GENERATING 1KM LAND SURFACE RADIATION PRODUCT SUITE FROM MODIS: ALGORITHMS AND VALIDATION

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ABSTRACT:

Land surface radiation products are urgently needed for various purposes, including global carbon cycle, hydrological, climate and meteorological research. There are currently several global radiative flux datasets derived from either satellite observations or GCM reanalysis, but the spatial resolution (usually >1°) and accuracy of these products are not satisfactory for high-resolution modeling and applications. The MODIS science team has to disaggregate NASA's 1°*1.5° reanalysis incident solar radiation to produce the 1-km net primary productivity (NPP) product. There are also other compelling reasons that we urgently need to produce high-resolution radiative fluxes. We have developed a series of algorithms for producing high-resolution land radiative fluxes from MODIS, including incident shortwave solar radiation (insolation) and photosynthetically active radiation (PAR), shortwave net radiation, longwave downward, upwelling and net radiation, and all-wave net radiation. Shortwave radiation under all-sky conditions can be estimated, but only clear-sky conditions for longwave radiation products will be considered. An empirical algorithm has been developed to estimate cloudy-sky longwave radiation. Therefore, the all-wave net radiation can be estimated under all-sky conditions. Because of two MODIS sensors and the orbit convergence, both instantaneous and daily integrated products can be generated. This presentation will introduce the background, algorithms, and validation results.

TOPIC: Physical modeling and signatures
ALTERNATIVE TOPIC: Multi-spectral and hyperspectral remote sensing