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Interactive Comment

Interactive comment on "The measurement of aerosol optical properties at a rural site in Northern China" by P. Yan et al.

Anonymous Referee #1

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General comments: The authors present 21-month measurement results of aerosol absorption and scattering coefficient at a rural site in northern Beijing. They examined the data in terms of seasonal and diurnal variation and in relation to backward trajectories. The data and results are valuable for an improved estimate of aerosol impact of the radiative forcing in China where such information is particularly sparse. While the authors made good effort to interpret the observation, I would love to see a more in-depth discussion of the data.

Specific comments:

(1) Page 13005 on instrumentation: Detailed description of the sampling system should be given as such information is important for determining any particle loss during sam-



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pling. In particular the material type, length and diameter of the sampling line should be given. Heating inside the nephenometer is expected to cause loss of not only ammonium nitrate but also semi-volatile organic aerosols. The latter tend to have a larger contribution to scattering compared to nitrate aerosol.

(2)Section 3.1 on comparison with other studies: As different instruments/methods may give different readings for BC, it is important to keep this mind when comparing the data from different investigators.

(3)Section 3.2 on seasonal variation: Different seasonal pattern in southern China (Cape D'Aguilar) (i.e. winter-high and summer-low) is mainly due to large scale changes in transport of pollution. In winter northerly winds brings polluted continental air masses while southern flows in summer contained clean oceanic air masses from the tropics.

(4)Section 3.3 on diurnal variation: the author examined the diurnal pattern using yearly average data. It would be better to examine the pattern in different seasons. Northern Beijing can experience upslope and downslope flow during summer time, thus it is possible that if the summertime data are examined, higher values of scattering and absorption can occur during afternoon not at nighttime. Such a feature has been observed for ozone, SO2 and NOx (Wang et al., GEOPHYSICAL RESEARCH LETTERS, VOL. 33, L21806, doi:10.1029/2006GL027689, 2006.)

(5)Section 3.4: the description on cluster analysis result can be shortened. Table 8 shows that the carbonaceous mass fraction in PM2.1 was low (9-13% after multiplying a factor of 1.6 to OC) in the two samples collected on polluted days. Urban Beijing has much larger mass fraction of carbonaceous materials. Were the two samples collected on foggy days?

Technical correction: page 13017, line 3: "server" should be "serve".

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