

**Dataset:** Element quotas of individual *Synechococcus* cells collected during Bermuda Atlantic Time-series Study (BATS) cruises aboard the R/V Atlantic Explorer between dates 2012-07-11 and 2013-10-13

**Project(s):** Understanding the Role of Picocyanobacteria in the Marine Silicate Cycle (Si\_in\_Syn)

**Abstract:** These data include element quotas of individual *Synechococcus* cells collected during Bermuda Atlantic Time-series Study (BATS) cruises. The cruises (AE1218, AE1228, and AE1322) were all aboard the R/V Atlantic Explorer between dates 2012-07-11 and 2013-10-13 around Bermuda. Instruments used were a CTD profiler, and a Synchrotron X-ray Fluorescence Microprobe (SXRF). Understanding the accumulation of silicon by picocyanobacteria of the genus *Synechococcus* has the potential to drive a major paradigm shift in our understanding of biogenic silica cycling in the ocean. These data assess the contribution of *Synechococcus* to total biogenic silica and were collected by Dr. Benjamin Twining of the Bigelow Laboratory for Ocean Sciences as part of the project Understanding the Role of Picocyanobacteria in the Marine Silicate Cycle. For a complete list of measurements, refer to the supplemental document 'Field\_names.pdf', and a full dataset description is included in the supplemental file 'Dataset\_description.pdf'. The most current version of this dataset is available at: <http://www.bco-dmo.org/dataset/644840>

**Description:** element quotas of individual *Synechococcus* cells

Field work at the Bermuda Atlantic Time Series (BATS) site was done to assess the contribution of *Synechococcus* and diatoms to total biogenic in surface waters. The data include information about the elemental content (Silicon, Phosphorus, and Sulfur) of *Synechococcus* cells as measured by synchrotron-based x-ray fluorescence (SBXF) microscopy. Derived mole ratios (Si:P, and Si:S) are also provided.

### References:

Twining, B.S., et al. Metal contents of phytoplankton and labile particulate material in the North Atlantic Ocean. *Prog. Oceanogr.* (2015) <http://dx.doi.org/10.1016/j.pocean.2015.07.001>  
[https://www.researchgate.net/publication/282626294\\_Metal\\_contents\\_of\\_phytoplankton\\_and\\_labile\\_particulate\\_material\\_in\\_the\\_North\\_Atlantic](https://www.researchgate.net/publication/282626294_Metal_contents_of_phytoplankton_and_labile_particulate_material_in_the_North_Atlantic)

### DMO notes:

- Changed formatting of lat/lon to 4 decimal places from 5.
- Elemental content values rounded to two decimal places from 15.

**Acquisition** Samples were analyzed as described in Twining et al. (2015).

**Description:** Bottle samples were collected during BATS cruises from surface level and the deep chlorophyll max (DCM) using a CTD. The SXRF runs were with a Beamline 2-ID-E during three analytical runs in December 2012, April 2013, and December 2013.

**Processing** Data were processed as described in Twining et al. (2015).

**Description:**

## Deployment Information

### Deployment description for R/V Atlantic Explorer AE1218

This is part of the Bermuda Atlantic Time-series Study (BATS).

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### Deployment description for R/V Atlantic Explorer AE1228

This cruise was part of a Bermuda Atlantic Time-series Study (BATS 286).

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### Deployment description for R/V Atlantic Explorer AE1322

This cruise is part of the Bermuda Atlantic Time-series Study (BATS).

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## Instrument Information

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|---------------------------------------|--|
| <b>Instrument</b>                     | CTD  |
| <b>Description</b>                    | <i>local description not specified</i>   |
| <b>Generic Instrument Name</b>        | CTD profiler   |
| <b>Generic Instrument Description</b> | The Conductivity, Temperature, Depth (CTD) unit is an integrated instrument package designed to measure the conductivity, temperature, and pressure (depth) of the water column. The instrument is lowered via cable through the water column and permits scientists observe the physical properties in real time via a conducting cable connecting the CTD to a deck unit and computer on the ship. The CTD is often configured with additional optional sensors including fluorometers, transmissometers and/or radiometers. It is often combined with a Rosette of water sampling bottles (e.g. Niskin, GO-FLO) for collecting discrete water samples during the cast. This instrument designation is used when specific make and model |

are not known.

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|---------------------------------------|---|
| <b>Instrument</b>                     | Synchrotron X-ray Fluorescence Microprobe   |
| <b>Description</b>                    | Abbreviation: SXRF For this dataset the model used was: Beamline:2-ID-D The instrument quantifies and maps elements (e.g. Si, Mn, Fe, Ni, S, P) in single cells. Used in the following paper to look at trace elements in aquatic protists: B. Twining, S. Baines, N. Fisher, J. Maser, S. Vogt, C. Jacobsen, A. Tovar-Sanchez, S. Sanudo-Wilhelmy; "Quantifying Trace Elements in Individual Aquatic Protist Cells with a Synchrotron X-ray Fluorescence Microprobe", Analytical Chemistry 2003, 75, 3806-3816. DOI: 10.1021/ac034227z |
| <b>Generic Instrument Name</b>        | unknown   |
| <b>Generic Instrument Description</b> | The correct value is not known to and not computable by the creator of this information. However a correct value probably exists.   |