CISNet Project's Phytoplankton Pigment Monitoring Database

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Distribution URL for file	http://links.baruch.sc.edu/data/accessfiles/Phytoplankton_Pigment_Monitoring_for_North_Inlet_&_ACE_Basin__CISNet__.zip	
DATASET TITLE:	CISNet Project's Phytoplankton Pigment Monitoring Database for the North Inlet and Ace Basin Estuaries, South Carolina: 1999-2001	
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DATA FILE INFORMATION:	***This condensed metadata is from the original, more extensive metadata*** created on 8/10/2005 by Ginger Ogburn-Matthews. If needed, the original may be accessed at: **http://links.baruch.sc.edu/data/CISNet/CISNet.Phytoplankton/metadata/CISNET.PHYTOPLNKTN.1999-2001.METADATA.pdf** Links and email addresses in the original have not been updated as those locations and people may no longer be available. The data manager identified on this page should be contacted for any questions about the data.	
Data File Name	Phytoplankton_Pigment_Monitoring_for_North_Inlet_&_ACE_Basin__CISNet__.zip	
Beginning Date	27-Jul-1999	
End Date	18-Sep-2001	
Number of Data Records	150	
RESEARCH LOCATION:	North Inlet Estuary	
Geographic Description	The North Inlet Estuary lies east of the uplands of Hobcaw Barony (also known as the Belle W. Baruch Property). The Estuary is located in Georgetown County, South Carolina. Sample Sites for the North Inlet Estuary are located within the following bounding coordinates: West -79.256, East -79.174, North 33.349, and South 33.299. The ACE Basin is named for its three rivers, the Ashepoo, Combahee, and Edisto, all of which empty into the St. Helena Sound. The ACE Basin Estuary is located south of Charleston, in Charleston and Beaufort Counties, South Carolina. Sample Sites for the ACE Basin Estuary are located within the following bounding coordinates: West -80.418, East -80.324, North 32.560, and South 32.484.	
Location Bounding Box		
West Bounding Coordinate	-80.418	
East Bounding Coordinate	-79.174	
North Bounding Coordinate	33.349	
South Bounding Coordinate	32.484	
OR if single point location		
Latitude		
Longitude		
Elevation		
TAXONOMIC COVERAGE:		
Taxonomic Protocols		
Organisms studied	Phytoplankton	

KEYWORD INFORMATION

KEYWORDS: coastal, creek, estuarine, estuarine communities, estuary, high-performance liquid chromatography, hplc, intertidal creek, marsh, nutrient loading, phytoplankton, phytoplankton bloom, phytoplankton community, pigment, plankton, salt marsh, tidal, water sample, ace basin estuary, ashepoo river, beaufort county, charleston county, clambank creek, combahee river, east coast, georgetown county, north inlet estuary, old man creek, south carolina, southeast coast, town creek, usa, water column

ABSTRACT:

Abstract:

EPA/NOAA/NASA CISNet Partnership

The Coastal Intensive Site Network (CISNet) was developed by the U.S. Environmental Protection Agency (EPA), National Oceanic and Atmospheric Administration (NOAA), and National Aeronautics and Space Administration (NASA) and is composed of intensive, long-term monitoring and research sites around the U.S. marine and Great Lakes coasts. The EPA and NOAA's focus for funding within the CISNet partnership is to support research and monitoring programs, and in particular, those that utilize ecological indicators and investigate the ecological effects of environmental stressors. NASA's funding focus is the development of remote sensing capabilities that can enhance and supplement the in situ research and monitoring programs selected for funding by the EPA and NOAA. The CISNet partnership has three main objectives:

1. To develop a sound scientific basis for understanding ecological responses to anthropogenic stresses in coastal environments, including the interaction of exposure, environment/climate, and biological/ecological factors in the response, and the spatial and temporal nature of these interactions,

2. To demonstrate the value of developing data from selected sites intensively monitored to examine the relationships between changes in environmental stressors, including anthropogenic and natural stresses, and ecological response, and

3. To provide intensively monitored sites for development and evaluation of indicators of change in coastal systems.

Summers, Kevin, Andrew Robertson and Barbara Levinson. 2000. Development of the Coastal Intensive Site Network (CISNet). Environ. Monit. Assess. 64(1):379-390. (ERL,GB 1076).

