NASA Technical Memorandum 104566, Vol. 24

SeaWiFS Technical Report Series

Stanford B. Hooker and
Elaine R. Firestone, Editors

Volume 24, SeaWiFS Technical Report Series
Cumulative Index: Volumes 1–23

Elaine R. Firestone and Stanford B. Hooker

June 1995

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Stanford B. Hooker, Editor
NASA Goddard Space Flight Center
Greenbelt, Maryland

Elaine R. Firestone, Technical Editor
General Sciences Corporation
Laurel, Maryland

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Elaine R. Firestone
General Sciences Corporation
Laurel, Maryland

Stanford B. Hooker
NASA Goddard Space Flight Center
Greenbelt, Maryland

National Aeronautics and
Space Administration

Goddard Space Flight Center
Greenbelt, Maryland 20771

1995

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 1995, on the SeaStar satellite, being built by Orbital Sciences Corporation (OSC). The SeaWiFS Project at the National Aeronautics and Space Administration's (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 23 volumes and consists of 6 sections including: an errata, an addendum (summaries of various SeaWiFS Working Group Bio-optical Algorithm and Protocols Subgroups Workshops, and other auxiliary information), an index to key words and phrases, a list of all references cited, and lists of acronyms and symbols used. It is the editors' intention to publish a cumulative index of this type after every five volumes in the series. Each index covers the topics published in all previous editions, that is, each new index will include all of the information contained in the preceeding indices.

1. INTRODUCTION

This is the fourth in a series of indices, published as a separate volume in the Sea-viewing Wide Field-of-view (SeaWiFS) Technical Report Series, and covers information found in the first 23 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 are as follows:

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

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

Vol. 3: C.R. McClain, 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: C.R. McClain, E. Yeh, and G. Fu, *An Analysis of GAC Sampling Algorithms: A Case Study.*

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

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

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

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

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

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

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

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

Vol. 13: C.R. McClain, 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: J.L. Mueller, *The First SeaWiFS Intercalibration Round-Robin Experiment, SIRREX-1, July 1992.*

Vol. 15: W.W. Gregg, 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.*

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 and 18, errata and addenda sections have been added to address issues and needed corrections that have come to the editors' attention since the volumes were first published.

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 pages 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, as in Volumes 13 and 19 (to name a few). In this instance, both the volume number and chapter number appear without a page field:

keyword, *Vol. # 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.

2. ERRATA

1. In Volume 23, Table 19, the headers entitled *Radiance* and *Counts* should be switched.

3. ADDENDA

This section presents a summary of the Fifth SeaWIFS Bio-optical Algorithm and Optical Protocols Workshop (BAOPW-5) held on 21 February 1995 at the Rosenstiel School of Marine and Atmospheric Sciences in Miami, Florida; submitted by C. McClain.

The primary workshop objectives were to:

1) finalize the initial operational SeaWiFS pigment, $K(490)$, and chlorophyll a algorithms;
2) review the field programs and bio-optical data sets; and
3) discuss proposed changes in standard data products.

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

Table 1. Team members and invited guests to the BAOPW-5, held 21 February, 1995 at the Rosenstiel School of Marine and Atmospheric Sciences (RSMAS) in Miami, Florida. 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		O. Kopelevich	
(G. Moore)	✓	M. Lewis	✓
W. Balch	✓	C. McClain	✓
K. Carder	✓	G. Mitchell	✓
D. Clark	✓	A. Morel	
G. Cota	✓	J. Mueller	✓
C. Davis	✓	F. Muller-Karger	✓
R. Doerffer	✓		
W. Esaias	✓	D. Siegel	✓
H. Gordon	✓	R. Smith	
F. Hoge	✓	C. Trees	✓
S. Hooker	✓	C. Yentsch	
D. Kamykowski		J. Yoder	✓
M. Kishino	✓	R. Zaneveld	✓
Other Attendees			
R. Arnone		S. Gallegos	
J. Campbell		S. Hawes	
R. Evans		N. Maynard	
R. Frouin		J. Morrow	
H. Fukushima			

