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Interactive comment on “Aerosol optical properties in a rural environment near the mega-city Guangzhou, China: implications for regional air pollution and radiative forcing” by R. M. Garland et al.

Anonymous Referee #2

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First Referee Comments on a manuscript titled “Aerosol optical properties in a rural environment near the mega-city Guangzhou, China: implications for regional air pollution and radiative forcing”;

General The overall quality of the discussion paper is very good as it highlighted the role of high quality measurement data in support of air quality and aerosol optical properties interpretation. Assembled a pertinent array of instrument for optical properties measurement and relevant air quality data were utilized to aide in-depth elucidation of aerosol formation, transport, and characterization.

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My main concerns on individual scientific questions/issues are as follows: 1. Strong justification on how and why only one rural site can be representative of PRD regional scale aerosol optical properties is needed. Apparently, even in the summer time when the aerosol loading is relatively low, contributions from local biomass burning source and diesel soot from truck traffic were significant. Was there any additional to support the claim that measurement from this site would be suitable site for a regional background site? What exactly is the zone of representation of this regional background site? 2. As this paper also recommends daytime average single scattering albedo value (0.87) for climate modeling purposes, it may be an indicative value for summer when the aerosol loading is typically low. Nevertheless, the question is how representative are the optical properties measurement at this site, including the single scattering albedo value, if winter high aerosol loading effect and seasonal effects were not included or determined. In other words, why pick summer to perform optical properties measurement instead of winter when typically more serious air pollution problem would occur. 3. Despite the comments presented above, the paper does address relevant scientific questions within the scope of ACP and the paper also present novel concepts in illustrating aerosol properties and its relationship with common air pollutants. 4. The data, without strong support in terms of regional representation, are relatively weak to support rigorous interpretations and conclusions. Specifically, the discussions and analyses on implications for regional air pollution need significant elaboration in order to reflect the title of the manuscript. 5. The abstract provides a concise and complete summary of the work; the overall presentation is well structured and clear; the language is fluent and precise; mathematical formulae and symbols are correctly defined; and the number and quality of references are appropriate.

Typos/clarification 1. Line 12, page 6865, Bergin et al reported a value 2.3-3.6 m² g⁻¹ (PM₁₀) for Beijing aerosol; However, in Table 2, the inlet cited is TSP for the Beijing aerosol. The Bergin et al 2001 paper again was cited. Please clarify if the aerosol is PM₁₀ or TSP.

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2. Lines 18 & 19, page 6872, “ … Most of the parameters measured and calculated for this site are similar to those of urban areas, confirming….” As indicated in the title and the main text, the measurement for the present study was conducted in a rural regional background site, how come the parameters measured and calculated for this rural site are similar to those of urban areas. Clarification is needed.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 6845, 2008.

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