NASA Technical Memorandum 104566, Vol. 36

SeaWiFS Technical Report Series

Stanford B. Hooker and
Elaine R. Firestone, Editors

Volume 36, SeaWiFS Technical Report Series
Cumulative Index: Volumes 1–35

Elaine R. Firestone and Stanford B. Hooker

December 1996

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1996

Abstract

The Sea-viewing Wide Field-of-view Sensor (SeaWiFS) is the follow-on ocean color instrument to the Coastal Zone Color Scanner (CZCS), which ceased operations in 1986, after an eight-year mission. SeaWiFS is expected to be launched in 1997, on the SeaStar satellite, being built by Orbital Sciences Corporation (OSC). The SeaWiFS Project at the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center (GSFC), has undertaken the responsibility of documenting all aspects of this mission, which is critical to the ocean color and marine science communities. This documentation, entitled the *SeaWiFS Technical Report Series,* is in the form of NASA Technical Memorandum Number 104566. All reports published are volumes within the series. This particular volume serves as a reference, or guidebook, to the previous 35 volumes and consists of 6 sections including: an addenda, an errata, an index to key words and phrases, lists of acronyms and symbols used, and a list of all references cited. The editors publish a cumulative index of this type after every five volumes. Each index covers the reference topics published in all previous editions, that is, each new index includes all of the information contained in the preceeding indices with the exception of any addenda.

1. INTRODUCTION

This is the sixth in a series of indices, published as a separate volume in the Sea-viewing Wide Field-of-view Sensor (SeaWiFS) Technical Report Series, and includes information found in the first 35 volumes of the series. The Report Series is written under the National Aeronautics and Space Administration's (NASA) Technical Memorandum (TM) Number 104566. The volume numbers, authors, and titles of the volumes covered in this index are:

Vol. 1: Hooker, S.B., W.E. Esaias, G.C. Feldman, W.W. Gregg, and C.R. McClain, *An Overview of SeaWiFS and Ocean Color.*

Vol. 2: Gregg, W.W., *Analysis of Orbit Selection for SeaWiFS: Ascending vs. Descending Node.*

Vol. 3: McClain, C.R., W.E. Esaias, W. Barnes, B. Guenther, D. Endres, S.B. Hooker, B.G. Mitchell, and R. Barnes, *SeaWiFS Calibration and Validation Plan.*

Vol. 4: McClain, C.R., E. Yeh, and G. Fu, *An Analysis of GAC Sampling Algorithms: A Case Study.*

Vol. 5: Mueller, J.L., and R.W. Austin, *Ocean Optics Protocols for SeaWiFS Validation.*

Vol. 6: Firestone, E.R., and S.B. Hooker, *SeaWiFS Technical Report Series Cumulative Index: Volumes 1–5.*

Vol. 7: Darzi, M., *Cloud Screening for Polar Orbiting Visible and IR Satellite Sensors.*

Vol. 8: Hooker, S.B., W.E. Esaias, and L.A. Rexrode, *Proceedings of the First SeaWiFS Science Team Meeting.*

Vol. 9: Gregg, W.W., F. Chen, A. Mezaache, J. Chen, and J. Whiting, *The Simulated SeaWiFS Data Set.*

Vol. 10: Woodward, R.H., R.A. Barnes, W.E. Esaias, W.L. Barnes, A.T. Mecherikunnel, *Modeling of the SeaWiFS Solar and Lunar Observations.*

Vol. 11: Patt, F.S., C.M. Hoisington, W.W. Gregg, and P.L. Coronado, *Analysis of Selected Orbit Propagation Models.*

Vol. 12: Firestone, E.R., and S.B. Hooker, *SeaWiFS Technical Report Series Cumulative Index: Volumes 1–11.*

Vol. 13: McClain, C.R., J.C. Comiso, R.S. Fraser, J.K. Firestone, B.D. Schieber, E-n. Yeh, K.R. Arrigo, and C.W. Sullivan, *Case Studies for SeaWiFS Calibration and Validation, Part 1.*

Vol. 14: Mueller, J.L., *The First SeaWiFS Intercalibration Round-Robin Experiment, SIRREX-1, July 1992.*

Vol. 15: Gregg, W.W., F.S. Patt, and R.H. Woodward, *The Simulated SeaWiFS Data Set, Version 2.*

Vol. 16: Mueller, J.L., B.C. Johnson, C.L. Cromer, J.W. Cooper, J.T. McLean, S.B. Hooker, and T.L. Westphal, *The Second SeaWiFS Intercalibration Round-Robin Experiment, SIRREX-2, June 1993.*

Vol. 17: Abbott, M.R., O.B. Brown, H.R. Gordon, K.L. Carder, R.E. Evans, F.E. Muller-Karger, and W.E. Esaias, *Ocean Color in the 21st Century: A Strategy for a 20-Year Time Series.*

Vol. 18: Firestone, E.R., and S.B. Hooker, *SeaWiFS Technical Report Series Summary Index: Volumes 1–17.*

Vol. 19: McClain, C.R., R.S. Fraser, J.T. McLean, M. Darzi, J.K. Firestone, F.S. Patt, B.D. Schieber, R.H. Woodward, E-n. Yeh, S. Mattoo, S.F. Biggar, P.N. Slater, K.J. Thome, A.W. Holmes, R.A. Barnes, and K.J. Voss, *Case Studies for SeaWiFS Calibration and Validation, Part 2.*

Vol. 20: Hooker, S.B., C.R. McClain, J.K. Firestone, T.L. Westphal, E-n. Yeh, and Y. Ge, *The SeaWiFS Bio-Optical Archive and Storage System (SeaBASS), Part 1.*

Vol. 21: Acker, J.G., *The Heritage of SeaWiFS: A Retrospective on the CZCS NIMBUS Experiment Team (NET) Program.*

Vol. 22: Barnes, R.A., W.L. Barnes, W.E. Esaias, and C.R. McClain, *Prelaunch Acceptance Report for the SeaWiFS Radiometer.*

Vol. 23: Barnes, R.A., A.W. Holmes, W.L. Barnes, W.E. Esaias, C.R. McClain, and T. Svitek, *SeaWiFS Prelaunch Radiometric Calibration and Spectral Characterization.*

Vol. 24: Firestone, E.R., and S.B. Hooker, *SeaWiFS Technical Report Series Summary Index: Volumes 1–23.*

Vol. 25: Mueller, J.L., and R.W. Austin, *Ocean Optics Protocols for SeaWiFS Validation, Revision 1.*

Vol. 26: Siegel, D.A., M.C. O'Brien, J.C. Sorensen, D.A. Konnoff, E.A. Brody, J.L. Mueller, C.O. Davis, W.J. Rhea, and S.B. Hooker, *Results of the SeaWiFS Data Analysis Round-Robin (DARR-94), July 1994.*

Vol. 27: Mueller, J.L., R.S. Fraser, S.F. Biggar, K.J. Thome, P.N. Slater, A.W. Holmes, R.A. Barnes, C.T. Weir, D.A. Siegel, D.W. Menzies, A.F. Michaels, and G. Podesta, *Case Studies for SeaWiFS Calibration and Validation, Part 3.*

Vol. 28: McClain, C.R., K.R. Arrigo, W.E. Esaias, M. Darzi, F.S. Patt, R.H. Evans, J.W. Brown, C.W. Brown, R.A. Barnes, and L. Kumar, *SeaWiFS Algorithms, Part 1.*

Vol. 29: Aiken, J., G.F. Moore, C.C. Trees, S.B. Hooker, and D.K. Clark, *The SeaWiFS CZCS-Type Pigment Algorithm.*

Vol. 30: Firestone, E.R., and S.B. Hooker, *SeaWiFS Technical Report Series Summary Index: Volumes 1–29.*

Vol. 31: Barnes, R.A., A.W. Holmes, and W.E. Esaias, *Stray Light in the SeaWiFS Radiometer.*

Vol. 32: Campbell, J.W., J.M. Blaisdell, and M. Darzi, *Level-3 SeaWiFS Data Products: Spatial and Temporal Binning Algorithms.*

Vol. 33: Moore, G.F., and S.B. Hooker, *Proceedings of the First SeaWiFS Exploitation Initiative (SEI) Team Meeting.*

Vol. 34: Mueller, J.L., B.C. Johnson, C.L. Cromer, S.B. Hooker, J.T. McLean, and S.F. Biggar, *The Third SeaWiFS Intercalibration Round-Robin Experiment (SIRREX-3), 19–30 September 1994.*

Vol. 35: Robins, D.B., A.J. Bale, G.F. Moore, N.W. Rees, S.B. Hooker, C.P. Gallienne, A.G. Westbrook, E. Marañón, W.H. Spooner, and S.R. Laney, *AMT-1 Cruise Report and Preliminary Results.*

This volume within the series serves as a reference, or guidebook, to the aforementioned volumes. It consists of the four main sections included with the first two indices published, Volumes 6 and 12, in the series: a cumulative index to key words and phrases, a glossary of acronyms, a list of symbols used, and a bibliography of all references cited in the series. In addition, as in Volumes 12, 18, and 24, an errata section has been added to address issues and needed corrections that have come to the editors' attention since the volumes were first published. Also, as in some of the previous indices, an addenda section has been added to include the proceedings of various workshops, which are too short in length to warrant a separate volume within the series.

The nomenclature of the index is a familiar one, in the sense that it is a sequence of alphabetical entries, but it utilizes a unique format since multiple volumes are involved. Unless indicated otherwise, the index entries refer to some aspect of the SeaWiFS instrument or project, for example, the *mission overview* index entry refers to an overview of the SeaWiFS mission. An index entry is composed of a keyword or phrase followed by an entry field that directs the reader to the possible locations where a discussion of the keyword can be found. The entry field is normally made up of a volume identifier shown in bold face, followed by a page identifier, which is always enclosed in parentheses:

keyword, **volume**(pages).

If an entry is the subject of an entire volume, the volume field is shown in slanted type without a page field:

keyword, *Vol. #*.

An entry can also be the subject of a complete chapter. In this instance, both the volume number and chapter number appear without a page field:

keyword, **volume**(ch. #).

Figures or tables that provide particularly important summary information are also indicated as separate entries in the page field. In this case, the figure or table number is given with the page number on which it appears.

keyword, **volume**(Fig. # *p.* #).

or

keyword, **volume**(Table # *p.* #).

2. ERRATA

Note: Since the issuance of previous volumes, a number of the references cited have changed their publication status, e.g., they have gone from "submitted" or "in press" to printed matter. In other instances, some part (or parts) of the citation, e.g., the title or year of publication, has changed or was printed incorrectly. Listed below are the references in question as they were cited in one or more of the first 35 volumes in the series, along with how they now appear in the references section of *this* volume.

Original Citation

Bidigare, R.R., and M.E. Ondrusek, 1995: Influence of the 1992 El Ninõ on phytoplankton pigment distributions in the equatorial Pacific Ocean. *Deep-Sea Res.,* (submitted).

Revised Citation

Bidigare, R.R., and M.E. Ondrusek, 1996: Spatial and temporal variability of phytoplankton pigment distributions in the central equatorial Pacific Ocean. *Deep-Sea Res.,* **43,** 809–833.

Original Citation

Chavez, F.P., K.R. Buck, R.R. Bidigare, D.M. Karl, D. Hebel, M. Latasa, L. Campbell, and J. Newton, 1995: On the chlorophyll *a* retention properties of glass-fiber GF/F filters. *Limnol. Oceanogr.*, **40,** (in press).

Revised Citation

Chavez, F.P., K.R. Buck, R.R. Bidigare, D.M. Karl, D. Hebel, M. Latasa, L. Campbell and J. Newton, 1995: On the chlorophyll *a* retention properties of glass-fiber GF/F filters. *Limnol. Oceanogr.*, **40,** 428–433.

Original Citation

Latasa, M., R.R. Bidigare, M.C. Kennicutt II, and M.E. Ondrusek, 1995: HPLC analysis of algal pigments: A comparison among laboratories. *Mar. Chem.,* (submitted).

