Composition and Morphometrics of a Miocene Karst Platform – Los Haitises, Dominican Republic

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Project Overview

We will initiate a study that combines satellite imagery and field mapping of the Miocene (?) Los Haitises platform in northeastern Dominican Republic. The Los Haitises platform is a ~1000 square kilometer platform composed of shallow water carbonates. The uplifted platform has been exposed to intense meteoric dissolution since exposure in the mid-Pliocene (?). A series of karst pinnacles and ridges with intervening sinkholes and dissolution depressions cap the platform. Our initial reconnaissance of road cut exposures along a new highway indicates that these platform limestones are likely age equivalent with the late Miocene to early Pliocene deposits further east in the Cibao Basin.

Figure 1: Map of the Dominican Republic showing the location of the Los Haitises carbonate platform.

Scope of Work

Two main research tasks are proposed. First, we will characterize the nature of the platform limestones: Their facies, fauna, and age. We will access different areas of the platform to assess regional changes in lithofacies and paleogeography of the reef fauna. Petrographic and diagenetic information will be used to document the development of micro- and macro-scale porosity. The nature of porosity, from mega-porous caves and caverns to bed-scale porosity, will be addressed in the field.

Figure 2: Detailed map of the Los Haitises carbonate platform showing the region of extensive tower karst.

Second, we will use satellite imagery to provide information on regional trends in the karst, characterization of a large fluvial channel that dissects the platform, and to provide basic metrics on the size and spacing of the karst features. These metrics can then be used for comparison to other areas of pinnacle development such as other karst platforms and areas of patch reef development (e.g. Glover's Reef atoll).

Key Deliverables and Expected Results

This study will provide a basic field study of a small, highly karstified carbonate platform. We will generate basic geological sections in road cut exposures to characterize the platform facies and to assess paleogeographic components of the platform. The ground information will be integrated with the satellite images and morphometric data measured from those images. We will generate a morphometric data set on karst feature size, spacing, and directionality of pinnacle/ridge and sink occurrences.

Figure 3: Road cut through Miocene (?) limestone showing the nature of the karst and the formation of pinnacle-like features separated by solution depressions and sinks. Much of the drainage is through subterranean conduits

Figure 4: GoogleEarth satellite image of the eastern part of the Los Haitises platform. The elevated limestone pinnacles and ridges are visible as well as the numerous solution depressions/sinks. Average yearly rainfall is 1.9-2.0 m. Image is 3.6 kilometers across.