

NASA Technical Memorandum 2003–206892, Volume 22

SeaWiFS Postlaunch Technical Report Series

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Volume 22, Algorithm Updates for the Fourth SeaWiFS Data Reprocessing

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PREFACE

The SeaWiFS Project continually strives to improve the quality of the SeaWiFS data products and to expand the product suite. This effort requires the SeaWiFS staff to be knowledgeable of recent developments in marine optics, atmospheric correction approaches, and vicarious calibration techniques. This capability is largely maintained through communication with the user community, particularly the SIMBIOS Project staff and science team which provides most of the *in situ* bio-optical and atmospheric validation data. As a result, a number of significant improvements in the sensor calibration, the atmospheric correction scheme, and certain masks and flags have been developed since the third reprocessing in mid-2000.

One particularly important improvement in data quality resulted from the recalibration of the Marine Optical Buoy (MOBY) to account for spectrometer stray light. MOBY data is used for the vicarious calibration of SeaWiFS. The recalibration required development of a portable version of the National Institute of Standards and Technology (NIST) Spectral Irradiance and Radiance Responsivity Calibrations using Uniform Sources (SIRCUS) which was deployed to the MOBY facility in Honolulu, Hawaii by NIST staff (Carol Johnson and Steve Brown). The cost of the portable system was shared by the SeaWiFS Project, the SIMBIOS Project, and the MODIS science team. The recalibration significantly increased the total radiances in bands 1 and 2, thereby increasing the retrieved water-leaving radiances and decreasing the frequency of negative water-leaving radiances in coastal regions. Another significant improvement is the implementation of a revised near-infrared reflectance model in the atmospheric correction scheme. The improved algorithm is designed to work in turbid Case-2 water with no impact on corrections in clear waters.

The research community has always stated a requirement for daily mean PAR, which is needed for computing primary production and the surface heat budget. With this reprocessing, daily mean PAR is now included in the archive product suite. This PAR product was under development and was tested in collaboration with members of the SIMBIOS science team (Robert Frouin and Menghua Wang) for over two years and the algorithm is described in Chapt. 8.

The overall improvements in the derived products, especially in coastal waters is impressive. I would like to congratulate the SeaWiFS Calibration and Validation Team and others who have helped realize these improvements and who have provided validation data. These collaborations underscore the fact that the SeaWiFS Project and the science community are partners in the overall SeaWiFS program and the Project looks forward to future cooperation.

Greenbelt, Maryland
November 2002

— C. R. McClain