3.1 BAOPW-5

1. *Introduction* (C. McClain):
   A. Workshop Objectives and Agenda
   B. Review of Action Items from the November Workshop
   C. SeaStar/SeaWiFS Update
2. *Data Set Development for Algorithm Evaluation* (J. Campbell): At the last bio-optical algorithm workshop in November, it was agreed that investigators would submit data for the verification of certain components of the operational chlorophyll algorithm, as well as evaluate the final chlorophyll retrievals. Campbell agreed to be the point of contact for the data submissions and will provide a status report. She gave a brief summary of what she personally has received [others have sent data directly to the SeaWiFS Bio-Optical Archive and Storage System (SeaBASS)]. She received data from A. Bricaud, C. Yentsch, and M. Kishino. She will provide these data to the SeaWiFS Project after some editing and reformatting. Also, permission is being sought to release Bricaud's data to the SeaBASS archive.
3. *Operational Chlorophyll a Algorithm* (K. Carder): Only minor modifications have been made to the algorithm since the November 1994 meeting. Preliminary analyses of Arabian Sea data and results from airborne oceanographic lidar (AOL) data obtained from the Mid-Atlantic Bight compare well with the algorithm. Initial analyses of California Cooperative Fisheries Institute (CalCoFI) data, by G. Mitchell, indicate that the algorithm underestimates chlorophyll by a factor of 2–5. Mitchell's analysis, however, was based on the ratios of subsurface upwelling radiance to subsurface downwelling irradiance and not remote sensing reflectances. D. Siegel made a recommendation that should improve the chlorophyll retrieval at low concentrations and will provide the details to Carder later.
4. *CZCS Pigment Algorithm* (G. Moore): At the November workshop, G. Moore presented a draft document for the bio-optics group to review and made a recommendation on a radiance ratio algorithm. The group suggested that the algorithm should include a band ratio in the green. Moore has incorporated this suggestion and others and has submitted a revised version of the document to the SeaWiFS Project for publication in the *SeaWiFS Technical Report Series*.
5. *$K(490)$ Algorithm* (J. Mueller): The results of Mueller's analysis of the effect of the 5 nm shift in the 555 nm SeaWiFS band from the 550 nm CZCS band indicates the effect is small and that no change in the prelaunch algorithm [the Austin-Petzold CZCS $K(490)$ algorithm] is required. The analysis was based on 44 optical profiles provided by C. Trees, D. Siegel, and G. Mitchell.
6. *Final Results from the First Data Analysis Round-Robin (DARR-1)* (D. Siegel): Siegel reviewed the results of the first data analysis round-robin, which had not changed since the November meeting. For Case-1 water, all the methods worked equally well below 600 nm, but diverged in the near-infrared. Turbid water cases were not considered. The summary document has also been submitted to the SeaWiFS Project for publication in the series.
7. *Second Data Analysis Round-Robin (DARR-2) Planning* (D. Siegel): Two topics of interest were discussed, turbid water and the extrapolation of values to the surface from observations at discrete levels only as is the case for moorings and drifters. C. Davis volunteered to hold a workshop to discuss measurement protocols for Case-2 waters, but thought it was premature to hold a data analysis round-robin. D. Clark volunteered to host DARR-2 to evaluate the analysis issue associated with moorings and drifters. The dates for these events will not be scheduled until the SeaWiFS launch schedule is clarified in April.
8. *18-Month Time Series of MER-2040/2041 Calibration* (G. Mitchell): The time series of the Scripps Photobiology Group's MER-2040/2041 instrument calibration for 18 months was presented. During this time, radiometric calibrations at Biospherical Instruments, Inc. (BSI) and the San Diego State University (SDSU) Center for Hydro-Optics and Remote Sensing (CHORS) have been completed with both integrating spheres and reflectance plaques at each facility (total of three separate spheres and three separate plaques). Immersion coefficients have been determined as well. The CHORS and BSI calibrations are in good agreement for most wavelengths. The calibrations are particularly consistent over the past three calibrations, the UV bands being a notable exception. These results are tangible evidence that the calibration round-robins are helping to improve the reliability, consistency, and traceability of the ocean color community's instrument calibrations.
9. *Protocol for Determining Algorithm Accuracy* (J. Campbell): In reporting the accuracy of a model or algorithm, it is important to distinguish between systematic errors and random errors. A statement such as "This algorithm is accurate to within 30%," is very ambiguous. It says nothing about whether errors are random or systematic, and whether the range is $1\,\sigma$ or $3\,\sigma$. A protocol is presented here for determining the accuracy of an algorithm, and for testing and reporting both systematic and random errors. Campbell distributed a document describing the protocol and analysis based on the CZCS NET algorithm data set.
10. *Band-to-Band Correlation Analysis* (J. Mueller): The issue of instrumental band center wavelength differences was discussed at the May 1994 workshop (Firestone and Hooker 1995) and remains unresolved. Mueller has performed further empirical orthogonal function

(EOF) analyses on the NET data from D. Clark. The analysis showed that in order to obtain a meaningful result, the radiances had to be extrapolated to a common depth, e.g., the surface. For the irradiance fields, the variance was contained in the first few EOFs, but for upwelling radiance, a large number were required. His conclusion was that the data was too noisy for this analysis and that more recent data from higher quality spectrometers should be used. Such data exists from a number of sources and he will pursue this work further.