Revised Citation

Latasa, M., R.R. Bidigare, M.E. Ondrusek, M.C. Kennicutt, 1996: HPLC analysis of algal pigments—A comparison exercise among laboratories and recommendations for improved analytical performance. *Mar. Chem.,* **51,** 315–324.

Original Citation

Trees, C.C., D.K. Clark, R. Bidigare, and M. Ondrusek, 1995: Chlorophyll *a* versus accessory pigment concentrations within the euphotic zone: A ubiquitous relationship? *Science,* (submitted).

Revised Citation

Trees, C.C., D.K. Clark, R. Bidigare, and M. Ondrusek, 1995: Chlorophyll *a* versus accessory pigment concentrations within the euphotic zone: A ubiquitous relationship? *Science,* (withdrawn).

Original Citation

Zaneveld, J.R.V., 1995: A theoretical deviation of the dependence of the remotely sensed reflectance on the IOP. *J. Geophys. Res.,* (in press).

Revised Citation

Zaneveld, J.R.V., 1995: A theoretical derivation of the ocean on the inherent optical-properties. *J. Geophys. Res.,* **100,** 13,135–13,142.

3. ADDENDA

This section presents summaries of the Sixth SeaWiFS Bio-optical Algorithm and Optical Protocols Workshop (BAOPW-6) and the Case-2 Water Measurement Protocol Workshop held 18–21 March 1996 at the National Institute of Standards and Technology (NIST), in Gaithersburg, Maryland; submitted by C. McClain. It also presents a summary of the Seventh SeaWiFS Bio-optical Algorithm and Optical Protocols Workshop (BAOPW-7) held on 21 October 1996 at the Sheraton Halifax Hotel in Halifax, Nova Scotia; submitted by C. McClain.

3.1 BAOPW-6

The primary workshop objectives of BAOPW-6 were to:

1. Review the status of the initial operational SeaWiFS pigment and chlorophyll *a* algorithms.
2. Review the field programs and bio-optical data sets.
3. Discuss the measurement protocol updates, [fifth SeaWiFS Intercalibration Round-Robin Experiment (SIRREX-5)], and data analysis round-robins.

The team members and invited guests are listed in Table 1.

A. Monday Morning, 18 March
   1. Introduction (C. McClain)
      a. Workshop Objectives and Agenda
      b. SeaStar and SeaWiFS Updates
   2. Bio-optical Algorithm Session (20 minutes per presentation)

Table 1. Team members and invited guests to the BAOPW-6, held 18–21 March 1996 at NIST, in Gaithersburg, Maryland. The subgroup memberships are as listed in Hooker et al. (1993). Participants are identified with a checkmark (✓).

Team Members	*Present*	*Team Members*	*Present*
J. Aiken		M. Kishino	✓
K. Arrigo	✓	O. Kopelovich	
B. Balch	✓	M. Lewis	
K. Carder	✓	S. Matsumara	✓
D. Clark	✓	C. McClain	✓
G. Cota	✓	G. Mitchell	✓
C. Davis	✓	A. Morel	✓
R. Doerffer		J. Mueller	✓
W. Esaias	✓	F. Muller-Karger	
R. Evans	✓		
R. Frouin	✓	D. Siegel	✓
H. Fukushima		R. Smith	✓
H. Gordon		C. Trees	✓
F. Hoge	✓	C. Yentsch	✓
S. Hooker	✓	J. Yoder	
D. Kamykowski	✓	R. Zaneveld	
Other Participants			
S. Ackleson		G. Kirkpatrick	
R. Arnone		R. Ladner	
A. Barnard		R. Maffione	
C. Barrientos		S. Maritorena	
J. Brock		S. McLean	
C. Brown		C. Mobley	
J. Campbell		B. Monger	
M. Carr		J. Morrison	
Y. Chen		S. Pegau	
S. Gallegos		D. Phinney	
R. Goulde		M. Pinkerton	
L. Hardin		A. Subramaniam	
S. Hawes		G. Valenti	
M. Kahru		C. Woody	
E. Kearne		A. Weidemann	

a. Operational chlorophyll *a* algorithm update (K. Carder)
b. California Cooperative Fisheries Institute (CalCoFI) pigment algorithm comparisons (G. Mitchell)
c. Bio-optical algorithms for the Ocean Color and Temperature Scanner (OCTS) and Global Imager (GLI) (M. Kishino)
d. Bio-optical algorithms for the Advanced Very High Resolution Radiometer (AVHRR) (R. Arnone)
e. $K(490)$ algorithm revisited (J. Mueller)
f. An inversion method for chlorophyll *a* concentration, the Gelbstoff absorption coefficient, and the backscattering coefficient (J. Campbell)
g. Phytoplankton-specific absorption time series (G. Kirkpatrick)
h. An algorithm for estimating the Q-factor (A. Morel)

B. Monday Afternoon
1. Field Program Update Session (20 minutes per presentation)
   a. National Space Development Agency (NASDA) Fisheries Agency cooperative field data collection system (S. Matsumura)
   b. Atlantic Meridional Transect (S. Hooker)
   c. Bermuda Bio-optical Time Series (D. Siegel)
   d. CalCoFI Bio-optical Cruises (G. Mitchell)
   e. Navy Field Program Update (C. Davis)
   f. Arctic Field Program (G. Cota)
   g. Arabian Sea Bio-optics Cruises (W. Balch)
   h. Marine Optical Buoy (MOBY) Status (D. Clark)
   i. SeaBASS update (K. Arrigo)

C. Tuesday Morning, 19 March
1. A Brief Presentation on Semi-Analytical Models (D. Siegel)
2. Measurement Protocols Session
   a. Effects of diffuse skylight on field observations (R. Frouin)
   b. Beta factor determinations (C. Trees)
   c. Remote sensing reflectance observations (D. Clark)
2. Instrument Calibration Session
   a. Time Series of MER-2040/2041 Calibration (G. Mitchell)
   b. SIRREX-5 Objectives and Status (S. Hooker and C. Johnson)

3.1.1 Meeting Action Items

The following action items arose from the meeting; the people responsible for them are also presented.

1. The revised $K(490)$ algorithm, which was presented by J. Mueller should be adopted as the SeaWiFS operational algorithm.
2. The SeaWiFS Project should work with A. Morel on implementing (prior to launch) and testing (off line, postlaunch) the variable Q factor algorithm.
3. C. Trees and G. Mitchell will host a workshop on beta factor determination and related topics sometime this year.
4. D. Clark will host a workshop on the estimation of water-leaving radiances from sparsely sampled vertical profiles, e.g., moorings and drifters.

3.2 Case-2 Water Measurement Protocols

This workshop commenced after BAOPW-6 and took place Tuesday afternoon through Thursday, 19–21 May

1996. The purpose of this workshop was to refine the optical measurement protocols for turbid water. The standard methodology for measuring normalized water-leaving radiance and remote sensing reflectance (R_{rs}), is to measure downwelling irradiance and upwelling radiance profiles. These profile data are then used to extrapolate the irradiance and radiance values through the air-water interface in order to estimate the above surface values. The normalized water-leaving radiance and R_{rs} are computed using these values. Because of high extinction coefficients and bottom reflectance, these procedures do not work well in turbid coastal waters. To overcome this problem, a number of groups are using specialized radiometers, or alternate methods to assess R_{rs} in coastal waters. This workshop began the process of establishing SeaWiFS optical protocols for turbid waters and initial protocols were distributed. The goal of the workshop was to develop a revised version of the protocols. The revised protocols would be tested during SIRREX-5 in July 1996, and a final version would be published by the end of 1996.

A. Tuesday Afternoon, 19 March
  1. Statement of the Problem and Goals of the Workshop (C. Davis)
  2. Radiance and Irradiance Profile Measurements for Turbid Waters (K. Carder, discussion leader)
     a. Turbid water radiometer with fiber optic heads (D. Clark)
     b. A full spectral system: the Submersible Upwelling and Downwelling Spectrometer (SUDS) (K. Carder)
     c. Shadowing, calibration, and other considerations (J. Mueller)
     d. Tethered spectral radiometer and K-chain (S. McLean)
  3. Group Discussion of Draft Protocols

B. Wednesday Morning, 20 March
  1. Brief Presentation on High Performance Liquid Chromatography (HPLC) Versus Fluorometric Pigment Measurements (C. Trees)
  2. Measurement of R_{rs} Using Reflectance Plaques (C. Davis, discussion leader)
     a. R_{rs} as measured at the Naval Research Laboratory (NRL) (C. Davis)
     b. R_{rs} as measured at GKSS (R. Doerffer)
     c. Improved model for calculation of R_{rs} (K. Carder)
     d. Surface reflectance as a function of view angle and wind speed (C. Mobley)
  3. Group Discussion of Draft Protocols

C. Wednesday Afternoon
  4. Ambrose Tower Project Update (C. Woodie, presentation originally scheduled for Monday, but postponed due to schedule conflict)
  5. Estimating R_{rs} From Measurements of Inherent Optical Properties (IOPs) (D. Siegel, discussion leader)
     a. AC-9 and related instruments (S. Pegau)
     b. Validation of water-leaving radiances using airbore active-passive measurements (F. Hoge)
     c. Spectral backscatter and beam attenuation sensor (R. Maffione)
     d. Modeling considerations (R. Maffione)

C. Thursday Morning, 21 March
  1. This session was a small group meeting to organize writing assignments for a revision of the Case-2 protocols and to discuss plans for SIRREX-5 field measurements.

3.2.1 Meeting Action Items

The following action items arose from this meeting.

1. A draft of the Case-2 protocols document will be completed by August.
2. SIRREX-5 (July) will provide an opportunity to test some of the protocols. A final version of the protocols will be completed and submitted to the SeaWiFS Project by the end of the calendar year.

3.3 BAOPW-7

The primary workshop objectives of BAOPW-7 were to:

1. Review the status of the initial operational SeaWiFS pigment and chlorophyll a algorithms.
2. Review the field programs and bio-optical data sets.
3. Discuss the measurement protocol updates and SIRREX-5.

The team members and invited guests are listed in Table 2.

A. Monday Morning, 21 October
  1. Introduction (C. McClain)
     a. Workshop Objectives and Agenda
     b. SeaStar and SeaWiFS Updates
  2. NASA Research Announcement (NRA) and Sensor Intercomparison and Merger for Biological and Interdisciplinary Ocean Studies (SIMBIOS) Program Update (J. Yoder)
  3. Bio-optical Algorithm Session (20 minutes per presentation)
     a. Operational chlorophyll a algorithm update (S. Hawes)
     b. CZCS pigment algorithm update (G. Moore)
     c. CalCoFI pigment algorithm comparisons (M. Kahru)

Table 2. Team members and invited guests to the BAOPW-7, held 21 October 1996 at the Sheraton Halifax Hotel in Halifax, Nova Scotia. The subgroup memberships are as listed in Hooker et al. (1993). Attendees are identified with a checkmark (✓).

