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An Atmospheric Correction Algorithm for FY-3/ MERSI Data over the Land: First Results

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Feng-Yun (FY-3) is the second Chinese Polar Orbiting Meteorological Satellite with global, three-dimensional, quantitative, and multispectral capabilities. Medium Resolution Spectral Imager (MERSI) has 20 channels on-board the FY-3A and FY-3B satellite. MERSI has five channels (four VIS and one thermal IR), with a spatial resolution of 250 m. Prior to the derivation of various biophysical parameters based on surface reflectance, the top of the atmosphere signal need to be radiometrically calibrated and corrected for atmospheric effects. This paper presents an atmospheric correction algorithm for FY3/MERSI in the visible to near-infrared band over the land. Previous operational correction schemes have assumed a Lambertian surface. A new atmospheric correction algorithm is developed to take into account the directional properties of the observed surface by a kernel-based Bi-directional Reflectance Distribution Function (BRDF) model. This algorithm is applied to remote sensing data from FY3/MERSI and compared with Moderate Resolution Imaging Spectro radiometer (MODIS) surface reflectance products (MOD09GA). It is found in the study that the relative accuracy of data, obtained with these two devices, was consistent with the acceptable overall accuracy of 73%. Furthermore, spatial resolution of MERSI is superior as compared to that of MODIS. Therefore, FY-3/MERSI can serve a reliable and new data source for quantifying global environmental change.