CITATION:

Bates, N.R., Best, M.H.P., and Hansell, D.A., 2005. Dissolved inorganic carbon (DIC) data from Shelf-Basin Interactions (SBI) survey cruises in the Chukchi and Beaufort Seas (May-August 2002).

TITLE:

Dissolved Inorganic Carbon (DIC) data from SBI cruises hly0201 and hly0203

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FUNDING SOURCE AND GRANT NUMBER:

NSF grant OPP-0124868

DATA SET OVERVIEW:

Dissolved Inorganic Carbon (DIC) Data.

- hly0201 are the data for the Spring cruise (8 May 2002 to 12 June 2002)
- hly0203 are the data for the Summer cruise (18 July 2002 to 21 August 2002)

Both cruises were in the Chukchi Sea and Beaufort Sea on board the USCGC Healy.
Individual data point locations are identified with decimal latitude and longitude and depth (m).

DATA COLLECTION AND PROCESSING:

Physical, biogeochemical and biological measurements were made from the USCGC Healy during two cruises to the Chukchi and Beaufort Seas as part of the 2002 field phase of the Western Arctic SBI project. During the spring cruise (5 May–15 June 2002), 40 CTD/rosette stations were occupied at the Bering Strait, over the Chukchi and Beaufort Sea shelves, the shelf-slope region and into the Arctic basin.

During the summer cruise (17 July 26–August 2002), 45 stations were occupied in the region. Three sections across the Chukchi and Beaufort Sea shelf, shelf-slope and Arctic basin were repeated each cruise, including: (1) West Hanna Shoal (WHS); (2) East Hanna Shoal (EHS) transect, and; (3) Barrow Canyon (BC) transect. In addition, during summer field activities, a fourth section East of Barrow (EB), and a section extending from the Alaskan side of the Bering Strait to the Diomede Islands also were taken. At each CTD/rosette station, a suite of biological and chemical measurements was collected, including salinity, inorganic nutrients (ammonium, nitrate, nitrite, phosphate, reactive silicon, and urea), dissolved inorganic carbon (DIC), dissolved oxygen and particulate organic matter (further details are given in Bates et al., 2005a, b). CTD, bottle and rate data are available at the SBI web site, and archived at the National Snow and Ice Data Center (NSIDC; http://nsidc.org/).

Seawater samples for DIC were drawn from the Niskin samplers into pre-cleaned 300-ml borosilicate bottles. DIC samples were subsequently poisoned with $HgCl_2$ to halt biological activity, sealed, and returned to BBSR for analysis.

DIC samples were analyzed using a highly precise and accurate (~0.025%; ~0.5 μmol kg_{-1}), gasextraction/ coulometric-detection system (Bates et al., 1996, 1998; Bates, 2001). The analytical system consists of a Single-Operator Multi-parameter Metabolic Analyzer (SOMMA) coupled to a CO_2 coulometer (model 5011; UIC Coulometrics) and personal computer (Johnson et al., 1993). Routine analyses of Certifed Reference Materials (provided by A.G. Dickson, Scripps Institution of Oceanography) ensured that the accuracy of the DIC measurements was within 0.05% (~0.5 μmol kg_{-1}).

The SOMMA-coulometer system has been used at BBSR for 14 years to analyze DIC samples from the Bermuda Atlantic Time-series Study (BATS) site and to determine long-term trends in oceanic CO_2 and air–sea CO_2 exchange in the subtropical gyre of the North Atlantic Ocean (Bates et al., 2002). The salinity of each DIC sample also was directly measured during analysis using a SeaBird SBE-911 conductivity sensor. The salinity data generated from the DIC analyses were compared with discrete salinity measurements made onboard the USCGC Healy as part of the quality control and assurance protocols. However, discrete salinity data from the USCGC Healy (Codispoti et al., 2005) were used here in data analysis and interpretation.

DATA FORMAT:

The three two columns of the data sets are DIC (μmoles kg^{-1}), and quality flag.

DATA REMARKS:

A questionable (Q) flag is applied to some data. Acceptable data have a A flag.

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