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Interactive comment on “Column aerosol optical properties and aerosol radiative forcing during a serious haze-fog month over North China Plain in 2013 based on ground-based sunphotometer measurements” by H. Che et al.

Anonymous Referee #3

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The analysis of aerosol properties over the North China Plain during the intense polluted event of January 2013 is a very interesting subject suitable for the publication on Atmospheric Chemistry and Physics. The paper is well written and the analysis is performed clearly and satisfactorily. I suggest only some minor revisions:

1. Pag 29688 from lines 19. Among the others ground based networks, authors should mention also the SKYNET network consisting of about 70 sun-sky radiometers installed worldwide (<http://atmos.cr.chiba-u.ac.jp/>, Takamura, T., and T. Nakajima

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(2004), Overview of SKYNET and its activities, Opt. Pura Apl., 37, 3303–3308).

2. Page 29692 lines 12-13. Authors state that CARSNET sky radiance measurements are analyzed using a “retrieval processing method...very similar to the Version 2 AERONET Algorithm”. Who developed this methodology ? Are there any references? What are the difference between this methodology and the AERONET's one?

3. Pag 29693: line 6: which of the 3 stations of Beijing is located close to the site were PM2.5 are collected? Should this site be representative of the entire Beijing, or it is expected that number of particles and their chemical composition change going from the north to the south part of the city? line 8: change Figure1 with Figure 2. line 18: “on the pollution days, the relative humidity usually exceeded 50%”. Have the authors any comment about the reason why the increase of RH and PM2.5 are correlated in the North China Plain?

4. Pag 29694 line 14: please add “spatial and temporal variation of AOD at 500 nm”. Moreover, in which way AOD was calculated at 500 nm? Using the Angstrom exponent? Lines 20- 24: here, but also in other parts of the text, the variation of AOD or other quantities is expressed as (for example) “varied by about 0.15-2.60”: what this two numbers indicate? The minimum and maximum variation? It could be also interesting an indication of percentage variation.

5. Pag 29695 Line 3: “AOD at 440” why not at 500 nm? Line 21: how many volume distributions do you have for each day? Figure 5: are the volume distributions for Nanjiao retrieved using the CARSNET methodology, instead of the AERONET inversion? (see my comment at point 2)

6. Pag 29702 line 17. During the most intense pollution, the volume distribution is 3-modal. How much is the modal radius of this mode, respect to the other two modes? Is this mode included in the calculation of the fine modal radius ?

About Figure 1, please increase the character of the sites' name. Moreover add a

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legend of the color used in the wind rose plots. Concerning the other figures, label of x and y axis should be in a larger character.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 13, 29685, 2013.

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