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

The Gulf of Vizcaya area is a North Pyrenean foreland basin developed between the westward prolongations of two main structural domains: the Landes Plateau and the Vizcaya fold and thrust belt. Eight exploratory wells have been drilled since 1980, when the Gaviota gas field was discovered, resulting in three commercial fields with a URR around 340 BCF and 12 MMBC.

The petroleum geology of this gas-condensate province can be summarized as follows: (i)Source rock: Carboniferous bituminous coals with a maturity level ranging from 0.6 to 0.9 Ro (%) values. (ii)Reservoir: Cenomanian, Turonian and Campanian limestones deposited in an outer ramp with oolitic and skeletal shoals, chinks, apron calcarenites and minor tidal flats and lagoonal facies. The reservoir has two major porosity types: intergranular, enhanced by late corrosion (in shoals and apron facies) and vuggy, also corroded in a late stage. The latter is common to all facies. Late microfractures and associated vugs enhance reservoir permeability. (iii) Seal: Late Campanian-Paleocene pelagic marls and marly limestones. (iv)Traps: Fault-propagation folds of the Early Eocene compressional phase. This productive traps are located below a very complex tectonic unit, in some cases overturned, that includes Triassic salt and flysch facies of the Cretaceous and Paleogene southern trough. (v)Migration pathway: Vertical, by fractures, and short-distance horizontal, by the basal cretaceous unconformity.

The high success ratio of the basin demonstrates the efficiency of the gas system and promises new exploration activity through 3D seismic resolution improvement.