GULF OF MEXICO CRUISE REPORT
HIGH RESOLUTION MULTICHANNEL, 2.5D, AND 3D SEISMIC SURVEY
HOSPITAL ROCK SEISMIC SURVEY ON THE R/V LONGHORN
22 OCTOBER 1996 TO 06 NOVEMBER 1996

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The following is a technical summary for the Gulf of Mexico cruise aboard the R/V *Longhorn* beginning on 10/22 and ending on 11/06/96. The southwestern Gulf of Mexico high resolution survey was a joint project between Rice University and IFREMER. The cruise incorporated multichannel, 2.5D, and 3D seismic techniques.

Seismic acquisition was digital using the Elics digital acquisition system, D24. Seismic data collected in compressed Elics format and stored on 2.3 GB Exabyte tapes. Navigation was DGPS acquired every second (every shot) and input directly to the Elics system through the RS232 serial port. A DGPS system was established on a VASTAR production platform in block 787. Energy source used was the SSI S-15 in^3 water gun in conjunction with a 24 channel streamer and four 6 channel streamers. Air pressure supplied by 75 scfm Price compressor.

Seismic acquisition:

Parameters	MCS/2.5D&3D
Shooting Interval =	1500 ms
Sampling Frequency =	2000 Hz
Recording Length =	256 ms
Energy =	2000 psi
High Pass Filter Digital =	200 Hz
Low Pass Filter Digital =	2000 Hz
Signal Amplification =	72 db
Source Type =	S-15 ci
S15 source depth =	0.6 m
24 Channel MCS lay back =	25.75 m
S15 source lay back for 24 MCS=	21 m
2.5D 4-6 Channel MCS lay back/spacing between streamers =	19/20 m
2.5D Cable pay out =	30 m
S15 source lay back for 24 MCS =	9 m
3D 4-6 Channel MCS lay back/spacing between streamers =	26/10 m
S15 source lay back for 24 MCS =	9 m
3D Cable pay out =	30 m

Seismic File Statistics for single channel lines using S-15 with 24 channel streamer:

Line name	Direction	Shots	Time	Size MB	SI sec.	Rate kts	Coordinates	Source
MCS1	227°	2462	0:59	27.88	1.5	3.1	27°27.30'N 096°30.51'W	S-15
							27°25.24'N 096°32.85'W	
MCS2	045°	3142	1:16	37.21	1.5	2.5	27°25.17'N 096°32.60'W	S-15
							27°27.23'N 096°30.16'W	
MCS3	224°	2300	1:01	28.38	1.5	3.1	27°27.00'N 096°30.06'W	S-15
							27°24.92'N 096°32.38'W	
MCS4	045°	3240	0:59	28.17	1.5	2.3	27°25.45'N 096°32.96'W	S-15
							27°27.06'N 096°31.19'W	

MCS5	140°	1710	0:44	20.39	1.5	2.5	27°27.43'N 27°26.11'N	096°31.86'W 096°30.35'W	S-15

Seismic File Statistics for 2.5D multi-channel lines using S-15 with four 6 channel streamer at 20 m spacing between streamers:

