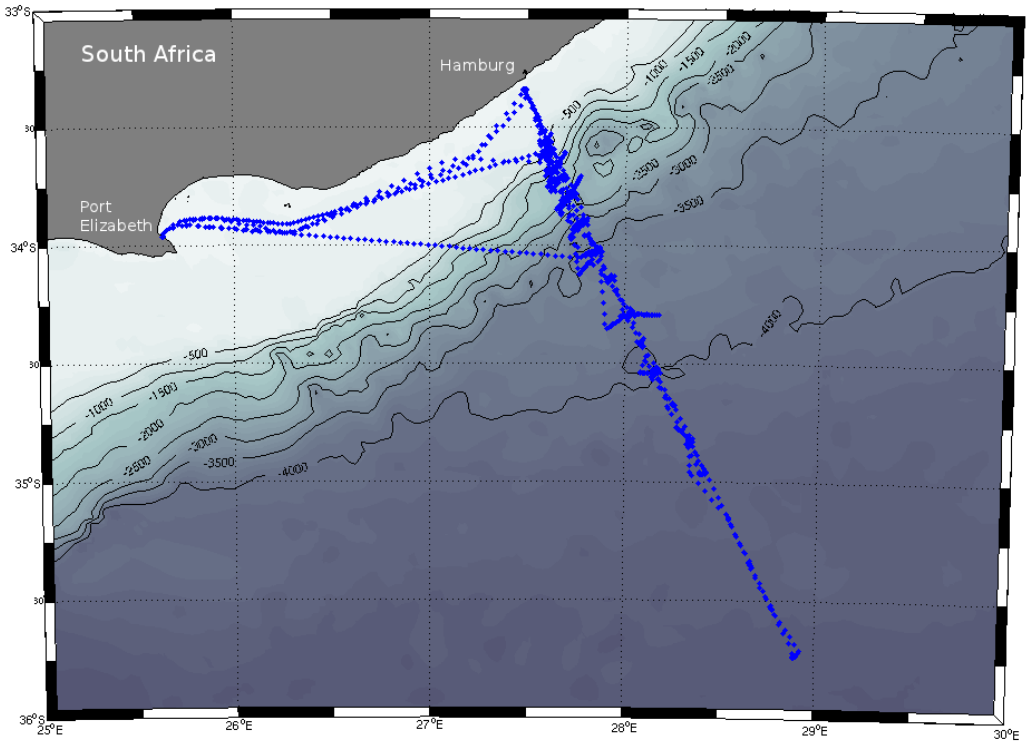
CRUISE REPORT: ACT2011

(Updated AUG 2017)



HIGHLIGHTS

Cruise Summary Information

Section Designation	ACT2011
Expedition designation (ExpoCodes)	318M20111103
Chief Scientists	Lisa Beal/RSMAS Sabrina Speich/U.BREST
Dates	2011 NOV 03 - 2011 NOV 26
Ship	*RV Melville*
Ports of call	Port Elizabeth, S. Africa - Durban, S. Africa
Geographic Boundaries	33° 12' 27" S 27° 17' 20" E 28° 59' 2" E 35° 54" 24" S
Stations	40
Floats and drifters deployed	0
Moorings deployed or recovered	8 moorings recovered and redeployed

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Links to Select Topics

Shaded sections are not relevant to this cruise or were not available when this report was compiled.

Objectives

Recover and redeploy eight moorings. Telemeter data from 4 CPIES. Complete 40 CTD casts (two sections across current). Occupy one continuous ADCP transect across the current.

Challenges

We had four problems that made for a challenging start to the cruise. (1) Our first container had not cleared customs, despite that our mooring technician had arrived the week before to handle local shipping issues. As a result, the container was not received dockside until the afternoon of the day we sailed (3rd November, 2011). (2) The Scripps CTD air freight was also delayed and eventually picked up during our first unscheduled port visit on the 5th. (3) The first mooring became wrapped around the bow thruster during recovery operations. We lost instrumentation and had to return to port (5th) to have divers clear the thruster. (4) Our second container was delayed until 9th November, when we returned to port for a second unscheduled visit to load it. In contrast to the *Knorr*, *Melville* does not involve the bosun during mooring operations, nor assign crew to man the stern winch or A-frame. As a result, science parties need to provide two additional technicians for mooring cruises scheduled aboard *Melville*. A student can be trained on the A-frame, but the winch and capstan are integral to the safety and success of operations and need people with experience.

We had persistent difficulty with acoustical operations throughout the cruise. This adversely affected (1) communications with mooring releases during both recovery and deployment (triangulation), (2) collection of telemetry data from the CPIES, and (3) quality and quantity of ADCP data. Communicating with other PIs who have sailed on *Melville* in the past, and from my own previous experience, these acoustical issues were abnormal. The Chief Engineer and myself conjectured that the very light fuel load, on account of an ensuing dry dock period, had the ship riding high, which caused increased cavitation under the hull and disruption of the acoustics. The Chief estimated the ship to be riding order feet higher than typical and the stern slapping and snap rolling was the worst I have experienced.

Despite these setbacks, we fulfilled the science objectives, aside from some lost mooring instrumentation and some data loss due to poor acoustics during CPIES telemetry.

Narrative

We left Port Elizabeth on 3 November at 16:00 to arrive at site P1/CTD01 at 02:00 LT the next morning. A CTD cast was conducted (depth 60 m). Tide gauge P1 was not recovered. Next we recovered mooring A, only to have it wrap around the bow thruster. Two releases were lost because the line was cut and we returned to port to have divers clear the thruster. We recovered mooring B successfully on 6 November and occupied CTD stations 02-05. The top float/ADCP on mooring C had become loose in November 2010, and on mooring D in September 2011, and both were picked up by *RV Africana*. Upon recovery of the rest of the mooring C on 7 November we found the 2nd float and Nortek current meter lost. We recovered mooring D the same day, with no losses and occupied CTD stations 06-08. Next we recovered mooring E successfully and conducted CTD09 before returning to port for a second time to collect our remaining gear. Back at sea we picked up the inshore end of the ACT line again, deploying the tide gauge P1 and moorings A-E without adverse incident, occurring CTD stations at night. On 15 November we recovered mooring F and attempted CPIES telemetry with limited success owing to poor acoustics. Next day we redeployed F and continued on to recover and redeploy G, conducting CPIES telemetry and CTD stations out to the end of the line at P5. We conducted a synoptic CTD section from site P5 (CTD20) all the way back along the ACT line, delayed by a kink in the CTD wire and retermination on 21st

