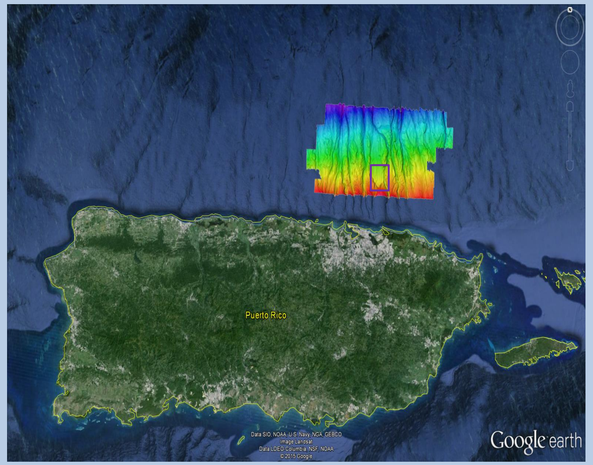
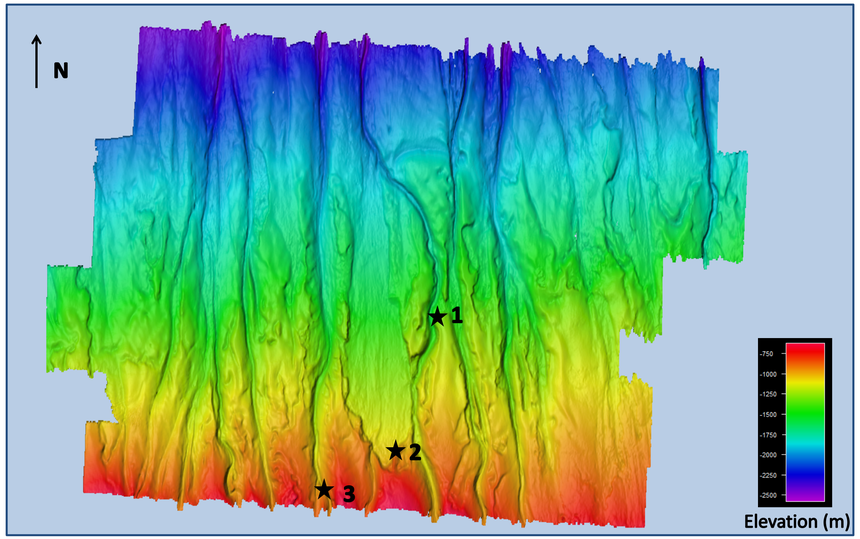
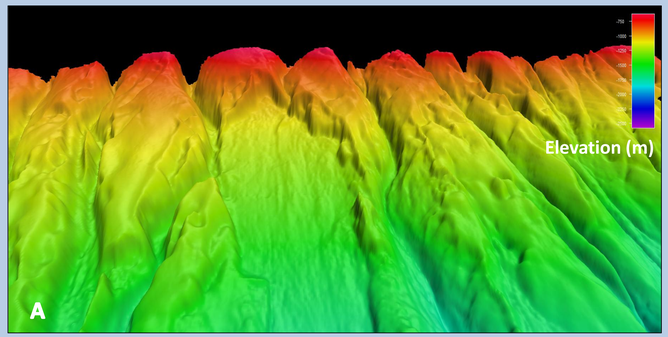
NOAA Ship *Okeanos Explorer*
EX1502 Leg 2 | 16 March – 03 April 2015
Assessment of Potential Deepwater Habitats of the Puerto Rico North Insular Slope Canyons

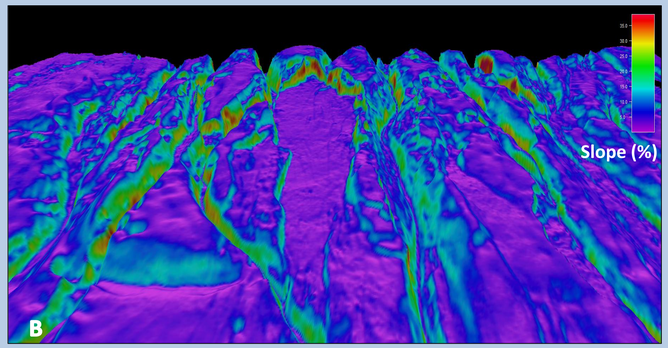
Study Area: The North Insular Slope extends from the shelf edge to about 3,000m and contains a number of canyons that lead in to the Puerto Rican Trench. The canyons are carved into the Tertiary limestone bed (Scanlon and Masson, 1996).

