NASA Technical Memorandum 104566, Vol. 30

SeaWiFS Technical Report Series

Stanford B. Hooker and
Elaine R. Firestone, Editors

Volume 30, SeaWiFS Technical Report Series
Cumulative Index: Volumes 1–29

Elaine R. Firestone and Stanford B. Hooker

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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 1996, 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 29 volumes and consists of 5 sections including: an errata, 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 reference 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 fifth in a series of indices, published as a separate volume in the Sea-viewing Wide Field-of-view (SeaWiFS) Technical Report Series, and includes information found in the first 29 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: 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.*

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: J.L. Mueller, 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.*

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.

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, as is the case 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, **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.

2. ERRATA

1. In the Table of Contents in Volume 19, Chapter 7's title was incorrectly printed as "The Generation of CZCS Near-Real Time Ancillary Data Files." The correct title is "The Generation of SeaWiFS Near-Real Time Ancillary Data Files."
2. In Volume 29, all the ratios in Fig. 5 were transposed—that is, the y axis for panel **a** should be C_{aa}/C_{TP}, for panel **b** C_{PS}/C_{TP}, and so on for all the graph figures. The legend for the figure has the same error. The first sentence of the legend should read (with the panel equations listed here for ease of reading): "Global total pigment ratios for a variety of biogeochemical provinces:
   a) C_{aa}/C_{TP},
   b) C_{PS}/C_{TP},
   c) $\big(C_{PS}+C_{PP}\big)/C_{TP}$,
   d) C_c/C_{TP},
   e) C_b/C_{TP},
   f) C_{PP}/C_{TP},
   g) $C_{abc}/\big(C_{PS}+C_{PP}\big)$,
   h) $C_{\mathrm{aa}}/\big(C_{PS}+C_{PP}\big)$, and
   i) $\big(C_{PS}+C_{PP}\big)/C_{PP}$."
3. In Volume 29, page 29, first sentence under (29) should read: "The correction is applied to the chlorophyll and pigment, determined using (23) and (24), where the pigment concentration is less than $2\,\mathrm{mg\,m^{-3}}$, i.e., when $L_{WN}(443)$ is valid."

4. Note: Since the issuance of previous volumes, a number of the references cited have changed their publication status, i.e., 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 29 volumes in the series, along with how they now appear in the references section of this volume.

Original Citation

Ding, K., and H.R. Gordon, 1995: Analysis of the influence of O_2 "A" band absorption on atmospheric correction of ocean color imagery. *Appl. Opt.,* (submitted).

Revised Citation

Ding, K., and H.R. Gordon, 1995: Analysis of the influence of O_2 "A" band absorption on atmospheric correction of ocean color imagery. *Appl. Opt.,* **34,** 2,068–2,080.

Original Citation

Duysens, L.N.M., 1956: The flattening of the absorption spectrum of suspensions as compared with that of solutions. *Biochim. Biophys. Acta.,* **19,** 255, 257, 261.

Revised Citation

Duysens, L.N.M., 1956: The flattening of the absorption spectrum of suspensions as compared with that of solutions. *Biochim. Biophys. Acta.,* **19,** 1–12.

Original Citation

Gordon, H.R., and K. Ding, 1991: Self shading of in-water optical instruments. *Limnol. Oceanogr.,* **37,** 491–500.

Revised Citation

Gordon, H.R., and K. Ding, 1992: Self shading of in-water optical instruments. *Limnol. Oceanogr.,* **37,** 491–500.

Original Citation

Gregg, W.W., 1993: The Simulated SeaWiFS Data Set, Version 1. *NASA Tech. Memo. 104566, Vol. 9,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 17 pp.

Revised Citation

Gregg, W.W., F.C. Chen, A.L. Mezaache, J.D. Chen, and J.A. Whiting, 1993: The Simulated SeaWiFS Data Set, Version 1. *NASA Tech. Memo. 104566, Vol. 9,* S.B. Hooker, E.R. Firestone, and A.W. Indest, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 17 pp.

Original Citation

McClain, C.R., G. Feldman, and W. Esaias, 1993: Oceanic primary production. *Global Change Atlas,* C. Parkinson, J. Foster, and R. Gurney, Eds., Cambridge University Press, 251–263.

Revised Citation

McClain, C.R., G. Feldman, and W. Esaias, 1993: Oceanic biological productivity. *Atlas of Satellite Observations Related to Global Change,* R.J. Gurney, J.L. Foster, and C.L. Parkinson, Eds., Cambridge University Press, 251–263.

Original Citation

Pegau, W.S., J.S. Cleveland, W. Doss, C.D. Kennedy, R.A. Maffione, J.L. Mueller, R. Stone, C.C. Trees, A.D. Weidemann, W.H. Wells, and J.R.V. Zaneveld, 1995: A comparison of methods for the measurement of the absorption coefficient in natural waters. *J. Geophys. Res.,* (submitted).

Revised Citation

Pegau, W.S., J.S. Cleveland, W. Doss, C.D. Kennedy, R.A. Maffione, J.L. Mueller, R. Stone, C.C. Trees, A.D. Weidemann, W.H. Wells, and J.R.V. Zaneveld, 1995: A comparison of methods for the measurement of the absorption coefficient in natural waters. *J. Geophys. Res.,* **100,** 13,201–13,220.

Original Citation

Siegel, D.A., A.F. Michaels, J. Sorensen, M.C. O'Brien, and M. Hammer, 1995: Seasonal variability of light availability and its utilization in the Sargasso Sea. *J. Geophys. Res.,* **100,** 8,695–8,713.

Revised Citation

Siegel, D.A., A.F. Michaels, J. Sorensen, M.C. O'Brien, and M. Hammer, 1995: Seasonal variability of light availability and its utilization in the Sargasso Sea. *J. Geophys. Res.,* **100,** 8,695–8,713.

Original Citation

Sorensen, J., D. Konnoff, M.C. O'Brien, E. Fields, and D.A. Siegel, 1994: The BBOP data processing system. *Ocean Optics XII,* SPIE, **2,258,** 539–546.

Revised Citation

Sorensen, J.C., M. O'Brien, D. Konoff, and D.A. Siegel, 1994: The BBOP data processing system. *Ocean Optics XII,* J.S. Jaffe, Ed., *SPIE,* **2,258,** 539–546.

Original Citation

Sosik, H.M., and B.G. Mitchell, 1995: Light absorption by phytoplankton, photosynthetic pigments, and detritus in the California Current System. *Deep-Sea Res.,* (in press).

Revised Citation

Sosik, H.M., and B.G. Mitchell, 1996: Light absorption by phytoplankton, photosynthetic pigments, and detritus in the California Current System. *Deep-Sea Res.,* **42,** 1,717–1,748.

Original Citation

Zibordi, G., and G.M. Ferrari, 1995: Instrument self-shading in underwater optical measurements: experimental data. *Appl. Opt.,* (submitted).

Revised Citation

Zibordi, G., and G.M. Ferrari, 1995: Instrument self-shading in underwater optical measurements: experimental data. *Appl. Opt.,* **34,** 2,750–2,754.

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 –

– C –

– D –

– E –

– F –

– G –

– T, U –

– V –

– W, X, Y –

– Z –

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
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
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
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 Program
BER Bit Error Rate
BMFT Minister for Research and Technology (Germany)
BOAWG Bio-Optical Algorithm Working Group
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
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
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)
CIRES Cooperative Institute for Research in Environmental Sciences
COADS Comprehensive Ocean-Atmosphere Data Set
COARE Coupled Ocean-Atmosphere Response Experiment
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
CSC Computer Sciences Corporation
CSIRO Commonwealth Scientific and Industrial Research Organization (of Australia)
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
CWR Clear Water Radiance
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
DCOM Dissolved Colored Organic Material
DCP Data Collection Platform
DEC Digital Equipment Corporation
DIW Distilled Water
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
EC Excluding CHORS (data)
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
gcc GNU C Compiler
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
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 –

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 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; 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
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
IFOV Instantaneous Field of View
IMS Information Management System
IOP Inherent Optical Property
IP Internet Protocol
IPD Image Processing Division
IR Infrared
IRIX Not an acronym, a computer operating system.
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 –

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.
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.
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
LUT Look-Up Table

– 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
NEAT Northeast Atlantic
NEdL Noise Equivalent Differential Spectral Radiance
NEδL Noise Equivalent delta Radiance
NEΔT Noise Equivalent Delta Temperature
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
NOPS NIMBUS Observation Processing System
NORAD North American Air Defense (Command)
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
OMP-8 Not an acronym, but a type of marine antibiofouling compound.
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 platform of EOS.
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 Reflectance (depending on usage).
PON Particulate Organic Nitrogen
PPC Photoprotectant Carotenoids
PR Photo Research
PRIME Plankton Reactivity in the Marine Environment
PSC Photosynthetic Carotenoids
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)
ROV Remotely Operated Vehicle
ROW Reverse Osmosis Water
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
SeaStar Not an acronym, but the name of the satellite on which SeaWiFS will fly.
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
SPIE Society of Photo-Optical Instrumentation Engineers
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 Structured 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
Sterna Not an acronym, but a BOFS Antarctic research project.
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 or Uninterruptable Power Supply, depending on usage.
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
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 $-20/\tanh(2)$; an exponential value in the expression relating the radiance of scattered light to wavelength; or a a regression coefficient (depending on usage).
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.
$a_i(\lambda_a,T)$ Initial estimate of the apparent absorption coefficient; used for determining the apparent absorption coefficient for substances other than water.
$a_{\rm o}$ Oxygen absorption coefficient.
$a_{\rm ox}$ Coefficient for oxygen absorption.
$a_{\rm oz}$ 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.
$a_t(\lambda)$ Tripton spectral absorption coefficient.
$a_w(\lambda)$ Absorption coefficient for pure water.
$a_{\rm wv}$ 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_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).
$A(k)$ 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.

– B –

b A formulation coefficient, a constant equal to 1/3, or a regression coefficient (depending on usage).
$b(z,\lambda)$ Total scattering coefficient.
$b(\theta,z,\lambda_0)$ Volume scattering coefficient.
b_b Backscattering coefficient.
$b_b(z,\lambda)$ Spectral backscattering coefficient.
$b_{bc}(\lambda)$ 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.
$b_w(\lambda)$ 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, the fitting coefficient for e^{B/P_5}, the width of band 7, a variable in the expression for limiting reflectance ($R_{\rm lim}$), defined as $0.33b/K_d$, or an empirical constant (depending on usage).
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.
$B(\lambda)$ Coefficient for calculating $b_b(\lambda)$.
B_b An empirical constant dependent on the backscatter ratio.

– 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_{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_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_{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.
$C_t(\lambda)$ 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 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_0' The downwelling irradiance at the Raman excitation wavelength.
$E(\lambda)$ Spectral irradiance.
$\hat{E}(z,m)$ A smoothed estimate of irradiance obtained by a least-squares regression fit in the center of a depth interval.
$E_a(\lambda)$ 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.
$E_d(z,\lambda)$ Downwelling spectral irradiance profile.
$E_d'(z,\lambda)$ Normalized 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.
$E_s(z,\lambda)$ Vertical profile of surface irradiance.
$\overline{E}_{s,i}(\lambda)$ The value of $E_s(z,\lambda)$ at node depth z_i.
$\vec{E}_s(z_m,\lambda)$ Defined as $\mathbb{H}\vec{\overline{E}}_s(\lambda)$.
$\vec{E}_s(\lambda)$ The measured irradiance vector of length M.
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.

– F –

f The fraction of the surface covered by foam or the ratio of sensor-to-instrument diameters (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.
$\bar{F}$ 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.
$\bar{F}(\lambda)$ 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.
$\underline{F}_0(\lambda)$ 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_i A correction factor or an immersion coefficient (depending on usage).
$F_v(\lambda)$ Field-of-view coefficient.

– 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. 24).
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.
$G(\mu_0,\lambda)$ 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.
$G(\lambda)$ $\grave{R}_a(\lambda_i)/\grave{R}_a(670) = (670/\lambda)^\gamma\ T_{2r}(670)/T_{2r}(\lambda_i)$.
G_e Gravitational constant of the Earth (398,600.5 km^3 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).
$H(\lambda_i{:}\lambda_j)$ Pigment calculated from the hyperbolic transform of $L_{i:j}$.
$\mathbb{H}$ Matrix of coefficients h_{ij} or $[h_{mj}]$ (depending on usage).
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 $(1/\lambda)$, 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.
$\vec{\overline{K}}$ Vector of $\overline{K}_n$.
$K(\lambda)$ Generic irradiance attenuation coefficient.
$K(z,\lambda)$ Diffuse attenuation coefficient.
$K(440)$ Diffuse attenuation coefficient 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 coefficients 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 for downwelled irradiance.
$K_g(\lambda)$ Attenuation coefficient for Gelbstoff.
$K_L(z,\lambda)$ 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.
$K_u(z,\lambda)$ Vertical profile of the diffuse attenuation coefficient for the upwelling irradiance spectrum.
$K'_u(z,\lambda)$ $K_u(z,\lambda)$ 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.
$L_{i:j}$ The ratio of normalized water-leaving radiances at wavelengths i (λ_i) to j (λ_j): $L_{WN}(\lambda_i)/L_{WN}(\lambda_j)$.
$L(\lambda)$ 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.
$L^*(\lambda,\theta,\phi)$ 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 Aerosol radiance.
$L_{\rm atm}$ Radiance of light reflected from the atmosphere.
$L_c(\lambda)$ Cloud radiance threshold.
$L_{\rm cal}$ Calibration source radiance.
$L_{\rm cloud}$ 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_{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.
$L_{\rm max}$ Maximum saturation radiance.
$L_{\rm nadir}$ Measured radiance at nadir.
$L_{\rm NER}\lambda)$ 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} $L_0 + L_{\rm sfc}$.
$L_{\rm sat}(\lambda)$ Saturation radiance for the sensor.
$L_{\rm scan}$ Measured radiance at any pixel in a scan.
$L_{\rm sfc}$ The radiance of the light reflected from the sea surface.
$\mathbb{L}_{\rm sfc}$ The columnar matrix of the four Stokes parameters ($L_{u,1}$, $L_{u,2}$, $L_{u,3}$, $L_{u,4}$).
$L_{\rm sky}(\lambda)$ Spectral sky radiance distribution.
$L_t(\lambda)$ Total radiance at the top of the atmosphere (where a satellite sensor is located).
$L_{\rm typical}$ 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.
$\mathbb{L}_{\rm up}$ The columnar matrix of light leaving the surface containing the values $L_{{\rm up},1}$, $L_{{\rm up},2}$, $L_{{\rm up},3}$, and $L_{{\rm up},4}$.
$L_{{\rm up},i}$ 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.
L'_{WN} Normalized water-leaving radiance at the Raman excitation wavelength.
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.
$M_{\rm oz}$ 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 the total number density (usage dependent).
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.
${\rm OD}_b(\lambda)$ Baseline optical density spectrum.
${\rm OD}_g(\lambda)$ Optical density of soluble material (Gelbstoff).
${\rm OD}_p(\lambda)$ Optical density spectra of filtered particles.
${\rm OD}_r(\lambda)$ Optical density reference for filter or distilled water.
${\rm OD}_t(\lambda)$ 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.
$p_{\rm dev}$ Pressure deviation between the minimum and maximum surface pressures compared to 1,013 mb.
$p_{\rm ref}$ 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_i PR714 raw radiance or the fitting coefficient for $i =$ 1–5.
P_S Simulated $C_a + C_P$ (q.v.).
P_W Probability of seeing sun glint in the spacecraft direction.
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 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, or the Earth-sun distance (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.
$R(\lambda)$ The irradiance reflectance at a particular wavelength.
$\mathbb{R}$ 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_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_e Mean Earth radius (6,378.137 km).
R_E Effective resistance for the thermistor-resistor pair.
$R_L(z, \lambda)$ Spectral reflectance.
R_{lim} Limiting reflectance for defining Case-1 water.
R'_L Reflectance from an uncalibrated radiometer.
R_r Rayleigh reflectance.
R_{rs} Remote sensing reflectance.
$R_{rs}(z, \lambda)$ Spectral remote sensing reflectance profile.
$R_{rs}(z,\lambda)$ Vertical profile of the remote sensing reflectance spectrum.
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 The solar constant or the slope of a line (depending on usage).
$S(\lambda)$ 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.
s_{xy} Residual standard deviation.

