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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Antarctic network of lamp-calibrated multichannel radiometers for continuous ozone and uv radiation data" *by* A. Redondas et al.

Anonymous Referee #2

Received and published: 13 March 2008

General Comments

The manuscript by Redondas et al. introduces a network of multichannel radiometers measuring total ozone and erythemal solar irradiance at three sites in Antarctica and South America. The paper focuses on the description of network sites, instrumentation, data analysis, quality control, and data dissemination. It seems that the primary goal of the paper is to raise awareness of the network and its data. The amount of science presented in the paper is unfortunately very limited: it is restricted to 20 lines of text (Section 4.1.) as well as the presentation of time series of total ozone, daily maximum UV Index and erythemal daily dose derived from measurements at the three

sites between 2000 and 2007. I leave it to the editor to decide whether these results are substantial enough to justify publication in ACP. I strongly encourage the authors to include a more comprehensive analysis of the UV environment in an updated version of their paper.

A good portion of the manuscript (specifically Section 2) has already been published by Lakkala et al. in the Journal of Geophysical Research (doi:10.1029/2004JD005584). These parts should be shortened and the material should be referenced.

The descriptions of the calibration and validation procedures are intertwined, which is sometimes confusing. Calibration and QA/AC procedures should be better decoupled. I suggest to first introduce the calibration method (Section 3), followed by the QA/QC section (Section 2.3). As I understand it, the irradiance scale of the network is based on calibrations performed by the instruments' manufacturer at Izana in 1999. This scale was maintained over the years by adjusting the instruments' calibration factors based on the analysis of lamp scans (Figure 1). The irradiance scale of the "travelling reference NILU-UV" is independent of the other instruments, and periodically established by comparison with measurements of a Bentham spectroradiometer operated by NRPA (P3391, L5). Data are additionally checked against measurements of the NSF SUV spectroradiometer at Ushuaia. If this summary is correct, it should appear in similar form in the paper.

It should be made clear that neither the reference NILU-UV nor the SUV are used to adjust the calibration of the instruments installed at the three sites. The sentences on P3390, L15-17 ("The irradiance scale can be transferred using the results of solar comparisons between the reference NILU-UV and the NILU-UV of the station") and P3992, L14 ("this absolute scale can be changed using the travelling reference in Ushuaia and Marambio and in Belgrano we can use the NILU#023 compared with QASUME unit (Gröbner et al., 2005) just before its setup at Belgrano as is described by Meinander et al. (2004)") indicate otherwise. To alleviate the confusing, the authors might include the following paragraph in the Conclusions: "The irradiance scale of the network is cur-

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rently based on the calibration established by the instruments' manufacturer at Izana in 1999. If need arises, the scale can be changed in the future by transferring the irradiance scale of the reference NILU-UV to the instruments installed at the three sites. As an alternative, the QUASUME irradiance scale could be implemented. This is possible because NILU-UV #023 was compared with the QASUME spectroradiometer (Gröbner et al., 2005) before it was installed at Belgrano (Meinander et al. (2004)"

The paper includes numerous spelling and grammar errors (see technical comments below). The manuscript should be edited by a native speaker before resubmission.

Specific Comments

P3385, L3: What is the purpose of "these UV-VIS spectroradiometers?" Could these instruments be used to measure ozone and UV irradiance? If so, could the data be used for comparison with the NILU-UV measurements?

P3387, L1 and P3393, L2: The instruments make measurements at three locations. This is hardly sufficient to track "the daily evolution of the vortex," which extends over a vast area in three dimensions. This is the domain of satellite observations. I think the NILU-UV measurements can only be used to measure total ozone and its effect on UV radiation at the three sites.

P3388, L11: "maximum and minimum temperatures range from -2°C to -4°C." This is obviously incorrect. Please correct.

P3390, L2: Even filters of the same batch may have a different spectral transmission. Are there any data on the variability of filters?

P3390, L7: Why is the drift largest for channels 3 and 4, but comparatively small for channels 5 and 6? Since the instruments share the diffuser and use the same type of silicon detector for all channels, I suspect that the filters are degrading. Is this the case? If so, are there plans to implement more stable filters in the future?

P3390, L23: Is the sensitivity of the reference instrument drifting at the same rate than

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that of the instruments installed at the sites? If this is the case, it may not be sufficient to calibrate the reference instrument only "every year or every second year."

P3391, L2: "A cosine ... data." Does this mean that it was assumed that SUV data of the NSF network are cosine corrected or was a cosine correction of 5% applied by the authors?

Technical Comments

The article "the" is excessively used and could be deleted in many instances.

P3384, L3-6: Include degree sign in latitude specifications; include comma after "Spain" and "Argentina".

P3384, L20: endangered > delayed

P3385, L2-9: Run-away sentence. Split in two or three. "Argentina) and INTA and INM, respectively." > "Argentina), INTA and INM."

P3385, L12: "provide and unique" > "provide unique"

P3385, L18: What does "they" refer to? "Ozone soundings?

P3385, L23: "enlarged into Spanish-..." > "expanded into a Spanish-..."

P3385, L24: Ushuaia is located in Argentina, not "the Antarctic region"

P3386, L11-12: "This makes ...scales." > "Measurements at Ushuaia therefore present a link between the two networks and their data."

P3386, L11-12: "are within 5%" > "agree to within 5%"

P3387, L12: "manned all the year round" > "manned year-round"

P3388, L1 and L6 "Sea of Weddell" > "Weddell Sea"

P3388, L6: Does "Confin Coast" really mean "Land of Coast"?

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P3388, L9: The name of the icebreaker is of no importance.

P3388, L19: "One-min" > "One-minute"

P3389, L14: "exclude" > "minimize"

P3390, L3-4: "we convert the measurements of the lamps for each instrument to that of the other one before it." > "we convert measurements of the new instrument to the scale of the previously installed unit." (If that was meant).

P3390, L14-15: "NILU-UV which makes ... stations." > "NILU-UV. By comparing measurements of the radiometers installed at the network sites with observations by the reference instrument, the consistency of measurements of the network is assured."

P 3391, L11: "determinate" > "determined"

P3392, L20: "every min, it is perfect" > "every minute, it is ideal"

P3393, L9: "at three" > "at the three"; "Fig. 3 during" > "Fig. 3. During"

Caption Table 3: "Erithemal" > "erythemal"; "KJ/mˆ2" > "kJ/mˆ2"; "stations, even thoungth ..." > "stations. Even though the latitude of the three stations varies by up to 23 degrees, values are comparable. The largest daily dose for November was measured at Belgrano despite the site's high latitude."

Caption Figure 1: "Lamp measurements" > "Lamp measurement". What is meant with "average of the lamps?" Doesn't every black point indicate a single lamp measurement rather than an average.

Caption Figure 2: "Horizontal ..." > "The horizontal lines in the ozone plots indicates 220 Dobson Units."

Caption Figure 3: "Dose Ushuaia" > "Dose at Ushuaia"

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 3383, 2008.

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Interactive Comment