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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Comparison of UV climates at Summit, Greenland; Barrow, Alaska and South Pole, Antarctica" *by* G. Bernhard et al.

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General comments:
"Comparison of UV climates at Summit, Greenland; Barrow, Alaska and South Pole, Antarctica" by G. Bernhard et al. is a paper of excellent scientific quality and excellent presentation quality analyzing global irradiance measurements at 3 polar sites. The work is based on measurements from SUV-150B and SUV-100 spectrometers. The treatment of the measurements (calibration, data reduction, uncertainty estimation, comparison to model calculations, analysis methods) is flawless. The paper reads very well. The novelty of the paper is the data from Summit, Greenland. It seems that this site "behaves as expected" within the NSF network stations. I was a little unsure of how to rate the scientific importance of the paper (see specific comments). At this

point I rate it as good, based on the importance of adding one more station (Summit) to make an important network (NSF network) more complete.

Specific comments:
The authors claim that “Additional monitoring sites at high latitudes, particularly in Russia, would be required. . .“ (page 4964, lines 22-23). Maybe this part of the conclusion could be exploited a bit more and potential questions like the following ones could be addressed:
The additional station Summit did not seem to add any significant new science to the network, other than adding another site, which is important too. Why should more stations be added?
Instead (or in addition) to adding new stations: Should the network sites be complemented with other instrumentation, which allows an even better assessment of the polar climate? Instruments measuring aerosol properties or trace gases may add to a more complete picture of the situation and also allow fixing some of the parameters going into the RT model.

This is just an idea:
A very important aspect of global irradiance measurements in the Arctic is the study of the influence of the surface albedo on the radiation budget (not just in the UV), especially considering potential future changes in the Arctic‘s surface albedo. Figure 4c is a very interesting comparison between all-sky data from Barrow, Alaska, and Summit, Greenland. If the RT model was used to match the measured ground irradiances by adjusting the input parameters (mostly cloud optical depth), then the modeled backscattered irradiance could be compared with satellite reflectivity data (e.g. from OMI). I think that such an analysis might help to improve our knowledge of what might happen if the surface albedo in the Arctic changes.

Technical corrections:
Title: shouldn‘t there be a semicolon after Alaska?
Figure 1: what does “Volume 14“, “Volume 15“ etc. mean?

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Page 4956, lines 16-18: I suggest inserting one sentence describing the clear sky determination, so that the reader does not necessarily have to look for the reference.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 4949, 2008.