

Interactive comment on “Inter-comparison between the Aerosol Optical Properties Retrieved by Different Inversion Methods from SKYNET Sky Radiometer Observations over Qionghai and Yucheng in China” by Zhe Jiang et al.

Anonymous Referee #1

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This analysis is divided in two parts: first, a comparison of aerosol properties retrieved by inversion code SKYRAD versions 4.2 and 5.0 is performed, based on two years of data for two SKYNET sites. Second, version 5.0 is used to analyze the aerosol characteristics at the two sites. This kind of study is needed for the improvement of the SKYNET network methodology, and also for the improvement of our knowledge of the aerosol characteristics at China. Therefore, it is adequate for this journal.

However, I would recommend to accept the paper after a major revision, mainly related to: - adding detail to the text - improving the graphical representations - further

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discussing the temporal behavior of aerosol at the two sites

The use of English is adequate, although some flaws are pointed out and I would recommend a revision.

General comments: - Introduction: Some more background discussion would be welcome. Please add also a few comments about general differences between versions 4.2 and 5.0. Non-sphericity, minimization technique used, etc, so general readers can learn about these codes. - Section 2.1: Please explain the method used for the calibration, and any findings you consider interesting to note, if any (calibration drift, etc). It is important also to detail the description of the two sites, including a map if possible, to understand aerosol characteristics. - Section 2.2: Please cite the source for the details given about version 5.0. Comments about expected errors would be useful at this stage. - Section 3.1: It is possible to further analyze the comparison of the SDF, including some statistics. In the first part of the paper, perhaps the authors should focus on the analysis of the differences (absolute or relative) and leave the absolute retrievals for the second part of the study (analysis of the aerosol properties). Why AOD is not included in the comparison? - Section 3.2. and 3.3.: similarly to 3.1, concentrate on differences rather than absolute values. Finally, add your opinion about the most adequate version to use in the remaining, based on the results, so both parts of paper are smoothly linked. - Section 3.4: I think the analysis of the aerosol properties at the two sites need a deeper analysis, also including references to previous analysis from China or elsewhere. Line 251 is particularly vague, as other reasons for the increase of AOD in summer are usually considered (differences in transport from remote areas, increase of secondary aerosols due to higher solar radiation...). In contrast to first part of the paper, in the second part I would recommend to focus on the absolute values, represented in monthly means along the year, with corresponding boxplots, for example. Current analysis based on seasonal averages alone, is not optimum.

Other specific corrections: - line 59: many -> several? - line 74: There are a few - line 94: The dynamic range seems should be 10^7 instead of 107? - line 120-121: rewrite

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(parenthesis?) - line 131-132: e^2 - line 156: more comments on the cloud screening and quality control - line 173: it is important to highlight the fact that the unrealistic coarse mode in v4.2 is removed - line 244: The AOD is - line 289-291: three significant digits is enough for the refractive index (1.45 etc)

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