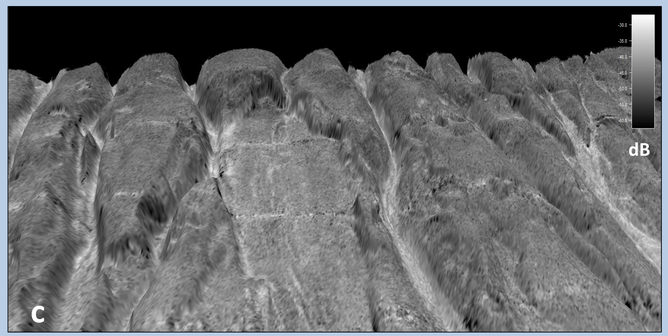


Introduction: The purpose of this study was to investigate areas within the region that may provide suitable habitat for deepwater sessile organisms (sponges, corals). The map below displays a subset of the bathymetry from the larger area mapped during this leg and was selected to be the focus for identifying potential sites. The upper canyons lie at depths near 700m and gradually reach depths ~3000m northward towards the trench. In addition to the presence of canyons, evidence of mass wasting can be seen throughout the Insular Slope and within this study area. These exposed areas may provide the hard substrate that deepwater organisms prefer. Additionally, the cutting of the canyons has exposed limestone outcrops that may provide suitable substrate.





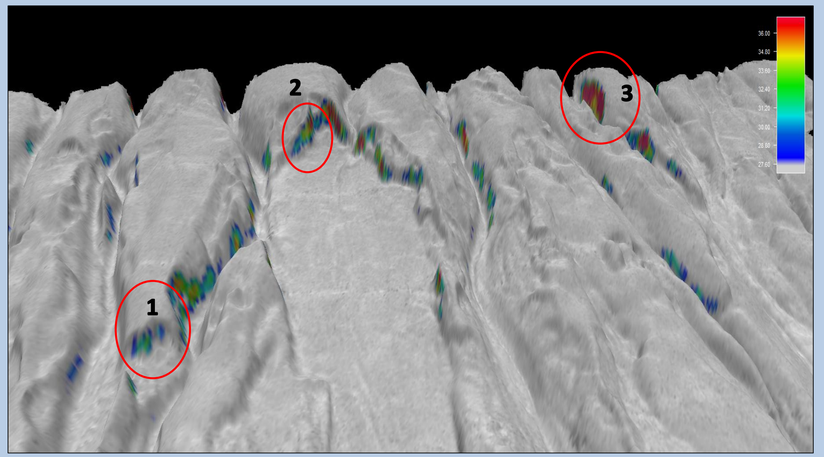




Note: Figures A-C are an oblique view from the North and upslope

Method: To determine the most favorable locations in the study area, we used several of the products derived from the data collected with the EM302 Multibeam sonar. This included the bathymetry (A), the slope (B) derived from the bathymetry, and the backscatter (C). Deepwater organisms prefer steeper slopes and harder substrates to attach to. Steep slopes were classified as being > 30% and hard surfaces classified as having acoustic returns > 40 dB. By assessing the combination of these layers, we were able to identify areas in which both conditions were met.

Data Analysis: The raw data was processed using CARIS HIPS and SIPS to remove any noise resulting in the collection of sonar data. Once processed, the data for the study area was added to a Base Surface in CARIS by selecting the corresponding lines and then exported to DMagic Software where the data was gridded at 25m. The raw backscatter data was processed in Fledermaus Geotools. After processing the data, a mosaic was created. The mosaic was then draped over the bathymetry grid in Fledermaus. The slope was calculated from the bathymetry layer using a processing tool in Fledermaus. By draping the semi-transparent slope layer (with the colormap inclusive of the targeted % range) over the backscatter layer, the potential habitat sites are highlighted below.



Potential Habitat Site	Latitude	Longitude
1	18° 39’ 06.92” N	65° 57’ 42.06” W
2	18° 34’ 49.05” N	65° 59’ 49.23” W
3	18° 33’ 19.99” N	66° 07’ 47.18” W

Potential Habitat Sites: Site 1 is located in a ‘nook’ positioned above a small shelf on the canyon wall. This site had the lower slope % of the three but had the highest backscatter acoustic return, while still meeting the steep slope classification. Site 2 is located on the sheer face of what appears to be the result of a landslide or mass wasting event, exposing the hard limestone bed. Site 3 is located on the sheer face of a canyon wall with an area that was just within the range of high acoustic returns. The locations relative to the study area are displayed in the larger bathymetry map.

Created by Chelsea Wegner, *Okeanos Explorer* Mapping Intern 2015