OKEANOS EXPLORER ROV DIVE SUMMARY

Site Name	Bumpland		
ROV Lead	Dave Lovalvo		
General Area Descriptor	100 km SSW of Grand Cayman Island		
ROV Dive Name	Cruise Season	Leg	Dive Number
	EX1104	-	DIVE08
Equipment Deployed	ROV:	Little Hercules	
	Camera Platfom:	Seirios	
ROV Measurements	☒ CTD	☒ Depth	☒ Altitude
	☒ Scanning Sonar	☒ USBL Position	☒ Heading
	☒ Pitch	☒ Roll	☒ HD Camera
	☒ Low Res Cam 1	☒ Low Res Cam 2	
Equipment Malfunctions			
ROV Dive Summary (From processed ROV data)	Dive Summary: EX1104_DIVE08 ^^ In Water at: 2011-08-11T13:46:08.534000 18°, 22.738' N ; 081°, 49.076' W Out Water at: 2011-08-11T23:15:10.282000 N/A ; N/A Off Bottom at: 2011-08-11T21:29:30.476000 18°, 23.359' N ; 081°, 49.362' W On Bottom at: 2011-08-11T15:05:29.013000 18°, 22.693' N ; 081°, 49.027' W Dive duration: 9:29:1 Bottom Time: 6:24:1 Max. depth: 2202.6 m		
Special Notes	Click here to enter text.		
Scientists Involved *(please provide name / location / affiliation / email)*	Chris German (Science team lead), EX, WHOI, cgerman@whoi.edu Paul Tyler, EX, Uni. Southampton, pat8@noc.soton.ac.uk Cameron McIntyre, EX, WHOI, cmcintyre@whoi.edu Diva Amon, URI, Uni. Southampton, dja605@noc.soton.ac.uk Bobbie John, URI, Uni. Wyoming, BJohn@uwyo.edu Jameson Clarke, URI, Duke, jamesonclarke@gmail.com Mike Cheadle, URI, Uni. Wyoming, cheadle@uwyo.edu Jill McDermott, URI, WHOI, jmcdermott@whoi.edu Sarah Bennett, Home, NASA JPL, Sarah.A.Bennett@jpl.nasa.gov Santiago Hererra, URI, WHOI, shererra@whoi.edu Cindy Van Dover, Home, Duke, clv3@duke.edu Julie Meyer, URI, MBL, jmeyer@mbl.edu		

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Purpose of the Dive

The aim of the dive was to determine the rock type within the mounds, test if their orientation is controlled by faulting, and possibly find hydrothermal vents. Observations of the fauna would be made throughout the dive.

Description of the Dive:

Overview: We observed several conical basalt mounds that were erupted onto the detachment fault surface. Later subvertical faults cut through the basalt hills to provide exposures. The presence of an extensive fauna consisting of very large undisturbed colonies of gorgonians plus numerous pale blue sponges covering the scarps, suggests that this faulting is not recent.

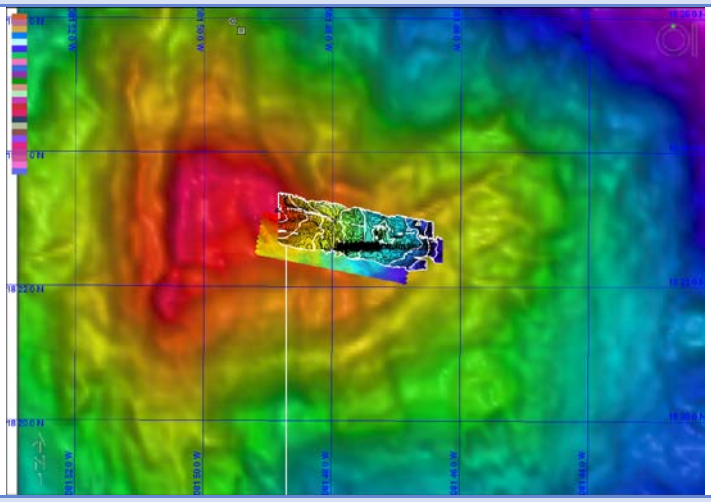
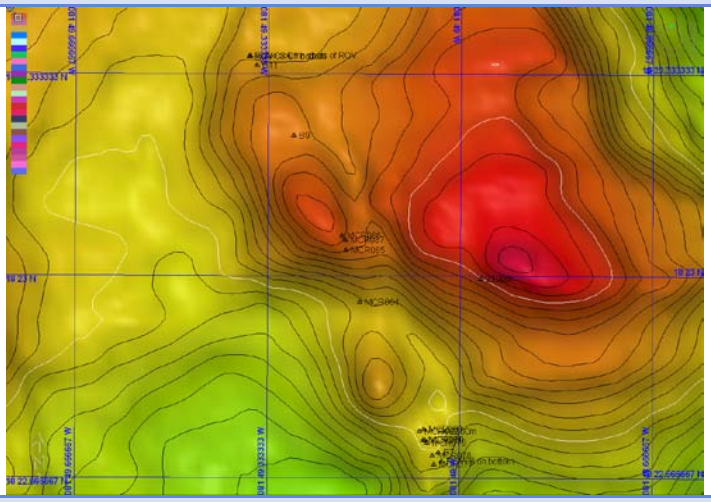
Little Herc was launched at a site on the central dome of Mt Dent OCC at 2195 mbsl at 18°22.709'N, 81°49.037'W. The site is at the southern end of a NNE trending line of conical mounds/hills visible in the bathymetry, to the southeast of the summit of Mt Dent. Little Herc landed on an irregular surface of fine biogenic carbonate that was pockmarked. Sediments exposed in cross-section suggest that the carbonate was layered and potentially lithified, and likely >1m thick. The holothurian ?*Benthodytes* sp. was present and was found on sediment throughout the dive. We very quickly reached a sediment-covered ridge which exposed rock cliffs that were likely outcrop, but were covered by sponges, gorgonians (bubblegum and bamboo coral) and poriferans. The occasional actinarian was noted on the gorgonians. The fauna, together with the sediment cover made the solid geology difficult to observe. With exploration, we found 1-3m wide, 2-5m deep, N-S trending fissures. Multiple fault splays (1->5 m apart) were observed and the rocks were basaltic, suggesting the mounds/hills are basalt domes/cones erupted on the top of the detachment fault. Fauna included extensive poriferans, gorgonians (common to most rock outcrops) with some comatulid crinoids.