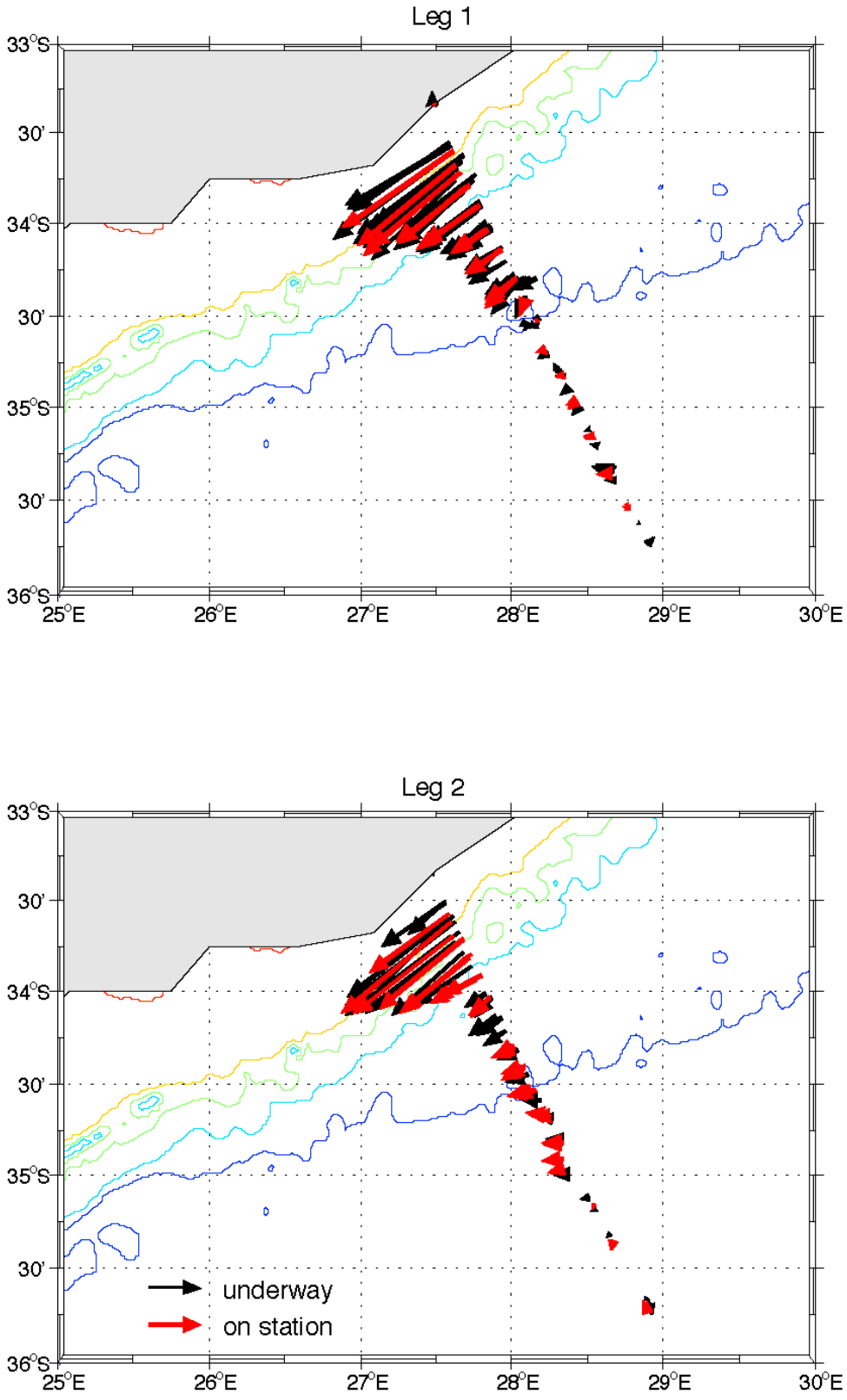
November. Finally, we conducted a non-stop underway ADCP section back out to P5, before heading north and into Durban for final port stop.

ADCP Report

Melville is equipped with two hull-mounted ADCPs of frequency 75 Hz (range about 600-800 m) and 150 Hz (range 200-300 m). Standard UHDAS configurations were used, as recommended by Jules Hummon, with collection of narrowband pings only throughout the cruise. This recommendation is due to known bubble issues on *Melville*: Air gets trapped in the transducer well and this problem was clear from lack of data return during CTD casts on our cruise, despite the strong current which we hoped might help flush the air out.

We noticed a bias issue with the underway data, due to bleeding of ship velocity into the ocean velocity data (see below figure)

Figure 1: Shipboard 75 kHz narrowband ADCP data averaged over 1 hour at 62.5m Leg 1



Lowered ADCP Operations

Adam Houk
27 November, 2011

LADCP Setup:

Full water column velocity profiles for the ACT November 2011 cruise were collected using a hybrid 150/300kHz Workhorse configuration. Most of the instruments, cables, and related equipment were supplied by Dan Torres of Woods Hole Oceanographic Institution, with two spare star-cables on loan from NOAA's AOML. A total of three profilers were on board. The 150 kHz prototype (s/n 13656) and one of the 300 kHz workhorse monitors (s/n 10417) belong to WHOI. The third 300 kHz workhorse monitor (s/n 6820) belongs to the University of Miami. Two custom-made 48-volt deep-sea batteries were supplied by WHOI as well. The two Workhorse ADCPs were mounted on a 12-bottle CTD rosette, with mounting brackets for the ADCPs and battery provided by Scripps Institution of Oceanography. The upward-looking ADCP was mounted near the outer edge of the rosette, situated above the upper rim of the frame. The downward-looking 150 kHz ADCP was mounted in the center of the frame; with the transducer face about 10cm off the bottom. The WHOI-owned 300 kHz workhorse was originally intended as a spare, with the UM workhorse serving as the primary upward-looking ADCP. After initially trying to mount the UM ADCP, I decided to switch to the smaller-footprint workhorse from WHOI. The UM unit has a sentinel-style housing, which is about twice the length of the WHOI unit. The rosette had only one clamp available for securing the upward-looking ADCP. Additionally, the proximity of the Niskin bottles made it impossible to lower the height of the transducer head to a safe distance. Ultimately, I felt it was safer to use the monitor-style workhorse, given the rosette size and configuration.

The sea-battery was initially secured adjacent to the downward-looking ADCP using ratchet straps. After returning to Port Elizabeth to pick up late-arriving equipment, the battery was placed in a stainless steel box secured to the rosette frame. Both ADCPs were wired to run off a single battery pack using the supplied star-cable.

The 150 kHz ADCP was configured for 16 16-meter bins, 10 meter blanking distance, and an ambiguity velocity of 350 cm s^{-1}. The 300 kHz ADCP was configured for 20 8-meter bins, zero blanking distance, and an ambiguity velocity of 350 cm s^{-1} (though the instrument limited this value to 330 cm s^{-1}). The units were configured for staggered single-ping ensembles; the upward-looking ADCP was set to 1 sec ensembles, and the downward-looking ADCP was set to burst-sample every 2 seconds with 0.8 seconds between pings. Measurements were saved in beam coordinates, with 3-beam solutions and bin-mapping disabled. The upward-looking ADCPs were running firmware version 51.36, while the downward-looking ADCP was running version 51.40.

Data Acquisition Setup:

Inside the main lab of the *Melville*, a dedicated laptop running Windows XP with two USB-serial ports was set up as the primary data acquisition platform. Two separate instances of BBTalk were run to communicate with the instruments. Data files downloaded to the laptop were transferred to my laptop via shared network drive for processing and archiving. A Soneil 4808SRF was used as the primary battery charger. The supply was programmed to output 58 Volts. The charger was plugged directly into the battery for recharging between stations using a third cable. Two long ADCP power/communication cables were set up to program the instruments and download data. Each cable was connected to a

standard RDI-supplied 48 Volt power supply, which powered the instruments when the battery was disconnected for charging.

Deployment and Recovery:

Lowered ADCP operations began on November 4th, 2011 with a "test" cast near the beginning of the main transect line in 60 meters of water. No operational problems were found with the hybrid setup. The first real station cast took place soon after, around 01:00 UTC. Initial operations proceeded slowly at first as the two LADCP shift operators needed to familiarize themselves with the equipment and procedures. CTD/LADCP casts were somewhat infrequent for several days, as mooring operations took priority, with two return trips to P.E. As they became more comfortable with the equipment, the typical deployment procedure was as follows:

- About 15-20 minutes prior to arrival on station, the LADCP operator shuts off the battery charger and reconnects the battery to the star-cable on the rosette.
- The operator wakes up the two ADCPs using RDI's BBTalk terminal program.
- Internal clock, memory and instrument voltage check are made. Clocks are synchronized to the ship's GPS.
- The appropriate command file would then be sent to the instrument to initiate sampling. The output from this operation is captured to a log-file.
- Once the 'cs' command was sent, the operator would listen for audible 'pings' from both ADCPs to verify operation.
- The operator would then replace the vent plug on the battery, disconnect the two serial cables, and insert the dummy plugs.

