

DRAFT CATALOG DOCUMENTATION
NATIONAL COASTAL ASSESSMENT- NORTHEAST DATABASE
YEAR 2000 STATIONS
LIGHT ATTENUATION DATA: "ATTENCO"

TABLE OF CONTENTS

1. DATASET IDENTIFICATION
2. INVESTIGATOR INFORMATION
3. DATASET ABSTRACT
4. OBJECTIVES AND INTRODUCTION
5. DATA ACQUISITION AND PROCESSING METHODS
6. DATA MANIPULATIONS
7. DATA DESCRIPTION
8. GEOGRAPHIC AND SPATIAL INFORMATION
9. QUALITY CONTROL AND QUALITY ASSURANCE
10. DATA ACCESS AND DISTRIBUTION
11. REFERENCES
12. TABLE OF ACRONYMS
13. PERSONNEL INFORMATION

1. DATASET IDENTIFICATION

1.1 Title of Catalog document

National Coastal Assessment-Northeast Region Database
Year 2000 Stations
WATER QUALITY - LIGHT ATTENUATION DATA

1.2 Authors of the Catalog entry

John Kiddon, U.S. EPA NHEERL-AED
Harry Buffum, CSC Corp.

1.3 Catalog revision date

August 2002

1.4 Dataset name

ATTENCO

1.5 Task Group

National Coastal Assessment-Northeast

1.6 Dataset identification code

004

1.7 Version

001

1.8 Request for Acknowledgment

EMAP requests that all individuals who download EMAP data acknowledge the source of these data in any reports, papers, or presentations. If you publish these data, please include a statement similar to: "Some or all of the data described in this article were produced by the U. S. Environmental Protection Agency through its Environmental Monitoring and Assessment Program (EMAP)".

2. INVESTIGATOR INFORMATION (for full addresses see Section 13)

2.1 Principal Investigators

John Paul, U.S. Environmental Protection Agency, NHEERL-Atlantic Ecology Division (AED)

Charles Strobel, U.S. Environmental Protection Agency, NHEERL-Atlantic Ecology Division (AED)

2.2 Sample Collection Investigators

Charles Strobel, U.S. Environmental Protection Agency, NHEERL-Atlantic Ecology Division (AED)

2.3 Sample Processing Investigators

Not applicable

3. DATASET ABSTRACT

3.1 Abstract of the Dataset

The ATTENCO data file reports water quality - light attenuation parameters: PAR Attenuation Coefficient and the number of PAR readings. Other physical water quality characteristics are found in the WATERPHYS data file. Readings were taken concurrent with CTD waterphys measurements in NCA Northeast estuaries during the Summer of 2000. Although light readings were taken on both the downcast and the upcast, only the downcast data was used for calculation of the attenuation coefficient. One calculated attenuation coefficient is presented per sampling event. At some shallow stations (designated with a QACODE = PAR-B), measurements were performed at too few water depths to obtain enough data to calculate the attenuation coefficient.

3.2 Keywords for the Dataset

Water quality, physical parameters, attenuation, light, PAR, photosynthetically active radiation

4. OBJECTIVES AND INTRODUCTION

4.1 Program Objective

The Coastal 2000 Initiative is a national EMAP effort. In Coastal 2000 we are demonstrating a consistent, integrated, probabilistic monitoring effort that will produce a national assessment of the condition of the U.S. marine estuaries. We partnered with EPA Regions, EPA's Office of Water, state resource/protection agencies in the 24 marine coastal states and Puerto Rico, USGS, and NOAA to conduct the sampling of estuaries during the late summer months of 2000 and 2001. A minimum of 50 sampling locations in each state have been established within EMAP's probabilistic sampling framework. From this we will develop a national report on the condition of the Nations's estuaries, as well as reports on the condition of the estuaries in each of the individual states and Puerto Rico. In 2002 we are beginning our assessment of the condition of the near-shore coastal environments to complement EPA's ongoing efforts to improve beach monitoring.

4.2 Dataset Objective

The objective of the ATTENCO data file is to report values of water quality - light attenuation parameters as measured in the water column.

