microcasi_metadata_biogeochemistry

Project Name	Start Date	End Date	Lat range	Lon range
microCASI	2017-09-11	2017-09-14	48.60252 50.22460	-69.0780 -66.3971

Role	Name	Affiliation	Email
PI	Simon Bélanger	UQAR	Simon_Belanger@uqar.ca
Database contact	Véronique Thériault	UQAR	Veronique_Theriault2@uqar.ca

Citation:
Université du Québec à Rimouski. Aquatel Laboratory. (2023). MicroCasi project 2017: mapping of coastal ecosystems, biogeochemistry data. [Version 1.0] Data published on St. Lawrence Global Observatory-SLGO. [https://slgo.ca]. Access date: [YYYY-MM-DD].

Project Description:

In September 2017, with the collaboration of Fish and Oceans Canada (DFO) and the Canadian Hydrographic Service (CHS), fieldwork was carried along the northern shore of the estuary of the gulf of St-Lawrence in support of airborne hyperspectral imagery acquisition. The main objective of these acquisitions was to map the nearshore coastal ecosystems (e.g. eelgrass meadows, macroalgae, saltmarsh) and derived bathymetry of the nearshore zone. The microCASI sensor was flown on September 11 2017 by the IIC company in the Forestville area and on September 14 2017 in the BSI area. Surface water was sampled at 6 stations in both area for basic bio-optical and biogeochemical parameters, i.e. TSS, fluorometric chlorophyll-a concentration, CDOM and particulate absorption coefficients. Above and in-water radiometry were also measured at different station. This particular dataset refers to the biogeochemistry parameters analyzed in the lab from water samples.

Funders:

Fisheries and Ocean Canada (DFO)

Datasets Table of Content

data_dictionary_biogeochemistry_microcasi.csv

Description:
The “data_dictionary_biogeochemistry_microcasi.csv” file contains the description and units of all parameters included in each dataset (each csv file). Parameter’s names are based on SeaBass standardized field names when possible (https://seabass.gsfc.nasa.gov/wiki/stdfields).

Dataset Contact:

Name	Affiliation	Email
Veronique Theriault	UQAR	veronique_theriault2@uqar.ca

Instruments:
NA

Sampling and Analysis:
NA

References:
NA

biogeochemistry_parameters_microcasi.csv

Description:
Various biogeochemical parameters analyzed in the lab from water samples.

Start Date: 2017-09-11
End Date: 2017-09-14

Dataset Contact:

Name	Affiliation	Email
Carlos A.S. Araujo	UQAR	araujocas81@gmail.com

Instruments:

Instrument Type	Manufacturer	Model	Instrument Features / Calibration
Fluorimeter	Tumer Design	TD10-AU	
Flow Cytometer	Beckman Coulter	CytoFLEX	

Sampling and Analysis:
Sampling: Water samples were mainly collected with a Niskin bottle (or bucket) and were kept cool in a sun-protected container until further laboratory procedures.

Analytical procedure:

FLUORIMETER: Chlorophyll a and phaeopigments concentration in the water samples were measured in the lab with a Fluorimeter Turner Design 10-AU (Christian Nozais lab ISMER/UQAR). These parameters were measured following the filtration protocol described by Trees et al. (2002) on three samples for each sampling station. The final values are the average of those three readings, excluding those that exceeded 95% confidence interval. Then pigment concentrations are derived as recommended by Jeffrey and Humphrey (1975).

FLOW CYTOMETRY: Cyanobacteria and prokaryotes were counted with a CytoFLEX flow cytometer (Beckman Coulter). For each analysis, duplicate 4 ml subsamples were fixed with glutaraldeide in the dark room, flash-frozen and then stored at -80 degrees Celsius until analysis. See Belzile et al. (2008) and Kirk (1994).