11. *Field Program Reports:* The intent of these reports is not to present results, but activities. Updates should review recent and future cruise plans, numbers of stations, data collected, status of analysis and data delivery to the SeaWiFS Project, etc. Each presentation should be no longer than 15 minutes.

    A. Bermuda Bio-Optical Time Series (D. Siegel): The bio-optical data collection will continue until at least December 1995. After that time, Siegel is unclear how the time-series will be supported. It appears unlikely, at this time, that the National Science Foundation (NSF) will support the program in fiscal year (FY) 1996 and he is not optimistic about NSF support in FY97.

    B. CalCoFI Bio-Optical Data Set (G. Mitchell): Mitchell has cruises planned in April, July, and October 1995. During each cruise, about 70 bio-optical stations will be taken.

    C. Navy Field Program Update (C. Davis): The Navy, NASA, and NSF will support a total of eight cruises with optics in the Arabian Sea. During the last cruise, much of the time was spent towing an instrument array. Nonetheless, 20 bio-optical stations were collected. Their bio-optical measurement suite included radiometer profiles, remote sensing reflectance measurements, and Q measurements.

    D. United Kingdom Field Program Update (G. Moore): The British have a fair number of cruises scheduled for 1995 and 1996. Of particular interest is the Antarctic Survey's transects of the Atlantic during May and September of each year. These cruises have many berths available and will stop daily for bio-optical casts (2 hours maximum station time). The Falkland Islands would be the point of departure for the September leg and the point of embarkation for the May leg.

    E. Japanese Field Program Update (M. Kishino): The Japanese have an impressive manifest of bio-optical cruises scheduled in the Pacific (from the Bering Sea to Antarctica) during 1995 and 1996. (The manifest is too long to recite here.) The Yamato Bank Optical Mooring (YBOM) will be deployed during April–July 1996 [Ocean Color Temperature Sensor (OCTS) check-out] and again in September 1996 after refurbishment. YBOM will be in a year-long cycle whereby it will be in the water for nine months, and then out of the water for three months, for refurbishment.

    F. German Field Program Update (R. Doerffer): The Germans will be in the Arabian Sea during July and will collect in-water bio-optical and remote sensing reflectance data. Doerffer described the Picasso Program proposal to put four optical platforms in place. Picasso participants include the Joint Research Center (JRC) and the British. The platform sites are the northern Adriatic, Baltic, and North Seas.

12. *Proposed Scheme for Variable Quality Level-3 Products* (R. Evans): Evans described his proposal for incorporating variable quality data into the level-3 products. The scheme allows for level-2 data, which is deemed less accurate or reliable, to be binned when no higher quality data is available for a particular binning cell. The scheme can be applied in either space or time binning. Before the scheme can be accepted, the Science Working Group (SWG) must approve it. The bio-optics group voice general support for the concept. A more detailed description will be circulated to the SWG for comment.

13. *Proposed Revisions in the Level-3 Products* (C. McClain): The present set of quality masks and flags used as exclusion criteria in the level-3 binning process are defined so as to yield high quality pigment and $K(490)$ level-3 products; all other parameters binned in the level-3 product are subject to the same criteria. At the present time, there is only one level-3 product containing several binned quantities. As a result, the level-3 product eliminates useful information on some quantities of interest, e.g., coccolithophore blooms and high aerosol radiances. Defining additional level-3 products, using exclusion criteria appropriate to each product while eliminating parameters of limited utility from the present level-3 product, would extend the applications for SeaWiFS, but not substantially increase the number of data granules or volumes submitted to the Goddard Space Flight Center (GSFC) Distributed Active Archive Center (DAAC). Examples of this might be a pigment product, a coccolithophore product, or an aerosol product. The bio-optics group endorsed the idea of smaller, but more numerous level-3 products and McClain will circulate a strawman to the SWG for comment.

3.1.1 Action Items

The following are the action items, and people responsible for them, that arose from the meeting.

1. J. Campbell will submit the Bricaud and Morel absorption data and the Yentsch pigment data to the SeaWiFS Project for inclusion in the SeaBASS database.
2. K. Carder will submit the data set he is using for the chlorophyll algorithm.
3. D. Clark will organize and host DARR-2.
4. C. Davis will organize and host a workshop on turbid Case-2 data collection and analysis.
5. D. Siegel will work with K. Carder on a modification to the chlorophyll *a* algorithm to improve estimates at low values.
6. J. Mueller will pursue higher quality spectral data for the EOF analysis. Possible sources of this are D. Clark and C. Davis.
7. C. McClain and R. Evans will draft strawmen proposals for revisions in the level-3 products. These will be circulated together for comment by the SWG.