4.3 Dataset Background Discussion

Light attenuation water parameters provide information about the habitat of resident organisms. Most plants have preferences or requirements regarding Photosynthetically Active Radiation. For instance, the distribution of submerged aquatic vegetation (SAV) largely reflects the availability of light (PAR), which in turn depends on water depth and clarity. Monitoring light attenuation parameters may therefore indicate important changes in the environmental condition of the estuaries. The attenuation coefficient is computed from multiple Photo active Radiation (PAR) readings from different depths.

4.4 Summary of Dataset Parameters

*STATION	Station name
*STAT_ALT	Alternate Site Coded (A, B or C)
*EVNTDATE	Event date
ATTENCO	PAR Attenuation Coefficient
PAR_RECS	Number of PAR readings
QACODE	QACODE

PAR-A Surface PAR readings were not recorded
PAR-B Fewer than four PAR readings
PAR-C Attenuation coefficients less than zero (not valid) recoded to zero

* denotes parameters that should be used as key fields when merging data files

5. DATA ACQUISITION AND PROCESSING METHODS

5.1 Data Acquisition

The sample collection methods used by USEPA trained field crews will be described here. Any significant variations by other NCA partners are noted in Section 5.1.12. Details regarding NCA partners are reported in the EVENTS data file.

5.1.1 Sampling Objective

Obtain *in situ* measurements of PAR in the water column of estuaries in the NCA region.

5.1.2 Sample Collection: Methods Summary

PAR was measured with a LICOR PAR sensor separately or attached to Hydrolab Datasonde or similar instrument. A deck sensor, if available, was located on the boat deck in an unshaded location. The PAR sensor was lowered on the sunny (or at least unshaded) side of the boat to a depth of about 0.5 meters. The PAR values were allowed to stabilize, and recorded from both sensors (if a deck sensor was present), along with the water depth of the PAR meter. Readings were then taken as follows:

Shallow sites (< 2 m) - every 0.5 m interval;
Nominal depths (>2<10 m) - 0.5 m (near-surface) and every 1-m interval to near-bottom (0.5 m off-bottom);
Deep sites (>10 m) - 0.5 m (near-surface) and every 1-m interval to 10 m, then at 5-m intervals, thereafter, to near-bottom (0.5 m off-bottom).

If the bottom was impacted with the meter, 2-3 minutes was allowed for the disturbed conditions to settle before taking the reading. This process was repeated on the upcast.

5.1.3 Beginning Sampling Dates

8 July 2000

5.1.4 Ending Sampling Dates

8 October 2000

5.1.5 Sampling Platform

Samples were collected from gasoline or diesel powered boats, 18 to 133 feet in length

5.1.6 Sampling Equipment

Quantum sensors measure photosynthetically active radiation (PAR) in the 400 to 700 nm waveband. The unit of measurement is micromoles per second per square meter ($\mu\text{mol s}^{-1}\text{m}^{-2}$). LICOR PAR sensor readings were recorded concurrently with hydrographic data from Hydrolab or similar instrument. PAR readings were recorded on datasheets and entered by hand into excel spreadsheets or recorded using a software program such as Procomm.

5.1.7 Manufacturer of Sampling Equipment

LICOR L1100 light meter, LI-COR, Inc.

5.1.8 Key Variables

Not applicable

5.1.9 Sample Collection: Calibration

No daily field calibration procedures are required for the LICOR light meter; however, the manufacturer recommends that the instrument be returned to the factory for annual calibration check and resetting of the calibration coefficient. Calibration kits are available from LICOR and this procedure can be performed at the laboratory (see LICOR operation manual).

5.1.10 Sample Collection: Quality Control

There are several field QC measures to help ensure taking accurate measurements of light penetration. The "deck" sensor must be situated in full sunlight (i.e., out of any shadows), likewise, the submerged sensor must be deployed from the sunny side of the vessel and care should be taken to avoid positioning the sensor in the shadow of the vessel. For the comparative light readings of deck and submerged sensors, (ratio of ambient vs. submerged), the time interval between readings should be held to a minimal (approximately 1 sec).