Team Members	*Present*	*Team Members*	*Present*
J. Aiken	✓	M. Kishino	✓
K. Arrigo		O. Kopelovich	✓
B. Balch	✓	M. Lewis	✓
J. Campbell	✓	S. Matsumara	
K. Carder	✓	C. McClain	✓
D. Clark		G. Mitchell	✓
G. Cota	✓	A. Morel	✓
C. Davis	✓	J. Mueller	✓
R. Doerffer	✓	F. Muller-Karger	✓
W. Esaias		D. Siegel	✓
R. Evans	✓	R. Smith	✓
R. Frouin	✓	C. Trees	✓
H. Fukushima		C. Yentsch	
H. Gordon	✓	J. Yoder	✓
F. Hoge		R. Zaneveld	✓
S. Hooker			
D. Kamykowski	✓		
Other Participants			
S. Ackleson		G. Leshkevich	
D. Antoine		S. Maritorena	
I. Asanuma		E. Michelena	
M. Babin		R. Miller	
J. Berthon		J. Morrow	
A. Bricaud		S. McLean	
C. Brown		T. Oishi	
L. Clementson		J. O'Reilly	
T. Dickey		S. Pegau	
M. Dowell		S. Saitoh	
P. Fearns		B. Schieber	
S. Gallegos		G. Valenti	
F. Gilbes		K. Waters	
S. Hawes		A. Weidemann	
K. Kawasaki		M. Wernand	
E. Kearns		C. Woody	
Z. Lee			

d. Bio-optical algorithm comparisons (S. Maritorena)

e. Bio-optical algorithm comparisons at high latitudes (G. Cota)

f. Bio-optical algorithm comparisons (D. Siegel)

g. Bio-optical algorithm optimization (P. Deschamps)

h. Discussion

B. Monday Afternoon

1. OCTS Status (M. Kishino)

2. Field Program Update Session (20 minutes per presentation)

   a. Ambrose Tower measurement program status (C. Woodie)

   b. National Oceanic and Atmospheric Administartion (NOAA) Office of Naval Research (ONR) Santa Barbara Channel time series (D. Siegel)

   c. Bermuda Bio-Optical Profiler (BBOP) calibration history (D. Siegel)

   d. Optical buoy time series (M. Lewis)

   e. Bermuda mooring time series (T. Dickey)

3. Measurement Protocols Session (20 minutes per presentation)

   a. Reflectance measurement comparisons (J. Mueller)

   b. Reflectance measurement comparisons (F. Gilbes)

   c. Protocols for R_{rs} measurements (Z. Lee)

   d. Absorption measurement comparison results (D. Phinney)

   e. Protocol revisions, in general (J. Mueller)

3.3.1 Meeting Action Items

The following action items arose from the meeting.

1. D. Siegel will host a small algorithm working group meeting in January to reach a final consensus on the pigment and chlorophyll *a* algorithms. Good progress has been made, but some decreptancies and issues remain.
2. J. Mueller will begin the next round of protocol revisions.

3.4 Invited Colleagues' Addresses

Following are the names and addresses of attendees of the various workshops presented in Sections 3.1–3.3. Members of the various teams and panels are identified with their team names(s) shown in *slanted* type face.

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Glossary

– A –

A-band Absorption Band
A/D Analog-to-Digital (also written as AD)
A&M (Texas) Agriculture and Mechanics (University)
AC Alternating Current
ACC Antarctic Circumpolar Current
ACRIM Active Cavity Radiometer Irradiance Monitor
ACS Attitude Control System
ADC Analog-to-Digital Converter
ADCP Acoustic Doppler Current Profiler
ADEOS Advanced Earth Observation Satellite (Japan)
AE Ångström Exponent
AIBOP Automated and Interactive Bio-Optical Processing
ALSCAT ALPHA and Scattering Meter [Note: the symbol α corresponds to $c(\lambda)$, the beam attenuation coefficient, in present usage.]
AM-1 Not an acronym, used to designate the morning platform of EOS.
AMC Angular Momentum Compensation
AMT Atlantic Meridional Transect
AMT-1 The First AMT Cruise
ANSI American National Standards Institute
AOCI Airborne Ocean Color Imager
AOL Airborne Oceanographic Lidar
AOP Apparent Optical Property
AOS/LOS Acquisition of Signal/Loss of Signal
APL Applied Physics Laboratory
APT Automatic Picture Transmission
ARGOS Not an acronym, but the name given to the data collection and location system on the NOAA Operational Satellites.
ARI Accelerated Research Initiative
ARS Airborne Remote Sensing
ASCII American Standard Code for Information Interchange
ASI Italian Space Agency
ASR Absolute Spectral Response
AT Along-Track
ATLAS Auto-Tracking Land and Atmosphere Sensor
ATM Airborne Thematic Mapper
AU Astronomical Unit
AVHRR Advanced Very High Resolution Radiometer
AVIRIS Advanced Visible and Infrared Imaging Spectrometer
AXBT Airborne Expendable Bathythermograph

– B –

BAOPW-1 First Bio-optical Algorithm and Optical Protocols Workshop
BAOPW-2 Second Bio-optical Algorithm and Optical Protocols Workshop
BAOPW-3 Third Bio-optical Algorithm and Optical Protocols Workshop
BAOPW-4 Fourth Bio-optical Algorithm and Optical Protocols Workshop
BAOPW-5 Fifth Bio-optical Algorithm and Optical Protocols Workshop
BAOPW-6 Sixth Bio-optical Algorithm and Optical Protocols Workshop
BAOPW-7 Seventh Bio-optical Algorithm and Optical Protocols Workshop
BAS British Antarctic Survey
BATS Bermuda Atlantic Time-Series Station
BBOP Bermuda Bio-Optical Profiler
BBR Band-to-Band Registration
BCRS Dutch Remote Sensing Board
BEP Benguela Ecology Programme
BER Bit Error Rate
BIOS Biophysical Interactions and Ocean Structure (NERC research program)
BMFT Minister for Research and Technology (Germany)
BNL Brookhaven National Laboratory
BNSC British National Space Center
BOAWG Bio-Optical Algorithm Working Group
BODC British Oceanic Data Center
BOFS British Ocean Flux Study
BOMS Bio-Optical Moored Systems
BOPS Bio-Optical Profiling System
bpi bits per inch
BRDF Bidirectional Reflectance Distribution Function
BSI Biospherical Instruments, Incorporated
BSIXR BSI's Transfer Radiometer
BSM Bio-Optical Synthetic Model
BTD Bright Target Detection
BTR Bright Target Recovery
BUV Backscatter Ultraviolet Spectrometer
BWI Baltimore-Washington International (airport)

– C –

C/N Carbon-to-Nitrogen (ratio)
CalCoFI California Cooperative Fisheries Institute
Cal/Val Calibration and Validation
CALVAL Calibration and Validation
Case-1 Water whose reflectance is determined solely by absorption.
Case-2 Water whose reflectance is significantly influenced by scattering.
CASI Compact Airborne Spectrographic Imager
CCD Charge Coupled Device
CCPO Center for Coastal Physical Oceanography (Old Dominion University)
CDF (NASA) Common Data Format
CDOM Colored Dissolved Organic Material
CD-ROM Compact Disk-Read Only Memory
CDR Critial Design Review
CEC Commission of the European Communities
CENR Committee on Environment and Natural Resources
CHN Carbon, Hydrogen, and Nitrogen
CHORS Center for Hydro-Optics and Remote Sensing (San Diego State University)
c.i. confidence interval
CICESE *Centro de Investigación Científica y de Educación Superior de Ensenada* (Mexico)
CIMEL Not an acronym, but the name of a sun photometer manufacturer.
CIRES Cooperative Institute for Research in Environmental Sciences
COADS Comprehensive Ocean-Atmosphere Data Set
COARE Coupled Ocean-Atmosphere Response Experiment

COAST Coastal Earth Observation Application for Sediment Transport
COOP Coastal Ocean Optics Program
COTS Commercial Off-The-Shelf (software)
CPR Continuous Plankton Recorder
cpu Central Processing Unit
CRM Contrast Reduction Meter
CRN Italian Research Council
CRSEO Center for Remote Sensing and Environmental Optics (University of California at Santa Barbara)
CRT Calibrated Radiance Tapes or Cathode Ray Tube (depending on usage).
CRTT CZCS Radiation and Temperature Tape
CSIRO Commonwealth Scientific and Industrial Research Organization (of Australia)
CSC Computer Sciences Corporation
CSL Computer Systems Laboratory
CT Cross-Track
CTD Conductivity, Temperature, and Depth
c.v. coefficient of variation
CVT Calibration and Validation Team
CW Continuous Wave
CWL Center Wavelength
CWR Clear Water Radiance
CXR CHORS Transfer Radiometer
CZCS Coastal Zone Color Scanner

– D –

DAAC Distributed Active Archive Center
DAO Data Assimilation Office
DARR Data Analysis Round-Robin
DARR-94 First Data Analysis Round-Robin
DARR-2 Second Data Analysis Round-Robin
DAT Digital Audio Tape
DC Direct Current or Digital Count (depending on usage).
DCF Data Capture Facility
DCM Deep Chlorophyll Maximum
DCOM Dissolved Colored Organic Material
DCP Data Collection Platform
DEC Digital Equipment Corporation
DIW Distilled Water
DML Dunstaffnage Marine Laboratory (Scotland)
DMS dimethyl sulfide
DOC Dissolved Organic Carbon
DoD Department of Defense
DOE Department of Energy
DOM Dissolved Organic Matter
DON Dissolved Organic Nitrogen
DOS Disk Operating System
DSP Not an acronym, but an image display and analysis package developed at RSMAS—University of Miami.
DU Dobson Units
DUT Device Under Test
DXW Not an acronym, but a lamp designator.

– E –

E-mail Electronic Mail
EAFB Edwards Air Force Base
EC Excluding CHORS (data)
ECEF Earth-Centered Earth-Fixed
ECMWF European Centre for Medium Range Weather Forecasts
ECT Equator Crossing Time
EDMED European Directory of Marine and Environmental Data
EDT Eastern Daylight Time
EEZ Exclusive Economic Zone
EG&G Not an acronym, but a shortened form of EG&G-Gamma Scientific (now known simply as Gamma Scientific).
ENSO El Niño Southern Oscillation
ENVISAT Environmental Satellite
EOF Empirical Orthogonal Function
EOS Earth Observing System
EOSAT Earth Observation Satellite Company
EOSDIS EOS Data Information System
EPA Environmental Protection Agency
EP-TOMS Earth Probe-Total Ozone Mapping Spectroradiometer
EqPac Equatorial Pacific (Process Study)
ER-2 Earth Resources-2
ERBE Earth Radiation Budget Experiment
ERBS Earth Radiation Budget Sensor
ERDAS Not an acronym, but a trade name for an image analysis system.
ERL (NOAA) Environmental Research Laboratories
ERS Earth Resources Satellite
ESA European Space Agency
EST Eastern Standard Time
EURASEP European Association of Scientists in Environmental Pollution
EUVE Extreme Ultraviolet Explorer

– F –

FASCAL Fast Calibration (Facility)
FDDI Fiber Data Distribution Interface
FEL Not an acronym, but a lamp designator.
FGGE First GARP Global Experiment
FLUPAC (Geochemical) Fluxes in the Pacific (Ocean)
FNOC Fleet Numerical Oceanography Center
FORTRAN Formula Translation (computer language)
FOV Field-of-View
FPA Focal Point Assembly
FRD Federal Republic of Deutschland (Germany)
FRRF Fast Repetition Rate Fluorometer
ftp File Transfer Protocol
FWHM Full-Width at Half-Maximum
FY Fiscal Year

– G –

GAC Global Area Coverage, coarse resolution satellite data with a nominal ground resolution at nadir of approximately 4 km.
GARP Global Atmospheric Research Program
GASM General Angle Scattering Meter
`gcc` GNU C Compiler
GF/F Not an acronym, but a specific type of glass fiber filter manufactured by Whatman.
GIN Greenland, Iceland, and Norwegian Seas
GIS Geographical Information System
GISS Goddard Institute for Space Studies
GLI Global Imager
GLOBEC Global Ocean Ecosystems dynamics

GMT Greenwich Mean Time
GNU GNU's Not UNIX
GOES Geostationary Operational Environmental Satellite
GOFS Global Ocean Flux Study
GOMEX Gulf of Mexico Experiment
GP Global Processing (algorithm)
GPM General Perturbations Model
GPS Global Positioning System
GRGS Groupe de Recherche de Geodesie Spatial
GRIB Gridded Binary
GRIDTOMS Gridded TOMS (data set)
GSFC Goddard Space Flight Center
GSO Graduate School of Oceanography (University of Rhode Island)
G/T System Gain/Total System Noise Temperature
GUI Graphical User Interface

