

General Comments

This manuscript proposes a methodology for reconstructing a two-dimensional atmospheric transmittance field in the 280-400 nm range using the GPR method with multi-star observations. While extending limited line-of-sight data into a continuous 2D space and quantifying uncertainty are meaningful attempts in atmospheric optics and radiative transfer correction, there is a critical lack of information about the instrumentation and measurements, as summarized below.

Even under high solar irradiance, measurements of UV signals below 310 nm are challenging due to strong ozone absorption and Rayleigh scattering. In addition, UV measurements are highly uncertain due to out-of-band stray light, which is typically difficult to quantify. The authors cited Zhao et al. (2025) for the in-house instrument. However, the paper also does not seem to report the calibration for each band's characteristic.

In particular, the calibration report (e.g., band-pass function, SNR) for the U3 and U4 measurements is essential for this study, as ozone absorption and Rayleigh scattering increase dramatically within each bandwidth (see Figure r1.)

The authors also need to show the Langley calibration procedures and results for each band and verify that the retrieved optical depth and F_0 are consistent with typical values. For example, in Figure 2, the authors calculated the transmittance of U4 to be approximately 0.16 near zenith. However, in my simple calculation in Figure r1, the mean transmittance of U4 (288-314 nm) is about half of these values (i.e., 0.073), which may vary depending on the band-pass function.

Therefore, I recommend rejection at this point and resubmission after elaborating on the measurement/method for the data used in this study.

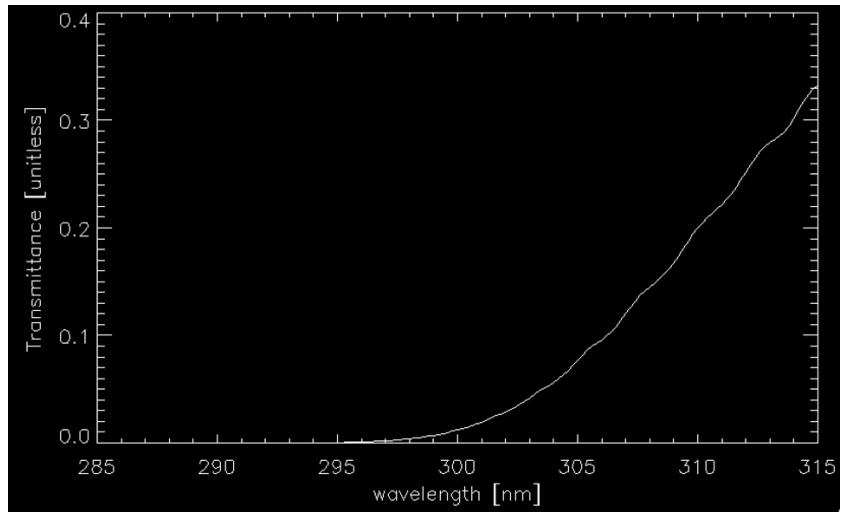


Figure r1. Vertical atmospheric transmittance at the sea level, and 300 DU of ozone.