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Atmospheric Chemistry and Physics Discussions

Interactive comment on "First long-term study of particle number size distributions and new particle formation events of regional aerosol in the North China Plain" *by* X. J. Shen et al.

Anonymous Referee #3

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The article "First long-term study of particle number size distributions and new particle formation events of regional aerosol in the North China Plain" by Shen et, al. presents more than a year of aerosol number density and aerosol size distribution observations. Data analysis is focused on descriptive presentation of basic parameters and temporal trends on various scales. Back-trajectory analysis shows importance of various air masses and sources on aerosol properties and occurrence of nucleation. Overall, the value of this article is not in a new or better understanding of processes controlling the atmospheric aerosol properties (from this point there is nothing new here), but in high

quality aerosol long-term measurements in polluted rural environment in China. Before publication in ACP, authors should consider comments below.

Page 7, line 17: what is a basis for size division in various modes? From Figures 3, 5 and 10 it is obvious that division between Aitken and accumulation mode at 100 nm often falls close to the mode of accumulation mode. How sensitive is the analysis to this division? As the size limits are arbitrary chosen, how the results would change if Aitken mode upper limit would be 70 or 80 nm, probably more realistic values? On page 8 is shown that Aitken mode has highest concentrations, but aerosol size distribution figures show that accumulation mode is dominating the aerosol size distribution. This can result in misinterpretation like on page 9 that Aitken mode has the same trend like accumulation mode, however their sources in the atmosphere and lifetime are different.

Page 7, line 22: low volatile vapors do not coagulate

Page 8, line 1: traffic emissions

Page 10, line 8-10: How often were CPCs calibrated and flows checked, especially in case of 3025? Can this be possible reason for explanation of different sizes of UF particles?

Page 10, line 23-30: How this trend changes if arbitrary limit for Aitken mode is decreased to 70 or 80 nm?

Equation (1) does not have to be presented in the paper. It is one of the basics in aerosol science and reference to literature is sufficient.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 25205, 2010.