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Beaufort Gyre Exploration Project: Dispatch 6: Water samples at the basin boundary

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Today we continued our south-north MacKenzie line of science stations making bongo plankton net tows and CTD/rosette casts across the continental slope. Here, the water deepens from about 50 m on the shelf to 2000 m in the basin over about 100 km. Science stations are spaced by approximately 20 km to resolve the structure of boundary currents of Pacific and Atlantic Ocean origin across the slope.

After each cast of the CTD/Rosette, the system is brought back on deck with about 240 liters of water in 24 bottles from a range of depths over the water column. The scientists then draw water samples from the rosette into different sizes and types of containers depending on the requirements for analysis of a given quantity.

On this expedition, we're collecting water samples to measure dissolved oxygen, dissolved oxygen isotopes, dissolved inorganic carbon, alkalynity, colored dissolved organic matter, nutrients, salinity, barium, bacteria, chlorophyll and tiny zooplankton.

Some water samples require special treatment prior to sampling. Samples for dissolved oxygen, for example, need to be chemically fixed immediately after they are drawn to prevent any changes in the oxygen concentration before analysis. Many of the samples will be analyzed here in labs on the ship, while others will be brought home for analysis. Marty Davelaar and Glenn Cooper (IOS) have labs on board to measure the level of dissolved inorganic carbon (DIC) and PH of the water column, and Michiyo Kawai (TUMSAT) is doing on-board analysis of alkalynity. DIC, PH and alkalynity are key properties for understanding ocean acidification and the exchange of carbon dioxide between the ocean and atmosphere.

During the CTD cast in deeper waters (> 2000 meters) John Kemp and Jeff Pietro from WHOI took the opportunity to strap two mooring releases (see Dispatch #3) to the Rosette frame for testing. Once the rosette package was at 2000 m depth, John sent an acoustic signal from the ship to command the releases to open. The successful deep-ocean test ensured that these essential mooring components are in good working order when they are deployed on BGOS mooring A in a few days.

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