– 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 The sum of the direct and diffuse transmission of sunlight through the atmosphere, or initial time (usage dependent).
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_{2r} Two-way diffuse transmittance for Rayleigh attenuation.
$T_0(\lambda, \theta_0)$ Total downward transmittance of irradiance.
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.
$V(z)$ Transmissometer voltage.
$V(\theta)$ Normalized measured value for a cosine collector.
$\vec{V}$ Orbit velocity vector.
$\hat{V}$ True voltage.
$\tilde{V}$ Measured voltage.
$\overline{V}(\theta_i)$ 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 quivalent 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 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 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 Vertical coordinate.
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, or the exponential value in the expression relating the extinction coefficient to wavelength (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).
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.
$\beta(z,\lambda,\theta)$ Spectral volume scattering function.
$\overline{\beta}_b$ The measured integral of the volume scattering function in the backward direction.

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.
$\Delta p\mathrm{CO}_2$ 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.
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.
$\Delta\omega$ 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).
ϵ_{sun} Self-shading error for E_{sun}.
ϵ_{sky} Self-shading error for E_{sky}.
$\varepsilon(\lambda)$ $1 - e^{-k'a(\lambda)r}$.

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, or the centroid angle of the scattering measurement (depending on usage).
$\dot{\theta}$ Pitch rate.
θ_0 Polar angle of the direct sunlight or solar zenith angle (depending on usage).
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_{0w} Refracted solar zenith angle.
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.
ξ Actual deployment distance.
ξ_d The calculated deployment distance for downwelling irradiance measurements.
ξ_{EM} The distance between the Earth and the moon.
ξ_u The calculated deployment distance for upwelling irradiance measurements.
ξ_L The calculated deployment distance for upwelling radiance measurements.
$\xi(\lambda)$ Minimum ship-shadow avoidance distance.

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.
$\rho(\lambda)$ The bidirectional reflectance.
$\rho(\theta)$ Fresnel reflectance for viewing geometry.
$\rho(\theta_0)$ Fresnel reflectance for solar geometry.
$\rho_{c,i}$ 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; and 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.
$\tau_{\rm ox}$ Oxygen optical thickness at 750 nm.
$\tau_{\rm ox}(\lambda)$ Optical thickness due to oxygen absorption.
$\tau_{\rm oz}$ 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_{ro} Rayleigh optical thickness weighted by the SeaWiFS spectral response.
τ_{r0} Rayleigh optical thickness at standard atmospheric pressure, P_0.
$\tau_s(\lambda)$ Spectral solar atmospheric transmission.
$\tau_s(\lambda)$ Spectral solar atmospheric transmission.
$\tau_{\rm wv}$ 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.

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 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).

References

– A –

Abbott, M.R., and P.M. Zion, 1985: Satellite observations of phytoplankton variability during an upwelling event. *Cont. Shelf Res.,* **4,** 661–680.

——, and D.B. Chelton, 1991: Advances in passive remote sensing of the ocean. *U. S. National Report to the International Union of Geodesy and Geophysics 1987–1990, Contributions in Oceanography,* Am. Geophys. Union, Washington, DC, 571–589.

Abel, P., G.R. Smith, R.H. Levin, and H. Jacobowitz, 1988: Results from aircraft measurements over White Sands, New Mexico, to calibrate the visible channels of spacecraft instruments. *SPIE*, **924,** 208–214.

——, B. Guenther, R. Galimore, and J. Cooper, 1993: Calibration results for NOAA-11 AVHRR channels 1 and 2 from congruent aircraft observations. *J. Atmos. and Ocean. Technol.,* **10,** 493–508.

Ackleson S.G., and P.M. Holligan, 1989: AVHRR observations of a Gulf of Maine coccolithophorid bloom. *Photogramm. Eng. Remote Sens.,* **55,** 473–474.

Aiken, J., G.F. Moore, and P.M. Holligan, 1992: Remote sensing of oceanic biology in relation to global climate change. *J. Phycol.,* **28,** 579–590.

——, and ——, 1995: Special requirements for the validation of ocean colour information. Proceedings of the WMO/IOC Conference on Space-Based Ocean Observation, *WMO/ PD-No. 649,* 93–101.

Ahmad, Z., and R.S. Fraser, 1982: An iterative radiative transfer code for ocean-atmosphere systems. *J. Atmos. Sci.,* **39,** 656–665.

Allen, C.W., 1973: *Astrophysical Quantities, 3rd Edition.* Athalone Press London, 310 pp.

Andersen J.H., 1991: CZCS level-2 generation. *OCEAN Technical Series, Nos. 1–8, Ocean Colour European Archive Network,* 49 pp.

Anderson, R.F., 1992: Southern Ocean processes study. *U.S. JGOFS Planning Report Number 16,* Woods Hole Oceanographic Institution, Woods Hole, Massachusetts, 114 pp.

André, J.-M. and A. Morel, 1989: Simulated effects of barometric pressure and ozone content upon the estimate of marine phytoplankton from space. *J. Geophys. Res.,* **94,** 1,029–1,037.

——, and ——, 1991: Atmospheric corrections and interpretation of marine radiances in CZCS imagery, revisited. *Oceanol. Acta,* **14,** 3–22.

Ångström, A., 1964: The parameters of atmospheric turbidity. *Tellus,* **16,** 64–75.

Arking, A., and J.D. Childs, 1985: Retrieval of cloud cover parameters from multispectral satellite images. *J. Climate Appl. Meteor.,* **24,** 322–333.

Arrigo, K.R., and C.R. McClain, 1995: "Cloud and ice detection at high latitudes for processing of CZCS imagery," In: McClain, C.R., W.E. Esaias, M. Darzi, F.S. Patt, R.H. Evans, J.W. Brown, K.R. Arrigo, C.W. Brown, R.A. Barnes, and L. Kumar, 1995: Case Studies for SeaWiFS Calibration and Validation, Part 4. *NASA Tech. Memo. 104566, Vol. 28,* S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, 8–12.

Austin, R.W., 1974: The remote sensing of spectral radiance from below the ocean surface. *Optical Aspects of Oceanography,* N.G. Jerlov and E. Steemann-Nielsen, Eds., Academic Press, 317–344.

——, 1976: Air-Water Radiance Calibration Factor. *Tech. Memo. ML–76–004t,* Vis. Lab., Scripps Inst. of Oceanogr., La Jolla, California, 8 pp.

——, 1980: Gulf of Mexico, ocean-color surface-truth measurements. *Bound.-Layer Meteor.,* **18,** 269–285.

——, 1993: Optical remote sensing of the oceans: BC (Before CZCS) and AC (After CZCS). *Ocean Colour: Theory and Applications in a Decade of CZCS Experience*, V. Barale and P. Schlittenhardt, Eds., ECSC, EEC, EAEC, Brussels and Luxembourg, Kluwer Academic Publishers, Norwell, Massachusetts, 1–15.

——, and T.J. Petzold, 1975: An instrument for the measurement of spectral attenuation coefficient and narrow-angle volume scattering function of ocean waters. *Visibility Laboratory of the Scripps Institution of Oceanography Report, SIO Ref. 75–25,* 12 pp.

——, and G. Halikas, 1976: The index of refraction of seawater. *SIO Ref. 76–1*, Vis. Lab., Scripps Inst. of Oceanogr., La Jolla, California, 64 pp.

——, and T.J. Petzold, 1981: The determination of diffuse attenuation coefficient of sea water using the Coastal Zone Color Scanner. *Oceanography from Space,* J.F.R. Gower, Ed., Plenum Press, 239–256.

——, and B.L. McGlamery, 1983: Passive remote sensing of ocean optical propagation parameters. *32nd Symp., AGARD Electromagnetic Wave Propagation Panel on Propagation Factors Affecting Remote Sensing by Radio Waves,* Oberammergau, Germany, 45-1–45-10.

– B –

Baker, K.S., and R.C. Smith, 1982: Bio-optical classification and model of natural waters, 2. *Limnol. Oceanogr.,* **27,** 500–509.

——, and ——, 1990: Irradiance transmittance through the air/water interface. *Ocean Optics X,* R.W. Spinrad, Ed., SPIE, **1302,** 556–565.

Balch, W.M., 1993: Reply. *J. Geophys. Res.,* **98,** 16,585-16,587.

——, P.M. Holligan, S.G. Ackleson, and K.J. Voss, 1991: Biological and optical properties of mesoscale coccolithophore blooms in the Gulf of Maine. *Limnol. Oceanogr.,* **36,** 629–643.

——, R. Evans, J. Brown, G. Feldman, C. McClain, and W. Esaias, 1992: The remote sensing of ocean primary productivity–use of a new data compilation to test satellite algorithms. *J. Geophys. Res.,* **97,** 2,279–2,293.

Ball Aerospace Systems Division, 1979: Development of the Coastal Zone Color Scanner for Nimbus-7, Test and Performance Data. *Final Report F78-11, Rev. A, Vol. 2,* Boulder, Colorado, 94 pp.

Barale, V., C.R. McClain, and P. Malanotte-Rizzoli, 1986: Space and time variability of the surface color field in the northern Adriatic Sea. *J. Geophys. Res.,* **91,** 12,957–12,974.

——, and R. Wittenburg-Fay, 1986: Variability of the ocean surface color field in central California near-coastal waters as observed in seasonal analysis of CZCS imagery. *J. Mar. Res.,* **44,** 291–316.

——, and P. Schlittenhardt, 1993: *Ocean Colour: Theory and Applications in a Decade of CZCS Experience,* ECSC, EEC, EAEC, Brussels and Luxembourg, Kluwer Academic Publishers, Norwell, Massachusetts, 367 pp.

Barnes, R.A., 1994: *SeaWiFS Data: Actual and Simulated.* [World Wide Web page.] From URLs: `http://seawifs.gsfc.nasa.gov/SEAWIFS/IMAGES/spectra1.dat` and `/spectra2.dat` NASA Goddard Space Flight Center, Greenbelt, Maryland.

——, and A.W. Holmes, 1993: Overview of the SeaWiFS Ocean Sensor. *Proc. SPIE,* **1,939,** 224–232.

——, W.L. Barnes, W.E. Esaias, and C.L. McClain, 1994a: Prelaunch Acceptance Report for the SeaWiFS Radiometer. *NASA Tech. Memo. 104566, Vol. 22,* S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 32 pp.

——, A.W. Holmes, W.L. Barnes, W.E. Esaias, and C.R. McClain, 1994b: The SeaWiFS Prelaunch Radiometeric Calibration and Spectral Characterization. *NASA Tech. Memo. 104566, Vol. 23,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 55 pp.

Berger, W.H., 1989: *Productivity of the Ocean: Present and Past.* V.S. Smetacek and G. Wefer, Eds., John Wiley & Sons, 471 pp.

Berk, A., L.S. Bernstein, and D.C. Robertson, 1989: MODTRAN: A moderate resolution model for LOWTRAN 7. *GL-TR-89-0122,* Geophysics Laboratory, Air Force Systems Command, 38 pp.

Bernstein, R.L., 1982: Sea surface temperature estimation using the NOAA-6 satellite Advanced Very High Resolution Radiometer. *J. Geophys. Res.,* **87,** 9,455–9,465.

Bidigare, R.R., 1991: Analysis of algal chlorophylls and carotenoids. In: *Marine Particles: Analysis and Characterization,* D.C. Hurd and D.W. Spencer, Eds., Am. Geophys. Union, Washington, DC, 119–123.

——, M.E. Ondrusek, J.H. Morrow, and D.A. Kiefer, 1990: *In vivo* absorption properties of algal pigments. *SPIE Ocean Optics,* **1302,** 290–302.

——, L. Campbell, M.E. Ondrusek, R. Letelier, D. Vaulot and D.M. Karl, 1995: Phytoplankton community structure at station ALOHA (22° 45' N, 158° W) during fall 1991. *Deep-Sea Res.,* (submitted).

