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Atmospheric Chemistry and Physics Discussions

Interactive comment on "AERONET and ESR sun direct products comparison performed on Cimel CE318 and Prede POM01 solar radiometers" *by* V. Estellés et al.

Anonymous Referee #1

Received and published: 12 March 2012

General comments

The authors compare the aerosol optical thickness, angstrom exponent, and water vapor content obtained from data observed PREDE sky radiometer and CIMEL sun-photometer. In this study the authors applied a sunrad code, which is built by borrowing subroutines of two different algorithms for PREDE sky radiometer and CIMEL sun-photometer. The paper can be accepted for the publication if authors thoroughly revise the manuscript. My general comments are as below:

(i). The English should be thoroughly checked.

(ii). The sunrad code is simply a merge of some routines of algorithms for PREDE

sky radiometer and CIMEL sun-photometer. The authors should explain their original contributions in this code.

(iii). The given discussions are not enough and clear. The authors may include scatter plot diagram to show how well results from two different instruments match. As I indicated in specific comments, the discussion section is not satisfactory and lacks scientific merit. For example, the authors transferred calibration coefficients of CIMEL sun-photometer to PREDE sky radiometer by assuming that optical thickness produced by both instruments should be same. After that, the authors used such calibration coefficients to calculate AOTs and compared the results. What is the use of such comparison since calibration coefficients for PREDE instrument were already tunned to produce optical thicknesses equal to those given by CIMEL sun-photometer?

Specific comments

Title

1. The title is ambiguous. Please revise the title that reflects the main content of the paper at a glance.

2. In title, sun direct product-→direct sun product?

Abstract

3. Line 4: SKYNET (SKYrad network)–> The meaning of SKYrad is not clear. Actually, what does SKYrad mean? Does it mean only sky radiometer or other instruments too?

4. Line 8:The retrieval of direct sun products. . ..—->What type of products, please write in the parenthesis

5. Line 9:. . .to derive aerosol optical properties. . . —->what type of products, please write in the parenthesis.

6. What are the new features of ESR algorithm in comparison to the present algorithms for CIMEL sun-photometer and PREDE sky radiometer to retrieve aerosol optical thick-

ness and water vapor content? Please describe very concisely in the abstract. This helps the user to figure out the most interesting part of this paper from the abstract.

7. The aerosol optical thickness difference described in the abstract is for which wavelength or wavelength range?

8. What about the difference for other products (angstrom exponent, water vapor content), more importantly water vapor content?

Introduction

9. Line 1 of the 2nd paragraph: ....the optical and radiative properties of the aerosols.... —>Instead of "property", the word "parameter" is suitable. Correct such mistake for the whole manuscript. Basically, the words "optical" and "radiative" are used with the same meaning in the literature. What are the optical parameters and what are the radiative parameters? Please carefully revise the manuscript to eliminate confusion to the readers.

10. Line 1 of the 4th paragraph: The paper of Dubovik and King, 2000 is not in the correct alphabetical order in the references section.

11. Line 1 of the 5th paragraph: No title of the paper in the references section for Takamura and Nakajima, 2004.

12. Line 3 of the 5th paragraph: ...Currently it holds 37 sites...–> Are 37 sites in only Asia or whole over the world?

13. Line 3 of the 5th paragraph: ...the Prede POM radiometer .... —>Please write in a very easy to understand way. As Prede is the name of the company, POM is the model of the instrument, please write them clearly. You may write as .. sky radiometer, manufactured by PREDE Co. Ltd., Japan. It has two models: POM-01 and POM-02 .....,... For the sentences after it, you may write PREDE sky radiometer (not Prede radiometer)

14. Line 1 of the 6th paragraph: ESR website, 2011—>Not applicable for scientific article. Write the link of the webpage.

15. Line 2 of the 7th paragraph : —than can be applied...—> ....that can be applied...

16. Line 1 of the 8th paragraph: write the types of direct sun product

17. Line 5 of the 8th paragraph: AERONET web site, 2011–>Not applicable for scientific article. Write the link of the webpage.

