September 8th | 2010

Ryan Chouest Cruise 14 Cumulative Report

Period covered: 1809 09/04/2010 - 1100 09/07/2010

280- Nautical miles covered

Vessel science party:

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Cumulative Cruise notes:

The *Ryan Chouest* cruised about 280 nautical miles, from 09/04/10 to 09/08/10, during cruise 14. The complete route is shown in Figure 1.

09/05
The *Ryan Chouest* followed the planned cruise 14 route leaving Port Fouchon and heading towards the first CTD test deployment site and then onward to the second CTD deployment site (Figure 1).
The underway pump was deployed after reaching open sea outside Port Fouchon using the modified deployment setup. Two CTD test casts were executed in total.

09/06
The *Ryan Chouest* continued along the planned cruise 14 route towards the location for CTD cast #3 and #4. (Figure 1). A 'clover leaf' pattern was conducted over the location of CTD cast site #4 to characterize the seep. The collection of underway fluorometry and echo sounder survey data continued.

09/07
The *Ryan Chouest* continued the planned cruise 14 route. A 'cloverleaf' pattern was conducted over the location of CTD cast site #5 and #6 in an attempt to characterize the seep. A rough grid pattern was also surveyed over the area southwest of the MC252 locality in order to further confirm the occurrence of possible seeps in the area. After cast #5 and #6 were taken the The *Ryan Chouest* completed the planned cruise 14 route and headed towards Theodore where the ship docked on the morning of 09/08/10 for a crew change and to take grocery supplies etc on board.

The underway fluorometry pump, echo sounder and CTD cast equipment operated smoothly throughout the cruise period. No underway fluorometry data was collected during the transit back to Theodore Port.

In this report we present a complete summary of the results of cruise 14.

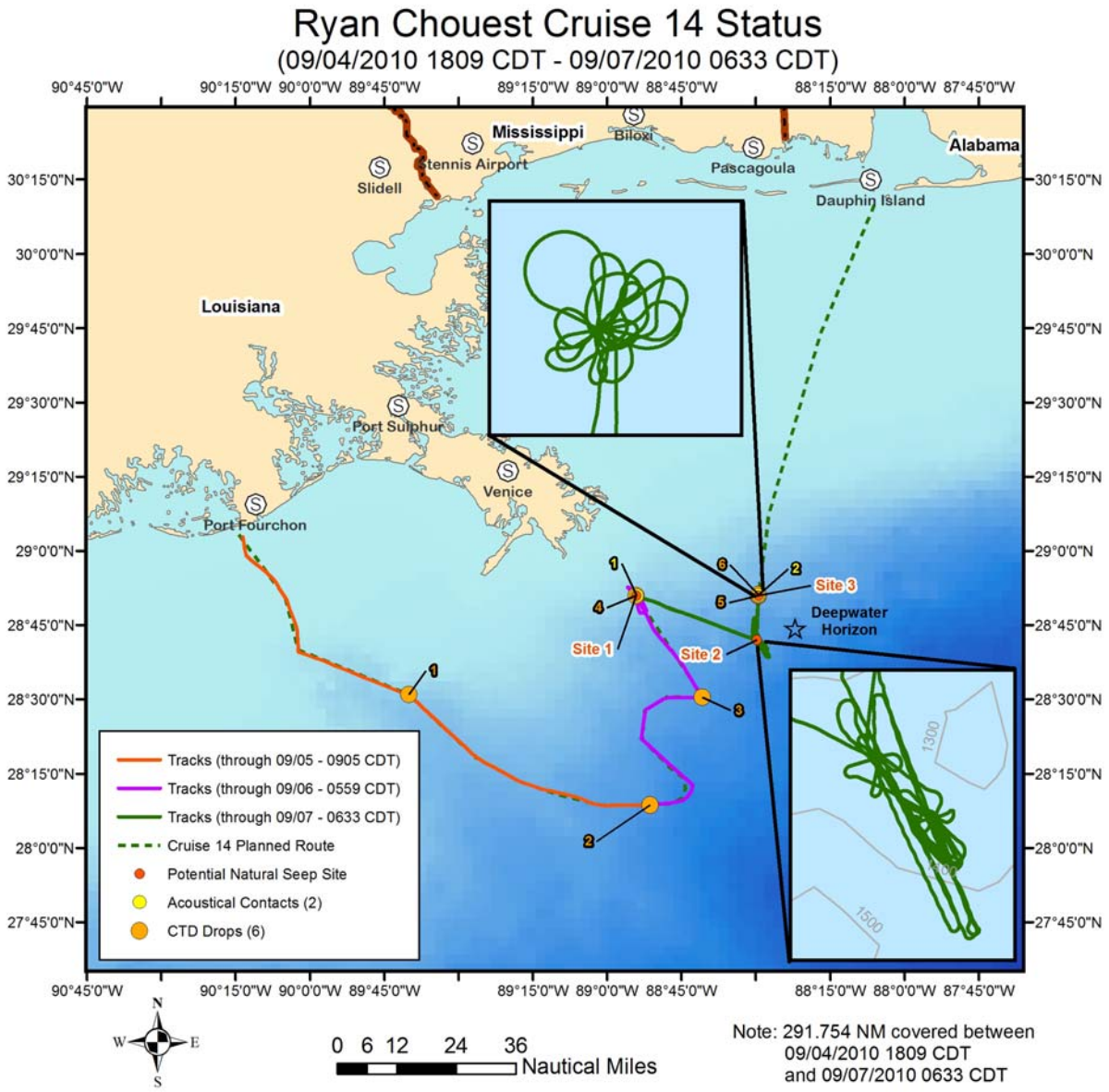

Figure 1: Planned and actual route course of the Ryan Chouest cruise 14 plotted between 09/04 – 09/07. The orange numbers represent CTD cast locations. The yellow numbers represent recorded acoustical contacts.

Science results and preliminary interpretation:

Fluorometry results

The Chelsea and Trios sensors generally indicated low levels of inferred hydrocarbons concentrations through the reporting period (Figures 2, Figure 3). A slightly enhanced response was observed from both sensors in areas close to the mouth of the Mississippi river.

Surface Observations

There were sightings of schools of fish and occasional small jellyfish and squid observed during the CTD test casts. Sargassum was occasionally spotted on the surface throughout the route.

EK-60 Echosounder results

During the cruise there were a total of two echo sounder contacts identified (Figures 1). The first major contact identified was found during the reporting period 9/5 to 9/6. To further define this contact it was surveyed in different directions in a 'clover leaf' pattern. Figures 4 to 11 show the echo sounder images obtained when the Ryan Chouest approached the potential natural seep from different angles after establishing its location. The plume from the contact extended from the bottom straight to ~100m water depth and diminished. A 3D image of the contact was constructed from the information collected (Figures 12).

At site 2 no potential seep features could be captured in the echo sounder system even after surveying the area in a dense grid pattern.

The second contact identified was found during attempts to re establish the location of the warm seeps at site 3 (Figure13 to Figure 16). Again, to further define the contact it was surveyed from different directions in a 'clover leaf' pattern. A 3D image of the contact was constructed from the information collected (Figures 17).

CTD casts

Two CTD test casts were completed during the report period 9/4 to 9/5(Figure 1). A PAH fluorometer and a methane sensor were also attached to the CTD carousel to provide real time chemical information.

The objective of cast#1 (down to 147m) was to test the functionality of the CTD deployment system and data acquisition of all incorporated sensors. Two water samples were collected at 50m as the CTD moved along the water column in both directions. GCMS analysis of these samples showed no aromatics and aliphatic above detection limit.

Cast #2 and Cast #3 were aiming at investigating the presence of a possible deep water HC plume. Cast #2 was performed at N28 08.699, W 088 51.373, CTD cast #3 went down to 1370 m of water and was performed at W088 40.795 N28 30.269. In both cases, at ~1100m depth PAH fluorometer maximum and dissolved oxygen minimum peaks were shown in the vertical profiles(Figure 19, Figure 20), which may suggest the existence of deep water hydrocarbons. PAH Fluorometer also displayed

enhanced response as the CTD approached the bottom. It is worth noting that the CDOM fluorometer did not display any notable changes throughout the water column. In Cast #2, Water samples were collected at 1360m, 1190m, 1125m; In Cast #3, Water samples were collected at 1353, 1250, 1160, 1130 and 1020m. However GCMS analysis of the collected water samples showed no HC above detection limit.

The objective of Cast #4, Cast #5 and Cast#6 was to verify the presence of potential natural seeps found during Cruise 11 and to assess their potential contribution to the surface CDOM fluorometry anomaly. The strategy was once the location of contact was established the ship was carefully maneuvered to position the CTD platform directly over the top of the "plume" detected by the echo sounder system.

Cast #4 was performed at W088 40.801 N 28 30.266. The plume shown in the echo sounder image did not trigger any notable response in the CDOM and PAH fluorometers (Figure 21). Water samples were collected at 350m, 340m, 285m 200m and 130m for further GCMS analysis.
Cast #5 and Cast#6 were also performed following the successful reestablishment of potential natural seeps at site 3 (Figure 1, Figure 22, Figure 23). CTD cast #5 in 880 m of water at N 28 51.135, W 088 29.511 and CTD cast #6 in 890 m of water at N 28 51.141, W088 29.512. In the sensor vertical profiles of both casts, very minor increases were observed in the CDOM fluorometer and the PAH fluorometer throughout the water column close to the bottom. Water samples were collected at 877m, 750m, 600m and 220m in Cast 5 and at 870m, 750m, 600m, 390m and 220m in cast #6 for further GCMS analysis.

Trace amounts of mono aromatics were only detected for the water samples collected during Cast #5 and Cast #6. We are in the process of verifying the source of the mono aromatics detected.

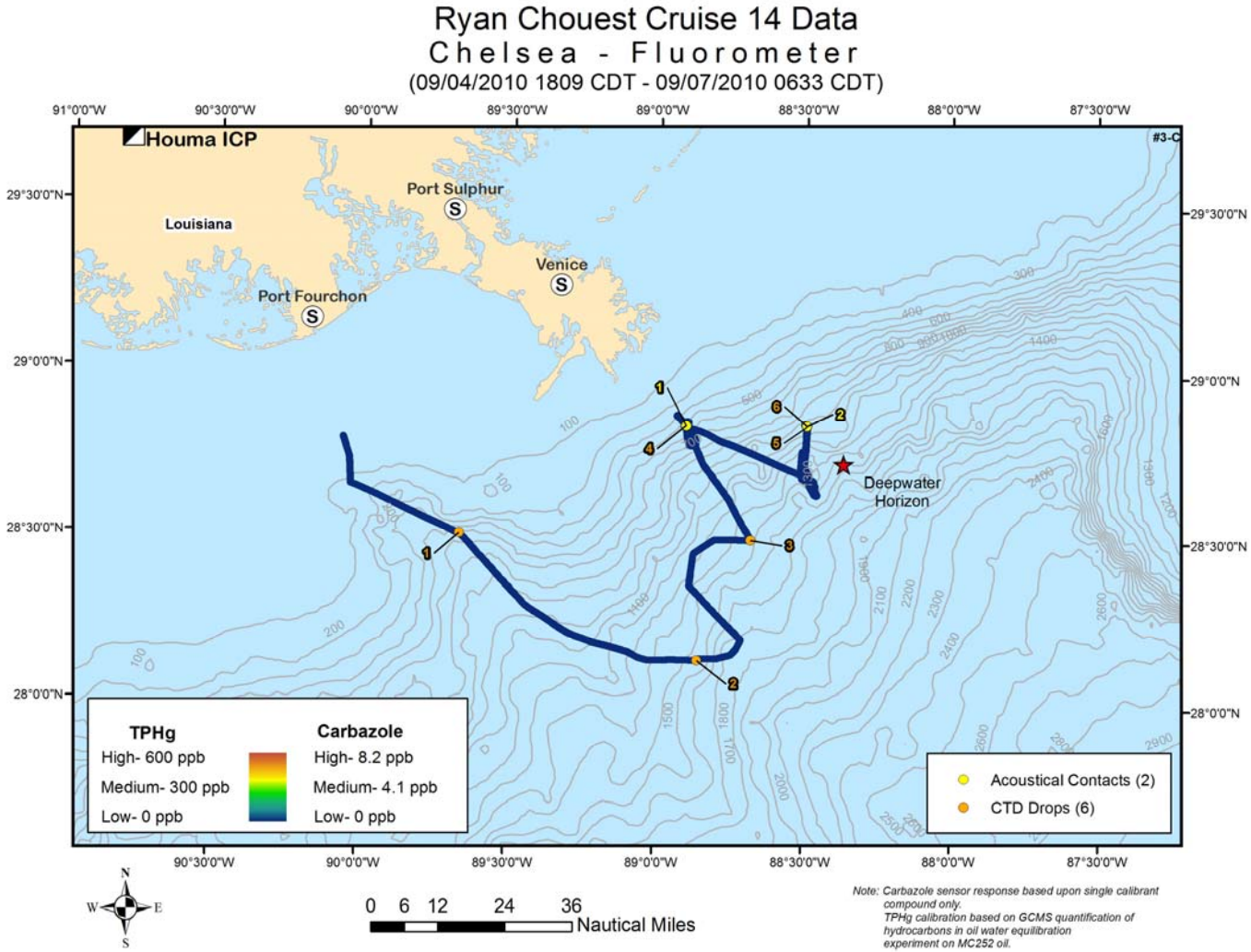

Figure 2A. Chelsea fluorometer results plotted with location on cruise track 14. The orange numbers represent CTD cast locations. The yellow numbers represent recorded acoustical contacts. Breaks in data occur when either data quality is poor or the systems were turned off due to pump problems.

