

Cruise report for *RV Falkor* cruise FK006b Leg II: Ecosystems Impacts of Oil and Gas Inputs to the Gulf of Mexico (ECOGIG) consortia cruise to monitor corals around Macondo and sample corals and sediments.

Expedition dates: 19-28 November 2012

Ports: Pascagoula, MS

Funding: Gulf of Mexico Research Initiative RFP-I (funding science), Schmidt Ocean Institute (funding ship & ROV)

Primary objectives accomplished during this cruise

- 1) Made collections of live corals using the ROV at 2 sites for shipboard experiments and to return living material to our home laboratories. These were known sites with detailed maps of where to make the collections. Started and ended the leg with collections, and made one other live coral collection approximately half way through the leg to allow time for all proposed experiments.
- 2) We revisited 4 known deep water coral sites in the Gulf to re-image corals with the ROPV and use the data to follow the outcome of impact (or lack of impact) on the corals from the Deep Water Horizon Disaster. At each of these sites between 40 – 80 specific individual coral colonies were revisited and imaged. New corals were discovered at 2 sites near Macondo and imaged for the first time. Physical markers on the sea floor were used to aid in locating each coral and calibration of navigation to previous visits was excellent.
- 3) We obtained water samples from niskins mounted on the ROV during every dive except the last.
- 4) We obtained push cores using the ROV on every dive except the last.
- 5) We successfully used the multicorer at multiple sites between dives.
- 6) We obtained multibeam data during evening hours at most sites for both bathymetric and bubble plume maps. These were supplied to I. McDonald and eventually BP from the ship for immediate analysis.

R/V Falkor Science Personnel Leg II -- 20 Nov - 28 Nov

Name	Affiliation	Role	Email
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Dive sites:

All locations are in WGS84 coordinate reference system and decimal degrees and represent the exact location for the planned dive at that site (either a physical marker or know aggregation of corals).

VK826 = 29.15462 , -88.02294 , 480m , Marker 2
MC294 = 28.6722 , -88.47653 , 1371m , Marker AA
MC297 = 28.68231 , -88.34487 , 1582m , Marker MM1
AT357 = 27.58651 , -89.70428 , 1050m , Marker M7
MC388 = 28.63349 , -88.16953 , 1851m , Marker M9

Detailed daily activities:

All times are in Shipboard local (UTC-5)

11/19/12

09:30 New scientists arrived at the dock while the Falkor was going through customs.
10:00 Ship clears customs and new scientists board. Day is spent on various welcomes events, briefings and tours, finishing with BBQ/Socializing

11/20/12

08:15 Fire and Boat drill
08:30 ROV/Chief Scientist equipment briefing
0900 First science meeting, general plans and priorities
1100 First ops meeting, discuss POD
11:30 Mapping briefing from Marine Techs and mapping scientists
0100 Test deployment of MUC: Failed

15:30 Test deployment of MUC: passed
1850 ETA at VK 826
1900 Multicore (MUC) deployment
1930 MUC recovery: Successful
2024- Begin mapping for bubble plumes at VK 826

11/21/2012:

0154 Finish mapping at VK 826
0816 First ROV dive to VK 826 (FK0006b-11)
The dive was very successful, all systems working well except the ROV Sonar. Small pieces of colonies or small colonies of both coral target species were collected into the biobox and quivers. One push core taken for Iliana and 2 for meiofauna associated with corals. 7 Niskin water samples taken for chemistry and microbiology. We finished early and the sub left the bottom at about 1500 local
1530 recover ROV and transited to MUC deployment site
1614 Successful MUC collection at same site in VK 826 as last night
1747 Repeat MUC collection for meiofauna in VK 826
1800 Began transit to MC 294 for multibeam (approx 4 hrs transit)
2148 Begin mapping for bubble plumes near MC 294

Nov. 22:

0748 Finish Mapping near MC 294
0815 ROV dive at MC 294 for coral imaging and mud/water sampling (FK0006b-12)
The dive was very successful. Excellent quality pictures of 45 corals of the 52 corals still being monitored. Six push cores taken next to the edge of the carbonate slabs supporting the corals. Two sets of niskins taken: one while imaging corals and another at the push core site.
1615 ROV left the bottom
1730 ROV on the surface and made a quick inspection of ships props.
1800 ROV on Deck
1840 Multicore launched about 600 m NNW of the site
1830 Most awesome and traditional Thanksgiving feast
1930 Successful multicore recovery
2000 begin transit to AT 357

Nov. 23:

0832 ROV dive at AT 357 for coral sampling/imaging and mud/water sampling (FK0006b-13)
Another successful dive. 90% of target corals imaged, with bonus of great imagery of many more. Very clear that there is no impact to any gorgonians at this site. Navigation was excellent and all targets acquired. 3 push cores from black reduced sediment near mussels. Water samples taken at 2 different sites with hard corals, one with Paramuricea, one with push cores and one 100m above the push cores..

