

Interactive comment on “Effect of wind speed on aerosol optical depth over remote oceans, based on data from the Maritime Aerosol Network” by A. Smirnov et al.

Anonymous Referee #2

Received and published: 25 January 2012

General Comments

This paper is an analysis of the relationship between wind speed and aerosol optical thickness in remote marine areas using data from the extremely valuable Maritime Aerosol Network (MAN). The authors have many years of experience making measurements of maritime aerosols, yet their efforts to reassess data and the parameterizations based upon data are commendable. Specifically, the authors show that the correlation between wind speed and aerosol optical depth is highly variable and probably not as large as is often assumed. In a particularly useful section of the paper, they show

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with a simulation that the measurement uncertainties of both aerosol optical depth and wind speed are currently too large to find a very precise relationship between the two parameters. Indeed, the slope and intercept of a linear fit between the two change with the quantity of measurement uncertainty. This is an important result and this paper should be published after only some minor changes.

Specific Comments

I'm concerned about the comments in the second to last paragraph of section 2 (lines 9-13 on page 7191). If I understand correctly, this says that some cruises were not accepted because they did not show a relationship between wind speed and AOD. If this is the case I am worried because this might affect the relationship presented in this paper. Please add more details about what specifically was excluded (one cruise? Many cruises?) and the justification for doing so.

The conclusion states that a linear relationship was found between AOD and wind speed. While a linear fit was made to the data, considering the large amount of scatter it is not clear to me that this excludes other types of (non-linear) relationships. I would imagine there is some sort of confidence test to prove or disprove this, but that's probably beyond the scope of this paper at this point. Perhaps language can be added saying that a linear fit was made, but not going so far as to say that the data exclusively show a linear relationship. This refers to the first line of the conclusion and the description of the results on line 6 of page 7192.

I had difficulty understanding figure 4, and to a lesser extent, figure 5. I think this is because the plotted values 'overlap' each other and the fit lines. Perhaps these figures and be plotted in a nicer way? I would suggest at least re-plotting the fit lines on top of everything else so they are visible.

I think the abstract should more explicitly state that the slope of the AOD-wind speed relationship is on the low end of observations in the literature.

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Technical Corrections

Page 7188, line 24: add “the need for” between the last two words, “and . . . more”

Page 7192, line 15-16: “lies in the range 0.002-0.005. . .” this is, to some extent, by design, which should be mentioned.

Interactive comment on Atmos. Meas. Tech. Discuss., 4, 7185, 2011.

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