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

Biggar, S.F., D.I. Gellman, and P.N. Slater, 1990: Improved evaluation of optical depth components from Langley plot data. *Remote Sens. Environ.,* **32,** 91–101.

——, P.N. Slater, K.J. Thome, A.W. Holmes, and R.A. Barnes, 1993: Preflight solar-based calibration of SeaWiFS. *Proc. SPIE, Vol. 1,939,* 233–242.

Bird, R.E., and C. Riordan, 1986: Simple solar spectral model for direct and diffuse irradiance on horizontal and tilted planes at the Earth's surface for cloudless atmospheres. *J. of Climate and Appl. Meteor.,* **25,** 87–97.

Booth, C.R.B. and R.C. Smith, 1988: Moorable spectroradiometer in the Biowatt Experiment. *Ocean Optics IX,* SPIE **925,** 176–188.

Bowman, K.P., and A.J. Krueger, 1985: A global climatology of total ozone from the Nimbus 7 Total Ozone Mapping Spectrometer. *J. Geophys. Res.,* **90,** 7,967–7,976.

Boyd, R.A., 1951: The development of prismatic glass block and the daylight laboratory. *Eng. Res. Bull. No. 32,* Eng. Res. Inst., Univ. of Mich., Ann Arbor, Michigan, 88 pp.

Bricaud, A., A. Morel, and L. Prieur, 1981: Absorption by dissolved organic matter of the sea (yellow substance) in the UV and visible domains. *Limnol. Oceanogr.,* **26,** 43–53.

——, and ——, 1987: Atmospheric corrections and interpretation of marine radiances in CZCS imagery: use of a reflectance model. *Oceanol. Acta,* **7,** 33–50.

Brock, J.C., C.R. McClain, M.E. Luther, and W.W. Hay, 1991: The phytoplankton bloom in the northwest Arabian Sea during the southwest monsoon of 1979. *J. Geophys. Res.,* **96,** 20,623–20,642.

——, and ——, 1992: Interannual variability in phytoplankton blooms observed in the northwestern Arabian Sea during the southwest monsoon. *J. Geophys. Res.,* **97,** 733–750.

Brouwer, D., 1959: Solution of the problem of artificial satellite theory without drag. *Astron. J.,* **64**(1274), 378–397.

Brown, C.W., 1995: "Classification of coccolithophore blooms in ocean color imagery." In: McClain, C.R., W.E. Esaias, M. Darzi, F.S. Patt, R.H. Evans, J.W. Brown, K.R. Arrigo, C.W. Brown, R.A. Barnes, and L. Kumar, 1995: Case Studies for SeaWiFS Calibration and Validation, Part 4. *NASA Tech. Memo. 104566, Vol. 28,* S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 13–19.

——, and J.A. Yoder, 1994a: Coccolithophorid blooms in the global ocean. *J. Geophys. Res.,* **99,** 7,467–7,482.

——, and ——, 1994b: Distribution pattern of coccolithophorid blooms in the western North Atlantic. *Cont. Shelf Res.,* **14,** 175–198.

Brown, O.B., and R.H. Evans, 1985: Calibration of Advanced Very High Resolution Radiometer infrared observations. *J. Geophys. Res.,* **90,** 11,667–11,677.

Bruegge, C.J., V.G. Duval, N.L. Chrien, and D.J. Diner, 1993: Calibration plans for the Multi-angle Imaging Spectroradiometer (MISR). *Metrologia,* **30(4),** 213–221.

Bruening, R.J., 1987: Spectral irradiance scales based on filtered absolute silicon photodetectors. *Appl. Opt.,* **26,** 1,051–1,057.

Burlov-Vasiljev, K.A., E.A. Gurtovenko, and Y.B. Matvejev, 1992: The Solar Radiation Between 310–680 nm. *Proceedings of the Workshop on the Solar Electromagnetic Radiation Study for Solar Cycle 22,* R.E. Donnelly, Ed., U.S. DOC NOAA Environmental Research Laboratory, Boulder, Colorado, 49–53.

Butler, W.L., 1962: Absorption of light by turbid materials. *J. Opt. Soc. Amer.,* **52,** 292–299.

– C –

Campbell, J.W., and J.E. O'Reilly, 1988: Role of satellites in estimating primary productivity on the northwest Atlantic continental shelf. *Cont. Shelf Res.,* **8,** 179–204.

Cantor, A.J., and A.E. Cole, 1985: *Handbook of Geophysics and the Space Environment,* A.S. Jursa, Ed., Air Force Geophysics Laboratory, Air Force Systems Command, USAF, 15–48.

Capellari, J.O., C.E. Velez, and A.J. Fuchs, 1976: Mathematical Theory of the Goddard Trajectory Determination System. *GSFC X-582-76-77,* NASA Goddard Space Flight Center, Greenbelt, Maryland, 596 pp.

Caraux, D., and R.W. Austin, 1983: Delineation of Seasonal Changes of Chlorophyll Frontal Boundaries in Mediterranean Coastal Waters with NIMBUS-7 Coastal Zone Color Scanner Data. *Rem. Sens. Environ.,* **13,** 239–249.

Carder, K.L., and R.G. Steward, 1985: A remote-sensing reflectance model of red-tide dinoflagellate off West Florida. *Limnol. Oceanogr.*, **30,** 286–298.

——, ——, J.H. Paul, and G.A. Vargo, 1986: Relationships between chlorophyll and ocean color constituents as they affect remote-sensing reflectance models. *Limnol. Oceanogr.,* **31,** 403–413.

——, G.R. Harvey, R.G. Steward, and P.B. Ortner, 1989: Marine humic and fulvic acids: their effects on remote sensing of ocean chlorophyll. *Limnol. Oceanogr.,* **34,** 68–81.

——, W.W. Gregg, D.K. Costello, K. Haddad, and J.M. Prospero, 1991: Determination of Saharan dust radiance and chlorophyll *a* from CZCS imagery. *J. Geophys. Res.,* **96,** 5,369–5,378.

——, P. Reinersman, R.F. Chen, F. Müller-Karger, C.O. Davis, and M. Hamilton, 1993a: AVIRIS calibration and application in coastal oceanic environments. *Remote Sens. Environ.,* **44,** 205–216.

——, R.G. Steward, R.F. Chen, S. Hawes, Z. Lee, and C.O. Davis, 1993b: AVIRIS calibration and application in coastal oceanic environments: Tracers of soluble and particulate constituents of the Tampa Bay coastal plume. *Photogramm. Eng. Remote Sens,* **59(3),** 339–344.

Cardone, V.J., J.G. Greenwood, and M.A. Cane, 1990: On trends in historical marine wind data. *J. Climate,* **3,** 113–127.

Cebula, R.P., H. Park, and D.F. Heath, 1988: Characterization of the Nimbus-7 SBUV radiometer for the long term monitoring of stratospheric ozone. *J. Atmos. Ocean. Technol.,* **5,** 215–227.

Chamberlin, W.S., C.R. Booth, D.A. Kiefer, J.H. Morrow, and R.C. Murphy, 1989: Evidence for a simple relationship between natural fluorescence, photosynthesis, and chlorophyll *a* in the sea. *Deep Sea Res.,* **37,** 951–973.

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.*, (in press).

Chelton, D.B., and M.G. Schlax, 1991: Estimation of time averages from irregularly spaced observations: With application to coastal zone color scanner estimates of chlorophyll *a* concentrations. *J. Geophys. Res.,* **96,** 14,669–14,692.

Chin, R.T., C. Jau, and J.A. Weinman, 1987: The application of time series models to cloud field morphology analysis. *J. Climate Appl. Meteor.,* **26,** 363–373.

Clark, D.K., 1981: Phytoplankton pigment algorithms for the Nimbus-7 CZCS. *Oceanography from Space,* J.F.R. Gower, Ed., Plenum Press, 227–238.

——, E.T. Baker, and A.E. Strong, 1980: Upwelled spectral radiance distributions in relation to particulate matter in sea water. *Bound.-Layer Meteor.,* **18,** 287-298.

Cleveland, J.S., and A.D. Weidemann, 1993: Quantifying absorption by aquatic particles: A multiple scattering correction for glass-fiber filters. *Limnol. Oceanogr.,* **38,** 1,321–1,327.

Coakley, J.A., Jr., and F.P. Bretherton, 1982: Cloud cover from high resolution scanner data: Detecting and allowing for partially filled fields of view. *J. Geophys. Res.,* **87,** 4,917–4,932.

Comiso, J.C., N.G. Maynard, W.O. Smith, Jr., and C.W. Sullivan, 1990: Satellite ocean color studies of Antarctic ice edges in summer and autumn. *J. Geophys. Res.,* **95,** 9,481–9,496.

——, C.R. McClain, C.W. Sullivan, J.P. Ryan, and C.L. Leonard, 1993: Coastal zone color scanner pigment concentrations in the Southern Ocean and relationships to geophysical surface features. *J. Geophys. Res.,* **98,** 2,419–2,451.

Corredera, P., A. Corróns, A. Pons, and J. Campos, 1990: Absolute spectral Irradiance scale in the 700–2400 nm spectral range. *Appl. Opt.,* **29,** 3,530–3,534.

Cox, C., and W. Munk, 1954a: Measurement of the roughness of the sea surface from photographs of the sun's glitter. *J. Opt. Soc. Am.,* **44,** 838–850.

——, and ——, 1954b: Statistics of the sea surface derived from sun glitter. *J. Mar. Res.,* **13,** 198–277.

——, and ——, 1955: *Some Problems in Optical Oceanography.* Scripps Institution of Oceanography, LaJolla, California, 63–77.

Crane, R.J., and M.R. Anderson, 1984: Satellite discrimination of snow/cloud surfaces. *Int. J. Remote Sens.,* **5,** 213–223.

Curran, R.J., 1972: Ocean color determination through a scattering atmosphere. *Appl. Opt.,* **11,** 1,857–1,866.

——, H.L. Kyle, L.R. Blaine, J. Smith, and T.D. Clem, 1981: Multichannel scanning radiometer for remote sensing cloud physical parameters. *Rev. Sci. Instrum.,* **52,** 1,546–1,555.

– D –

Darzi, M., 1992: Cloud Screening for Polar Orbiting Visible and IR Satellite Sensors. *NASA Tech. Memo. 104566, Vol. 7,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 7 pp.

——, J. Chen, J. Firestone, and C.R. McClain, 1989: SEAPAK: A satellite image analysis system for oceanographic research. *Proc. Fifth Intl. Conf. Interactive Information Processing Systems for Meteorol., Oceanogr., and Hydrol.,* Am. Meteorol. Soc., Atlanta, Georgia, 26–32.

——, F.S. Patt, J.K. Firestone, B. Schieber, L. Kumar, and D. Ilg, 1995: *SeaWiFS Operational Archive Product Specifications.* [World Wide Web page.] From URL: `http://seawifs.gsfc.nasa.gov/SEAWIFS/SOFTWARE/SOFTWARE.html` see "SeaWiFS Product Specifications (postscript)". NASA Goddard Space Flight Center, Greenbelt, Maryland.

Dave, J.V., 1972a: Development of programs for computing characteristics of ultraviolet radiation. *Technical Report—Vector Case, Program IV,* FSC-72-0013, IBM Federal Systems Division, Gaithersburg, Maryland, 138 pp.

——, 1972b: Development of programs for computing characteristics of ultraviolet radiation. *Technical Report—Scalar Case, Program II,* FSC-72-0011, IBM Federal Systems Division, Gaithersburg, Maryland, 38 pp.

Denman, K.L., and M.R. Abbott, 1988: Time evolution of surface chlorophyll patterns from cross spectrum analysis of satellite color images. *J. Geophys. Res.,* **93,** 6,789–6,798.

Dera, J., and H.R. Gordon, 1968: Light field fluctuations in the photic zone. *Limnol. Oceanogr.,* **13,** 697–699.

Detwiler, A., 1990: Analysis of cloud imagery using box counting. *Int. J. Remote Sens.,* **11,** 887–898.

Deuser, W.G., F.E. Muller-Karger, and C. Hemleben, 1988: Temporal variations of particle fluxes in the deep subtropical and tropical North Atlantic: Eulerian versus Lagrangian effects. *J. Geophys. Res.,* **93,** 6,857–6,862.

——, ——, R.H. Evans, O.B. Brown, W.E. Esaias, and G.C. Feldman, 1990: Surface-ocean color and deep-sea carbon flux: how close a connection? *Deep-Sea Res.,* **37,** 1,331–1,343.

Dickey, T., J. Marra, T. Granata, C. Langdon, M. Hamilton, J. Wiggert, D. Siegel, and A. Bratkovich, 1991: Concurrent high-resolution bio-optical and physical time series observations in the Sargasso Sea during the spring of 1987. *J. Geophys. Res.,* **96,** 8,643–8,663.

——, and D.A. Siegel, (Eds.), 1993: *Bio-Optics in U.S. JGOFS.* Report of the Bio-Optics Workshop, U.S. JGOFS Planning and Coordination Office, Woods Hole, Massachusettes, 180 pp.

Ding, K., and H.R. Gordon, 1995: Analysis of the influence of O_2 "A" band absorption on atmospheric correction of ocean color imagery. *Appl. Opt.,* **34,** 2,068–2,080.

Duffett-Smith, P., 1979: *Practical Astronomy With Your Calculator.* Cambridge University Press, 129 pp.

Duntley, S.Q., R.W. Austin, W.H. Wilson, C.F. Edgerton,and M.E. Moran, 1974: Ocean color analysis. *Visibility Laboratory of the Scripps Institution of Oceanography Report, SIO Ref. 74–10,* 70 pp.

Duysens, L.N.M., 1956: The flattening of the absorption spectrum of suspensions as compared with that of solutions. *Biochim. Biophys. Acta.,* **19,** 1–12.

– E –

Ebert, E.E., 1992: Pattern recognition analysis of polar clouds during summer and winter. *Int. J. Remote Sens.,* **13,** 97–109.

Eck, T.F., and V.L. Kalb, 1991: Cloud-screening for Africa using a geographically and seasonally variable infrared threshold. *Int. J. Remote Sens.,* **12,** 1,205–1,221.

