NASA Technical Memorandum 104566, Volume 6

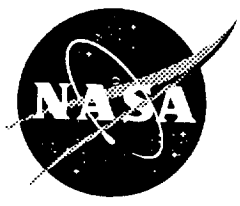
SeaWiFS Technical Report Series

Stanford B. Hooker and Elaine R. Firestone, Editors

Volume 6, SeaWiFS Technical Report Series Cumulative Index: Volumes 1–5

Stanford B. Hooker and Elaine R. Firestone

November 1992



NASA Technical Memorandum 104566, Volume 6

SeaWiFS Technical Report Series

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

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

Volume 6, SeaWiFS Technical Report Series Cumulative Index: Volumes 1–5

Stanford B. Hooker
Goddard Space Flight Center
Greenbelt, Maryland

Elaine R. Firestone
General Sciences Corporation
Laurel, Maryland

National Aeronautics and
Space Administration

Goddard Space Flight Center
Greenbelt, Maryland 20771

1992

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 August 1993, on the SeaStar satellite, being built by Orbital Sciences Corporation (OSC). The SeaWiFS Project at the 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 Memoranda Number 104566. All reports published are volumes within the series. This volume serves as a reference, or guidebook, to the previous five volumes and consists of four main sections including an index to key words and phrases, a list of all references cited, and lists of acronyms and symbols used. It is our intention to publish a summary index of this type after every five volumes in the series. This will cover the topics published in all previous editions of the indices, that is, each new index will include all of the information contained in the preceeding indices.

1. INTRODUCTION

This first in a series of indices, published as a separate volume in the SeaWiFS Technical Report Series, covers information found in the following volumes:

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, *Calibration and Validation Plan for SeaWiFS.*

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.*

This volume within the series serves as a reference, or guidebook, to the aforementioned volumes and consists of four main sections including a summary index to key words and phrases, a glossary of acronyms, a list of symbols used, and a bibliography of all references cited. Unless indicated otherwise, the index entries refer to some aspect of the SeaWiFS sensor or project, for example, the *mission overview* index entry refers to an overview of the SeaWiFS mission.

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. An index entry is composed of a keyword followed by an entry field which directs the reader to the possible locations where a discussion of the keyword can be found. The entry field is normally made up of a volume identifier shown in bold face, followed by a pages identifier, which is always enclosed in parentheses:

keyword, **volume**(pages).

If an entry is the subject of an entire volume, the volume field is shown in slanted type with no page field:

keyword, *Vol. (number).*

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

SUMMARY INDEX

airborne spectral radiometry, **5**(7–8).
aircraft calibration technique, **3**(Fig. 19 *p.* 27).
ancillary measurements, **5**(8, 27–28, 30).
ascending node, *Vol. 2.*
  computation methods, **2**(1–2).
  tilt strategy, **2**(Table 1 *p.* 2).
algorithms:
  development, **3**(27–35, Fig. 22 *p.* 33).
  atmospheric correction, **3**(1–2, Fig. 4 *p.* 5, 16, 23, 27–28, 31, 32–34).
  database development, **3**(28).
  derived products, **3**(27–28).
  field studies, **3**(30–32, Fig. 22 *p.* 33), 34–35.
  see also GAC.
atmospheric measurements, **5**(28–29).
azimuth:
  angles at equinox, **2**(2, 10, 16).
  angles at solstice, **2**(Fig. 5 *p.* 7, 10, 16).
  solar angle, **2**(2, 16).
  spacecraft angle, **2**(2, Fig. 6 *p.* 8, 16).
  relative angle, **2**(2, Fig. 7 *p.* 9, 10, Fig. 10 *p.* 13, 16).

basin-scale processes, **1**(6–7).
biogeochemical, **1**(2, 19).
  properties, **5**(6–7).
bio-optics, **1**(3, 5, 7, 19).
  algorithms, **1**(19); **3**(8, 13, Fig. 20 *p.* 29, 29); **5**(3).
  see also algorithm development.
buoy:
  see optical buoy.
  see optical mooring.

