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Atmospheric Chemistry and Physics Discussions

Interactive comment on "UV radiation measurements in Marambio, Antarctica during years 2017–2019 in a wider temporal and spatial context" *by* Margit Aun et al.

Anonymous Referee #3

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The manuscript presents a study of the solar UV radiation behaviour observed over an Antarctic site during the 2017-2019 period and compares it with that characterising the UV irradiance over other sites and periods, revealing specific features. In this context, I find that the manuscript can be of interest to the scientific community and should be published. Nevertheless, I would suggest a revision of the analysis and improvement of the presentation.

The study is focused mainly on 2 observational seasons but despite the comparatively short period presented results outline an interesting feature of the polar environment impact on the solar UV irradiance reaching the ground. It was reported a significantly

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higher UV level during the second season with respect to the first one even in the time when the ozone depletion in Antarctica was finished. Such an occurrence hardly could be explained by ozone column variations only. For instance, the mean January ozone column dropped by about 5.5% from the first to the second season (Table 2) that would cause nearly 7% increase of the mean erythemal dose assuming RAF of about 1.2. However, according to Table 1, the measured increase in the 2018/2019 season was 21% that could be attributed to the predominant role of the other factors discussed in the manuscript. To my opinion even such simple assessments with a short discussion would enhance the weight of obtained results.

At the beginning of the introduction, the authors claim that “UV radiation at wavelengths smaller than 280 nm does not reach the surface of the Earth”. To my knowledge the short wavelength border of the solar irradiance at the ground is no less than 295 nm, so I would ask the authors to provide references confirming their statement. In addition, in the line 62 it is said that “The data from 2000–2008 serve as a reference for times when there were not yet signs of ozone recovery”, while above, in the line 45 it is mentioned that “Thanks to these efforts, concentrations of ozone depleting substances have declined since the 1990s (WMO, 2018), the loss of stratospheric ozone has stopped and the first signs of recovery have been noted (Solomon et al., 2016)”. In the cited article of Solomon, 2000 is considered as year, where fingerprints of healing could be recognized. Hence, I suggest a reformulation of the motives leading to choose 2000-2008 as a reference period.

Generally, the manuscript is written in report-like style, which would create difficulties for larger audience. For instance, the paragraph between lines 165 and 170 shortly introduces the OMI dataset and immediately after it is said that the data were taken for a certain geographical point and majority of the points in Fig. 2 are in a certain range and are characterised by a certain median. It is not explained that the geographical point was chosen to be maximally close to Marambio station, that the points in the figure represent the ratio between GUV and OMI instruments and that namely the

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distribution of this ratio has a median of 1.01. It is true that a part of this information can be found in the figure but I think that the meaning of the used parameters should be explained in the text. Moreover, it is not indicated if the ratio is GUV/OMI or OMI/GUV, which gives an idea about over- or underestimation of one device with respect to the other.

The numeration of the figures jumps from 2 to 4 and the same is in the text, figure 3 is missing. In addition, on the y-axis of the most of the figures only the measurement units are given without the corresponding parameters.

Some issues of minor importance:

I suggest to include “Solar” at the beginning of the title.

l. 159. “The daily doses and UVI maxima. . .”.

In the legend of Table 1, the standard deviation is indicated by both “std” and “St. Dev.”

l. 356. “..similar pattern is also present in Troll:. . .”.

Legend of Fig. 10. What is the meaning of the gray and black curves in the upper panel, which of them is maximum or noon UVIs?

l. 382. Repetition of “also”.

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