Eckstein, B.A., and J.J. Simpson, 1991: Cloud screening Coastal Zone Color Scanner images using channel 5. *Int. J. Remote Sens.,* **12,** 2,359–2,377.

England, C.F., and G.E. Hunt, 1985: A bispectral method for the automatic determination of parameters for use in imaging satellite cloud retrievals. *Int. J. Remote Sens.,* **6,** 1,545–1,553.

Eppley, R.W., 1984: Relations between primary productivity and ocean chlorophyll determined by satellites. *Global Ocean Flux Study: Proceedings of a Workshop,* National Academy Press, Washington, DC, 85–102.

Esaias, W., G. Feldman, C.R. McClain, and J. Elrod, 1986: Satellite observations of oceanic primary productivity. *Eos, Trans. AGU,* **67,** 835–837.

Evans, R.H., and H.R. Gordon, 1994: CZCS "system calibration:" A retrospective examination. *J. Geophys. Res.,* **99,** 7,293–7,307.

– F –

Feldman, G., 1986: Variability of the productive habitat in the eastern equatorial Pacific. *Eos, Trans. AGU,* **67,** 106–108.

——, D. Clark, and D. Halpern, 1984: Satellite color observations of the phytoplankton distribution in the eastern equatorial Pacific during the 1982–1983 El Niño. *Science,* **226,** 1,069–1,071.

——, N. Kuring, C. Ng, W. Esaias, C. McClain, J. Elrod, N. Maynard, D. Endres, R. Evans, J. Brown, S. Walsh, M. Carle, and G. Podesta, 1989: Ocean Color: Availability of the global data set. *Eos, Trans. AGU,* **70,** 634.

Firestone, E.R., and S.B. Hooker, 1992: SeaWiFS Technical Report Series Cumulative Index: Volumes 1–5. *NASA Tech. Memo. 104566, Vol. 6,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 9 pp.

——, and ——, 1993: SeaWiFS Technical Report Series Cumulative Index: Volumes 1–11. *NASA Tech. Memo. 104566, Vol. 12,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 28 pp.

——, and ——, 1995: SeaWiFS Technical Report Series Cumulative Index: Volumes 1–17. *NASA Tech. Memo. 104566, Vol. 18,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 47 pp.

Firestone, J.K., G. Fu, M. Darzi, and C.R. McClain, 1990: NASA's SEAPAK software for oceanographic data analysis: An update. *Proc. Sixth Int. Conf. Interactive Information Processing Systems for Meteor., Oceanogr., and Hydrol.,* Am. Meteor. Soc., Anaheim, California, 260–267.

——, and B.D. Scheiber, 1994: "The Generation of Ancillary Data Climatologies." In: McClain, C.R., K.R. Arrigo, J. Comiso, R. Fraser, M. Darzi, J.K. Firestone, B. Schieber, E-n. Yeh, and C.W. Sullivan, 1994: Case Studies for SeaWiFS Calibration and Validation, Part 1. *NASA Tech. Memo. 104566, Vol. 13,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 35–42.

Flierl, G., D. Glover, J. Bishop, and S. Paranjpe, 1993: *The JGOFS Distributed Object Oriented Data System User Guide.* Massachusetts Institute of Technology, Cambridge, Massachusetts, 90 pp.

Flittner, D.E., and P.N. Slater, 1991: Stability of narrow-band filter radiometers in the solar-reflective range. *Photogramm. Eng. Remote Sens.,* **57,** 165–171.

Fofonoff, N.P., and R.C. Millard, Jr., 1983: Algorithms for Computation of Fundamental Properties of Seawater. *UNESCO Tech. Papers in Mar. Sci.,* **44,** UNESCO, 53 pp.

Fraser, R.S., 1993: Optical thickness of atmospheric dust over Tadjhikistan. *Atmos. Envir.,* **27A,** 2,533–2,538.

——, R.A. Ferrare, Y.J. Kaufman, B.L. Markham, and S. Mattoo, 1992: Algorithm for atmospheric corrections of aircraft and satellite imagery. *Int. J. Remote Sens.,* **13,** 541–557.

Frederick, J.E., R.P. Cebula, and D.F. Heath, 1986: Instrument characterization for detection of long-term changes in stratospheric ozone: An analysis of the SBUV/2 radiometer. *J. Atmos. Ocean. Technol.,* **3,** 472–480.

Frohlich, C., 1979: WMO/PMOD Sunphotometer: Instructions for Manufacture. *World Meteor. Org.,* Geneva, Switzerland, 3 pp., (plus tables and drawings).

Frost, B.W., 1991: The role of grazing in nutrient rich areas of the open seas. *Limnol. Oceanogr.,* **36,** 1,616–1,630.

Fukuchi, M., 1980: Phytoplankton chlorophyll stocks in the Antarctic ocean. *J. Oceanogr. Soc. Japan,* **36,** 73–84.

– G –

Gallaudet, T.C., and J.J. Simpson, 1991: Automated cloud screening of AVHRR imagery using split-and-merge clustering. *Remote Sens. Environ.,* **38,** 77–121.

Garand, L., 1986: *Automated Recognition of Oceanic Cloud Patterns and Its Application to Remote Sensing of Meteorological Parameters.* Doctoral dissertation, Dept. of Meteorology, Univ. of Wisconsin-Madison.

Garver, S.A., D.A. Siegel, and B.G. Mitchell, 1995: Variability in near surface particulate absorption spectra: What can a satellite imager see? *Limnol. Oceanogr.,* **39,** 1,349–1,367.

General Sciences Corp., 1991: SeaWiFS Science Data and Information System Architecture Report. *GSC-TR-21-91-006,* General Sciences Corp., Laurel, Maryland, 133 pp.

Gieskes, W.W.C., and G.W. Kraay, 1986: Analysis of phytoplankton pigments by HPLC before, during, and after mass occurrence of the microflagellate corymbellus during the spring bloom in the open north North Sea in 1983. *Mar. Biol.,* **92,** 45–52.

Gleason, J.F., P.K. Bhartia, J.R. Herman, R. McPeters, P. Newman, R.S. Stolarski, L. Flynn, G. Labow, D. Larko, C. Seftor, C. Wellemeyer, W.D. Komhyr, A.J. Miller, and W. Planet, 1993: Record low global ozone in 1992. *Science,* **260,** 523–526.

Goericke, R., and D.J. Repeta, 1993: Chlorophylls *a* and *b* and divinyl chlorophylls *a* and *b* in the open subtropical North Atlantic Ocean. *Mar. Ecol. Prog. Ser.,* **10,** 307–313.

Gordon, H.R., 1978: Removal of atmospheric effects from satellite imagery of the oceans. *Appl. Opt.,* **17,** 1,631–1,636.

——, 1981a: Reduction of error introduced in the processing of coastal zone color scanner-type imagery resulting from sensor calibration and solar irradiance uncertainty. *Appl. Opt.,* **20,** 207–210.

——, 1981b: A preliminary assessment of the Nimbus-7 CZCS atmospheric correction algorithm in a horizontally inhomogeneous atmosphere. *Oceanography from Space,* J.F.R. Gower, Ed., Plenum Press, 257–266.

——, 1985: Ship perturbations of irradiance measurements at sea, 1: Monte Carlo simulations. *Appl. Opt.,* **24,** 4,172–4,182.

——, 1987a: Calibration requirements and methodology for remote sensors viewing the ocean in the visible. *Remote Sens. Environ.,* **22,** 103–126.

——, 1987b: Visible calibration of ocean-viewing sensors. *Remote Sens. of Environ.,* **22,** 103–126.

——, 1988: Ocean color remote sensing systems: radiometric requirements. *Recent Advances in Sensors, Radiometry, and Data Processing for Remote Sensing,* P.N. Slater, Ed., SPIE, **924,** 151–167.

——, 1989a: Dependence of the diffuse reflectance of natural waters on the sun angle. *Limnol. Oceanogr.,* **34**, 1,484–1,489.

——, 1989b: Can the Lambert-Beer law be applied to the diffuse attenuation coefficient of ocean water? *Limnol. Oceanogr.,* **34,** 1,389–1,409.

——, 1990: Radiometric considerations for ocean color remote sensors. *Appl. Opt.,* **29,** 3,228–3,236.

——, 1991: Absorption and scattering estimates from irradiance measurements: Monte Carlo simulations. *Limnol. Oceanogr.,* **36,** 769–777.

——, J.M. Smith, and O.B. Brown, 1971: Spectra of underwater light-field fluctuations in the photic zone. *Bull. Mar. Sci.,* **21,** 466–470.

——, and D.K. Clark, 1980: Remote sensing optical properties of a stratified ocean: an improved interpretation. *Appl. Opt.,* **19,** 3,428–3,430.

——, ——, J.L. Mueller, and W.A. Hovis, 1980: Phytoplankton pigments from the NIMBUS-7 Coastal Zone Color Scanner: Comparisons with surface measurements. *Science,* **210,** 63–66.

——, and ——, 1981: Clear water radiances for atmospheric correction of coastal zone color scanner imagery. *Appl. Opt.,* **20,** 4,175–4,180.

——, ——, J.W. Brown, O.B. Brown, and R.H. Evans, 1982: Satellite measurements of phytoplankton pigment concentration in the surface waters of a warm core Gulf Stream ring. *J. Mar. Res.,* **40,** 491–502.

——, ——, ——, ——, ——, and W.W. Broenkow, 1983a: Phytoplankton pigment concentrations in the Middle Atlantic Bight: Comparison of ship determinations and CZCS estimates. *Appl. Opt.,* **22,** 20–36.

——, J.W. Brown, O.B. Brown, R.H. Evans, and D.K. Clark, 1983b: Nimbus 7 CZCS: reduction of its radiometric sensitivity with time. *Appl. Opt.,* **24,** 3,929–3,931.

——, and A.Y. Morel, 1983c: Remote assessment of ocean color for interpretation of satellite visible imagery: review. *Lecture Notes on Coastal and Estuarine Studies, Vol. 4,* Springer-Verlag, 114 pp.

——, and D.J. Castaño, 1987: Coastal Zone Color Scanner atmospheric correction algorithm: multiple scattering effects. *Appl. Opt.,* **26,** 2,111–2,122.

——, O.B. Brown, R.H. Evans, J.W. Brown, R.C. Smith, K.S. Baker, and D.K. Clark, 1988a. A semianalytic radiance model of ocean color. *J. of Geophys. Res.,* **93,** 10,909–10,924.

——, J.W. Brown, and R.H. Evans, 1988b: Exact Rayleigh scattering calculations for use with the Nimbus-7 Coastal Zone Color Scanner. *Appl. Opt., 27,* **5,** 862–871.

——, and D.J. Castaño, 1989: Aerosol analysis with Coastal Zone Color Scanner: A simple method for including multiple scattering effects. *Appl. Opt.,* **28,** 1,320–1,326.

——, and K. Ding, 1992: Self shading of in-water optical instruments. *Limnol. Oceanogr.,* **37,** 491–500.

——, and M. Wang, 1994: Retrieval of water-leaving radiances and aerosol optical thickness over the oceans with SeaWiFS: a preliminary algorithm, *Appl. Opt.,* **33,** 443–452.

Gower, J.F.R., 1985: Reduction of the effect of clouds on satellite thermal imagery. *Int. J. Remote Sens.,* **6,** 1,419–1,434.

Gregg, W.W., 1992: Analysis of Orbit Selection for SeaWiFS: Ascending vs. Descending Node. *NASA Tech. Memo. 104566, Vol. 2,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 16 pp.

——, and K.L. Carder, 1990: A simple spectral solar irradiance model for cloudless maritime atmospheres. *Limnol. Oceanogr.,* **35,** 1,657–1,675.

——, F.C. Chen, A.L. Mezaache, J.D. Chen, and J.A. Whiting, 1993: The Simulated SeaWiFS Data Set, Version 1. *NASA Tech. Memo. 104566, Vol. 9,* S.B. Hooker, E.R. Firestone, and A.W. Indest, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 17 pp.

——, and F.S. Patt, 1994: Assessment of tilt capability for spaceborne global ocean color sensors. *IEEE Trans. Geosci. Remote Sens.,* **32,** 866–877.

Griggs, M., 1968: Absorption coefficients of ozone in the ultraviolet and visible regions. *J. Chem. Phys.,* **49,** 857.

Groom, S.B., and P.M. Holligan, 1987: Remote sensing of coccolithophorid blooms. *Adv. Space Res.,* **7,** 73–78.

Guenther, B., 1991: Accuracy and precisions actually achieved for large aperture sources for aircraft and space investigations. *Metrologia,* **28,** 229–232.

Gutman, G., D. Tarpley, and G. Ohring, 1987: Cloud screening for determination of land surface characteristics in a reduced resolution satellite data set. *Int. J. Remote Sens.,* **8,** 859–870.

– H –

Habermann, T., 1991: Freeform—A Flexible System of Format Specifications For Data Access. National Geophysical Data Center, NOAA, 37 pp.

Hamilton, M.K., C.O. Davis, W.J. Rhea, S.H. Pilorz, and K.L. Carder, 1993: Estimating chlorophyll content and bathymetry of Lake Tahoe using AVIRIS data. *Remote Sens. Environ.,* **44,** 217–230.

Haury, L.R., J.J. Simpson, J. Pelaez, C. Koblinsky, and D. Wiesenhahn, 1986: Biological consequences of a recurrent eddy off Point Conception, California. *J. Geophys. Res.,* **91,** 12,937–12,956.

Hay, B.J., C.R. McClain, and M. Petzold, 1993: An assessment of the NIMBUS-7 CZCS calibration for May 1986 using satellite and *in situ* data from the Arabian Sea. *Remote Sens. Environ.,* **43,** 35–46.

Hayes, S.P., L.J. Mangum, J. Picaut, A. Sumi, and K. Takeuchi, 1991: TOGA-TAO: A moored array for real-time measurements in the tropical Pacific Ocean. *Bull. Am. Meteor. Soc.,* **72,** 339–347.

Helliwell, W.S., G.N. Sullivan, B. MacDonald, and K.J. Voss, 1990: Ship shadowing: model and data comparison. *Ocean Optics X,* R.W. Spinrad, Ed., SPIE, **1302,** 55–71.

