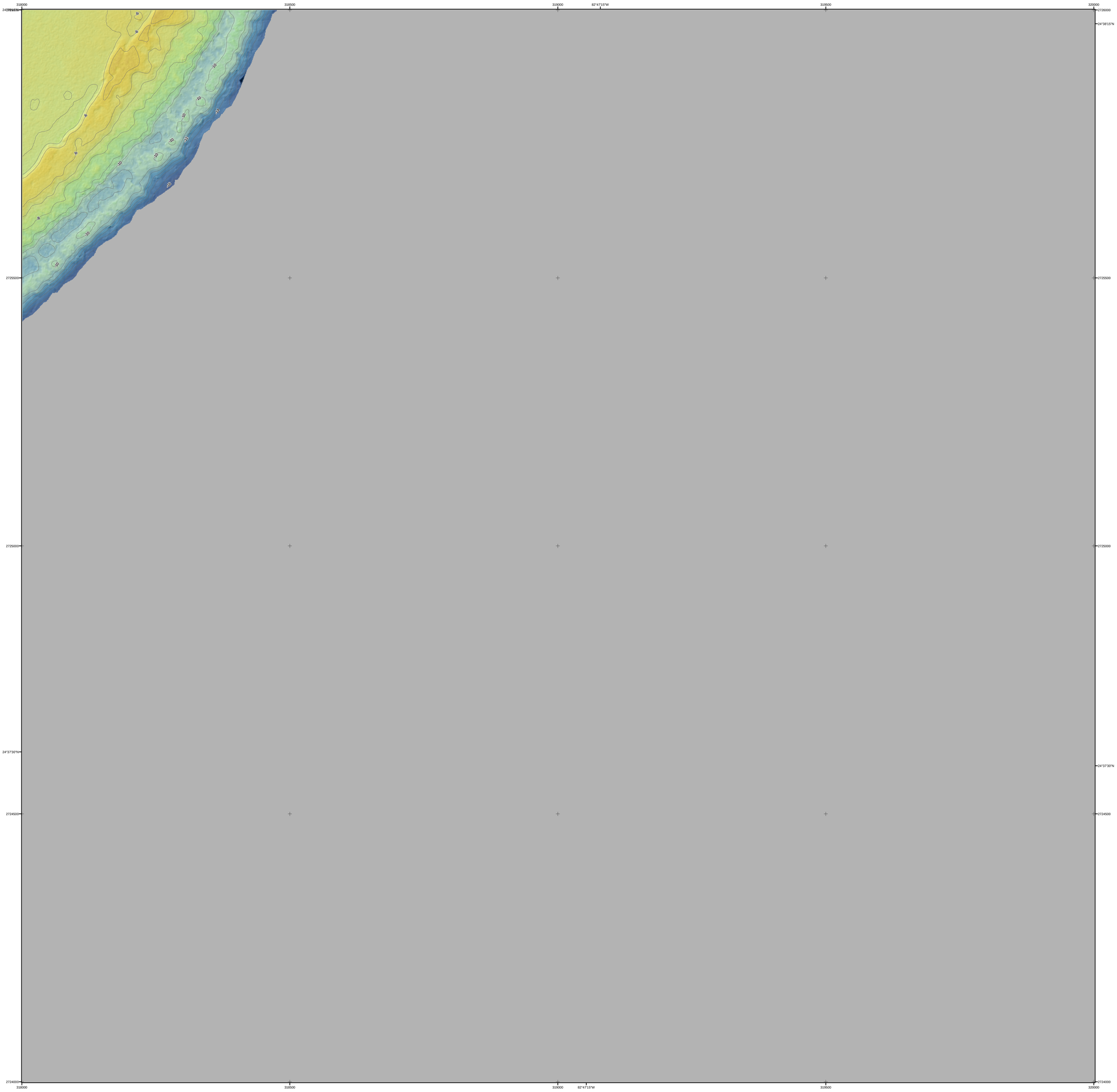


PROJECT DESCRIPTION

This lidar-derived submarine topography map was produced as a collaborative effort between the U.S. Geological Survey (USGS) Coastal and Marine Geology Program, National Park Service (NPS) South Florida/Caribbean Network Inventory and Monitoring Program, and the National Aeronautics and Space Administration (NASA) Wallops Flight Facility. One objective of this research is to create techniques to survey coral reefs for the purposes of habitat mapping, ecological monitoring, change detection, and event assessment (for example: bleaching, hurricanes, disease outbreaks). As part of this project, data from an innovative instrument under development at the NASA Wallops Flight Facility, the NASA Experimental Airborne Advanced Research Lidar (EAARL) are being used. This sensor has the potential to make significant contributions in this realm for measuring water depth and conducting cross-environment surveys. High spectral resolution, water-column correction, and low costs were found to be key factors in providing accurate and affordable imagery to managers of coastal habitats.

DATA DESCRIPTION

The laser soundings used to create this map were collected during July and August 2004 by the NASA EAARL system mounted on a Cessna 310 aircraft. The EAARL uses a ‘waveform-resolving’ green laser capable of mapping submarine and subaerial (land) topography in a single overflight. The EAARL system is typically flown at 300 m altitude AGL, resulting in a 240 m swath for each flightline. Data collection occurred with approximately 50% overlap between flightlines, resulting in about one laser sounding per square meter. The data were processed by the USGS Center for Coastal and Watershed Studies to produce 1-meter resolution raster images that can be easily ingested into a Geographic Information System (GIS). The data were organized as 2 km by 2 km data tiles in 32-bit floating-point integer GeoTiff format. Contour line and hillshade layers were generated from the lidar data tile and incorporated into this map product.