PAR readings at depth should be normalized to surface PAR readings. In many cases this normalization was not possible because surface PAR readings were not recorded. These cases are flagged with QACODE values of "PAR-A". PAR data collected deeper than the 1% light level is excluded during the SAS calculations to yield a more accurate attenuation coefficient.

The variable PAR_RECS indicates how many different measures were used to compute the coefficient. The coefficient can not be computed for stations with less than two PAR readings. The coefficient is considered unreliable

where there are fewer than four readings, so these cases are flagged with QACODE values of "PAR-B". Attenuation coefficients less than zero are not valid. Cases where the regression equation resulted in a coefficient of less than zero are flagged with QACODE values of "PAR-C". The coefficient was recoded to zero in these cases.

Because data on the downcasts seemed of better quality than data on the upcasts, only downcast data was used. However, if the ratio of downcast:upcast was drastically different, the data was flagged and the station was dropped from interstation comparisons.. The criteria used for flagging a station's PAR data was a greater than 10% difference in PAR readings (i.e, if the downcast:upcast ratio was >1.1 or <0.9)

5.1.11 Sample Collection: References

Strobel, C.J. 1998. Environmental Monitoring and Assessment Program - Mid-Atlantic Integrated Assessment. Estuaries Component, Field Operations and Safety Manual. U.S. EPA, Office of Research and Development, NHEERL-AED, Narragansett, RI. July 1998.

Strobel, C.J. 2000. Environmental Monitoring and Assessment Program: Coastal 2000 - Northeast component: field operations manual. Narragansett (RI): U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Atlantic Ecology Division. Report nr EPA/620/R-00/002. 68 p.

Kokkinakis, S.A., J.L. Hyland, and A. Robertson. 1994. Carolinian Demonstration Project - 1994 Field Operations Manual. Joint National Status and Trends/Environmental Monitoring and Assessment Program. NOAA/NOS/ORCA, Silver Spring, MD.

5.1.12 Sample Collection: Alternate Methods

Consult the STATIONS data file for cooperative agreement code (ST_COOP)
The different partners used the following equipment:

ST_COOP	Water Profile Equipment
CT	Sea-bird SBE-19
CT-FSH	Sea-bird SBE-19
DE	Hydrolab Datasonde
MA	Hydrolab Datasonde
	Quanta
MA-FSH	Hydrolab Datasonde
ME	Hydrolab Datasonde
NH	YSI model 6600_M
NJ-C	Hydrolab Datasonde
NJ-DB	Hydrolab Datasonde
	Hydrolab Datasonde
NY	YSI model 6600_M
	YSI 85
	Seabird model 25
RI	Hydrolab Datasonde
RI-FSH	Hydrolab Datasonde

5.2 Data Preparation and Sample Processing

No analytical processing was involved for the ATTENCO parameters.

5.2.1 Sample Processing Objective

Not applicable

5.2.2 Sample Processing: Methods Summary

Not applicable

5.2.3 Sample Processing: Calibration

Not applicable

5.2.4 Sample Processing: Quality Control

Not applicable

5.2.5 Sample Processing: References

Not applicable

5.2.6 Sample Processing: Alternate Methods

Not applicable

6. DATA ANALYSIS AND MANIPULATIONS

6.1 Name of New or Modified Value

PAR Attenuation Coefficient

6.2 Data Manipulation Description

Attenuation coefficients were extracted from discrete PAR water profile data files by (1) sorting the PAR records from the same water profile by downcast and upcast; (2) selecting the downcast records for analysis; (3) calculating the regression coefficient; (4) performing QA checks

6.2.3 ATTENCO

ATTENCO is calculated as the slope of the line defined by the regression of light (ratio I_z/I_o) vs. depth at each station location.