– H –

HAPEX Hydrological Atmospheric Pilot Experiment
HDDT High Density Data Tape
HDF Hierarchical Data Format
HEI Hoffman Engineering, Incorporated
HeNe Helium-Neon
HHCRM Hand-Held Contrast Reduction Meter
HIRIS High Resolution Imaging Spectrometer
HN (Polaroid) Not an acronym, but a linear sheet polarizer used to check the polarization sensitivity of SeaWiFS bands 7 and 8.
HOTS Hawaiian Optical Time Series
HP Hewlett Packard
HPGL Hewlett Packard Graphics Language
HPLC High Performance Liquid Chromatography
HQ Headquarters
HR (Polaroid) Not an acronym, but a linear sheet polarizer used to check the polarization sensitivity of SeaWiFS bands 1–6.
HRPT High Resolution Picture Transmission
HST Hawaii Standard Time
HYDRA Hydrographic Data Reduction and Analysis

– I –

I/O Input/Output
IAPSO International Association for the Physical Sciences of the Ocean
IAU International Astrophysical Union
IBM International Business Machines
ICARUS Instrumentation Characterizing Aerosol Radii Using Sun photometry
ICD Interface Control Document
ICES International Council on Exploration of the Seas
ICESS Institute for Computational Earth System Science (University of California at Santa Barbara)
IDL Interactive Data Language
IDS Integrated Data System
IFOV Instantaneous Field of View
ILS Incident Light Sensor
IMS Information Management System
IOP Inherent Optical Property
IOSDL Institute of Oceanographic Sciences, Deacon Laboratory (UK)
IP Internet Protocol
IPD Image Processing Division
IR Infrared
IRIX Not an acronym, but a computer operating system.
ISA Integrating Sphere Accessory
ISCCP International Satellite Cloud Climatology Project
ISIC Integrating Sphere Irradiance Collector
ISTP International Solar Terrestrial Program
IUCRM Inter-Union Commission on Radio Meteorology
IUE International Ultraviolet Explorer

– J –

JAM JYACC Application Manager
JARE Japanese Antarctic Research Expedition
JCR (RRS) *James Clark Ross*
JGOFS Joint Global Ocean Flux Study
JHU Johns Hopkins University
JOI Joint Oceanographic Institute
JPL Jet Propulsion Laboratory
JRC Joint Research Center
JYACC Not an acronym, but the name of the company that makes JAM.

– K –

KQ K_d Quality (flag)

– L –

L&N Leeds & Northrup
LAC Local Area Coverage, fine resolution satellite data with a nominal ground resolution at nadir of approximately 1 km.
LAN Local Area Network
LANDSAT Land Resources Satellite
LCD Least Common Denominator (file)
LDEO Lamont-Doherty Earth Observatory (Columbia University)
LDGO Lamon-Doherty Geological Observatory (Columbia University)
LDTNLR Local Dynamic Threshold Nonlinear Raleigh
Level-0 Raw data.
Level-1 Calibrated radiances.
Level-2 Derived products.
Level-3 Gridded and averaged derived products.
LHCII Light-Harvesting Complex II
LMCE *Laboratoire de Modelisation du climat et de l'Environment* (France)
LOC Local Time
LODYC *Laboratoire d'Océanographie et de Dynamique du climat* (France)
LOICZ Land Ocean Interaction in the Coastal Zone
LOIS Land-Ocean Interaction Study
LPCM *Laboratoire de Physique et Chimie Marines* (France)
LRER Long-Range Ecological Research
LSB Least Significant Bits
LSF Line Spread Function
LUT Look-Up Table

– M –

MAFF	Ministry of Agriculture, Fisheries, and Food (UK)
MARAS	Marine Radiometric Spectrometer
MAREX	Marine Resources Experiment Program
MARMAP	Marine Resources Monitoring, Assessment, and Prediction
MARS	Multispectral Airborne Radiometer System
MASSS	Multi-Agency Ship-Scheduling for SeaWiFS
MBARI	Monterey Bay Aquarium Research Institute
MCMC	Markov Chain Monte Carlo
MEM	Maximum Entropy Method
MER	Marine Environmental Radiometer
MERIS	Medium Resolution Imaging Spectrometer
METEOSAT	Meteorological Satellite
MF	Major Frame
mF	Minor Frame
MIPS	Millions of Instructions Per Second
MIT	Massachusetts Institute of Technology
MIZ	Marginal Ice Zone
MLE	Maximum Likelihood Estimator
MLML	Moss Landing Marine Laboratory (San Jose State University)
MO	Magneto-Optical
MOBY	Marine Optical Buoy
MOCE	Marine Optical Characterization Experiment
MODARCH	MODIS Document Archive
MODIS	Moderate Resolution Imaging Spectroradiometer
MODIS-N	Nadir-viewing MODIS instrument
MODIS-T	Tilted MODIS instrument to minimize sun glint
MOS	Marine Optical Spectroradiometer
MOU	Memorandum of Understanding
MRF	Meteorological Research Flight
MSB	Most Significant Bits
MS/DOS	Microsoft/Disk Operating System (also written as MS-DOS)
MTF	Modulation Transfer Function
MVDS	Multichannel Visible Detector System

– N –

NABE	North Atlantic Bloom Experiment
NAS	National Academy of Science
NASA	National Aeronautics and Space Administration
NASCOM	NASA Communications
NASDA	National Space Development Agency (Japan)
NASIC	NASA Aircraft/Satellite Instrument Calibration
NAVSPASUR	Naval Space Surface Surveillance
NCAR	National Center for Atmospheric Research
NCCOSC	Navy Command, Control, and Ocean Surveillance Center
NCDC	(NOAA) National Climatic Data Center
NCDS	NASA Climate Data System
NCSA	National Center for Supercomputing Applications
NCSU	North Carolina State University
NDBC	National Data Buoy Center
NDVI	Normalized Difference Vegetation Index
NEAT	Northeast Atlantic
NECC	North Equatorial Counter Current
NEdL	Noise Equivalent Differential Spectral Radiance
NEΔT	Noise Equivalent Delta Temperature
NEδL	Noise Equivalent delta Radiance
NER	Noise Equivalent Radiance
NERC	Natural Environment Research Council (UK)
NESDIS	National Environmental Satellite Data Information Service
NESS	National Environmental Satellite Service
NET	NIMBUS Experiment Team
netCDF	(NASA) Network Common Data Format
NFS	Network File System
NGDC	National Geophysical Data Center
NIMBUS	Not an acronym, but a series of NASA experimental weather satellites containing a wide variety of atmosphere, ice, and ocean sensors.
NIR	Near-Infrared
NIST	National Institute of Standards and Technology
NMC	National Meteorological Center
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOARL	Naval Oceanographic and Atmospheric Research Laboratory
NODC	National Oceanographic Data Center
NORAD	North American Air Defense (Command)
NOPS	NIMBUS Observation Processing System
NOS	National Ocean Service
NRA	NASA Research Announcement
NRaD	Naval Research and Development
NRIFSF	National Research Institute of Far Seas Fisheries (Japan)
NRL	Naval Research Laboratory
NRT	Near-Real Time
NSCAT	NASA Scatterometer
NSF	National Science Foundation
NSSDC	National Space Science Data Center

– O –

OAM	Optically Active Materials
OCDM	Ocean Color Data Mission
OCEAN	Ocean Colour European Archive Network
OCI	Ocean Color Irradiance (sensor)
OCR	Ocean Color Radiance (sensor)
OCS	Ocean Color Scanner
OCTS	Ocean Color and Temperature Sensor (Japan)
ODAS	Ocean Data Acquisition System
ODEX	Optical Dynamics Experiment
ODU	Old Dominion University
OFFI	Optical Free-Fall Instrument
OI	Original Irradiance
OL	Optronics Laboratories
OLIPAC	Oligotrophy in the Pacific (Ocean)
OMEX	Ocean Marine Exchange
OMP-8	Not an acronym, but a type of marine antibiofouling compound.
ONR	Office of Naval Research
OPC	Optical Plankton Counter
OPT	Ozone Processing Team
ORKA	On-line Real-time Knowledge-based Analysis
OS	Operating System
OSC	Orbital Sciences Corporation
OSFI	Optical Surface Floating Instrument
OSSA	Office of Space Science and Applications
OSU	Oregon State University

– P –

P-I Production-Irradiance
PACE Plymouth Atmospheric Correction Experiment (UK)
PAR Photosynthetically Available Radiation
PC (IBM) Personal Computer
PCASP Passive Cavity Aerosol Spectrometer Probe (UK)
PDR Preliminary Design Review
PDT Pacific Daylight Time
PFF Programmable Frame Formatter
PI Principal Investigator
PIKE Phased Illuminated Knife Edge
PlyMBODy Plymouth Marine Bio-Optical Data Buoy (UK)
PM-1 Not an acronym, used to designate the afternoon.
PMEL Pacific Marine Environmental Laboratory
PMI Programmable Multispectral Imager
PML Plymouth Marine Laboratory (UK)
POC Particulate Organic Carbon
POLDER Polarization Detecting Environmental Radiometer (France) or Polarization and Directionality of the Earth's Reflectance (depending on usage).
PON Particulate Organic Nitrogen
PPC Photoprotectant Carotenoids
ppm parts per million
PR Photo Research
PRIME Plankton Reactivity in the Marine Environment (UK)
PRR Profiling Reflectance Radiometer
PRT Platinum Resistance Thermometer
PSC Photosynthetic Carotenoids
PSII Photosystem II
PST Pacific Standard Time
PSU Practical Salinity Units
PTFE Polytetrafluoroethylene
PUR Photosynthetically Usable Radiation
PZN Phytoplankton, Zooplankton, and Nutrients

– Q –

QC Quality Control
QED Quantum Efficient Device
QUBIT Trade name of commercial data logging system.

– R –

R&A Research and Applications
R&D Research and Development
R/V Research Vessel
RACER Research on Antarctic Coastal Ecosystem Rates
RACS(C) Rivers Basins-Atmosphere-Coast and Estuaries Study (Coastal)
RAF Royal Air Force (UK)
RC Resistor-Capacitor (circuit)
RDBMS Relational Database Management System
RDF Radio Direction Finder
RDI RD Instruments
RF Radio Frequency
RFP Request for Proposals
RISC Reduced Instruction Set Computer
rms root mean squared
ROSIS Remote Sensing Imaging Spectrometer, also known as the Reflective Optics System Imaging Spectrometer (Germany)
ROV Remotely Operated Vehicle
ROW Reverse Osmosis Water
RR Round-Robin
RRS Royal Research Ship
RSADU Remote Sensing Applications Development Unit
RSMAS Rosenstiel School for Marine and Atmospheric Sciences (University of Miami)
RSS Remote Sensing Systems (Inc.)
RTM Reversing Thermometer
RTOP Research and Technology Operation Plan

– S –

S/C Spacecraft
S/N Serial Number
SAC Satellite Applications Centre
SARSAT Search and Rescue Satellite
SBE Sea-Bird Electronics
SBRC (Hughes) Santa Barbara Research Center
SBUV Solar Backscatter Ultraviolet Radiometer
SBUV-2 Solar Backscatter Ultraviolet Radiometer–2
SCADP SeaWiFS Calibration and Acceptance Data Package
SCDR SeaWiFS Critical Design Review
SCOR Scientific Committee on Oceanographic Research
SDPS SeaWiFS Data Processing System
SDS Scientific Data Set
SDSU San Diego State University
SDY Sequential Day of the Year
SeaBASS SeaWiFS Bio-Optical Archive and Storage System
SeaDAS SeaWiFS Data Analysis System
SeaOPS SeaWiFS Optical Profiling System
SEAPAK Not an acronym, but an image display and analysis package developed at GSFC.
SeaSCOPE SeaWiFS Study of Climate, Ocean Productivity, and Environmental Change
SeaStar Not an acronym, but the name of the satellite on which SeaWiFS will fly.
SeaWiFS Sea-viewing Wide Field-of-view Sensor
SEEP Shelf Edge Exchange Program
SEI SeaWiFS Exploitation Initiative (UK)
SEIBASS SeaWiFS Exploitation Initiative Bio-Optical Archive and Storage System (UK)
SES Shelf Edge Study
SFP Size-Fractionated Pigments
SGI Silicon Graphics, Incorporated
SHP Shaft Horsepower
SI International System of Units or *Système International d' Unitès*
SIG Special Interest Group
SIMBIOS Sensor Intercomparison and Merger for Biological and Interdisciplinary Ocean Studies
SIO Scripps Institution of Oceanography
SIO/MPL Scripps Institution of Oceanography/Marine Physical Laboratory
SIRREX SeaWiFS Intercalibration Round-Robin Experiment
SIRREX-1 The First SIRREX (July 1992)

