

AN OVERVIEW OF TWO DECADES OF SYSTEMATIC EVALUATIONS OF CANOPY RADIATIVE TRANSFER MODELS

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ABSTRACT:

Canopy radiative transfer (RT) models can simulate the angular distribution of light reflected from vegetated surfaces in the optical domain. This directional aspect is important since the brightness with which a canopy target appears in Earth observation data depends not only on the structural and spectral properties of the target area but also on the viewing and illumination geometry at the time of measurement. The quantitative interpretation of remote sensing data thus hinges increasingly on the exploitation of RT models: In operational contexts they are used to pre-compute look-up-tables of quantities required by inversion algorithms; in off-line applications they may be inverted against measurements to yield sets of state variables describing the properties of some target. In both cases, the accuracy and reliability of the solutions to the inverse problems are determined by the performance of the RT model (and the remote sensing instrument). Reducing the uncertainty of RT models will thus increase the quality of the information derived from remote sensing data and augment the reliability of RT model studies in forward mode. This understanding has led to a series of model evaluation attempts starting in the mid 1980's, when the first computer models of surface reflectance emerged, to the late 1990's when the more systematic approach of the RAdiative transfer Model Intercomparison (RAMI) was formalised. This presentation will provide 1) an overview of the achievements of these efforts, 2) a description of on-going benchmarking activities and 3) a personal view on the challenges and opportunities that lie ahead.

TOPIC: Physical modeling and signatures

ALTERNATIVE TOPIC: Not Specified