Cumulative Index

Unless indicated otherwise, the index entries that follow 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.

– A –

– B –

– N –

– O –

– P –

– T, U –

– V –

– W, X, Y –

– Z –

Glossary

– A –

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
ADEOS Advanced Earth Observation Satellite (Japan)
AE Ångström Exponent
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
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
ARGOS Not an acronym, but the name given to the data collection and location system on the NOAA Operational Satellites.
ARI Accelerated Research Initiative
ASCII American Standard Code for Information Interchange
ASI Italian Space Agency
ASR Absolute Spectral Response
AT Along-Track
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
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
BMFT Minister for Research and Technology (Germany)
BOFS British Ocean Flux Study
BOMS Bio-Optical Moored Systems
bpi bits per inch
BRDF Bidirectional Reflectance Distribution Function
BSI Biospherical Instruments, Incorporated
BSIXR BSI's Transfer Radiometer
BTR Bright Target Recovery
BUV Backscatter Ultraviolet Spectrometer
BWI Baltimore-Washington International (airport)

– C –

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.
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
CHORS Center for Hydro-Optics and Remote Sensing (San Diego State University)
CICESE *Centro de Investigación Científica y de Educación Superior de Ensenada* (Mexico)
CIRES Cooperative Institute for Research in Environmental Sciences
COADS Comprehensive Ocean-Atmosphere Data Set
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.
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
CVT Calibration and Validation Team
CW Continuous Wave
CWR Clear Water Radiance
CZCS Coastal Zone Color Scanner

– D –

DAAC Distributed Active Archive Center
DAO Data Assimilation Office
DARR-1 First Data Analysis Round-Robin
DARR-2 Second Data Analysis Round-Robin
DAT Digital Audio Tape
DC Direct Current
DCF Data Capture Facility
DCOM Dissolved Colored Organic Material
DCP Data Collection Platform

DEC Digital Equipment Corporation
DMS dimethyl sulfide
DOC Dissolved Organic Carbon
DoD Department of Defense
DOM Dissolved Organic Matter
DOS Disk Operating System
DSP Not an acronym, but an image display and analysis package developed at RSMAS University of Miami.
DU Dobson Units
DXW Not an acronym, but a lamp designator.

– E –

E-mail Electronic Mail
EAFB Edwards Air Force Base
ECEF Earth-Centered Earth-Fixed
ECMWF European Centre for Medium Range Weather Forecasts
ECT Equator Crossing Time
EDT Eastern Daylight Time
EEZ Exclusive Economic Zone
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
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)
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
GF/F Not an acronym; a specific type of glass fiber filter manufactured by Whatman
GIN Greenland, Iceland, and Norwegian Seas
GISS Goddard Institute for Space Studies
GLI Global Imager
GLOBEC Global Ocean Ecosystems dynamics
GMT Greenwich Mean Time
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 –

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; a linear sheet polarizer used to check the polarization sensitivity of 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; a linear sheet polarizer used to check the polarization sensitivity of 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
ICD Interface Control Document
ICES International Council on Exploration of the Seas
IDL Interactive Data Language
IFOV Instantaneous Field-of-View
IMS Information Management System
IOP Inherent Optical Property
IP Internet Protocol
IPD Image Processing Division
IR Infrared
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
JGOFS Joint Global Ocean Flux Study
JHU Johns Hopkins University
JOI Joint Oceanographic Institute
JPL Jet Propulsion Laboratory
JRC Joint Research Center

– K, L –

L&N Leeds & Northrup
LAC Local Area Coverage, fine resolution satellite data with a nominal ground resolution at nadir of approximately 1 km.
LANDSAT Land Resources Satellite
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.
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
LPCM *Laboratoire de Physique et Chimie Marines* (France)
LRER Long-Range Ecological Research
LSB Least Significant Bits
LSF Line Spread Function

– M –

MAREX Marine Resources Experiment Program
MARS Multispectral Airborne Radiometer System
MASSS Multi-Agency Ship-Scheduling for SeaWiFS
MBARI Monterey Bay Aquarium Research Institute
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
MSB Most Significant Bits
MS/DOS MicroSoft/Disk Operating System
MTF Modulation Transfer Function

– 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
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
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.
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
OCS Ocean Color Scanner
OCTS Ocean Color Temperature Sensor (Japan)