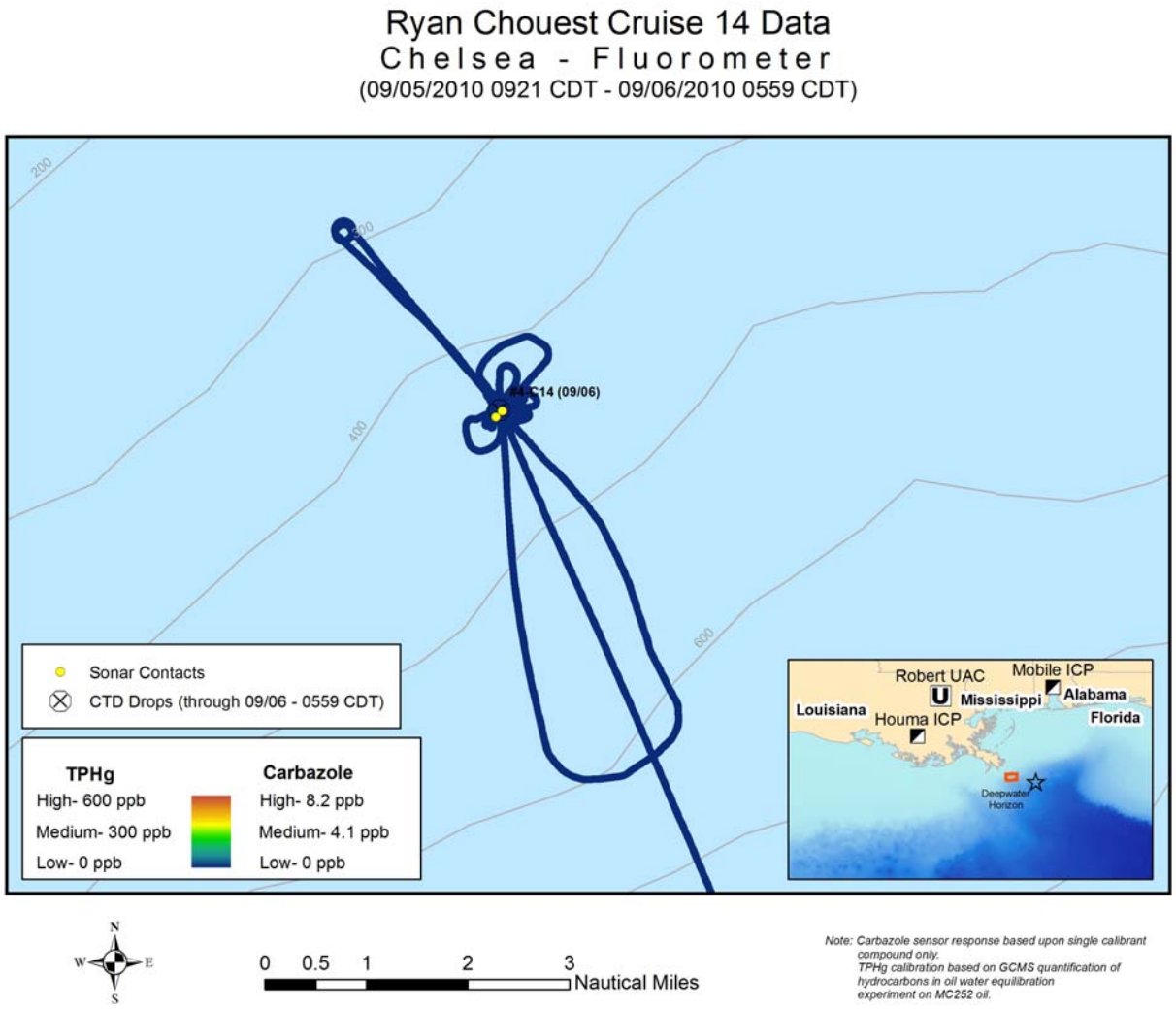

Figure 2B. Chelsea fluorometer results plotted 09/05 – 09/06. The yellow dots represent recorded acoustical contacts.

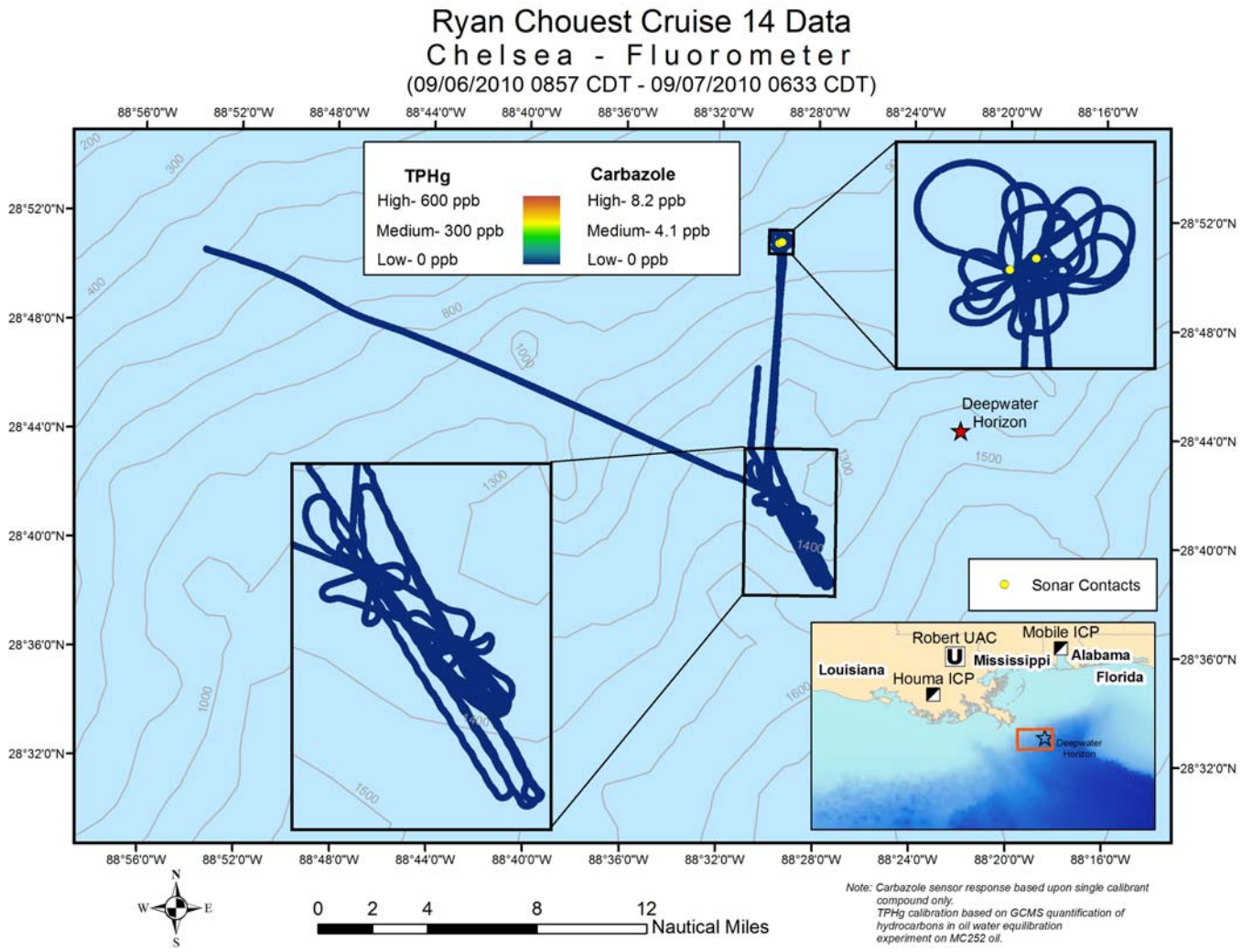

Figure 2C. Chelsea fluorometer results plotted 09/05 – 09/06. The yellow dots represent CTD Casts

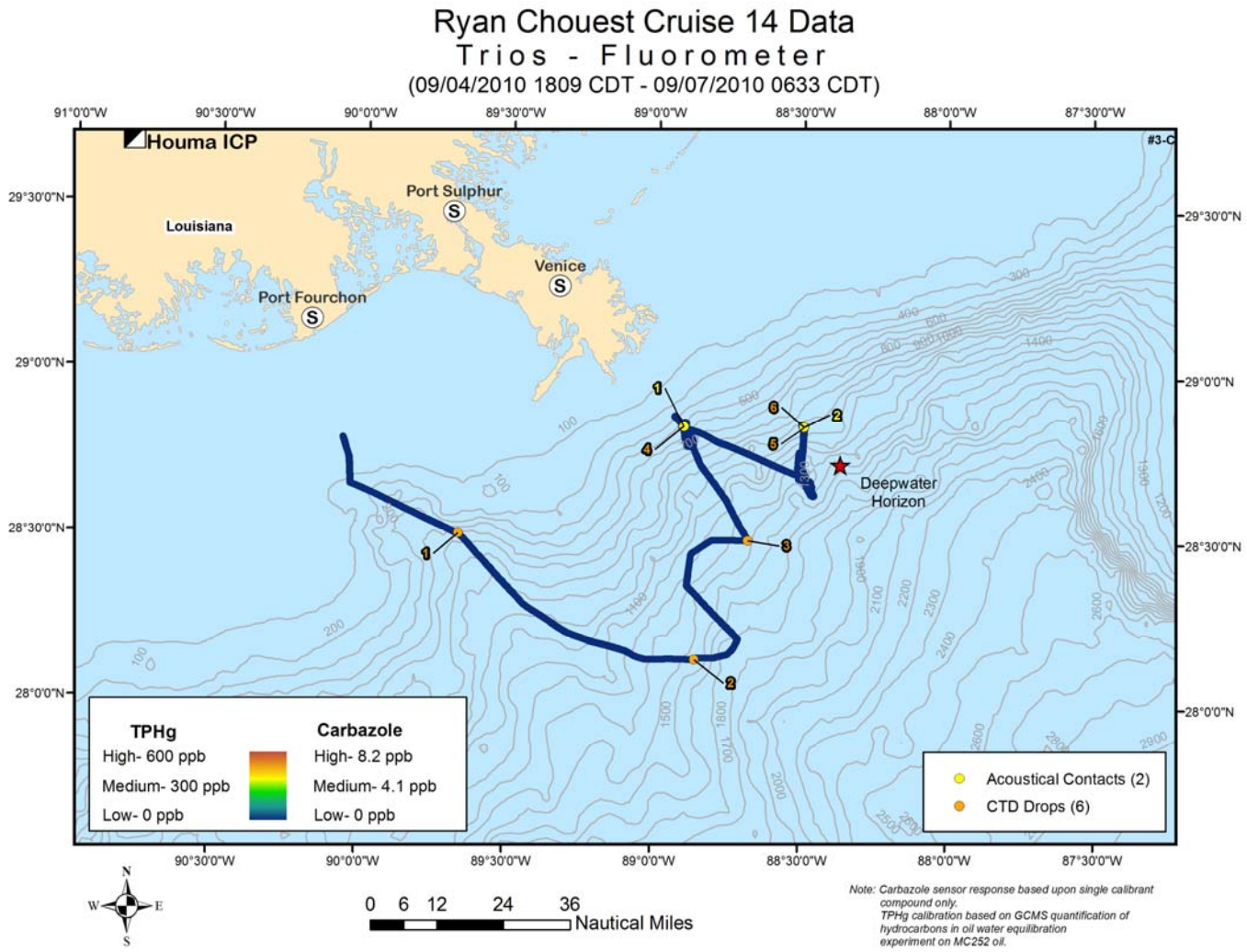

Figure 3A. Trios fluorometer results plotted with location on cruise track 14. Breaks in data occur when either data quality is poor or the systems were turned off due to pump problems.

