

### **The Mona Reef Complex Revisited: Influence of Tectonics on Carbonate Facies Distribution and Reef Evolution**

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Isla de Mona (12 x 5 km) and Isla Monito (0.75 x 0.50 km) are raised (20 to 80 m ASL) carbonate platforms outcropping between Puerto Rico and Dominican Republic (70 km W of PR). Isla de Mona and Isla Monito lie on up-thrown structural blocks on the Mona Platform and are separated by a shallow graben. Vertical cliffs on most of the periphery of the islands are receded fault escarpments.

Two lithostratigraphic units, the Isla de Mona Dolomite and the Lirio Limestone are exposed on the islands. The Miocene to Pliocene Mona Reef Complex, portions of which outcrop on these two islands, was defined as a south facing barrier reef, based on limited fieldwork along the southern and western cliffs of Isla de Mona. The reef core, which outcrops on the cliffs of Isla de Mona, was inferred to extend continuously from south to west through the southwestern portions of the platform. Lagoon deposits comprise the bulk of the platform while fore reef deposits are visible on the western cliffs and distal fore reef facies are present along the southwestern cliffs. The geology of Isla Monito had been inferred solely from remote observations. Recent fieldwork on Isla de Mona and Isla Monito significantly increased field coverage and improved our understanding of the reef complex.

Recent fieldwork revealed: 1) reef core facies remnants on the northern side of Isla de Mona; 2) no reef core facies along the southwestern platform; and 3) presence of fore reef facies on Isla Monito. Observations indicate that on the western side of Isla de Mona the reef is prograding to the southwest while on the southeastern and eastern sides of the island the reef is clearly backstepping to the north or northeast.

New data suggests that the Mona Reef Complex was a north facing "horseshoe" shaped reef open to the southwest. Differences in reef core migration indicate a tectonically active platform during the development of the Mona Reef Complex and suggest synsedimentary differential motion of the platform during reef development. Fault activity most likely was a result of the interactions between the Dominican Republic and Puerto Rico microplates produced by the collision of the Caribbean and North American Plates.

Similarity of the reef development on the Mona Platform and that of important carbonate reservoirs in island arc systems of Southeast Asia suggest that studies of the exposed Mona Reef Complex could provide valuable clues to our understanding of these important reservoirs.