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Beaufort Gyre Exploration Project: Dispatch 11: Recovery of an Ice-Tethered Profiler (76 N, 148 W)

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The morning began with helicopter reconnaissance to survey sea-ice conditions to the north and to search for an Ice-Tethered Profiler (ITP) that was in the vicinity of the ship. An ITP consists of a surface buoy (installed in permanent ice) and a profiler that rolls up and down a wire suspended below the buoy to measure upper-ocean properties down to 750 m. The data (temperature, salinity, pressure, and optionally dissolved oxygen and velocity) are transmitted in near-real time via satellite from the surface buoy to the Woods Hole Oceanographic Institution (to learn more, visit www.whoi.edu/itp). The system (ITP 42) was deployed last October on a 2-m thick ice floe in the Beaufort Sea about 160 km to the northwest of where it was recovered today. We knew its position because the ITP was transmitting GPS data from the surface float every hour. However, it had stopped transmitting ocean profiles in April 2010 when the battery voltage dropped precipitously for unknown reasons. Recovery of the ITP means we may be able to diagnose the failure to prevent it from happening again on future ITPs, and to re-use the system hardware for a deployment in the coming days.

Helicopter pilot Chris Swannell, Ice Observer Roger Provost, John Kemp (WHOI) and Chief Scientist Bill Williams (IOS) visually located the ITP from the helicopter, and assessed its supporting floe. They spotted the yellow surface buoy in ponded ice about 21 miles northeast of the ship. On the same ice floe, two other instruments were installed at deployment: a Naval Postgraduate School Arctic Ocean Flux Buoy (AOFB 22) and a US Army Cold Regions Research and Engineering Laboratory (CRREL) Ice Mass Balance Buoy (IMB 2010E). There was no sign of the AOFB (which is no longer transmitting), but the IMB was there, mostly intact and still transmitting data. The IMB monitors the growth and melt of sea ice; it measures air temperature, barometric pressure, ice and surface-ocean temperature, snow depth, and ice draft. These ice-based instrument systems (the ITP, IMB and AOFB) are often deployed on the same floe since the combined measurements provide valuable information on how the ocean is influencing the changing sea-ice cover.

After we had steamed to the ITP site, the Captain's skillful maneuvering of the ship (11 thousand tonnes!) cracked the floe supporting the ITP precisely where it needed to be broken while leaving the nearby IMB completely untouched. After Seaman Barney Noseworthy hooked the ITP's surface buoy from the basket, the mooring team and Deck Department brought the entire system on board in only one hour - just in time for formal Sunday supper on board the *Louis*.

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