SIRREX-2 The Second SIRREX (June 1993)
SIRREX-3 The Third SIRREX (September 1994)
SIRREX-4 The Fourth SIRREX (May 1995)
SIRREX-5 The Fifth SIRREX (July 1996)
SIS Spherical Integrating Source or Sensoren-Instrumente Systeme (depending on usage).
SISSR Submerged *In Situ* Spectral Radiometer
SJSU San Jose State University
SMM Solar Maximum Mission
SNR Signal-to-Noise Ratio
SO Southern Ocean (algorithm)
SOC Southampton Oceanography Center (UK) or Simulation Operations Center (depending on usage).
SOGS SeaStar Operations Ground Subsystem
SOH State of Health
SOW Statement of Work
SPIE Society of Photo-Optical Instrumentation Engineers
SPM Suspended Particulate Material or Special Perturbations Model (depending on usage).
SPMPR SeaWiFS Post-Modification Preship Review
SPO SeaWiFS Project Office
SPOT *Satellite Pour l'Observation de la Terre* (France)
SPR SeaWiFS Preship Review
SPSWG SeaWiFS Prelaunch Science Working Group
SQL Sequential Query Language
SRC Satellite Receiving Station (NERC)
SRT Sigma Research Technology, Incorporated
SSLSP SeaWiFS Stray Light Signal Paths
SSM/I Special Sensor for Microwave/Imaging
SST Sea Surface Temperature or SeaWiFS Science Team (depending on usage).
ST Science Team
Sterna Not an acronym, but a BOFS Antarctic research project.
STM Science Team Member
SUDS Submersible Upwelling and Downwelling Spectrometer
SUN Sun Microsystems
SWAP Sylter Wattenmeer Austausch-prozesse
SWG Science Working Group
SWIR Shortwave Infrared
SWL Safe Working Load
SXR SeaWiFS Transfer Radiometer

– T –

T-S Temperature-Salinity
TAE Transportable Applications Executive
TAO Thermal Array for the Ocean or more recently, Tropical Atmosphere-Ocean
TBD To Be Determined
TBUS Not an acronym, but a NOAA orbital element.
TDI Time-Delay and Integration
TDRSS Tracking and Data Relay Satellite System
TIROS Television Infrared Observation Satellite
TLM Telemetry
TM Technical Memorandum
TOA Top of the Atmosphere
TOGA Tropical Ocean Global Atmosphere program
TOMS Total Ozone Mapping Spectrometer
TOPEX Topography Experiment
TOVS TIROS Operational Vertical Sounder
TRMM Tropical Rainfall Measuring Mission
TSM Total Suspended Material
TV Thermal Vacuum

– U –

UA University of Arizona
UARS Upper Atmosphere Research Satellite
UAXR University of Arizona's Transfer Radiometer
UCAR University Consortium for Atmospheric Research
UCMBO University of California Marine Bio-Optics
UCSB University of California at Santa Barbara
UCSD University of California at San Diego
UH University of Hawaii
UIC Underway Instrumentation and Control (room)
UIM/X User Interface Management/X-Windows
UM University of Miami
UNESCO United Nations Educational, Scientific, and Cultural Organizations
UNIX Not an acronym, but a computer operating system.
UoP University of Plymouth (UK)
UOR Undulating Oceanographic Recorder
UPS Uninterruptable Power System
URI University of Rhode Island
USC University of Southern California
USF University of South Florida
UTC Coordinated Universal Time (definition reflects actual usage instead of following the letters of the acronym)
UTM Universal Transverse Mercator (projection)
UV Ultraviolet
UVB Ultraviolet-B
UWG User Working Group

– V –

V0 Version 0
V1 Version 1
VAX Virtual Address Extension
VCS Version Control Software
VDC Volts Direct Current
VHF Very High Frequency
VHRR Very High Resolution Radiometer
VI Virtual Instrument
VISLAB Visibility Laboratory (Scripps Institution of Oceanography)
VISNIR Visible and Near Infrared
VMS Virtual Memory System
VSF Volume Scattering Function

– W –

WFF Wallops Flight Facility
WHOI Woods Hole Oceanographic Institute
WMO World Meteorological Organization
WOCE World Ocean Circulation Experiment
WORM Write-Once Read-Many (times)
WP2 Not an acronym, but a standard net mesh size (200 μm).
WVS World Vector Shoreline

– X –

XBT Expendable Bathythermograph
XDR External Data Representation

– Y, Z –

YBOM Yamato Bank Optical Mooring

Symbols

– A –

a The semi-major axis of the Earth's orbit, a formulation constant, a constant equal to 0.983, a constant equal to $-20/\tanh(2)$; an exponential value in the expression relating the radiance of scattered light to wavelength; or a a regression coefficient (depending on usage).
$\tilde{a}$ The measured value of a.
a' The absorption at the Raman excitation wavelength.
$a(\lambda)$ Total absorption coefficient.
$a(z,\lambda)$ Spectral absorption coefficient.
a_a The specific absorption of chlorophyll a.
a_{abc} The specific absorption of chlorophylls a, b, and c.
a_b The specific absorption of chlorophyll b.
a_c The specific absorption of chlorophyll c.
$a_e(\lambda)$ Absorption coefficient due to substances other than water.
$a_f(z,\lambda)$ $a_p(\lambda) - a_t(z,\lambda)$.
a_g The DOM/detritus specific absorbance.
$a_g(\lambda)$ Gelbstoff spectral absorption coefficient.
a_i Cubic polynomial coefficients.
$a_i(\lambda_a,T)$ Initial estimate of the apparent absorption coefficient; used for determining the apparent absorption coefficient for substances other than water.
a_N Normalized absorption coefficient.
a_{o} Oxygen absorption coefficient.
a_{ox} Coefficient for oxygen absorption.
a_{oz} Coefficient for ozone absorption.
$a_p(\lambda)$ Particulate spectral absorption coefficient.
a_{PP} The specific absorption of PPC.
$a_{ps}(\lambda)$ Photosynthetically active pigment spectral absorption coefficient.
a_{PS} The specific absorption of PSC.
$a_s(\lambda)$ The sediment specific absorption coefficient.
$a_t(\lambda)$ Tripton spectral absorption coefficient.
$a_w(\lambda)$ The absorption coefficient for pure water.
a_{wv} Coefficient for water vapor absorption.
a_ϕ The DOM/chlorophyll combined absorbance.
$a_\phi(\lambda)$ Phytoplankton pigment spectral absorption coefficient.
$a_\phi^M(\lambda)$ Phytoplankton pigment spectral absorption coefficient determined in methanol extract.
A Fitting coefficient for $P_4 - X$, or clearance area of a filter (depending on usage).
$A(k)$ Absorptivity.
$A(\lambda)$ Coefficient for calculating $b_b(\lambda)$.
$A(\lambda_a)$ AC-9 instrument calibration factor for absorption.
$A(\lambda_c)$ AC-9 instrument calibration factor for beam attenuation.
A_0 Coefficient for the linear term in the scan modulation correction equation.
A_d The detector aperture.
$A_d(\overline{z},\lambda)$ Linear regression intercepts at the center of a fitted depth interval for ln of $A_d(z,\lambda)$ (defined in Vol. 26).
A_f The foam reflectance.
A_i The intersection area or an arbitrary constant (depending on usage).
A_i' An arbitrary constant.
A_j An arbitrary constant.
A_j' An arbitrary constant.
$A_l(\overline{z},\lambda)$ Linear regression intercepts at the center of a fitted depth interval for ln of $A_l(z,\lambda)$ (defined in Vol. 26).
$A_u(\overline{z},\lambda)$ Linear regression intercepts at the center of a fitted depth interval for ln of $A_u(z,\lambda)$ (defined in Vol. 26).

– B –

b A formulation coefficient, a constant equal to 1/3, or a regression coefficient (depending on usage).
$b(z,\lambda)$ The total scattering coefficient.
$b(\theta,z,\lambda_0)$ Volume scattering coefficient.
b_b Backscattering coefficient.
$\tilde{b}_b(\lambda)$ The backscatter ratio (b_b/b).
$b_b(z,\lambda)$ The spectral backscattering coefficient.
$b_{bc}(\lambda)$ The spectral backscattering coefficient for phytoplankton.
b_{bp} The particle specific backscatter coefficient (usually normalized to chlorophyll a concentration).
b_{bw} The backscatter coefficient of water.
$b_i(\lambda)$ Initial estimate of the particle scattering coefficient; used for determining the apparent particle scattering coefficient for substances other than water.
$b_{\min}$ Scattering associated with phytoplankton (Prieur and Sathyendranath 1981).
$b_p(\lambda)$ Total particle scattering.
$b_r(\lambda)$ Total Raman scattering coefficient.
b_R The Raman scattering coefficient.
$b_s(\lambda)$ The sediment specific scattering coefficient.
$b_w(\lambda)$ The total scattering coefficient for pure seawater.
$b1(k)$ Input data for polarization calculations for SeaWiFS band 1.
$b7(k)$ Input data for polarization calculations for SeaWiFS band 7.
B Excess target radiance, the fitting coefficient for e^{B/P_5}, the width of band 7, a variable in the expression for limiting reflectance (R_{lim}), defined as $0.33b/K_d$, or an empirical constant. (depending on usage).
$B(\lambda)$ Coefficient for calculating $b_b(\lambda)$.
B_0 Coefficient for the power term in the scan modulation correction equation.
B_1 BBOP casts 1 m from the ship's stern.
B_6 BBOP casts 6 m from the ship's stern.
B_b An empirical constant dependent on the backscatter ratio.
$B_b(\lambda)$ Greybody radiance model.

– C –

$\tilde{c}$ The measured value of c.
$c(z,\lambda)$ Spectral beam attenuation coefficient.
$c(z,660)$ Red beam attenuation (at 660 nm).
$c_e(\lambda)$ Corrected non-water beam attenuation coefficient.
$c_i(\lambda)$ Initial estimate of the beam attenuation coefficient (used for determining the apparent beam attenuation coefficient for substances other than water).
$c_p(\lambda)$ Beam attenuation coefficient due to particles.
$c_w(\lambda)$ Beam attenuation coefficient for pure water equal to $a_w(\lambda) + b_w(\lambda)$.
$[chl.\ a]/K$ Concentration of chlorophyll a over K, the diffuse attenuation coefficient.
C Chlorophyll a pigment, or just pigment concentration.
$C'(\lambda)$ AC-9 factory calibration coefficient.
$C_r'(\lambda)$ Additional AC-9 factory calibration coefficient.
C_1 Measured value for the flight diffuser on a given scan line in counts, or a polynomial regression factor (depending on usage).
C_2 Measured value of the flight diffuser for the scan line immediately sequential to the first scan line used to measure the flight diffuser (i.e., S_1 in counts).

