OKEANOS EXPLORER ROV DIVE SUMMARY

Site Name	Cayman Trough		
ROV Lead	Dave Lovalvo		
General Area Descriptor	30 km SW of Grand Cayman Island		
ROV Dive Name	Cruise Season	Leg	Dive Number
	EX1104	-	DIVE12
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	none		
ROV Dive Summary (From processed ROV data)	Dive Summary: EX1104_DIVE12 ^^ In Water at: 2011-08-15T13:36:46.811000 19°, 05.362' N ; 081°, 36.564' W Out Water at: 2011-08-15T23:00:37.745000 19°, 05.868' N ; 081°, 36.073' W Off Bottom at: 2011-08-15T21:09:07.046000 19°, 05.953' N ; 081°, 36.549' W On Bottom at: 2011-08-15T15:36:15.494000 19°, 05.333' N ; 081°, 36.505' W Dive duration: 9:23:50 Bottom Time: 5:32:51 Max. depth: 3267.6 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, Internet1, Uni. Wyoming, BJohn@uwyo.edu Mike Cheadle, Internet1, Uni. Wyoming, cheadle@uwyo.edu Jill McDermott, URI, WHOI, jmcdermott@whoi.edu Sarah Bennett, Home, NASA JPL, Sarah.A.Bennett@jpl.nasa.gov Julie Huber, WHOI or Internet1, MBL, jhuber@mbl.edu Colin Devey, Internet1/SKYPE, IfM-GEOMAR on sabbatical at WHOI, cdevey@whoi.edu Santiago Herrera, URI, WHOI, Sherrera@whoi.edu Catriona Munro, WHOI, catmunro89@gmail.com		

	Coquilla Rex, ? Donald Sweet, URI, URI, ?

Purpose of the Dive

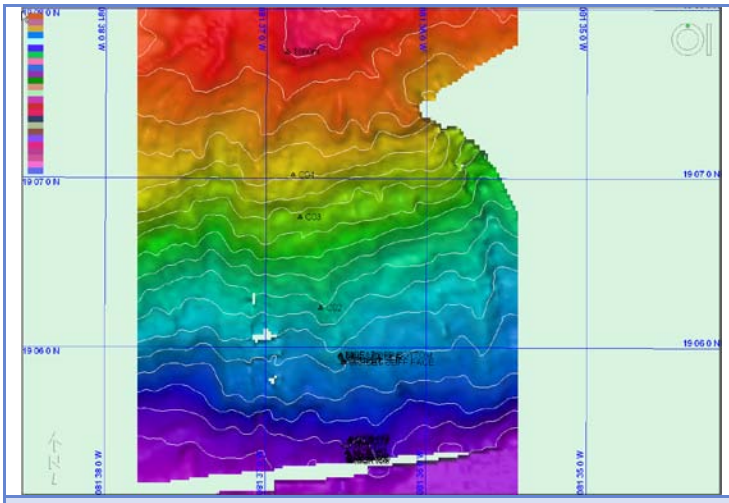
Conduct a geological and biological transect from South to North up the interior (south-facing) wall of the North Cayman Fracture Zone. We know of no similar study in this, or perhaps any other, Fracture Zone even though, along with ridges and trenches, they represent one of the three major types of Plate Tectonic Boundary.

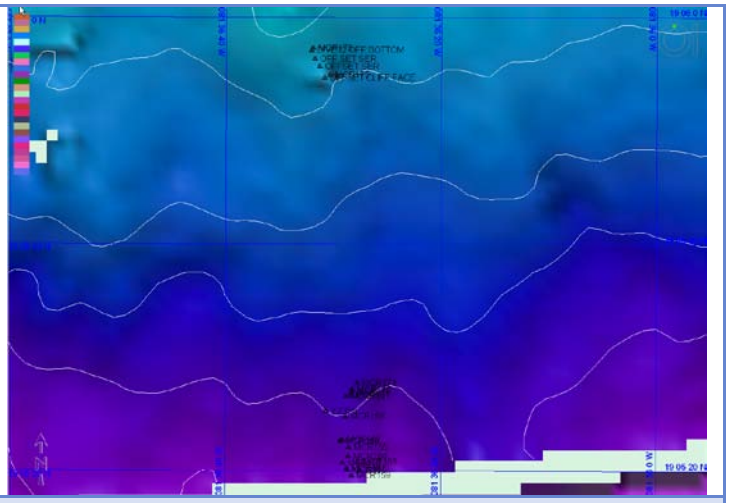
Description of the Dive:

Little Herc travelled up a heavily sedimented slope for the majority of the dive. The biogenic sediment appeared to have a lot of small-scale variation in places with many pteropod shells, holothurian tracks, and seagrass and seaweed debris. Some small-unidentified fish were observed as well as the occasional *Bathypterois* sp. Stalked sponges and vase sponges were some of the most common fauna seen, as well as holothurians. Four possible species of holothurians were seen – *Benthodytes* sp., *Benthothuria* sp., *Psychropotes* sp. and *Mesothuria* sp. The occasional *Sergestes* sp., several pennatulids, one scaleworm, two octacnemid ascidians, one large anemone, one dead nautilus shell and one dandelion siphonophore were noted. An unidentified pink animal with antennae was seen sitting on the seabed covered lightly by sediment. We also came across one wood fall, which showed evidence of extensive burrowing by *Xylophaga* sp. Some amphipods were also seen on the wood fall. The slope was punctuated briefly on a few occasions by some rocky outcrops. These rocky outcrops appeared to have two species of sponge growing – white siliceous sponges and brown ragged-looking sponges.

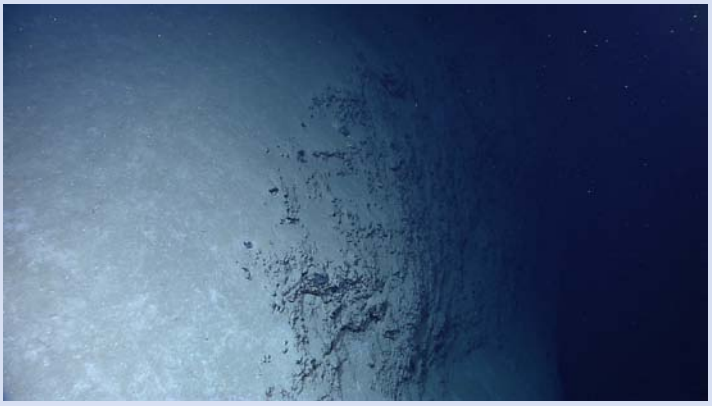
The geological highlight of the dive was a tall cliff, approximately 13m in height, that was encountered midway through the cruise between water depths of 3169m and 3182m. The ROV was lowered slowly facing inward to the vertical cliff to obtain a complete sequence of video documentation from top to bottom followed by more detailed observations of specific features during a return ascent along the same vertical path, approximately 1.5m from the cliff face, from base to top. Dr Barbara John, a remote participant in this dive, having already had to return from the ECC to her home laboratory, identified this outcrop via Internet 1 as a quite perfectly exposed fault system with talus breccias overlying slabby fault rocks and including individual layers of heavily altered material, sometimes up to tens of cm in thickness crossing the face of the cliff. While other rare encounters with dark foliated and sometime rectilinearly faulted rocks were also reported – primarily in the early stages of the dive – the only other notable outcrop per se was a ~1m off-set fault running E-W across the ROV dive transect, observed early in the cruise, with a throw downhill to the South. Geologically, the vast majority of the dive was conducted over thick biogenic carbonate sediment on a hillside that dipped steeply (average gradient ~35°) to the south with intermittent rises and gullies (~5m wavelength) across the face of the wall toward the upper reaches of the dive. Occasional slump scarps were also observed in lithified sediments (exposing scarps of 20-30cm at a time), running E-W across the direction of the ROV transect but again, these were most notable during the early stages of the dive, deeper than 3000m.

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

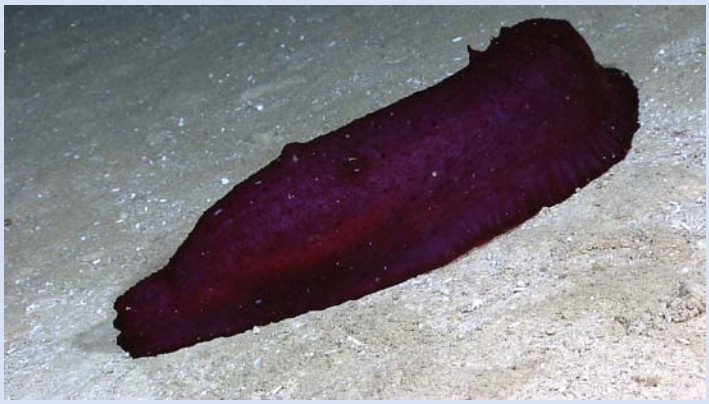




Representative Photos of the Dive



A steep rock part way up the northern edge of the Cayman Trough



The sea cucumber *Benthothuria* sp. crawling up the slope

Please direct inquiries to:	NOAA Office of Ocean Exploration & Research 1315 East-West Highway (SSMC3 10th Floor) Silver Spring, MD 20910 (301) 734-1014