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comment

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 #1

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The presented study analyses a two year worth of UV data in Marambio station, Antartica. Data from 2 GUV instruments are utilized to derive daily erythemal and UV indexes, while proxy data from a wide range of instruments/observations were also presented. Additionally, the authors compare these datasets with data from 5 close by stations in order to reveal the spatial distribution of the UV irradiance and probably linked it to geophysical parameters.

Although a research that is related to UV radiation at this vulnerable area is quite interesting and could potentially be of high scientific value, the way that is presented in this work is poor and lacks of essential information/elaboration.

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Discussion paper

I believe that the introduction could be enriched, for example the authors could highlight more the need of observations in Antarctica and possibly state some extreme events during the last years that support this need.

For the measurement sites it is a bit confusing how the authors introduce the sites. Sometimes they include the instrument information, sometimes not. For some of the stations they give an extended description, for others they don't mention if any other measurements apart from the UV ones are present. It would be helpful to try be consistent and provide an analytical table with the station information (coordinates, height, type of measurements, instrumentation, duration of measurements etc.) Line 92: please check this, because the soil doesn't melt, the snow on top of it does.

In general there are some vague statements in the manuscript that rather confuse the reader than illuminating the details of the study. For example, the authors often use the references without providing any further explanation especially during the presentation of the data used in this study (e.g. lines 137-138, 154, 156, 162, 206 etc.). The references should work as a guide for the methodology applied in this study or to support findings of this study, or even justify the reason of this research. They shouldn't replace information that is crucial and aims to support the validity of the data presented here. Elaborating more on this, as concerns the data section, there are a lot of gaps and blurry areas: The wavelengths that are stated are the nominal ones (lines 132,151). Usually each individual instrument has deviations from the nominal values not only at the wavelength peaks but as well at the spectral responses. Here it is not clear if the datasets were cured for these discrepancies in their spectral and angular characteristics (both the 2 GUVs used and the NILU - this could apply for the rest of the instruments providing the proxy data like the SL501 sensors used for the albedo retrieval). In line 138 you are stating the general uncertainty provided by Bernhard et al. (2005) but this is not enough to state the uncertainty of your data since you are not using the same serial numbers as in this study. You probably need to use the methodology provided by your references in order to derive the corresponding values for your

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specific instruments. Elaborating more on this, here are some questions that should be addressed adequately in order to support the validity of your datasets: - What is the exact calibration process? Do you correct for angular errors? Do you correct for different spectral responses? - Is there any degradation through time between consecutive calibrations? Are you correcting for this and how? - What is the uncertainty of your calibration process and thus the uncertainty of the level 1 data (calibrated irradiances) - What are the overall uncertainty of the derived products? - Do you have any QA/QC flags that indicate possible problems of the data and thus exclude some extremes cases? And one more question would be: how do you homogenize the different datasets used in this study? partially this could be answered by the validity of the calibration process.

Lines 165-170: this statement is not clear since the reader might be confused regarding which dataset you refer to in lines 168-169. Again, the comment in line 167 should follow the results of your analysis as to support them.

For the proxy data, a small reference to the modified potential vorticity could be helpful here. After the proxy data, you also refer to the UV measurements at the remaining stations of the study, but you don't support the datasets with more information on their calibration procedures, uncertainties, and most importantly the procedures that were used to derive the products you are referring to (since this is important to assure the homogeneity of the compared data).

The results section lacks of comprehensive plots. Please add descriptive y-axis labels (eg Daily UV doses (kJ/m2) instead of KJ/m2, ozone (DU) instead of DU), grid lines would help and titles like the station name would be useful to have. Also, please consider adding appropriate legends (e.g. figure 7 should somehow state that the long term while line comes from the NILU measurements apart from mentioning it in the caption). Add caption for tables and consider plotting the proxy data underneath the UV data to help the reader see the correlation - which is something that you need to elaborate more in the results sections. Likewise, do the same for the spatial analysis

(multiple stations). Why the Palmer, McMurdo and South Pole stations don't have data for the last period seen in this study?

The paper requires major revisions in order to become acceptable for publication.

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