calibration, **5**(2).
  lunar, **1**(11); **3**(Fig. 15 *p.* 22).
  sensor, **1**(11).
  solar, **1**(11); **3**(24).
calibration and validation, **1**(3, 8, 14, 18–22); *Vol. 3.*
  on-board, **3**(21–23).
  post-launch, **3**(23–27).
  pre-launch program, **3**(17–21).
  program milestones, **3**(Fig. 12 *p.* 14).
  program schematic, **3**(Fig. 11 *p.* 14).
  see also initialization.
Coastal Zone Color Scanner, *see* CZCS.
commercial applications, **1**(7).
CZCS, **1**(1, 5, 6–7, 19); **3**(1).
  algorithms, **3**(1–11, 23).
  data collection, **3**(6, Fig. 5 *p.* 5, 21, 30).
  global sampling, **3**(Fig. 9 *p.* 10).
  level-2 products, **4**(1).
  level-2 processing parameters, **4**(Table 2 *p.* 2)
  modeling compared to SeaWiFS, **3**(Fig. 4 *p.* 5).
  parameters and characteristics, **1**(Table 2 *p.* 5), **3**(Table 1 *p.* 1).
  pigment concentration, **3**(1–2, 8, 27).
  quality control, **3**(Fig. 7 *p.* 8, Fig. 8 *p.* 9, 32, 35).
  sensor, **3**(8); **1**(5).
  time of launch, **2**(1).
  vicarious calibration, **3**(Fig. 6 *p.* 7, 11, 23, 24–27); **5**(3–4).

data:
  distribution, **1**(16).
  management, **1**(3, 11–18); **3**(32).
  policy, **3**(37–38).
  processing, **1**(3, Fig. 2 *p.* 4, 11–16, Fig. 10 *p.* 20, 22); **3**(13, 32).
  subsampling, **4**(1).
  using SEAPAK with, **4**(1–2).
descending node, *Vol. 2.*
  see also ascending node.

equator crossing time, **2**(10, 16).
equinox:
  see azimuth.
  see sun glint.
  see zenith.

field program:
  instruments, **3**(34–35).
  computing network, **3**(Fig 21 *p.* 31).

GAC:
  alorithms, *Vol. 4.*
  sampling techniques, *Vol. 4.*
  generation mechanisms, **4**(Table 1 *p.* 1).
  generation methods, *Vol. 4.*
geometry, **2**(1).
  derived parameters, **2**(1).
  solar, **2**(1, 10, 16).
  sun glint, **2**(1).
  viewing, **2**(1, 10, 16).
  see also azimuth.
  see also zenith.
global area coverage, *see* GAC.
global-scale processes, **1**(6–7).
ground coverage, **2**(2, Fig. 1 *p.* 3).
ground systems and support, **1**(14–15).

initialization, **5**(4–6, Table 1 *p.* 5).
  sampling, **5**(31–32).

joint commercial aspects, **1**(8).

marine optical buoy:, *see* MOBY.
mesoscale processes, **1**(6).
mission:
  operations, **1**(14–18).
  overview, *Vol. 1.*
MOBY:
  system schematic, **3**(Fig. 17 *p.* 25).
  see also optical buoy.
  see also optical mooring.
MODIS-N:
  instrument characteristics, **3**(Table 4 *p.* 12).

non-research uses, **1**(7–8).

ocean color, **1**(1–4, 8, 10).
  future missions, **3**(Fig. 10 *p.* 12).
  requirements, **1**(2).
ocean optics protocols, *Vol. 5.*
OCTS:
  instrument characteristics, **3**(Table 3 *p.* 11).
operational applications, **1**(7–8).
optical buoy:
  drifting, **5**(9, 31).
  mooring, **5**(8, 30–31).
  see also MOBY.
optical instruments, *Vol. 5.*
  accuracy specifications, **5**(9–15).
  analysis methods, **5**(33–39).
  sensor characterization, **5**(15–25). Tables 2–4 *pp.* 10–11).
  science community, role of, **5**(3).
  see also MOBY.
  see also optical buoy.
orbit, **3**(23).
  distribution of local time, **2**(Fig. 2 *p.* 4).

pigment:
  concentration, **3**(32); **4**(Table 3 *p.* 3, Figs. 5–11 *pp.* 6–9).

