

## Saturday 18 April 2009 JD 108

After a good nights' sleep, many people gained their sea-legs and were able to sample from the 'monster' CTD cast (for scientists who require large volumes [60-80 litres] of seawater for their experiments) at 04:15 and the 'pre-dawn' CTD cast (for scientists requiring smaller volumes of water but at several depths) at 05:50. The Engineers, including Chris Carey (Second), Gary Slater (Third) and Tom Levy (Third) (see photo 1) have



successfully reconfigured the CCTV system to allow the CTD winch operator to monitor the winches. The sea surface temperature (SST) was 19.9°C, salinity 36.7, and fluorescence (a measure of plankton biomass) very low at 0.17ugl<sup>-1</sup>. Martin Bridger, Kev Smith and Dan Comben worked in shifts through the night and day to try to mend the MilliQ water system. Without this system, many people

had to curtail their experiments, and we began to calculate how much MilliQ water everyone really needed (rather than how much they would like) and the relative merits and disadvantages of travelling to either

Tenerife or Cape Verde to pick up a new system. During the afternoon the wind speed was 4.4 ms<sup>-1</sup> at 205°. We continued the MVP survey throughout the day, with the MVP profiling (towed behind the ship moving up and down between the surface and 350m) every 8 minutes. In order to deploy the surface patch of SF<sub>6</sub> on Wednesday, Phil Nightingale, John Stephens and Malcolm Liddicoat flush a 6000 litre tank of seawater with SF<sub>6</sub> from a gas cylinder until the water is saturated with the gas. They can only do this when the ship is



facing into the wind so that any saturated SF<sub>6</sub> in the air blows away from the ship rather than into the laboratory where it can contaminate the instruments which can measure SF<sub>6</sub> at vanishing small quantities (as low as one 'atto mole' or 1 part in 1000,000,000,000,000). They therefore needed to work in shifts to do this at the times the ship was travelling in the correct direction relative to the wind. In the early evening, Dan, Martin and Kev found and rectified the fault on the MilliQ system (see photo 2) – a tiny (8mm) fuse had blown on a circuit board. This was an amazing marathon of patient problem solving – well done lads – and thank you so much. Sometime during the day, we realised there was a problem with the email system at the National Oceanography Centre, Southampton which processes all the scientists' emails from the ship to the outside world. As it is a non-working day in the 'real' world, we didn't expect any contact with home until Monday morning when the Southampton staff return to work.

They say that an army marches on its' stomach, and in the daily routine of life onboard, food becomes a vital 'normaliser'. Meal times at sea are: breakfast 07:20-08:30, lunch 11:20-12:30 and evening meal 17:20-18:30. The food on this trip has been exceptional, with the catering staff including Head Chef Mark Preston and Chef Lloyd Sutton (see photo 3) producing an outstanding range of food three times a day for almost 50 people. The split



pea and pea and ham soups are specialities, and the cheesecakes, chocolate cakes and quiches are out of this world.

### Sunday 19 April 2009 JD 109

An interesting phenomenon which happens during research cruises, is that time can simultaneously progress incredibly quickly and geologically slowly. I'm writing this narrative on Monday morning, and yet it seems that Sunday was an eon ago - so much has happened in the last 24 hours that I can hardly remember how things seemed back then. My logbook says that the 'monster' CTD cast occurred at 07:00 and the 'pre-dawn' cast just after 08:00. SST was 19.2 °C, salinity 36.6, air temperature 18.7 °C and fluorescence 0.3 volts. Although the MilliQ system was fixed last night, it cannot be used until the reservoir tank is full (estimated to occur before breakfast). An electricity short caused some downtime of equipment and precipitated some rewiring in the port container. As the email system was still down, we arranged for any satellite images and drifter positions from NEODAAS (National Earth Observation Data Acquisition and Analysis Service, UK) and NOAA (National Oceanographic and Atmospheric Administration, USA) to go to the Captain's independent email address. We are extremely grateful for this extra inconvenience this caused him - especially when we received position data from all the drifters we deployed on Friday off the coast of Morocco. In order to try and isolate the electrical fault on the ship we systematically went through most of the laboratories switching off each power point and checking whether the electrical short reduced. Since some of the specialised instruments take



several days to set up, we did not power everything down and so didn't find the problem. However, the tray containing the condensation from the air conditioning unit above the deck laboratory flooded through the ceiling this morning, so that is a potential culprit. Once the early morning CTDs were inboard, we deployed the MVP and continued a survey of the physical (temperature, salinity, water speed and direction) features of the filament. At 13:00, the MVP stopped working, and at 14:00 the PES fish (to accurately measure depth) stopped working. Both instruments were brought onboard, and Dan

Comben, Dave Teare, John Wynar and Martin Bridger began to take them apart to find the respective faults. At 21:00 we decided to continue the survey without the MVP, recording ADCP (water current) data and stopping every 30 minutes for a CTD. This meant removing 24 x 20 litre sampling bottles from the CTD and adjusting shifts so that Dave could continue working on the MVP while Dan and John ran the CTD. Beginning to think the cruise had surely had sufficient bad luck, we continued to monitor the 'filament' of cold upwelled water which moves south and then curls west and northwest offshore. These measurements continued overnight until the 'monster' cast at 03:00 on Monday. Meanwhile the scientists were grappling with problems associated with the breakdown of the liquid nitrogen generator (see photo 4), calibrating chemicals for the dissolved oxygen systems, re-plumbing solenoid valves in the nitrous oxide system, and reconfiguring the cuvette holder for the chlorophyll fluorometer. Just another boring day at the office !