

**Volume III:** The chapters of this volume briefly review methods used in the field to make the *in situ* radiometric measurements for ocean color validation, together with methods of analyzing the data (Chapter 1), detailed measurement and data analysis protocols for in-water radiometric profiles (Chapter 2), above water measurements of remote sensing reflectance (Chapter III-3), determinations of exact normalized water-leaving radiance (Chapter 4), and atmospheric radiometric measurements to determine aerosol optical thickness and sky radiance distributions (Chapter 5). Chapter 1 is adapted from relevant portions of Chapter 9 in Revision 3. Chapter 2 of Volume III corresponds to Chapter 10 of Revision 3, and Chapters 3 through 5 to Revision 3 Chapters 12 through 14, respectively. Aside from reorganization, there are no changes in the protocols presented in this volume.

**Volume IV:** This volume includes a chapter reviewing the scope of inherent optical properties (IOP) measurements (Chapter 1), followed by 4 chapters giving detailed calibration, measurement and analysis protocols for the beam attenuation coefficient (Chapter 2), the volume absorption coefficient measured *in situ* (Chapter 3), laboratory measurements of the volume absorption coefficients from discrete filtered seawater samples (Chapter 4), and *in situ* measurements of the volume scattering function, including determinations of the backscattering coefficient (Chapter 5). Chapter 4 of Volume IV is a slightly revised version of Chapter 15 in Revision 3, while the remaining chapters of this volume are entirely new contributions to the ocean optics protocols. These new chapters may be significantly revised in the future, given the rapidly developing state-of-the-art in IOP measurement instruments and methods.

**Volume V:** The overview chapter (Chapter 1) briefly reviews biogeochemical and bio-optical measurements, and points to literature covering methods for measuring these variables; some of the material in this overview is drawn from Chapter 9 of Revision 3. Detailed protocols for HPLC measurement of phytoplankton pigment concentrations are given in Chapter 2, which differs from Chapter 16 of Revision 3 only by its specification of a new solvent program. Chapter 3 gives protocols for Fluorometric measurement of chlorophyll *a* concentration, and is not significantly changed from Chapter 17 of Revision 3. New chapters covering protocols for measuring, Phycoerythrin concentrations, Particle Size Distribution (PSD) and Particulate Organic Carbon (POC) concentrations are likely future additions to this volume.

**Volume VI:** This volume gathers chapters covering more specialized topics in the ocean optics protocols. Chapter 1 introduces these special topics in the context of the overall protocols. Chapter 2 is a reformatted, but otherwise unchanged, version of Chapter 11 in Revision 3 describing specialized protocols used for radiometric measurements associated with the Marine Optical Buoy (MOBY) ocean color vicarious calibration observatory. The remaining chapters are new in Revision 4 and cover protocols for radiometric and bio-optical measurements from moored and drifting buoys (Chapter 3), ocean color measurements from aircraft (Chapter 4), and methods and results using LASER sources for stray-light characterization and correction of the MOBY spectrographs (Chapter 5). In the next few years, it is likely that most new additions to the protocols will appear as chapters added to this volume.

**Volume VI** also collects appendices of useful information. Appendix A is an updated version of Appendix A in Revision 3 summarizing characteristics of past, present and future satellite ocean color missions. Appendix B is the List of Acronyms used in the report and is an updated version of Appendix C in Revision 3. Similarly, Appendix C, the list of Frequently Used Symbols, is an updated version of Appendix D from Rev. 3. The SeaBASS file format information given in Appendix B of Revision 3 has been removed from the protocols and is promulgated separately by the SIMBIOS Project.

In the Revision 4 multi-volume format of the ocean optics protocols, Volumes I, II and III are unlikely to require significant changes for several years. The chapters of Volume IV may require near term revisions to reflect the rapidly evolving state-of-the-art in measurements of inherent optical properties, particularly concerning instruments and methods for measuring the Volume Scattering Function of seawater. It is anticipated that new chapters will be also be added to Volumes V and VI in Revision 5 (2003).

This technical report is not meant as a substitute for scientific literature. Instead, it will provide a ready and responsive vehicle for the multitude of technical reports issued by an operational Project. The contributions are published as submitted, after only minor editing to correct obvious grammatical or clerical errors.