

**SBI WINTER 2003 CRUISE**  
**Profiles of ISUS Nitrate Concentrations, Temperature, Salinity, and Density**  
**1 - 15 April 2003**

By:

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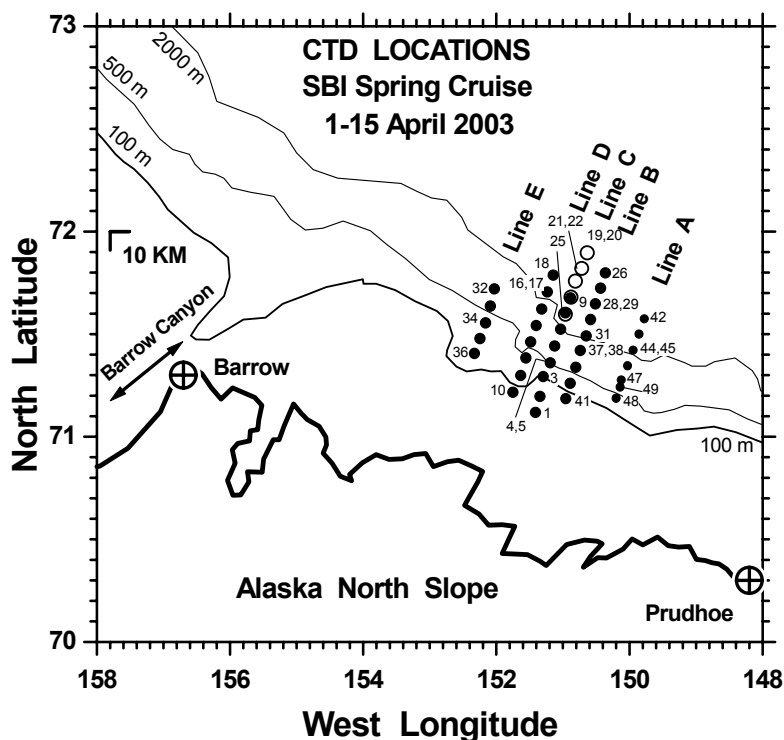
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**SAMPLING.** As part of the Shelf-Basin Interactions (SBI) projects, early spring sampling was performed in the eastern area of the SBI study area using aircraft. Flights began on 1 April 2003 and finished on 15 April. During this time, we sampled 42 sites (49 CTD casts) on a series of 5 transect lines which bracketed and were parallel to the SBI current meter mooring line located at 152°W longitude (Fig. 1). Stations were about 10 km apart along each transect line. Transect lines B, C, and D were at the same spacing; while, lines A and E were 20 km from the nearest transect line. A map of the achieved sampling sites is available in the EOL/SBI repository (file: SW3LOC4A.pdf) and station locations and sampling times are in the file (SW3VIT-4.csv).

Figure 1. Station locations during the expedition, SBI Winter 2003. CTD numbers are adjacent to the location. The SBI current meter mooring line is between transect lines D and E.



At sites 10 - 49, a Seabird CTD (SBE-25) and Satlantic In-Situ Ultraviolet Spectrophotometer (ISUS) nitrate analyzer with a water sampling bottle was deployed through an 8 inch hole augured through the pack-ice. Continuous profiles of pressure, temperature, salinity, and ISUS-sensed nitrate concentrations were made from the ice hole to either the sediment surface or to about 390 m. The ISUS was not used at CTD casts 1 - 9. CTD data were processed with Seabird software (Seasoft) and the data binned into 0.5 dbar layers. All basic CTD data are already available in the EOL/SBI data repository. The ISUS samples at a relatively slow rate (3.5 Hz), and even though repeated vertical profiles were collected at each site, not all pressure bins contained ISUS measurements. Data herein include basic CTD data as well as the ISUS data (in its respective bin) converted to nitrate concentration, and the continuous ISUS nitrate profiles constructed by linearly interpolating binned data between two vertically adjacent ISUS averages. A complete description of the evaluation procedure for these ISUS data is being prepared for publication, so data herein are considered to be in draft form. Nutrient data collected from the water sampling bottles are reported in the EOL/SBI repository as files SW3BOTLE.csv and SW3BOTLE.pdf.

The ISUS-CTD data are reported in 5 ASCII comma-separated-value files, one for each of the transect lines (Table 1). Each file has 17 rows containing headers. After this comes the data section with 12 columns. Column 1 is the cruise name (SW-2003). Column 2 is the CTD number. Column 3 is the center depth of the pressure bins (dbar). Column 4 is the average pressure of all the data in the bin (dbar). Column 5 is the average depth of all data within the bin (meters). Column 6 is the average temperature within the bin (degrees C). Column 7 is the average potential temperature within the bin (degrees C). Column 8 is the average salinity in the bin (psu). Column 9 is the sigma-t in the bin (kg/m<sup>3</sup>). Note that these data are identical to the basic CTD already on file at EOL/SBI. Column 10 is the difference between the potential temperature and the freezing point for water of this salinity (calculated by F.J. Millero and W.H. Leung, The Thermodynamics of Seawater at One Atmosphere, Am. J. Science, 1976, 276: 1035-1077). Column 11 is the nitrate concentration (µmol/L) calculated from the adjusted ISUS voltage for all data within the bin. Column 12 is the continuous profile of ISUS nitrate concentrations (µmol/L) made by interpolating vertical adjacent ISUS measurements. Dummy values are -9, -99 or -999 and represent either faulty data or no data.

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Table 1. Listing of the 5 data files which accompany this report.

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CTD #s in the File	File name	data rows	columns
CTD # 10-18	SW3I1018.csv	4896	12
CTD # 19-25	SW3I1925.csv	5016	12
CTD # 26-31, 37-41	SW3I2641.csv	5877	12
CTD # 32-36	SW3I3236.csv	2560	12
CTD # 42-49	SW3I4249.csv	5295	12

This report is file SW3-ISUS.pdf.