THE RELATIONSHIP BETWEEN DIRECTIONAL BRIGHTNESS TEMPERATURES AND HEMISPHERICAL THERMAL EMISSION AT TOP-OF-ATMOSPHERE

Yu-Li, SHI
Remote Sensing School, Nanjing University of Information Science and Technology
Nanjing, 210044,China

Abstract:

Upwelling long wave radiation (UPLW) is one of the important input parameters for many land surface models, and it plays an important role in estimating the energy state of the Earth's surface. However, LWUP in zenith direction can not substitute the hemispherical thermal emission which is determined indirectly by integrating the directional brightness temperatures (BT) over the hemisphere. Our purpose of the simulations was to investigate the relationship between the directional brightness temperatures and hemispherical thermal emission over a grass scene based on a physical-based thermal model (Thermal5a) and MODTRAN4. Extensive thermal emission simulations were conducted under a wide variety of solar illumination and sensor view conditions, component temperatures, atmospheric profiles, aerosol types and conditions and canopy leaf angle distributions. The best substituted angle of hemispherical thermal emission estimate was given over the grass scene at top of the atmosphere. The sensitivity of study was also conducted to determine which parameters most strongly affect the relationship. This study may determine the best view angle of satellite sensors over a continue scene.

Corresponding author: Yu-Li, SHI

Yuli SHI
E-mail: ylshi@nuist.edu.cn