Title: Quantifying Pelagic Primary Production and Respiration via Automated In-Situ Incubation System
Data Type: Field data
Size of Data: 60 MB
Website: Enter in website.
Version: 1.0
Version Date: 10/20/2022
Thumbnail: Include a thumbnail to be displayed with the database.

Readme file: Readme files are mandatory for datasets. Please include Readme file when submitting the datasets.

Contributors	Affiliation	Role
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Abstract:
We developed and validated a novel automated water incubator that measures in-situ rates of photosynthesis and respiration. This dataset includes raw data, Monte-Carlo simulation method, and processed results from field deployments in Summer, 2021. Deployment of the incubator was conducted near Ucantena Island, Massachusetts, USA.

Coverage: Spatial-- 41 31'3" N, 70 42'3" W. Temporal— 8/2021-10/2021.

Key words: Metabolic fluxes, dissolved oxygen, automated incubation, Monte-Carlo simulation, UV biofouling control

Data Description: dataset includes timeseries of automated incubation experiments, reporting dissolved oxygen concentration (DO), temperature, and photosynthetically active radiation (PAR). There are four deployments spanning from late august to early October, 2021. Each deployment lasted approximately 72 hours. Hourly DO fluxes from photosynthesis/respiration are calculated and reported for each deployment respectively. Data of derivative analysis are also included for various validation on the automated incubator and data analysis techniques.

Acquisition Description: the automated incubation system was developed to conduct hourly incubation, quantifying photosynthesis and respiration by DO consumption/production. The automated incubation system consists of three 1-liter incubation chamber, a pump flushes and renew water for each chamber at the end of an incubation experiment. Each chamber is equipped with a Pyroscience OXROB3 optode and a thermistor to monitor DO and temperature in the chamber. Hourly DO flux is calculated via Monte-Carlo simulation technique, reported as uMole $L^{-1} h^{-1}$.

Related Publications: (submitted) Chen, S., Ward, C., Long, M. Quantifying Pelagic Primary Production via Automated In-Situ Incubation Systems. Limnology & Oceanography- Method. Submitted [date].

Parameters: List all parameters used

Parameter	Description	Units

Number	Serial number for sensor sample	N/A
ts	Generic datetime string	"HH:mm:ss dd MM yyyy"
tnum	MATLAB datenum	N/A
Hour	Number of hour (0-23)	N/A
DO_uM	Dissolved oxygen	μMole L^{-1}
Temp	Temperature	^{o}C
PAR	Photosynthetically active radiation by wavelength	uMole s^{-1} m^{-2}
Transmittance	Light transmittance	%
Respiration	Hourly respiration rate	uMole O$_2$ L^{-1} h^{-1}
Photosynthesis	Hourly photosynthesis rate	uMole O$_2$ L^{-1} h^{-1}

Instruments:

Dataset-specific Instrument Name	PhRePhOx
Generic Instrument Name	Automated Incubator
Generic Instrument Description	Automated 3-chamber incubation system with integrated UV biofouling control

Deployments:

Website				
Platform	Benthic mount, attached to mooring anchor			
Start Date	8/26/2021	9/7/2021	9/29/2021	10/7/2021
End Date	8/29/2022	9/10/2021	10/2/2021	10/10/2021

Funding:

Funding Source	Award
National Science Foundation	OTIC 1841092