pigment, *cont.*
values, **4**(Fig. 26 *p.* 15, Figs. 31–33 *pp.* 18–19).
pixel size, **3**(Fig. C-1 *p.* 39).
Prelaunch Science Working Group, *see* SPSWG.
project, **1**(3); **3**(1, 13, 16, 23–24, 32, 34, 38).
goals, **1**(2–3).
objectives, **1**(3).
organization and personnel, **1**(Table 4 *p.* 22); **3**(Fig 13 *p.* 15).
schematic, **1**(Fig. 8 *p.* 12, Fig. 9 *p.* 13).
structure, **3**(13–16).

quality control, **3**(29–30, 35–36).
level-1 screening, **3**(35).
level-2 product screening, **3**(35–36).
level-3 product screening, **3**(36).
level-2 quality control, **3**(35).

radiometric specifications, **3**(36–37, Table A-1 *p.* 36).
research:
applications, **1**(3–5).
cruises, **3**(30–32).

saturation radiances, **3**(Tables A-2 through A-4 *pp.* 36–37).
science mission goals, **3**(12–13).
SEAPAK, **4**(1–2, 19).
SeaStar, **1**(1, 3, 8); **2**(1–2); **3**(21).
launch sequence, **1**(Fig. 4 *p.* 9).
operational system, **1**(Fig. 6 *p.* 10).
orbital simulation parameters, **2**(Table 1 *p.* 2).
satellite, **1**(Fig. 5 *p.* 9).
spacecraft description, **1**(8–10).
SeaWiFS instrument, **1**(1, 5–6, 8).
bandwidths, **1**(Table 1 *p.* 1, Fig. 2 *p.* 2).
characteristics, **2**(Table 1 *p.* 2); **3**(Table 2 *p.* 11, 13).
calibration and characterization, **3**(Fig 14 *p.* 18).
description, **1**(10–11).
launch time, **2**(1).
major milestones, **3**(Table 7 *p.* 21).
monitoring of, **1**(18).
operations schedules, **1**(17–18).
scanner, **1**(11, Fig. 7 *p.* 14).
sensitivities, **1**(Fig. 3 *p.* 6).
telemetry parameters, **3**(Table 8 *p.* 23).
test plan summary, **3**(Table 6 *p.* 19–20).
vicarious calibration, **5**(3–4, 33).
sensor:
SeaWiFS, *see* SeaWiFS instrument.
CZCS, *see* CZCS.
solar irradiance measurements, **3**(Fig 16 *p.* 22).
solstice:
see azimuth.
see sun glint.
see zenith.
spectral irradiance and radiance measurements, **3**(2); **5**(25–27).
SPSWG, **3**(Table 5 *p.* 16, 27–28).
sun glint, **2**(1, 10, 14); **3**(6).
at equinox, **2**(10).
sun glint, *cont.*
at solstice, **2**(10, 16).
radiance distribution, **2**(Fig. 8 *p.* 11, Fig. 11 *p.* 14).

validation:
sampling, **5**(2).
zenith, **2**(10).
angles at equinox, **2**(2, 16).
angles at solstice, **2**(10, 16).
solar angle, **2**(2, Fig. 3 *p.* 5, 10, Fig. 9 *p.* 5, Fig. 12 *p.* 15, Table 3 *p.* 16, 16); **3**(8, 23).
spacecraft angle, **2**(2, Fig. 4 *p.* 6, 10, 16).