7. DATA DESCRIPTION

7.1 Description of Parameters

7.1.1 Components of the Dataset

PARAMETER	TYPE	LENGTH	LABEL
STATION	Char	9	Station Name
STAT_ALT	Char	1	Alternate Site Code (A,B, or C)
EVNTDATE	Num	8	Event Date
ATTENCO	Num	8	PAR Attenuation Coefficient
PAR_RECS	Num	8	Number of PAR readings
QACODE	Char	18	QA Qualifier

7.1.2 Precision of Reported Values

<u>NAME</u>	<u>LABEL</u>	N	MIN	MAX	MEAN	STD
EVNTDATE	Event Date	240.00	14801.00	14903.00	14854.70	26.59
ATTENCO	PAR Attenuation Coefficient	233.00	0.00	5.59	0.66	0.85
PAR_RECS	Number of Par readings	240.00	1.00	241.00	25.68	39.90

7.1.3 Minimum Value in Dataset
See Section 7.1.2

7.1.4 Maximum Value in Dataset
See Section 7.1.2

7.2 Data Record Example

7.2.1 Column Names for Example Records

STATION	STAT_ALT	EVNTDATE	ATTENCO	PAR_RECS	QACODE
---------	----------	----------	---------	----------	--------

7.2.2 Example Data Records

STATION	STAT_ALT	EVNTDATE	ATTENCO	PAR_RECS	QACODE
CT00-0021	A	08/07/00	0.70	79.00	PAR-A
CT00-0023	A	08/08/00	0.44	121.00	PAR-A
CT00-0025	A	08/08/00	0.60	69.00	PAR-A

8. GEOGRAPHIC AND SPATIAL INFORMATION

8.1 Minimum Longitude (Westernmost)
-75.7737 decimal degrees

8.2 Maximum Longitude (Easternmost)
-67.0939 decimal degrees

8.3 Minimum Latitude (Southernmost)
38.4521 decimal degrees

8.4 Maximum Latitude (Northernmost)
44.9456 decimal degrees

8.5 Name of area or region

The National Coastal Assessment Northeast Region covers the northeastern US coastline from Maine to Delaware.

9. QUALITY CONTROL AND QUALITY ASSURANCE

9.1 Measurement Quality Objectives

The measurement quality objectives of the EMAP-Estuaries program specify accuracy and precision requirements of 10% in the water physical parameters (see Valente and Strobel, 1993)

9.2 Data Quality Assurance Procedures

The data were reviewed to assure consistency among partners regarding sampling procedures, reporting format, etc. All measurements were performed in the field

9.3 Actual Measurement Quality

No field replicates were measured for these parameters

10. DATA ACCESS

10.1 Data Access Procedures

Data can be downloaded from the web

10.2 Data Access Restrictions

None

10.3 Data Access Contact Persons

John Paul, Principal Investigator

U.S. EPA NHEERL-AED

401-782-3037, 401-782-3099 (FAX), paul.john@epa.gov

Harry Buffum, Data Manager/ NCA-Estuaries

U.S. EPA NHEERL-AED

401-782-3183, 401-782-3030 (FAX), buffum.harry@epa.gov

10.4 Dataset Format

ASCII (CSV) and SAS Export files

10.5 Information Concerning Anonymous FTP

Not available

10.6 Information Concerning WWW

No gopher access, see Section 10.1 for WWW access

10.7 EMAP CD-ROM Containing the Dataset

Data not available on CD-ROM

11. REFERENCES

Holland, A.F., ed. 1990. Near Coastal Program Plan for 1990: Estuaries. EPA 600/4-90/033. U.S. EPA, Office of Research and Development, NHEERL-AED, Narragansett, RI. November 1990.

Kokkinakis, S.A., Hyland, J.L., and Robertson, A. 1994. Carolinian Demonstration Project - 1994 Field Operations Manual. Joint National Status and Trends/Environmental Monitoring and Assessment Program. NOAA/NOS/ORCA, Silver Spring, MD.

Plumb, R.H. 1981. Procedures for Handling and Chemical Analysis of Sediment and Water Samples. Prepared for the U.S. Environmental Protection Agency/Corps of Engineers Technical Committee on Criteria for Dredge and Fill Material. Published by Environmental Laboratory, U.S. Army Waterways Experiment Station, Vicksburg, MS. Technical Report EPA/CE-81-1.

