

Ocean Carbon and Biogeochemistry: CARIACO Data System

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CARIACO cruises CTD profile methodology

PI: CARIACO Project Investigators

4 January 2008: Prepared for OCB data system by Terry McKee (BCO-DMO) from documentation contributed by Laura Lorenzoni (IMaRS, USF).

23 March 2009: Updated by Terry McKee (BCO-DMO) to include notes on recently contributed data for cruises 132 through 146 and fluorescence

BCO-DMO processing notes

The OCB DMO makes very few modifications to the data content as contributed by the CARIACO team.

Data submitted to BCO-DMO required reformatting for compatibility with database standards. The goal was to create a single uniform-vertical-interval profile for each cruise from individual parameter profiles which had been measured during separate casts. As submitted by the CARIACO team, the data set consisted of profiles of salinity, temperature, potential temperature, density, and potential density, and, for some cruises, Oxygen and beam attenuation. See [CARIACO Bottle Cast Methods](#) for a description of acquisition methods. Since data were taken from multiple casts, gaps in each parameter's profiles (due to computer or sensor problems) did not necessarily align. In addition, data had been collected since 1995, therefore sensors and processing methodology occasionally shifted due to quality control issues or current practices. Oxygen, Beam attenuation, and Fluorescence were always measured during separate casts, and did not have pressure or depth measurements that could be matched to the standard CTD pressure and depth recorded during the temperature and conductivity cast. These issues were resolved during the conversion to the OCB-DMO database.

Data were extracted from Microsoft Excel™ spreadsheets using Mathworks® xls2csv routine. Each parameter profile was plotted to determine which represented the deepest cast, so that no data would be lost during the process of merging all parameters back into a single profile. In most cases, pressure or depth from salinity was used as the base for the merge. Occasionally, where difficulties had been encountered with salinity sensors, pressure or depth from temperature (cruises 1, 4, 10, 116, and 60) was used.

After merging, profiles for each parameter were plotted over traces from original data to confirm the reliability of the merge.

A PDF-format table listing the cruise and cast source files from which each composite profile was assembled can be found at [CARIACO Data Source Table](#). This table does not include Fluorescence which was added at a later date. For

details about the quality of individual Temperature and Salinity profiles, please see **CTD profile quality notes**.

The following is an itemized list of all changes:

- The bad or missing data value was made a consistent value (nd) wherever necessary.
- Gaps in the pressure were filled in order to avoid data loss when merging properties that did not have gaps (having been recorded during a different cast.) A missing data value (nd) in the depth field indicates sections of the profile where no Salinity or Temperature data were reported, but additional fields (Oxygen, Beam Attenuation, Fluorescence) were merged in.
- All parameters for cruises 1, 2, 3, 4, 7, and 10 were reported in the original spreadsheet at 2db intervals and were carried over as such. [Note: documentation in spreadsheets indicated that the first ten cruises were difficult to process]
- Oxygens for cruises 8 and 9 were padded from 2db to 1db output.
- Missing values (nd) were inserted when necessary to pad profiles taken during short casts to the length of the longest cast.
- For Oxygens from cruises 60 through 86, neither pressure nor depth had been bin-averaged to an integer, so pressures were rounded to the nearest integer before merging could be accomplished.
- Beam attenuation relative to light was measured for cruises 11 through 74 using a SeaTech sensor. For cruises 93 through 115, beam attenuation relative to light and relative to particulate matter were recorded using a WETlabs CStar sensor. For cruises 93 - 128, no pressure data were carried over to the spreadsheet, so it was necessary to establish a pressure interval on which to merge beam attenuation with the rest of the parameters by calculating pressure. A Matlab subroutine, Sw_press.m, part of the Physical Properties of Seawater collection, was used. The latitude for the calculated pressure was set at the nominal cruise latitude of 10.5. This calculated pressure does not appear in the final data set and was used strictly to create a merge point for the beam attenuation data. A later spreadsheet containing beam attenuation profiles from cruises 117 through 144 did contain a depth field, but, as in other
- Cruise 36 contained an incorrect depth column in potential density and this was corrected by copying a correct depth column from another parameter.
- Data columns in cruise 45 labelled Fluorescencia were ignored since they contained no data.
- Data columns labelled 21t were not included in the profile for C21 since they were redundant (verified by Laura Lorenzoni (11/29/2007)).

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- Processing for Cruises 132 through 146 was carried out with the same methods and objectives as cruises 1 through 131.
- Fluorescence (raw and adjusted) was added to cruises 1 through 146 if available.
- Beam attenuation data was added to cruises 117 through 144 (none available for cruises 130 and 131.)