

Interactive comment on “Quantifying aerosol size distributions and their temporal variability in the Southern Great Plains, USA” by Peter J. Marinescu et al.

Anonymous Referee #1

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The authors describe a quality controlled four-year dataset of aerosol size distribution with diameter ranging from 7 nm to 14 microns. The dataset was developed by combining measurements from SMPS, APS, and CPC at the DOE SGP site. Statistics of aerosol number, surface, and volume concentrations are presented for different seasons. The authors also carried out power spectral analysis of the temporal variation of aerosol size distribution and show a diurnal cycle in the concentration of small particles ranging from 7 to 30 nm for all four seasons. The diurnal variation is attributed to new particle formation.

The dataset will be useful for validating models, and future studies of aerosol pro-

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cesses. The key results presented largely confirm findings of earlier studies. The topic is well suited for Atmospheric Chemistry and Physics, and overall the manuscript is well written. Following are my comments and suggestions.

- (1) One focus of the manuscript is the quality-controlled aerosol size distribution dataset. Were particle losses through the inlet and inside APS (especially for coarse mode particles) taken into consideration?
- (2) Equation 1- I don't think this is how lognormal aerosol size distribution is defined. Is $N(\ln(D_p))$ cumulative size distribution? If so, the limits of integration are incorrect.
- (3) Page 5, Line 26: Reference Wang et al., 2009 is missing.
- (4) Equation 3: please check the numerator on the righthand side.
- (5) Page 9, line 12: The peak of small particle concentration occurs around UTC 22-24 (CST 16:00-18:00) during winter. I am wondering if boundary layer deepens until CST16:00-18:00 during winter time.
- (6) Page 10, line 26: “The peak concentrations of the 12-hour cycle for all seasons occurred between 04 and 12 UTC (23 and 07 CDT) and between 16 and 24 UTC (11 and 19 CDT) for both N_T and N_{7-30nm} .” There is no second peak for N_T or N_{7-30nm} between 4 and 12 UTC, at least for MAM and DJF (Figures 5 and 7).

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