

***Interactive comment on “A new method to determine the mixing state of light absorbing carbonaceous using the measured aerosol optical properties and number size distributions” by N. Ma et al.***

**Anonymous Referee #2**

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General Comments:

This paper proposed the new algorithm to estimate the mixing state of black carbon (BC) using the hemispheric backscattering fractions (HBF) obtained by a TSI nephelometer and adopted the algorithm to the observation conducted in a regional site in the North China Plane. Detail understanding of the mixing state of BC is essential to estimate the contribution of aerosol particles on the earth's radiation balance. Although there are large uncertainties in the estimation of the mixing state as mentioned in the manuscript, the algorithm is simple and needs only size distribution and mass concen-

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tration data in addition to TSI nephelometer data. I therefore recommend publication in ACP once the comments and questions below are addressed.

Major Comments:

In eq.(5), the volume fraction of LAC to all aerosols is calculated. I think density for LAC in eq.(5) should be replaced by density for average of all aerosol particles.

Minor Comments:

\*page 27488 lines 9-10, Does “the average aerosol effective radius” mean number based mobility radius?

\*page 27493 line 26 - page 27494 line 2, It would be nice to add some information on comparison between the obtained size dependence of the rext-LAS,model and those obtained with HHTDMA data.

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Interactive comment on Atmos. Chem. Phys. Discuss., 11, 27475, 2011.

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