Instrumentation, calibration, and methodology

Instrumentation

18. Line 4 of the 1st paragraph: Write shortly about direct sun triplets.

19. Line 4 of the 1st paragraph: RIMA website, 2011–> Not applicable for scientific article. Write the link of the webpage.

20. Line 9 of the 2nd paragraph: #424 and #425—>Those numbers suddenly appear here without any description in the previous lines. From where they were brought. Write more clearly. If they are from other RIMA-AERONET, state it in previous lines.

Calibrations

21. Lines 1 and 2 of the 1st paragraph: Describe very shortly about the pre and post calibrations.

22. Line 1 of the 2nd paragraph: ...sun direct reading ...—>direct sun reading ?

23. Lines 6 and 7 of the 2nd paragraph: These calibration transfers were periodically performed .....—->periodically means at what time interval?

24. Calibration procedure of the 3rd paragraph: The sentences are very ambiguous. Please reformat your sentences to make them clear and easy to understand.

25. Line 4 and Line 6 of the 6th paragraph: post-calibration and pre-calibration —>Why

italic here?

Implementation of the sunrad module

26. The last line of the 1st paragraph: . . ...will be made public through ESR website (2011) —-> Why only year within the parenthesis? Do you want to write the reference within the parenthesis?

27. Lines 2-3 of the 2nd paragraph: . . .a formatting program (dsform) reads the Cimel and Prede data ïňĄles and converts them to a common data format ïňĄle—>In order to use this program, does the user need to have simultaneous observation of both CIMEL and PREDE sky radiometers? If the user has data of only a single type of the instrument, is this program applicable? Please write few sentences about it.

28. Line 7 of the 3rd paragraph: (AERONET website, 2011) —> not applicable for scientific article.

29. Lines 6-8 of the 7th paragraph: Equivalent triplets can be built during the data formatting stage, so equivalent triplet criteria are imposed.—>How is it possible to generate the equivalent triplets? Please explain the methodology briefly.

30. I was expecting something new in this section. In sunrad code, the calculation technique or subroutines of mode 1 are borrowed from Skyrad.pack software and the calculation technique or subroutines of mode 2 are borrowed from AERONET sun direct algorithm. Where are the original contributions of the authors in sunrad code?

Comparison methodology

31. Line 2 of the 2nd paragraph: (OMI website, 2011)—>The same mistake as above. Not applicable for scientific article.

32. Line 4 of the 6th paragraph: What is U95?

33. Line 5 of the 6th paragraph: Since the authors are comparing results obtained from two different codes, I do not understand the necessity to remove outliers here. Why is

it necessary?

Results

Comparison of ESR and AERONET for Cimel photometer

34. The title of subsection 3.1 does not make any sense to me.

35. As stated in the second paragraph of this section, the seasonal variability of differences in Figure 3 are due to inaccuracies of solar position and optical airmass routines of mode 1.Before discussing the results of Figure 3, the authors are suggested to briefly discuss the errors in airmass and solar position calculations caused by routines of mode 1.

Comparison of ESR for cimel and prede radiometers

36. The title of subsection 3.2 does not make any sense to me.

37. As stated in previous section, the calibration coefficients for PREDE sky radiometers had been transferred from CIMEL sun-photometer. In other words, authors had determined calibration constants for PREDE instrument in such a way that total optical thicknesses produced by both instruments should be exactly same. In this section, the authors have used such calibration constants to determine aerosol optical thickness (AOT) for PREDE instrument. There is no meaning of discussing comparison results of AOT when such calibration constants transferred from CIMEL instrument are used for PREDE instrument. It would be more informative if authors had compared AOTs those were derived independently.

Comparison of ESR –prede and AEONET cimel

38. The title as well as content of subsection 3.3 do not make any sense to me.

References

39. The references are not in alphabetical order.

40. Authors‘ name, article title, published year etc. are randomly written.

Table and Figure captions

Please write the captions for Tables and Figures in such a way that they could be understood even without reading the main text.

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