

Beaufort Gyre Exploration Project: Dispatch 18: Phytoplankton Food

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During this cruise, we are measuring nutrient levels in the Arctic Ocean. Nutrients are the building blocks or food supply for single celled plant organisms called phytoplankton. For plant growth on land in your backyard gardens, plants utilize the three main nutrients; N, P and K, (nitrogen, phosphorous and potassium). In the oceans potassium is replaced by Si (silicate) as one of the primary nutrients. Silicate is very interesting in that it builds siliceous phytoplankton such as diatoms and radiolarian; tiny delicate single celled organisms of glass whose structures can appear as geodesic domes and discs.

Aboard the *Louis*, nutrient analysis is performed on a three channel Technicon Autoanalyser. A sample probe draws up approximately 0.5- 1.5 ml of seawater and an assortment of chemical reagents are introduced to develop a colour complex with each target nutrient. The intensity of colour is proportional to the amount of nitrate, silicate or phosphate present. Samples are taken at many depths at a station. A story of water structure is built around the results we get from the analyses or profile with depth. And added to the other parameters analysed, i.e. oxygen, salinity, alkalinity and temperature, describe where the layers of different waters originate.

Much preparation goes into sample analyses on board the *Louis*. Equipment must be tested, chemicals are pre-weighed and spare parts for equipment are packed prior to departure. Hundreds of sample bottles, test tubes and filters are cleaned and baked and stowed in metal boxes for a safe trip to the Arctic. We try to assist everyone when and where needed to get the task done. Sometimes Jane Eert (IOS) needs methanol to clean the connectors on the CTD or Nes Sutherland (IOS) will require tubing of a very small inside diameter. Usually they can find it in the nutrient supplies. Spare parts are important!

A portable Nanopure water purifying system is plumbed into the ship's distilled water supply. Any of the many analyses performed on board has access to this ultra pure water to prepare standards and for cleaning. Today I have a couple of stations worth of nutrients to analyse and used tubes to clean. There is always something to do in the nutrient lab.

Last updated: October 19, 2015



The author drawing seawater from the CTD rosette bottles for nutrient analysis. *Photo by Rick Krishfield, WHOI.*



Jane Eert operates the CTD, assists in the deployment of the package, draws water samples, and performs a multitude of other tasks essential for the science program. *Photo by Rick Krishfield, WHOI.*



Any time of the day or night, you will probably find Nes Sutherland at her workstation in the main lab tirelessly processing her CFC (chlorofluorocarbon) samples. *Photo by Rick Krishfield, WHOI.*



The CTD and rosette package descends into the frigid Arctic waters to retrieve more seawater samples for our hydrographic and chemical analysis. *Photo by Rick Krishfield, WHOI.*

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