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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Evaluation of regional background particulate matter concentration based on vertical distribution characteristics" *by* S. Han et al.

Anonymous Referee #1

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Review of "Evaluation of regional background particulate matter concentration based on vertical distribution characteristics" by Han et al. This study presents vertical structures of meteorological parameters, turbulence, and PM in a 250 meter tower. The data presented here is valuable to study the effect of PBL on the PM diffusions. Because the region is under heavy PM pollution, this study provides some useful results. The paper analyzes seasonal variations of diffusion of PM at different levels, and some statistical methods are applied in this study. However, some definitions need to be clarified. The English in the paper needs to be improved. This paper needs to be revised before it can be accepted for publication. The detailed comments are listed as below.

Specific comments: P6; The definitions of the stable, neutral, and unstable conditions in Fig. 2 need to be explained. P7; The definition of the night PBL height (NPBL) needs to be explained. P8 and Fig. 5; Why the PM2.5 concentrations are higher at noontime at 220 m than other levels? Is this due to the secondary formation? P2; "was 40.0 $\pm$ 20.2, 63.6 $\pm$ 16.9 and 53.2 $\pm$ 11.1 μg m3 , respectively, in July, August and September". Should change to "was 40.0 $\pm$ 20.2, 63.6 $\pm$ 16.9 and 53.2 $\pm$ 11.1 μg m3 , in July, August and September, respectively". P2; Atmospheric particulate matter (PM) has drawn considerable attention because it has been associated with many urban environmental problems, such as acid precipitation, decreasing visibility and climate change (Zeng and Hopke, 1989; Charlson et al., 1992; Schwartz et al., 1996; Chameides et al., 1999). PM has also been implicated in human mortality and morbidity (Dockery et al., 1993; Lagudu et al., 2011). The references should include Cao et al., 2013. Tie et al., 2009. Cao J.J., X. Tie, W. Dabberdt, Z.Z. Zhao, and T. Jie, On potential acid rain enhancement in eastern China, J. Geophys. Res., 118, 4834–4846, doi:10.1002/jgrd.50381, 2013.

Tie, X., D. Wu, and G. Brasseur, Lung Cancer Mortality and Exposure to Atmospheric Aerosol Particles in Guangzhou, China, Atmos. Environ, 43, 2375–2377, 2009.

P3; "In addition, regional compound pollution" should be "In addition, regional air pollution" P3; "in the city cluster" should be " a cluster of cities". P4; With the increase of vertical height, the influence of source emission on local air quality is weakening should be "With the increase of vertical height, the influence of source emission on local air quality decreases with altitude"

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 14889, 2015.