

# Late Pleistocene to Recent Sand Distribution and Composition in the Magdalena Fan, Offshore Colombia

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## Abstract

This study characterizes Late Pleistocene to Recent sand distribution and composition from across the Caribbean margin offshore Colombia. The sediment composition variations, coupled with the understanding of the turbidity current flow patterns and sand dispersal in the Magdalena fan, provides insights into potential reservoir composition and provenance across the Colombian margin. Piston cores, sea floor bathymetry and regional geology were used to evaluate the provenance areas coupled with the Magdalena fan evolution from the Late Pleistocene to Recent. Forty-six representative samples were selected from turbidite sandy intervals in twenty-one piston cores from across the margin, covering the Sinu fold belt province to the SE, the Magdalena Fan in the central margin and the Guajira fold belt area to the NE. The samples were characterized via thin section analysis using a standard polarized microscope, laser particle analysis and the results were integrated with bathymetric and side-scan sonar data, regional geologic maps and records of submarine cable breaks identifying recent turbidity current events. Textural characterization of the sands from the piston cores show the mean grain size range from silt to fine sand and are generally subangular to subrounded in shape. Sand composition indicate that these sands are feldspathic litharenite to litharenite in nature. Quartz, feldspar and lithic fragments are main constituents of the framework components. Bioclasts and accessory minerals constitute variable proportions of the framework components. Pyrite is sparsely distributed and present as grain replacement and/or pore-filling phases in some cases. Carbonate cement has been observed in one sample. Based on this study five different depositional areas have been identified in the offshore Caribbean Basin as Sinu Basin and associated deposits,

Pleistocene Magdalena Fan, Holocene Magdalena Fan, Holocene Aguja Canyon and associated deposits, and Guajira Peninsula and associated deposits. Cuttings from the nearshore wells from Colombia were studied and used for comparison with the piston core samples. Both the cutting samples and the piston core samples plot in the same region in the QFR diagram. Similar rock fragments have been identified in both set of samples; however, the nearshore wells are dominantly coarse to very-coarse grained compared to the piston core samples.