**Atmospheric
Chemistry
and Physics
Discussions**

Interactive
Comment

Interactive comment on "**Atmospheric aerosol compositions in China: spatial/temporal variability, chemical signature, regional haze distribution and comparisons with global aerosols**" *by* X. Y. Zhang et al.

Anonymous Referee #2

Received and published: 18 November 2011

This paper presents a summary of major PM10 water-soluble components collected over a 2-year period from sites throughout China. Visibility data from various sites are also included. Although the data is somewhat interesting, most notably the spatial distributions, for the most part the paper present an analysis that is unclear and highly simplistic. First off, the paper needs significant editing to improve clarity. Some examples are noted below, however, there were just too many instances of awkward or unclear sentences that not all could be identified. It was not clear why PM10 was the focus, since health and visibility concerns suggest PMfine could be more important.

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Presumably PMfine data was not available at the chosen monitoring sites; this issue should be discussed. Also, no discussion is included on measurement limitations associated with filter sampling and storage, especially those pertaining to the semi-volatile components associated with organic compounds and nitrate. It was never clear if the data were quantitative, most notably the ammonium nitrate data that is extensively discussed throughout the paper. It was also not clear how the mineral mass was determined. The SOC analysis based on OC/EC ratios is overly simplistic, as described. The primary OC/EC ratio is not even presented. Highly simplistic comparisons are also frequently made between their data and that reported in the literature. In summary, some of the data appears of sufficient quality and uniqueness that a paper could be published; however the paper in the current form needs substantial revisions before publication is recommended.

Some specifics

Pg 5 Lines 12-15 – reword.

Pg 6, line 5, reword . . .this session, should it be this section. Line 18, other hands should be reworded.

Fig 3, why not look at difference between urban rural pairs instead of the overall average of urban vs. rural. It is not clear this type of average has significant meaning when averaged over such a large region.

Pg 9, lines 15, 20, reword. Line 23 are pets really a significant source of ambient ammonia.

Pg 14, line 21, reword.

Section 3.3.2. SOC. A discussion on the uncertainty with this method is needed and all results should include a +/- with each number. Also, pg 16 lines 12-13, giving a single number for OC/EC rates for various sources is a gross oversimplification. Give some indication of a range.

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Pg 17, line 4, quantify "substantial uncertainty"

Last line pg 18 and first line of pg 19, also at end of Summary. The importance of noting that haze in China is referred to, as Grey Haze is not clear.

Pg 20 line 1, what exactly does dynamical and substantial contributions mean? Line 16, change specie to species. Line 20 gives the impression that the authors are suggesting that sulfate affects ammonium emissions, which is not correct.

Pg 21, line 21, reword.

Figure 2, define symbols in plot.

Figure 5 needs a legend.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 26571, 2011.