Herman, J.R., R.D. Hudson, and G.N. Serafino, 1990: An analysis of the 8 year trend in ozone depletion from alternate models of SBUV instrument degradation. *J. Geophys. Res.,* **95,** 7,403–7,416.

Hoepffner, N., and S. Sathyendranath, 1993: Determination of the major groups of phytoplankton pigments from the absorption spectra of total particulate matter. *J. Geophys. Res.,* **98,** 22,789–22,803.

Hoge, F.E., and R.N. Swift, 1990: Phytoplankton accessory pigments: Evidence for the influence of phycoerythrin on the submarine light field. *Remote Sens. Environ.,* **34,** 19–25.

——, and ——, 1993: The influence of chlorophyll pigment upon the upwelling spectral radiances from the North Atlantic Ocean. *Deep-Sea Res.,* **40,** 265–278.

Holligan, P.M., M. Viollier, D.S. Harbour, P. Camus, and M. Champagne-Philippe, 1983: Satellite and ship studies of coccolithophore production along a continental shelf edge. *Nature,* **304,** 339–342.

——, and W.M. Balch, 1991: From the ocean to cells: coccolithophore optics and biogeochemistry. *Particle Analysis in Oceanography,* S. Demers, Ed., Springer-Verlag, Berlin, 301–324.

——, E. Fernandez, J. Aiken, W.M. Balch, P. Boyd, P.H. Burkill, M. Finch, S.B. Groom, G. Malin, K. Muller, D.A. Purdie, C. Robinson, C.C. Trees, S.M. Turner, and P. van der Wal, 1993: A biogeochemical study of the coccolithophore, *Emiliania huxleyi,* in the North Atlantic. *Global Biogeochem. Cycles,* **7,** 879–900.

Holm-Hansen, O., C.J. Lorenzen, R.W. Holmes, and J.D.H. Strickland, 1965: Fluorometric determination of chlorophyll. *J. du Cons. Int'l. pour l'Explor. de la Mer,* **30,** 3–15.

Hooker, S.B., P.L. Coronado, W.E. Esaias, G.C. Feldman, W.W. Gregg, C.R. McClain, B.W. Meeson, L.M. Olsen, R.A. Barnes, and E.F. Del-Colle, 1992a: *Baselines and Background Documentation,* SeaWiFS Science Team Meeting, January, 1993, Volume 1, S.B. Hooker and W.E. Esaias, Eds., SeaWiFS Proj. Office, NASA Goddard Space Flight Center, Greenbelt, Maryland, 244 pp.

——, W.E. Esaias, G.C. Feldman, W.W. Gregg, and C.R. McClain, 1992b: An Overview of SeaWiFS and Ocean Color. *NASA Tech. Memo. 104566, Vol. 1,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 24 pp., plus color plates.

——, W.L. Barnes W.E. Esaias, G.C. Feldman, W.W. Gregg, R.G. Kirk, C.R. McClain, C.H. Vermillion, D.J. Zukor, R.A. Barnes, 1993a: *SeaWiFS Project Presentations,* SeaWiFS Science Team Meeting, January, 1993, Volume 2. S.B. Hooker and W.E. Esaias, Eds., SeaWiFS Proj. Office, NASA Goddard Space Flight Center, Greenbelt, Maryland, 235 pp.

——, W.E. Esaias, and L.A. Rexrode, 1993b: Proceedings of the First SeaWiFS Science Team Meeting. *NASA Tech. Memo. 104566, Vol. 8,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 61 pp.

——, C.R. McClain, and A. Holmes, 1993c: Ocean color imaging: CZCS to SeaWiFS. *Mar. Tech. Soc. J.,* **27,** 3–15.

——, ——, J.K. Firestone, T.L. Westphal, E-n. Yeh, and Y. Ge, 1994: The SeaWiFS Bio-Optical Archive and Storage System (SeaBASS), Part 1. *NASA Tech. Memo. 104566, Vol. 20,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 40 pp.

Hoots, F.R., and R.L. Roehrich, 1980: Models for Propagation of NORAD Element Sets. *Project Spacetrack Report No. 3,* 100 pp.

Hoppel, W.A., J.W. Fitzgerald, G.M. Frick, and R.E. Larson, 1990: Aerosol size distributions and optical properties found in the marine boundary layer over the Atlantic Ocean. *J. Geophys. Res.,* **95,** 3,659–3,686.

Hovis, W.A., 1981: The Nimbus-7 Coastal Zone Color Scanner (CZCS) program. *Oceanography from Space,* J.F.R. Gower, Ed., Plenum Press, 213–225.

——, and K.C. Leung, 1977: Remote sensing of ocean color. *Optical Eng.,* **16,** 158–166.

——, D.K. Clark, F. Anderson, R.W. Austin, W.H. Wilson, E.T. Baker, D. Ball, H.R. Gordon, J.L. Mueller, S. El-Sayed, B. Sturm, R.C. Wrigley, and C.S. Yentsch, 1980: NIMBUS-7 Coastal Zone Color Scanner: System description and initial imagery. *Science,* **210,** 60–63.

——, J.S. Knoll, and G.R. Smith, 1985: Aircraft measurements for calibration of an orbiting spacecraft sensor. *Appl. Opt.* **24,** 407–410.

Hughes, C.G., III, 1982: Silicon photodiode absolute spectral self-calibration using a filtered tungsten source. *Appl. Opt.,* **21,** 2,129–2,132.

– I –

Inn, E.C.Y., and Y. Tanaka, 1953: Absorption coefficient of ozone in the ultraviolet and visible regions. *J. Opt. Soc. Amer.,* **43,** 870–873.

Iqbal, M., 1983: *An Introduction to Solar Radiation.* Academic Press, 390 pp.

Ishizaka, J., 1990a: Coupling of Coastal Zone Color Scanner data to physical-biological model of the southeastern U.S. continental shelf ecosystem, 1. CZCS data description and Lagrangian particle tracing experiments. *J. Geophys. Res.,* **95,** 10,167–10,181.

——, 1990b: Coupling of Coastal Zone Color Scanner data to physical-biological model of the southeastern U.S. continental shelf ecosystem, 2. an Eulerian model. *J. Geophys. Res.,* **95,** 10,183–10,199.

——, 1990c: Coupling of Coastal Zone Color Scanner data to physical-biological model of the southeastern U.S. continental shelf ecosystem, 3. nutrient and phytoplankton fluxes and CZCS data assimilation. *J. Geophys. Res.,* **95,** 10,201–10,212.

– J –

James, H.R., and E.A. Birge, 1938: A laboratory study of the absorption of light by lake waters. *Trans. Wis. Acad. Sci.,* **31,** 1–154.

Jerlov, N.G., 1976: *Marine Optics,* Elsevier Scientific Publishing Co., 231 pp.

Joint EOSAT–NASA SeaWiFS Working Group, 1987: System concept for wide-field-of-view observations of ocean phenomena from space. *Report of the Joint EOSAT/NASA SeaWiFS Working Group,* Earth Observation Satellite Co., Lanham, Maryland, 92 pp.

Joint Global Ocean Flux Study, 1991: JGOFS Core Measurements Protocols. *JGOFS Report No. 6,* Scientific Committee on Oceanic Research, 40 pp.

Joseph, J.H., 1985: The morphology of fair weather cumulus cloud fields as remotely sensed from satellites and some applications. *Adv. Space Res.,* **5,** 213–216.

Jursa, A.S., 1985: *Handbook of Geophysics and the Space Environment.* Air Force Geophysics Laboratory, 18-11–18-24.

Justice, J.O., B.L. Markham, J.R.G. Townshend, and R.L. Kennard, 1989: Spatial degradation of satellite data.*Int. J. Remote Sens.,* **10,** 1,539–1,561.

Justus, C.G., and M.V. Paris, 1985: A model for solar spectral irradiance and radiance at the bottom and top of a cloudless atmosphere, *J. Climate Appl. Meteor.,* **24,** 193–205.

– K –

Kasten, F., 1966: A new table and approximate formula for relative optical air mass. *Geophys. Biokimatol.,* **B14,** 206–223.

Kaufman, Y.J., 1987: The effect of subpixel clouds on remote sensing. *Int. J. Remote Sens.,* **8,** 839–857.

Kelly, K.A., 1985: Separating clouds from ocean in infrared images. *Remote Sensing Environ.,* **17,** 67–83.

Kerr, R.A., 1993: Ozone takes a nose dive after the eruption of Mt. Pinatubo. *Science,* **260,** 490–491.

Key, J.R., and R.G. Barry, 1989: Cloud cover analysis with Arctic AVHRR data. 1. Cloud detection. *J. Geophys. Res.,* **94,** 18,521–18,535.

——, J.A. Maslanik, and R.G. Barry, 1989: Cloud classification from satellite data using a fuzzy sets algorithm: A polar example. *Int. J. Remote Sens.,* **10,** 1,823–1,842.

Kidwell, K.B., 1991: NOAA Polar Orbiter User's Guide. NOAA NESDIS, Washington D.C., 279 pp.

Kiefer, D.A., and R.A. Reynolds, 1992: Advances in understanding phytoplankton fluorescence and photosynthesis. *Primary Productivity and Biogeochemical Cycles in the Sea,* P.G. Falkowski and A.D. Woodhead, Eds., Plenum Press, 155–174.

King, M.D., Y.J. Kaufman, W.P. Menzel, and D. Tanre, 1992: Remote sensing of cloud, aerosol, and water vapor properties from the Moderate Resolution Imaging Spectrometer (MODIS). *IEEE Trans. Geosci. Remote Sens.,* **30,** 2–27.

Kishino, M., N. Okami, and S. Ichimura, 1985: Estimation of the spectral absorption coefficients of phytoplankton in the sea. *Bull. Mar. Sci.,* **37,** 634–642.

Kneizys, F.X., E.P. Shettle, W.O. Gallery, J.H. Chetwynd, L.W. Abreu, J.E.A. Selby, S.A. Clough, and R.W. Fenn, 1983: *Atmospheric transmittance/ radiance: computer code LOWTRAN 6.* AFGL-TR-83-0187, Air Force Geophysics Lab, Hanscom AFB, Massachusetts, 200 pp.

Koepke, P., 1985: The reflectance factors of a rough ocean with foam. Comment on "Remote sensing of sea state using the 0.8–1.1 m spectral band" by L. Wald and M. Monget. *Int. J. Remote Sens.,* **6,** 787–799.

Kohler, R., R. Pello, and J. Bonhoure, 1990: Temperature dependent nonlinearity effects of a QED-200 detector in the visible. *Appl. Opt.,* **29,** 4,212–4,215.

Kuring, N., M.R. Lewis, T. Platt, and J.E. O'Reilly, 1990: Satellite-derived estimates of primary production on the northwest Atlantic continental shelf. *Cont. Shelf Res.,* **10,** 461–484.

– L –

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).

Lee, Z., K.L. Carder, S.K. Hawes, R.G. Steward, T.G. Peacock and C.O. Davis, 1992: An interpretation of high spectral resolution remote sensing reflectance. *Optics of the Air-Sea Interface: Theory and Measurement,* L. Estep, Ed., SPIE, **1749,** 49–64.

Letelier, R.M., R.R. Bidigare, D.V. Hebel, M.E. Ondrusek, C.D. Winn, and D.M. Karl, 1993: Temporal variability of phytoplankton community structure at the U.S.-JGOFS time-series Station ALOHA (22° 45' N, 158° W) based on HPLC pigment analysis. *Limnol. Oceanogr.,* **38,** 1,420–1,437.

Lyddane, R.H., 1963: Small eccentricities or inclinations in the Brouwer theory of the artificial satellite. *Astron. J.*, **68,** 555–558.

Lynnes, C., B. Vollmer, H. Griffioen, and P. King, 1992: *Metadata Submission Guide, version 0.9.* NASA Goddard Space Flight Center DAAC, Oct. 2, 1992, NASA GSFC, Greenbelt, Maryland, 11 pp.

– M –

Maffione, R.A., D.R. Dana, and R.C. Honey, 1991: Instrument for underwater measurement of optical backscatter. In: *Underwater Imaging, Photography, and Visibility,* R.W. Spinrad, Ed., SPIE, **1,537,** 173–184.

Mantoura, R.F.C., and C.A. Llewellyn, 1983: The rapid determination of algal chlorophyll and carotenoid pigments and their breakdown products in natural waters by reverse-phase high-performance liquid chromatography. *Anal. Chim. Acta,* **151,** 297–314.

Marshall, B.R., and R.C. Smith, 1990: Raman scattering and in-water optical properties. *Appl. Opt.,* **29,** 71–84.

Martin, D.L., 1992: *Minimizing Systematic Errors in Phytoplankton Pigment Concentration Derived from Satellite Ocean Color Measurements.* Ph.D. dissertation, University of Washington, Seattle, Washington, 121 pp.

McClain, C.R., and L.P. Atkinson, 1985: A note on the Charleston Gyre. *J. Geophys. Res.,* **90,** 11,857–11,861.

——, S.-Y. Chao, L. Atkinson, J. Blanton, and F. de Castillejo, 1986: Wind-driven upwelling in the vicinity of Cape Finisterre, Spain. *J. Geophys. Res.,* **91,** 8,470–8,486.

——, J.A. Yoder, L.P. Atkinson, J.O. Blanton, T.N. Lee, J.J. Singer, and F. Muller-Karger, 1988: Variability of Surface Pigment Concentrations in the South Atlantic Bight. *J. Geophys. Res.,* **93,** 10,675–10,697.

——, J. Ishizaka, and E. Hofmann, 1990a: Estimation of phytoplankton pigment changes on the Southeastern U.S. continental shelf from a sequence of CZCS images and a coupled physical-biological model. *J. Geophys. Res.,* **95,** 20,213–20,235.

——, W.E. Esaias, G.C. Feldman, J. Elrod, D. Endres, J. Firestone, M. Darzi, R. Evans, and J. Brown, 1990b: Physical and biological processes in the North Atlantic during the First Global GARP Experiment. *J. Geophys. Res.,* **95,** 18,027–18,048.