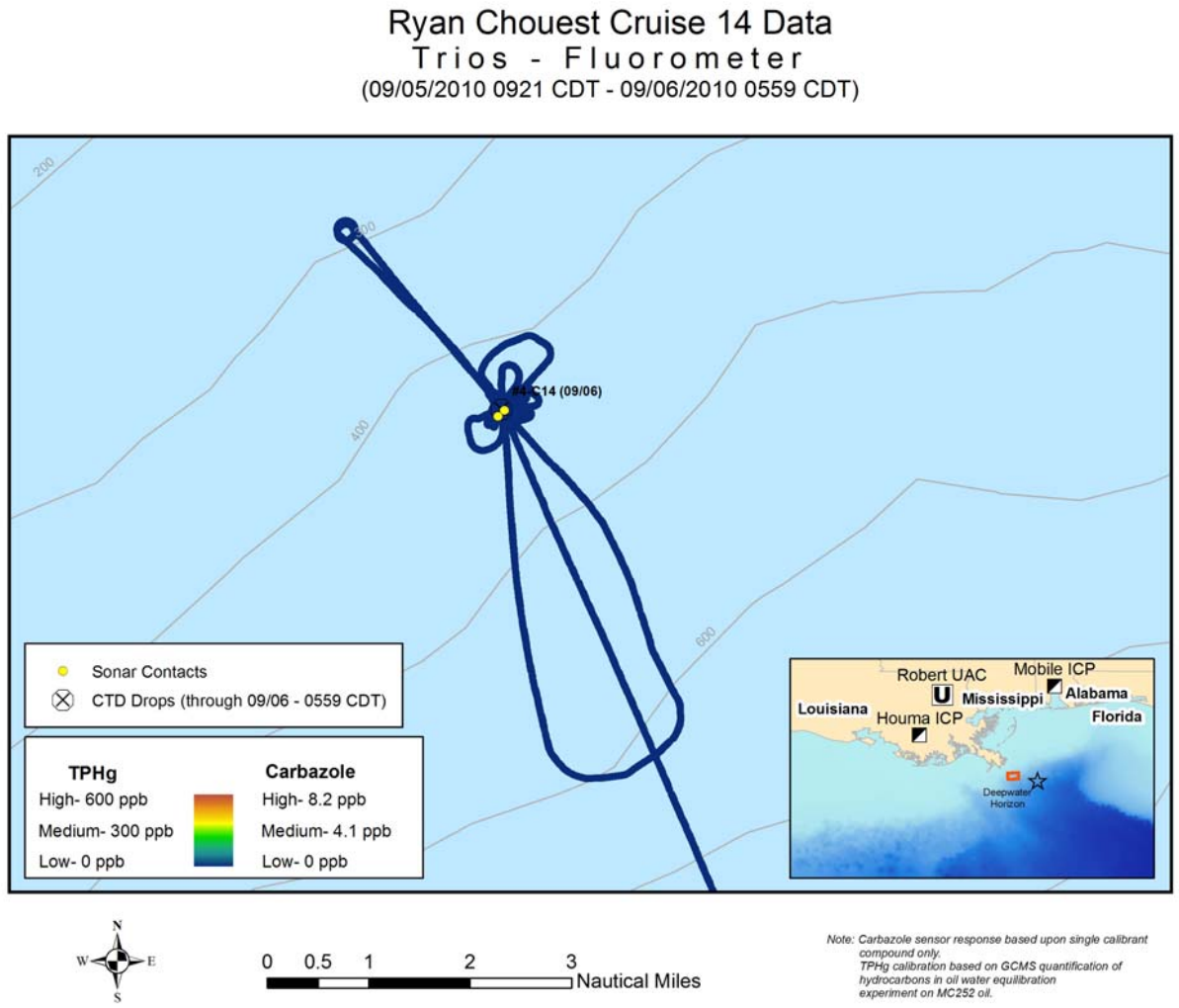

Figure 3B. Trios fluorometer results plotted with location on cruise track 14. Breaks in data occur when either data quality is poor or the systems were turned off due to pump problems.

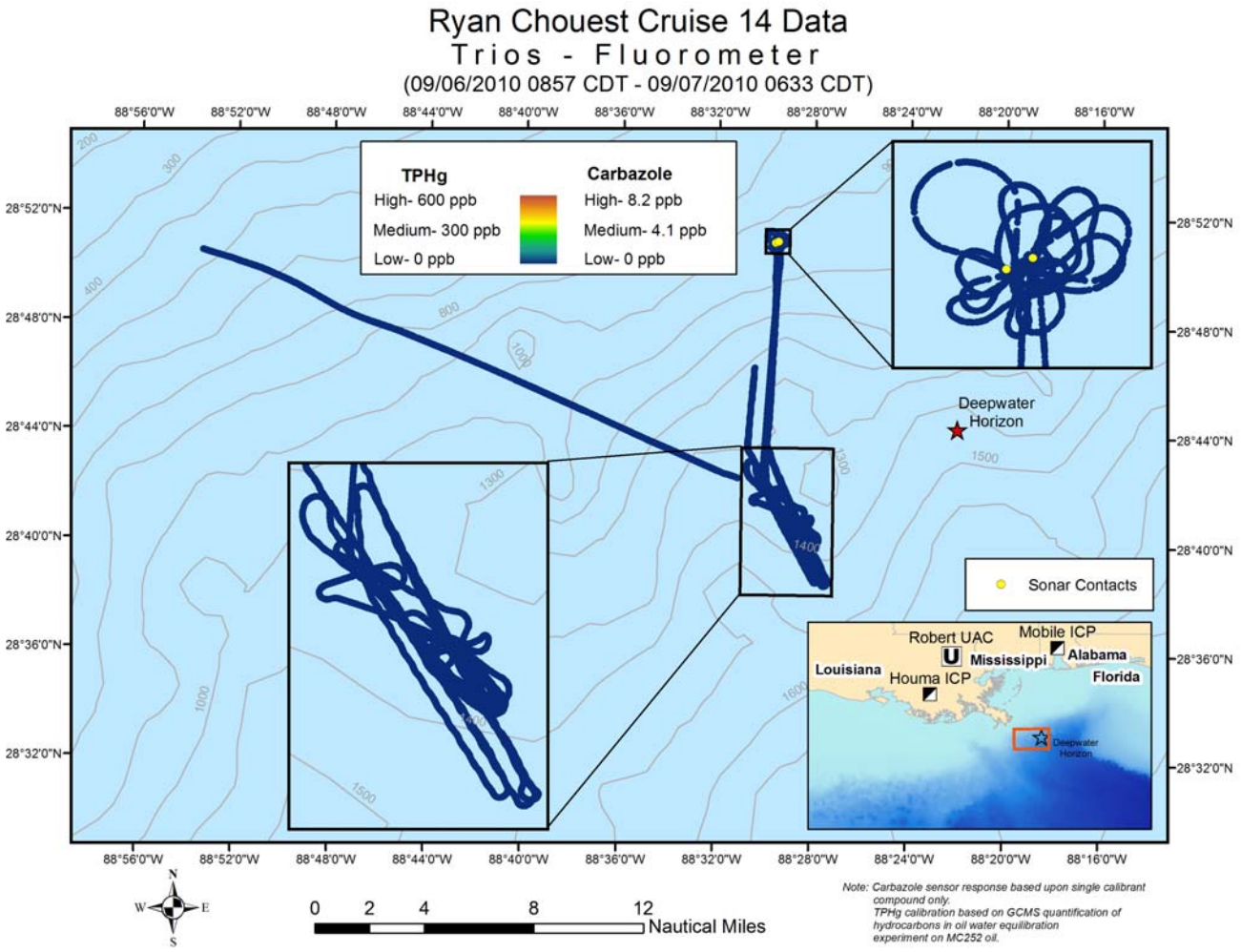

Figure 3C. Trios fluorometer results plotted with location on cruise track 14. Breaks in data occur when either data quality is poor or the systems were turned off due to pump problems.

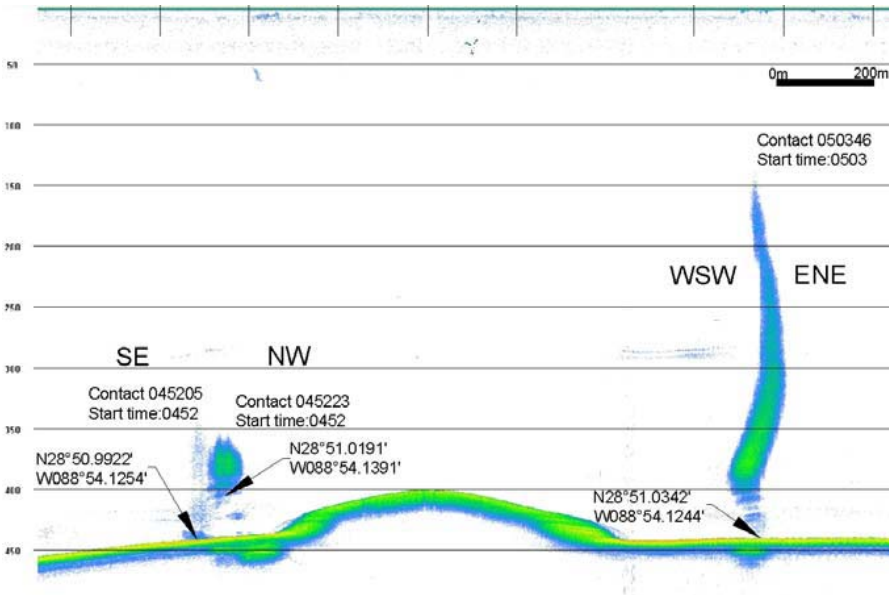

Figure 4. This line is oriented initially from Southeast on the left to Northwest and then Westsouthwest to Eastnortheast. a) Contact_09062010_045205. Description: Bottom contact. Time (CST): 09/05/2010 23:52:05. Location: 28° 50.9922N, 88° 54.1254W. Depth: 344.5m to 443.5m. b) Contact_09062010_045223. Description: Near bottom contact. Time (CST): 09/05/2010 23:52:23. Location: 28° 51.0191N; 88° 54.1391W. 357.5m to 410.5m. c) Contact_09062010_050346. Description: Bottom to midwater contact. Time (CST): 09/06/2010 00:03:46. Location: 28° 54.1244N, 88° 54.1244W. Depth: 126.0m to 437.2m

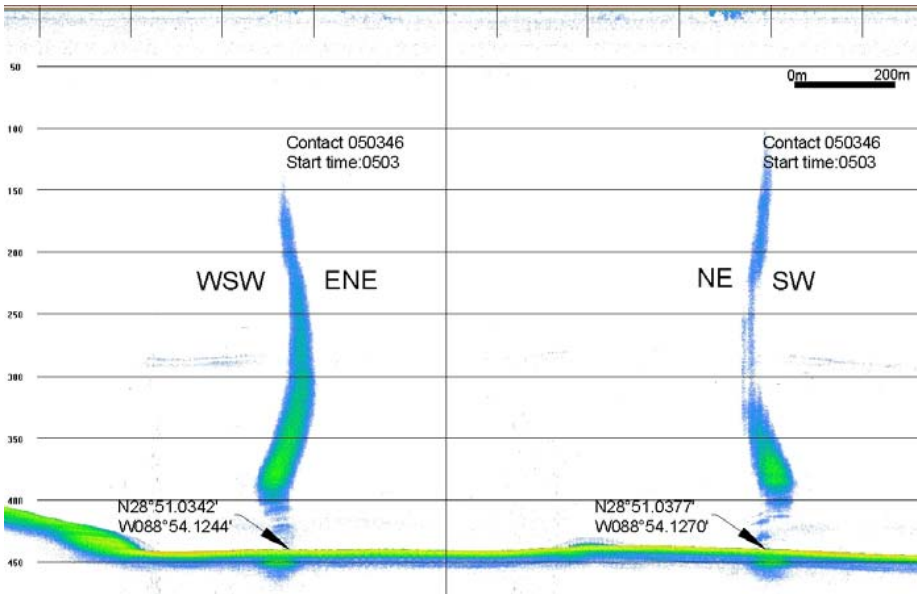

Figure 5. This line is oriented initially from Westsouthwest on the left to Eastnortheast and then Northeast to Southwest. a) Contact_09062010_050346. Description: Bottom to midwater contact. Time (CST): 09/06/2010 00:03:46. Location: 28° 51.0342N, 88° 54.1244W. Depth: 126.0m to 437.2m. b) Contact_09062010_051224. Description: Bottom to midwater contact. Time (CST): 09/06/2010 00:12:24. Location: 28° 51.0377N; 88° 54.1270W. Depth: 93.5m to 438.9m.

