoirs from Southeastern Mexico

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ABSTRACT

Upper Jurassic carbonates, evaporates, and sandstones are exposed in the Sierra Madre Oriental (SMO) revealing stratigraphic sections that vary from 440 to 650 meters thickness. This facies are overlain in several localities by shales and shaly-limestones with Kimmeridgian fauna of ammonites and are underlain by middle to early Jurassic or older continental clastics red beds and volcanic rocks. Northern SMO carbonates and evaporites are underlain by a thick package of middle Jurassic salt.

Depositional shelf parasequences are represented by: (1) tidal flat facies dominated shallowing-upward parasequences, varying from burrowed lagoonal limestones, algal mats, and laminar and nodular evaporites, calcareous breccias, and red shale beds; (2) lagoonal facies-dominated parasequences consisting mainly of pelloidal and algae burrowed packstone to mudstone with minor cryptoalgal limestones; and (3) high energy, sand shoal parasequences composed of ooid-pellet-bioclastic packstone and grainstone. Dolomitization varies from pervasive to scattered dolomite crystals but there is an uneven control from limestone facies.

Quartz sandstone, oolitic and algal sandy limestone, and minor shale and siltstone are interfingering with shelf carbonates.

Facies belt locations of carbonates, evaporites, sandstones, and salt are shown in non-palinspastic lithofacies maps interpreted from exposed stratigraphic sections at the SMO fold belt.

Upper Jurassic ramp limestone plays have yielded great volumes of hydrocarbons from surrounding Gulf of Mexico basins—these are similar facies of the exceptional Jurassic rocks outcrop analogues at the SMO.