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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 #1**

Received and published: 29 December 2013

In January 2013, one of the worst haze events on record swept over much of central-eastern China including North China Plain. This wintertime haze and smog covered a quarter of the total land area in China with half of the Chinese population, exposed to the haze air pollution. The suffering of those in China from haze and poor air quality has attracted worldwide attention. It is urgent to comprehensively understand the large-area haze formation in atmospheric Environment. This work made the extensive analysis on aerosol optical properties and radiative forcing during the severe haze-fog month over North China Plain based on ground-based sunphotometer and meteorol-

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ogy measurements, and the authors present the fine results of the study with well-written in English. This manuscript is appropriate for the publication in the "ACP" with minor revisions as follows.

1) Line 16-20, page 29695: "On 24 January, the Alpha values at Shangdianzi, RAD1, CAMS, and Nanjiao were all lower than 0.80, which suggests that coarse particles were dominant. This could be due to the decreasing relative humidity and increasing wind speed (Fig. 1), which is not conducive to the hygroscopic growth of fine particles and their diffusion." This interpretation is unreasonable from the hygroscopic growth of fine particles and their diffusion. Coarse particles could be from more natural and anthropogenic dust emission with increasing wind speed. 2) Line 4-9 of page 29697: "Alpha at Shangdianzi ( $1.06\pm 0.15$ ) is lower than at the other sites, which indicates that the aerosol size is larger than in the urban and suburban sites. In contrast to the AOD, Alpha decreased from the north (RAD1) to the southern location (Nanjiao) during both the polluted and non-polluted periods in Beijing, suggesting that larger size aerosol particles exist in the southern suburbs of Beijing." Please add "in the rural site " into the first sentence so as "Alpha at Shangdianzi ( $1.06\pm 0.15$ ) is lower than at the other sites, which indicates that the aerosol size in the rural site is larger than in the urban and suburban sites" please give a brief discussion about this statement that the aerosol size in the rural site is larger than in the urban and suburban sites. 3) Line 14 of page 29699; what is the "them"? 4) Line 16-17 of page 29701: Please clarify the sentence "This is not affected by aerosol scattering and absorption processes." 5) Line 19-20 of page 29703: The last sentence "More detailed description about the impacts of NRT data application in the haze forecast and assimilation will be illustrated in our colleagues' works following." Could be unnecessary. Please delete it.

Please also note the supplement to this comment:

<http://www.atmos-chem-phys-discuss.net/13/C10492/2013/acpd-13-C10492-2013-supplement.pdf>

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