

# Reservoir Porosity and Stratigraphy of Eocene-Miocene Successions, North-Central, Jamaica: Onshore Analogues for Petroleum Systems on the Eastern Nicaraguan Rise\*

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## Abstract

Petrophysical analysis of Eocene-Miocene carbonates across the North Coast Belt of Jamaica has been supplemented by new detailed geological mapping and petrographic descriptions of samples collected ([Figure 1](#)). A revised understanding on the sequence stratigraphy of the White Limestone Group of Jamaica has intensified our interest in identifying onshore analogues for potential hydrocarbon systems offshore southern Jamaica. Focus has been placed on the Eocene-Miocene successions as these carbonate facies exhibit distinct lithological and sedimentary character changes moving from the central Clarendon Block towards the northern coastline of the island (See map). Eight formations within the White Limestone Group have been identified here with multiple facies being recognized including grainstones, packstones, wackestones, mudstones, chalks with chert and coral boundstones. Depositional environments reflect a transition from platform carbonates, shelf edge, open-shelf to lower-shelf. These facies changes reflect an active tectonic history and complex carbonate ramp development across north-south transects. The presence of lepidocyclinid assemblages and several miliolid species define an Eocene-Miocene age and a Eulepidina undosa rich assemblage within the grainstones indicates an Oligocene age. Thick beds of grainstone units across the platform margin provide an excellent reservoir analogue as these facies preserve good inter-granular and intra-granular porosities. Petrophysical analysis of grainstones and packstones reveal good secondary porosity (~15-35%) with thick marlstones and coastal limestones providing a tight top seal. With an Eocene source rock identified, a potential candidate for Eocene-Miocene reservoirs are the foraminiferal grainstones that accumulated on the platform margin and later transported into the basin during lowstands and highstands. This work contributes to ongoing hydrocarbon exploration initiatives in Jamaica and provides an onshore analogue for the Walton Basin on the Eastern Nicaragua Rise.

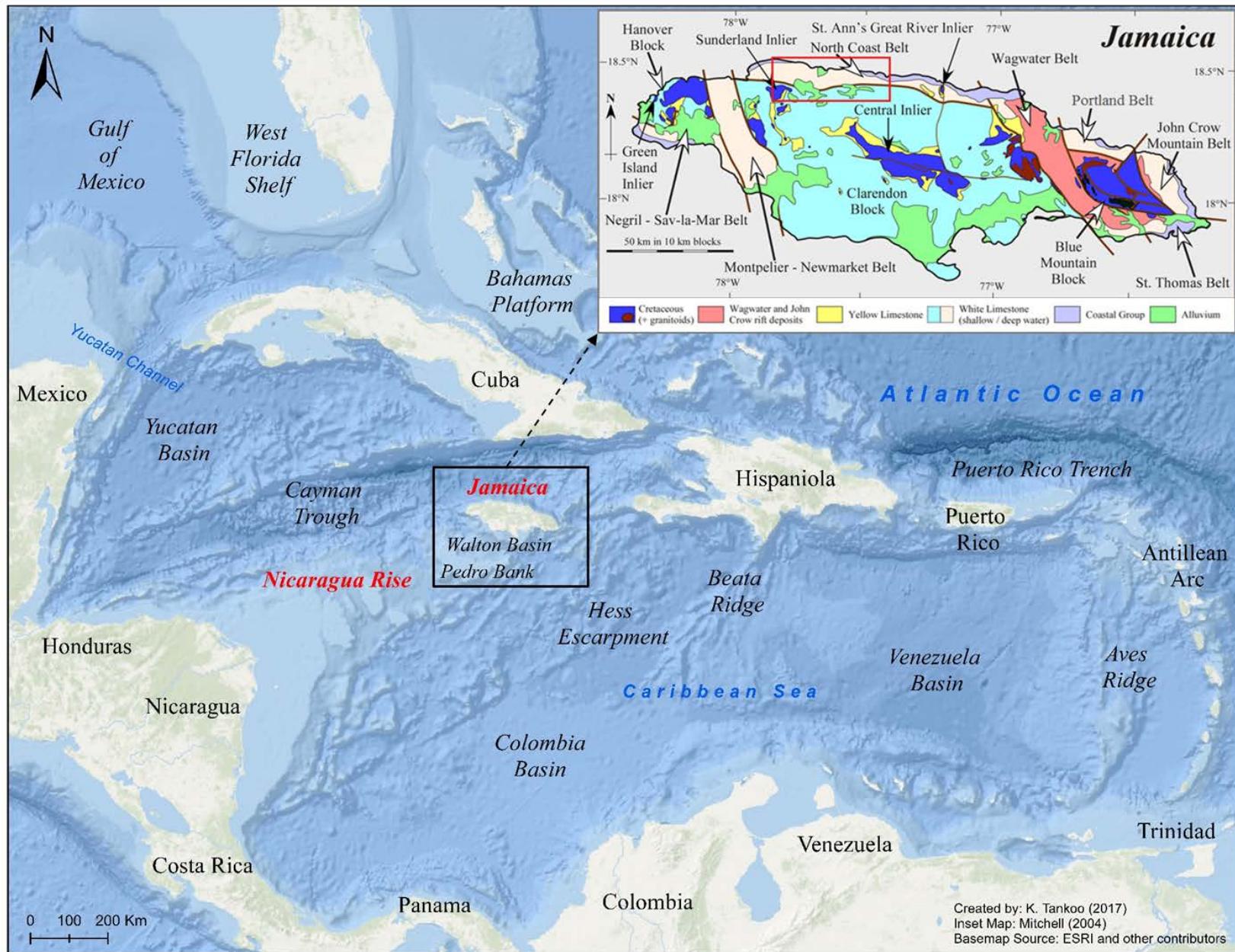


Figure 1. Map of Caribbean region showing location of Jamaica and the Nicaragua Rise; inset map shows geology of Jamaica with study area highlighted in the red box.