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Interactive comment on “Impact of Gobi desert dust on aerosol chemistry of Xi’an, inland China during spring 2009: differences in composition and size distribution between the urban ground surface and the mountain atmosphere” by G. H. Wang et al.

Anonymous Referee #3

Received and published: 1 October 2012

This paper provides an insight on the interaction between dust and pollution. I would like to make minor comments on that. Dust enhance the heterogeneous reaction but it depends on the mineralogy of dust particles. For example Al_2SiO_5 has a affinity to SO_2 and it helps to convert SO_2 to sulfate. More caution is required for the explanation about the interaction between dust particles and air pollution.

1. The authors said that the enhancement of the heterogeneous formation of nitrate

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in the dust event makes the urban fine particles more acidic. If more nitrate may be the reason, in the sense of thermodynamic equilibrium, a certain amount of cation is needed to convert nitric acid to nitrate. This seemed not to be the case in Fig. 5. It seemed that less ammonium cannot be ignored for the less acidity in addition to that.

2 The authors explained less acidity in the mountain by decreasing formation of nitrate in the event. Both sulfate and nitrate were formed less in the event than in the nonevent and it seemed that more cation such as ammonium may be contributed to the less acidity. Further explanation needs to be explored for acidity issues.

3. The same air mass should be a necessary condition to explore the interaction between dust and air pollution. In a non event, two sites may be under a mountain-valley circulation which turns over its direction during a day. Of course, when the synoptic circulation is dominant, the local circulation is ignored. Authors might need to check it.

In addition to the above issues, I hope authors might elaborate on exploring the issues of OC dominating over the dust event.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 21355, 2012.

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