Line name	Direction	Shots	Time	Size MB	SI sec.	Rate kts	Coordinates		Source
3D01	130°	1418	0:37	17.19	1.5	2.2	27°27.06'N 27°26.18'N	096°31.49'W 096°30.42'W	S-15
3D02	315°	1155	0:28	13.95	1.5	2.7	27°26.02'N 27°26.01'N	096°30.94'W 096°32.01'W	S-15
3D03	133°	1729	0:47	20.86	1.5	2.1	27°27.18'N 27°26.16'N	096°31.63'W 096°30.44'W	S-15
3D04	315°	1240	0:31	14.95	1.5	2.9	27°25.93'N 27°26.98'N	096°30.87'W 096°32.05'W	S-15
3D05	130°	1627	0:39	19.66	1.5	2.2	27°27.19'N 27°26.15'N	096°31.64'W 096°30.45'W	S-15
3D06	315°	1269	0:31	14.83	1.5	2.5	27°25.86'N 27°26.93'N	096°30.89'W 096°32.04'W	S-15
3D07	130°	2096	0:52	28.77	1.5	1.9	27°27.17'N 27°26.14'N	096°31.65'W 096°30.47'W	S-15
3D08	315°	1264	0:31	18.32	1.5	2.8	27°25.86'N 27°26.93'N	096°30.87'W 096°32.06'W	S-15
3D09	130°	1170	0:29	18.65	1.5	2.7	27°27.13'N 27°26.11'N	096°31.60'W 096°30.98'W	S-15
3D10	315°	1290	0:32	18.49	1.5	2.8	27°25.87'N 27°26.95'N	096°30.93'W 096°32.06'W	S-15
3D11	130°	1415	0:33	20.33	1.5	2.5	27°27.12'N 27°26.07'N	096°31.67'W 096°30.50'W	S-15
3D12	315°	1040	0:28	16.93	1.5	2.8	27°25.87'N 27°26.84'N	096°30.97'W 096°32.04'W	S-15
3D13	130°	1204	0:34	19.85	1.5	2.6	27°27.13'N 27°26.15'N	096°31.70'W 096°30.60'W	S-15
3D14	315°	1315	0:33	19.03	1.5	2.8	27°25.81'N 27°26.91'N	096°30.93'W 096°32.17'W	S-15
3D15	135°	1294	0:32	18.71	1.5	2.7	27°27.10'N 27°26.06'N	096°31.71'W 096°30.52'W	S-15
3D16	315°	1165	0:29	16.85	1.5	2.9	27°25.83'N 27°26.84'N	096°30.96'W 096°32.11'W	S-15
3D17	130°	1540	0:39	22.33	1.5	2.3	27°27.11'N 27°26.04'N	096°31.72'W 096°30.54'W	S-15
3D18	315°	1209	0:30	17.48	1.5	2.9	27°25.80'N 27°26.85'N	096°30.96'W 096°32.14'W	S-15
3D19	130°	1666	0:40	24.10	1.5	2.2	27°27.08'N 27°26.03'N	096°31.74'W 096°30.57'W	S-15
3D20	315°	1150	0:28	16.39	1.5	2.3	27°25.82'N 27°26.83'N	096°31.00'W 096°32.15'W	S-15
3D21	125°	1407	0:41	23.41	1.5	2.3	27°27.09'N 27°26.07'N	096°31.79'W 096°30.59'W	S-15

3D22	315°	1320	0:33	19.10	1.5	2.8	27°25.75'N	096°30.97'W	S-15
							27°26.82'N	096°32.19'W	
3D23	135°	1343	0:33	19.43	1.5	2.5	27°27.07'N	096°31.81'W	S-15
							27°26.02'N	096°30.62'W	
3D24	315°	1151	0:33	19.10	1.5	2.8	27°25.76'N	096°31.03'W	S-15
							27°26.80'N	096°32.19'W	

Seismic File Statistics for 2.5D multi-channel lines using S-15 with four 6 channel streamer at 20 m spacing between streamers:

Line name	Direction	Shots	Time	Size MB	SI sec.	Rate kts	Coordinates		Source
3D25	135°	1156	0:28	17.15	1.5	2.9	27°27.00'N	096°31.77'W	S-15
							27°26.01'N	096°30.66'W	
3D26	315°	1200	0:25	14.43	1.5	3.3	27°25.81'N	096°31.13'W	S-15
							27°26.79'N	096°32.21'W	
3D27	130°	1345	0:33	19.46	1.5	2.7	27°27.02'N	096°31.01'W	S-15
							27°25.97'N	096°30.63'W	
3D28	315°	1080	0:25	15.62	1.5	3.2	27°25.81'N	096°31.17'W	S-15
							27°26.79'N	096°32.26'W	
3D29	135°	1310	0:32	18.94	1.5	2.5	27°26.96'N	096°31.79'W	S-15
							27°25.96'N	096°30.65'W	
3D30	315°	1070	0:32	16.92	1.5	3.2	27°25.75'N	096°31.04'W	S-15
							27°26.76'N	096°32.25'W	
3D31	135°	1360	0:26	19.67	1.5	2.8	27°27.01'N	096°31.88'W	S-15
							27°25.94'N	096°30.66'W	
3D32	315°	1040	0:25	15.04	1.5	3.4	27°25.69'N	096°31.08'W	S-15
							27°26.74'N	096°32.27'W	
3D33	135°	1269	0:31	17.89	1.5	2.8	27°26.97'N	096°31.86'W	S-15
							27°25.90'N	096°30.66'W	
3D34	315°	1082	0:26	15.66	1.5	3.3	27°25.67'N	096°31.07'W	S-155
							27°26.73'N	096°32.29'W	
3D35	135°	1200	0:30	17.35	1.5	3.1	27°26.98'N	096°31.91'W	S-15
							27°25.91'N	096°30.69'W	
3D36	315°	1024	0:25	14.88	1.5	3.4	27°25.65'N	096°31.11'W	S-15
							27°26.73'N	096°32.30'W	
3D37	130°	1150	0:28	16.64	1.5	3.1	27°26.89'N	096°31.83'W	S-15
							27°25.89'N	096°30.74'W	
3D38	315°	1256	0:31	17.77	1.5	2.6	27°26.27'N	096°30.51'W	S-15
							27°27.31'N	096°31.66'W	
3D39	135°	1417	0:37	20.45	1.5	2.5	27°26.94'N	096°30.73'W	S-15
							27°25.87'N	096°30.75'W	
3D40	315°	1388	0:31	17.29	1.5	2.8	27°26.31'N	096°30.69'W	S-15
							27°27.33'N	096°31.67'W	