The operator then notes the time and position for the beginning of the cast, the maximum CTD depth, and the end of the cast on the log sheet. Upon the safe recovery of the rosette, the operator would begin the recovery procedure:

- Once the rosette is secured on deck, the operator connects the two serial cables to the instruments. The 'break' command is sent to halt pinging and close out the data files.
- After verifying the battery charger is off, the operator would connect the charger cable directly to the battery and open the battery purge port.
- The battery charger is powered on as soon as possible to maximize the time available for charging.
- The instrument baud rate is changed to 115,200 bps to minimize the download time.
- The most recent good data file is transferred to a temporary cruise directory on the acquisition computer.
- The operator copies the downloaded data files to a separate folder, labeled by station number. The files are renamed here using the cruise convention: 'ACT0410_DN_nnn.000' or 'ACT0410_UP_nnn.000' where 'nnn' is the station number.
- The baud rates are changed back to 9600 and the ADCPs are powered down.

The main transect line contained 22 CTD stations, starting at mooring 'P1' and ending at mooring 'P5'. CTD/LADCP casts were done up to station 9 during the first mooring recovery period, November 4th through the 8th, before briefly returning to port. A second series of consecutive casts along the same

transect line began at station 1 (at site P1, cast number 10), on November 10th at 08:47 UTC, ending at station CTD-20, near station P5 (cast number 31) on November 20th at 01:09 UTC. The third series of CTD/LADCP casts began with cast number 32 on November 20th at 08:22. Continuous casts were then made back up the transect line towards P1, ending on November 23rd.

There were three incidents during CTD operations that resulted in aborted casts. Two were winch malfunctions at the beginning of a cast that caused damage to the winch cable. The first occurred on cast 14, where the cable was pinched while raising the rosette off the deck. The rosette was transferred to a second winch cable on the starboard A-frame. There was no damage to the LADCP system, but the charger and comms cables had to be re-located to reach the side A-frame. Once repositioned, cast 14 was done without incident. The second winch problem occurred at cast number 41 on November 22nd at 01:00. The rosette had been moved back to the original winch. Once again, a cable malfunction led to the package being dropped onto the deck from about 3 ft. up. Fortunately, no observable damage was done to the LADCP system. As before, the rosette was moved to the alternate winch and A-frame.

The most significant damage to the LADCP system occurred at cast number 17, on November 12th at 14:00. After the rosette had been brought back on board at the end of the cast, the operators noticed that the LADCP was not pinging and there was an acrid odor coming from the battery. Upon closer inspection, it was discovered that the 2 ft. 2-pin to 7-pin adapter cable coming off the battery cable had completely burned through and was severed. The impulse connector at the battery-star-cable connection had swollen and burned as well. The star-cable segment leading to the battery connector was scored in several places up to the main junction. This was the only visible damage; the rest of the cable assembly appeared normal, while both ADCPs appeared unaffected. The battery had clearly shorted out and the high current had melted the cable. It is unclear where the short initially occurred, although the most likely explanation would seem to be that there was a leak in the 7-pin connector where the battery connects to the 2-ft. adapter cable.

The battery and star-cable were rendered unusable. A spare battery and star-cable were installed and the system was tested before being re-deployed. After examining the data recovered from the 150 kHz ADCP, it was found that the battery had failed shortly after the beginning of the upcast at a depth of about 3000 meters.

Another unusual behavior in the LADCP system was the occasional, somewhat random communications disruption. The instrument would become unresponsive when certain routine commands were sent, most commonly during baud rate changes or when uploading data from the recorder. The cause of these disruptions is unclear, and the solution usually involved disconnecting the instrument from the star-cable and running a direct power/comms cable to it. This problem did not cause any significant delays.

Preliminary processing shows that there was only one cast, number 23, that contained some unusual data which caused problems during the LADCP processing. Examining the raw data, there appeared to be some abnormally high velocities near the beginning of the cast, especially in the vertical component; however, this is not reflected in the error velocities. Examination of the downward-looking raw data revealed several missing ensembles and timestamp errors that caused the processing software to crash. This was resolved by cutting the first 1932 ensembles from the file, which allowed the processing to complete successfully.

Additionally, there were a few casts early on, numbers 5 and 8 in particular where the ADCPs recorded very high pitch/roll values, in excess of 30 degrees, which is the normal cutoff limit in the processing software. This limit had to be increased on cast 5 in order for the processing to complete successfully.

This cast also did not record any clear bottom-track data. The resulting profile is therefore rather questionable.

As might be expected, using the 150 kHz prototype in very shallow water did not always produce solid results, especially when not using CTD depth or bottom tracking. The LADCP software had trouble distinguishing the bottom reflection from other reflections and high backscatter. Overall, however, the 150 performed well, with consistent signal strength and range throughout the survey. The same can be said of the 300 kHz unit as well. This particular combo also seemed to be very efficient as well; rarely did the battery charger require a substantial amount of time to bring the battery back to nearly full-capacity.

Data Processing:

The two raw ADCP data files were first copied to a dedicated laptop for processing. Navigation data were extracted from the uncorrected one-second time-series CTD data provided by the CTD operator, downloaded over the ship's network. Once the files were in the proper directories, the "first-pass" processing could be executed.

The initial processing of the raw ADCP data was done using version 10.8 of the M. Visbeck & A. Thurnherr MATLAB toolbox, modified by G. Krahmann. The 'process_cast(nnn)' script was run, with 'nnn' representing the station number, which called subroutines to copy, load, scan in, and run the shear and least-squares inverse methods. About a dozen graphics are generated with useful diagnostic information and the final water column profile. The processing scripts required some code modifications, primarily to ensure the ADCP and GPS data were properly loaded. Two small m-files were added: 'load_ctd_for_nav.m' and 'load_ctd_for_prof.m' to the local /m directory that were called by the 'prepctdprof.m', 'prefctdtime.m' and 'prepnav.m' scripts to generate mat-files for processing. Manual changes to the 'cruise_params.m' and 'prepare_cast.m' codes were also necessary to ensure that only the navigation data would be used in the first-pass processing, and that bottom tracking was disabled. When the first-pass was finished, the operator would note in the log sheet the calculated depth based on the integrated vertical velocity and compare it to the maximum depth reported by the CTD.

During the CTD/LADCP survey, the casts were re-processed to include the CTD pressure record and time-series data. The inclusion of the CTD depth allowed the LADCP software to be far more accurate in determining the bottom-track velocities and masking out data below the sea floor. The 1st –pass processing run was not able to accurately mask out bad data below the sea floor because of what appears to be a flawed bottom depth calculation. Depth from the integrated W values appears to be valid, but without CTD input, it is ultimately in error, therefore the calculated velocity profiles are substantially deeper than they should be.

Summary:

Overall, the prototype 150 & 300 kHz ADCPs performed quite well, with no major communication or power issues. In total, 50 LADCP profiles were collected. Processing shallow water casts (less than 100 meters or so) proved somewhat difficult due to errors in bottom detection. Both units experienced significant drops in profile range at depths below 2000 meters, down to around 50 meters for the 300 and 150 meters for the 150 kHz unit at the 3000 to 4000 meter range. Many stations appeared to have somewhat high error velocity in the downward looking profile immediately after the rosette begins the upcast, possibly related to turbulence in the wake of the rosette. As expected, the change from a dual-300 kHz system to the 150/300 hybrid produces better results overall, with greater range at depth and less

occurrence of the "runaway shear" profile. The cause of the battery short remains unclear. Some improvement to the 1st –pass processing would seem to be needed to more accurately determine the true water depth.