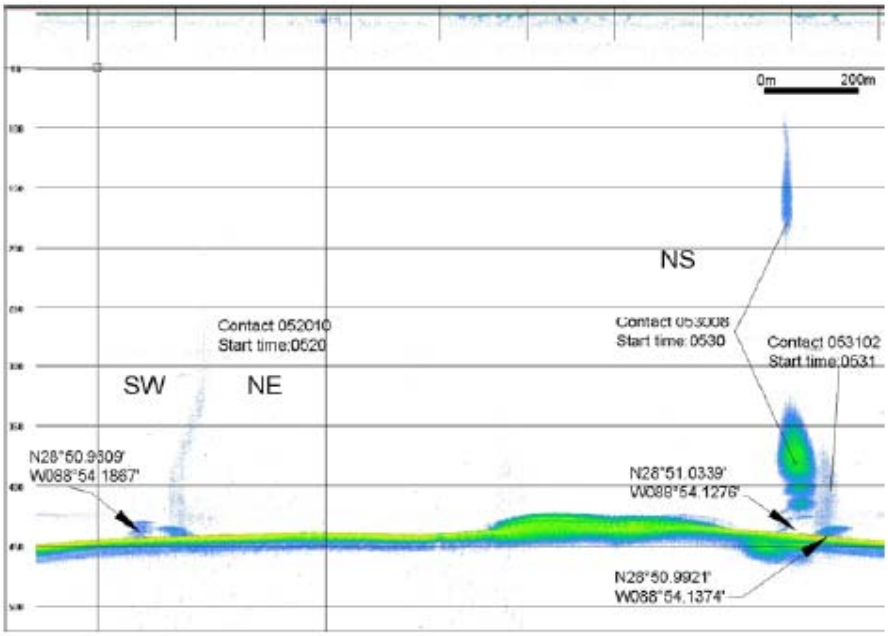

Figure 6. This line is oriented initially from Southwest on the left to Northeast. a) Contact_09062010_052010. Description: Bottom contact. Time (CST): 09/06/2010 00:20:10. Location: 28° 50.9690N, 88° 54.1867W. Depth: 426.9m to 441.1m. b) Contact_09062010_053008. Description: Near bottom contact. Time (CST): 09/06/2010 00:30:08. Location: 28° 51.0339N; 88° 54.1276W. 86.3m to 432.0. c) Contact_09062010_053102. Description: Bottom contact. Time (CST): 09/06/2010 00:31:02. Location: 28° 54.9921N, 88° 54.1374W. Depth: 359.1m to 440.4.

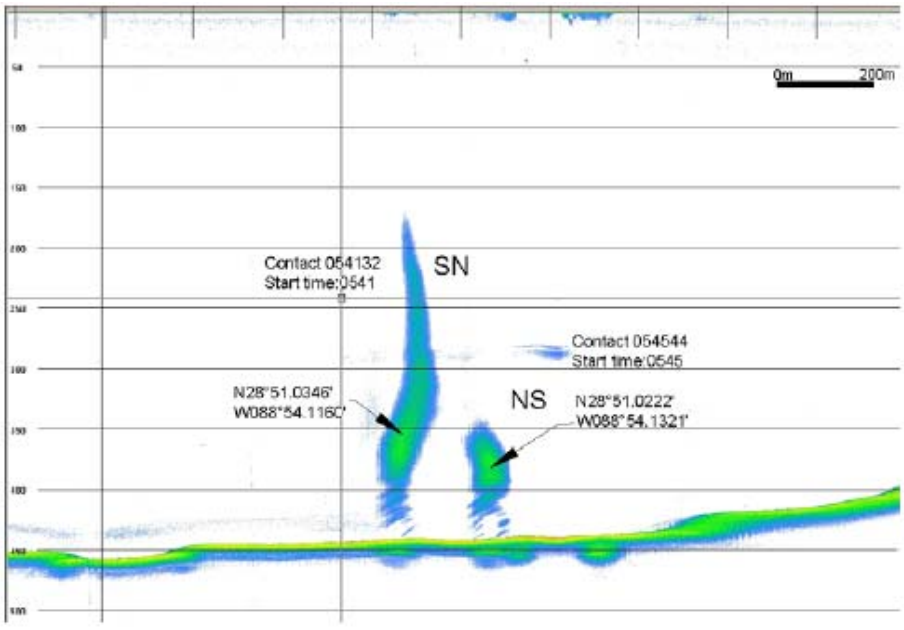

Figure 7. This line is oriented from Southnorth on the left to Northsouth. a) Contact_09062010_054132. Description: Bottom contact. Time (CST): 09/06/2010 00:41:32. Location: 28° 51.0346N, 88° 54.1160W. Depth: 166m to 440.5m. b) Contact_09062010_054544. Description: Bottom contact. Time (CST): 09/06/2010 00:45:44. Location: 28° 51.0222N; 88° 54.1321W. 212.3m to 438.8m.

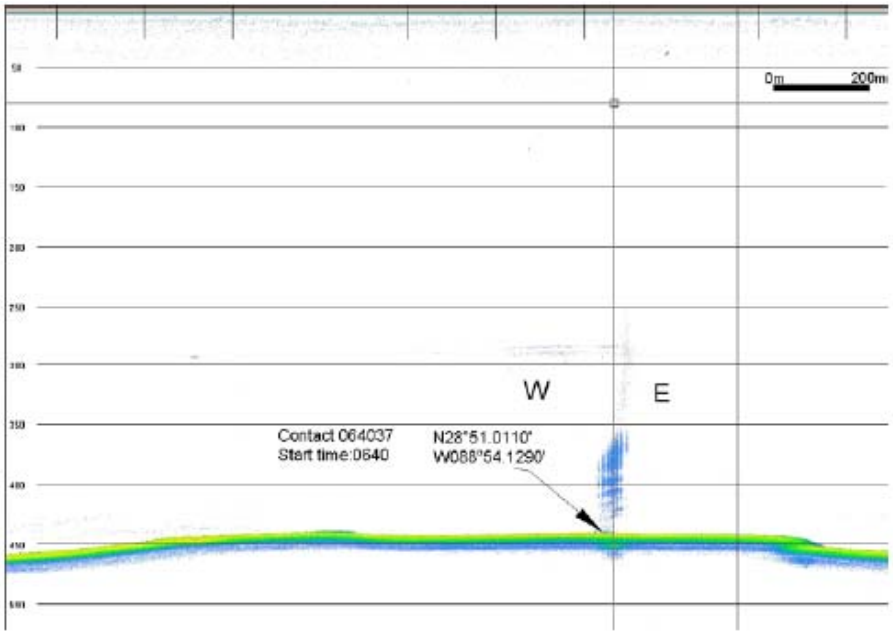

Figure 8. This line is oriented from West on the left to East. a) Contact_09062010_064037. Description: Bottom to midwater contact. Time (CST): 09/06/2010 01:40:37. Location: 28° 51.0110N, 88° 54.1290W. Depth: 159.6m to 437.2m.

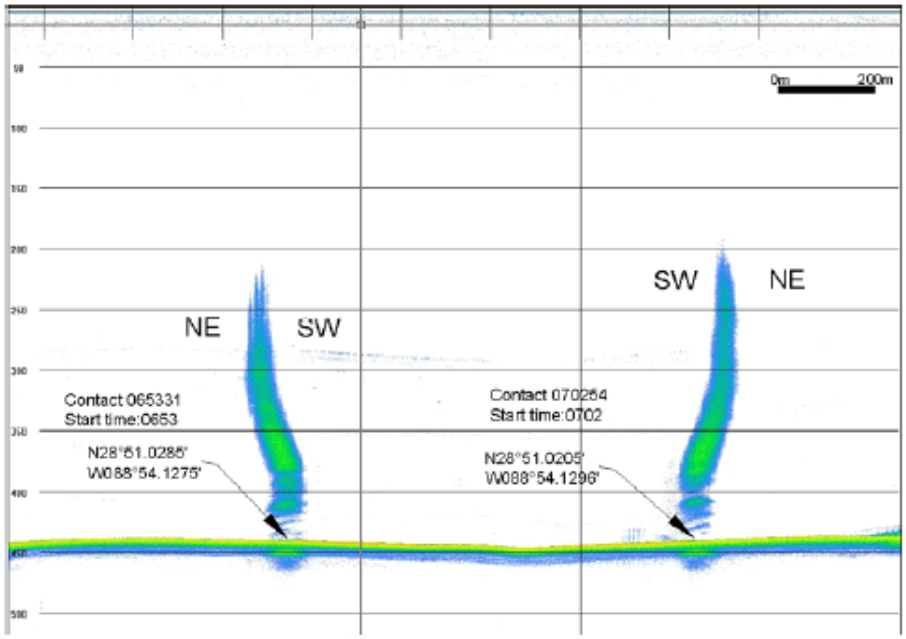

Figure 9. This line is oriented initially from Northeast on the left to Southwest and then from Southwest to Northeast. a) Contact_09062010_065331. Description: Bottom to midwater contact. Time (CST): 09/06/2010 01:53:31. Location: 28° 51.0285N, 88° 54.1275W. 208.3m to 437.7m. b) Contact_09062010_070254. Description: Bottom to midwater contact. Time (CST): 09/06/2010 02:02:54 Location: 28° 51.0205N; 88° 54.1296W. 182.7m to 437.5m.

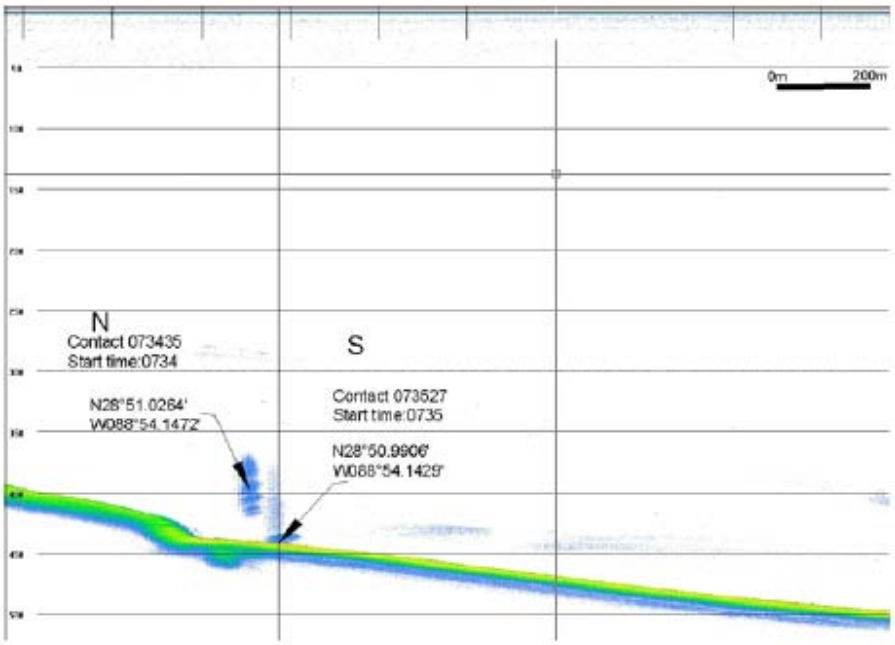

Figure 10. This line is oriented from North on the left to South. a) Contact_09062010_073435. Description: Near bottom contact. Time (CST): 09/06/2010 02:34:35. Location: 28° 51.0264N, 88° 54.1472W. 365.1m to 420.6m. b) Contact_09062010_073527. Description: Bottom contact. Time (CST): 09/06/2010 02:35:27. Location: 28° 50.9906N; 88° 54.1429W. Depth: 364.1m to 441.5m.

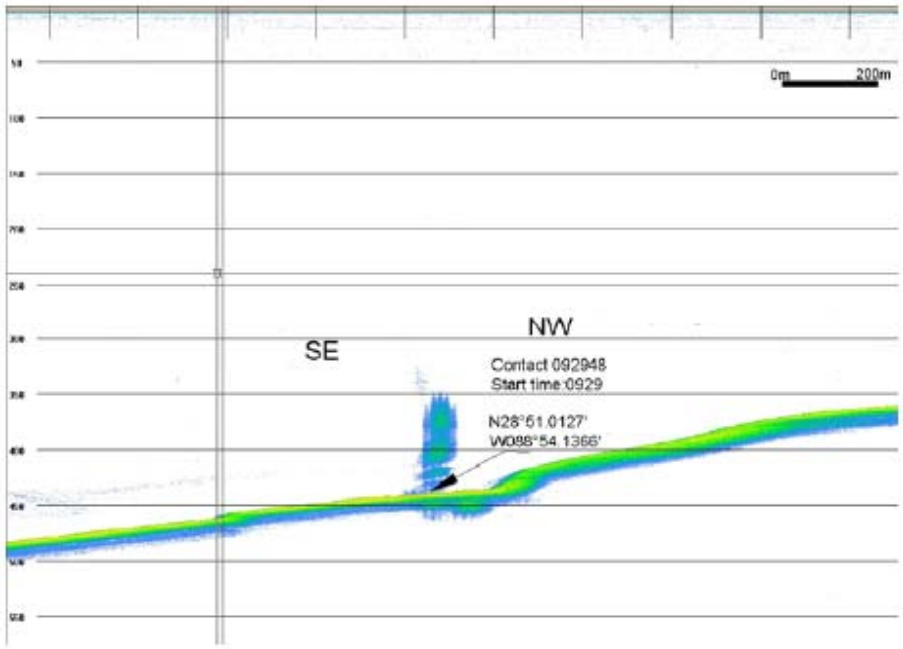

Figure 11. This line is oriented from Southeast on the left to Northwest. a) Contact_09062010_092948. Description: Bottom contact. Time (CST): 09/06/2010 04:29:48. Location: 28° 51.0127N, 88° 54.1366W. Depth: 312m to 435.3m.

