Interactive comment on "European UV DataBase (EUVDB) as a repository and quality analyzer for solar spectral UV irradiance monitored in Sodankylä" *by* A. Heikkilä et al.

Anonymous Referee #1

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This paper details the QA aspect of the EUVDB, and the outcome of applying that QA to 25 years of UV data from Sodankyla. Neither the EUVDB, the QA tools, nor the Brewer spectrophotometer and its data are new, but the paper fits the remit of the journal by describing them as the focus of the manuscript rather than an adjunct to analyzing the data.

The manuscript aims to describe the QA system employed at the EUVDB, and then both demonstrate application of the QA tools and use them to assess the performance of the Brewer spectrophotometer measurements of UV data at Sodankyla over the past 25 years. This dual purpose application to Sodankyla data is in danger of becoming a circular argument, lacking as it does a critical assessment of whether the QA tools are

valid. There is some addressal of these issues in the case studies, but in the context of explaining away grey flags, rather than as a discussion of the use and validity of the QA system. In trying to do two things the manuscript does not quite succeed in doing either properly. This should be addressed before publication can be considered – some guidance is given below.

Top of P3 It would be helpful to have some further detail of the EUVDB repository e.g. to mention that data comes from both long-term monitoring sites and also campaign data. How many data records/stations are current (still regularly submitting data), and how many substantial data records exist (eg more than 10 years of data). What is the geographical extent of the submitting stations?

P3 line 7 – are data submitters actively alerted if there is a QA issue with their data, or does the system rely on the submitters checking for the QA flags? Can you prove this statement (line 6-7) eg by referencing publications that have used data from EUVDB.

P4 line 30 – how can the QA system determine whether the model scenario that the measurement matches was indeed the scenario under which the measurement was taken? It should be (as stated) but this cannot be determined by the software, so the quality becomes determined by whether the spectrum is "normal" i.e. meets expectation for the majority of times and places in Europe. This should not determine quality, as well illustrated by Sodankyla where many spectra are grey because of low SZA, not necessarily because the data are unrepresentative of the true conditions. See also comment on Figure 1.

P6 Shift1: Although the original description of shicRIVM is cited, a little more detail is needed to assist the reader of this manuscript e.g. the shift is assessed relative to what?

P6 Shift2: The description of this flag should not be discarded just because it does not apply to Brewers. The manuscript claims to describe the QA system of EUVDB, so it should describe it fully and completely, not as applied to a subset of the data.

P6 Start_irr: this description is very confusing. "Five subsequent ratios of irradiance readings. . ." What are the ratios (i.e. if a:b what are a and b?) and subsequent to what? What is the model to which this assessment is also applied? Which of these 5 ratios determines the first reliable reading (first?, fifth?), and why is a highest value below (assuming that below here means at a shorter wavelength) the first reliable reading potentially used to set the flag when it is by definition not reliable?

P6 Spike_shape: again a clearer description is needed e.g. (line 24) "the spectral irradiance reading at the measured wavelength and the median of 10 readings around the measured wavelength is over twice that of the matching model calculation. . .." As with Start-irr, the model should be explained somewhere before this point. Is it from AtmosphericSignature, or is it from within shicRIVM (as implied by Figure 1)? Line 30 "subsequent readings" could mean two scans one after the other. What I think you mean is two consecutive wavelengths in a single spectrum (measured or modeled). Please clarify. See also comment on Start_irr, which I think suffers from the same confusion.

P7 Scan-Variability_2: Please describe fully (see above comment on Shift2).

Figure 1 – this does not entirely agree with Table 6, nor with the description of the master flag in the text. The master flag in Figure 1 is stated as dependent on (taken as the worst of) wavelength errors, spectral shape errors (ie spikes) and irradiance scale errors (start irradiance). It does not include (according to Figure 1) the 2 versions of atmospheric transmission flag (from shicRIVM and AtmosphericSignature) that are included in table 6 as contributing to the master flag. Nor does it address the scan variability flag that has been ignored for the Brewer. Figure 1 is operational at the database and implies that a user can select a master flag that for the most part indicates instrument based quality, and then one or both (?) of two atmospheric condition indicators (that are not identical but very similar in their information). The manuscript should explain what a general user of the database can expect from the quality flags (as per Figure 1). If the Sodankyla data has combined the instrument master flag with

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the atmospheric flags to give an overall flag then that should be explained separately. If not, then the page on the database for the user interface needs to be changed to be consistent with the applied meaning of master flag.

P8, line 19 .. the annual total number of spectra. . . Line 22 – why is there so little data in 2011. If this aspect of the manuscript now indicates the QA of the Sodankyla data we should be told.

P9 line 3 Suggest "This is a frequent occurrence for Sodankyla, located within the Polar circle, where the sun can be low for several consecutive scans after sunrise and before sunset."

Lines 7-17 Rather clumsily written. See also comment on figure 1 and develop the argument (eg should Atm_signature be part of the master flag?)

The combination of figures 3-7 should be explored. Figs 3 and 4 can definitely be combined, indeed are more instructive that way. Figure 5 might also be added. Alternatively Figure 5 could be combined with Figs 6&7.

The case studies are useful. It would also be helpful to show how selecting a certain flag would alter the data set eg select only master flag green and show how that influences the entire Sodankyla dataset – contrast to Fig 2.

P12 End of conclusion. The work done here has been performed and presented by those very familiar with the EUVDB and the Sodankyla Brewer in its unique setting. The last paragraph of the conclusion states that the master flag is not the most relevant overall, and more detailed exploration of flags (presumably aided by prior knowledge) is required. How would a novice user fare when trying to use the site and QA system. Could a comment on this be provided.

Minor points: P3 Line 4 What is "the planned study". Better just to say "according to the requirements of the user".

P4 line 7 aspects of what?

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P4 line 27 grammar

Multiple cases of misuse of prepositions. These do not detract from the meaning but should be corrected in editing (one example contributes to the problems in line 27 above).

P10, Case study 3, and first paragraph of conclusion on P11 – rewrite (clumsy construction)

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