

### Wednesday 15 April 2009 Julian Day 105

We departed Tenerife ( $28^{\circ} 28'12.54''$  N  $16^{\circ} 14'33.16''$  W) at 09:00 BST, passing a huge luxury liner on the way out of the harbour (see photo 1). Problems with both of RRS Discovery's radars threatened to delay us, however these were rectified during Tuesday. We plotted a course south to Cap Corveiro, at  $21^{\circ}$ N on the coast of Western Sahara. With the ship rolling gently, the scientists continued to set up and calibrate their instruments, and sort out the usual teething problems with baselines, and standardisation.



The first emergency muster station occurred at 16:15, when we practised getting into our immersion suits and the lifeboats (see photo 2). This was



followed by the first meeting of the 'management committee' – consisting of myself and the objective leaders Phil, Andy, Gavin and Riqui. Andy Rees agreed to be the deputy Principal Scientist (Deputy Fahrtleiter), and we discussed co-ordination of the science. The scientists were introduced to the Master - Peter Newton and the Chief Engineer Ian Slater at the first science meeting, held at 19:00. We arranged to put together a photo board of the officers, crew and scientists to help getting to know each other. The scientific plan for the next few days includes flushing out and testing the non-toxic seawater supply, and undertaking a 'shakedown' or test deployment of all the over-side scientific equipment tomorrow afternoon. On arrival at Cap Corveiro we will deploy the Moving Vehicle Profiler (MVP) and

undertake a box grid survey around the area of most intense upwelling. After the 4 day grid survey we will deploy 5 drifting buoys and the tracer sulphur hexafluoride ( $\text{SF}_6$ ), and begin a 10-12 day 'Lagrangian' study following the patch of upwelled water as it meanders offshore. The engineers reported a problem with the CCTV in the winch room, such that the winch driver of the CTD would not be able to monitor the wires on the winch drum as the CTD was deployed. If the CCTV cannot be mended, then at least 2 engineers will need to be in the winch room during deployment.

Science on a research ship is always recorded in Greenwich Mean Time (GMT), and so in order to minimise the risk of confusion between the science recorded in GMT and meals occurring at times in BST, the clocks will go back one hour tonight to GMT.

### Thursday 16 April Julian Day 106

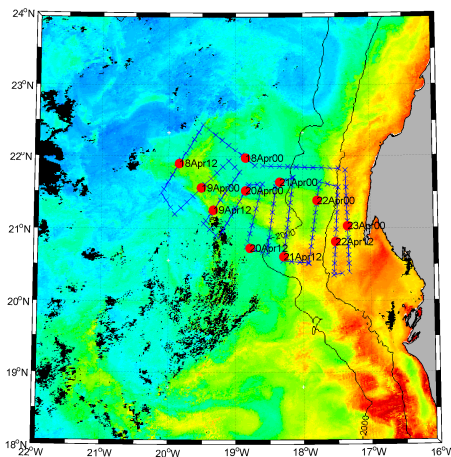
Dawn occurred at approximately 06:15 (official sunrise at 06:47, sunset at 19:29 and twilight until after 20:00), wind speed 10 knots and wind direction  $69^{\circ}$  True. At 07:10 GMT we were at  $24^{\circ} 21.62^{\circ}$ N  $17^{\circ} 01.10^{\circ}$ W, heading south, and keeping west of the 1000m depth contour in order to deploy the instruments in deep water. The sunny weather encouraged lots of willing pairs of hands to set up the incubators on the back deck (see photo 3). After lunch we completed the



'shakedown' station, deploying a drogue drifter with an instrument package called a 'wire walker' which mechanically moves up and down the vertical wire collecting data. This is a newly configured instrument/buoy/drogue package and so it took some time to achieve the correct buoyancy and design an efficient method of deployment and recovery. We will be deploying and recovering one of these buoys every few days during the 'Lagrangian' experiment and so it was important to plan and practise the deployment and recovery. Dan Comben and Mark Squibb are to be congratulated for their effective co-ordination of this operation. We then deployed the towed fish, which pumps 'clean' surface seawater into the deck laboratory from which we will sample for volatile organic compounds, nutrients and biogenic gases. We also deployed the CTD (Conductivity, Temperature, Depth) + water bottle rosette and the optics rig before recovering the drifter and wirewalker. The final test deployment of the day was the MVP, which was towed for 6 hours across the shelf break.

### Friday 17 April 2009 JD 107

MVP operations finished at 05:00. The weather forecast for the next few days is force 6 gusting force 7. The sea surface temperature monitored continually with a flow-through thermosalinograph (TSG) is 17.8°, the salinity is 36.3, and the air temperature is 17°C. Most of the scientific equipment is working well, apart from the liquid nitrogen generator. This prevents us from measuring dimethylsulphide, one of the climate relevant gases this project is focussing on. At 09:00 we deployed four 'throw over' buoys which will track the water currents and transmit temperature data back to the ship. We hadn't been able to receive satellite images on the ship until this morning, when the problem with the email was solved. This meant that Riqui Torres could



use the latest image of ocean colour (an indicator of the plankton production due to the high nutrient upwelled water) to design a grid survey to quantify the volume and speed of upwelled water moving offshore. Once the grid was designed, Mike Hood, the Second Officer could input the co-ordinates into the ship's navigation system to allow us to sample the high and low productivity waters (see satellite image 1: red / orange is high plankton biomass and blue / green is low plankton biomass). We deployed the MVP at 13:00 in a maximum depth of 350m and followed the survey grid at a speed of 7 knots. We will continue to follow this grid over the next 4 days, collecting samples for chlorophyll to calibrate the underway fluorometer, dissolved oxygen to calibrate the underway oxygen optode, temperature, salinity and inorganic nutrients. We will stop

once a day, bring the MVP inboard and carry out one CTD station to sample vertically through the water column. Unfortunately the MilliQ water system broke down this evening – this provides ultra clean water for the chemists and microbiologists to use. We have a back-up system, but this is too small to provide sufficient water for all the scientists at the speed they require it. The increased rolling of the ship during today meant that several people were feeling worse for wear, or had taken to their bunks. We turned in early, ready for the first 'pre-dawn' productivity station at 04:00, not knowing how many people would be fit enough to sample.