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Petroleum Geology of the Oil and Gas Commercial Discoveries in Spanish Basins: Mediterranean sea

Over a hundred wells have been drilled in the Gulf of Valencia basin since initial commercial discovery in 1970 (Amposta field), resulting in 18 oil discoveries and 8 commercial developments with an URR of 255 MMBO. Previous exploration concepts emphasized Jurassic-Cretaceous carbonate reservoirs with karst-related porosity and paleo-high type traps (buried hills) generated by karstification at the angular unconformity between the heterogeneous substratum and the Miocene.

This paper aims to show a different interpretation of the petroleum geology, arisen from a careful review of the ample database: (i) Burdigalian-Langhian oil-prone source rock, mature in limited areas and expelling during Plio-Pleistocene times. This late expulsion is critical for understanding reservoir properties development and entrapment model. (ii) Traps controlled by extensive faults active during the Mio-Pliocene. These tilted blocks contain, at small scale (meter size), the rugosity inherent to the erosional unconformity and the subaereal karstification mentioned above. (iii) Current data indicate major obliteration of the early karst porosity by meteoric and burial carbonate cements. Present-day porosity is mostly related to late burial dolomitization and corrosion, controlled by faults, fractures and possible minor remnants of the early karstic porosity. This late reservoir development took place during the Pliocene migration time and also affected Miocene clastic deposits and organic buildups onlapping the top reservoir unconformity.