How Palynology Contributes on Hydrocarbon Exploration: A Case of Study from Colombia, South America

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Oil exploration in Colombia is now focused on transitional to shallow marine Cretaceous sequences from the Upper Magdalena Valley Basin (UMVB), Colombia. Regionally, the complex architecture of these strata, usually due to structural and sedimentological constraints, hinders seismic modeling, and is the cause of the high exploratory risk in the basin. A type-example of such complexity is Guando field, where reservoir correlation has been a challenging task. In order to solve this problem, is necessary to have a thorough characterization of the different rock units in the area for correlation purposes. Consequently, a detailed palynostratigraphic and palynofacial analysis has been conducted. In preliminary results, 28 core samples from the sequence traversed by the Guando 73 well (UMVB) have been analyzed. Four biozones were recognized and an Upper Campanian - Maastrichtian age was assigned to the studied interval, based on the palynological zonation for the basin. In addition, four palynofacies zones were identified revealing an overall shallowing trend (from base to top): Palynofacies D (dominated by amorphous organic matter and dinoflagellate cysts), Palynofacies C (dominated by fitoclasts and a mixture of continental and marine palynomorphs), Palynofacies B (dominated by amorphous organic matter, black debris and continental palynomorphs) and Palynofacies A (dominated by black debris). Interestingly, the zonal boundaries between both biozones and palynofacies zones do not overlap; generating a higher stratigraphic resolution than the traditionally palynological zonation utilized for the area, which is based merely on palynomorphs. The results of this study will constitute an additional correlation tool for Guando field as well as a useful paleoenvironmental and age-constraning proxy for the sequences within the basin.