

Interactive comment on “Recent increase in aerosol loading over the Australian arid zone” by R. M. Mitchell et al.

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Received and published: 25 January 2010

Response to referee #1

The authors thank the referee for a constructive review, and respond as follows.

- (1) We have removed discussion of the “step” function in order to improve the clarity of the discussion of change in the aerosol time series.
- (2) A description of the cloud screening algorithm now appears in section 2.1, lines 113-119 of the revised manuscript.
- (3) Section 3.4 has been revised substantially following the referee’s suggestions. a. Note that the scale height does not require a logarithmic decrease in aerosol concen-

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tration with height, but applies equally to a well-mixed layer (constant scattering coefficient with height) of depth h , and to the exponential fall-off. To aid clarity, the section discussing this has been rewritten (lines 298-301). b. We calculated the scale height for different ranges of the aerosol optical depth as suggested but found limited additional information in this approach. To show why, a diagram has been added, showing the scatterplot of aerosol optical depth against scattering coefficient. This shows a wide spread of cases, ranging from high optical depths with low scattering coefficient caused by elevated aerosol plumes, to the converse case of high scattering coefficient but low to moderate optical depth, indicating high surface aerosol tailing off rapidly with height. c. The data correspond to daytime averages. The text has been modified to clarify this (lines 276-280).

- (4) Point taken - the text addressed by this point has been modified (see lines 332-335 of revised ms)
- (5) The x axis tic for year “97” in Figure 2 has been added.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 21619, 2009.

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