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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The Climatology of Australian Aerosol" *by* Ross M. Mitchell et al.

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The authors wish to thank the reviewer for these suggestions.

We agree that section 1 (Introduction) is long; however the material it contains is all required to set the work in context. Section 2 (Observations) contains a description of the different sun photometer and processing systems used by the two agencies concerned (The Bureau of Meteorology and CSIRO). This is necessarily long because two observing systems are described. However, it is difficult to shorten or subdivide it without compromising its coherence or content.

The reviewer acknowledges our representation of the aerosol time series using an annual cycle and two higher harmonics. As stated in the paper, this choice was based on the spectral decomposition achieved through a fast fourier transform (FFT). The reviewer suggests that the higher harmonics could be replaced by appropriately phased

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"annual cycles". If these annual cycles are sinusoids with periods of 12 months, then the time series cannot be adequately modelled since the details of the spring-summer aerosol peaks clearly require higher frequency variation than is available from 12-month sinusoids, however phased. If the reviewer means pulsed or gated functions occurring every year, then the present analysis shows that this adds unnecessary complexity. On a monthly time scale, the time variation in aerosol can be well represented as a three-term harmonic oscillator. Since this finding has consequences for the construction of aerosol generation models, we will add a point to the Conclusions stating this.

We thank the reviewer for drawing out attention to the Bouya et al paper, and offering a suggestion for further work. We will consider the cited paper for inclusion. Coming up with a "grand-fit" to the data is a useful suggestion for further work, but well beyond the scope of the present paper.

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