Glossary

ACRIM	Active Cavity Radiometer Irradiance Monitor
ACS	Attitude Control System
A/D	Analog-to-Digital
ADEOS	Advanced Earth Observation Satellite (Japanese)
ALSCAT	ALPHA and Scattering Meter (Note: the symbol α corresponds to $c(\lambda)$, the beam attenuation coefficient, in present usage).
AOCI	Airborne Ocean Color Imager
AOL	Airborne Oceanographic Lidar
AOS/LOS	Acquisition of Signal/Loss of Signal
ARGOS	Name given to the data collection and location system on the NOAA Operational Satellites (not an acronym)
AT	Along-Track
AVHRR	Advanced Very High Resolution Radiometer
AVIRIS	Advanced Visible and Infrared Imaging Spectrometer
BBR	Band-to-Band Registration
bpi	bits per inch
BRDF	Bidirectional Reflectance Distribution Function
BUV	Backscatter Ultraviolet Spectrometer
CalCOFI	California Cooperative Fisheries Institute
Cal/Val	Calibration and Validation
Case 1	Water whose reflectance is determined solely by absorption.
Case 2	Water whose reflectance is significantly influenced by scattering.
CDOM	Colored Dissolved Organic Material
CDR	Critial Design Review
CHORS	Center for Hydro-Optics and Remote Sensing (San Diego State University)
cpu	Central Processing Unit
CRM	Contrast Reduction Meter
CRT	Calibrated Radiance Tapes; or Cathode Ray Tube.
CT	Cross-Track
CTD	Conductivity, Temperature, and Depth
CVT	Calibration/Validation Team
CW	Continuous Wave
CZCS	Coastal Zone Color Scanner
DAAC	Distributed Active Archive Center
DC	Direct Current
DCF	Data Capture Facility
DCP	Data Collection Platform
DOC	Dissolved Organic Carbon
DOM	Dissolved Organic Matter
ECMWF	European Centre for Medium Range Weather Forecasts
ECT	Equator Crossing Time

EOS Earth Observing Satellite
EOSAT Earth Observation Satellite Company
EOSDIS Earth Observing Satellite Data Information System
ERBE Earth Radiation Budget Experiment
ERBS Earth Radiation Budget Sensor
ER-2 Earth Resources-2
ESA European Space Agency

FDDI Fiber Data Distribution Interface
FNOC Fleet Numerical Oceanography Center
FOV Field-of-View
FWHM Full-Width Half-Maximum

GAC Global Area Coverage, coarse resolution satellite data with a nominal ground resolution of approximately 4 km.
GASM General Angle Scattering Meter
GFF Glass Fiber Filter by Whatman
GLI Global Imager
GMT Greenwich Mean Time
GOES Geosynchronous Orbital Environmental Sat-ellite
GOFS Global Ocean Flux Study
GPS Global Positioning System
GSFC Goddard Space Flight Center

HeNe Helium-Neon
HPLC High Performance Liquid Chromatography
HRPT High Resolution Picture Transmission
HYDRA Hydrographic Data Reduction and Analysis

IAPSO International Association for the Physical Sciences of the Ocean
ICES International Council on Exploration of the Seas
IFOV Instantaneous Field-of-View
I/O Input/Output
IOP Inherent Optical Properties
IR Infrared
IUE International Ultraviolet Explorer

JGOFS Joint Global Ocean Flux Study

LAC Local Area Coverage, fine resolution satellite data with a nominal ground resolution of approximately 1 km.
Level-0 Raw data.
Level-1 Calibrated radiances.
Level-2 Derived products.
Level-3 Gridded and averaged derived products.

MAREX Marine Resources Experiment Program
MARS Multispectral Airborne Radiometer System
MERIS Medium Resolution Imaging Spectrometer
MIPS Millions of Instructions Per Second
MOBY Marine Optical Buoy
MODIS Moderate Resolution Image Spectrometer
MODIS-N Moderate Resolution Image Spectrometer—Nadir
MODIS-T Moderate Resolution Image Spectrometer—Tilt
MTF Modulation Transfer Function

NAS National Academy of Science
NASA National Aeronautics and Space Administration
NASCOM NASA Communications
NASDA National Space Development Agency (Japanese)
NASIC NASA Aircraft/Satellite Instrument Calibration
NCDS National Climate Data System
NEΔT Noise Equivalent Delta Temperature
NEδL Noise Equivalent delta Radiance
NESDIS National Environmental Satellite Data Information Service
NET Nimbus Experiment Team
NIST National Institute of Standards of Technology
NMC National Meteorological Center
NOAA National Oceanic and Atmospheric Administration
NOARL Naval Oceanographic and Atmospheric Research Laboratory
NRA NASA Research Announcement
NSCAT NASA Scatterometer
NSF National Science Foundation

OCTS Ocean Color Temperature Sensor (Japanese)
ODAS Ocean Data Acquisition System
OFFI Optical Free-Fall Instrument
ONR Office of Naval Research
OSC Orbital Sciences Corporation
OSFI Optical Surface Floating Instrument
OSSA Office of Space Science and Applications

