

# Treatment description and growth parameters for *Thalassiosira weissflogii* generating d13C-AA, collected on R/V Meteor M77 in the Peruvian ocean margin from November to December 2008.

Website: <https://www.bco-dmo.org/dataset/715856>

Data Type: Cruise Results

Version: 1

Version Date: 2017-09-14

## Project

» [The Use of Nitrogen Isotopes of Amino Acids To Understand Marine Sedimentary 15N Records](#) (Amino Acid Sediment 15N)

Contributors	Affiliation	Role
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## Abstract

Treatment description and growth parameters for *Thalassiosira weissflogii* generating d13C-AA, collected on R/V Meteor M77 in the Peruvian ocean margin from November to December 2008.

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## Coverage

**Temporal Extent:** 2008-11-01 - 2008-12-31

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## Dataset Description

Treatment description and growth parameters for *Thalassiosira weissflogii* generating d13C-AA.

Temperature and irradiance values are means of outdoor conditions; the 25% and 75% quartiles for temperature were 9.8 and 11.3 deg C, and the 25% and 75% quartiles for irradiance levels were 269 and 1274  $\mu\text{mol m}^{-2} \text{s}^{-1}$ .

### **These data were published in:**

Larsen T, , L. T. Bach, R. Salvattecchi, M. Ventura, Y. V. Wang, N. Andersen, and M. D. McCarthy (2015). Assessing the potential of amino acid d13C patterns as a carbon source tracer in marine sediments: effects of algal growth conditions and sedimentary diagenesis. (Biogeosciences, 12, 4979-4992. doi:[10.5194/bg-12-4979-2015](https://doi.org/10.5194/bg-12-4979-2015))

## Acquisition Description

## **Culturing**

The marine diatom *Thalassiosira weissflogii* Grunow (strain CCMP 1010) was cultured in sterile filtered natural North Sea water (Schleswig-Holstein, Germany) or Baltic Sea water (Schleswig-Holstein, Germany). The medium was enriched with f/4 concentrations of macro- and micronutrients (nitrate, phosphate, silicic acid, trace metal mixture, vitamin mixture (Guillard and Ryther, 1962)). All experiments were performed in sterile 2.1 L Schott Duran glass bottles. These bottles were made of borosilicate glass (filters UV radiation <310 nm) except for the quartz glass bottles (pure silica without UV radiation filter) used in the UV experiment. The cultures were either incubated in climate chambers with 400 –700 nm radiation or 10 cm below water level at low tide in Kiel Fjord in May 2011. Water temperature and light irradiance data were obtained from the weather station maintained by the GEOMAR institute in Kiel, Germany. Growth conditions for the various treatments, i.e. salinity, pH, temperature, and irradiance are given in Table 1. pH values (reported on free scale) were measured with separate glass and reference electrodes (Metrohm) and calculated with equation 3 from DOE 2007 chapter 6b (Dickson et al., 2007) as described in (Bach et al., 2012). Cultures were inoculated with densities of 20 cells ml<sup>-1</sup>. Cell densities and equivalent spherical diameters were determined with a Coulter Counter (Beckman Coulter) at the beginning and the end of the experiment, respectively. When incubations ended, cells were filtered on 47 mm diameter, 5 µm mesh size Nucleopore Track-Etch Membrane filters (Whatman) and frozen at -18 deg C immediately after filtration.

## **Processing Description**

Thermo-Finnigan Isodat software and Microsoft Excel 2013.

### **BCO-DMO Processing:**

- changed column names to comply with BCO-DMO standards
- captured superscript numbers by changing them to (1) and (2) where appropriate
- changed degree symbol to "deg"
- deleted blank columns
- combined pH headers to create pH columns pH\_init and pH\_term

## Related Publications

Larsen, T., Bach, L. T., Salvatelli, R., Wang, Y. V., Andersen, N., Ventura, M., & McCarthy, M. D. (2015). Assessing the potential of amino acid <sup>13</sup>C patterns as a carbon source tracer in marine sediments: effects of algal growth conditions and sedimentary diagenesis. *Biogeosciences*, 12(16), 4979–4992. doi:[10.5194/bg-12-4979-2015](https://doi.org/10.5194/bg-12-4979-2015)