Baruch's CISNet Project

The Belle W. Baruch Institute for Marine and Coastal Sciences received funding under the CISNet EPA/NOAA/NASA partnership to further these objectives. Baruch's CISNet project originally proposed to investigate two very different estuaries, North Inlet and Winyah Bay. However, after conducting a preliminary assessment of several South Carolina estuaries, investigators decided to include portions of the ACE Basin Estuary instead of Winyah Bay. While the North Inlet and ACE Basin estuaries are similar in terms of salinity, temperature, and tidal exchange, they differ in terms of the influence of the freshwater drainage basin. North Inlet is a relatively small estuary with minimal fresh water input (nutrient impoverished); ACE Basin is larger and is characterized by a much greater riverine drainage influence (a highly fertile estuary). As a result, they display extreme differences in nutrient loading, nutrient dynamics, and productivity. Baruch's aim was to address the differences in nutrient loading between these two estuaries, and the expected impact on the regulation of their food webs, by addressing these three main hypotheses:

1. The composition and abundance of ACE Basin and North Inlet bacterial and phytoplankton communities will differ and will vary as functions of nutrient availability.

2. Bacterial and phytoplankton communities form associations which vary in complexity (species diversity) as a function of nutrient availability.

3. At a landscape-scale, remote sensing of the concentration of chlorophyll in emergent wetland vegetation will provide a quantitative index of wetland condition, and will demonstrate differences in nutrient loading among estuaries.

Several subprojects were initiated to address these hypotheses. Information on the other subprojects that make up Baruch's CISNet project can be found below under "Other CISNet Datasets". Information on the relevant subproject follows:

CISNet Phytoplankton Pigment Monitoring Subproject

Phytoplankton community pigment compositions were measured seasonally along salinity gradients at 5 locations in the ACE Basin Estuary, and 5 locations in the North Inlet Estuary. Water samples were collected bimonthly from July to September 1999, from April to October 2000, and from March to September 2001. Samples were analyzed with highperformance liquid chromatography (HPLC), for 18 pigments that have known chemotaxonomic importance for phytoplankton identification. These pigment levels were then used to examine the spatial and temporal distributions of phytoplankton communities within the two estuaries.

Purpose:

The Phytoplankton Pigment Monitoring portion of Baruch's CISNet project was initiated to develop a High-Performance Liquid Chromatography (HPLC) method for phytoplankton community analysis, to correlate phytoplankton community information with water quality data, and to compare community structure within and between estuary types.

METHODS:

Field Collection Procedures and Protocols (Phytoplankton Pigment Field Collection Protocol

As part of the CISNet database, one-liter bottles were used to collect water samples in triplicate (a, b, and c), approximately mid-way between the daytime high and low tide stages, from a depth of 0.5 meters below the surface. This depth was chosen based on a preliminary CISNet subproject that determined there was little or no difference in pigment results for samples collected from 0.5 meters below the surface and those collected 0.5 meters above the sediment (see the CISNet: Weekly Monitoring at North Inlet database for these data). Light profiles were determined and salinity and water temperature measurements were taken at the time of sample collection. Sample bottles were immediately placed on ice and rushed to the laboratory for processing. The triplicate samples were processed for nutrients, suspended solids, and chlorophyll (see the CISNet: Water Quality Monitoring at North Inlet and ACE Basin database for these data). One of the triplicate samples (a) was analyzed for phytoplankton pigment levels using HPLC. Samples were collected on a bimonthly basis from July to September 1999, from April to October 2000, and from March to September 2001.

Laboratory Procedures and Protocols (Phytoplankton Pigment Sample Processing and HPLC Analysis)

The water samples were filtered using a 25-millimeter glass fiber grade F (GF/F) filter, with a vacuum of 10 inches mercury or less, within a couple hours of collection. The filter and the algae it contained were stored in a -80 degree Celsius freezer until the samples were needed. From this freezer, each sample (filter with algae) was placed into a glass vial. The HPLC technician added 2 milliliters of HPLC grade acetone and agitated the mixture with a vortex mixer for about 20 seconds, or until the filter broke down. The filter and algae "slurry" were then placed in a -20 degree Celsius freezer overnight. The next morning, the sample was vortexed again and then syringe filtered through a 0.2 micron pore size PTFE membrane. The filtrate was stored at -20 degrees Celsius until it was analyzed, usually within a day or two. Analysis was conducted using a Beckman System Gold HPLC (125 pump unit and 168 detector), initially with the Beckman Gold software (1999 samples) and later with the 32 Karat Gold software (2000 and 2001 samples), following the method of Van Heukelem and Thomas (2001) specific for the Agilent XDB C8 column.

