

## ***Interactive comment on “Real-Time Aerosol Optical Properties, Morphology and Mixing States under Clear, Haze and Fog Episodes in the Summer of Urban Beijing” by Rui Li et al.***

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Received and published: 19 February 2017

Firstly, we acknowledge the comments of anonymous reviewers, and are also grateful to the efficient serving of the editor. We have already revised MS based on the reviewers' comments. We also inspected MS roundly and corrected some errors in English presentation. We are sure that the revised MS adhere to Science of the Total Environment format. The marked MS was also uploaded to be easily reviewed.

Response 1. The English thorough the manuscript have been improved by an English native speaker 2. Line 12: Indeed, an overview of the study or its objectives should be provided in the abstract. Thus, “Aerosol particles play significant roles on the climate-forcing agent via its optical absorption properties. However, the relationship

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between characteristics of aerosol particles and optical absorption remains poorly understood” has been added in the abstract. 3. Line 30: “Soot fog period” means the fog episode filled with large amount of soot. 4. Line 289: “R” has been changed into “r”. Thank you for reviewer’s chariness. 5. Line 373: “organic matter” is a right expression, which has much difference from soot and tar ball. Li et al. (2009) and Fu et al. (2012) also used “organic matter” expression in their paper. Organic matter generally exhibits amorphous structure with abundant carbon and minor oxygen, whereas soot are chain-like aggregates of carbon-bearing spheres. Tar ball displays spherical appearance with substantial carbon, while they generally do not possess other elements. Organic matter could be released via biomass burning, vehicle exhausts, and other human activities by directly process. Besides, they can also be generated through photochemical reaction between VOCs and some photochemical oxidants such as O<sub>3</sub> and NO<sub>x</sub>. 6. Line 407: The cubic shape of K-rich particles suggested they have not undergone long transportation or severe photochemical reaction because cubic K-rich particles were mainly produced from the molten nature of the material at high temperatures. The K-rich particles undergoing the long-range transport are generally encapsulated by visible coatings. 7. Indeed, coarser particles were near the centers of the grid and finer particles on the periphery. However, three to four areas were chosen from the center and periphery of the sampling spot on each grid in order to ensure that the analyzed particles were representative. Therefore, we can assure the quality of the data. 8. Much literature published after 2016 about optical properties has been cited.

Please also note the supplement to this comment:

<http://www.atmos-chem-phys-discuss.net/acp-2016-976/acp-2016-976-AC4-supplement.pdf>