

Interactive comment on “Improved sky imaging for studies of enhanced UV irradiance” by J. M. Sabburg and C. N. Long

Anonymous Referee #1

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Review of “Improved sky imaging for studies of enhanced UV irradiance,” by J. M. Sabburg and C. N. Long

General Comments

This paper presents new results on the measurement of enhanced UV irradiance at the surface and its wavelength dependence, based on new instrumentation and new image processing algorithms. The enhanced UV irradiance is measured at smaller solar zenith angles than previously reported and its wavelength dependence is shown to vary differently than previously reported. As such, the paper presents novel results. However, the analysis of the results is somewhat disappointing, and some points need to be clarified, as listed below.

Specific Comments

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1. The paper would flow better if the Introduction and sections 3.3 and 3.4 were organized differently. In the first paragraph of the Introduction, there is no mention of the possible causes of the enhancement of surface spectral UV irradiance or the wavelength dependence of the enhancement, leaving the reader to speculate. It is not even clear whether the enhancement being referred to occurs due to a decrease in cloudiness, allowing more radiation to reach the surface, or due to the presence of clouds and some sort of scattering effect. Only later in paragraphs 1 and 4 of section 3.3 and paragraph 2 of section 3.4 are possible causes reviewed from the literature. I would move these paragraphs to the Introduction.

2. Introduction, paragraphs 2 and 3: A number of instruments are mentioned in paragraph 2. It isn't clear from paragraph 3 how the TSI-440 ranks in comparison.

3. Section 2.2, paragraph 1: Does the shadow band serve to block some of the direct and/or diffuse UV irradiance from being measured by the detector as well as preventing reflection of the direct sun into the camera lens? If so, how does this affect the results?

4. Section 3.3, paragraph 5 and section 3.4, paragraph 3: The authors state that the current results do not give an indication of which mechanisms are indeed responsible for the UV enhancement or the wavelength dependence of the enhancement and state that the wavelength dependence may even be an artifact of the finite scan time. This fact detracts from the paper. Can any speculation be made?

5. Conclusions: How well did the new image processing algorithms process the images?

Technical Corrections

1. Introduction, paragraph 2: “enables” should be “enable.”

2. Introduction, paragraph 3: “The operation of the TSI-440...” is not a complete sentence.

3. Section 2.2, paragraph 2: “manufacturers and pixels” should have apostrophes

before the “s.”

4. Section 2.2, paragraph 3: It took me a moment to understand the meaning of “clouds looking up” and “clouds looking down.” It might be clearer as “looking up at the clouds” and “looking down at the clouds.”

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 6213, 2004.

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