Seismic File Statistics for 3D multi-channel lines using S-15 with four 6 channel streamer at 10 m spacing between streamers:

Line name	Direction	Shots	Time	Size MB	SI sec.	Rate kts	Coordinates		Source
T3D01	315°	753	0:15	10.89	1.5	3.6	27°26.450'N	096°30.756'W	S-15
							27°27.195'N	096°31.600'W	
T3D02	135°	832	0:20	12.03	1.5	3.1	27°26.982'N	096°31.514'W	S-15
							27°26.249'N	096°30.693'W	
T3D03	315°	670	0:16	9.69	1.5	3.4	27°26.370'N	096°30.697'W	S-15

							27°27.086'N 096°31.507'W	
T3D04	135°	891	0:21	12.88	1.5	2.7	27°26.920'N 096°31.529'W	S-15
							27°26.241'N 096°30.719'W	
T3D05	315°	720	0:18	10.51	1.5	3.2	27°26.380'N 096°30.733'W	S-15
							27°27.064'N 096°31.515'W	
T3D06	140°	907	0:23	13.65	1.5	2.8	27°26.869'N 096°31.466'W	S-15
							27°26.083'N 096°30.592'W	
T3D07	315°	769	0:19	11.15	1.5	3.1	27°26.350'N 096°30.740'W	S-15
							27°27.098'N 096°31.514'W	
T3D08	135°	875	0:16	12.65	1.5	2.7	27°26.912'N 096°31.513'W	S-15
							27°26.216'N 096°30.715'W	
T3D09	315°	735	0:18	10.66	1.5	3.1	27°26.316'N 096°30.780'W	S-15
							27°27.061'N 096°31.552'W	
T3D10	135°	823	0:20	12.32	1.5	2.7	27°26.887'N 096°31.572'W	S-15
							27°26.189'N 096°30.752'W	
T3D11	311°	595	0:18	10.09	1.5	3.2	27°26.260'N 096°30.899'W	S-15
							27°26.851'N 096°31.528'W	

S-15 in^3 water gun statistics:

Rice U. S-15 Total Shots Recorded = 54,800 Rebuild S-15 after 54,800 shots as a precaution
IFREMER S-15 Total Shots Recorded = 31,831 Cleaned S-15 after 31,831 shots end of cruise
Total S-15 data shots = 86,631

Exabyte Tape Statistics, collected in compressed Elics format:

Tape#01 Lines MCS1 - MCS5	=	287.53 MB
Tape#02 Lines 3D01 - 3D21	=	401.10 MB
Tape#03 Lines 3D22 - 3D40	=	330.66 MB
Tape#04 Lines T3D-01 - T3D11	=	126.59 MB
Total seismic data collected	=	1145.88 MB (1.145 GB)

Tape#05 Back up of all seismic and DGPS navigation data	=	1145.88 MB (1.145 GB)

CRUISE OUTLINE: 24 June to 09 July 1995

22 October 1996
1) Got to IAH to pick up 3D seismic gear returning from Mediterranean cruise - unpack gear at Rice and load into truck for transport to Corpus Christi.
2) Pick up boomer seismic source at ORE
Depart for Corpus Christi to meet R/V Lone Star at 2000, arrive at 0015 on 10/24.
3) Sleep on R/V Lone Star

23 October 1996
1) Unload seismic gear from truck and load onto the R/V Lone Star.
2) Stage seismic gear, set up boomer source
3) Finish setting up computer lab (previously set up when vessel was in Galveston.
4) Depart marina at 1410 to fuel vessel.
5) Depart fuel dock at 1500 for VASTAR rig to install DGPS base station.
6) Arrive at VASTAR rig at 2100. Could not off load DGPS gear because of hydraulic leak on A-frame on vessel.
7) Could not do any sea trials because of sea state.

24 October 1996
1) Arrive at UT dock in Port Aransas at 0100.
2) Make alternative arrangements to get DGPS set up on VASTAR rig via helo.

3) Wait at refueling dock until 1400 - helo flight canceled because of weather conditions.
4) Attempted sea trials - not possible because of 5 to 7 foot seas.