——, M. Darzi, J. Firestone, E.-n. Yeh, G. Fu, and D. Endres, 1991a: SEAPAK Users Guide, Version 2.0, Vol. I—System Description. *NASA Tech. Mem. 100728,* NASA Goddard Space Flight Center, Greenbelt, Maryland, 158 pp.

——, ——, ——, ——, ——, and ——, 1991b: SEAPAK Users Guide, Version 2.0, Vol. II—Descriptions of Programs. *NASA Tech. Mem. 100728,* NASA Goddard Space Flight Center, Greenbelt, Maryland, 586 pp.

——, C.J. Koblinsky, J. Firestone, M. Darzi, E-n. Yeh, and B. Beckley, 1991c: An examination of some Southern Ocean data sets, *EOS Trans. AGU,* **72,** 345–351.

——, W.E. Esaias, W. Barnes, B. Guenther, D. Endres, S.B. Hooker, G. Mitchell, and R. Barnes, 1992a: Calibration and Validation Plan for SeaWiFS. *NASA Tech. Memo. 104566, Vol. 3,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 41 pp.

——, G. Fu., M. Darzi, and J.K. Firestone, 1992b: PC-SEAPAK User's Guide, Version 4.0. *NASA Technical Memorandum 104557,* NASA Goddard Space Flight Center, Greenbelt, Maryland, 408 pp.

——, E-n. Yeh, and G. Fu, 1992c: An Analysis of GAC Sampling Algorithms: A Case Study. *NASA Tech. Memo. 104566, Vol. 4,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 20 pp., plus color plates.

——, G. Feldman, and W. Esaias, 1993: Oceanic biological productivity. *Atlas of Satellite Observations Related to Global Change,* R.J. Gurney, J.L. Foster, and C.L. Parkinson, Eds., Cambridge University Press, 251–263.

——, and E-n. Yeh, 1994a: "Pixel-by-pixel pressure and ozone correction study," In: McClain, C.R., J.C. Comiso, R.S. Fraser, J.K. Firestone, B.D. Schieber, E-n. Yeh, K.R. Arrigo, C.W. Sullivan, 1994: Case Studies for SeaWiFS Calibration and Validation, Part 1. *NASA Tech. Memo. 104566, Vol. 13,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 21–26.

——, and ——, 1994b: "CZCS Bio-Optical Algorithm Comparison." In: McClain, C.R., J.C. Comiso, R.S. Fraser, J.K. Firestone, B.D. Scheiber, E-n. Yeh, K.R. Arrigo, and C.W. Sullivan, 1994: Case Studies for SeaWiFS Calibration and Validation, Part 1. *NASA Tech. Memo. 104566, Vol. 13,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 3–8.

——, and ——, 1994c: "Sun glint flag sensitivity study." In: 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, 1994: Case Studies for SeaWiFS Calibration and Validation, Part 1. *NASA Tech. Memo. 104566, Vol. 13,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 46–47.

——, R.S. Fraser, and E-n. Yeh, 1994: "SeaWiFS Pressure and Oxygen Absorption Study," In: McClain, C.R., J.C. Comiso, R.S. Fraser, J.K. Firestone, B.D. Schieber, E-n. Yeh, K.R. Arrigo, C.W. Sullivan, 1994: Case Studies for SeaWiFS Calibration and Validation, Part 1. *NASA Tech. Memo. 104566, Vol. 13,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 15–20.

McClain, E.P., 1989: Global sea surface temperatures and cloud clearing for aerosol optical depth estimates. *Int. J. Remote Sens.,* **10,** 763–769.

——, W.G. Pichel, and C.C. Walton, 1985: Comparative performance of AVHRR-based multichannel sea surface temperatures. *J. Geophys. Res.,* **90,** 11,587–11,601.

McLean, J.T., and B.W. Guenther, 1989: Radiance calibration of spherical integrators. *Optical Radiation Measurements II,* SPIE, **1109,** 114–121.

Mecherikunnel, A.T., and H.L. Kyle, 1991: Eleven-year cycle of solar constant variation from spacecraft measurements: 1978 to 1990. *Science,* (withdrawn).

Meindl, E.A., and G.D. Hamilton, 1992: Programs of the National Data Buoy Center, *Bull. Am. Meteor. Soc.,* **73,** 985–993.

Michaelsen, J., X. Zhang, and R.C. Smith, 1988: Variability of pigment biomass in the California Current system as determined by satellite imagery, 2. temporal variability. *J. Geophys. Res.,* **93,** 10,883–10,896.

Mitchell, B.G., 1990: Algorithms for determining the absorption coefficient for aquatic particulates using the quantitative filter technique. *Ocean Optics X,* R.W. Spinrad, Ed., SPIE, **1302,** 137–148.

——, and D.A. Kiefer, 1984: Determination of absorption and fluorescence excitation spectra for phytoplankton. *Marine Phytoplankton and Productivity,* O. Holm-Hansen, L. Bolis, and R. Gilles, Eds., Springer-Verlag, 157–169.

——, and ——, 1988: Chlorophyll–*a* specific absorption and fluorescence excitation spectra for light-limited phytoplankton. *Deep-Sea Res.,* **35,** 639–663.

——, and O. Holm-Hansen, 1991: Bio-optical properties of Antarctic Peninsula waters: differentiation from temperate ocean models. *Deep-Sea Res.,* **39,** 1,009–1,028.

Morel, A., 1974: Optical properties of pure water and sea water. *Optical Aspects of Oceanography,* N.G. Jerlov and S. Nielsen, Eds., Academic Press, 1–24.

——, 1980: In-water and remote measurements of ocean color. *Bound.-layer Meteor.,* **18,** 178–201.

——, 1988: Optical modeling of the upper ocean in relation to its biogenous matter content (Case I waters). *J. Geophys. Res.,* **93,** 10,749–10,768.

——, and L. Prieur, 1977: Analysis of variations in ocean color. *Limnol. Oceanogr.,* **22,** 709–722.

——, and R.C. Smith, 1982: Terminology and units in optical oceanography. *Mar. Geod.,* **5,** 335–349.

——, and B. Gentili, 1991: Diffuse reflectance of oceanic waters. I. Its dependence on sun angle as influenced by the molecular scattering contribution. *Appl. Opt.,* **30,** 4,427–4,438.

——, and ——, 1993: Diffuse reflectance of oceanic waters. II. Bidirectional aspects. *Appl. Opt.,* **32,** 6,864–6,879.

Mueller, J.L., 1976: Ocean color spectra measured off the Oregon coast: characteristic vectors. *Appl. Opt.,* **15,** 394–402.

——, 1985: Nimbus–7 CZCS: confirmation of its radiometric sensitivity decay rate through 1982. *Appl. Opt.,* **24,** 1,043–1,047.

——, 1988: Nimbus-7 CZCS: electronic overshoot due to cloud reflectance. *Appl. Opt.,* **27,** 438–440.

——, 1991: Integral Method for Irradiance Profile Analysis. *CHORS Tech. Memo. 007-91,* San Diego State Univ., San Diego, California, 10 pp.

——, 1993: The First SeaWiFS Intercalibration Round-Robin Experiment, SIRREX-1, July 1992. *NASA Tech. Memo. 104566, Vol. 14,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 60 pp.

Mueller, J.L., 1994: Preliminary Comparison of Irradiance Immersion Coefficients for Several Marine Environmental Radiometers (MERs). *CHORS Tech. Memo. 004-94,* Center for Hydro-Optics and Remote Sensing, San Diego State University, San Diego, California, 4 pp.

——, and R.E. Lang, 1989: Bio-optical provinces of the northeast Pacific Ocean: a provisional analysis. *Limnol. Oceanogr.,* **34,** 1,572–1,586.

——, and R.W. Austin, 1992: Ocean Optics Protocols. *NASA Tech. Memo. 104566, Vol. 5,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 45 pp.

——, B.C. Johnson, C.L. Cromer, J.W. Cooper, J.T. McLean, S.B. Hooker, and T.L. Westphal, 1994: The Second SeaWiFS Intercalibration Round-Robin Experiment, SIRREX-2, June 1993. *NASA Tech. Memo. 104566, Vol. 16,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 121 pp.

——, and R.W. Austin, 1995: Ocean Optics Protocols for SeaWiFS Validation, Revision 1. *NASA Tech. Memo. 104566, Vol. 25,* S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 66 pp.

Muller-Karger, F., C.R. McClain, and P. Richardson, 1988: The dispersal of the Amazon water. *Nature,* **333,** 56–59.

——, ——, T.R. Fisher, W.E. Esaias, and R. Varela, 1989: Pigment distribution in the Caribbean Sea: Observations from space. *Prog. Oceanogr.,* **23,** 23–64.

——, ——, R.N. Sambrotto, and G.C. Ray, 1990: A comparison of ship and CZCS-mapped distributions of phytoplankton in the Southeastern Bering Sea. *J. Geophys. Res.,* **95,** 11,483–11,499.

——, J.J. Walsh, R.H. Evans, and M.B. Meyers, 1991: On the seasonal phytoplankton concentration and sea surface temperature cycles of the Gulf of Mexico as determined by satellites. *J. Geophys. Res.,* **96,** 12,645–12,665.

– N –

National Academy of Sciences, 1984: *Global Ocean Flux Study, Proceedings of a Workshop,* National Acad. Press, 360 pp.

National Aeronautics and Space Administration, 1982: The marine resources experiment program (MAREX). *Report of the Ocean Color Science Working Group*, NASA Goddard Space Flight Center, Greenbelt, Maryland, 107 pp.

National Oceanic and Atmospheric Administration (NOAA), 1990: *NDBC Data Availability Summary,* 1801-24-02 Rev. E, U.S. Dept. of Commerce, National Data Buoy Center, Stennis Space Center, 88 pp.

National Research Council, 1990: *TOGA, A Review of Progress and Future Opportunities.* National Academy Press, Washington, D.C., 66 pp.

National Space Science Data Center, 1991: NSSDC CDF User's Guide for UNIX Systems, version 2.1. *Publication NSSDC-WDC-A-R&S 91-30,* 245 pp.

——, 1993: NODIS (NSSDC's On-line Data and Information Service) [database on-line] Master Directory [cited July 1993] Data Set Information Search; identifier: Multiple Key Word Search—TOMS and COADS.

Neckel, H., and D. Labs, 1984: The solar radiation between 3300 and 12500 Å. *Sol. Phys.,* **90,** 205–258.

– O –

Olesen, F.-S., and H. Grassel, 1985: Cloud detection and classification over the oceans at night with NOAA-7. *Int. J. Remote Sens.,* **6**, 1,435–1,444.

Olsen, L.M., and C.R. McClain, 1992: Cooperative efforts in support of ocean research through NASA's Climate Data System. *Proc. Eighth Int. Conf. on Interactive Inform. and Processing Systems for Meteor., Oceanogr., and Hydrol.,* Am. Meteor. Soc., 206–211.

– P –

Pagano, T.S., and R.M. Durham, 1993: Moderate resolution imaging spectroradiometer (MODIS). *Proc. SPIE,* **1,939,** 2–17.

Palmer, J.M., 1988: Use of self-calibrated detectors in radiometric instruments. *Recent Advances in Sensors, Radiometry, and Data Processing for Remote Sensing.* P.N. Slater, Ed., SPIE, **924,** 224–231.

Paltridge, G.W., and C.M.R. Platt, 1976: Radiative processes in meteorology and climatology. *Developments in Atmospheric Science, Vol. 5.* Elsevier Scientific Publishing Co., 318 pp.

Parikh, J.A., 1977: A comparative study of cloud classification techniques. *Remote Sens. Environ.,* **6,** 67–81.

Patt, F.S., C.W. Hoisington, W.W. Gregg, and P.L. Coronado, 1993: Analysis of Selected Orbit Propagation Models for the SeaWiFS Mission. *NASA Tech. Memo. 104566, Vol. 11,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 16 pp.

——, and W.W. Gregg, 1994: Exact closed-form geolocation algorithm for Earth survey sensors. *Inter. J. Remote Sens.,* **15,** 3,719–3,734.

Pegau, W.S., and J.R.V. Zaneveld, 1993: Temperature dependent absorption of water in the red and near infrared portions of the spectrum. *Limnol. Oceanogr.,* **38,** 188–192.

——, J.S. Cleveland, W. Doss, C.D. Kennedy, R.A. Maffione, J.L. Mueller, R. Stone, C.C. Trees, A.D. Weidemann, W.H. Wells, and J.R.V. Zaneveld, 1995: A comparison of methods for the measurement of the absorption coefficient in natural waters. *J. Geophys. Res.,* **100,** 13,201–13,220.

Petzold, T.J., 1972: Volume Scattering Functions for Selected Ocean Waters. *SIO Ref. No. 72–78,* Scripps Institution of Oceanography, La Jolla, California, 79 pp.

——, 1988: A Method for Obtaining Analytical Curve Fits to Underwater Radiometric Measurements. *Tech. Memo. Oc Op/TJP–88–06t,* Scripps Inst. of Oceanogr., La Jolla, California, 20 pp.

——, and R.W. Austin, 1988: Characterization of MER-1032. *Tech. Memo. EV–001–88t*, Vis. Lab., Scripps Inst. of Ocean ogr., La Jolla, California, 56 pp.

Pinder, G.F., and W.G. Gray, 1977: *Finite Element Simulation in Surface and Subsurface Hydrology.* Academic Press, 295 pp.

Phulpin, T., M. Derrien, and A. Brard, 1983: A two-dimensional histogram procedure to analyze cloud cover from NOAA satellite high-resolution imagery. *J. Climate Appl. Meteor.,* **22** 1,332–1,345.

Pinder, G.F., and W.G. Gray, 1977: *Finite Element Simulation in Surface and Subsurface Hydrology,* Academic Press, 295 pp.

Platt, T., and S. Sathyendranath, 1988: Oceanic primary production: estimation by remote sensing at local and regional scales. *Science,* **241,** 1,613–1,620.

——, ——, C.M. Caverhill, and M.R. Lewis, 1988: Ocean primary production and available light: further algorithms for remote sensing. *Deep-Sea Res.,* **35,** 855–879.

——, and ——, 1993: Comment on "The remote sensing of ocean primary productivity: Use of a new data compilation to test satellite algorithms," by, William Balch et al., *J. Geophys. Res.,* **98,** 16,583–16,584.

