

Data File Description

Nutrients, Oxygen, and Salinity from Rosette Bottle Samples

All data is organized in folders under the main file. Three folders are contained within the main directory: processed data (Profile Data), the raw data files for each of the analyses (Oxygen, Nutrient, and Salinity) and a file containing progress reports through the cruise. The processed data in the Profile directory is organized into event numbers (corresponding to CTD cast numbers in the data spreadsheets). In addition surface casts were taken at each deployment of the CTD instrument package (Stern deployment) and are labeled according to the dates covered. The exact format for presentation of this data is described below

A test cast of the CTD rosette was conducted on August 4, 2002 just south of Anvers Island (65° 06.293, 65° 08.030) in 150 meters of water depth. All bottles were closed at 100 meters then the rosette was raised to the surface where it stayed for approximately five minutes. Results of nutrient, oxygen and salinity analysis for all bottles are located in the rosette test file (TESTcast) in the profile data. All bottles appeared to be operating sufficiently, though this was not the case throughout the cruise. Several bottles were removed and repaired during the cruise due to shearing of the bolts holding the bottles to the rosette frame. During the time of repair replacement of these bottles with un-tested equipment could have contributed to a loss of integrity.

Nutrients, oxygen (Winkler titrations) and salinity determinations from water samples taken from casts during the GLOBEC IV cruise (LMG0205) are organized into folders under the profile data directory and are labeled by event numbers. Each folder contains:

- One Excel spreadsheet (LMG0203Nutevntxxx.xls) listing nutrient concentrations (Nitrate, Nitrite, Phosphate, Ammonium, Silicate) corresponding to depth of sample and Niskin bottle number and

station information (e.g. event number and cast number, location, time of cast, depth of cast and total depth, date and operator).

- One Excel spreadsheet (LMG0203Oxyevntxxx.xls) listing oxygen concentrations (Winkler titration) corresponding to depths and bottle sampled along with station information (e.g. event number and cast number, location, time of cast, depth of cast and total depth, date and operator).

- One Excel spreadsheet ((LMG0203Salevntxxx.xls) containing salinity determination data corresponding to bottle numbers and depth. These spreadsheets also contain relevant standardization and run parameter data associated with the Guildline analyzer employed in the analysis.

The bottle sensor files given above were matched with casts where water samples were taken from the rosette. Water samples were not taken on all casts, so CTD sensor data for some casts is not contained in these folders. Bottle data for all casts is located in the folder labeled "bottlefiles".

Raw data files for the calculations generating the above presented data are located in the folders labeled "Nutrients", "Oxygen" and "Salinity". All oxygen calculations, standards and peripheral information (i.e. Bottle volumes) are contained in an excel workbook labeled "O2calculationsLMG0205.xls" under the oxygen folder. The manual for analysis and standardization of the system is also contained in the "Oxygen analysis" file. Prior to each series of analysis the titrator was standardized with a solution of KIO_3 (standard solution concentrations are listed in the calculation workbook). Standards were titrated until agreement reached $\pm 2 \mu\text{L}$. A reagent blank determination was conducted at the start of the cruise and used throughout. Titrations performed on the Langford Amperometric system were logged during operation and the titration data is located in the raw data file under the folder "Oxygen analysis" and labeled according to the date the samples

were run. Nutrient determinations were conducted on an Alpkem Flow Solutions segmented flow autoanalyzer. Operation and standardization of the system is described in detail in the Flow Solutions manual under the file "Alpkem manuals". Linearity checks were conducted at the beginning of the cruise for each of the ions and conducted at the start and completion of each sample sequence. Efficiency checks on the Nitrate reduction column (OTRC, Alpkem) were run after introduction of the column into the analytical stream. Analysis integrity was also checked by sampling surface and bottom water bottles in duplicate. This process was repeated on most casts. The nutrient folder contains the raw data output by the Alpkem Flow Solutions system in a folder labeled Alpkem output. These files were exported to spreadsheet format and saved as excel files under the folder "Nutrient Spreadsheets". Corresponding ion concentrations for each depth were transferred to the profile data sheets. Salinity determinations were conducted on a Guildline model 8410 Portable Salinometer (PortaSal). Standardization was conducted using Copenhagen water prior to each series of determination and relevant information is entered in the spreadsheets.

Significant difficulty was experienced with the SBE oxygen sensor on the CTD instrument package. Agreement between the titration determinations of oxygen and logged values through the CTD instrument package was extremely variable and suggested several sources of error. Under the directory containing bottle data, two jpeg format files contain comparisons of the SBE output and other parameters taken by the CTD package and the Winkler determinations. In property:property comparisons with other parameters collected by the package (i.e. Temperature, Salinity) variability was obvious and difficult to explain. Investigation into this variability suggested dependence on the rate of decent as well as strong dependence on the extreme cold temperatures

and ice problems. During the cruise a second sensor was installed as a secondary. This sensor reported higher concentrations but similar trends. An intercomparison with the CTD package operated on the NBP was carried out on September 1 (Event 201). Comparison of the data files showed significantly higher concentrations reported by the NBP system agreeing with the Winkler titration values.