Towards a Caribbean Airborne Topography Lidar Initiative

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The catastrophic January 12th, 2010 earthquake in Haiti highlights the need for basic research into active plate-boundary processes associated with the Caribbean plate margin. First order questions related to the location, and long-term geologic slip rates associated with the most recent ground rupturing earthquakes are currently lacking or incompletely understood for many on-shore regions along the plate boundary. The GPS network proposed by COCONet will be invaluable for better understanding present-day plate boundary deformation and seismic hazard in the Caribbean, and geologic data that extends our understanding beyond the geodetic time scale are a critical complement to these observations.

High-resolution Lidar topography along the Caribbean plate boundaries would provide a crucial community resource to identify, map, and quantify the behavior of on-shore active faults in the region. We envision a cooperative initiative to acquire and make available research-grade Lidar data for Hispaniola, Jamaica, Puerto Rico, and Trinidad. Community-oriented lidar data collections in the United States (e.g., B4 Project, EarthScope, and El Mayor-Cucapah EQ) have pioneered the approach for acquiring these valuable data, and have yielded important new insights into active faulting and seismic hazards. Similar datasets be even more useful in the Caribbean because of the relative lack of high resolution base geographic data, and because of the potential to penetrate vegetation and interpret features below the vegetative canopy.

A high-resolution Caribbean Lidar dataset would have far-reaching impacts as a fundamental resource for seismic hazard analysis. In addition, Lidar data along active plate boundary faults would provide an important baseline dataset for quantifying near-field deformation associated with future ground rupturing earthquakes in the region (e.g., the B4 dataset). As a geospatial data product, publicly available high-resolution topography could also be widely utilized for infrastructure, planning, and environmental development in the Caribbean.

We propose a Caribbean Lidar Initiative (CLI) modeled after NSF's successful EarthScope Lidar project, which acquired and made available approximately 6000 km^2 of high-resolution lidar data along active faults in the western U.S. EarthScope employed an open and transparent planning and data distribution process that would also be emulated. Through the CLI, all data would be made immediately freely and easily accessible to all researchers through a venue such as NSF's OpenTopography Facility (http://www.opentopography.org). We also propose that CLI targets will be defined by an international community working group. The CLI will also emphasize training and capacity building to ensure that all researchers have the skills necessary to utilize the data acquired.