

Results and Lessons from a Decade of Terra MODIS On-orbit Spectral Characterization

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Since its launch in December 1999, the NASA EOS Terra MODIS has successfully operated for more than a decade. MODIS makes observations in 36 spectral bands from visible (VIS) to long-wave infrared (LWIR) and at three nadir spatial resolutions: 250m (2 bands), 500m (5 bands), and 1km (29 bands). In addition to its on-board calibrators designed for the radiometric calibration, MODIS was built with a unique device, called the spectro-radiometric calibration assembly (SRCA). It can be configured in three different modes: radiometric, spatial, and spectral. When it is operated in the spectral modes, the SRCA can monitor changes in sensor spectral performance for the VIS and near-infrared (NIR) spectral bands. For more than 10 years, the SRCA operation has continued to provide valuable information for MODIS on-orbit spectral performance. This paper briefly describes SRCA on-orbit operation and calibration activities; it presents decade-long spectral characterization results for Terra MODIS VIS and NIR spectral bands in terms of changes in their center wavelengths (CW) and bandwidths (BW). It is shown that the SRCA on-orbit wavelength calibration capability remains satisfactory. For most spectral bands, the changes in CW and BW are less than 0.5 and 1nm, respectively. Results and lessons from Terra MODIS on-orbit spectral characterization have and will continue to benefit its successor, Aqua MODIS, and other future missions.