

Effect and Improvement of Aerosol on Temperature Profile from MODIS

Jie Zhang, Jun Li, Qiang Zhang

Based on statistical synthetic regression algorithm from America, temperature and moisture profile of atmosphere is retrieved from the Moderate Resolution Imaging Spectroradiometer (MODIS) longwave infrared radiances, on the basis of profile result, spectrum transmittance is estimated by using Pressure-Layer Fast Algorithm for Atmospheric Transmittances(PFAAST), then, temperature profile is retrieved by using Nonlinear physical retrieval algorithm. The results show that atmosphere temperature above the top of boundary layer is well retrieved, the error is within 2K, in boundary layer, retrieval error is large, the error is positive correlated with aerosol optical depth and estimated error of skin temperature, but it is not correlated with atmosphere water vapor mixing ratio. According to theory of radiative transfer equation, the research analyze effect of aerosol optical depth on retrieval error, moreover, the sensitivity of which with weighting functions are analyzed. Finally, aerosol optical depth is used for improving on atmospheric transmittance and physical algorithm, the results show that temperature profile can reflect real value of atmospheric temperature within boundary layer after improving on aerosol effect.

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