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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Analysis of Influential Factors for the Relationship between $PM_{2.5}$ and AOD in Beijing" *by* Caiwang Zheng et al.

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Dear Reviewers, We highly appreciate your valuable comments and suggestions that have helped us improve the quality of this manuscript. Our detailed responses (Bold) to the reviewers' questions and comments (Italic) are attached in the attached response file (along with the tracking changes and final manuscript). Chuanfeng

Please also note the supplement to this comment:
https://www.atmos-chem-phys-discuss.net/acp-2016-1170/acp-2016-1170-AC1-supplement.pdf

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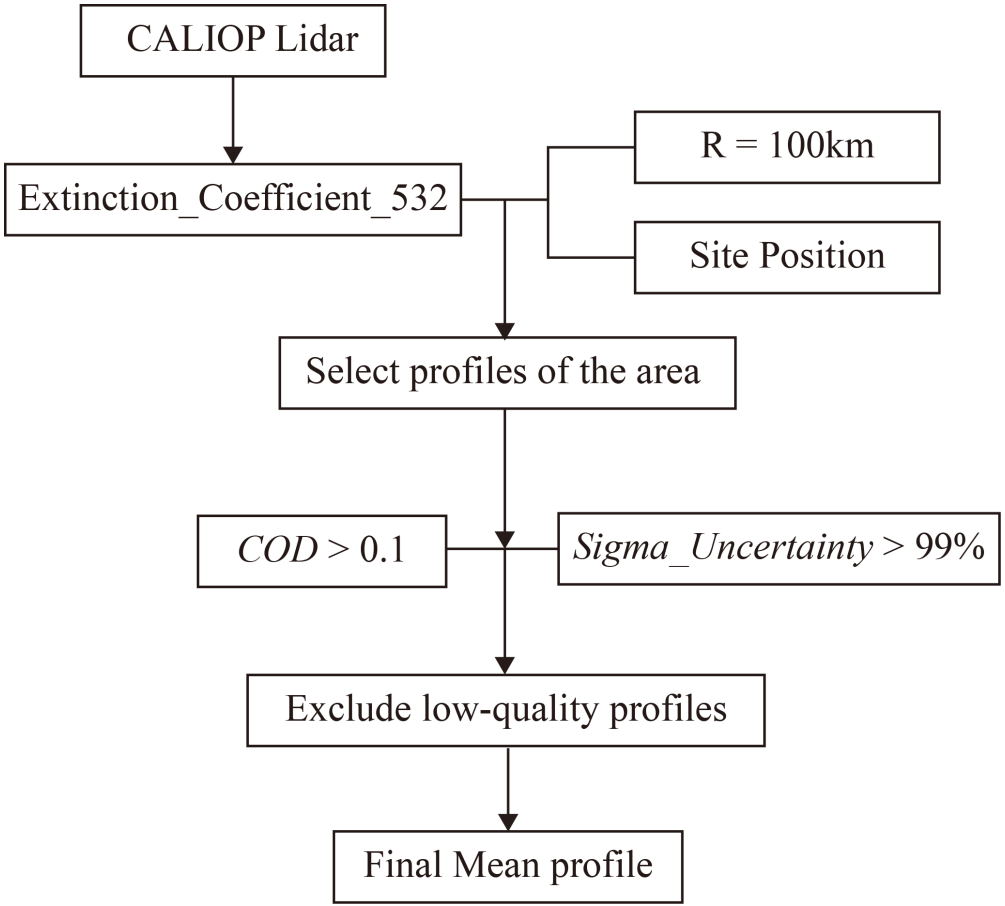

Fig. 1. Flow chart of deriving aerosol vertical profile from CALIPSO data.