Table 1: Summary of CTD/LADCP station location, time and depth

Station	Date (yyyy/mm/dd)	Start time	In-situ time	End cast time	Stop time	Int. w depth (m)	ctd max depth (m)	depth (m)	Latitude	Longitude
test	2011/11/04	23:26	23:42	00:16	00:06	165	52	60	-33 20.7508	27 28.8959
1	2011/11/04	01:08	01:21	01:34	01:50	103	53	58	-33 27.9732	27 28.9010
2	2011/11/06	17:57	18:08	18:23	18:30	70	72	80	-33 27.8262	27 32.9454
3	2011/11/06	19:32	19:40	20:13	20:25	324	337	340	-33 33.4856	27 35.9234
4	2011/11/06	21:07	21:09	22:06	22:13	609	609	616	-33 35.742	27 37.3749
5	2011/11/06	23:26	23:54	01:22	01:36	1282	1230	1275	-33 39.5182	27 39.2458
6	2011/11/07	16:49	16:58	18:40	18:49	1742	1738	1782	-33 42.3598	27 40.9414
7	2011/11/07	19:54	20:18	22:19	22:30	2265	2260	2210	-33 47.1434	27 43.0434
8	2011/11/07	23:44	23:58	02:42	02:53	3034	3020	3210	-33 53.8716	27 48.0298
9	2011/11/08	10:30	11:02	13:45	13:49	3525	3478	3600	-34 0.7497	27 51.6326
10	2011/11/10	08:52	09:14	09:34	09:38	47	50	60	-33 20.5918	27 29.0699
11	2011/11/11	10:49	11:03	11:22	11:24	80	83	80	-33 27.7189	27 32.6757
12	2011/11/11	13:21	13:43	14:19	14:20	300	280	292	-33 33.3526	27 35.6473
13	2011/11/11	15:07	15:25	16:26	16:29	505	597	607	-33 35.7308	27 37.1512
14	2011/11/11	19:24	19:39	20:53	21:00	1770	1300	1306	-33 39.2326	27 39.6574
15	2011/11/11	21:59	22:16	23:54	23:59	1691	1688	1800	-33 42.7840	27 39.9709
16	2011/11/12	10:47	11:22	13:11	13:14	2289	2282	2430	-33 46.9333	27 43.5581
17	2011/11/12	20:36	20:46	23:01	23:08	3141	3114	3210	-33 53.8235	27 47.9474
18	2011/11/13	10:05	10:43	13:15	13:18	3571	3072	3543	-34 1.2518	27 51.7378
19	2011/11/13	14:38	14:42	17:24	17:28	3633	3597	3606	-34 7.9400	27 56.7057
20	2011/11/14	11:32	11:42	14:21	14:24	3749	3701	3707	-34 17.3607	28 1.9435
21	2011/11/14	15:16	15:27	18:13	18:22	3852	3814	3828	-34 23.8097	28 5.5506
22	2011/11/14	19:33	19:45	22:39	22:47	4641	3974	3977	-34 31.0311	28 10.0644
23	2011/11/16	10:50	11:22	14:03	14:07	-	3938	-	-34 31.05	28 9.84
24	2011/11/16	15:18	15:32	18:25	18:33	4202	4151	4168	-34 41.2482	28 13.4541
25	2011/11/16	19:43	20:06	22:56	23:02	4633	4269	4276	-34 49.3275	28 20.5725
26	2011/11/18	10:41	10:54	13:48	13:50	4314	4244	4275	-34 49.0621	28 20.8201
27	2011/11/18	14:56	15:10	18:11	18:15	4378	4317	4330	-34 57.5113	28 25.6273
28	2011/11/18	19:39	19:52	22:51	23:01	4374	4380	4380	-35 9.0678	28 32.6454
29	2011/11/19	07:36	07:53	10:58	11:01	4430	4367	4440	-35 20.9755	28 39.8687
30	2011/11/19	12:15	12:34	15:44	15:49	4532	4502	4502	-35 32.0216	28 46.5575
31	2011/11/20	01:11	01:28	05:02	05:07	4781	4628	4560	-35 44.0586	28 53.7878
32	2011/11/20	08:13	08:22	11:41	11:46	4558	4605	4526	-35 32.0822	28 46.6594
33	2011/11/20	13:22	13:40	16:57	17:03	4373	4352	4369	-35 20.8557	28 39.9394

34	2011/11/20	18:31	18:47	21:53	22:05	4368	4379	4316	-35 9.0656	28 32.6415
35	2011/11/20	23:38	23:58	02:59	03:17	4363	4334	4370	-35 57.4017	28 20.4208
36	2011/11/21	04:02	04:09	07:12	07:21	4298	4278	4275	-34 49.2716	28 20.7073
37	2011/11/21	08:28	08:42	11:37	11:44	4212	4157	4154	-34 40.2395	28 15.3408
38	2011/11/21	12:38	12:54	15:43	15:47	3996	3955	3982	-34 32.0537	28 9.6963
39	2011/11/21	16:42	16:53	19:30	19:42	3838	3815	3851	-34 23.9643	28 5.5796
40	2011/11/21	20:34	20:50	23:36	23:40	3687	3698	3700	-34 17.1739	28 1.3169
41	2011/11/22	03:14	03:26	06:13	06:17	3605	3592	3624	-34 8.1004	27 56.4593
42	2011/11/22	07:13	07:26	12:04	12:08	3630	3584	3650	-34 1.2084	27 51.7866
43	2011/11/22	11:06	11:23	13:47	13:51	3144	3112	-	-33 53.9675	27 47.6686
44	2011/11/22	14:41	15:08	16:58	17:01	2276	2287	-	-33 47.0435	27 44.6258
45	2011/11/22	18:01	18:12	19:55	20:03	1719	1708	1726	-33 42.0343	27 41.4213
46	2011/11/22	21:11	21:34	23:05	23:11	1250	1211	1288	-33 40.0692	27 38.9616
47	2011/11/23	00:50	01:01	01:44	01:54	580	561	619	-33 36.1957	27 37.2894
48	2011/11/23	02:54	03:02	03:42	03:48	322	363	373	-33 33.4117	27 36.1920
49	2011/11/23	04:46	04:59	05:07	05:26	-	84	92	-33 27.798	27 32.922

