

## Beaufort Gyre Exploration Project: Dispatch 3: Recovery of the CABOS mooring

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This afternoon the mooring team, Captain, First Officer and Deck Department recovered the Canadian Basin Observational System (CABOS) mooring, a joint US (IARC) and Canadian (IOS) project. For the past two years, the mooring has been anchored to the seafloor in the southeast boundary of the Canada Basin (132 W, 72 N) in around 1150 m of water with the main aim of measuring water pathways along the slope of the Canadian Basin. The mooring is a vertical string of oceanographic instruments in the water column, including a McLane Moored Profiler (MMP) that rolls up and down the mooring wire logging continuous samples of temperature, salinity and ocean currents between around 50 and 1100 meters depth in the water column. Acoustic release devices hold the moored instruments to an anchor weight on the seafloor, and flotation on the mooring keeps it vertical.

The first task in the recovery was to pinpoint the location of the subsurface mooring. Because there can be some drift of the system as it settles to the seafloor when it is deployed, it may not be exactly where it was released from the ship. While today there was open water for the recovery, knowing the exact location of a mooring before bringing it to the surface is particularly important when there is sea ice; in that case, the Captain will maneuver the ship to avoid the mooring surfacing under ice floes.

The exact location of the mooring was determined with an acoustic survey, using the acoustic releases on the mooring and an acoustic transducer mounted in the hull of the ship. From a unit in the mooring lab Rick Krishfield interrogated a release with an acoustic signal, at which point it started pinging acoustically. Travel times for the signal between the ship's transducer and the release on the mooring were used to pinpoint the mooring's position as the Captain maneuvered the ship in a oval pattern.

When the mooring was located exactly (267 m from its deployment location) Rick sent another acoustic command from the lab to one of the acoustic releases to order it to unhook from the anchor. Once released, the flotation on the mooring allowed it to float to the surface leaving the anchor on the seafloor. With the top float on the mooring at the surface, the Captain maneuvered the ship into place and John Kemp, Mike Dempsey, Jeff Pietro, Rick Krishfield and the Deck Department brought all the instruments on deck using the ship's crane and starboard A-frame in conjunction with a custom winch system. At one stage of the recovery the mooring load needed to be removed from the winch drums to change wire storage reels, and John Kemp swiftly wove a tidy "Yale Grip" to stop off the load. On last year's expedition the ship's Carpenter Gary Morgan built a useful custom dolly cart to hold and transport the MMP safely once on board.

In calm and sunny conditions with no sea ice, it took only 1 hour and 7 minutes to bring all instruments aboard. The mooring team, Captain, First Officer and Deck Department will use the same procedure three more times on this expedition (for the recovery of BGOS moorings A, B and C), although weather and ice conditions may present more of a challenge.

We concluded the CABOS station with a CTD/Rosette cast, as well as a bongo plankton net tow to sample phytoplankton and zooplankton from various depths in the water column. Surface ocean temperatures here are around 3 degrees Celsius with warm water of Atlantic Ocean origin having a maximum temperature of 0.6 degrees Celsius around 380 meters depth.

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