ODAS Ocean Data Acquisition System
ODEX Optical Dynamics Experiment
ODU Old Dominion University
OFFI Optical Free-Fall Instrument
OI Original Irradiance
OLIPAC Oligotrophy in the Pacific (Ocean)
OMEX Ocean Marine Exchange
ONR Office of Naval Research
OPT Ozone Processing Team
OS Operating System
OSC Orbital Sciences Corporation
OSFI Optical Surface Floating Instrument
OSSA Office of Space Science and Applications
OSU Oregon State University

– P –

PAR Photosynthetically Available Radiation
PC (IBM) Personal Computer
PDR Preliminary Design Review
PDT Pacific Daylight Time
PFF Programmable Frame Formatter
PI Principal Investigator
PIKE Phased Illuminated Knife Edge
PM-1 Not an acronym, used to designate the afternoon.
PMEL Pacific Marine Environmental Laboratory
PML Plymouth Marine Laboratory
POC Particulate Organic Carbon
POLDER Polarization Detecting Environmental Radiometer (France) or Polarization and Directionality of the Earth's Reflectances (depending on usage).
PON Particulate Organic Nitrogen
PR Photo Research
PRIME Plankton Reactivity in the Marine Environment
PST Pacific Standard Time
PSU Practical Salinity Units
PTFE Polytetrafluoroethylene
PUR Photosynthetically Usable Radiation

– Q –

QC Quality Control
QED Quantum Efficient Device

– R –

R&A Research and Applications
R&D Research and Development
R/V Research Vessel
RACER Research on Antarctic Coastal Ecosystem Rates
RDBMS Relational Database Management System
RDF Radio Direction Finder
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)
RR Round-Robin
RSMAS Rosenstiel School for Marine and Atmospheric Sciences (University of Miami)
RSS Remote Sensing Systems (Inc.)
RTOP Research and Technology Operation Plan

– S –

S/C Spacecraft
S/N Serial Number
SAC Satellite Applications Centre
SARSAT Search and Rescue Satellite
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
SCOR Scientific Committee on Oceanographic Research
SDPS SeaWiFS Data Processing System
SDS Scientific Data Set
SDSU San Diego State University
SeaBASS SeaWiFS Bio-Optical Archive and Storage 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
SeaWiFS Sea-viewing Wide Field-of-view Sensor
SES Shelf Edge Study
SGI Silicon Graphics, Incorporated
SI *Système International d' Unitès* or International System of Units
SIG Special Interest Group
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)
SIS Spherical Integrating Source
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 Simulation Operations Center
SOGS SeaStar Operations Ground Subsystem
SOH State of Health
SOW Statement of Work
SPM Suspended Particulate Material or Special Perturbations Model (depending on usage).
SPO SeaWiFS Project Office
SPOT *Satellite Pour l'Observation de la Terre* (France)
SPSWG SeaWiFS Prelaunch Science Working Group
SQL Sequential Query Language
SRC Satellite Receiving Station (NERC)
SRT Sigma Research Technology, Incorporated
SSM/I Special Sensor for Microwave/Imaging
SST Sea Surface Temperature or SeaWiFS Science Team (depending on usage).
ST Science Team
STM Science Team Member
SUN Sun Microsystems
SWAP Sylter Wattenmeer Austausch-prozesse
SWG Science Working Group
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 orbit prediction
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
UIM/X User Interface Management/X-Windows
UM University of Miami
UNESCO United Nations Educational, Scientific, and Cultural Organizations
UNIX Not an acronym, a computer operating system.
UPS Uninterruptable Power System
URI University of Rhode Island
USC University of Southern California
USF University of South Florida
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
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)
WVS World Vector Shoreline

– X –

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 $-20/\tanh(2)$ or an exponential value in the expression relating the radiance of scattered light to wavelength (depending on usage).
- $a(z,\lambda)$ Spectral absorption coefficient.
- $a_{\leq}$ Oxygen absorption coefficient.
- a_{ox} Coefficient for oxygen absorption.
- a_{oz} Coefficient for ozone absorption.
- a_{wv} Coefficient for water vapor absorption.
- A_0 Coefficient for the linear term in the scan modulation correction equation.
- A_d The detector aperture.
- A_f The foam reflectance.
- A_i The intersection area.
- $A(k)$ Absorptivity.
- $A(\lambda)$ Coefficient for calculating $b_b(\lambda)$.

– B –

- b Formulation coefficient or a constant equal to 1/3 (depending on usage).
- $b(z,\lambda)$ Total scattering coefficient.
- $b(\theta,z,\lambda_0)$ Volume scattering coefficient.
- $b_b(z,\lambda)$ Spectral backscattering coefficient.
- $b_{bc}(\lambda)$ Spectral backscattering coefficient for phytoplankton.
- $b_r(\lambda)$ Total Raman scattering coefficient.
- $b_w(\lambda)$ 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.
- B_0 Coefficient for the power term in the scan modulation correction equation.
- $B(\lambda)$ Coefficient for calculating $b_b(\lambda)$.