## Parameters

Parameter	Description	Units
ID	Treatment ID	unitless
Treatment	Treatment description	unitless
Temp	Temperature. Temperature values marked with (1) are means of outdoor conditions	celsius
Light	Irradiance. Irradiance values marked with (2) are means of outdoor conditions.	umol/square meter/second
Light_cycle	Light cycle conditions	D/L (h)
Salinity	Salinity	PSU
pH_init	pH initial value; free scale at 17 degrees Celsius	pH
pH_term	pH term. Value; free scale at 17 degrees Celsius	pH

## Instruments

<b>Dataset-specific Instrument Name</b>	Water Temperature Sensor
<b>Generic Instrument Name</b>	Water Temperature Sensor
<b>Dataset-specific Description</b>	Used to measure temperature
<b>Generic Instrument Description</b>	General term for an instrument that measures the temperature of the water with which it is in contact (thermometer).

<b>Dataset-specific Instrument Name</b>	pH sensor
<b>Generic Instrument Name</b>	pH Sensor
<b>Dataset-specific Description</b>	Used to measure pH
<b>Generic Instrument Description</b>	General term for an instrument that measures the pH or how acidic or basic a solution is.

<b>Dataset-specific Instrument Name</b>	Light meter
<b>Generic Instrument Name</b>	Light Meter
<b>Dataset-specific Description</b>	Used to measure irradiance
<b>Generic Instrument Description</b>	Light meters are instruments that measure light intensity. Common units of measure for light intensity are $\mu\text{mol}/\text{m}^2/\text{s}$ or $\mu\text{E}/\text{m}^2/\text{s}$ (micromoles per meter squared per second or microEinsteins per meter squared per second). (example: LI-COR 250A)

<b>Dataset-specific Instrument Name</b>	Salinity sensor
<b>Generic Instrument Name</b>	Salinity Sensor <a href="#">table of contents</a> <a href="#">back to top</a> ]
<b>Dataset-specific Description</b>	Used to measure salinity
<b>Generic Instrument Description</b>	Category of instrument that simultaneously measures electrical conductivity and temperature in the water column to provide temperature and salinity data.

## M77

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/715334">https://www.bco-dmo.org/deployment/715334</a>
<b>Platform</b>	R/V Meteor
<b>Report</b>	<a href="https://www.lfd.uni-hamburg.de/meteor/wochenberichte/wochenberichte-meteor/m77/m77-2-scr.pdf">https://www.lfd.uni-hamburg.de/meteor/wochenberichte/wochenberichte-meteor/m77/m77-2-scr.pdf</a>
<b>Start Date</b>	2008-11-24
<b>End Date</b>	2008-12-21
<b>Description</b>	Main research topic of cruise M77-2 was the investigation of the oxygen minimum zone (OMZ) in the coastal upwelling areas off Peru and off Ecuador.

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## Project Information

## The Use of Nitrogen Isotopes of Amino Acids To Understand Marine Sedimentary $^{15}\text{N}$ Records (Amino Acid Sediment $^{15}\text{N}$ )

**Coverage:** California Margin , Santa Barbara Basin , CA current system, Eastern Tropical Pacific

The bioavailability of nutrients plays a crucial role in oceanic biological productivity, the carbon cycle, and climate change. The global ocean inventory of nitrogen (N) is determined by the balance of N-fixation (sources) and denitrification (sinks). In this three-year project, a researcher from the University of California, Santa Cruz, will focus on developing compound-specific N isotope ( $\delta^{15}\text{N}$ ) analysis of amino acids as a new tool for understanding N source and transformation of organic matter in paleo-reservoirs. The offsets in the isotopic ratios of individual amino acid groups may yield information about trophic transfer, heterotrophic microbial reworking, and autotrophic versus heterotrophic sources. By measuring and comparing the bulk and amino acid  $\delta^{15}\text{N}$  in size-fractionated samples from plankton tows, sediments traps, and multi-cores in oxic and suboxic depositional environments, the researcher will: (1) Provide a proxy of the  $\delta^{15}\text{N}$  of average exported photoautotrophic organic matter; and (2) Provide a new level of detail into sedimentary organic N degradation and preservation. Broader impacts: This project will improve understanding of the fundamental underpinnings and behaviors of  $\delta^{15}\text{N}$  amino acid patterns and how they behave in contrasting sedimentary environments, while also developing a potential paleoceanographic proxy. Funding will support a graduate student and undergraduate research at the institution. The researcher will also conduct community outreach in the form of a workshop/tutorial on the proxy development.

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### Funding

Funding Source	Award
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-1131816</a>

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