AN INTEGRATED RADIATIVE TRANSFER MODEL FOR SATELLITE SIMULATION

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ABSTRACT. An integrated radiative transfer model (IRTM) for solar/infrared band is proposed in the study. The model contains improved correlated K distribution scheme, a cloud property parameterization scheme and a rapid radiative transfer scheme which is based on four-stream spherical harmonic expansion adding method for solar band and variational iteration method for infrared band. The simulation results of IRTM are consistent with observations of the satellite when it is applied to the Himawari-8 satellite simulation in both solar and infrared band. In addition, The computational efficiency of IRTM is approximately 4 and 6 orders of magnitude higher than the strict model (Discrete ordinate radiative transfer scheme with line-by-line radiative model) in solar and infrared band respectively. In view of its accuracy and computational efficiency, IRTM is well suited for forward simulation in remote sensing measurements of satellite.

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