C_{13} Pigment concentration derived using CZCS bands 1 and 3.
C_{23} Pigment concentration derived using CZCS bands 2 and 3.
C_a The concentration of chlorophyll *a*.
C_{abc} The concentration of chlorophylls *a*, *b*, and *c*.
C_b The concentration of chlorophyll *b*.
C_c The concentration of chlorophyll *c*.
C_{dark} Instrument dark restore value, in counts.
C_{est} Estimated chlorophyll concentration.
C_{ext} Average total extinction cross-section of a particle.
C_F The calibration factor.
C_{out} Instrument output, in counts.
C_P Phaeopigment concentration.
C_{PP} PPC concentration.
C_{PS} PSC concentration.
$C_r(\lambda)$ Digital response of reference detector.
C_{ref} Reference chlorophyll value (0.5).
C_S Simulated C.
C_{sed} Sediment concentration (SPM).
$C_t(\lambda)$ Digital response of water transmission detector.
C_{temp} Temperature sensor output, in counts, represented by an 8-bit digital word in the SeaStar telemetry.
C_{TP} Total pigment concentration.
$[C+P]$ Pigment concentration defined as mg chlorophyll *a* plus phaeopigments m^{-3}.

– D –

d The distance between source and detector apertures.
$d(I(\lambda))$ An increment in detector current.
d_i Distance from the ith observation point to the point of interest.
d_j Distance from the jth observation point to the point of interest.
ds Detector configuration datum.
$d\lambda$ An increment in wavelength.
D Sequential day of the year.
$\vec{D}$ Orbit position difference vector.
D_{at} Along-track position difference.
D_{ct} Cross-track position difference.
D_{rad} Radial position difference.
DC Digital count (value), or direct current (depending on usage).
DC_{10} Digital counts at 10-bit digitization.
DC_{meas} The digital counts measured unshadowed.
DC_{scat} The digital counts due to scattered sunlight.
DC_{TOA} The digital counts measured at the top of the atmosphere.

– E –

e Orbit eccentricity of the Earth.
$\hat{E}(z,m)$ A smoothed estimate of irradiance obtained by a least-squares regression fit in the center of a depth interval.
$E(\lambda)$ Spectral irradiance.
$E(\lambda,50)$ Spectral irradiance measured at 50 cm from a source.
E_0 Incident downwelling irradiance.
E_0' The downwelling irradiance at the Raman excitation wavelength.
$E_a(\lambda)$ Irradiance in air.
E_{beg} Beginning irradiance value.
E_{cal} Calibration source irradiance.
$E_d(\lambda)$ Incident downwelling irradiance.
$E_d(0,\lambda)$ Surface irradiance.
$E_d(0^-,\lambda)$ Incident spectral irradiance.
$E_d(z,\lambda)$ Downwelling spectral irradiance profile.
$E_d'(z,\lambda)$ Normalized downwelled spectral irradiance.
E_{end} Ending irradiance value.
$E_{\mathrm{meas}}(\lambda)$ Measured radiance.
$E_s(z,\lambda)$ Vertical profile of surface irradiance.
$\vec{E}_s(z_m,\lambda)$ Defined as $\mathbb{H}\vec{\overline{E}}_s(\lambda)$.
$E_s(\lambda)$ Surface irradiance.
$\vec{E}_s(\lambda)$ The measured irradiance vector of length M.
$\overline{E}_{s,i}(\lambda)$ The value of $E_s(z,\lambda)$ at node depth z_i.
$E_{\mathrm{ref}}(\lambda)$ Reference radiance.
E_{rem} Percentage of energy removed from a wavelength band.
$E_{\mathrm{sky}}(\lambda)$ Spectral sky irradiance distribution.
$E_{\mathrm{sun}}(z,\lambda)$ Spectral sun irradiance distribution.
$E_u(z,\lambda)$ Upwelling spectral irradiance profile.
$E_u(0^-,\lambda)$ Upwelling spectral irradiance just beneath the sea surface.
$E_w(z,\lambda)$ Irradiance in water.
$E_{WN}(\lambda)$ Normalized water-leaving irradiance.

– F –

f The fraction of the surface covered by foam, the ratio of sensor-to-instrument diameters, or a factor relating IOPs to irradiance reflectance (depending on usage).
f_i Filter number, i=0–11.
$f(T)$ Offset voltage correction from the linear function characterizing temperature response.
$f(\lambda)$ Instrument spectral response function.
f-ratio The ratio of new to total production.
F Fluorescence.
$\bar{F}$ Arithmetic average.
$\overline{F}(\lambda)$ A mean conversion factor.
$F(\lambda)$ A calibration factor.
$F(\lambda)$ A conversion factor to convert PR714 readings to the GSFC sphere radiance scale.
$F\bar{(}\lambda)$ Average of calibration factors.
F_0 The extraterrestrial irradiance corrected for Earth-sun distance, or initial fluorescence (depending on usage).
$\mathbb{F}_0$ The scalar value of the solar spectral irradiance at the top of the atmosphere, multiplied by a columnar matrix of the four Stokes parameters (1/2, 1/2, 0, 0).
$\overline{F}_0$ Mean solar irradiance.
F_0' Extraterrestrial irradiance corrected for the atmosphere.
$F_0(\lambda)$ Mean extraterrestrial spectral irradiance.
$\overline{F}_0(\lambda)$ Mean extraterrestrial irradiance.
F_1 Pigment biomass loading factor.
F_2 Detritus concentration loading factor.
F_3 Carotenoid concentration (or relative pigment abundance) loading factor.
F_a Forward scattering probability of the aerosol.
F_d The total flux incident on the surface if it did not reflect light.
F_d' The total flux incident on the surface, corrected for surface reflection.
$\mathbb{F}_d'$ The scalar value of the total flux incident on the surface, corrected for surface reflection, multiplied by a columnar matrix of the four Stokes parameters.

F_{GAC} A GAC correction factor.
F_i A correction factor, or an immersion coefficient (depending on usage).
F_m Total sample maximal fluorescence (directly comparable to values measured by standard active fluorometers).
F_{SL} A correction factor for stray light.
$F_v(\lambda)$ Field-of-view coefficient or variable fluorescence, $F_m - F_0$.

– G –

g A constant that consists of the ratios of the air-sea interface effects, the effects of the light field, and the relative spectral variation of Q.
$g(T)$ Coefficient of a linear function characterizing temperature response.
g_1 A constant equal to 0.82.
g_2 A constant equal to −0.55.
g_{ij} Integrals of γ_{ij} (defined in Vol. 26).
gs Gain selection datum.
G Gain factor or the concentration of DOM and DOM-like absorbers (depending on usage).
$G(z,\lambda)$ Solid angle dependence with water depth.
$G(\lambda)$ $\grave{R}_a(\lambda_i)/\grave{R}_a(670) = (670/\lambda)^\gamma \; T_{2r}(670)/T_{2r}(\lambda_i)$.
$G(\mu_0,\lambda)$ The effect of the downwelling light field.
G_1 Gain setting 1.
G_2 Gain setting 2.
G_3 Gain setting 3.
G_4 Gain setting 4.
G_e Gravitational constant of the Earth (398,600.5 $\mathrm{km}^3\ \mathrm{s}^{-2}$).
G_n Gain factor at gain setting n.

– H –

$h(k)$ Residual values without the calculated sinusoidal response.
$h(\lambda)$ Normalized response function.
h_{ij} Analytic integral coefficients over the Hermitian polynomials γ_{ij}.
h_{mj} Matrix elements (defined in Vol. 26).
$\mathbb{H}$ Matrix of coefficients h_{ij}, or $[h_{mj}]$ (depending on usage).
$H(\lambda_i{:}\lambda_j)$ Pigment calculated from the hyperbolic transform of $L_{i:j}$.
H_{GMT} GMT in hours.
H_M The measured moon irradiance.
H_s Altitude of the spacecraft (for SeaStar 705 km).

– I –

i Inclination angle, interval index, or variable infrared bands (depending on usage).
i' Inclination angle minus 90°.
I Rayleigh intensity.
$I(\lambda)$ Detector current.
I_0 Surface downwelling irradiance.
I_1 Radiant intensity after traversing through an absorbing medium.
I_2 Reflected radiant energy received by the satellite sensor.
$I_{\max}$ Recorded maximum instrument output in response to linearly polarized light.
$I_{\min}$ Recorded minimum instrument output in response to linearly polarized light.
ICS Current from the current source diode.

– J –

j Interval index, or variable infrared bands (depending on usage).
$J2$ The $J2$ gravity field term (0.0010863).
$J3$ The $J3$ gravity field term (−0.0000254).
$J4$ The $J4$ gravity field term (−0.0000161).
$J5$ The $J5$ gravity field term.

– K –

k Wavenumber of light ($1/\lambda$), the fractional factor of total particle scattering, the molecular absorption cross-section area, or an index to two vectors of band ratios k_1 and k_2 (depending on usage).
k' $y/\tan\theta_{0w}$.
k_1 Beginning wavenumber, or a band ratio vector (depending on usage).
k_2 Ending wavenumber, or a band ratio vector (depending on usage).
k_c Wavelength independent fraction.
$k_c(\lambda)$ Spectral fit coefficient weighted over the SeaWiFS bands; $k'_c(\lambda)$ also used.
k_s A constant related to a_s and b_s.
$\vec{\overline{K}}$ Vector of $\overline{K}_n$.
$K(\lambda)$ Generic irradiance attenuation coefficient.
$K(z,\lambda)$ Diffuse attenuation coefficient.
$K(440)$ Diffuse attenuation coefficient of seawater measured at 440 nm.
$K(490)$ Diffuse attenuation coefficient of seawater measured at 490 nm.
$K_0(\lambda)$ Diffuse attenuation coefficient at $z = 0$.
K_1 Primary instrument sensitivity factor.
K_2 Gain factor.
K_3 Temperature dependence of detector output.
K_4 Scan modulation correction factor.
K_5 Spacecraft analog-to-digital conversion factor.
K_6 Analog-to-digital offset in spacecraft conversion.
K_7 Current from the diode at 20°C.
$K_c(\lambda)$ Attenuation coefficient for phytoplankton.
K_d Diffuse attenuation coefficient for downwelling irradiance.
$K_d(z,\lambda)$ Vertical profile of the diffuse attenuation coefficient for the downwelling irradiance spectrum.
$K'_d(z,\lambda)$ $K_d(z,\lambda)$ determined by least squares regression over a depth interval.
$K_E(\lambda)$ Attenuation coefficient downwelled irradiance.
$K_g(\lambda)$ Attenuation coefficient for Gelbstoff.
K_i A correction constant at the ith pixel.
$K_L(z,\lambda)$ Vertical profile of the diffuse attenuation coefficient for the upwelling radiance spectrum.
$K'_L(z,\lambda)$ $K_L(z,\lambda)$ determined by least squares regression over a depth interval.
$\overline{K}_n$ K at node depth z_n determined, with its vertical derivative by least-squares fit to radiometric profiles.
$K_s(z,\lambda')$ Apparent attenuation coefficient measured in a homogenous water column.
$K_u(z,\lambda)$ Vertical attenuation coefficient for upwelled irradiance.
$K'_u(z,\lambda)$ $K_u(z,\lambda)$ determined by least squares regression over a depth interval.
$K_w(\lambda)$ Attenuation coefficient for pure seawater.

– L –

l Cuvette pathlength.

l_s Nominal absorption pathlength.

L Radiance of light transmitted through absorbing oxygen.

$L(0,0)$ Spectral radiance measured at the point closest to the center of a sphere.

$L(411.5)$ Spectral radiance at 411.5 nm.

$L(532)$ Spectral radiance at 532 nm.

$L(z,\theta,\phi)$ Submerged upwelled radiance

$L(\lambda)$ Spectral radiance.

$L(\lambda_m)$ The radiance of a calibration sphere at the nominal peak wavelength of a filter. distribution.

$L^{(}\lambda,\theta,\phi)$ Atmospheric path radiance at flight altitude.

L_0 The radiance of the atmosphere.

$L_1(\lambda)$ Apparent radiance response to a linearly polarized source.

$L_2(\lambda)$ Orthogonal apparent radiance response to a linearly polarized source.

L_a Atmospheric path radiance due to aerosols.

L_{atm} Radiance of light reflected from the atmosphere.

$L_c(\lambda)$ Cloud radiance threshold.

L_{cal} Calibration source radiance.

L_{cloud} The maximum radiance from reflected light off of clouds.

$\mathbb{L}_d$ A matrix of the four Stokes parameters for radiance incident on the surface.

