Sedimentological Study of Kimmeridgian (Upper Jurassic) Oolites in the Southern Basins, Mexico

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ABSTRACT

This study shows a detailed sedimentological analysis of the Kimmeridgian oolitic carbonate bodies in the Southern Basins, Mexico. The data used include wells along with regional sections complemented by wireline logs and core sample data. Reservoir facies correspond to dolomitized oolite packstone and grainstone with significant dissolution and intercrystalline porosity. These sediments are interpreted as carbonate sand shoals deposited in an inner ramp setting. Offshore shoal bodies are 15 km long, 6–8 km wide, and up to 370 m thick at the top of paleohighs generated by salt diapirs. In the marine region, the Kimmeridgian rocks have been divided into four informal lithostratigraphic units. Unit 1 at the base is predominantly terrigenous, units 2 and 3 are mixed terrigenous-carbonate, and unit 4 at the top is predominantly carbonate. The oolitic packstone and grainstone appear in unit 2, but are predominant in unit 4. Onshore wells only have penetrated unit 4 with the same facies and skeletal grains. Diagenetic processes identified in this study are compaction, early cementation, dolomitization, dissolution, late cementation, fracturing, and hydrocarbon migration. The most important processes for the development of porosity are dolomitization and dissolution. Diagenetic processes that caused the destruction of porosity are mechanical compaction and cementation. Porosity types identified are moldic, intercrystalline, interparticle, fracture, and stylolite. Onshore and offshore hydrocarbons are housed primarily in the intercrystalline porosity in dolomitized oomoldic rocks and to a lesser extent in the interparticle porosity, fractures, and stylolites.

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