FURTHER READING

Brock, J.C., and Sallenger, Ashbury, 2001, Airborne topographic lidar mapping for coastal science and resource management: U.S. Geological Survey Open File Report 2001-46, p. 4

Brock, J.C., Wright, C.W., Nayegandhi, Amar, Clayton, Tonya, Hansen, Mark, Longenecker, John, Gesch, Dean, and Crane, Michael, 2002, Initial results from a test of the NASA EAARL lidar in the Tampa Bay Region: Transactions of the Gulf Coast Association of Geological Societies, v. 52, p. 89-98.

Wright, C.W. and Brock, J.C., 2002, EAARL: A lidar for mapping shallow coral reefs and other coastal environments, in the Proceedings of the Seventh International Conterence on Remote Sensing for Marine and Coastal Environments, Miami, May 20-22, 2002: Ann Arbor, MI, Veridian International Conferences, 1 computer optical disc.

SCALE 1:2470

0.1 0.05 0 0.1 0.2 0.3 MILES

0.1 0.05 0 0.1 0.2 0.3 KILOMETERS

NORTH AMERICAN VERTICAL DATUM OF 1988

Dry Tortugas National Park
USGS-NPS-NASA EAARL Submarine Topography
Map Tile 318000e_2726000n

By

John C. Brock[1], C. Wayne Wright[2], Matt Patterson[3], Amar Nayegandhi[4], and Judd Patterson[3],

[1]USGS Center for Coastal and Watershed Studies, St. Petersburg, FL

[2]NASA Wallops Flight Facility, Wallops Is., VA

[3]NPS South Florida/Caribbean Network Inventory and Monitoring Program, Miami, FL

[4]ETI Professionals, Lakewood, CO

2006

NAVD 88 Elevation (meters)

-20 -19 -18 -17 -16 -15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0

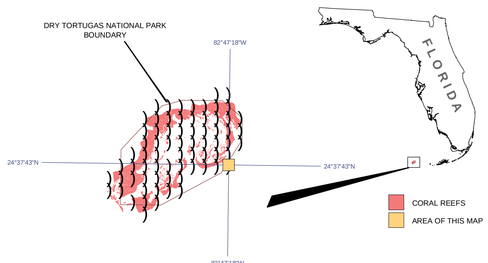
NO DATA

Universal Transverse Mercator. 1983 North American datum
Zone 17 North

This map is not intended for use in navigation.

Submarine topography mapped using NASA Experimental Advanced Airborne Research Lidar (EAARL)
July and August 2004

MAP LOCATION AND CORRESPONDING
2X2 KILOMETER DATA TILE INDEX



Cooperators: