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## ***Interactive comment on “Aerosol optical properties in the North China Plain during HaChi campaign: an in-situ optical closure study” by N. Ma et al.***

### **Anonymous Referee #1**

Received and published: 6 May 2011

#### General Comments:

This paper is a closure study. There are few new concepts, ideas, or methods presented. The aerosol of the North China Plain has been studied previously. The work, however, utilizes high quality aerosol measurements and the closure study was performed with great care to detail. The measurements are in an important aerosol source region and will be of use to modelers. It is important to get quality data such as these into the refereed literature. Therefore the paper deserves to be published in ACP.

#### Specific Comments:

p. 9573, MAAP absorption measurement: Assumes a mass absorption efficiency

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(MAE) of 6.6 m<sup>2</sup> g<sup>-1</sup>. This the "standard" MAE recommended by the manufacturer? Aerosols in China may have quite different optical properties than aerosols in Europe or the US. Have you tried to determine the site-specific MAE for your region? Can you place an uncertainty on this number?

p. 9573, Line 20: Other types of sampling line losses (e.g., electrostatic losses) were ignored? Was conductive tubing used in all portions of the inlet system?

p. 9574, Lines 2-5: OC can have light absorbing components (e.g., HULIS). To neglect these may be a mistake.

p. 9574, Lines 13-15: BC mass size distribution (normalized) in Wuqing is assumed to be the same as that in Yufa. Wuqing might be influenced more by fresh Tianjin emissions than Yufa. Any comment on this? Any reason to discount this possibility?

p. 9578, Lines 4-6: AAE of 1.0 is used, based on an old reference using aerosol measurements from pristine regions. AAE can be quite variable, especially if the aerosols are internally mixed. Are there any historical multiple-wavelength light absorption or AAE data from this region? These data could be used to determine whether an AAE of 1.0 is reasonable for this region. At the least the authors should list a more appropriate reference.

p. 9578, Line 7: These SSA values are not consistent with the findings of Yan et al. (2008) at SDZ. Are the aerosols really that different at SDZ and Wuqing? If so, it is difficult to rationalize the idea that the aerosols of the NCP are similar (see comment above for p. 9574, Lines 13-15).

p. 9582, Lines 22-23: Absorption enhancement of 2.32? This is quite large! Has an absorption enhancement for internally mixed vs. externally mixed aerosols of this magnitude ever been observed before? If so, please reference. If not, you should emphasize this finding.

p. 9585: Good discussion of the uncertainties in the calculated parameters. +/- 30%

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is a large range - perhaps not surprising that the measurements agree with the calculations. This is a typical finding in carefully performed closure studies... when all uncertainties are considered and accounted for, total uncertainties are large and calculated and measured values often agree (within the envelopes of the uncertainties).

Technical Comments:

p. 9578, Line 12-13: Incomplete sentence.

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Interactive comment on Atmos. Chem. Phys. Discuss., 11, 9567, 2011.

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