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NOAA OKEANOS EXPLORER PROGRAM 2014 DISCOVERIES IN THE U.S. ATLANTIC CONTINENTAL MARGIN AND GULF OF MEXICO

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Ocean Exploration and Research

SUMMARY

NOAA Ship *Okeanos Explorer*, the only U.S. federal vessel dedicated to global ocean exploration, made several important discoveries in U.S. waters of the North Atlantic Ocean and Gulf of Mexico during the 2014 field season. Based on input received from a broad group of marine scientists and resource managers, over 100,000 square kilometers of seafloor and associated water column were systematically explored using advanced mapping sonars. 39 ROV dives were conducted, leading to new discoveries that will further our understanding of biologic, geologic, and underwater-cultural heritage secrets hidden within the oceans.

In the Atlantic, season highlights include completion of a multi-year submarine canyons mapping effort of the continental shelf break from North Carolina to the U.S.-Canada maritime border; new information on the ephemerality of recently discovered and geographically extensive cold water seeps; and continued exploration of the New England Seamount chain; and mapping of two potential historically significant World War II wreck sites.

In the Gulf of Mexico, season highlights include completion of a multi-year mapping effort of the West Florida Escarpment providing new insight into submarine landslides and detachment zones; the discovery of at least two asphalt volcanoes, or 'tar lilies'; range extensions of deep-sea corals; discovery of two potential new species of crinoids; identification of at least 300 potential cold water seeps; and ROV exploration of three historically significant 19th century shipwrecks.

In both regions, high-resolution mapping led to new insight into the geological context in which deep sea corals develop, while ROV dives provided valuable observations of deep sea coral habitats and their associated organisms, and chemosynthetic habitats. All mapping and ROV data is freely available to the public in usable data formats and maintained in national geophysical and oceanographic data archives.

2014 Okeanos Explorer Mapping Statistics:

- 108,300 sq. km of seafloor mapped with EM 302 (>NH, VT, MA, and MD combined)
- 31,200 linear km mapped with EM302, subbottom and EK 60
- > 300 gaseous plumes discovered
- 679 XBT casts conducted
- 6 CTD casts conduced
- 13 mapping explorers-in-training sailed

MAP ONCE USE MANY TIMES

The Okeanos Explorer Program encourages the re-use of its data by all members of the global research and management communities. All mapping data collected with the ship's multibeam, split beam, and subbottom sonars is publically available within 30-90 days of each cruise.
oar.oer.exmappingteam@noaa.gov

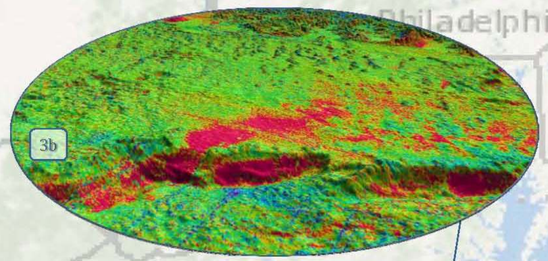
Depths in meters: -500, -2000, -3000, -5000

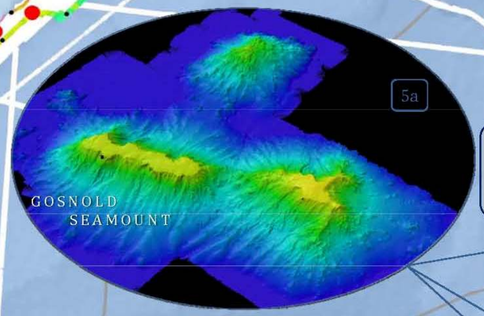
0 80 160 320 Miles

N

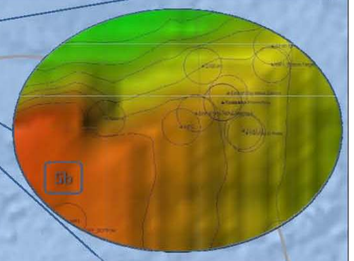
D2 ROV Dives
Gaseous Plume Detections (2014 only)
XBTs
2011-2013 Okeanos Multibeam Coverage
World Maritime Boundary