– C –

- $c(z,\lambda)$ Spectral beam attenuation coefficient .
- $c(z,660)$ Red beam attenuation (at 660 nm).
- $[chl.\ a]/K$ Concentration of chlorophyll a over K, the diffuse attenuation coefficient.
- C Chlorophyll a pigment, or just pigment concentration.
- C_1 Measured value for the flight diffuser on a given scan line, in counts.
- C_{13} Pigment concentration derived using CZCS bands 1 and 3.
- 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_{23} Pigment concentration derived using CZCS bands 2 and 3.
- C_{dark} Instrument dark restore value, in counts.
- C_{ext} Average total extinction cross-section of a particle.
- C_F The calibration factor.
- C_{out} Instrument output, in counts.
- C_{ref} Reference chlorophyll value (0.5).
- C_{temp} Temperature sensor output, in counts, represented by an 8-bit digital word in the SeaStar telemetry.
- $[C+P]$ Pigment concentration defined as mg chlorophyll a plus phaeopigments m^{-3}.

– D –

- d The distance between source and detector apertures.
- 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.
- $d(I(\lambda))$ An increment in detector current.
- $d\lambda$ An increment in wavelength.
- ds Detector configuration datum.
- 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.
- $E(\lambda)$ Spectral irradiance.
- $E_a(\lambda)$ Irradiance in air.
- E_{beg} Beginning irradiance value.
- E_{cal} Calibration source irradiance.
- E_d Incident downwelling irradiance.
- $E_d(0^-,\lambda)$ Incident spectral irradiance.
- $E_d(z,\lambda)$ Downwelled spectral irradiance.
- E_{end} Ending irradiance value.
- $E_{\mathrm{meas}}(\lambda)$ Measured radiance.
- $E_{\mathrm{ref}}(\lambda)$ Reference radiance.
- $E_s(\lambda)$ Surface irradiance.
- 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.
- $E_u(z,\lambda)$ Upwelled spectral irradiance.
- $E_w(z,\lambda)$ Irradiance in water.

– F –

- f The fraction of the surface covered by foam.
- f_i Filter number, i=0–11.
- f-ratio The ratio of new to total production.
- $\bar{F}$ Arithmetic average.
- $\overline{F}(\lambda)$ A mean conversion factor.
- $F(\lambda)$ 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 Extraterrestrial irradiance corrected for Earth-sun distance.
- $\mathbb{F}_0$ 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.
- $\overline{F_0}(\lambda)$ Mean extraterrestrial spectral irradiance.
- $\overline{F}_0(\lambda)$ Mean extraterrestrial irradiance.

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_i A correction factor.

– G –

g_1 A constant equal to 0.82.
g_2 A constant equal to -0.55.
gs Gain selection datum.
G Gain factor.
G_1 Gain setting 1.
G_2 Gain setting 2.
G_3 Gain setting 3.
G_4 Gain setting 4.
$G(\lambda)$ $\grave{R}_a(\lambda_i)/\grave{R}_a(670) = (670/\lambda)^\gamma\ T_{2r}(670)/T_{2r}(\lambda_i)$.
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_{GMT} GMT in hours.
H_M The measured moon irradiance.
H_s Altitude of the spacecraft (for SeaStar 705 km).

– I –

i Inclination angle or interval index (depending on usage).
i' Inclination angle minus 90°.
I Rayleigh intensity.
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.
$I(\lambda)$ Detector current.
ICS Current from the current source diode.

– J –

j Interval index.
$J2$ 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 ($1/\lambda$).
k_1 Beginning wavenumber.
k_2 Ending wavenumber.
$k_c(\lambda)$ Spectral fit coefficient weighted over the SeaWiFS bands; $k'_c(\lambda)$ also used.
$K(z,\lambda)$ Diffuse attenuation coefficient.
$K(490)$ 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 coefficients for phytoplankton.
$K_E(\lambda)$ Attenuation coefficient downwelled irradiance.
$K_g(\lambda)$ Attenuation coefficients for Gelbstoff.
$K_L(z,\lambda)$ Attenuation coefficient upwelled radiance.
$K_w(\lambda)$ Attenuation coefficients for pure seawater.