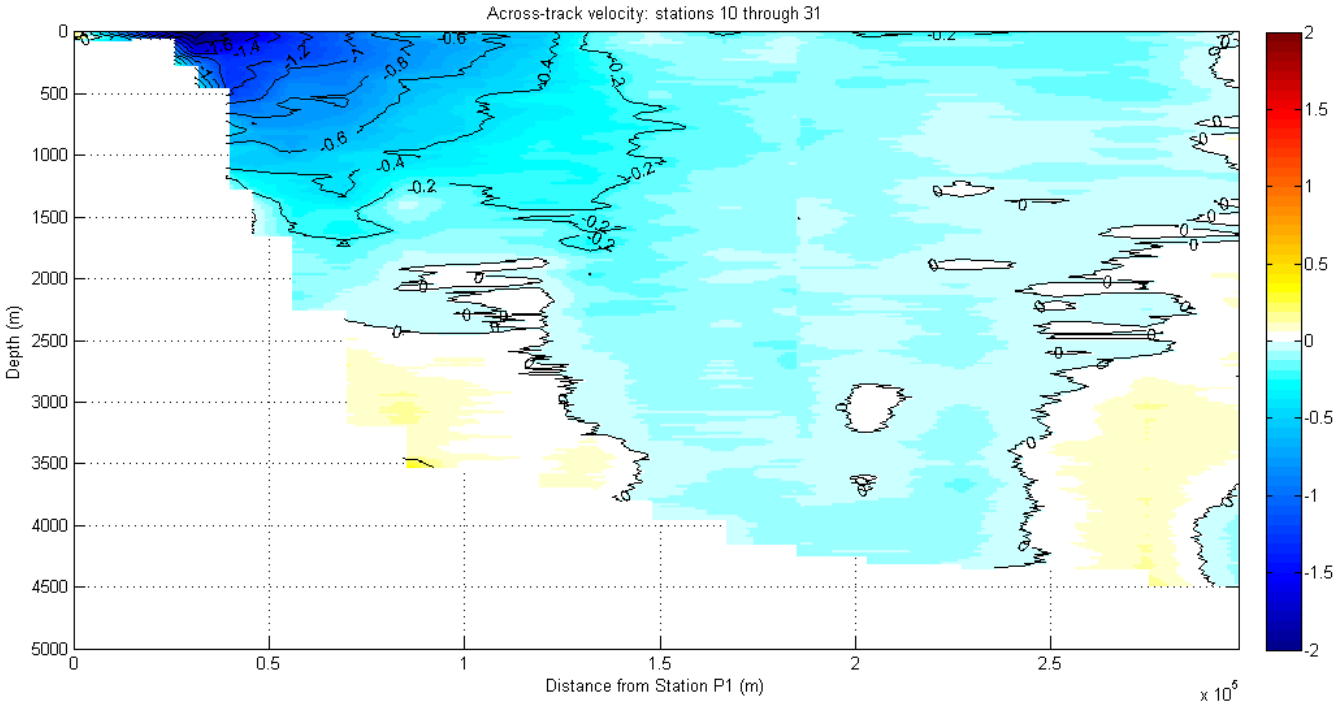


Figure 2: Across-track velocity profile for stations 10 through 31

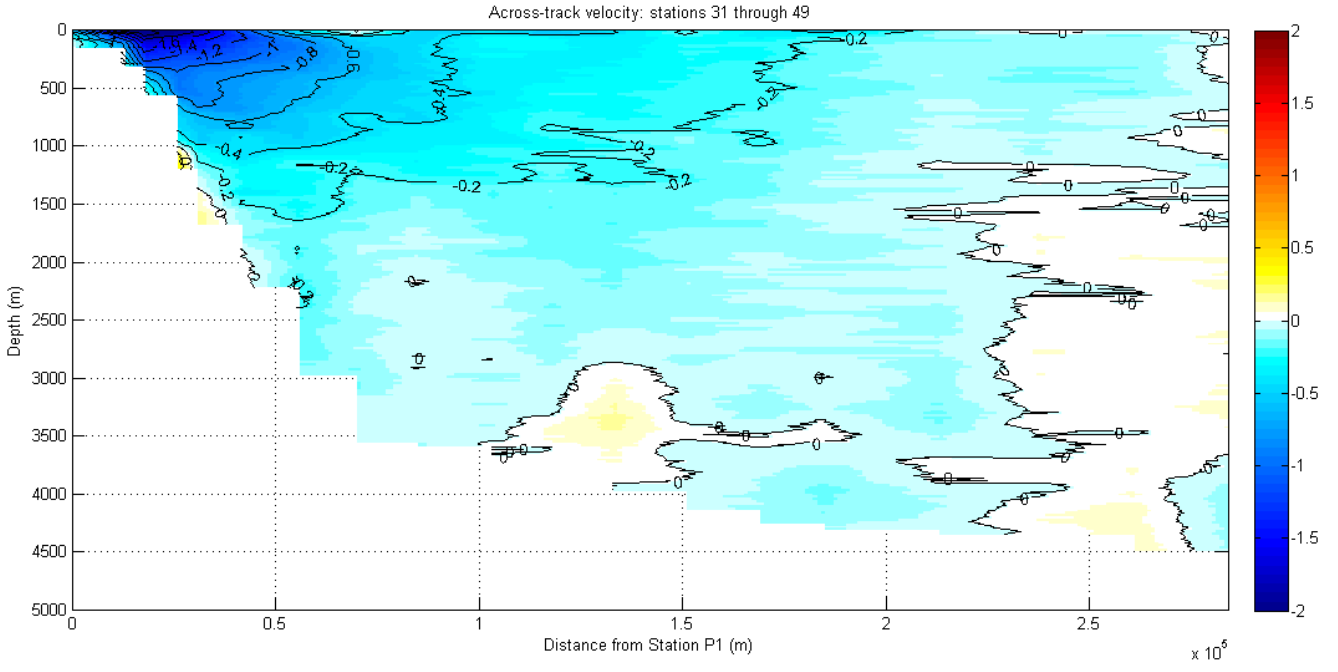


Figure 3: Across-track velocity profile for stations 31 through 49

```
;================================================
;  W H M A S T E R _ 2 0 1 1 . C M D
;  LMB: Fri 21 Oct 2011 16:23:14 EDT
;
;  WH150kHz master/downlooker deployment script
;  for *new* lowered 150 from RDI (ten years in the making!)
;================================================
; Changes from previous deployment scripts:
; (1) "wm15" command for LADCP mode and no longer need "L" commands
; (2) only commands that change defaults are included (EA,ES etc removed)
; (3) data collected in beam coordinates (allows better inspection of
;     raw data and 3-beam solutions if necessary)
; (4) staggered single-ping ensembles every 0.8/1.2 s (Andreas has seen
;     bottom-interference in WH300 data in Antarctic - seems unlikely for
;     Abaco, but does not lose us pings).
; (5) 16 x 16 m bins - for a range of 256 m (could try less for casts > 3500
m)
;
; Changes made after email discussions with Eric and Andreas, April 2008
; and looking at Dan Torres' command file for his new wh150.
;
; Ask for log file
$L
; display ADCP system parameters
PS0
; Pause
$D2
; return to factory default settings
CR1
; activates LADCP mode (BT from WT pings)
WM15
; Flow control:
;       - automatic ensemble cycling (next ens when ready)
;       - automatic ping cycling (ping when ready)
;       - binary data output
;       - disable serial output
;       - enable data recorder
CF11101
$D2
; coordinate transformation:
;       - radial beam coordinates (2 bits)
;       - use pitch/roll
;       - no 3-beam solutions
;       - no bin mapping
EX00100
; Sensor source:
;       - manual speed of sound (EC)
;       - manual depth of transducer (ED = 0 [dm])
;       - measured heading (EH)
;       - measured pitch (EP)
;       - measured roll (ER)
;       - manual salinity (ES = 35 [psu])
;       - measured temperature (ET)
EZ0011101
;
$D2
;  - configure staggered ping-cycle
```

```
; ensembles per burst
TC2
; pings per ensemble
WP1
; time per burst
TB 00:00:02.00
; time per ensemble
TE 00:00:00.80
; time between pings
TP 00:00.00
$D2
; - configure no. of bins, length, blank
; number of bins
WN016
; bin length [cm]
WS1600
; blank after transmit [cm]
WF1000
$D2
; ambiguity velocity [cm]
WV350
$D2
; master
SM1
; send pulse before each ensemble (for synchronisation)
SA011
; wait .5000 s after sending sync pulse
SW05000
; # of ensembles to wait before sending sync pulse
SI0
$D2
; keep params as user defaults (across power failures)
CK
; echo configuration
T?
W?
$D5
; start Pinging
CS
; End Logfile
$L

;===============================================
;  W H S L A V E _ 2 0 1 1 . C M D
;  LMB: Fri 21 Oct 2011 16:23:14 EDT
;
;  WH300kHz slave/uplooker deployment script
;  for new firmware v16.30
;===============================================
; Changes from previous deployment scripts:
; (1) "wm15" command for LADCP mode and no longer need "L" commands
; (2) only commands that change defaults are included (EA,ES etc removed)
; (3) data collected in beam coordinates (allows better inspection of
;     raw data and 3-beam solutions if necessary)
; (4) staggered single-ping ensembles every 0.8/1.2 s (Andreas has seen
;     bottom-interference in WH300 data in Antarctic - seems unlikely for
;     Abaco, but does not lose us pings).
```

```
; (5) 20 8 m bins - for a range of 160 m.
;
; These changes made after email discussions with Eric and Andreas, April
2008.
;
; Ask for log file
$L
; display ADCP system parameters
PS0
; Pause
$D2
; return to factory default settings
CR1
; activates LADCP mode (BT from WT pings)
WM15
; Flow control:
;       - automatic ensemble cycling (next ens when ready)
;       - automatic ping cycling (ping when ready)
;       - binary data output
;       - disable serial output
;       - enable data recorder
CF11101
$D2
; coordinate transformation:
;       - radial beam coordinates (2 bits)
;       - use pitch/roll
;       - no 3-beam solutions
;       - no bin mapping
EX00100
; Sensor source:
;       - manual speed of sound (EC)
;       - manual depth of transducer (ED = 0 [dm])
;       - measured heading (EH)
;       - measured pitch (EP)
;       - measured roll (ER)
;       - manual salinity (ES = 35 [psu])
;       - measured temperature (ET)
EZ0011101
$D2
;  - configure for slave
; pings per ensemble
WP1
; time per ensemble
TE 00:00:01.00
; time between pings
TP 00:00.00
; slave
SM2
; listen for sync pulse before each ensemble
SA011
$D2
; - configure no. of bins, length, blank
; number of bins
WN020
; bin length [cm]
WS0800
; blank after transmit [cm]
```

```
WF0000
$D2
; ambiguity velocity [cm]
WV350
$D2
; keep params as user defaults (across power failures)
CK
; echo configuration
T?
W?
$D5
; start Pinging
CS
; End Logfile
$L
```