Strobel, C.J. 1998. Environmental Monitoring and Assessment Program - Mid-

Atlantic Integrated Assessment. Estuaries Component, Field Operations and Safety Manual. U.S. EPA, Office of Research and Development, NHEERL-AED, Narragansett, RI. Forthcoming.

Strobel, C.J. 1998. Mid Atlantic Integrated Assessment / Environmental Monitoring and Assessment Program - Estuaries: Virginian Province Quality Assurance Project Plan. U.S. EPA, Office of Research and Development, NHEERL-AED, Narragansett, RI. June 1998.

Strobel, C.J. 2000. Environmental Monitoring and Assessment Program: Coastal 2000 - Northeast component: field operations manual. Narragansett (RI): U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Atlantic Ecology Division. Report nr EPA/620/R-00/002.

U.S. EPA. 1995. Environmental Monitoring and Assessment Program (EMAP): Laboratory Methods Manual-Estuaries, Volume 1: Biological and Physical Analyses. U.S. Environmental Protection Agency, Office of Research and Development, Narragansett, RI. EPA/620/R-95/008.

Valente, R. and Strobel, C.J. 1993. Environmental Monitoring and Assessment Program- Estuaries: 1993 Virginian Province Quality Assurance Project Plan. U.S. EPA, NHEERL-AED, Narragansett, RI. May 1993

12. TABLE OF ACRONYMS

AED	Atlantic Ecology Division
C	Degrees Celsius
CTD	Conductivity, Temperature, and Depth
DB	Delaware Bay
DO	Dissolved Oxygen
EMAP	Environmental Monitoring and Assessment Program
EPA	U.S. Environmental Protection Agency
GED	Gulf Ecology Division
m	Meter
mg/L	Milligrams per liter
NHEERL	National Health and Environmental Effects Research Laboratory
QA/QC	Quality Assurance/Quality Control
ppt	Parts per thousand
SAV	Submerged Aquatic Vegetation
USEPA	United States Environmental Protection Agency
VER	Versar, Inc.
WWW	World Wide Web

13. PERSONNEL INFORMATION

Harry Buffum, Database Manager, CSC Corp.
U.S. Environmental Protection Agency, NHEERL-AED
27 Tarzwell Drive, Narragansett, RI 02882-1197
401-782-3183, 401-782-3030 (FAX), buffum.harry@epa.gov

Don Cobb, Chemist
U.S. Environmental Protection Agency, NHEERL-AED
27 Tarzwell Drive, Narragansett, RI 02882-1197
401-782-9616, 401-782-3030 (FAX), cobb.donald@epa.gov

Steve Hale, EMAP Information Manager
U.S. Environmental Protection Agency, NHEERL-AED
27 Tarzwell Drive, Narragansett, RI 02882-1197
401-782-3048, 401-782-3030 (FAX), hale.stephen@epa.gov

Melissa M. Hughes, Data Librarian, EMAP-Estuaries
CSC Corp., U.S. EPA NHEERL-AED
27 Tarzwell Drive, Narragansett, RI 02882-1197
401-782-3184, 401-782-3030 (FAX), hughes.melissa@epa.gov

John Kiddon, AED Oceanographer
U.S. Environmental Protection Agency, NHEERL-AED
27 Tarzwell Drive, Narragansett, RI 02882-1197
401-782-3044, 401-782-3030 (FAX), kiddon.john@epa.gov

Joe LiVolsi, AED QA Officer
U.S. Environmental Protection Agency, NHEERL-AED
27 Tarzwell Drive, Narragansett, RI 02882-1197
401-782-3163, 401-782-3030 (FAX), livolsi.joseph@epa.gov

John Paul, Principal Investigator
U.S. Environmental Protection Agency, NHEERL-AED
27 Tarzwell Drive, Narragansett, RI 02882-1197
401-782-3037, 401-782-3099 (FAX), paul.john@epa.gov

Charles J. Strobel, Field Coordinator
U.S. Environmental Protection Agency, NHEERL-AED
27 Tarzwell Drive, Narragansett, RI 02882-1197
401-782-3180, 401-782-3030 (FAX), strobel.charles@epa.gov