– L –

$L(\lambda)$ Spectral radiance.
$L(\lambda_m)$ The radiance of a calibration sphere at the nominal peak wavelength of a filter.
$L(z,\theta,\phi)$ Submerged upwelled radiance distribution.
L_0 The radiance of the atmosphere.
L_a Aerosol radiance.
$L_c(\lambda)$ Cloud radiance threshold.
L_{cal} Calibration source radiance.
$\mathbb{L}_d$ A matrix of the four Stokes parameters for radiance incident on the surface.
L_{cloud} Maximum radiance from reflected light off of clouds.
$L_g(\lambda)$ Sun glint radiance.
$L_i(\lambda)$ 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_{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.
$L_r(\lambda)$ Rayleigh radiance.
$L_{r0}(\lambda)$ 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 sensor.
L_{typical} Expected radiance from the ocean measured on orbit.
$L_u(z,\lambda)$ 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 $i = 1, 4$).
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.
$\mathbb{L}_w$ The scalar value of the water-leaving radiance multiplied by a columnar matrix of the four Stokes parameters.
$L_{WN}(\lambda)$ 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.
M Path length through the atmosphere.
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, or the gain setting (depending on usage).
$n(\lambda)$ An exponent conceptually similar to the Ångström exponent.
$n_w(\lambda)$ Index of refraction of water.
N The total number of something.
N_D The compensation factor for a 4 log neutral density filter.
N Total number density.
N_i Total number density of either the first or second aerosol model when $i = 1$ or 2, respectively.

– O –

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

– P –

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_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 or local surface pressure (depending on usage).
$\vec{P}$ Orbit position vector.
$P(\theta^+)$ Phase function for forward scattering.
$P(\theta^-)$ Phase function for backward scattering.
P_0 Standard atmospheric pressure (1,013.25 mb).
P_a Probability of scattering to the spacecraft.
P_i PR714 raw radiance.
P_σ Phaeopigment concentration.
PF Polarization factor.
Pxl Pixel number, i.e., the numerical designation of a pixel in a scan line.

– Q –

q Water transmittance factor.
$Q(\lambda)$ $L_u(0^-,\lambda)$ to $E_u(0^-,\lambda)$ relation factor (theoretically equal to π).

– R –

r Water-air reflectance for totally diffuse irradiance.
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.
$\mathbb{R}$ The reflection matrix.
R^2 The square of the linear correlation coefficient.
$R(0^-,\lambda)$ Irradiance reflectance just below the sea surface.
R_1 Multiplier for mirror side 1.
R_2 Multiplier for mirror side 2.
R_a Aerosol reflectance.
$\grave{R}_a$ $R_a/(qT_{2r})$.
R_e Mean Earth radius (6,378.137 km).
R_E Effective resistance for the thermistor-resistor pair.
$R_L(z,\lambda)$ Spectral reflectance.
R_r Rayleigh reflectance.
R_{rs} Remote sensing reflectance.
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.
$s(\lambda)$ Slope for the range 0–1,023.
S Solar constant.
S_i Initial detector signal.
S_n Detector signal with gain.
$S(\lambda)$ $L_a(\lambda)/L_a(670)$.

– T, U –

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_0 The sum of the direct and diffuse transmission of sunlight through the atmosphere.
t_1 First observation time.
t_2 Second observation time.
t_0 Initial time.
t_{aa} 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_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.
$T(\lambda)$ The transmittance along the slant path to the sun.
$T_s(\lambda)$ Transmittance through the surface.
$T(\lambda,\theta)$ 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_{2r} Two-way diffuse transmittance for Rayleigh attenuation.
$T_0(\lambda,\theta_0)$ Total downward transmittance of irradiance.
T_e Equation of time.
$T_{\rm ox}$ Transmittance of oxygen (O_2).
$T_{\rm oz}$ Transmittance of ozone (O_3).
$T_s(\lambda)$ Transmittance through the surface.
$T_w(\lambda)$ Transmittance through a water path.
$T_{\rm wv}$ Transmittance of water vapor (H_2O).

– V –

$\vec{V}$ Orbit velocity vector.
$V_i(t_j)$ 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 Wind speed.
W_d Direct irradiance divided by the total irradiance at the surface.
W_s Diffuse irradiance divided by the total irradiance.

– X –

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

– Y –

y Ordinate or meridional coordinate.
Y ECEF y component of orbit position.
$\dot{Y}$ ECEF Y component of orbit velocity.

– Z –

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, or the exponential value in the expression relating the extinction coefficient to wavelength (depending on usage).

β A formulation coefficent (slope) or a constant in the Ångström formulation (depending on usage).
β_i The extinction coefficient of either the first or second aerosol model when $i = 1$ or 2, respectively.
$\beta(z,\lambda,\theta)$ Spectral volume scattering function.

γ The Ångström exponent.
$\gamma(\lambda)$ The ratio of the aerosol optical thickness at wavelength λ to the aerosol optical thickness at 670 nm.