25 October 1996

1) Leave Andrè Droxler and Jean Michel Baillard at UT dock - will meet helo for flight to VASTAR rig to set up DGPS.
2) Depart UT facility for sea trials at 0630
3) Perform sea trials testing various sources and streamer configurations. EG&G power supply to sparker and boomer not working properly - not enough energy, possible blown capacitor(s).
4) Finished sea trials at 1700 arrived at dock 1900.
5) Stow gear on vessel, break down ORE boomer, pack and load up gear on truck.
6) Depart marina at 2000, arrive Rice at 0030.

26 October 1996

1) Return ORE boomer.
2) Unload departmental truck.
3) Results of shake down cruise on R/V Lone Star - Deck space on vessel too small to do S15 water gun work and 3D seismic. Checking on using the R/V Longhorn. Need to check on a larger compressor (Price Compressor, Inc)

31 October 1996

1) Load up departmental truck and depart Rice at 1130 and arrive at Corpus Christi Marina to meet the R/V Lone Star at 1530.
2) Prepare R/V Lone Star for departure to Aransas (UT docks) at 1630. Drive to Aransas to meet the R/V Longhorn. Truck arrived at 1830, R/V Lone Star arrived at 1900. Off load gear from truck and R/V Lone Star onto the R/V Longhorn.
3) Pick up electronic parts to make connector for multichannel amplifier.
4) Begin setting up seismic system on R/V Longhorn.
5) Stay on R/V Lone Star.

01 November 1996

1) Finish setting up seismic system on R/V Longhorn.
2) Work on 24 channel amplifier - make plug connection (hardwire ribbon to BNC connectors).
3) Off load more gear from R/V Lone Star.
4) Compressor arrived from Price Compressor, Inc. via Texas Hot Shot transport at 0730. Off load compressor and load onto R/V Longhorn at 0900.
5) Test multichannel seismic system.
6) Problem with DGPS - called VASTAR 787 rig to fix problem (disk full).
7) BNC sub-click connectors did not arrive from France. Had to modify previously made connectors.
8) Rough seas - did not depart UT dock as planned. Stayed on R/V Longhorn.

02 November 1996

1) Travel to Corpus Christi for more electronic parts for making the BNC/sub-click connectors. Make connectors.
2) Final stowing of equipment. Finish setting up seismic system on R/V Longhorn.
3) Final test of multichannel seismic system.
4) Depart UT dock at 1930.
5) Setup/stage seismic gear at 2330.

03 November 1996

1) Deploy multichannel seismic gear at 0130.
2) Begin shooting first MSC line at 0311 using S15 at 1000 ms. Had to change firing rate to 1500 ms because Litton solenoid power supply could not handle load. Finish setting up seismic system on R/V Longhorn.
3) Problem with compressor - coolant leak, only loose hose clamp.
4) Shot lines MCD1 - 4 (dip lines) and MCS1 - 5 (strike lines). Backed up seismic data on Tape#01.

5) S-15 lay back = 63 ft/21 m, 24 channel MCS streamer lay back = 25.75 m. Channels 14 and 22 on amplifier bad (3 and 11 on streamer).
6) Recover MCS gear at 1550.
7) Compressor maintenance after 26,137 shots.
8) Prepare and deploy 3D streamer array at 1730. Begin shooting 2.5D seismic grid at 1908. S-15 lay back = 9 m, spacing between 4-6 channel MCS streamers 20 m with a 30 m lay back.
9) Collected lines 3D01 - 05, began collecting 3D06.

04 November 1996 1) Continued with 2.5D seismic grid with line 3D06. Collected lines 3D06 - 21 on Tape#02. Collected lines 3D22 - 33 on Tape#03.
2) Contact VASTAR to arrange helo trip to recover DGPS gear on rig 787 on 11/6 at 0700.
3) Service compressor and change out S15 at end of line 3D21. ultichannel seismic gear at 0130.

05 November 1996 1) Continued with 2.5D seismic grid with end of line 3D33. Collected lines 3D33 - 40 on the rest of Tape#03.
2) Ended 2.5D seismic grid at 0742. Recovered S15 and streamer array.
3) Modify streamer array for 3D seismic grid and deploy gear at 0845. Begin 3D survey at 0932.
4) Collected lines T3D01 - 11 on Tape #04. Ended 3D survey at 1635. Pulled seismic gear at 1640.
5) Make tape back up of seismic and DGPS data on Tape#05.
6) Contact VASTAR rig 787 to shutdown DGPS system.
7) Breakdown gear and prepare for off load at UT dock.

06 November 1996 1) Off load seismic gear from R/V Longhorn to truck and R/V Lone Star. Compressor off load to Texas Hot Shot for return to Price Compressor, Inc. at 0800.
2) Helo flight to VASTAR rig 787 at 0800 to recover DGPS system. Return from rig at 1130.
3) Arrive at Rice at 1530. Off load equipment from trucks.