

## Thursday 21 May 2009 JD 141

The pre-dawn CTDs (#92 and #93) were deployed at 03:58 and 04:59 respectively, on completion of which we went in search of the wire walker buoy (#2879) which we knew was running out of battery power. At 06:06 our position was 19° 37.38 N 018° 54.87 W, sea surface temperature was 18.6 °C, fluorescence was 0.58 fluorescence units (3.3 µg l<sup>-1</sup> Chl), barometric pressure was 1011, salinity was 35.66, water depth was 2904 m and the winds were NNE 20 knots. The surface SF<sub>6</sub> concentration reached a maxima of 26 fmol l<sup>-1</sup>. The buoy was recovered at 07:16 and we returned to the SF<sub>6</sub> patch for CTD #94 at 09:25, followed by Apstein net #29 at 10:30. For the first time in the cruise, there was actually a hint of rain and we joked about sampling with umbrellas to prevent contamination of the samples with freshwater. As was becoming usual, the buoy marking the centre of the patch and the actual SF<sub>6</sub> patch became increasingly separated, and we therefore spent some time searching for the highest SF<sub>6</sub> concentrations in which to deploy CTD #95 at 12:03 and optics rig OPT 026 at 12:36. These short intensive searches are only achievable through the experience and expertise of the Officers on the bridge. At 15:14 we re-deployed the wire walker buoy (#2879) and undertook turbulence probe deployments between 15:23 and 16:24, before deploying the MVP at 16:51 until 22:03. We completed a high resolution SF<sub>6</sub> mapping exercise between 22:41 and 02:00. As tomorrow may be our last day sampling the SF<sub>6</sub> patch, it was important to have as much data as possible to guide us to the patch centre for the day's sampling activities.

## Friday 22 May 2009 JD 142

In order to leave sufficient time to recover 4 buoys and undertake the required MVP survey, we decided to deploy 4 CTDs immediately after each other this morning for 1) large volume experimentation, 2) pre-dawn



incubation experiments, 3) SF<sub>6</sub>/He transfer between the sea surface and the atmosphere and 4) measurements of N<sub>2</sub>O and CH<sub>4</sub> at the oxygen minimum. We deployed CTD #96 at 04:09, CTD #97 at 05:09, CTD #98 at 06:17 and CTD #99 at 07:35. Thinking that this would be the last CTD of the cruise, we taped a few cans of lager to the CTD frame (photo 1) to celebrate and thank the crew (Greg – photo 2, Mark, Phil, Paul – photo 3, John, Ian – photo 4 and Steve)

for their invaluable help. Simon wrote **RRS Discovery** on several polystyrene cups and tied them up in stockings (kindly donated by ????) to the CTD frame. The pressure of the water at 500m would reduce the cups to a third of their size and provide an unusual souvenir for his niece. At 07:31 our position was 19° 29.70 N 019° 08.34 W, sea surface temperature



was 18.8 °C, fluorescence was 0.62 fluorescence units (3.6 µg l<sup>-1</sup> Chl), barometric pressure was 1014, salinity was 35.69, water depth was 3068 m and the winds were NNE 18 knots.

Surface SF<sub>6</sub> concentrations were in the range 10-12 fmol l<sup>-1</sup>. We recovered the ADCP buoy at 09:45, the drifter buoy #5988 at 12:31, returned to the SF<sub>6</sub> patch for an optics cast (OPT 027) at 14:03, and recovered the wire walker buoy #2879 at 15:06. We deployed the MVP at 15:28 and headed for the last known position of the Carioca buoy – almost 4 hours away. The Carioca buoy



(worth ca. £45k) had become detached from its GPS buoy and had no light attached. We therefore needed to find it before it got dark at 20:00. Despite several willing volunteers searching with binoculars (photo 5) from

the bridge, we were unable to recover the buoy, and very disappointed, continued the hexagonal MVP survey of the filament at 20:00 (due to finish at almost this position at 00:00 Saturday).

## Saturday 23 May 2009 JD 143

The MVP survey continues, with Dave, John and Kev working shifts to monitor its safe deployment. Without any pre-dawn CTDs to get me out of bed, I had a very welcome lie in this morning, and a luxurious breakfast of home-made croissants – thanks to Mark and Lloyd. At 08:23 our position was 19° 57.62 N 018° 27.17 W, the sea surface temperature was 18.4 °C, fluorescence was 0.35 fluorescence units (1.4 µg l<sup>-1</sup> Chl), salinity was 35.66, barometric pressure was 1015, water depth was 3012 m and the winds were NNE 23 knots. At 09:48 the conducting cable of the MVP broke, and so the MVP was recovered inboard. The problem was



expected to take at least a day to repair, and so the decision was made to return south to search again for the Carioca buoy, and prepare the CTD for repeated deployments in lieu of the broken MVP. The final number of MVP casts made during the cruise is 1797 – almost three times as many casts as the MVP has made in its previous 7 years of use. At 10:30,



the Master carried out his weekly inspection (photo 6 from left to right – John Leask, First Officer; Peter Newton, Master; Mike Ripper, Purser) of the laboratories and cabins to ensure they are maintained in a clean, tidy and safe condition. The PSO carried out the final oxygen titration of the cruise and the oxygen 'A' team celebrated the end of

titrations on the aft deck (photo 7). The incubators were switched off and cleaned during the afternoon (photo 8) and the Carioca buoy was successfully retrieved at 18:29 (photo 9). We then started CTD deployments to 500m every 3 hours. CTD #100 was deployed at 19:16 and CTD #101 was deployed at 22:48. Very many thanks to John, Dave and Kev who stayed on shifts to complete these important CTDs.

