

Interactive comment on “High levels of ultraviolet radiation observed by ground-based instruments below the 2011 Arctic ozone hole” by G. Bernhard et al.

Anonymous Referee #1

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Thank you for clarifying the issues I raised in my first review. There is just one remaining issue, where I think further discussion would be useful. That is the question of the stray light contribution in the Brewer instruments. I still wonder if out-of-band stray light scattered from longer wavelengths could contribute to a larger error in erythemally-weighted UV than estimated by the authors. They quote a stray light rejection of 10(-3) or 10(-4). But my understanding is that figure applies to the stray light from a monochromatic source measured several bandpasses from the centre wavelength. In the case of spectral UV measurements of sunlight, the situation is much worse because, rather than a single line, there is a continuum of longer wavelengths with irradiances that are

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orders of magnitude larger than those expected in the wavelength region of interest (mainly 300 to 310 nm for erythemally weighted UV). That is why double monochromators are preferred for the purposes of monitoring solar UV irradiance incident at Earth's surface. It is difficult to demonstrate the problem (or lack of it) using model calculations because in the wavelength region of interest, uncertainties in the value of ozone input to the model could have a similar spectral effect. Perhaps the best way to resolve the issue would be to compare the output of single-monochromator and double-monochromator versions of the Brewer instruments while making simultaneous measurements at the same site. Although I'm not aware of a publication that shows this, I'd be surprised if the study had not been undertaken during the development of the double version. It would be particularly interesting to see how the measured spectra diverge from each other at shorter wavelengths for the ozone amounts and relatively large solar zenith angles that apply in this case. Hopefully the addition of a citation will suffice. If not, perhaps another paper is needed.

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