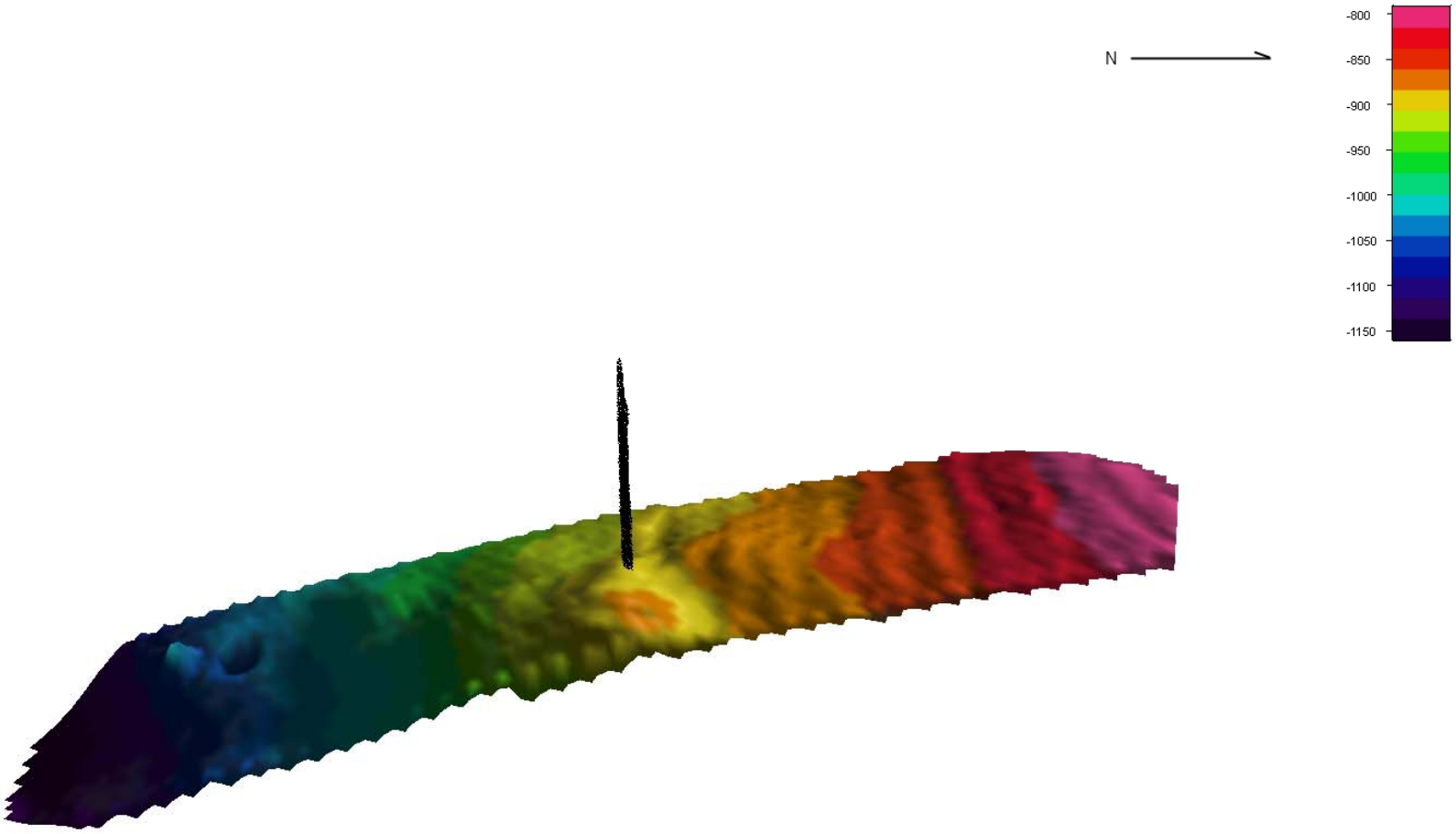

Figure 12. 3D image of the 'plume' from the contact at 28° 54.1244N, 88° 54.1244W, reconstructed from the cumulative echo sounder scans.

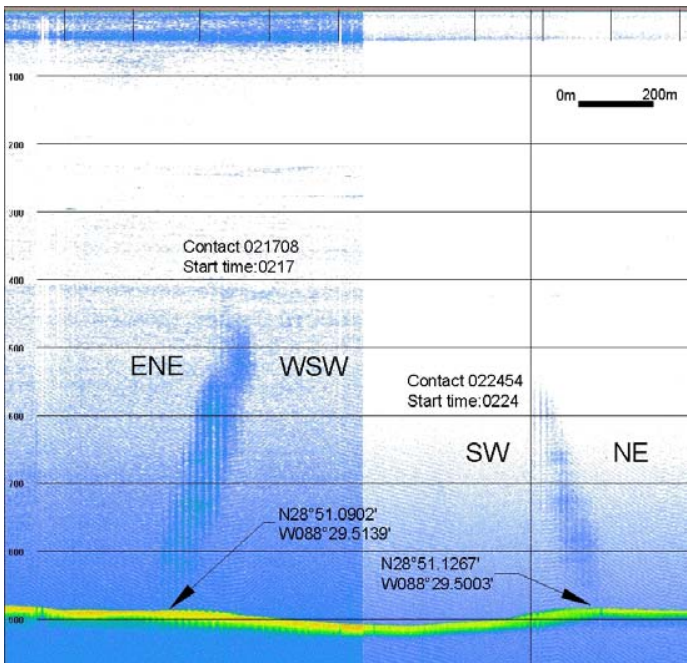

Figure 13. This line is oriented initially from Southeast on the left to Northwest and then Westsouthwest to Eastnortheast. a) Contact_09072010_021708. Description: Near bottom contact seep investigation. Time (CST): 09/06/2010 21:17:08. Location: 28° 51.0902N, 88° 29.5139W. Depth: 458.9m to 856.3m. b) Contact_09072010_022454. Description: Bottom contact. Time (CST): 09/06/2010 21:24:54. Location: 28° 51.1267N; 88° 29.5003W. 544.9m to 881.9m.

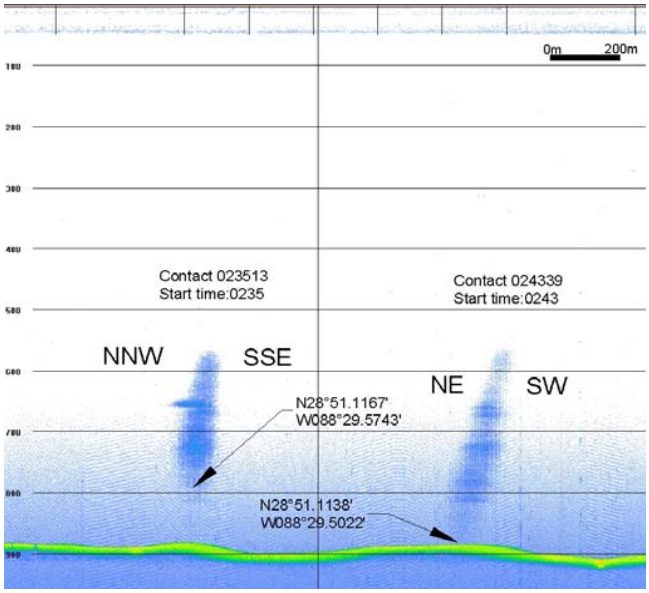

Figure 14. This line is oriented initially from Northnorthwest on the left to Southsoutheast and then Northeast to Southwest. a) Contact_09072010_023513. Description: Near bottom contact. Time (CST): 09/06/2010 21:35:13. Location: 28° 51.1167N, 88° 29.5743W. Depth: 559.6m to 812.3m. b) Contact_09072010_024339. Description: Bottom contact. Time (CST): 09/06/2010 21:43:39. Location: 28° 51.1138N; 88° 29.5022W. Depth: 552.5m to 864.2m.

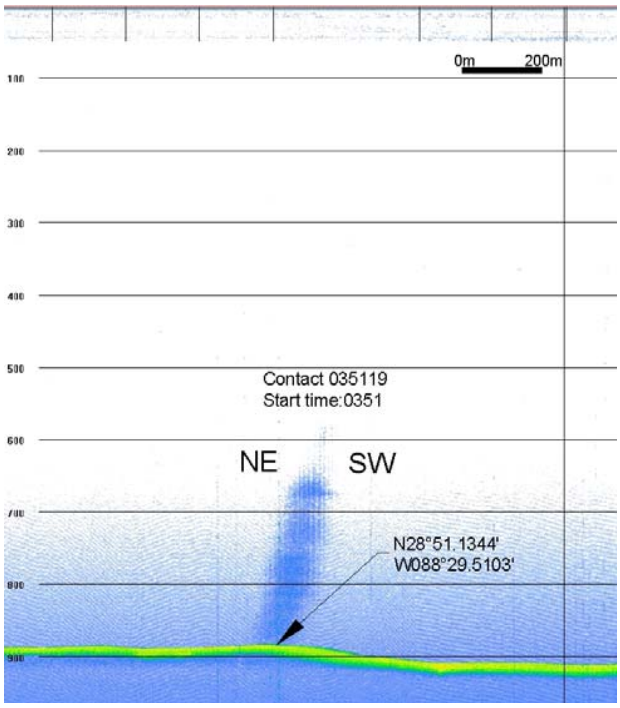

Figure 15. This line is oriented initially from Northeast on the left to Southwest. a) Contact_09072010_035119. Description: Bottom contact. Time (CST): 09/07/2010 22:51:19. Location: 28° 51.1344N, 88° 29.5103W. Depth: 574.5m to 885.1m.

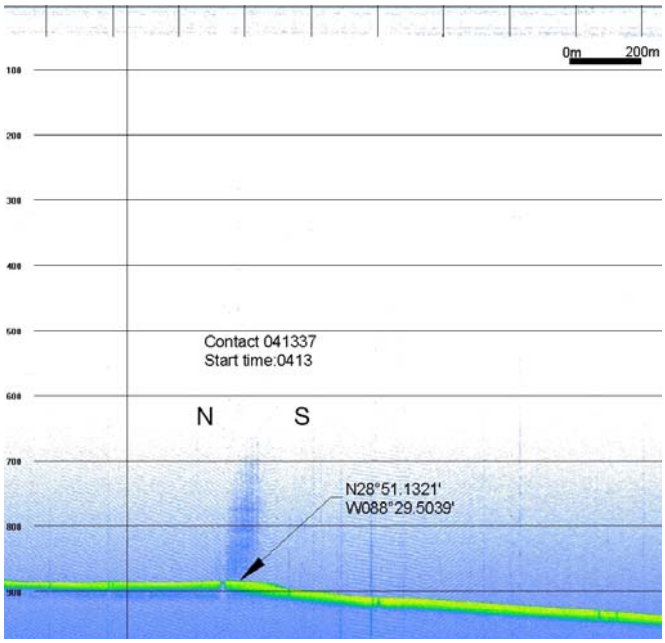

Figure 16. This line is oriented from North on the left to south. Contact_09072010_041337. Description: Bottom contact. Time (CST): 09/07/2010 23:13:19. Location: 28° 51.1321N, 88° 29.5039W. Depth: 668.6m to 888.9m.

