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英文题目：Influences of Physical Processes and Parameters on Simulations of TOA Radiance at UV Wavelengths: Implications for Satellite UV Instrument Validation

作者：DING Shouguo, WENG Fuzhong*

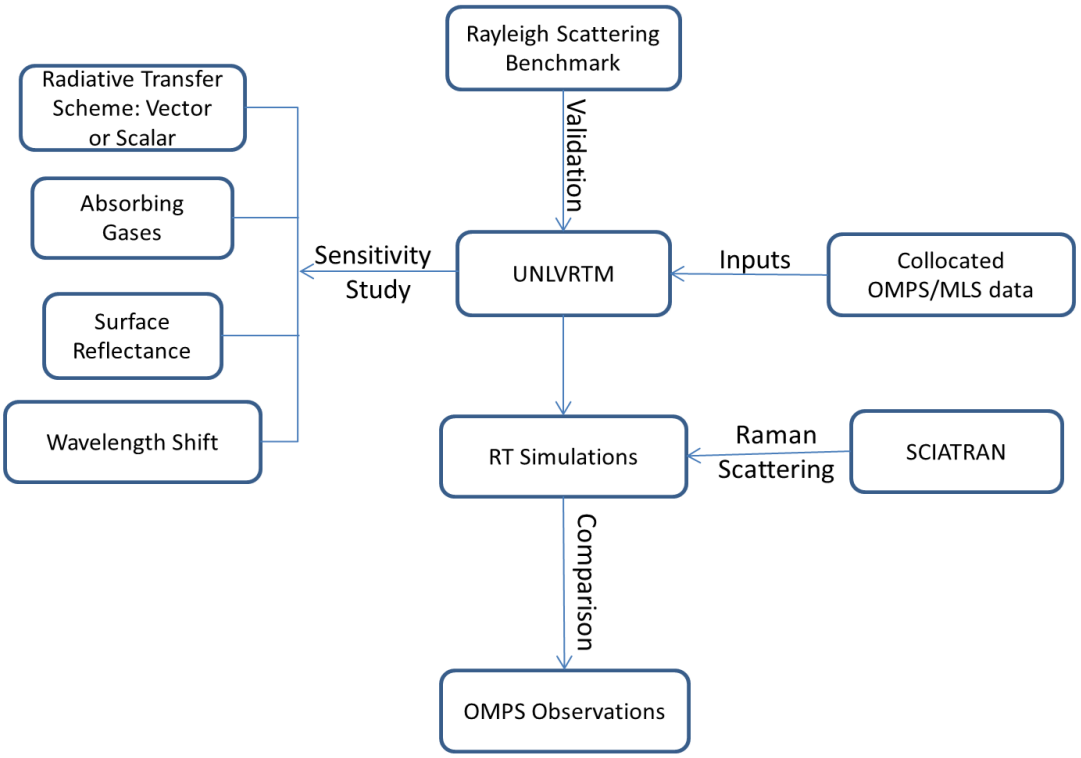
英文摘要： Numerous factors can influence the radiative transfer simulation of hyper-spectral ultraviolet satellite observation, including radiative transfer scheme, gaseous absorption coefficients, Rayleigh scattering scheme, surface reflectance, aerosol scattering, band center wavelength shifts of sensor, and accuracy of input profile. In this study, a Unified Linearized Vector Radiative Transfer Model (UNLVRTM) is used to understand the influences of various factors on the top of atmosphere (TOA) normalized radiance in the ultraviolet region. A benchmark test for Rayleigh scattering is first performed to verify the UNL-VRTM accuracy and show the model performances agree well with earlier peerreviewed results. The sensitivity studies show that a scalar radiative transfer approximation, considering only ozone, and a constant surface reflectance within UV region may cause significant errors to the TOA normalized radiance. A comparison of OMPS radiances between simulations and observations shows that the surface reflectance strongly influences the accuracy for the wavelengths larger than 340 nm. Thus, uses of the surface reflectivity at 331 nm as a proxy for simulating the whole OMPS hyperspectral ultraviolet radiances are problematic. The impact of rotational Raman scattering on TOA radiance can be simulated through using SCIATRAN, which can also reduce the difference between measurements and simulation to some extent. Overall, the differences between OMPS simulations and observations can be less than 3% for the entire wavelengths. The bias is nearly constant across the cross-track direction.

中文题目：物理过程和参数对紫外辐射强度的模拟暨卫星紫外仪器验证的影响

作者：丁守国， 翁富忠***

中文摘要：影响卫星紫外高光谱辐射传输模拟的因素很多, 其中包括辐射传输的求解方案，气体吸收系数，瑞利散射的求解，地表反射率，气溶胶散射，传感器中心波长偏移，以及输入大气廓线的精度等。为了测试不同因素对大气层顶的反射紫外辐射的影响，本文采用的辐射传输模式为 UNLVRTM 模式。利用该模式对瑞利散射进行验证的结果表明，UNLVRTM 模式对瑞利散射的计算精度与此前其他同行的结果一致。敏感性测试的结果表明, 标量辐射传输的近似，只考虑臭氧, 以及地表反照率在整个紫外波段选用常熟等都可能对 辐射强度的模拟产生重大误差。对 OMPS 的模拟和观测结果的比较显示，地表反射率对大于 340 nm 的波长模拟精度有很大影响， 因此，使用 331 nm 的地表反射率作为整个紫外波段的地表反照率值是有问题的。另外，利用 SCIATRAN 辐射传输模式，可以模拟旋转拉曼散射对大气层顶反射紫外辐射的影响, 从而在一定程度上缩小了测量与模拟之间的差异。总的看来, OMPS 模拟和观测结果之间的差异小于 3%。

英文文章结构图示例



中文文章结构图示例