

NC State University Mooring Operations

Cruise Report 0506 12 - 16 August 2005

Project: Caro-COOPS and CORMP

Vessel: R/V Cape Hatteras

Personnel: John Bichy, Jeff Kinder (Operations Chief), Jay Souza, Ben Speckhart, and Dave Wells.

Primary Activities:

- FRP02-05 deployment
- FRP02-04 recovery
- CAP03-06 deployment
- CAP03-05 deployment
- Acoustic modem test buoy deployment
- ILM03-01 recovery/repair/deployment

Mooring Specifications:

Caro-COOPS CAP03 and FRP02 moorings are bi-moored as each buoy is anchored by the combination of a railroad wheel stack (3500 lbs.) and science frame (3000 lbs.). At each site bottom water temperature, conductivity, and pressure (high resolution digi-quartz sensor) are measured every 15 minutes from a Seabird 16IM-plus Seacat located within the science frame. Current direction and velocity (every 30 minutes) throughout the water column and wave direction, period, and height (every 2 hours) are measured with a bottom mounted RDI 600-khz sentinel ADCP located within the science frame. All sub-surface data are inductively transferred to the buoy datalogger through 3/16" communication wire rope. Each science frame holds a pop-up float for mooring recovery operations. Atmospheric data is collected at each site every two hours from a Coastal Environmental Weatherpak mounted on the buoy tower. These data includes air temperature, solar radiation, wind speed, wind direction, humidity, and barometric pressure. At the CAP03 site only, surface water temperature, conductivity, pressure, and fluorescence (Wetlab Inc. fluorometer) are measured every 15 minutes from a Seabird 16IM-plus Seacat mounted directly to the G-2000 buoy. Every two hours data is transferred via Iridium satellites to University of South Carolina in Columbia, SC for real-time display and archiving.

The mooring at ILM03 is identical to the Caro-COOPS CAP03 mooring except for the addition of a bottom-mounted fluorometer.

The acoustic test buoy deployed near Caro-COOPS CAP02 mooring is comprised of a stand-alone bottom instrumentation frame located within ¼ mile from a single point mooring. A 5-stack railroad wheel anchor is connected to an MSI G3000 buoy with a 45m section of ½” chain. ADCP data will be transferred from the bottom frame to a buoy ZENO datalogger using the combination of a surface and bottom mounted Benthos acoustic modem.

Mooring upgrades/changes/notes:

FRP02 & CAP03

- Weatherpaks with new seal and marine grade directional bearings
- Tri-lens radar reflectors
- New buoy well thru-hull fittings back sealed w/ silicone sealant

FRP02

- Visibility sensor added

Activity Log:

FRP02 turnaround

FRP02-05 was successfully deployed.

A CTD cast was made following this deployment.

FRP02-04 was successfully recovered by 1830. Release float failed to release on first few attempts but did release and recovery was performed as intended. At the time of recovery all mooring components were working despite water damage to the RTT and battery stacks as water entered the well through the thru hull fittings. These fittings were upgraded and back sealed with silicone sealant on the FRP02-05 deployment.

Buoy and instrumentation bio-fouling was minimal. Pictures of instruments available.

The weather was fair and did not influence deck operations.

Salinity and water temperature data from the bottom mounted SBE Seacat agreed well with the CTD cast made following the recovery indicating very little calibration drift.

	FRP02-04		
	<u>CTD</u>	<u>S45-01</u>	<u>Diff</u>
Local time	1730	1729	1
Temperature	29.2	29.0	0.2

Salinity	34.0	33.9	0.1
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CAP03 turnaround

CAP03-06 was successfully deployed.

A CTD cast was made following this deployment.

CAP03-05 was successfully recovered utilizing the pop up release float. Buoy and instrumentation bio-fouling was minimal. Pictures of instruments available.

The weather was fair and did not influence deck operations.

Salinity and water temperature data from the bottom and surface mounted SBE Seacat agreed well with the CTD cast made following the recovery indicating very little calibration drift.

	CAP03-05		
	<u>CTD</u>	<u>S100-02</u>	<u>Diff</u>
Local time	1010	1014	4
Temperature	24.7	24.6	0.1
Salinity	36.1	36.0	0.1

	CAP03-05		
	<u>CTD</u>	<u>SFL-04</u>	<u>Diff</u>
Local time	1010	1014	4
Temperature	29.1	29.0	0.1
Salinity	34.6	34.6	0

Acoustic test buoy

The science frame housing the acoustic modem and ADCP was lowered to the bottom and communications tested prior to buoy deployment. After some technical problems that resulted in the recovery of the science frame twice, the frame and mooring were successfully deployed. One of the technical issues was the need to manually turn the ADCP on prior to deployment rather than sending a break from the top-side modem.

A CTD cast was made near CAP02 following the test buoy deployment.

The weather was fair and did not influence deck operations.

ILM03-01 recovery/repair/re-deployment

Communications were lost with ILM03 on 30 July thus on this cruise we planned to find and attempt the necessary repairs. The buoy was brought on deck and strapped down with both mooring elements or legs remaining attached during the repair. No signs of damage to any of the mooring components were found including the buoy well, which was found completely sealed and dry. The complete RTT was therefore replaced on ILM03-01 with the thought that the ZENO and/or Iridium modem had failed. With all new buoy well electronics the cover was sealed and the buoy re-deployed. Post-deployment testing found failures with the Iridium modem; however, post-cruise communications with ILM03-01 had not recovered.

A CTD cast was made following the re-deployment.

The weather was fair and did not influence deck operations.

Station Log:

Station	Date	Time	Lat	Long	Activity
FRP02-05	12 Aug	1730	N 32 16.44	W 80 24.53	Mooring deployment
CTD 01	12 Aug	1730	N 32 16.59	W 80 24.46	CTD cast at FRP02
FRP02-04	12 Aug	1915	N 32 16.54	W 80 25.08	Mooring recovery
CAP03-06	13 Aug	1005	N 32 29.92	W 79 20.09	Mooring deployment
CTD 02	13 Aug	1010	N 32 29.82	W 79 19.94	CTD cast at CAP03
CAP03-05	13 Aug	1121	N 32 30.03	W 79 19.38	Mooring recovery
Test buoy	14 Aug	1455	N 32 48.54	W 79 37.37	Mooring deployment
CTD 03	14 Aug	1458	N 32 48.51	W 79 37.47	CTD cast at CAP02
ILM03-01	15 Aug	0825	N 33 59.47	W 77 21.56	Mooring repair
CTD 04	15 Aug	0840	N 33 59.55	W 77 21.72	CTD cast at ILM03

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