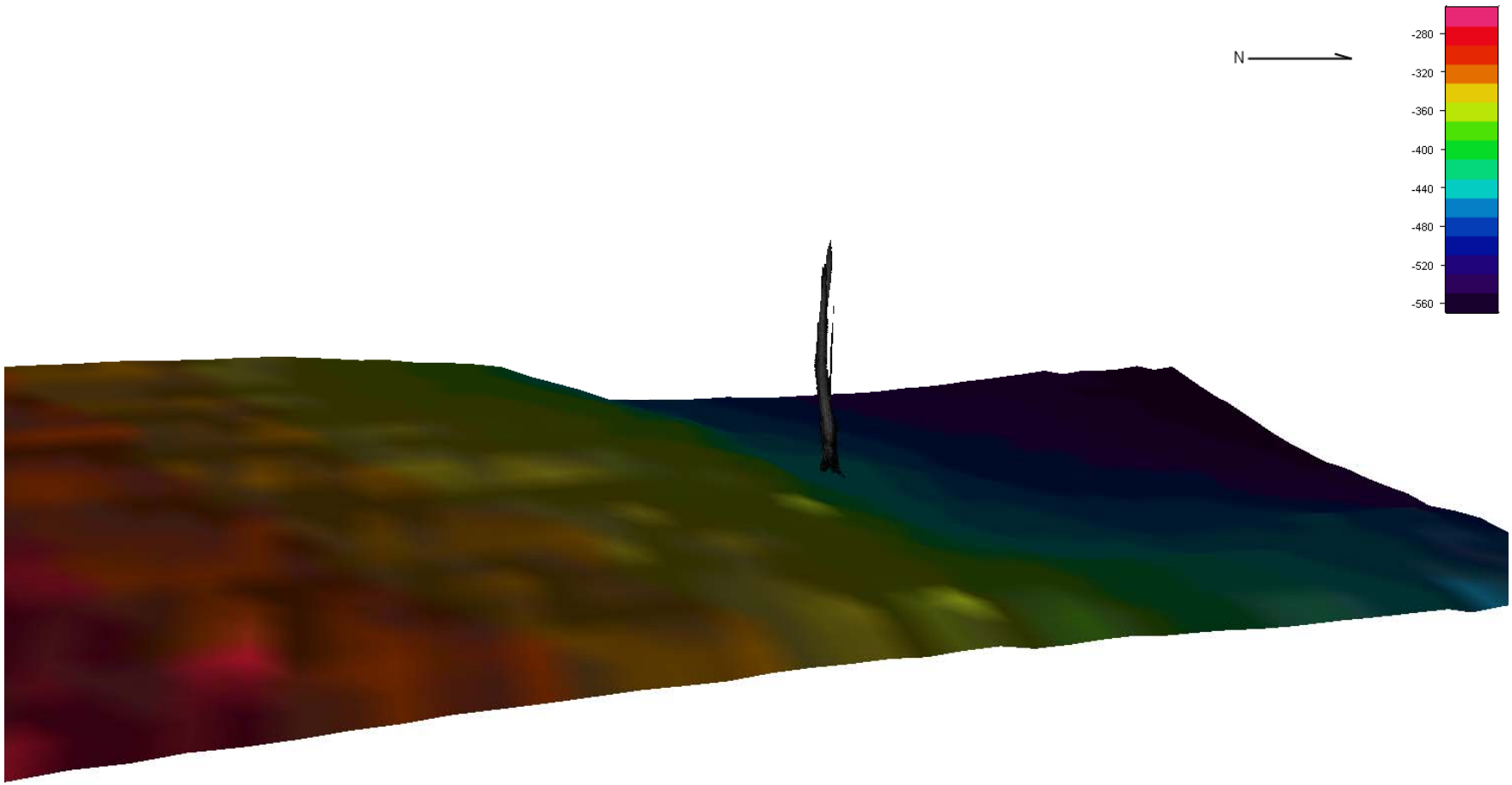

Figure 17. 3D image of the 'plume' from the contact at 28° 51.0902N, 88° 29.5139W , reconstructed from the cumulative echo sounder scans.

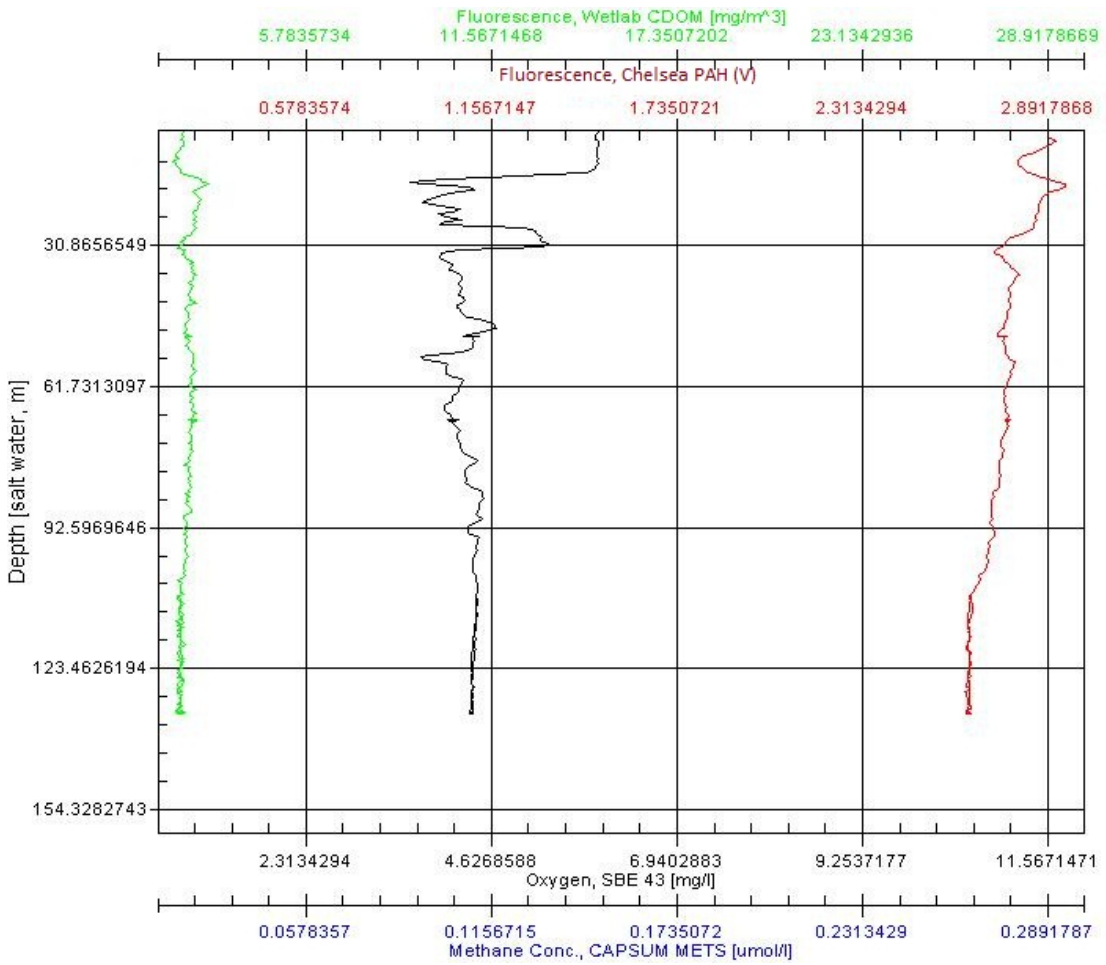

Figure 18. CDOM fluorescence, PAH fluorescence, dissolved oxygen, and methane concentration profiles. The results were obtained for Cruise 14 CTD cast 1 down to 140 m. Water samples were collected at 55m and 66m. Temperature, conductivity and water depth measurements were also recorded from a SBE 19+ system.

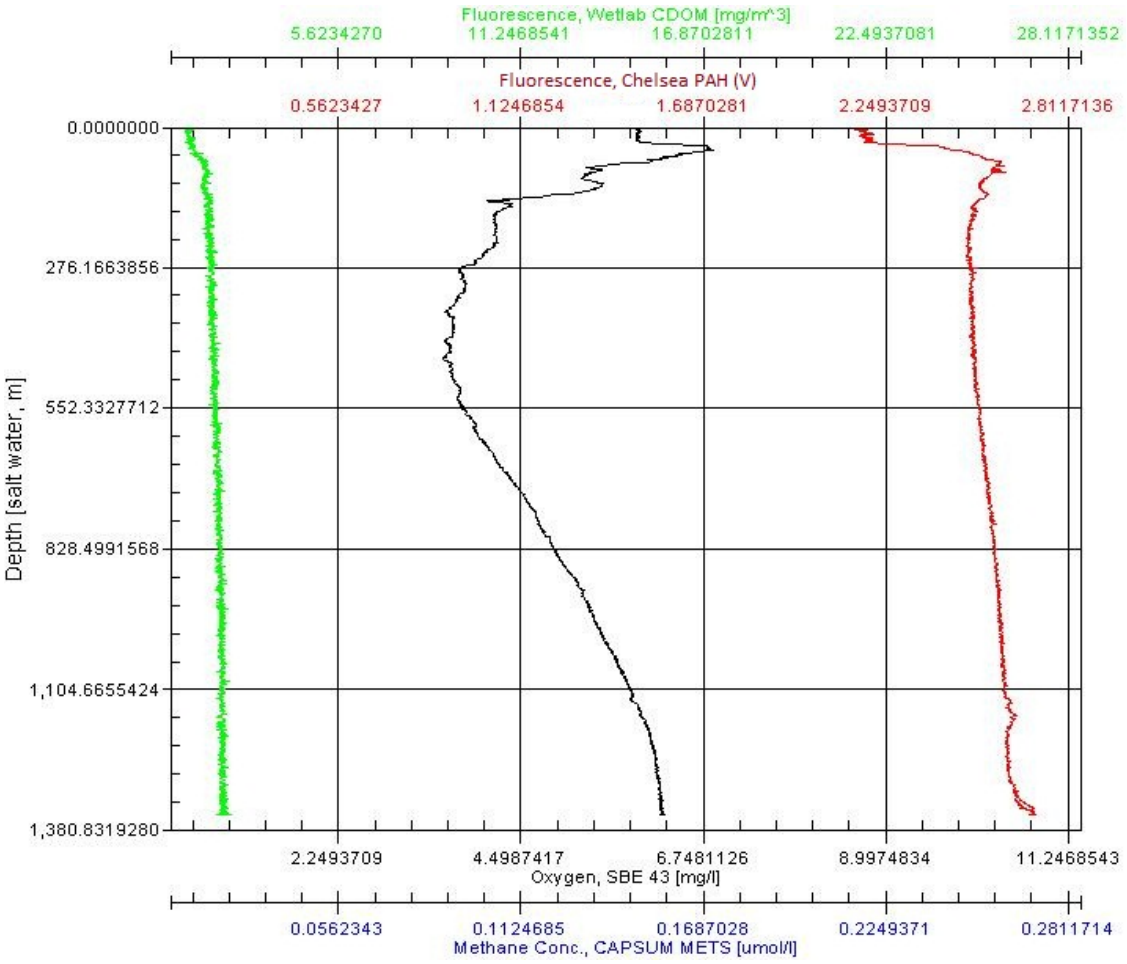

Figure 19. CDOM fluorescence, PAH fluorescence, dissolved oxygen, and methane concentration profiles. The results were obtained for Cruise 14 CTD cast 2 down to 1300 m. Water samples were collected at 1353m, 1250m, 1160m, 1130m and 1020m. Temperature, conductivity and water depth measurements were also recorded from a SBE 19+ system.

