

Answer to Anonymous Referee #1

Author replies are in red

Specific Comments

I appreciate the authors' efforts to address my previous comments and the manuscript has indeed improved. I still have some comments as follows:

1) I think the title could be revised to better reflect the work and make the paper more complete. Maybe it can be something like this: Real-time UV-Index retrieval in Europe using Earth Observation based techniques: system description, quality assessment and future plan

This way, it can help better organize the paper structure. I think this paper serves as the overview paper of the system, which is just the beginning. With that, I would like to see an additional section to talk about some of the future plans with the system, such as how the data can be accessed and used etc. Also, it might be good to break section 2 into two sections: once section can be "section 2: system description which focuses on the detailed description of the component of the system such as the input data and the nowcasting products; another section "section 3: ground measurements and evaluation methodology. Then section 4: "results and future plan" can be together or separate.

We thank the reviewer for the constructive suggestions that indeed upgraded the manuscript and the presentation quality. In the revised version we changed the title into "Real-time UV-Index retrieval in Europe using Earth Observation based techniques: system description and quality assessment". The future plan part was added in the last paragraph of the updated "Section 5: Conclusions and future plans". Section 2 was also divided into the following two sections: "Section 2: The UV Index operating system (UVIOS)" including the subsections "2.1: System description", "2.2: Real-time processing concept" and "2.3: Input data description". Then, we placed the "Section 3: Ground measurements and evaluation methodology" which consists of the subsections "3.1: Ground-based measurements" and "3.2: Evaluation methodology". Finally, the Results section was adjusted to "Section 4: Results" and the final section was renamed as "Section 5: Conclusions and future plans" in order to provide some brief information about the future plans with the system.

2) The introduction is still long and I have provided several comments here to make it more concise and readable:

- This work is not focusing on the trend analysis, line 104-123 discusses a lot of studies of trend analysis. I understand that the point is to show the importance of continuous monitoring of UV index. I would suggest cutting this short to keep only one paragraph and indicate the main points without the need to describe each study.

The new paragraph is significantly shorter with less studies discussed in detail.

-Line 142-167: it is a very long paragraph and hard to read. I would suggest breaking this down into two paragraphs

The part discussing the comparison of satellite to ground based retrievals has been separated to a new paragraph.

-Line 168-193: again, I appreciate the authors to explain the nowcasting and forecasting products, which can be overwhelming here. I would suggest moving this bulk of information to Section 2 where this system is introduced.

This part was moved to the new Section 2.2.

3) Line 56, 59: It would be helpful to add the wavelength range for the UV radiation and UVB radiation, respectively.

Wavelength ranges have been added.

4) Line 72: In this spectral region, what is “this spectral region”?

Changed to UV.

5) Figure 5 caption: please describe the color bar in the caption.

The caption was corrected as to describe this type of plot, i.e. density scatter plot in which a pattern of shaded squares represents the counts of the points falling in each square. The aforementioned brief description was added in the Fig. 5 discussion.

6) Table A.1 is not necessary. It is better to put the # of data points on the respective figure so that the information would be available right away to readers when they read the figure without going back to the table.

Corrected.

7) I would suggest the authors to do a round of thorough proofreading of the manuscript.

The proofreading of the manuscript was performed by all authors individually.

Corrections:

Line 78-80: this sentence needs to be reorganized: “ as well as single scattering albedo (SSA) “ there is confusing

We have reorganized in two sentences and now it reads as:

“Aerosol optical depth (AOD) that quantifies the attenuation of the direct solar beam by aerosols is a parameter varying with wavelength. Single scattering albedo (SSA), which determines the scattering ratio to total extinction, is also a spectrally variant parameter”

Line 80: what do you mean by “incoming UV irradiance measurements”, surface UV irradiance measurements?

Has been changed to surface.

Line 81-83: This sentence to show the conclusion from these literature reviews is a little confusing. They show the importance of using SSA in the UV spectral region, what did they use the SSA for? What did they study?

The sentence now reads as:

“Finally, a number of studies have highlighted the importance of using representative SSA in the UV spectral region, instead of interpolating SSA at visible wavelengths to the UV, or directly using SSA at visible wavelengths, options that systematically overestimate UV irradiance (Corr et al., 2009; Fountoulakis et al., 2019; Kazadzis et al., 2016; Mok et al., 2018; Raptis et al., 2018).”

Line 375: change “which is followed by” to “which shows”

Corrected.

Line 375: the correlation coefficient is “0.944”, there is no need to keep 3 decimal places as other places have used two decimal places, it is better to be consistent. Again, the decimal places on the figures in the Appendix are like “R = 0.98005”, please double check.

Corrected to two decimal places throughout the manuscript including the Appendix figures.

Line 377: “For both, clear sky and all sky”, remove the “,”

Corrected.

Line 571: add “,” between “to date” and “polar orbiting”

Corrected.

Line 577: change “The mean differences TEMIS TOC” to “The mean differences between TEMIS TOC...”

Corrected.

Following the proposed correction, we believe that the manuscript is now complete. We want to thank the reviewer once again for his support and for making this study even more clear and reader friendly.