

An Overview of Seals in Petroleum Systems of Central and Eastern Saudi Arabia

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Abstract

Seals are rocks in which the capillary entry pressure is sufficiently elevated to preclude further hydrocarbon migration and potentially form traps. Seal failure mechanisms include the effects of erosion, fracturing and hydrodynamics.

The Phanerozoic sequence of Central and Eastern Saudi Arabia includes three petroleum systems; the Paleozoic, Jilh, and Mesozoic-Cenozoic. These systems are separated from each other by two mega seals; the Triassic Sudair shale, and Jilh dolomite units. The three petroleum systems of Eastern Saudi Arabia include more than forty reservoirs each with its own top seal. The seals are mainly shale and siltstone in the Paleozoic and anhydrite and shale in the Mesozoic and Cenozoic sequences. Some faults are found to form efficient lateral seals for oil and gas traps mainly in the Paleozoic system. Additional seals that have potential to exist in Central and East Arabian petroleum systems include deformation bands, and hydrodynamically-aided stratigraphic and fault rocks.