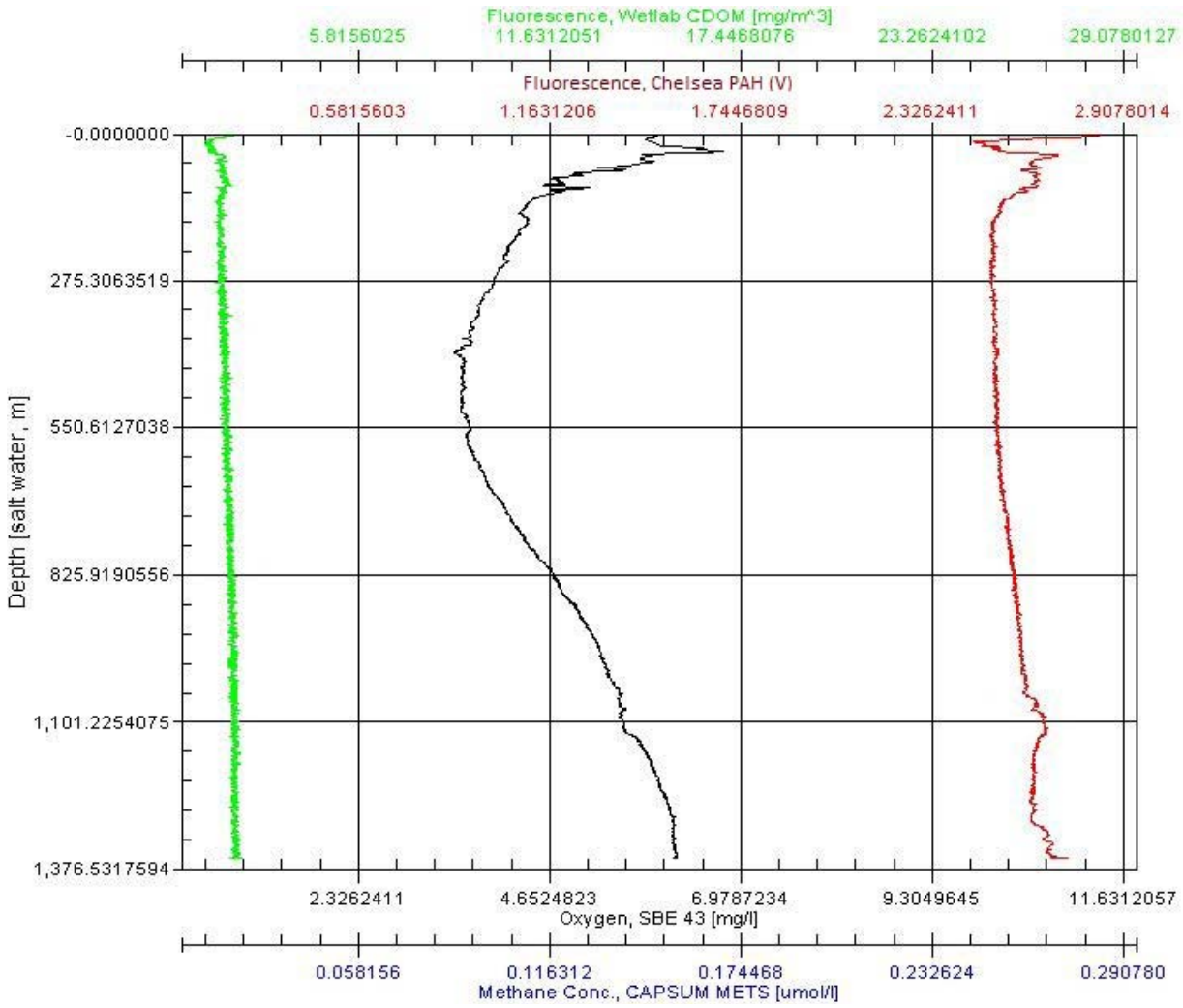

Figure 20. CDOM fluorescence, PAH fluorescence, dissolved oxygen, and methane concentration profiles. The results were obtained for Cruise 14 CTD cast 3 down to 1300 m. Water samples were collected at 1360m, 1190m, 1125m and 1000m. Temperature, conductivity and water depth measurements were also recorded from a SBE 19+ system.

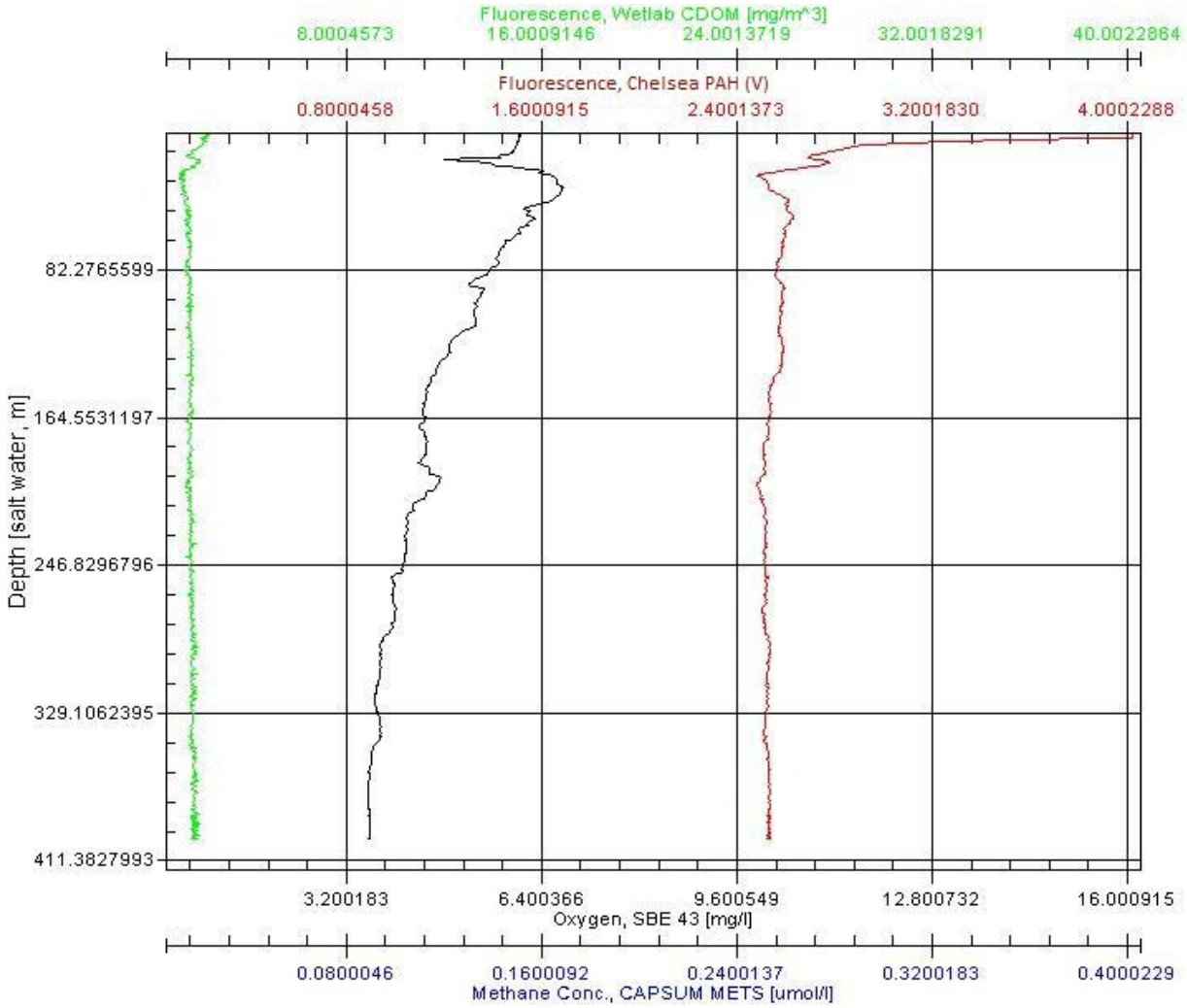

Figure 21. CDOM fluorescence, PAH fluorescence, dissolved oxygen, and methane concentration profiles. The results were obtained for Cruise 14 CTD cast 4 down to 400 m. Water samples were collected at 350m, 340m, 285m, 200m and 130m. Temperature, conductivity and water depth measurements were also recorded from a SBE 19+ system.

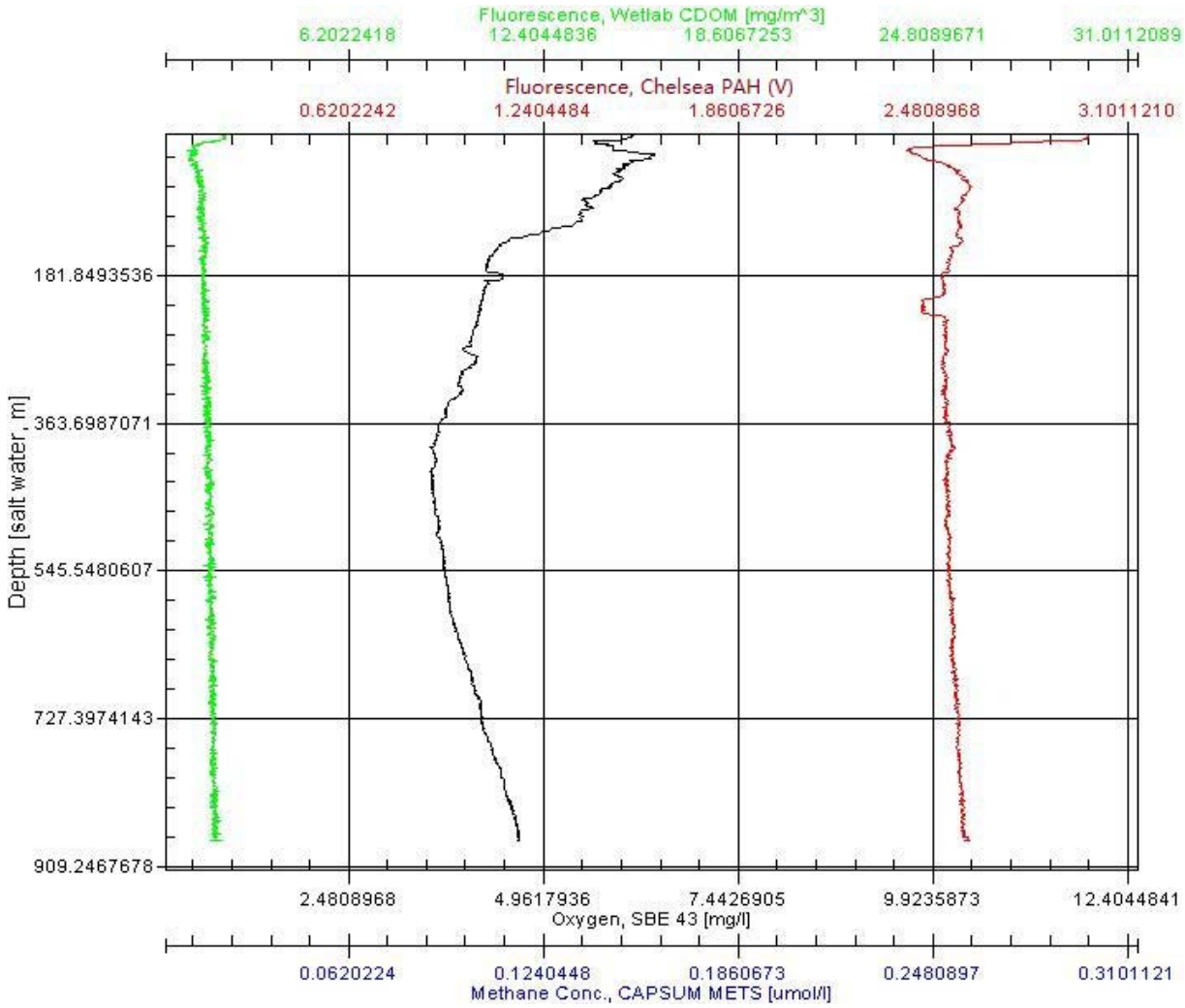

Figure 22. CDOM fluorescence, PAH fluorescence, dissolved oxygen, and methane concentration profiles. The results were obtained for Cruise 14 CTD cast 5 down to 880 m. Water samples were collected at 877m, 750m, 600m and 220m. Temperature, conductivity and water depth measurements were also recorded from a SBE 19+ system.

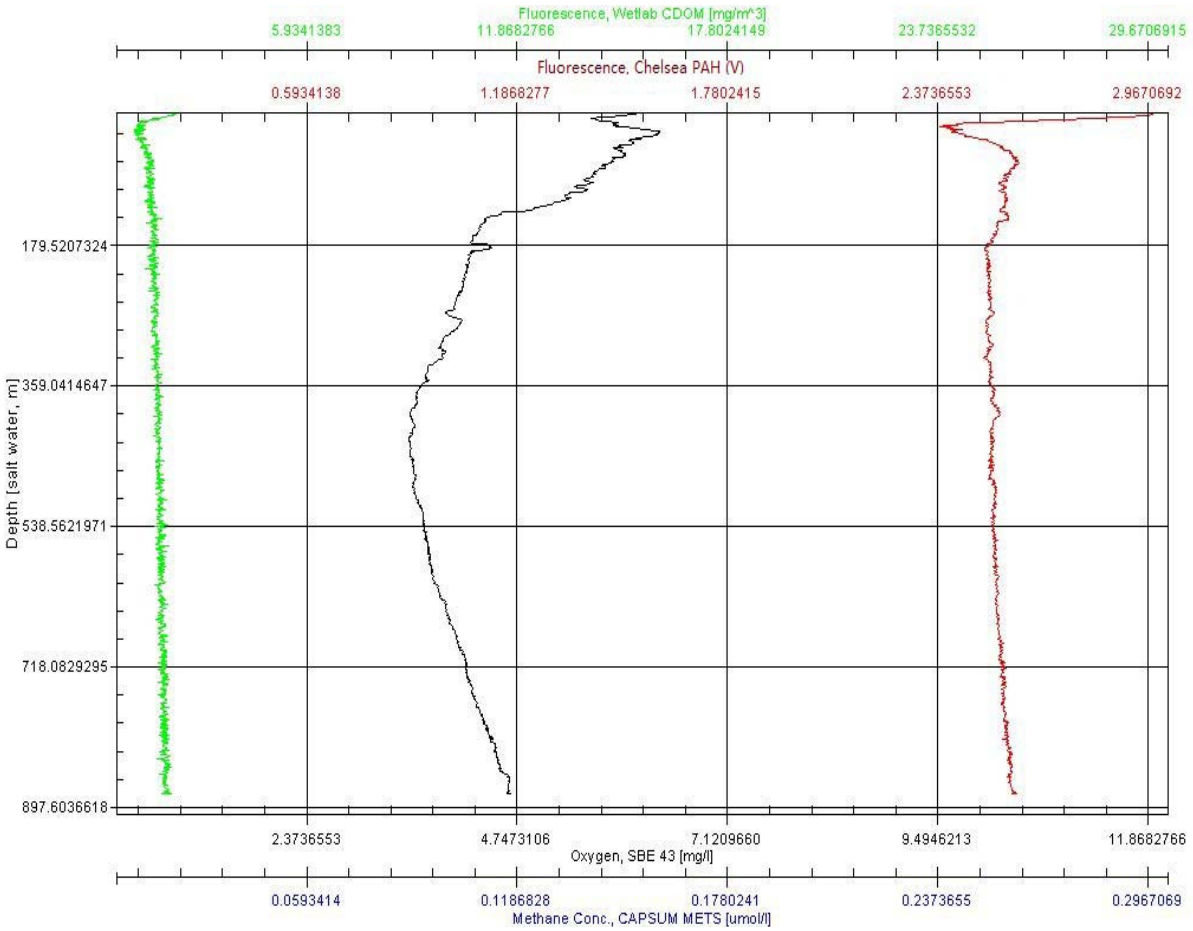

Figure 23. CDOM fluorescence, PAH fluorescence, dissolved oxygen, and methane concentration profiles. The results were obtained for Cruise 14 CTD cast 6 down to 890 m. Water samples were collected at 870m, 750m, 600m, 390m and 220m. Temperature, conductivity and water depth measurements were also recorded from a SBE 19+ system.