$L_g(\lambda)$ Sun glint radiance.

L_i Incident light, or the length of the ith element (depending on usage).

$L_i(\lambda)$ Spectral radiance for run number i, or radiance, where i may represent any of the following: m for measured; LU for look-up table; 0 for light scattered by the atmosphere; sfc for reflection from the sea surface; and w for water-leaving radiance.

$L_{i:j}$ The ratio of normalized water-leaving radiances at wavelengths i (λ_i) to j (λ_j): $L_{WN}(\lambda_i)/L_{WN}(\lambda_j)$.

L_{LU} The radiance calculated for the look-up tables.

L_m The radiance of the ocean-atmosphere system measured at a satellite.

L_M The radiance of the moon.

$L_{\max}$ Maximum saturation radiance.

L_{nadir} Measured radiance at nadir.

$L_{\mathrm{NER}}(\lambda)$ Noise equivalent radiance.

$L_r(\lambda)$ Atmospheric path radiance due to Rayleigh scattering.

$L_{r0}(\lambda)$ Rayleigh radiance at standard atmospheric pressure, P_0.

$L_s(\lambda)$ Subsurface water radiance.

L_{sa} $L_0 + L_{\mathrm{sfc}}$.

$L_{\mathrm{sat}}(\lambda)$ Saturation radiance for the sensor.

L_{scan} Measured radiance at any pixel in a scan.

L_{sfc} The radiance of the light reflected from the sea surface.

$\mathbb{L}_{\mathrm{sfc}}$ The columnar matrix of the four Stokes parameters ($L_{u,1}$, $L_{u,2}$, $L_{u,3}$, $L_{u,4}$).

$L_{\mathrm{sky}}(\lambda)$ Spectral sky radiance distribution.

$L_t(\lambda)$ Total radiance at the top of the atmosphere (where a satellite sensor is located).

L_{toa} Radiance emerging at the top of the atmosphere.

L_{typical} Expected radiance from the ocean measured on orbit.

$L_u(z,\lambda)$ Upwelling spectral radiance profile.

$L_u(0^-,\lambda)$ Upwelling spectral radiance just beneath the sea surface.

$\hat{L}_u(\lambda)$ True upwelled spectral radiance.

$\tilde{L}_u(\lambda)$ Measured upwelled spectral radiance.

$\mathbb{L}_{\mathrm{up}}$ The columnar matrix of light leaving the surface containing the values $L_{\mathrm{up},1}$, $L_{\mathrm{up},2}$, $L_{\mathrm{up},3}$, and $L_{\mathrm{up},4}$.

$L_{\mathrm{up},i}$ The `RADTRAN` radiance parameters (for $i = 1, 4$).

$\mathbb{L}_w$ The scalar value of the water-leaving radiance multiplied by a columnar matrix of the four Stokes parameters.

L_W The water-leaving radiance of light scattered from beneath the surface and penetrating it.

$L_W(443)$ Water-leaving radiance at 443 nm.

$L_W(520)$ Water-leaving radiance at 520 nm.

$L_W(550)$ Water-leaving radiance at 550 nm.

$L_W(670)$ Water-leaving radiance at 670 nm.

L'_{WN} Normalized water-leaving radiance at the Raman excitation wavelength.

$L_{WN}(\lambda)$ Normalized water-leaving radiance.

LS_1 Measured radiance for mirror side 1.

LS_2 Measured radiance for mirror side 2.

– M –

m Index of refraction, or an air mass (depending on usage).

M Path length through the atmosphere, or the total number of discrete data points in a vertical radiometeric profile (depending on usage).

M'_m The corrected mean orbit anomaly of the Earth, which is a function of date, and refers to an imaginary moon in a circular orbit.

M_{oz} Path length for ozone transmittance.

– N –

n The index of refraction, the mean orbital motion in revolutions per day, the gain setting, or the starting index in a measurement for angular measurements, or node index for the integral K analysis (depending on usage).

$n(\lambda)$ An exponent conceptually similar to the Ångström exponent.

$n_g(\lambda)$ Index of refraction of Plexiglas™.

$n_w(\lambda)$ Index of refraction of water.

N The total number of something, or the ending index in a measurement sequence for angular measurements, or total number density (depending on usage).

N_D The compensation factor for a 4 log neutral density filter.

N_i Total number density of either the first or second aerosol model when $i = 1$ or 2, respectively.

– O –

$\vec{O}$ $\vec{P} \times \vec{V}$.

O_{20} OFFI casts 20 m from the ship's stern.

$\mathrm{OD}_b(\lambda)$ Baseline optical density spectrum.

$\mathrm{OD}_g(\lambda)$ Optical density of soluble material (Gelbstoff).

$\mathrm{OD}_p(\lambda)$ Optical density spectra of filtered particles.

$\mathrm{OD}_r(\lambda)$ Optical density reference for filtered or distilled water.

$\mathrm{OD}_t(\lambda)$ Optical density of non-pigmented particulates (tripton).

– P –

p Surface pressure.
p_a A factor to account for the probability of scattering to the spacecraft for three different paths from the sun.
$p_a/(4\pi)$ Aerosol albedo of the scattering phase function.
$p\mathrm{CO}_2$ The partial pressure of CO_2.
p_{dev} Pressure deviation between the minimum and maximum surface pressures compared to 1,013 mb.
p_{ref} Reference pressure.
p_w The probability of seeing sun glitter in the direction θ, Φ given the sun in position θ_0, Φ_0 as a function of wind speed (W).
P Nodal period, phaeopigment concentration, local surface pressure, or the particulate concentration including detrital material (depending on usage).
$\vec{P}$ Orbit position vector.
$P(\theta^+)$ Phase function for forward scattering.
$P(\theta^-)$ Phase function for backward scattering.
$P(\lambda)$ Polarization sensitivity.
P_0 Standard atmospheric pressure (1,013.25 mb).
P_a Probability of scattering to the spacecraft.
P_{edge} A pixel located on the exact edge of a bright source in a GAC scene.
P_i PR714 raw radiance, the fitting coefficient for $i = 1$–5, or the ith pixel under correction (depending on usage).
P_S Simulated $C_a + C_P$ (q.v.).
P_{slit} Designates the number of pixels after the slit for the instrument to return to the residual counts allowed in the specification.
P_W Probability of seeing sun glint in the spacecraft direction.
Pxl Pixel number, i.e., the numerical designation of a pixel in a scan line.
P_{zero} Designates the number of pixels required for the instrument to settle to a level of zero residual counts.
$PB_{\max}$ Maximum biomass-specific photosynthetic rate.
PF Polarization factor.
P_Δ The location of the pixel to be corrected in GAC pixels relative to the (bright target) edge pixel.
P_σ Phaeopigment concentration.

– Q –

q Water transmittance factor.
Q The ratio of upwelling irradiance to radiance, which varies with the angular distribution of the upwelling light field, and is π for an isotropic distribution.
$Q(\lambda)$ $L_u(0^-,\lambda)$ to $E_u(0^-,\lambda)$ relation factor (equal to π for a Lambertian surface).

– R –

r Water-air reflectance for totally diffuse irradiance, the radius coordinate, the Earth-sun distance, or the lamp-to-plaque distance in centimeters (depending on usage).
r_1 The radius of circle one, or source aperture (depending on usage).
r_2 The radius of circle two, or detector aperture (depending on usage).
r_i The geometric mean radii of either the first or second aerosol model when $i = 1$ or 2, respectively.
R Reflectance, or the linear correlation coefficient (depending on usage).
$\mathbb{R}$ The reflection matrix.
$\overline{R}$ Mean Earth-sun distance.
R^2 The square of the linear correlation coefficient.
$R(0^-,\lambda)$ Irradiance reflectance just below the sea surface.
$R(\lambda)$ The irradiance reflectance at a particular wavelength.
R_1 A multiplier for mirror side 1.
R_2 A multiplier for mirror side 2.
R_a Aerosol reflectance.
$\grave{R}_a$ $R_a/(qT_{2r})$.
R_B Bidirectional reflectance distribution function.
R_e Mean Earth radius (6,378.137 km).
R_E Effective resistance for the thermistor-resistor pair.
R_i Radiance of the ith pixel.
R'_L Reflectance from an uncalibrated radiometer.
$R_L(z,\lambda)$ Spectral reflectance.
R_{lim} Limiting reflectance for defining Case-1 water.
R_r Rayleigh reflectance.
R_{rs} Remote sensing reflectance.
$R_{rs}(z,\lambda)$ Spectral remote sensing reflectance profile.
R_s Subsurface reflectance.
R_t Total reflectance at the sensor.
$\grave{R}_t$ $(R_t - R_r)/(qT_{2r})$.
R_T Resistance of the thermistor.
R_z Sunspot number.

– S –

s The reflectance of the atmosphere for isotropic radiance incident at its base.
$s(\lambda)$ The slope for the range 0–1,023.
s_{xy} Residual standard deviation.
S The solar constant, or the slope of a line (depending on usage).
$S(\lambda)$ The solar spectral irradiance, or $L_a(\lambda)/L_a(670)$ (depending on usage).
$S(\lambda_r)$ A coefficient of water temperature variation in $a_w(\lambda, T)$.
$S_G(\lambda)$ Radiometer signal (uncalibrated) measured viewing a reflectance plaque.
S_i Initial detector signal.
S_n Detector signal with gain.
S_{sky} Radiometer signal (uncalibrated) measured viewing the sky.
$S_W(\lambda)$ Radiometer signal (uncalibrated) measured viewing the water.

– T –

t Time variable, or the transmission of L_{sfc} through the atmosphere (depending on usage).
t' The transmission of L_W through the atmosphere.
$t(k)$ Spectral transmission as a function of wavenumber.
$t(\lambda)$ Diffuse transmittance of the atmosphere.
$t(750,\theta)$ Diffuse transmittance between the ocean surface and the sensor at 750 nm.
t_0 Initial time, or the sum of the direct and diffuse transmission of sunlight through the atmosphere (depending on usage).
t_1 First observation time.
t_2 Second observation time.
t_a Aerosol transmittance after absorption.
t_{as} Aerosol transmittance after scattering.

t_d Direct component of transmittance after absorption by the gaseous components of the atmosphere, scattering and absorption by aerosols, and scattering by Rayleigh.
$t_d(z,\lambda)$ Downward spectral irradiance transmittance from flight altitude z to the surface.
t_e Time difference in hours between present position and most recent equator crossing.
t_{EC} Equator crossing time.
t_{oz} Transmittance after absorption by ozone.
t_r Transmittance after Rayleigh scattering.
t_s Diffuse component of transmittance after absorption by the gaseous components of the atmosphere, scattering and absorption by aerosols, and scattering by Rayleigh.
t_{wv} Transmittance after absorption by water vapor.
T Tilt position.
T' Instrument temperature during calibration.
$T(\lambda)$ The transmittance along the slant path to the sun.
$T(\lambda,\theta)$ Total transmittance (direct plus diffuse) from the ocean through the atmosphere to the spacecraft along the path determined by the spacecraft zenith angle θ.
$T(\lambda,\theta,\theta_0)$ Two-way transmission through oxygen in the model layer in terms of zenith angle (θ), and solar angle (θ_0).
$T_0(\lambda,\theta_0)$ Total downward transmittance of irradiance.
T_{2r} Two-way diffuse transmittance for Rayleigh attenuation.
T_e Equation of time.
$T_g(\lambda)$ Transmittance through a glass window.
T_{ox} Transmittance of oxygen (O_2).
T_{oz} Transmittance of ozone (O_3).
$T_s(\lambda)$ Transmittance through the surface.
$T_w(\lambda)$ Transmittance through a water path.
T_{wv} Transmittance of water vapor (H_2O).