Poole, H.H., 1936: The photo-electric measurement of submarine illumination in offshore waters. *Rapp. Proc-Verb. Conseil Expl. Mar.,* **101,** 9.

Press, W.H., S.A. Tuekolsky, W.T. Vettering, and B.P. Flannery, 1992: *Numerical Recipes in C: The Art of Scientific Computing.* Cambridge University Press, 994 pp.

Prieur, L., and S. Sathyendranath, 1981: An optical classification of coastal and oceanic waters based on the specific spectral absorption curves of phytoplankton pigments, dissolved organic matter, and other particulate materials. *Limnol. Oceanogr.,* **26,** 671–689.

– Q, R –

Raschke, E., P. Bauer, and H.J. Lutz, 1992: Remote sensing of clouds and surface radiation budget over polar regions. *Int. J. Remote Sens.,* **13,** 13–22.

Research Systems, Inc., 1992a: *Interactive Data Language (IDL) User's Guide, Ver. 3.0.* Boulder, Colorado, 356 pp.

——, 1992b: *Interactive Data Language (IDL) Reference Guide, Version 3.0.* Boulder, Colorado, 424 pp.

Reynolds, D.W., and T.H. Vonder Haar, 1977: A bispectral method for cloud parameter determination. *Mon. Wea. Rev.,* **105,** 446–457.

Reynolds, R.W., 1988: A real-time global sea surface temperature analysis. *J. Climate,* **1,** 75–86.

Robbins, L.L., and P.L. Blackwelder, 1992: Biochemical and ultrastructural evidence for the origin of whitings: A biologically induced calcium carbonate precipitation mechanism. *Geology,* **20,** 464–468.

Rossow, W.B., L.C. Garder, P.-J. Lu, and A. Walker, 1988: International Satellite Cloud Climatology Project (ISCCP) Documentation of Cloud Data. *WMO/TD-No. 266,* World Meteor. Org., Geneva.

——, L.C. Garder, and A.A. Lacis, 1989: Global, seasonal cloud variations from satellite radiance measurements. Part I: Sensitivity of analysis. *J. Climate,* **2,** 419–458.

——, and R.A. Schiffer, 1991: ISCCP cloud data products. *Bull. Am. Meteor. Soc.,* **72,** 2–20.

– S –

Santoreli, R., S. Marallo, and E. Böhm, 1991: An objective analysis scheme for AVHRR imagery. *Int. J. Remote Sens.,* **12,** 681–693.

Sathyendranath, S., 1981: *Influence des substances en solution et en suspension dans les eaux de mer sur l'absorption et la reflectance. Modelisation et application a la teledetection.* Ph.D. Thesis, University of Paris, 123 pp (in French).

Saunders, R.W., 1986: An automated scheme for the removal of cloud contamination for AVHRR radiances over western Europe. *Int. J. Remote Sens.,* **7,** 867–888.

——, 1989: A comparison of satellite-retrieved parameters with mesoscale model results. *Quart. J. Roy. Meteor. Soc.,* **115,** 551–572.

——, and K.T. Kriebel, 1988: An improved method for detecting clear sky and cloudy radiances from AVHRR data. *Int. J. Remote Sens.,* **9,** 123–150, *Errata,* ibid., **9,** 1,393–1,394.

Schowengerdt, R.A., 1983: *Techniques for Image Processing and Classification in Remote Sensing.* Academic Press, 249 pp.

Shaw, G.E., 1976: Error analysis of multiwavelength sun photometry. *Pure Appl. Geophys.,* **114,** 1–14.

Shinn, J.A., R.P. Steinen, B.H. Lidz, and P.K. Swart, 1989: Whitings, a sedimentologic dilemma. *J. Sed. Petrol.,* **59,** 147–161.

Siegel, D.A., C.R. Booth, and T.D. Dickey, 1986: Effects of sensor characteristics on the inferred vertical structure of the diffuse attentuation coefficient spectrum. *Ocean Optics VIII,* M.A. Blizard, Ed., *SPIE,* **637,** 115–124.

——, and T.D. Dickey, 1987: Observations of the vertical structure of the diffuse attenuation coefficient spectrum. *Deep-Sea Res.,* **34,** 547–563.

——, and ——, 1988: Characterization of high-frequency downwelling irradiance fluctuations. *Ocean Optics IX,* **925,** 67–74.

——, A.F. Michaels, J. Sorensen, M.C. O'Brien, and M. Hammer, 1995a: Seasonal variability of light availability and its utilization in the Sargasso Sea. *J. Geophys. Res.,* **100,** 8,695–8,713.

——, M.C. O'Brien, J.C. Sorensen, D. Konnoff, and E. Fields, 1995b: *BBOP Sampling and Data Processing Protocols.* U.S. JGOFS Planning and Coordination Office, Woods Hole, Massachusettes, 79 pp.

Simpson, J.J., and C. Humphrey, 1990: An automated cloud screening algorithm for daytime Advanced Very High Resolution Radiometer imagery. *J. Geophys. Res.,* **95,** 13,459–13,481.

Slater, P.N., and J.M. Palmer, 1991: Solar-diffuser panel and ratioing radiometer approach to satellite sensor on-board calibration. *Proc. SPIE,* **1,493,** 100–105.

Slutz, R.J., S.J. Lubker, J.D. Hiscox, S.D. Woodruff, R.L. Jenne, P.M. Steurer, and J.D. Elms, 1985: *Comprehensive Ocean-Atmosphere Data Set; Release 1.* Climate Research Program, Boulder, Colorado, 263 pp.

Smart, J.H., 1992: Empirical relationships between optical properties in the ocean. In: *Ocean Optics XI,* SPIE, **1,750,** 276–298.

Smith, R.C., 1974: Structure of the solar radiation in the upper layers of the sea. *Optical Aspects of Oceanography.* N.G. Jerlov and E. Steemann-Neilsen, Eds., Academic Press, 95–119.

——, and K.S. Baker, 1978a: The bio-optical state of ocean waters and remote sensing. *Limnol. Oceanogr,* **23,** 247–259.

——, and ——, 1978b: Optical classification of natural waters. *Limnol. Oceanogr.,* **23,** 260–267.

——, and K.S. Baker, 1981: Optical properties of the clearest natural waters (200–800 nm). *Appl. Opt.,* **20,** 177–184.

——, ——, and P. Dustan, 1981: Fluorometric techniques for the measurement of oceanic chlorophyll in the support of remote sensing. *SIO Ref. 81–17,* Scripps Inst. of Oceanogr., La Jolla, California 14 pp.

——, and W.H. Wilson, 1981: Ship and satellite bio-optical research in the California Bight. *Oceanography from Space,* J.F.R. Gower, Ed., Plenum Press, 281–294.

——, and K.S. Baker, 1984: Analysis of ocean optical data. *Ocean Optics VII,* M. Blizard, Ed., SPIE **478,** 119–126.

——, C.R. Booth, and J.L. Star, 1984: Oceanographic bio-optical profiling system. *Appl. Opt.,* **23,** 2,791–2,797.

——, and ——, 1985: Spatial and temporal patterns in pigment biomass in Gulf Stream Warm-Core Ring 82B and its environs. *J. Geophys. Res.,* **90,** 8,859–8,870.

——, and K.S. Baker, 1986: Analysis of ocean optical data. *Ocean Optics VIII,* P.N. Slater, Ed., SPIE, **637,** 95–107.

——, R. Bidigare, B. Prézelin, K. Baker, and J. Brooks, 1987a: Optical Characterization of Primary Productivity Across a Coastal Front. *Mar. Biol.,* **96,** 575–591.

——, O.B. Brown, F.E. Hoge, K.S. Baker, R.H. Evans, R.N. Swift, and W.E. Esaias, 1987b: Multiplatform sampling (ship, aircraft, and satellite) of a Gulf Stream warm core ring. *Appl. Optics,* **26,** 2,068–2,081.

——, X. Zhang, and J. Michaelsen, 1988: Variability of pigment biomass in the California Current system as determined by satellite imagery, 1. Spatial variability. *J. Geophys. Res.,* **93,** 10,863–10,882.

——, and K.S. and Baker, 1989: Stratospheric ozone, middle ultraviolet radiation and phytoplankton productivity. *Oceanography,* **2,** 4–10.

——, K.J. Waters, and K.S. Baker, 1991: Optical variability and pigment biomass in the Sargasso Sea as determined using deep-sea optical mooring data. *J. Geophys. Res.,* **96,** 8,665–8,686.

——, B.B. Prézelin, K.S. Baker, R.R. Bidigare, N.P. Boucher, T. Coley, D. Karentz, S. MacIntyre, H.A. Matlick, D. Menzies, M. Ondrusek, Z. Wan and K.J. Waters, 1992: Ozone depletion: Ultraviolet radiation and phytoplankton biology in Antarctic waters. *Science,* **255,** 952–959.

Smith, S.L., W. Balch, K. Banse, W. Berelson, P. Brewer, O. Brown, K. Cochran, H. Livingston, M. Luther, C. McClain, D. Olson, L. Peterson, W. Peterson, W. Prell, L. Codispoti, A. Devol, H. Ducklow, R. Fine, G. Hitchcock, D. Lal, D. Repeta, E. Sherr, N. Surgi, J. Swallow, S. Wakeham, and K. Wishner, 1991: U.S. JGOFS: Arabian Sea Process Study. *U.S. JGOFS Planning Report No. 13,* Woods Hole Oceanographic Institution, Woods Hole, Massachusetts, 164 pp.

Smith, W.L., P.K. Rao, R. Koffler, and W.P. Curtis, 1970: The determination of sea surface temperature from satellite high-resolution infrared window radiation measurements. *Mon. Wea. Rev.,* **98,** 604–611.

Snyder, R.L., and J. Dera, 1970: Wave-induced light-field fluctuations in the sea. *J. Opt. Soc. Am.,* **60,** 1,072–1,079.

Sørensen, B., 1981: Recommendations of the 2$^{\text{nd}}$ international workshop on atmospheric correction of satellite observation of sea water colour. March 30–April 1, Ispra, Italy, 49 pp.

Sorensen, J.C., M. O'Brien, D. Konoff, and D.A. Siegel, 1994: The BBOP data processing system. *Ocean Optics XII,* J.S. Jaffe, Ed., *SPIE,* **2,258,** 539–546.

Sosik, H.M., and B.G. Mitchell, 1996: Light absorption by phytoplankton, photosynthetic pigments, and detritus in the California Current System. *Deep-Sea Res.,* **42,** 1,717–1,748.

Stackpole, J.D., 1990: GRIB and BUFR: The only codes you will ever need. *Sixth Intl. Conf. on Interactive Information and Processing Systems for Meteorol., Oceanogr., and Hydrol.,* Am. Meteorol. Soc., Anaheim, California, 23–30.

Stone, R.S., G.L. Stephens, C.M.R. Platt, and S. Banks, 1990: The remote sensing of thin cirrus cloud using satellites, lidar and radiative transfer theory. *J. Appl. Meteor.,* **29,** 353–366.

Stowe, L.L., C.G. Wellemeyer, T.F. Eck, H.Y.M. Yeh, and the Nimbus-7 Cloud Data Processing Team, 1988: Nimbus-7 global cloud climatology. *J. Climate,* **1,** 445–470.

——, E.P. McClain, R. Carey, P. Pellegrino, G. Gutman, P. Davis, C. Long, and S. Hart, 1991: Global distribution of cloud cover derived from NOAA/AVHRR operational satellite data. *Adv. Space Phys.,* **11**(3), 51–54.

Stramski, D., 1990: Artifacts in measuring absorption spectra of phytoplankton collected on a filter. *Limnol. Oceanogr.,* **35,** 1,804–1,809.

——, C.R. Booth, and B.G. Mitchell, 1992: Estimation of the downward irradiance attenuation from a single mooring instrument. *Deep-Sea Res.,* **39,** 567–584.

Strickland, J.D.H., 1958: Solar radiation penetrating the ocean: A review of requirements, data and methods of measurement, with particular reference to photosynthetic production. *J. Fish. Bd. Can.,* **15,** 453–493.

——, and T.R. Parsons, 1972: *A Practical Handbook of Sea Water Analysis.* Fish. Res. Board. Canada, 310 pp.

Strub, P.T., C. James, A.C. Thomas, and M.R. Abbott, 1990: Seasonal and nonseasonal variability of satellite-derived surface pigment concentration in the California Current. *J. Geophys. Res.,* **95,** 11,501–11,530.

Sturm, B., 1981: The atmospheric correction of remotely sensed data and the quantitative determination of suspended matter in marine water surface layers. *Rem. Sens. in Meteor., Oceanogr., and Hydrol.,* A.P. Cracknell, Ed., John Wiley & Sons, 163–197.

——, 1993: CZCS data processing algorithms. *Ocean Colour: Theory and Applications in a Decade of CZCS Experience,* V. Barale and P.M. Schlittenhardt (Eds.), ECSC, EEC, EAEC, Brussels and Luxembourg, Kluwer Academic Publishers, Norwell, Massachusetts, 95–116.

Subramaniam, A., and E.J. Carpenter, 1994: An empirically derived protocol for the detection of blooms of the marine cyanobacterium *Trichodesmium* using CZCS imagery. *Int. J. Remote Sens.,* **15,** 1,559–1,569.

Sullivan, C.W., C.R. McClain, J.C. Comiso, and W.O. Smith, Jr., 1988: Phytoplankton standing crops within an Antarctic ice edge assessed by satellite remote sensing. *J. Geophys. Res.,* **93,** 12,487–12,498.

——, K.R. Arrigo, C.R. McClain, J.C. Comiso, and J.K. Firestone, 1993: Distributions of phytoplankton blooms in the Southern Ocean. *Science,* **262,** 1,832–1,837.

– T –

Thiermann, V., and E. Ruprecht, 1992: A method for the detection of clouds using AVHRR infrared observations. *Int. J. Remote Sens.,* **13,** 1,829–1,841.

Toll, R.F., Jr., and W.M. Clune, 1985: An operational evaluation of the Navy Operational Global Atmospheric Prediction System (NOGAPS): 48-hour surface pressure forecasts. *Mon. Wea. Rev.,* **113,** 1,433–1,440.

