Improved Near-Real Time Atmospheric Correction of MODIS Data for Earth Observation Applications

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Current operational satellite-based sensors designed for Earth observation such as the Moderate Resolution Imaging Spectroradiometer (MODIS) possess the capability to provide remotely sensed land surface information in Near-Real Time (NRT). This means that vegetation parameters, measures of land cover change, pasture and crop yield, and a range of environmental indicators may be available within an hour of the satellite overpass for areas up to regional scale.

Such land surface parameters are based on surface reflectance data acquired from MODIS. To produce remotely sensed surface reflectance data of the highest quality the atmospheric component of the signal received at the satellite sensor must be removed. This step requires that the amount of water vapour, ozone and aerosols in the atmosphere be accurately determined so that their contributions to the measured signal may be evaluated and removed. For optimum results, these ancillary data should be obtained coincidently with reflectance information from the satellite sensor. The MODIS sensor was designed as an operational NRT sensor for just such a purpose, possessing the necessary spectral coverage to retrieve the required atmospheric parameters.

This paper will describe the development of an operational system for the atmospheric correction of reflectance data from the MODIS sensor. It will describe the sensitivity of the atmospheric correction process to the accuracy of the input ancillary data and detail the validation of results to date. Examples of how the atmospheric correction of remotely sensed data in NRT benefits Earth observation and downstream applications will also be discussed. This Cooperative Research Centre for Spatial Information project serves as a foundation for future NRT processing of remotely sensed data in Australia.