1625 ROV left the bottom
1800 recover ROV
1812 deploy multicore.
1845 Multicore on deck
1900 Multibeam one line to confirm location of bubble plume
2000 Begin transit to MC 297

Nov. 24:

0836 ROV dive at MC 297 for coral imaging and mud/water sampling (FK0006b-14)
The dive again went very well despite the fact that an almost complete absence of current slowed our operations. All 18 corals around the southern cluster of markers were imaged and an additional coral imaged while in transit to the northern coral bed. About 20 of the 68 corals in the north were imaged, 5 push cores taken (one failed), and a water sample collected at each site. The ROV left the bottom at about 1630 local, was on the surface shortly after 17:30 and recovered before 1800

1840 Successful multicore deployed 500m S of the dive site
1930 began transit to MC 388 for overnight mapping
2050 Begin mapping for bubble plumes in MC 388

Nov. 25:

0615 Finish mapping at MC 388
0815 ROV dive at MC 388 for coral imaging and mud/water sampling (FK0006b-15)
MC 388 is a lightly impacted coral site and was our deepest dive to a bit over 1800m. This was a very successful dive, despite the fact that we had almost no current and were fighting clouds of sediment all dive. We not only re-imaged all corals originally documented, but also imaged about 10 additional large colonies and many smaller ones for the first time. We deployed an additional marker and have a much better appreciation for the state of this site than we did 48 hours ago. Push cores and water samples were successfully taken.
1730 ROV on the surface
1800 ROV recovered and began transit to MC 118
1932 We deployed the multicore and were planning on two cores back to back to finish up our work with this instrument. However the first attempt failed (it did not fire) and since we would have to come back to get a second drop any way we decided to put off the effort for 24 hours rather than continue the deck work past 8 pm. We have finished the mapping of this area and no mapping was done overnight.
2000 Began transit to MC 297

Nov. 26: ROV dive to MC 297 to finish up coral imaging, coring and water sampling. (FK0006b-16)

0812: ROV launched for another successful dive to MC 297. This dive was to the Northern cluster of coral markers at this site and went near perfectly. In addition to locating and imaging every single coral previously identified, another marker was deployed and an addition 5-6 corals located, logged and imaged. Push cores and water samples were successfully taken. The digital still camera had some

problems during the last hour of the dive, and as a result 4 corals were documented with HD video only and frame grabs will be used for analysis of these corals. After over 4000 successful digital still images, this minor problem served to underscore the previous successes. All imaging was completed on time by 1500 and the ROV left the bottom for an early recovery and transit for multiple multicores

1630 : ROV on the surface

1700 ROV recovered and began transit to MC 118

1830 multicore deployed at MC 118.

1900 multicore recovered

1915 multicore deployed for second sample set at MC 118

2000 multicore secured for transit to VK 826

Nov 27:

0800 First ROV of the day at VK 826 for coral collections (FK0006b-17)

Dive went very well even though the Chief Scientist provided the wrong launch coordinates due to a dyslexic dive log. We landed 500m away from our first target and proceeded to the correct target at 1 knot, arriving 30 min later.

Collections of leiopathes for transport home and for in situ fixation in RNA later went perfectly with co-located push cores and water samples. We ended with collections from 3 Lophelia colonies into quivers and surfaced about 20 min.

early. This was fortunate because a squall came through while recovering the ROV and persisted with gusts to 40 and 50 knots. This delayed the second dive by 2 hours

1140 ROV recovered

1300 WOW (Waiting on Weather)

1450 Second ROV dive at VK 826 for coral collections (FK0006b-18)

We landed on the Lophelia and made the bulk collections and two independent collections into quivers with associated water samples. We began out transit to the Callogorgia site but even with an extended dive window we were unable to get into the Callogorgia habitat and had to end the dive without collections of this last species. Nonetheless a successful dive as the number one priority for the Cordes lab was Lophelia, with a minimum of 5 colonies collected and this was achieved.

1750 ROV on Surface

1755 ROV on deck and secured for transit to port.

1800 Begin Transit to Pascagoula for arrival between 0200 and 0400 on Nov. 28