Toratani, M., and H. Fukushima, 1993: Atmospheric correction scheme for ocean color remote sensing in consideration to Asian dust aerosol. *IGARSS '93, Vol. 4,* IEEE, New York, 1,937–1,940.

Traganza, E., V. Silva, D. Austin, W. Hanson, and S. Bronsink, 1983: Nutrient mapping and recurrence of coastal upwelling centers by satellite remote sensing: Its implication to primary production and the sediment record. *Coastal Upwelling,* E. Suess and J. Thiede, Ed., Plenum Press, 61–83.

Trees, C.C., M.C. Kennicutt, II, and J.M. Brooks, 1985: Errors associated with the standard fluorometric determination of chlorophylls and phaeopigments. *Mar. Chem.,* **17,** 1–12.

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

Trenberth, K.E., and J.G. Olson, 1988: An evaluation and intercomparison of global analyses from the National Meteorological Center and the European Centre for Me-dium Range Weather Forecasts. *Bull. Am. Meteor. Soc.,* **69,** 1,047–1,057.

——, W.G. Large, and J.G. Olson, 1990: The mean annual cycle in global ocean wind stress. *J. Phys. Oceanogr.,* **20,** 1,742–1,760.

Tucker, C.J., and L.D. Miller, 1977: Soil spectra contributions to grass canopy spectral reflectance. *Photogrammetry, Engineering, and Remote Sens.,* 721–726.

Tyler, J.E., and R.C. Smith, 1970: *Measurements of Spectral Irradiance Underwater.* Gordon and Breach, 103 pp.

– U –

United States Navy, 1978: *Marine Climatic Atlas of the World; South Atlantic Ocean, Vol. 4,* NAVAIR 50–1C–531, US Government Printing Office, Washington, DC, 325 pp.

University of Illinois at Urbana-Champaign, 1989: *NCSA HDF Specification.* 43 pp.

——, 1993: *NCSA HDF Calling Interfaces and Utilities, Version 3.2.* 121 pp.

– V –

Viollier, M., 1982: Radiance calibration of the Coastal Zone Color Scanner: a proposed adjustment. *Appl. Opt.,* **21,** 1,142–1,145.

——, D. Tanré, and P.Y. Deschamps, 1980: An algorithm for remote sensing of water color from space. *Bound.-Layer Meteor.,* **18,** 247–267.

Voss, K.J., 1989: Use of the radiance distribution to measure the optical absorption coefficient in the ocean. *Limnol. Oceanogr.,* **34,** 1,614–1,622.

——, J.W. Nolten, and G.D. Edwards, 1986: Ship shadow effects on apparent optical properties. *Ocean Optics VIII,* M. Blizard, Ed., SPIE, **637,** 186–190.

——, and G. Zibordi, 1989: Radiometric and geometric calibration of a spectral electro-optic "fisheye" camera radiance distribution system. *J. of Atmos. and Ocean. Technol.,* **6,** 652–662.

– W –

Walker, J.H., R.D. Saunders, J.K. Jackson, and D.A. McSparron, 1987: Spectral Irradiance Calibrations. *NBS Special Publication 250–20*, U.S. Dept. of Commerce, National Bureau of Standards, Washington, D.C., 37 pp. plus appendices.

——., C.L. Cromer, and J.T. McLean, 1991: Technique for improving the calibration of large-area sphere sources. *Ocean Optics,* B.W. Guenther, Ed., SPIE, **1493,** 224–230.

Walsh, J.J., G.T. Rowe, R.L. Iverson, and C.P. McRoy, 1981: Biological export of shelf carbon is a sink of the global CO_2 cycle. *Nature,* **291,** 196–201.

Walters, N.M., 1983: *Coastal zone colour scanner (CZCS) algorithm description for the South African coastal waters.* Internal report, NPRL Div. of Optical Sciences, Pretoria, S. Africa, 30 pp.

Warneck, P., 1988: *Chemistry of the Natural Atmosphere.* Academic Press, 757 pp.

Waters, K.J., R.C. Smith, and M.R. Lewis, 1990: Avoiding ship induced light field perturbation in the determination of oceanic optical properties. *Oceanogr.*, **3,** 18–21.

Weare, B.C., 1992: A comparison of the ISCCP C1 cloud amounts with those derived from high resolution AVHRR images. *Int. J. Remote Sens.,* **13,** 1,965–1,980.

Weinreb, M.P., G. Hamilton, S. Brown, and R.J. Koczor, 1990: Nonlinear corrections in calibration of Advanced Very High Resolution Radiometer infrared channels. *J. Geophys. Res.,* **95,** 7,381–7,388.

Weir, C., D.A. Siegel, A.F. Michaels, and D. Menzies, 1994: An *in situ* evaluation of a ship's shadow. *Ocean Optics XII,* SPIE, **2,258,** 815–821.

Weller, M. and U. Leiterer, 1988: Experimental data on spectral aerosol optical thickness and its global distribution. *Beitr. Phys. Atmosph.,* **61,** 1–9.

Wertz, J.R. (Ed.), 1978: *Spacecraft Attitude Determination and Control.* D. Reidel, Dordrecht, Holland, 858 pp.

Williams, S.P., E.F. Szajna, and W.A. Hovis, 1985a: Nimbus 7 Coastal Zone Color Scanner (CZCS) Level 1 Data Product Users' Guide. *NASA Tech. Memo. 86203,* NASA Goddard Space Flight Center, Greenbelt, Maryland, 49 pp.

——, ——, and ——, 1985b: Nimbus 7 Coastal Zone Color Scanner (CZCS), Level 2 Data Product Users' Guide. *NASA Tech. Memo. 86202,* NASA Goddard Space Flight Center, Greenbelt, Maryland, 57 pp.

Wilson, W.H., R.C. Smith, and J.W. Nolten, 1981: The CZCS Geolocation Algorithms. *SIO Ref. 81-32,* Scripps Inst. of Oceanogr., La Jolla, California, 37 pp.

Woodruff, S.D., R.J. Slutz, R.L. Jenne, and P.M. Steurer, 1987: A comprehensive ocean-atmosphere data set. *Bull. Am. Meteor. Soc.,* **68,** 1,239–1,250.

Woodward, R.H., J. Firestone, and C.R. McClain, 1992: Progress report on AVHRR/Pathfinder activities. Internal document submitted to Pathfinder Project, NASA Goddard Space Flight Center, Greenbelt, Maryland, 14 pp.

——, R.A. Barnes, C.R. McClain, W.E. Esaias, W.L. Barnes, and A.T. Mecherikunnel, 1993: Modeling of the SeaWiFS Solar and Lunar Observations. *NASA Tech. Memo. 104566, Vol. 10,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 26 pp.

World Meteorological Organization, 1990: Report of the International Ozone Trends Panel, 1988: *World Meteorological Organization Global Ozone Research and Monitoring Project, Report No. 18, 2 Vols.,* Geneva, Switzerland.

Wright, S.W., S.W. Jeffrey, R.F.C. Mantoura, C.A. Llewellyn, T. Bjornland, D. Repeta, and N. Welschmeyer, 1991: Improved HPLC method for the analysis of chlorophylls and carotenoids from marine phytoplankton. *Mar. Ecol. Prog. Ser.,* **77,** 183–196.

Wroblewski, J.S., J.L. Sarmiento, and G.R. Flierl, 1988: An ocean basin scale model of plankton dynamics in the North Atlantic 1. solutions for the climatological oceanographic conditions in May. *Global Biogeochem. Cycles,* **2,** 199–218.

Wu, M.C., 1985: Remote sensing of cloud-top pressure using reflected solar radiation in the oxygen A-band. *J. Climate Appl. Meteorol.,* **24,** 540–546.

Wu, R., J.A. Weinman, and R.T. Chin, 1985: Determination of rainfall rates from GOES satellite images by a pattern recognition technique. *J. Atmos. Ocean. Technol.,* **2,** 314–330.

Wyatt, C.L., 1978: *Radiometric Calibration: Theory and Methods.* Academic Press, 200 pp.

Wyman, M., 1992: An *in vivo* method for the estimation of phycoerythrin concentrations in marine cyanobacteria. *Limnol. Oceanogr.,* **37,** 1,300–1,306.

– X, Y –

Yamanouchi, T., and S. Kawaguchi, 1992: Cloud distribution in the Antarctic from AVHRR data and radiation measurements at the surface. *Int. J. Remote Sens.,* **13,** 111–127.

Yentsch, C.S., 1983: Remote Sensing of Biological Substances. *Remote Sensing Applications in Marine Science and Technology,* A.P. Cracknell, Ed., D. Reidel Publishing Co., 263–297.

——, and D.W. Menzel, 1963: A method for the determination of phytoplankton, chlorophyll, and phaeophytin by fluorescence. *Deep-Sea Res.,* **10,** 221–231.

——, and D.A. Phinney, 1985: Rotary motion and convection as a means of regulating primary production in warm core rings. *J. Geophys. Res.,* **90,** 3,237–3,248.

Yoder, J.A., C.R. McClain, J.O. Blanton, and L.-Y. Oey, 1987: Spatial scales in CZCS-chlorophyll imagery of the southeastern U.S. continental shelf. *Limnol. Oceanogr.,* **32,** 929–941.

– Z –

Zalewski, E.F., and C.R. Duda, 1983: Silicon photodiode device with 100% external quantum efficiency. *Appl. Opt.,* **22,** 2,867–2,873.

Zaneveld, J.R.V., J.C. Kitchen, A. Bricaud, and C. Moore, 1992: Analysis in *in situ* spectral absorption meter data. *Ocean Optics XI,* G.D. Gilbert, Ed., SPIE, **1750,** 187–200.

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

Zibordi, G., and G.M. Ferrari, 1995: Instrument self-shading in underwater optical measurements: experimental data. *Appl. Opt.,* **34,** 2,750–2,754.

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Maryland, 43 pp.

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Hooker, S.B., W.E. Esaias, and L.A. Rexrode, 1993: Proceedings of the First SeaWiFS Science Team Meeting. *NASA Tech. Memo. 104566, Vol. 8,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 61 pp.

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Firestone, E.R., and S.B. Hooker, 1993: SeaWiFS Technical Report Series Summary Index: Volumes 1–11. *NASA Tech. Memo. 104566, Vol. 12,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 28 pp.

Vol. 13

McClain, C.R., K.R. Arrigo, J. Comiso, R. Fraser, M. Darzi, J.K. Firestone, B. Schieber, E-n. Yeh, and C.W. Sullivan, 1994: Case Studies for SeaWiFS Calibration and Validation, Part 1. *NASA Tech. Memo. 104566, Vol. 13,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 52 pp., plus color plates.

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Vol. 15

Gregg, W.W., F.S. Patt, R.H. Woodward, 1994: The Simulated SeaWiFS Data Set, Version 2. *NASA Tech. Memo. 104566, Vol. 15,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 42 pp., plus color plates.

Vol. 16

Mueller, J.L., B.C. Johnson, C.L. Cromer, J.W. Cooper, J.T. McLean, S.B. Hooker, and T.L. Westphal, 1994: The Second SeaWiFS Intercalibration Round-Robin Experiment, SIRREX-2, June 1993. *NASA Tech. Memo. 104566, Vol. 16,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 121 pp.

Vol. 17

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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, 1994: Case Studies for SeaWiFS Calibration and Validation, Part 2. *NASA Tech. Memo. 104566, Vol. 19,* S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 73 pp.

Vol. 20

Hooker, S.B., C.R. McClain, J.K. Firestone, T.L. Westphal, E-n. Yeh, and Y. Ge, 1994: The SeaWiFS Bio-Optical Archive and Storage System (SeaBASS), Part 1. *NASA Tech. Memo. 104566, Vol. 20,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 40 pp.

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Vol. 22

Barnes, R.A., W.L. Barnes, W.E. Esaias, and C.R. McClain, 1994: Prelaunch Acceptance Report for the SeaWiFS Radiometer. *NASA Tech. Memo. 104566, Vol. 22,* S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 32 pp.

Vol. 23

Barnes, R.A., A.W. Holmes, W.L. Barnes, W.E. Esaias, C.R. McClain, and T. Svitek, 1994: SeaWiFS Prelaunch Radiometric Calibration and Spectral Characterization. *NASA Tech. Memo. 104566, Vol. 23,* S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 55 pp.

Vol. 24

Firestone, E.R., and S.B. Hooker, 1995: SeaWiFS Technical Report Series Summary Index: Volumes 1–23. *NASA Tech. Memo. 104566, Vol. 24,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 36 pp.

Vol. 25

Mueller, J.L., and R.W. Austin, 1995: Ocean Optics Protocols for SeaWiFS Validation, Revision 1. *NASA Tech. Memo. 104566, Vol. 25,* S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 67 pp.

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, 1995: Results of the SeaWiFS Data Analysis Round-Robin, July 1994 (DARR-94). *NASA Tech. Memo. 104566, Vol. 26,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 58 pp.

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 1995: Case Studies for SeaWiFS Calibration and Validation, Part 3. *NASA Tech. Memo. 104566, Vol. 27,* S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 46 pp.

Vol. 28

McClain, C.R., W.E. Esaias, M. Darzi, F.S. Patt, R.H. Evans, J.W. Brown, K.R. Arrigo, C.W. Brown, R.A. Barnes, and L. Kumar, 1995: SeaWiFS Algorithms, Part 1. *NASA Tech. Memo. 104566, Vol. 28,* S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 38 pp., plus color plates.

Vol. 29

Aiken, J., G.F. Moore, C.C. Trees, S.B. Hooker, and D.K. Clark, and 1995: The SeaWiFS CZCS-Type Pigment Algorithm. *NASA Tech. Memo. 104566, Vol. 29,* S.B. Hooker, E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 34 pp.

Vol. 30

Firestone, E.R., and S.B. Hooker, 1995: SeaWiFS Technical Report Series Cumulative Index: Volumes 1–29. *NASA Tech. Memo. 104566, Vol. 30,* S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 42 pp.

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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 1996, 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 29 volumes and consists of 5 sections including: an errata, 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 reference topics published in all previous editions, that is, each new index will include all of the information contained in the preceeding indices.

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