PAR Photosynthetically Available Radiation
PDR Preliminary Design Review
PIKE Phased Illuminated Knife Edge
POC Particulate Organic Carbon
POLDER Polarization Detecting Environmental Radiometer (French)
PON Particulate Organic Nitrogen
PSU Practical Salinity Units

QC Quality Control

RDF Radio Direction Finder
RFP Request for Proposal
rms root mean squared
ROSIS Remote Sensing Imaging Spectrometer, also known as the Reflective Optics System Imaging Spectrometer (Germany)
RTOP Research and Technology Operation Plan

SARSAT Search and Rescue Satellite
SBRC Santa Barbara Research Center
SBUV Solar Backscatter Ultraviolet Radiometer
SBUV-2 Solar Backscatter Ultraviolet Radiometer–2
SCOR Scientific Committee on Oceanographic Research
SDPS SeaWiFS Data Processing System
SeaWiFS Sea-viewing Wide Field-of-view Sensor
SIS Spherical Integrating Source
SISSR Submerged *In Situ* Spectral Radiometer
SMM Solar Maximum Mission
SNR Signal-to-Noise Ratio
SOC Spacecraft Operations Center
SOGS SeaStar Operations Ground Subsystem
SPM Suspended Particulate Material
SPO SeaWiFS Project Office
SPOT *Satellite Pour l'Observation de la Terre* (French)
SPSWG SeaWiFS Prelaunch Science Working Group
SST Sea Surface Temperature
ST Science Team
SWG Science Working Group

T-S Temperature-Salinity
TBD To Be Determined
TDI Time-Delay and Integration
TDRSS Tracking and Data Relay Satellite System
TOMS Total Ozone Mapping Spectrometer
TOPEX Topography Experiment
TSM Total Suspended Material

UNESCO United Nations Educational, Scientific, and Cultural Organizations
UVB Ultraviolet-B

VHF Very High Frequency
VISLAB Visibility Laboratory (Scripps Institution of Oceanography)
VISNIR Visible and Near Infrared

WFF Wallops Flight Facility
WMO World Meteorological Organization
WOCE World Ocean Circulation Experiment
WORM Write Once Read Many

SYMBOLS

$a(z,\lambda)$ Spectral absorption coefficient
$b(z,\lambda)$ Total scattering coefficient
$b(\theta,z,\lambda_0)$ Volume scattering coefficient
$b_b(z,\lambda)$ Spectral backscattering coefficient
$b_r(\lambda)$ Total Raman scattering coefficient
$c(z,\lambda)$ Spectral beam attenuation coefficient
$c(z,660)$ Red beam attenuation (at 660 nm)
$E_a(\lambda)$ Irradiance in air
E_{cal} Calibration source irradiance
$E_d(0^-,\lambda)$ Incident spectral irradiance
$E_d(z,\lambda)$ Downwelled spectral irradiance
$E_s(\lambda)$ Surface irradiance
$E_{\text{sky}}(\lambda)$ Spectral sky irradiance distribution
$E_{\text{sun}}(\lambda)$ Spectral sun irradiance distribution
$E_u(z,\lambda)$ Upwelled spectral irradiance
$E_w(z,\lambda)$ Irradiance in water
$K(z,\lambda)$ Diffuse attenuation coefficient
$K_E(\lambda)$ Attenuation coefficient downwelled irradiance
$K_L(z,\lambda)$ Attenuation coefficient upwelled radiance
$L_u(z,\lambda)$ Upwelled spectral radiance
L_{cal} Calibration source radiance
$L(z,\theta,\phi)$ Submerged upwelled radiance distribution
$L_{\text{sky}}(\lambda)$ Spectral sky radiance distribution
$L_W(\lambda)$ Water-leaving radiance
$L_{WN}(\lambda)$ Normalized water-leaving radiance
$n_w(\lambda)$ Index of refraction of water
$Q(\lambda)$ $L_u(0^-,\lambda)$ to $E_u(0^-,\lambda)$ relation factor (theoretically equal to π)
$R_L(z,\lambda)$ Spectral reflectance
R_z Sunspot number
S Solar constant
$T_s(\lambda)$ Transmittance through the surface
$T_w(\lambda)$ Transmittance through a water path
$\beta(z,\lambda,\theta)$ Spectral volume scattering function
$\overline{\mu}_d(0^+,\lambda)$ Spectral mean cosine for downwelling radiance at the sea surface
$\tau(z,\lambda)$ Spectral optical depth
$\tau_s(\lambda)$ Spectral solar atmospheric transmission

REFERENCES

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

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

Abel, P., B. Guenther, R. Galimore, and J. Cooper, 1991: Calibration results for NOAA-11 AVHRR channels 1 and 2 from congruent aircraft observations, *J. Atmos. and Oceanic Technology,* (submitted).