SPM / PIM: SPM were measured according to Neukermans et al., (2012). Known volume of seawater was filtered in triplicate through pre-ashed and pre-weighed glass fiber filters at low vacuum. Each filter was then rinsed with Milli-Qwater, and dried prior to weighing under a dry atmosphere to obtain the SPM concentration. Organic matter loss on ignition (LOI) was determined after baking the filters for 3h at 500 degrees Celsius, weighted again, giving the concentration of particulate inorganic matter (PIM). The final values are considered the averages of the triplicate (excluding those that exceeded 95% confidence interval).

References:

- Belzile C. S, Brugel ., Nozais Y, Gratton and S Demers, 2008. Variations of the abundance and nucleic acid content of heterotrophic bacteria in Beaufort Shelf waters during winter and spring. J. Mar. Syst. 74: 946-956
- Jeffrey SW and Humphrey GF, 1975. New spectrophotometric equations for determining chlorophylls a b c1 and c2 in higher plants algae and natural phytoplankton. Biochem. Physiol. Pflanzen 167 : 191-194
- Neukermans, G, K Ruddick, H Loisel, and P Roose. 2012. “Optimization and Quality Control of Suspended Particulate Matter Concentration Measurement Using Turbidity Measurements.” *Limnology and Oceanography: Methods* 10: 1011–23. https://doi.org/10.4319/lom.2012.10.1011.

ad_long_microcasi.csv

ag_long_microcasi.csv

ap_long_microcasi.csv

Description:
CDOM absorption coefficient (ag), particular absorption coefficient (ap) and non-algal particles absorption coefficient (ad, often called anap) measured in the lab from water samples. Refer to the “biogeochemistry_parameters_microcasi.csv” dataset for additional parameters analyzed for the same water samples (based on “sample_id”) and/or station (based on “station_id”).

Start Date: 2017-09-11
End Date: 2017-09-14

Dataset Contact:

Name	Affiliation	Email
Carlos A.S. Araujo	UQAR	araujocas81@gmail.com

Instruments:

Instrument Type	Manufacturer	Model	Instrument Features / Calibration
Spectrophotometer	Perkin Elmer	Lambda-850	Integrating sphere for particles

Sampling and Analysis:
Sampling: Water samples were mainly collected with a Niskin bottle (or bucket) and were kept cool in a sun-protected container until further laboratory procedures.

Analytical procedure: Ag, ap and ad were measured following the same method as described in Bélanger et al. 2017 and Araujo and Bélanger 2022. CDOM absorbance (ag) was measured with a Perkin Elmer double-beam Lambda-850 spectrophotometer using a 10 cm quartz cell between 220 and 800 nm against nano pure water. Measurements of ap and ad were done using the integrating sphere and the filter-pad technique described in Röttgers and Gehnke (2012) and Stramski et al. (2015).

References:

- Bélanger S, Carrascal-Leal C, Jaegler T, Larouche P, and Galbraith P, 2017. Assessment of Radiometric Data from a Buoy in the St. Lawrence Estuary. Journal of Atmospheric and Oceanic Technology. 34. 10.1175/JTECH-D-16-0176.1
- Carlos A.S. Araújo, Simon Bélanger, 2022. Variability of bio-optical properties in nearshore waters of the estuary and Gulf of St. Lawrence: Absorption and backscattering coefficients, Estuarine, Coastal and Shelf Science, Volume 264,2022,107688,ISSN 0272-7714,https://doi.org/10.1016/j.ecss.2021.107688.
- Röttgers, R, and S Gehnke. 2012. “Measurement of Light Absorption by Aquatic Particles: Improvement of the Quantitative Filter Technique by Use of an Integrating Sphere Approach.” *App. Opt.* 51 (9): 1336–51.
- Stramski, D, R Reynolds, S Kaczmarek, J Ultz, and G Zheng. 2015. “Correction of Pathlength Amplification in the Filter-Pad Technique for Measurements of Particulate Absorption Coefficient in the Visible Spectral Region.” *Appl. Opt.* 54 (22): 6763–82. https://doi.org/10.1364/AO.54.006763.