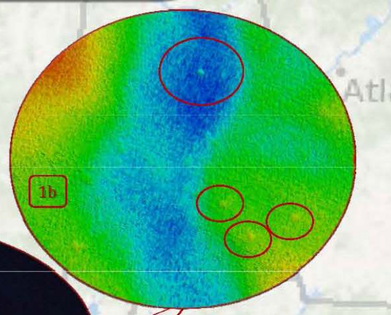
NEW ENGLAND SEAMOUNTS





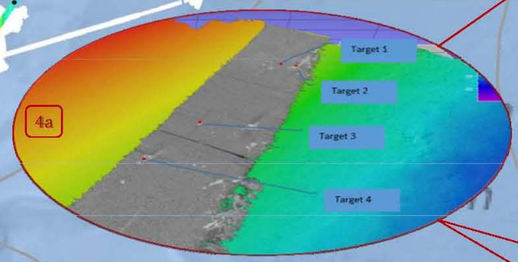
5) SEAMOUNT EXPLORATION
Exploration mapping (5a) of 19 of the New England Seamounts was conducted. 7 ROV dives were conducted, including the first ever submersible dive at Gosnold Seamount, (5b) notably revealing high densities of bamboo coral colonies (5c).





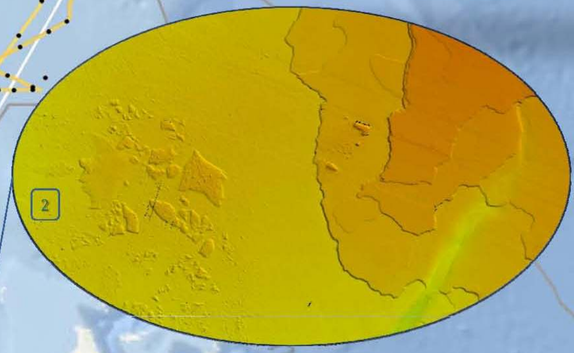
3) DEEP SEA CORAL HABITAT
Exploration mapping was conducted at Stetson Mesa , an area designated as a deep coral Habitat Area of Particular Concern in 2010 by the Southern Atlantic Fishery Management Council. High resolution multibeam bathymetry (3a) revealed complex topography , while multibeam bottom backscatter data indicated complex variable bottom types in the region. (3b).

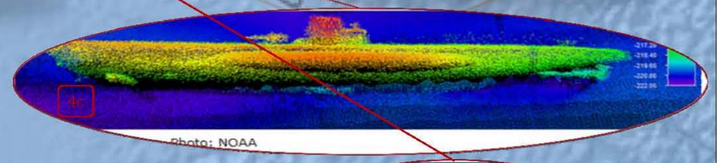
4) UNDERWATER CULTURAL HERITAGE
October 21, 2014,. Following initial exploration mapping (4a) conducted by Okeanos Explorer, the locations of the WWII wrecks German U-boat U-576 (4c) and Nicaraguan freighter Bluefields (4b) were confirmed by NOAA Office of National Marine Sanctuary. The wrecks were found within 240 yards of each another. 4b&4c image source: NOAA ONMS

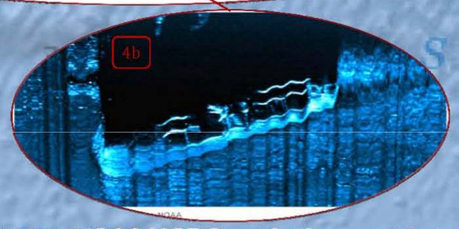


STETSON MESA

WEST FLORIDA ESCARPMENT







1) ASPHALT EXTRUSION 'TAR LILY'
Following guidance from the Bureau of Ocean Energy Management based on industry AUV data, ROV D2 dove on a sidescan sonar anomaly, expecting to find a shipwreck. Instead, an asphalt 'tar lily' (1a) was discovered, the first discovery of its kind in the Gulf of Mexico. A dense multibeam survey (1b) was subsequently conducted and discovered at least 5 more potential similar structures in the area.

2) GEOHAZARD EXPLORATION
A massive landslide on the West Florida Escarpment (2) was mapped in high resolution for the first time. A channel was discovered running through the slide as well as numerous substantial isolated debris blocks.

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