——, 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.

Austin, R.W., 1976: Air-water radiance calibration factor, *Tech. Memo. ML–76–004t,* Vis. Lab., Scripps Inst. of Oceanogr., 8 pp.

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

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

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

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

Balch, W.M., 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, CO, 94 pp.

Barale, V., 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.

——, 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.

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

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

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., 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. and Oceanogr.,* **26,** 43–53.

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.

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.

Burlov-Vasiljev, K.A., E.A. Gurtovenko, and Y.B. Matvejev, 1991: The Solar Radiation Between 310–680 nm. *SOLARS-22 Conference Proceedings,* Boulder, CO, (in preparation).

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.

Carder, K.L., 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. and Oceanogr.*, **34,** 68–81.

Clark, D.K., 1981: Phytoplankton algorithms for the Nimbus-7 CZCS. *Oceanography from Space,* J.R.F. 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. *Boundary-Layer Meteor.*, **18,** 287-298.

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.

Cox, C., and W. Munk, 1954: Measurement of the roughness of the sea surface from photographs of the sun's glitter. *J. Mar. Res.*, **44,** 838-850.

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.

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.

Eppley, R.W., 1984: Relations between primary productivity and ocean chlorophyll determined by satellites, in *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,* **67,** 835–837.

Feldman, G., 1986: Variability of the productive habitat in the eastern equatorial Pacific, *EOS,* **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,* **70,** 634.

Fofonoff, N.P., and R.C. Millard, Jr., 1983: Algorithms for computation of fundamental properties of seawater, *UNESCO Tech. Papers in Marine Science,* **44,** UNESCO, 53 pp.

Frohlich, C., 1979: WMO/PMOD Sunphotometer: Instructions for manufacture, *World Meteorol. Organ.,* 3 pp (plus tables and drawings).

General Sciences Corp., 1991: SeaWiFS science data and information system architecture report, *GSC-TR-21-91-006,* General Sciences Corp., Laurel, MD, 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.

Gordon, H.R., 1981: 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.

——, 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.

——, 1989: Can the Lambert-Beer law be applied to the diffuse attenuation coefficient of ocean water? *Limonol. and 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. and Oceanogr.*, **36,** 769–777.

——, and D.K. Clark, 1980: Remote sensing optical properties of a stratified ocean: an improved interpretation, *Applied Optics,* **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 D.K. Clark, 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 D.J. Castaño, 1987: Coastal Zone Color Scanner atmospheric correction algorithm: multiple scattering effects. *Appl. Opt.*, **26,** 2,111–2,122.

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

——, and K. Ding, 1991: Self shading of in-water optical instruments, *Limnol. and Oceanogr.*, (accepted).

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., 16 pp.

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.

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, 1991: Phytoplankton pigment assessment in the Arabian Sea comparing satellite data and *in situ* data. *Remote Sens. of Environ.,* (in press).

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.

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

Hooker, S.B., W.E. Esaias, G.C. Feldman, W.W. Gregg, and C.R. McClain, 1992: An Overview of SeaWiFS and Ocean Color, *NASA Tech. Memo. 104566, Vol. 1,* S.B. Hooker and E.R. Firestone, Eds., 24 pp.

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

——, 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.

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.

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, MD, 92 pp.

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

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

Kohler, R., R. Pello, and J. Bonhoure, 1990: Temperature dependent nonlinearity effects of a QED-200 detector in the visible, *Applied 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.

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, *Analytical 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.

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.

——, G. Feldman, and W. Esaias, 1991a: A review of the Nimbus-7 Coastal Zone Color Scanner data set and remote sensing of biological oceanic productivity. *Global Change Atlas,* C. Parkinson, J. Foster and R. Gurney, Eds., Cambridge University Press, (in press).