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, or the absorption coefficient (depending on usage).
Δk Equivalent bandwidth.
$\Delta L_W(670)$ The error in the water-leaving radiance for the red channel.
$\Delta p CO_2$ Partial pressure difference of CO_2 between air and sea water.
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.
$\Delta\theta_s$ 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.
$\Delta\omega$ The longitude difference from the sub-satellite point to the pixel.
$\Delta\omega_s$ Longitude difference.

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

θ Spacecraft zenith angle, spacecraft pitch, or polar angle of the line-of-sight at a spacecraft (depending on usage).
$\dot{\theta}$ Pitch rate.
θ_0 Polar angle of the direct sunlight.
θ_1 The intersection angle of circle one.
θ_2 The intersection angle of circle two.
θ_0 Solar zenith angle.
θ_n The zenith angle of the vector normal to the surface vector for which glint will be observed.
θ_N The angle with respect to nadir that the sea surface slopes to produce a reflection angle to the spacecraft.
θ_s Scan angle of sensor or the solar zenith angle (depending on usage).
θ'_s Scan angle of sensor adjusted for tilt.

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

λ Wavelength of light.
λ_1 Starting wavelength.
λ_2 Ending wavelength.
λ_m Nominal center wavelength.

μ Mean value or cosine of the satellite zenith angle (depending on usage).
μ_0 Cosine of the solar zenith angle.
$\overline{\mu}_d(0^+,\lambda)$ 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_{EM} The distance between the Earth and the moon.

ρ The Fresnel reflectivity, the weighted direct plus diffuse reflectance, or the average reflectance of the sea (depending on usage).
$\rho(\theta)$ Fresnel reflectance for viewing geometry.
$\rho(\theta_0)$ Fresnel reflectance for solar geometry.
$\rho_{c,i}$ Reflectance of clouds and ice.
ρ_n Sea surface reflectance for direct irradiance at normal incidence for a flat sea.
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; and w for water-leaving radiance.
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 $\sigma_i^2 = \langle(\log r - \log r_i)^2\rangle$.

$\tau(z,\lambda)$ Spectral optical depth.
τ_a Aerosol optical thickness.
τ_{ox} Oxygen optical thickness at 750 nm.
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.
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.

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_D The detector solid angle.
Φ_M The solid angle subtended by the moon at the measuring instrument.
Φ_0 Solar azimuth angle.

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

ω Longitude variable or the surface reflection angle (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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REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*

2. REPORT DATE
June 1995

3. REPORT TYPE AND DATES COVERED
Technical Memorandum

4. TITLE AND SUBTITLE
SeaWiFS Technical Report Series
Volume 24–SeaWiFS Technical Report Series Cumulative Index: Volumes 1–23

5. FUNDING NUMBERS
Code 970.2

6. AUTHOR(S)
Elaine R. Firestone and Stanford B. Hooker

Series Editors: Stanford B. Hooker and Elaine R. Firestone

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Laboratory for Hydrospheric Processes
Goddard Space Flight Center
Greenbelt, Maryland 20771

8. PERFORMING ORGANIZATION REPORT NUMBER
95B00092

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
National Aeronautics and Space Administration
Washington, D.C. 20546–0001

10. SPONSORING/MONITORING AGENCY REPORT NUMBER
TM–104566, Vol. 24

11. SUPPLEMENTARY NOTES

Elaine R. Firestone: General Sciences Corporation, Laurel, Maryland

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Unclassified–Unlimited
Subject Category 48
Report is available from the Center for AeroSpace Information (CASI),
7121 Standard Drive, Hanover, MD 21076–1320; (301)621-0390

12b. DISTRIBUTION CODE

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 1995, on the SeaStar satellite, being built by Orbital Sciences Corporation (OSC). The SeaWiFS Project at the National Aeronautics and Space Administration's (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 23 volumes and consists of 6 sections including: an errata, an addendum (summaries of various SeaWiFS Working Group Bio-optical Algorithm and Protocols Subgroups Workshops, and other auxiliary information), an index to key words and phrases, a list of all references cited, and lists of acronyms and symbols used. It is the editors' intention to publish a cumulative index of this type after every five volumes in the series. Each index covers the topics published in all previous editions, that is, each new index will include all of the information contained in the preceeding indices.

14. SUBJECT TERMS
SeaWiFS, Oceanography, Cumulative, Index, Summary, Overview, Errata, Addendum, Glossary, Symbols, References, Bio-optical, Algorithm Workshop, Protocols Subgroup Workshop

15. NUMBER OF PAGES
36

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	Unlimited