

## Comment on **essd-2021-55**

Anonymous Referee #2

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Referee comment on "UV-Indien network: ground-based measurements dedicated to the monitoring of UV radiation over the western Indian Ocean" by Kevin Lamy et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-55-RC2>, 2021

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A useful manuscript detailing UV measurements in a part of the world that has, until now, had limited coverage. I expect it should find a suitable home somewhere, but as Reviewer #1 notes, it does appear to fall slightly outside the remit of EESD by a strict reading of the journal's aims and scope. This could be addressed by a shift in emphasis to providing more details about the ground instruments and their capabilities and calibrations, and a summary of the resulting data, and less emphasis on the intercomparison to satellite datasets. However that specific point I leave for the editor.

Aside from the issue of whether the manuscript properly fits within EESD's remit, I think the manuscript would anyway be improved by this shift in emphasis and some restructuring. There would be much to be gained by adding details of the calibration procedures, more details on the sites and their localities, more details about what instruments are running when at each station, more details about the data processing. This would enable the reader to assess the quality of the resulting data, which is not really possible at present. The comparison to satellite data tells us more about the disparities between different satellite and model products than it does about the ground data — ground data usually being used to validate satellites, rather than the other way round. I found the two sections comparing ground based data to satellite data less helpful, perhaps because the thrust is that there are differences between the Bentham and the satellites due to their different footprints and processing techniques, but little effort to resolve these differences. As a result it tells us little about the Bentham and UVR data. More details and depth on the calibration procedure and instrument characterisation on the other hand would assist here. The conclusions are also heavily biased to interpreting the satellite aspect rather than the novel ground data.

In general I would recommend the authors restructure the paper. The introduction is mostly fine. Then perhaps something as follows:

- site selection (how were they chosen)
- site details (latitude, longitude, altitude, urban, rural, general surrounding habitat, other ancillary measurements e.g. SAOZ)
- instruments and which at which sites

- instrument maintenance protocols and frequencies, characterisations (cosine error, spectral responses), calibrations and data processing (include levels of data)
- data products and pathways (leading on from data processing)
- presentation of summary data: diurnal variation of UVR and CF at each site, monthly means / annual variation, depending on length of measurement period

I think most of this information will be available to the authors if it is not already in the manuscript, but, for example, putting all the information about calibrations together will help (at present it is spread between sections 2.1 and 3.1).

Some more specific points follow:

l 1-2 Rephrase to make it clear that the spectroradiometer is a single instrument shared across the network, rather than each site having a spectroradiometer. Likewise for the all sky cameras that not all sites benefit from such an instrument.

l 2 "Homogenously" is not quite correct, there are not an equal number in each country; perhaps "spatially" or "geographically" would be better. How these sites were selected would also be interesting to include.

l 19 "increases more than 4". I presume this does not mean a factor of 4, but it should be made clearer to the reader.

l 48 Insert comma after "radiation" and remove after "conditions"

l 82 Region should not have a capital here

l 92-95 This would be better changed to "all sites have operational UVR instruments (...), and four stations (...) have operational all sky cameras" or similar

l 96 Which model spectroradiometer?

l 97 How are the TOC and calibration measured simultaneously? Or do the authors mean that the calibration is dependent on TOC (and also SZA?) and applied after measurement? How was the calibration obtained? How often is it reassessed?

l 98-100 What is the calibration frequency so far? This is more important than an anticipated future 2 years cycle for the data presented. How is the cross-calibration carried out? How is the Bentham calibrated and what are the details of its calibration / traceability? Why was the Saint-Denis calibration method changed from the Davos one to the Bentham-derived one? How does this affect the data? Do the authors mean PMOD when they state "Davos"? If so, this should be stated more clearly and acknowledged.

l 101 What do the authors mean by mesh-size (graduations in TOC in the lookup table for calibration)? If so, how does this relate to the cost of the instrument?

l 102 How much difference is there between OMI TOC and SAOZ TOC at the stations with both, and how much does this affect the UVR calibration?

l 105 It would be useful to know what level 0 and level 1 data is as well.

l 107 It would be useful to provide at least brief details of the cloud segmentation algorithm and any known issues or bias in addition to the citation to assist the reader.

l 96-197 Using the abbreviations AD and RD makes reading the following section much harder. Suggest they be removed and spelt out.

l 208 Remove space before period.

l 211 BENTHAM should not be fully capitalised here

l 231-234 This detail should be left for the figure caption.

l 241 Absolute and Relative Differences should not be capitalised

II 248-249 Yes UVI-RADIO and UVI-BENTHAM should be aligned, but as the authors are presenting the data, and the quality of the data depends on the quality of the calibration, how well this has been transferred between the two instruments would be very interesting to include.

I 252 M-RD: these designations make reading the text harder

I 289 Likely smaller than 100km as well, but including some details of the sites' local environment would complement this point

I 300 How long is the measurement period? Please provide details.

I 317 Enhancement suggests a ratio (or factor), but as before do the authors mean a difference of 2 to 3?

I 328 How long is the data set being discussed?

I 369 Rearrange sentence so does not start with "10 am"

II 380-390 This information would be better in a "data availability" section

Fig 1: It would be useful to distinguish the stations, perhaps by colour, according to the instruments that monitor at each site.

Fig 2: This mainly shows satellite timelines. It would be better to show the timelines of the UVR instruments which give most of the geographic coverage and the all sky cameras which are the focus of the manuscript

Fig 5: Is this UVR data or Bentham data?

Fig 6: I am not sure whether the length of the data series is sufficient to call these "climatologies"