——, M. Darzi, J. Firestone, E.-N. Yeh, G. Fu, and D. Endres, 1991b: SEAPAK Users Guide, Version 2.0, Vol. I—System Description, *NASA Tech. Mem. 100728,* 158 pp.

——, ——, ——, ——, ——, and ——, 1991c: SEAPAK Users Guide, Version 2.0, Vol. II—Descriptions of Programs. *NASA Tech. Mem. 100728,* 586 pp.

——, G. Feldman, and W. Esaias, 1992a: Oceanic primary production, *Global Change Atlas,* C. Parkinson, J. Foster, and R. Gurney, Eds., Cambridge University Press, (in press).

——, W.E. Esaias, W. Barnes, B. Guenther, D. Endres, S.B. Hooker, G. Mitchell, and R. Barnes, 1992b: Calibration and Validation Plan for SeaWiFS, *NASA Tech. Memo. 104566, Vol. 3,* S.B. Hooker and E.R. Firestone, Eds., 41 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., 20 pp.

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,* (submitted).

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,* **8/9,** 1,009–1,028.

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

——, 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.

Mueller, J.L., 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., 10 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., 45 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. Ocean-og.,* **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.

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, MD, 107 pp.

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

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.

Petzold, T.J., 1988: A method for obtaining analytical curve fits to underwater radiometric measurements, *Tech. Memo. Oc Op/TJP–88–06t,* Scripps Inst. of Oceanogr., 20 pp.

——, and R.W. Austin, 1988: Characterization of MER-1032, *Tech. Memo. EV–001–88t,* Visibility Lab., Scripps Inst. of Oceanogr., 56 pp.

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.

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

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

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

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

——, and W.H. Wilson, 1981c: 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.

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

——, 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.

——, 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.

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, MA, 164 pp.

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

Strickland, J.D.H., 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.

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

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. Weather Rev.,* **113,** 1,433–1,440.

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

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.

Tyler, J.E., and R.C. Smith, 1979: *Measurements of Spectral Irradiance Underwater,* Gordon and Breach, 103 pp.

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

Voss, K.J., 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 Oceanic Tech.,* **6,** 652–662.

Walker, J.H., 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.

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

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.

Wilson, W.H., R.C. Smith, and J.W. Nolten, 1981: The CZCS geolocation algorithms. *SIO Ref. 81-32,* Scripps Institute of Oceanography, 37 pp.

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.

Yentsch, C.S., 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.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	November 1992	Technical Memorandum

4. TITLE AND SUBTITLE
SeaWiFS Technical Report Series
Volume 6, SeaWiFS Technical Report Series Cumulative Index: Volumes 1–5

5. FUNDING NUMBERS
970.2

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

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

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

8. PERFORMING ORGANIZATION REPORT NUMBER
93B00016

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

10. SPONSORING/MONITORING AGENCY REPORT NUMBER
TM–104566, Vol. 6

11. SUPPLEMENTARY NOTES
E. Firestone: General Sciences Corporation, Laurel, Maryland.

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Unclassified–Unlimited
Subject Category 48

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

The Sea–viewing Wide Field–of–View Sensor (SeaWiFS) is the follow–on ocean–color instrument to the Coastal Zone Color Scanner (CZCS) which ceased operations in 1986, after an 8-year mission. SeaWiFS is expected to be launched in August 1992, on the SeaStar satellite, being built by Orbital Sciences Corporation (OSC). The SeaWiFS Project at the NASA/Goddard Space Flight Center (GSFC) has undertaken the responsibility of documenting all aspects of the mission, which is critical to the ocean–color and marine–science communities, in the form of NASA Technical Memoranda. This volume within the series serves as a reference, or guidebook, to the previous five volumes and consists of four main sections including an index to keywords and phrases, a list of all references cited, and lists of acronyms and symbols used. It is our intention to publish a summary index after every five volumes in the series, which will cover the topics published in all previous editions of the indices—that is, each new index will include all of the information contained in the preceding indices.

14. SUBJECT TERMS
Oceanography, SeaWiFS, Index, Overview, Ocean Optic Protocols, Calibration/Validation, Ascending Node, Descending Node, GAC, Algorithm, Glossary, Symbol, Reference

15. NUMBER OF PAGES
9

16. PRICE CODE

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