Science Operations:

Observations of sea-surface conditions were made throughout the cruise. CTD cast data was collected from a total of six completed casts. The EK-60 echo sounder is continuously collecting data to evaluate the seabed and water column for possible seeps.

Problems/operational issues:

During cruise 14 there were minimal operational problems.

Grease was found on the CTD winch cable and a quick test showed that deionised water in contact with the grease collected from the winch cable could trigger a higher response in the Chelsea fluorometer. A sample of the grease was also taken for GCMS analysis in order to make further assessment of potential contamination issues.

The Contros methane sensor cannot be integrated with the CTD system because of its high power requirement at start up. We are seeking to purchase additional battery with higher current output. A semiconductor type of Methane sensor is in use now, however has not given valid values during the last vertical casts. We are in communication with the manufacture and SEABIRD to obtain an underwater battery for the power supply of the Contros methane sensor; however the earliest delivery time for the Methane sensor deep water battery will not be until 20th September.

GC column was replaced.

Photo 1. CTD Rosette deployment deck and A-frame

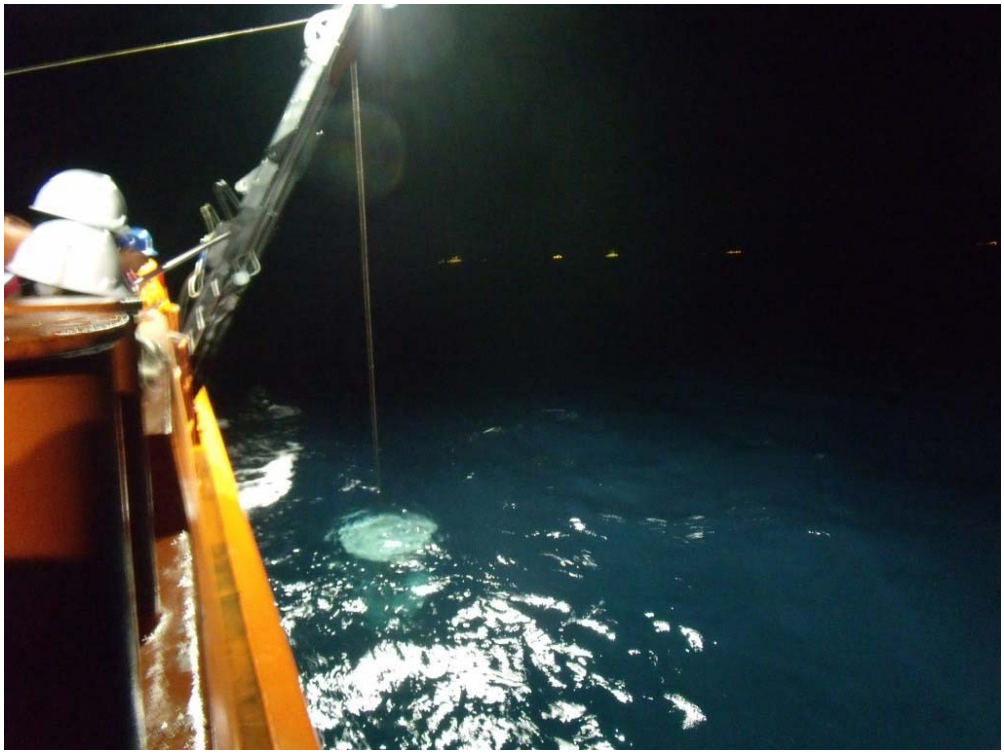

Photo 2. CTD deployment at test cast location # 1.

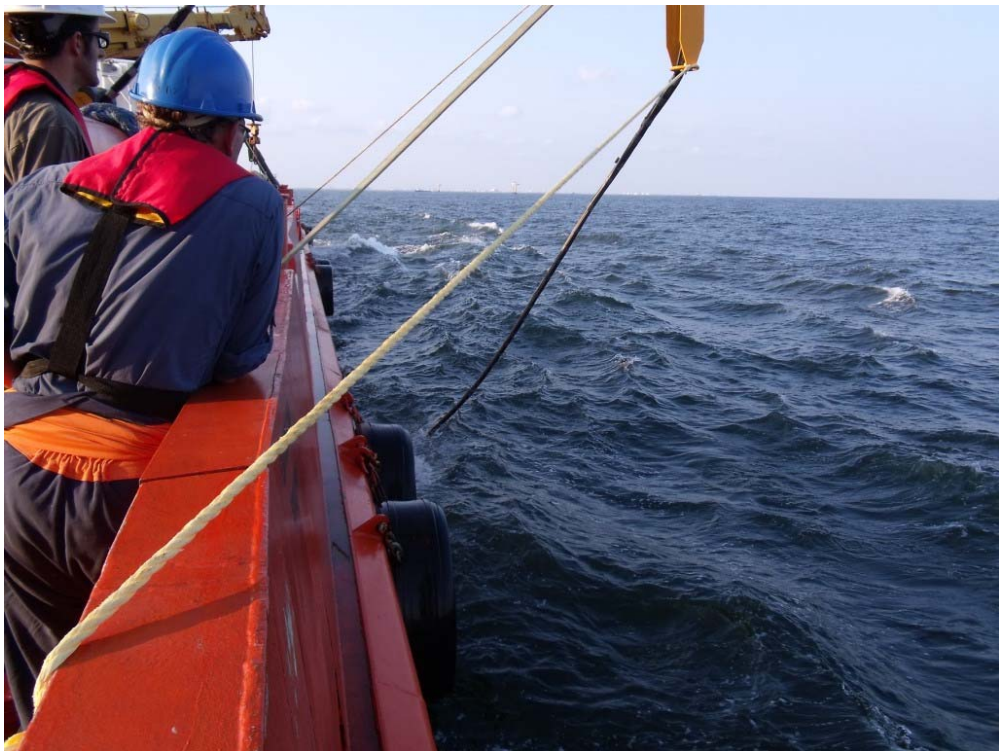

Photo 3. Revised underway pump deployment setup.

Planned activities for next 24 hours and next cruise:

The Ryan Chouest docked in port at Theodore for scheduled personnel and crew change, cruise up-date and groceries delivery. Two Wave Gliders were loaded on to the vessel for deployment during Cruise 15, which is scheduled to start on 09/09. There are two main objectives planned for Cruise 15. The first objective is to deploy two satellite-controlled, unmanned vehicles, known as Wave Gliders, and the second objective is to survey natural seeps located in the Desota Canyon area located to the NE of the wellhead using the echosounder and CTD equipment. The collection of underway fluorometery data will be continuous throughout the duration of the Cruise.

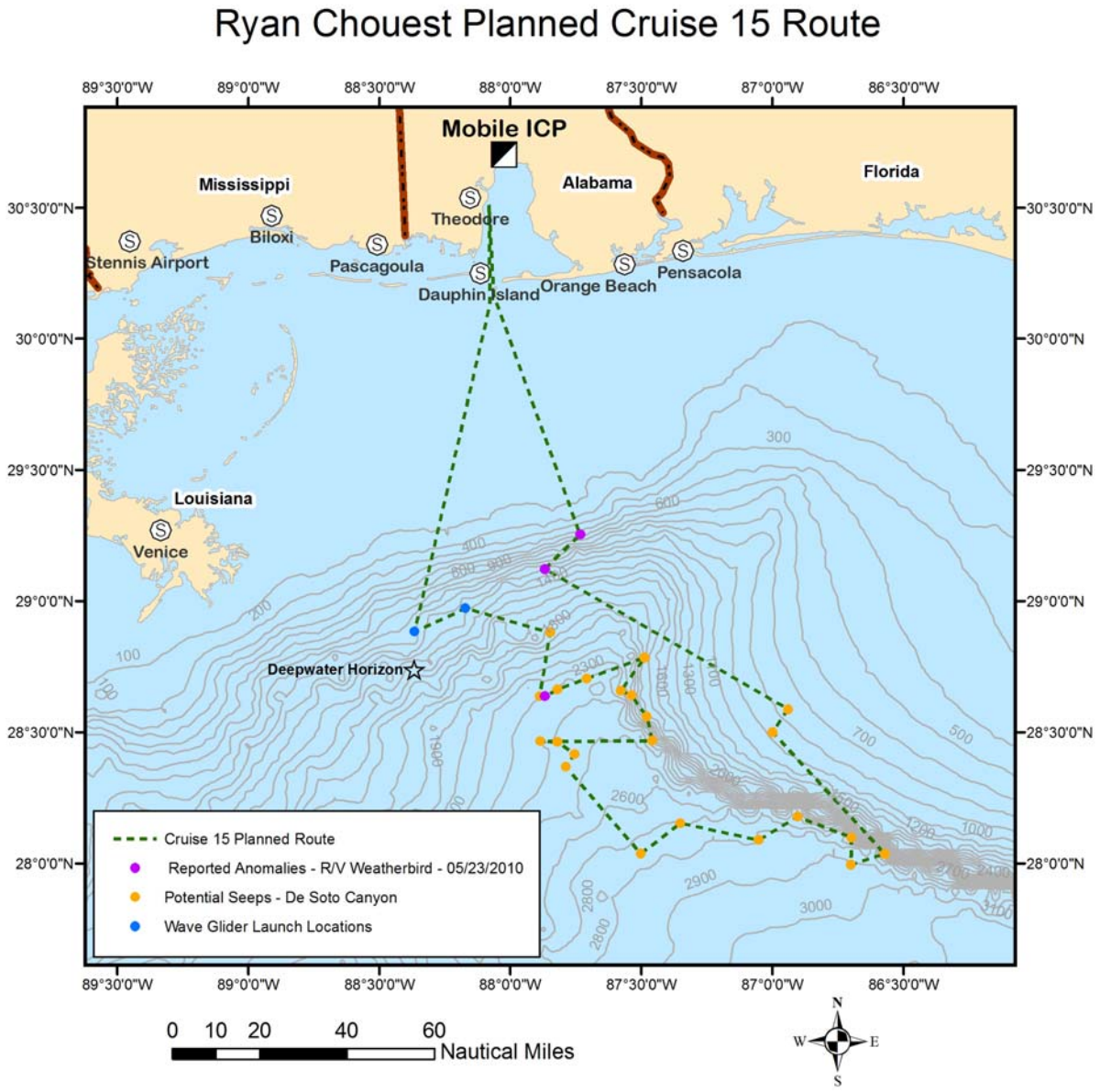

Figure 24. Planned route for Cruise 15 between 09/09/2010 – 09/15/2010 of the Ryan Chouest.

Full crew list before crew change:

Eric Houston	BP	William Smith	MASTER
Brett Bundick	C&C	Brian Corley	Mate
Mathew Baham	C&C	Mark Harmon	A/B
Bobby Patrick	C&C	Ricky Matherne	A/B
Tim MacEwen	C&C	Robert Thompson	ENG
Craig Smith	C&C	Patric Cousin	A/B
Emily Burke	C&C	Trever Dorics	A/B
Xiubin Qi	CSIRO	Kevin Hartley	Qmed
Charlotte Staivies	CSIRO	Jason Bednarski	A/B/Cook
Andy Revill	CSIRO	Steve Morgan	O/S
Stephane Armand	CSIRO	Josh Chauffe	Crane Op
Curtis Walker	Entrix	Larry Luke	Crane Op
Collen Fanelli	NOAA	Rebecca Tedford	BP