



Impact of Vertical Stratification of Atmosphere on Radiative Transfer in O₂-A and SWIR CO₂ band

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The atmosphere is often divided into several homogeneous layers in simulations of radiative transfer in plane-parallel media. This artificial stratification introduces discontinuities in the vertical distribution of the inherent optical properties at boundaries between layers, which result in errors in the radiative transfer simulations, especially for high spectral-simulations in gas absorption band. To investigate the effect of the vertical discontinuity of the atmosphere on radiative transfer simulations and the inverse algorithm, case studies in the Oxygen-A band and SWIR CO₂ band, which are the main spectral used in the satellite carbon observation, are discussed, the results show that larger errors could be introduced in the forward simulations and inverse algorithm if the atmosphere is not layered properly.