

ON ORBIT VALIDATION AND CALIBRATION OF OCEAN COLOR SENSORS WITH UNDERFLIGHTS OF THE NASA AIRBORNE VISIBLE/INFRARED IMAGING SPECTROMETER

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Accurate calibration of ocean color sensors in the orbital environment is essential to achieve the objectives for which the sensors were developed and launched. However, the trauma of launch and the orbital environment may lead to changes in sensor performance with respect to the performance in laboratory calibration. On board, vicarious, as well as lunar on orbit calibration validation approaches each have significant challenges. An alternate approach has been developed to validate the calibration of ocean color sensors while the sensors are on orbit. A series of direct underflight calibration experiments have been performed with the NASA Airborne Visible/Infrared Imaging Spectrometer (AVIRIS) to assess the on orbit performance ocean color sensors. AVIRIS measures the total upwelling spectral radiance from 400 to 2500 nm at 10 nm intervals at high radiometric and spatial resolution. The spectral, radiometric, and spatial calibration of AVIRIS is rigorously assessed before, during, and after each flight. In the past three years, the AVIRIS sensor has underflown both the ADEOS OCTS and the SeaWiFS satellite sensors. The AVIRIS spectral image data have been geometrically projected and convolved to match the spectral, spatial, geometric, radiometric, and temporal domains of these spaceborne sensors. The simultaneous AVIRIS and the ocean color sensor data have been used to assess and validate the calibration of the spaceborne sensors on orbit. Aspects of this on orbit calibration method and the results for OCTS and SeaWiFS are presented.