



Carbonate Facies within Siliciclastic Submarine Fan Deposits, Lower Cenozoic Toledo Formation, Southern Belize: Petrography and Provenance

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ABSTRACT

The Toledo formation in the Belize Basin of southern Belize is an informal Lower Cenozoic (Paleogene) stratigraphic unit, which consists of conglomerate, sandstone, interbedded sandstone and mudstone, and detrital limestone. The Toledo was deposited in a submarine-fan system and is presently well-exposed in southern Belize, particularly along and near the Southern and Mile 14 highways. The present study was undertaken to examine the depositional processes and environments of constituent carbonate facies within this clastic submarine fan system, and to better understand the provenance and tectonic setting of the sandstones. Petrographic analysis of the carbonates reveals that the skeletal grains represent an Early Cenozoic open-marine assemblage of crinoids and echinoids that is combined with a restricted marine assemblage of gastropods, foraminifera, and algae. Non-skeletal grains vary widely in abundance between carbonate beds, and generally consist of ooids, peloids, and terrigenous grains. The carbonate facies are interpreted to be slope deposits. Lithic analysis of the coeval Toledo sandstones indicates an average composition of 34% quartz, 2% feldspar, and 64% lithic fragments; thus all samples are classified as lithic arenites. These lithic fragments include limestone clasts, and a variety of igneous rock fragments. Diagenesis of both carbonates and sandstones includes initial cementation (and thus reduction of existing pore spaces), followed by compaction and silicification. Ternary plots of framework mineralogy indicate derivation from a recycled orogen, which may be related to the Early Cenozoic collision of the North America and Caribbean tectonic plates.

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