– U, V –

V Volume of water filtered.
$\vec{V}$ Orbit velocity vector.
$\hat{V}$ True voltage.
$\tilde{V}$ Measured voltage.
$V(z)$ Transmissometer voltage.
$V(\theta)$ Normalized measured value for a cosine collector.
$\overline{V}(\theta_i)$ Mean normalized measured value of instrument response.
V_{air} Factory transmissometer air calibration voltage.
V'_{air} Current transmissometer air calibration voltage.
V_{dark} Transmissometer dark response.
$V_i(t_j)$ The ith spatial location at observation time t_j.
V_M The radiance detector voltage while viewing the moon.
V_S The irradiance detector voltage while viewing the sun.
V_T Focal plane temperature sensor voltage output.

– W –

w_m The weighting coefficient at each depth z_m.
W Wind speed, or equivalent bandwidth (depending on usage).
W_d Direct irradiance divided by the total irradiance at the surface.
W_s Diffuse irradiance divided by the total irradiance.
W_θ Weighting function.

– X –

x The abscissa or longitudinal coordinate, or the pixel number within a scan line (depending on usage).
X ECEF x component of orbit position, or depth in meters (depending on usage).
$\dot{X}$ ECEF X component of orbit velocity.

– Y –

y The ordinate, meridional coordinate, or an empirical factor (depending on usage).
Y ECEF y component of orbit position; or the base 10 logarithm of the radiometric measurement E_d, E_u, or L_u (depending on usage).
$\dot{Y}$ ECEF Y component of orbit velocity.

– Z –

z The vertical coordinate (frequently water depth).
z' Corrected depth for pressure transducer depth offset relative to a sensor.
z_i The depth of a particular node.
z_m Centered depth, or the depth of the mth data point in a vertical radiometric profile (depending on usage).
z_n The node depth number ($n = 0,\ldots,N-1$).
z_r Shallow depth.
z_s Exclusion depth due to data contamination.
Z ECEF z component of orbit position.
$\dot{Z}$ ECEF Z component of orbit velocity.

– Greek –

α Percent albedo, tilt angle, formulation coefficient (intercept), the power constant in the Ångström formulation, the exponential value in the expression relating the extinction coefficient to wavelength, or the off-axis angle (depending on usage).
α' A power law constant.
α_0 A curve fitting constant.
α_1 A curve fitting constant.
α_2 A curve fitting constant.
α_{750} Albedo at 750 nm.

β A formulation coefficent (slope) or a constant in the Ångström formulation (depending on usage).
$\beta(z,\lambda,\theta)$ Spectral volume scattering function.
$\tilde{\beta}(\theta)$ The normalized scattering phase function ($\beta(\theta)/b$).
$\overline{\beta}_b$ The measured integral of the volume scattering function in the backward direction.
β_i The extinction coefficient of either the first or second aerosol model when $i = 1$ or 2, respectively; or the filter absorption correction factor for scattering within the filter.

γ The Ångström exponent.
$\gamma(\lambda)$ The ratio of the aerosol optical thickness at wavelength λ to the aerosol optical thickness at 670 nm.
$\gamma_{ij}(\xi)$ Hermitian cubic polynomial.

δ The great circle distance from $\Psi_s(t_0)$ to $\Psi_s(t-t_0)$, the departure of each individual conversion factor from the mean, a relative difference, the absorption coefficient, or the cosine response asymmetry (depending on usage).

Δk Equivalent bandwidth.
ΔL The difference between L and L_0.
$\Delta L_W(670)$ The error in the water-leaving radiance for the red channel.
Δp The difference in atmospheric pressure.
$\Delta p\mathrm{CO}_2$ The difference in the partial pressure of CO_2 in the air and in the sea.
ΔP The difference in successive pixels, or the pressure deviation from standard pressure, P_0 (depending on usage).
Δt Time difference.
$\Delta T(\lambda)$ The error in transmittance.
Δz Half-interval depth increment.
$\Delta\theta$ Angular increment.
$\Delta\theta_s$ The error (in radians) in the knowledge of θ_s.
$\Delta\lambda$ An interval in wavelength.
$\Delta\rho_w(\lambda)$ The error in the water-leaving reflectance for the red channel.
$\Delta\sigma(\lambda)$ The absolute error in spectral optical depth.
$\Delta\tau_a$ The error in the aerosol optical thickness.
$\Delta\Phi_{\max}$ The ratio F_v/F_m which corresponds to the (normalized) maximum number of reaction centers in the chlorophyll population which are capable of photosynthesis.
$\Delta\omega$ The longitude difference from the sub-satellite point to the pixel.
$\Delta\omega_s$ Longitude difference.

ϵ Cosine collector response error or an atmospheric correction parameter (depending on usage).
$\epsilon(i,j)$ The ratio of L_a in two bands i and j.
ϵ_{sky} Self-shading error for E_{sky}.
ϵ_{sun} Self-shading error for E_{sun}.
$\varepsilon(\lambda)$ $1 - e^{-k'a(\lambda)r}$.

η The bearing from the sub-satellite point to the pixel along the direction of motion of the satellite.

θ The spacecraft zenith angle, spacecraft pitch, the polar angle of the line-of-sight at a spacecraft, the centroid angle of the scattering measurement, or a generalized angle (depending on usage).
$\dot{\theta}$ Pitch rate.
θ_0 Polar angle of the direct sunlight, or solar zenith angle (depending on usage).
θ_{0w} Refracted solar zenith angle.
θ_1 The intersection angle of circle one or the lower integration limit (depending on usage).
θ_2 The intersection angle of circle two or the upper integration limit (depending on usage).
θ_a In-air measurement angle.
θ_i Any nominal angle.
θ_n The zenith angle of the vector normal to the surface vector for which glint will be observed or an angular origin (depending on usage).
θ_N The angle with respect to nadir that the sea surface slopes to produce a reflection angle to the spacecraft or an angular terminus (depending on usage).
θ_s Scan angle of sensor or the solar zenith angle (depending on usage).
θ_s' Scan angle of sensor adjusted for tilt.
θ_t Tilt angle.
θ_w In-water measurement angle.

κ An integration constant: $\kappa = A_d\pi r_1^2(r_1^2+r_2^2+d^2)^{-1}$.
κ' Self-shading coefficients.

λ Wavelength of light.
λ' A channel of nominal wavelength, or the Raman excitation wavelength (depending on usage).
λ_0 Center wavelength.
λ_1 Starting wavelength.
λ_2 Ending wavelength.
λ_i A wavelength of light at a particular band.
λ_j A wavelength of light at a particular band.
λ_m Nominal center wavelength.
λ_n Any nominal wavelength.
λ_r Near-IR wavelength.

μ Mean value, or cosine of the satellite zenith angle (depending on usage).
μ_0 Cosine of the solar zenith angle.
$\overline{\mu}_d(z,\lambda)$ Spectral mean cosine for downwelling radiance at depth z.
$\overline{\mu}_d(0^+,\lambda)$ Spectral mean cosine for downwelling radiance at the sea surface.
μ_s The reciprocal of the effective optical length to the top of the atmosphere, along the line of sight to the sun.

ν_j The jth temporal weighting factor.

ξ A local depth coordinate ranging from -1 at node z_{i-1} to $+1$ at node z_i, or actual deployment distance (depending on usage).
$\xi(\lambda)$ Minimum ship-shadow avoidance distance.
ξ_d The calculated deployment distance for downwelling irradiance measurements.
ξ_{EM} The distance between the Earth and the moon.
ξ_L The calculated deployment distance for upwelling radiance measurements.
ξ_u The calculated deployment distance for upwelling irradiance measurements.

ρ The Fresnel reflectivity, the weighted direct plus diffuse reflectance, or the average reflectance of the sea (depending on usage).
$\tilde{\rho}$ The Fresnel reflectance for sun and sky irradiance.
$\rho(\theta)$ Fresnel reflectance for viewing geometry.
$\rho(\theta_0)$ Fresnel reflectance for solar geometry.
$\rho(\lambda)$ The bidirectional reflectance.
$\rho_{c,i}$ Reflectance of clouds and ice.
$\rho_g(\lambda)$ Gray card or plaque reflectance.
ρ_i The reflectance of the sea of either the first or second aerosol model when $i = 1$ or 2, respectively.
$\rho_i(\lambda)$ The reflectance where i may represent any of the following: m for measured; LU for look-up table; o for light scattered by the atmosphere; sfc for reflection from the sea surface; or w for water-leaving radiance.
ρ_n Sea surface reflectance for direct irradiance at normal incidence for a flat sea.
ρ_N Reflectance for diffuse irradiance.

σ One standard deviation of a set of data values.
σ^2 The mean square surface slope distribution.
$\sigma(\lambda)$ The spectral optical depth.
σ_i^2 $\sigma_i^2 = \langle(\log r - \log r_i)^2\rangle$.
σ_t The density of sea water determined from the *in situ* salinity and temperature, but at atmospheric pressure.
σ_θ The density of sea water determined from the *in situ* salinity and the potential temperature (θ), but at atmospheric pressure.

$\vec{\tau}$ Vector of measured optical depths.
$\tau(z,\lambda)$ Vertical profile of the spectral optical depth.
$\hat{\tau}(z,\lambda)$ The estimated vertical profile of the spectral optical depth.
τ_a Aerosol optical thickness.
$\tau_g(\lambda)$ Uniform mixed gas optical thickness.
$\tau_o(\lambda)$ Ozone optical thickness.
τ_{ox} Oxygen optical thickness at 750 nm.
$\tau_{\mathrm{ox}}(\lambda)$ Optical thickness due to oxygen absorption.
τ_{oz} The optical thickness of ozone.
τ_r Rayleigh optical thickness (due to scattering by the standard molecular atmosphere).
τ_r' Pressure corrected Rayleigh optical thickness.
$\tau_R(\lambda)$ Rayleigh optical thickness.
τ_{r0} Rayleigh optical thickness at standard atmospheric pressure, P_0.
τ_{ro} Rayleigh optical thickness weighted by the SeaWiFS spectral response.
$\tau_s(\lambda)$ Spectral solar atmospheric transmission.
τ_{wv} The absorption optical thickness of water vapor.
$\tau_w v(\lambda)$ Water vapor optical thickness.

ϕ Azimuth angle of the line-of-sight at a spacecraft.
ϕ_0 Azimuth angle of the direct sunlight.
Φ Spacecraft azimuth angle or roll (depending on usage).
$\dot{\Phi}$ Roll rate.
Φ_0 Solar azimuth angle.
Φ_D The detector solid angle.
Φ_M The solid angle subtended by the moon at the measuring instrument.

χ Proportionality constant.

Ψ Pixel latitude or yaw (depending on usage).
$\dot{\Psi}$ Yaw rate.
Ψ_d Solar declination latitude.
$\Psi_s(t)$ Subsatellite latitude as a function of time.

ω Longitude variable, the surface reflection angle, or the single scattering albedo (depending on usage).
ω_0 Old longitude value.
ω_a Single scattering albedo of the aerosol.
ω_e Equator crossing longitude.
ω_i Spatial weighting factor.
ω_s Longitude variable.
Ω Solar hour angle, or the amount of ozone in Dobson units (depending on usage).

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13. ABSTRACT *(Maximum 200 words)*

The Sea-viewing Wide Field-of-view Sensor (SeaWiFS) is the follow-on ocean color instrument to the Coastal Zone Color Scanner (CZCS), which ceased operations in 1986, after an eight-year mission. SeaWiFS is expected to be launched in 1997, on the SeaStar satellite, being built by Orbital Sciences Corporation (OSC). The SeaWiFS Project at the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center (GSFC), has undertaken the responsibility of documenting all aspects of this mission, which is critical to the ocean color and marine science communities. This documentation, entitled the *SeaWiFS Technical Report Series*, is in the form of NASA Technical Memorandum Number 104566. All reports published are volumes within the series. This particular volume serves as a reference, or guidebook, to the previous 35 volumes and consists of 6 sections including: an addenda, an errata, an index to key words and phrases, lists of acronyms and symbols used, and a list of all references cited. The editors publish a cumulative index of this type after every five volumes. Each index covers the reference topics published in all previous editions, that is, each new index includes all of the information contained in the preceeding indices with the exception of any addenda.

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