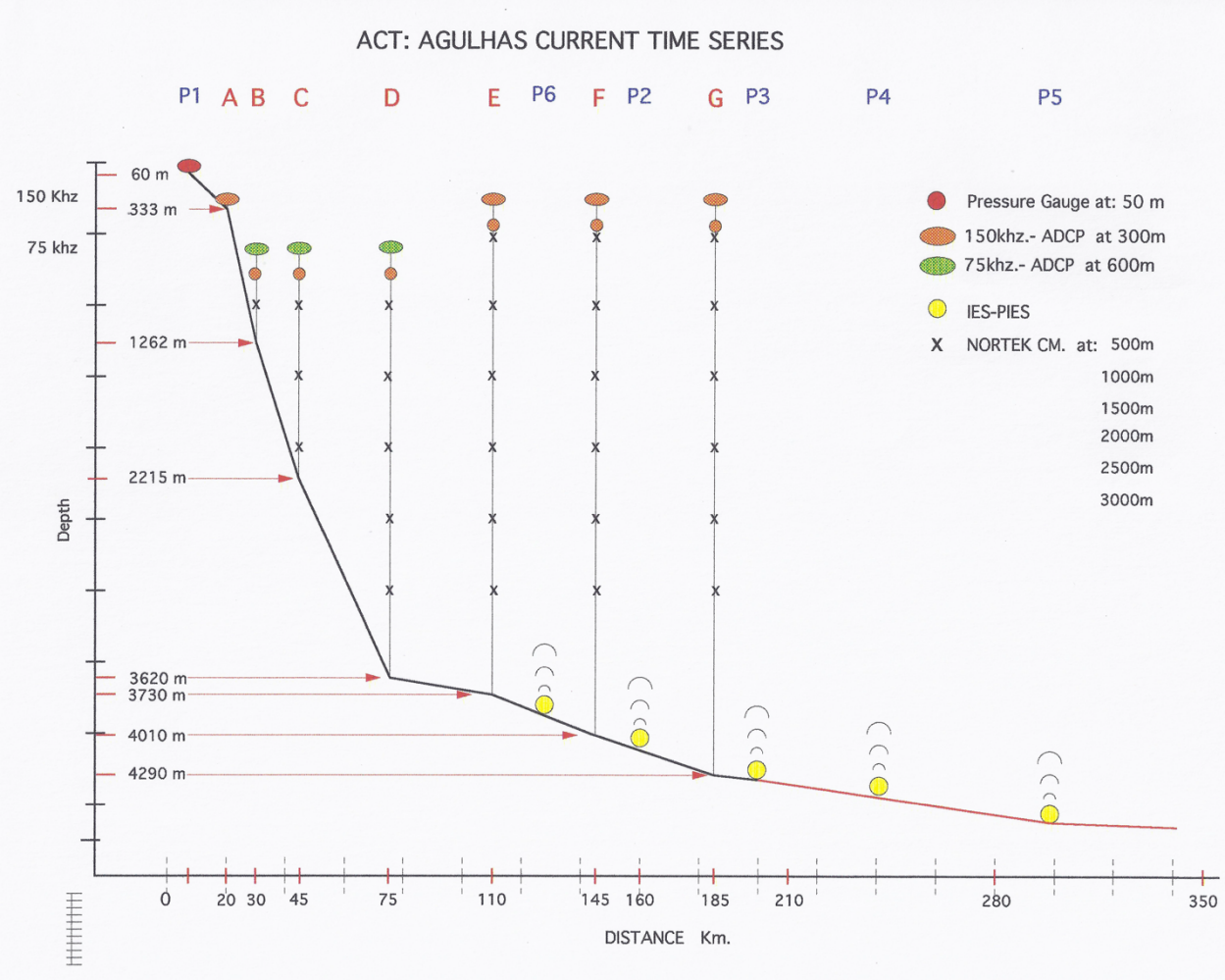
Instrument Recovery Summary

Mooring ID	Depth (m)	Instrument S/N	Instr. Type	In-situ (UTC)	Out-situ (UTC)	Clock Drift	Comments / Problems
M395 (A)							
M395-01	278	13413	150 kHz WHQM-ADCP	17 Apr. 2010 10:00	4 Nov. 2011 08:00	+888 sec	Data saved in multiple files on ADCP, 9-hour gaps between files. Pressure sensor off by about 10m
M396 (B)							
M396-01	297	13389	150 kHz WHQM-ADCP	8 Apr. 2010 9:35	6 Nov. 2011 14:35	+715 sec	Data look OK, nominal 300m range
M396-02	496	6159	Nortek Aquadopp	8 Apr. 2010 10:00	6 Nov. 2011 14:35	+26 sec.	Corrosion and/or leak in dummy plug. One pin broke off from plug. No internal leaks, data is OK
M396-03	996	6166	Nortek Aquadopp	8 Apr. 2010 10:22	6 Nov. 2011 14:35	-6 sec	Occasional high pitch & roll caused some data to be flagged as bad, otherwise OK
M397 (C)							
M397-01	291	13391	150 kHz WHQM-ADCP	9 Apr. 2010 05:22	7 Nov. 2010 06:00	unknown	Top buoy broke free in Nov 2010 Strong blow-down but data OK, 300m nominal range
M397-02	491	6150	Nortek Aquadopp	9 Apr. 2010 05:43	N/A	N/A	Instrument and attached 37" hydro float lost NO DATA
M397-03	991	6172	Nortek Aquadopp	9 Apr. 2010 06:05	7 Nov. 2011 04:20	-51 sec	Data look OK No problems
M397-04	1491	6129	Nortek Aquadopp	9 Apr. 2010 06:22	7 Nov. 2011 04:20	-68 sec	Leak in dummy plug, no internal damage, Data is OK, some periods of bad data during high pitch & roll
M397-05	1991	6103	Nortek Aquadopp	9 Apr. 2010 06:41	7 Nov. 2011 04:20	-3 sec	Data look OK Some periods of bad data during high pitch & roll
M398 (D)							
M398-01	300	13388	150 kHz WHQM-ADCP	11 Apr. 2010 06:28	8 Sept. 2011 22:00	N/A	Top buoy broke away from mooring on 8 September 2011 due to strong blow-down. Data split into 3 parts with 9-18 hour gaps in between. Data otherwise OK, 300m nominal range
M398-02	500	6136	Nortek Aquadopp	11 Apr. 2010 06:46	7 Nov. 2011 09:33	+27 sec	Data look OK
M398-03	1000	6155	Nortek Aquadopp	11 Apr. 2010 07:03	7 Nov. 2011 09:33	+38 sec	Data look OK
M398-04	1500	6154	Nortek Aquadopp	11 Apr. 2010 07:25	7 Nov. 2011 09:33	-7 sec	Data look OK
M398-05	2000	6141	Nortek Aquadopp	11 Apr. 2010 07:41	7 Nov. 2011 09:33	+15 sec	Bad dummy plug, no leaks however. Data look OK
M398-06	2500	6173	Nortek Aquadopp	11 Apr. 2010 07:57	7 Nov. 2011 09:33	+13 sec	Data look OK
M398-07	3000	6147	Nortek Aquadopp	11 Apr. 2010 08:14	7 Nov. 2011 09:33	-3 sec	Data look OK
M399 (E)							
M399-01	310	13392	150 kHz WHQM-ADCP	12 Apr. 2010 04:57	8 Nov. 2011 05:32	+968 sec	Data split into 4 files with 9 hour gaps in between, otherwise OK
M399-02	510	6137	Nortek Aquadopp	12 Apr. 2010 05:14	8 Nov. 2011 05:32	-2 sec	Data look OK
M399-03	1010	6143	Nortek Aquadopp	12 Apr. 2010 05:34	8 Nov. 2011 05:32	+4 sec	Data look OK
M399-04	1510	6139	Nortek Aquadopp	12 Apr. 2010 5:59	8 Nov. 2011 05:32	-8 sec	Data look OK
M399-05	2010	6157	Nortek Aquadopp	12 Apr. 2010 06:17	8 Nov. 2011 05:32	+18 sec	Bad dummy plug, but no internal leaks. Data look OK
M399-06	3010	6138	Nortek Aquadopp	12 Apr. 2010 06:47	8 Nov. 2011 05:32	+47 sec	Data look OK, some bad data during periods of high pitch & roll
M400 (F)							
M400-01	300	13390	150 kHz WHQM-ADCP	13 Apr. 2010 06:08	15 Nov. 2011 04:55	+573 sec	Data split into 3 files with 9 hour gaps in between, otherwise OK
M400-02	500	6145	Nortek Aquadopp	13 Apr. 2010 06:23	15 Nov. 2011 04:55	+13 sec	Data look OK
M400-03	1000	6124	Nortek Aquadopp	13 Apr. 2010 06:40	15 Nov. 2011 04:55	+12 sec	Data look OK
M400-04	1500	6175	Nortek Aquadopp	13 Apr. 2010 07:00	15 Nov. 2011 04:55	+15 sec	Data look OK
M400-05	2000	6133	Nortek Aquadopp	13 Apr. 2010 07:24	15 Nov. 2011 04:55	+22 sec	Data look OK
M400-06	3000	6168	Nortek Aquadopp	13 Apr. 2010 07:50	15 Nov. 2011 04:55	+12 sec	Bad dummy plug, but no internal leaks. Data look OK