1m diameter pillow tubes with ropey basaltic surface features and more resistant chilled margins up to 10s of cm thick were observed at the top of the scarps encountered. In some cases, yellow alteration was observed on pillow interiors. Some pillows were elongate suggesting flow downslope. In other cliff faces the basalt consisted of angular basaltic rubble rather than pillows. Variations in alteration were observed, with some light brown alteration likely being of hydrothermal origin. The density of fauna and sediment on the exposed scarps, suggested they were not presently active.

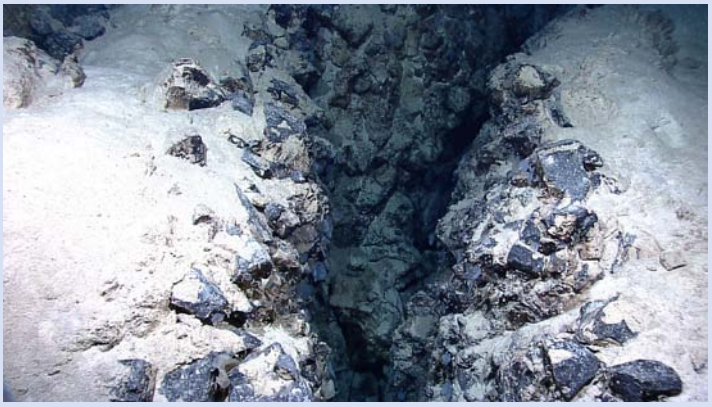
We left this southern series of outcrops and traversed biogenic carbonate to mound/hill 9. The sediment was scoured, and pock marked with numerous pits (up to 1-2 m in diameter) hosting coarse sediment at bottom, including gastropods, pteropod shell debris, and small angular rock fragments; likely these remain from substrate as fines are blown out, by some sort of fluid expulsion event. We arrived at the second series of basalt outcrops at MCR085. Small angular basalt clasts were visible in the sediment at the top of a series of fissures. These outcrops were similar to those seen at the start of the dive, consisting of ~N-S trending fissures exposing basalt scarps covered by sponges, overlain by >1m of lithified carbonate sedimentary deposits. Some elongation of small pillows suggesting downslope flow from NW to SE was visible. Angular basalt fragments appeared more common here than in the first outcrop. One scarp was heavily covered by sponges and

gorgonian corals, suggesting that it was older than those seen earlier. Clear cross -sections through the lithified carbonate sediment were visible showing stratification locally with slightly darker coloration (red/orange) – possibly indicating ancient hydrothermal sediment and/or entrainment of fine basaltic glass particles.

The final part of the dive consisted of a transverse along the eastern flank of hill 9 towards hill 10 over pock marked (locally up to 4 m diameter holes) and scoured biogenic carbonate sediment, until the dive ended. During this section we observed a dark tripod fish, an ophiuroid and many tracks of holothurians or echinoids.

Overall Map of ROV Dive Area	Close-up Map of Main Dive Site
	

Representative Photos of the Dive



A chasm in the rock where the seabed has been torn apart

Detail of the branches of a gorgonian coral showing the distribution of polyps down the branches

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