VARIABLE DESCRIPTIONS:

Variable Name	Variable Description	Units	Measurement Scale	Code Information	Number Type
Date	the month day and year that the sample was collected, not necessarily processed or analyzed	1-12, 1-31, 1999-2001	nominal		
CISNET#	the sample designation for the CISNet project. Each sampling event (may have occurred over 2 days) was given a number.	1-15,	nominal		
Site/Rep	sample designation information. Site refers to sample locations 1-5 at either ace (ACE Basin) or ni (North Inlet). The replicate refers to one of three replicates (a-c), for the purpose of this subproject/dataset, only replicate "a" was analyzed.	ace or ni, 1-5, a	nominal	ace = ACE Basin|| ni=North Inlet	
Chlorophyll c2	Pigment concentrations (reported in nanograms per milliliter) were calculated by the HPLC technician using the following formula: (Peak Area * Rf * 20) / Volume.	0.000 – 7.248 nanograms per milliliter	ratio		real
Chlorophyll c1	Pigment concentrations (reported in nanograms per milliliter) were calculated by the HPLC technician using the following formula: (Peak Area * Rf * 20) / Volume.	0.000 – 9.112 nanograms per milliliter	ratio		real
Peridinin	Pigment concentrations (reported in nanograms per milliliter) were calculated by the HPLC technician using the following formula: (Peak Area * Rf * 20) / Volume.	0.000 – 14.767 nanograms per milliliter	ratio		real
19'-Butanoyloxyfucoxanthin	Pigment concentrations (reported in nanograms per milliliter) were calculated by the HPLC technician using the following formula: (Peak Area * Rf * 20) / Volume.	0.000 – 1.787 nanograms per milliliter	ratio		real
Fucoxanthin	Pigment concentrations (reported in nanograms per milliliter) were calculated by the HPLC technician using the following formula: (Peak Area * Rf * 20) / Volume.	0.095 – 24.246 nanograms per milliliter	ratio		real
Neoxanthin	Pigment concentrations (reported in nanograms per milliliter) were calculated by the HPLC technician using the following formula: (Peak Area * Rf * 20) / Volume.	0.000 – 0.301 nanograms per milliliter	ratio		real
Prasinoxanthin	Pigment concentrations (reported in nanograms per milliliter) were calculated by the HPLC technician using the following formula: (Peak Area * Rf * 20) / Volume.	0.000 – 0.373 nanograms per milliliter	ratio		real
Violaxanthin	Pigment concentrations (reported in nanograms per milliliter) were calculated by the HPLC technician using the following formula: (Peak Area * Rf * 20) / Volume.	0.000 – 3.661 nanograms per milliliter	ratio		integer
19'-Hexanoyloxyfucoxanthin	Pigment concentrations (reported in nanograms per milliliter) were calculated by the HPLC technician using the following formula: (Peak Area * Rf * 20) / Volume.	0.000 – 0.081 nanograms per milliliter	ratio		real
Diadinoxanthin	Pigment concentrations (reported in nanograms per milliliter) were calculated by the HPLC technician using the following formula: (Peak Area * Rf * 20) / Volume.	0.030 – 8.596 nanograms per milliliter	ratio		real

Alloxanthin	Pigment concentrations (reported in nanograms per milliliter) were calculated by the HPLC technician using the following formula: (Peak Area * Rf * 20) / Volume.	0.000 – 1.826 nanograms per milliliter	ratio		real	
Diatoxanthin	Pigment concentrations (reported in nanograms per milliliter) were calculated by the HPLC technician using the following formula: (Peak Area * Rf * 20) / Volume.	0.000 – 1.017 nanograms per milliliter	ratio		real	
Zeaxanthin	Pigment concentrations (reported in nanograms per milliliter) were calculated by the HPLC technician using the following formula: (Peak Area * Rf * 20) / Volume.	0.000 – 0.782 nanograms per milliliter	ratio		real	
Lutein	Pigment concentrations (reported in nanograms per milliliter) were calculated by the HPLC technician using the following formula: (Peak Area * Rf * 20) / Volume.	0.000 – 0.497 nanograms per milliliter	ratio		real	
Canthaxanthin	Pigment concentrations (reported in nanograms per milliliter) were calculated by the HPLC technician using the following formula: (Peak Area * Rf * 20) / Volume.	0.000 – 0.141 nanograms per milliliter	ratio		real	
Chlorophyll b	Pigment concentrations (reported in nanograms per milliliter) were calculated by the HPLC technician using the following formula: (Peak Area * Rf * 20) / Volume.	0.018 – 1.734 nanograms per milliliter	ratio		real	
Chlorophyll a	Pigment concentrations (reported in nanograms per milliliter) were calculated by the HPLC technician using the following formula: (Peak Area * Rf * 20) / Volume.	0.236 – 61.006 nanograms per milliliter	ratio		real	
Carotenes (a+b)	Pigment concentrations (reported in nanograms per milliliter) were calculated by the HPLC technician using the following formula: (Peak Area * Rf * 20) / Volume.	0.050 – 2.362 nanograms per milliliter	ratio		real	