M401 (G)

M401-01	315	13412	150 kHz WHQM-ADCP	14 Apr. 2010 08:00	17 Nov. 2011 05:28	+228 sec	Data split into 7 files with variable 10+ hour gaps in between, otherwise Data look OK
M401-02	515	6152	Nortek Aquadopp	14 Apr. 2010 08:15	17 Nov. 2011 05:28	+17 sec	Data look OK
M401-03	1015	6127	Nortek Aquadopp	14 Apr. 2010 08:48	17 Nov. 2011 05:28	-6 sec	Data look OK
M401-04	1515	5995	Nortek Aquadopp	14 Apr. 2010 09:10	17 Nov. 2011 05:28	+16 sec	Data look OK
M401-05	2015	6146	Nortek Aquadopp	14 Apr. 2010 09:33	17 Nov. 2011 05:28	+46 sec	Battery voltage drop was higher than normal, otherwise Data look OK
M401-06	3014	6144	Nortek Aquadopp	14 Apr. 2010 10:15	17 Nov. 2011 05:28	+5 sec	Data look OK

Array Diagram Deployed



Mooring Diagrams

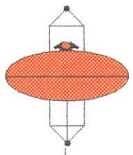
PROJECT :AGULHAS CURRENT SITE: (A)

MOORING # 407

Survey position:
Lat
Lon

	Deployed	Recovered
	_____	_____
Time in.	Time out.	

Radio/Strobe s/n
Freq:
Argos: s/n



300.M

Elliptical ADCP Buoy
150Khz ADCP s/n

_____ _____

Note: Added 1.0m 3/8" chain+25lb lead

1/4" WIRE 407 A= 8.0 m

10-17" GLASS FLOATS

321.M

RELEASES: s/n
s/n

_____ _____

1/4" WIRE 407 B= 5.0 m.

3/8" CHAIN 5.0 m.

333 m

ANCHOR.lbs. Air _____ _____ _____

PROJECT :AGULHAS CURRENT SITE: (B)

(600.0M MOORING # 408

Survey position:
Lat
Lon

		Deployed	Recovered
	Radio/Strobe s/n Freq: Argos: s/n	_____	_____
		Time in.	Time out.
600m	Elliptical ADCP Buoy 75Khz ADCP s/n	_____	_____
	3/16" WIRE 408 A =100.0m ✓		
703m	37" Hydro-float	_____	_____
	3/16" WIRE 408 B =290.0m ✓		
1000m	5-17" GLASS FLOATS NORTEK C.M. s/n	_____	_____
	1/4" WIRE C =11.0m		
1022m	10-17" GLASS FLOATS RELEASES: s/n s/n	_____	_____
	1/4" WIRE 408 D=232.0m ✓		
	3/8" CHAIN = 5.0 m		
1262m	ANCHOR –		

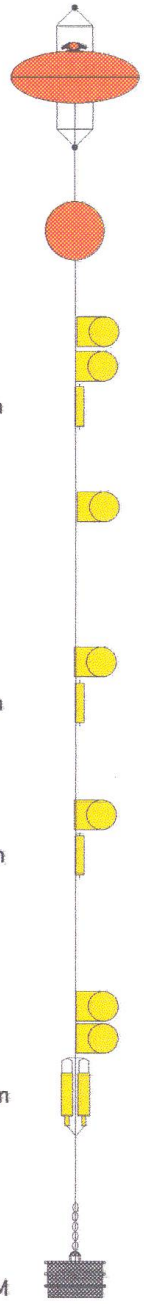
PROJECT :AGULHAS CURRENT SITE: (C)

MOORING # 409

Survey position:
Lat
Lon

Radio/Strobe s/n
Freq:_____ mhz
Argos: s/n
ID.

	Deployed	Recovered
	_____	_____
	Time in.	Time out.



600m — Eliptical ADCP Buoy
75 Khz ADCP s/n _____ _____

1/4" WIRE 409 A =190.3 m

794m — 37" Hydro-float _____ _____

3/16" WIRE 409 B =194.5 m

10-17" GLASS FLOATS

1000m — NORTEK C.M. s/n _____ _____

3/16" WIRE 409 C =238.3 m

5-17" GLASS FLOATS

1/4" WIRE 409 D =248.5 m

5-17" GLASS FLOATS

1500m — NORTEK C.M. s/n _____ _____

1/4" WIRE 409 E =492.6 m

5-17" GLASS FLOATS

2000m — NORTEK C.M. s/n _____ _____

1/4" WIRE 409 F =91.3 m

10-17" GLASS FLOATS

2102m — RELEASES: s/n _____ _____
s/n

1/4" WIRE 409 G = 100.0 m

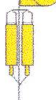
3/8" CHAIN = 5.0 m

2210.M — ANCHOR. _____ lbs. Air _____ _____

PROJECT :AGULHAS CURRENT SITE: (D)
MOORING # 410

Survey position:
Lat
Lon

Radio/Strobe s/n
Freq:
Argos: s/n
ID.

