

4-D Modeling of the Jurassic-Cretaceous Petroleum System of the Southeastern Basins, Mexico

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The study described in this paper was performed with 4-D numerical modeling of elements and processes of Jurassic-Cretaceous Petroleum System of Chiapas-Tabasco Area, combining geometrics, stratigraphic, structural and thermal evolution, maturation of source rocks, multi-phase fluids flow of hydrocarbons and mass balance, from sources to reservoirs.

Acquisition of the kinetic parameters to simulate numerically the genesis of hydrocarbons required, on one hand, the geochemistry characterization of the Tithonian generation subsystem of the Southeast of Mexico and for other, a series of experimental simulations of laboratory of the formation of hydrocarbons with samples of immature kerogen. The numeric modeling of oil systems it approached the geometric, petrophysics, thermal and geochemistry aspects. The geometry control, lithofacies distribution and petrophysics properties, isopaches and paleobathymetries of each stratigraphic horizon, from the Jurassic to the Pleistoceno, it allowed the reconstruction of the past geometries by means of the calculation of the history of the subsidency.

The calculations of the primary and secondary cracking allowed to build maps of prolificity of the source rock, in function of the expelled volumes. The structural analysis of the top of the Middle Cretaceous reservoir, led to the delimitation of drain areas and vectors of address vectors flow. The pattern of fluids flow, in the time and in the space, it allowed finally to reconstruct the masses balance of hydrocarbons relating the generated volumes and expelled by the source rock, the migrates volumes and finally the accumulate volumes in each regional structure represented by the drainage areas.
