3D FACIES AND SW MODELLING OF THE TOP CRETACEOUS UNITS IN LA YUCA FIELD – (COLOMBIA)

Final Master Project

Master of Reservoir Geology and Geophysics

Student: Álvaro Solano Díaz

Tutors: Dra. Patricia Cabello – Universitat de Barcelona

Msc. Manfredo Kleber – Occidental de Colombia

Abstract

A 3D facies and petrophysical model is presented in this study to detect interest areas for future development. The study was carried out for the K1A reservoir in La Yuca area, which is part of the mature Caño Limón - La Yuca field. The project integrates log data, core data and previous studies that allowed the characterization of the depositional environments within the K1A reservoir. The resulted stochastic three-dimensional geocellular facies model distinguished four main lithofacies associated to a fluvio-dominated deltaic system and honours the hard data as well as the facies proportions obtained in the statistical analysis. The facies model was also the base to model the porosity and permeability distribution. A water saturation model of the reservoir was subsequently generated using the Leverett J function equation together with porosity and permeability models, and was finally used to calculate the hydrocarbon pore volume property that is a product of the area, thickness, porosity and oil saturation. The three-dimensional models obtained were integrated with production data to delineate drainage areas and to identify a portfolio of 12 opportunities for further evaluation. All opportunities are located in the southernmost part of the field were few producer wells have been placed and some of the channels – mouth bars and splays deposits hasn't been swept properly.