		Deployed	Recovered
		_____	_____
600.M	 Eliptical ADCP Buoy 75 Khz ADCP s/n	_____	_____
	1/4" wire 410 A=100.0 m		
	 36" Hydro-float	_____	_____
	3/16" wire 410 B=290.0 m		
1000.M	 5-17" GLASS FLOATS NORTEK C.M. s/n	_____	_____
	3/16" wire 410 C=492.6 m		
1500M	 5-17" GLASS FLOATS NORTEK C.M. s/n	_____	_____
	1/4" wire 410 D=492.8 m		
2000.M	 5-17" GLASS FLOATS NORTEK C.M. s/n	_____	_____
	1/4" wire 410 E=493.0 m		
2500.M	 5-17" GLASS FLOATS NORTEK C.M. s/n	_____	_____
	1/4" wire 410 F=493.0 m		
3000.M	 5-17" GLASS FLOATS NORTEK C.M. s/n	_____	_____
	1/4" wire 410 G=499.0 m		
	 10-17" GLASS FLOATS		
3512.M	 RELEASES: s/n s/n	_____	_____
	1/4" wire 410 H=101.0 m		
	3/8" chain = 5.0 m		
3620.M	 ANCHOR. lbs. Air	_____	_____

AGULHAS CURRENT SITE: (E) 150 ADCP AT : 300 m.
MOORING # 411

Survey position:
Lat
Lon

Radio/Strobe s/n
Freq: 160.785 mhz
Argos: s/n
ID.

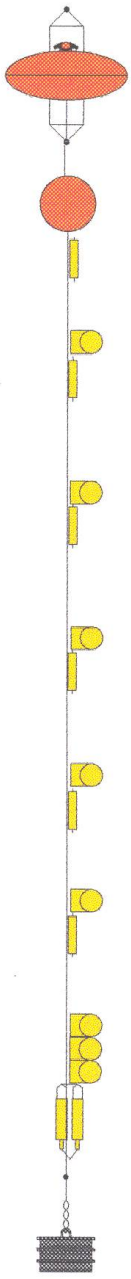
		Deployed	Recovered
300.M	Eliptical ADCP Buoy 150Khz ADCP s/n	_____	_____
	3/16" WIRE 411-A =77.5 m		
	36" Hydro-float		
	3/16" WIRE 411- B =112.5 m	_____	_____
500.M	NORTEK C.M.		
	3/16" WIRE 411-C =492.6 m		
1000.M	5-17" GLASS FLOATS NORTEK C.M. s/n	_____	_____
	1/4" WIRE 411- D =492.8 m		
1500.M	5-17" GLASS FLOATS NORTEK C.M. s/n	_____	_____
	1/4" WIRE 411-E =492.6 m		
2000.M	5-17" GLASS FLOATS NORTEK C.M. s/n	_____	_____
	1/4" WIRE 411- F =991.4 m		
3000.M	5-17" GLASS FLOATS NORTEK C.M. s/n	_____	_____
	1/4" WIRE 411- G =208.0 m		
3220.M	10-17" GLASS FLOATS RELEASES: s/n s/n	_____	_____
	1/4" WIRE 411- H =401.0 m 1/4" WIRE 411-I =100.0 m 3/8" CHAIN = 5.0 m		
3730.M	ANCHOR. lbs. Air	_____	_____

AGULHAS CURRENT SITE: (F)
MOORING # 412

Survey position:
Lat
Lon

Radio/Strobe s/n
Freq:
Argos: s/n
ID.

Deployed _____ Recovered _____



300.M — Eliptical ADCP Buoy
150Khz ADCP s/n

3/16" WIRE 412-A =195.0 m

36" Hydro-float

500.M — NORTEK C.M. s/n

3/16" WIRE 412-B =493.0 m

5-17" GLASS FLOATS

1000.M — NORTEK C.M. s/n

3/16" WIRE 412-C =492.3 m

5-17" GLASS FLOATS

1500M — NORTEK C.M. s/n

1/4" WIRE 412-D =493.0 m

5-17" GLASS FLOATS

2000.M — NORTEK C.M. s/n

1/4" WIRE 412-E =492.5 m

5-17" GLASS FLOATS

2500.M — NORTEK C.M. s/n

1/4" WIRE 412-F =493.0 m

5-17" GLASS FLOATS

3000.M — NORTEK C.M. s/n

1/4" WIRE 412-G =102.0 m

15-17" GLASS FLOATS

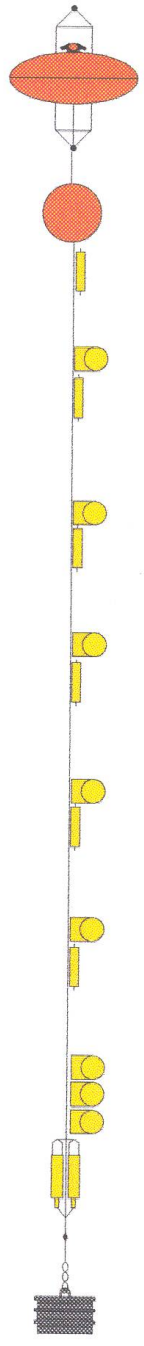
3118.M — RELEASES: s/n
s/n

1/4" WIRE 412-H =782.0 m
1/4" WIRE 412-I =100.0 m
3/8" CHAIN =

4010.M — ANCHOR. lbs. Air

AGULHAS CURRENT MOORING # 413 SITE: (G)

Survey position:
Lat
Lon



		Deployed	Recovered
	Radio/Strobe Freq: Argos: s/n ID	_____	_____
300.M	Eliptical ADCP Buoy 150Khz ADCP s/n	_____	_____
	3/16" WIRE 413-A = 194.5 m		
	36" Hydro-float		
500.M	NORTEK C.M. s/n	_____	_____
	3/16" WIRE 413-B = 493.0 m		
1000.M	5-17" GLASS FLOATS NORTEK C.M. s/n	_____	_____
	3/16" WIRE 413-C= 492.4 m		
1500M	5-17" GLASS FLOATS NORTEK C.M. s/n	_____	_____
	1/4" WIRE 413-D = 493.0 m		
2000.M	5-17" GLASS FLOATS NORTEK C.M. s/n	_____	_____
	1/4" WIRE 413-E = 493.5 m		
2500.M	5-17" GLASS FLOATS NORTEK C.M. s/n	_____	_____
	1/4" WIRE 413-F = 492.5 m		
3000 M	5-17" GLASS FLOATS NORTEK C.M. s/n	_____	_____
	1/4" WIRE 413-G=198.2 m		
	15-17" GLASS FLOATS		
3215.M	RELEASES: s/n s/n	_____	_____
	1/4" WIRE 413-H =965.0 m 1/4" WIRE 413-I =100.0 m		
4290.M	3/8" CHAIN = 5.0 m ANCHOR. lbs. Air	_____	_____

CCHDO Data Processing Notes

- **File Submission myshen**

318M20111103_nc_ctd.zip (download) #e6f17
Date: 2014-04-08
Current Status: dataset
Notes
```
Written permission 2014-04-07 19:29 from Lisa Beal to Steve Diggs to post as
public.
```

- **File Merge Matthew Shen**

318M20111103_nc_ctd.zip (download) #e6f17
Date: 2014-04-08
Current Status: dataset
Notes
```
CTD
```

- **Available under 'Files as received' CCHDO Staff**

Date: 2014-04-08
Data Type: CTD
Action: Website Update
Note:
```
The following files are now available online under 'Files as received',
unprocessed by the CCHDO.

act1111_nc_ctd.zip
```

- **Make CTD public Matt Shen**

Date: 2014-04-08
Data Type: CTD public
Action: Website Update
Note:
```
=======================
318M20111103 processing
=======================

2014-04-08

M Shen

.. contents:: :depth: 2
```

```
Submission
==========

================== ============ ========== ========= ====
filename           submitted by date       data type id
================== ============ ========== ========= ====
act1111_nc_ctd.zip myshen       2014-04-08 CTD       None
================== ============ ========== ========= ====

Changes
-------

act1111_nc_ctd.zip
~~~~~~~~~~~~~~~~~~

* Renamed act1111_nc_ctd.zip to 318M20111103_nc_ctd.zip

Directories
===========
:working directory:
  /data/co2clivar/indian/act/318M20111103/original/2014.04.08_CTD-public_MYS
:cruise directory:
  /data/co2clivar/indian/act/318M20111103

Updated Files Manifest
======================
====================== =====
file                   stamp
====================== =====
318M20111103_nc_ctd.zip
====================== =====
```