

Verification of atmospheric correction of MODIS data using Bidirectional Reflectance Simulator (BiRS)

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ABSTRACT:

Vegetation absorbs the carbon dioxide (CO₂) in the atmosphere by photosynthesis, and discharge the CO₂ into the atmosphere by respiration. Moreover, vegetation quantity such as biomass and distribution changes by global warming. Therefore, it is necessary to clarify the amount of absorption and discharge of the CO₂ by vegetation that considers the influence of global warming using the global vegetation quantity of the time series to improve the reliability of the forecast of global warming by the Global Climate Model (GCM). It is thought that it is effective to estimate the global vegetation quantity of the time series from the bidirectional reflectance obtained from optical satellite sensor of low resolution such as Terra, Aqua/MODIS and NOAA/AVHRR. However, vegetation quantity estimated from the bidirectional reflectance is influenced by the accuracy of atmospheric corrected bidirectional reflectance. Since, it is necessary to verify the accuracy of atmospheric corrected bidirectional reflectance by various vegetations, and to guarantee the quality. It is extremely difficult to obtain the bidirectional reflectance in the same observation geometry condition as optical satellite sensor of low resolution from top of canopy synchronizing with the measurement of the optical satellite sensor of low resolution. We have already contracted Bidirectional Reflectance Simulator (BiRS) to simulated bidirectional reflectance in arbitrary observation geometry condition using Digital Surface Model (DSM) and bidirectional reflectance obtained from top of canopy, and the effectiveness has been shown using bidirectional reflectance obtained from top of canopy using radio controlled helicopter. Therefore, if there are DSM and bidirectional reflectance obtained from top of canopy, Atmospheric corrected bidirectional reflectance can be verified by comparing bidirectional reflectance simulated using BiRS on the same observation geometry condition as it. In this paper we will report on the result of the verification of the atmospheric corrected bidirectional reflectance of Terra, Aqua/MODIS using BiRS for the forest in Kochi Prefecture Tosashimizu City, Japan.