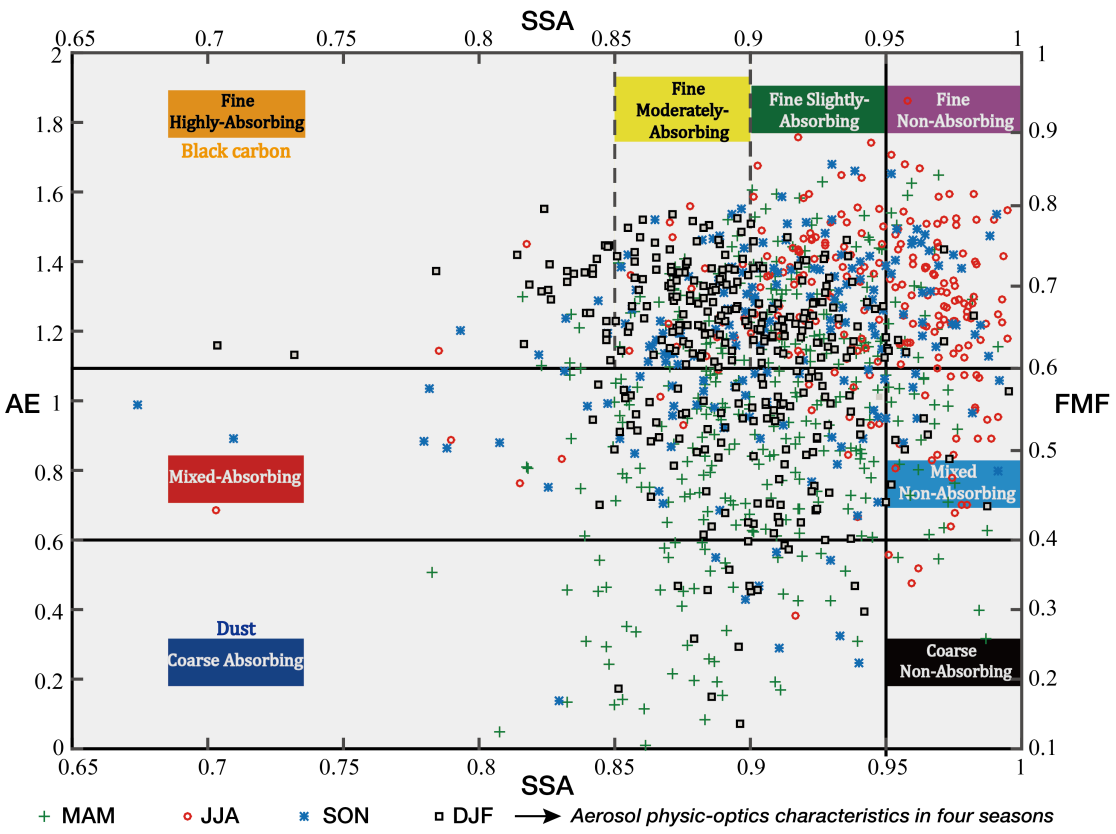

Fig. 2. The aerosol classification scheme in four seasons from 2011 to 2015 using AE, SSA and FMF data from AERONET at sites in Beijing. The scatter plots of different colors is the distribution of aerosol ty

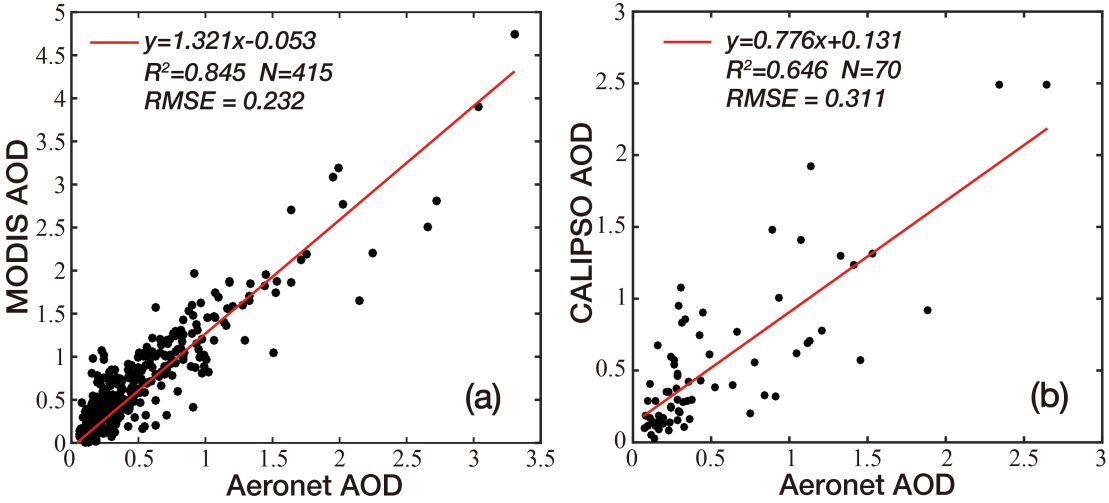

Fig. 3. Scatter plots of AERONET AOD vs. MODIS AOD (a), and AERONET AOD vs. CALIPSO AOD (b) for the period of 2011 to 2015 in Beijing.

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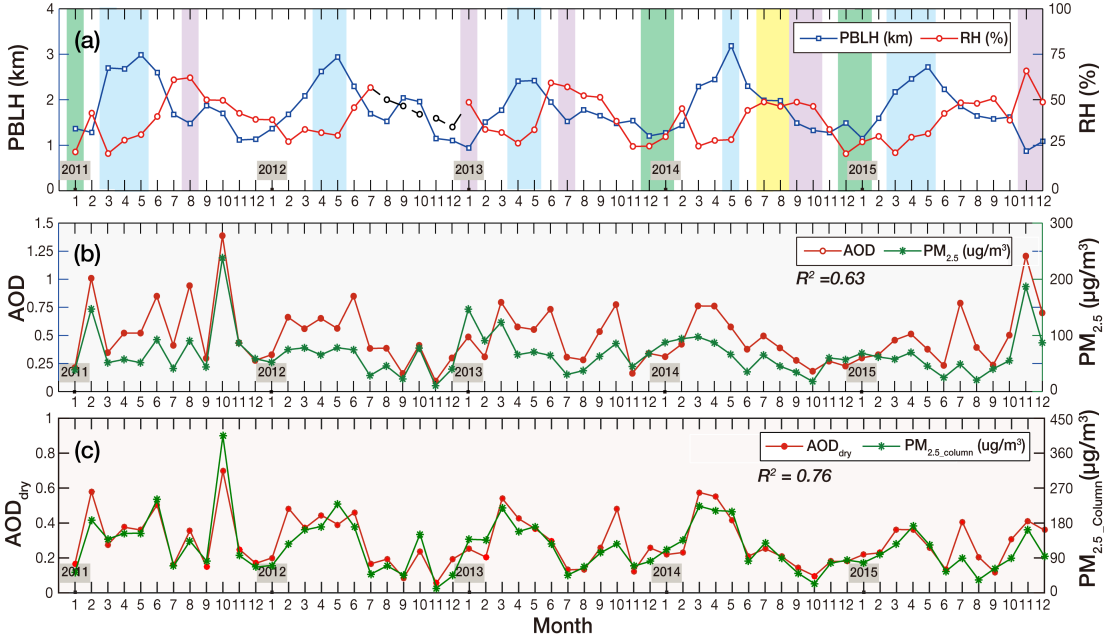

Fig. 4. Comparison of monthly averaged RH and PBLH (a), AOD and PM2.5 (b), AODdry and PM2.5_column (c) at 14:00 LT for the period of 2011 to 2015 in Beijing. The blue, purple, green and yellow bands in (a) ar

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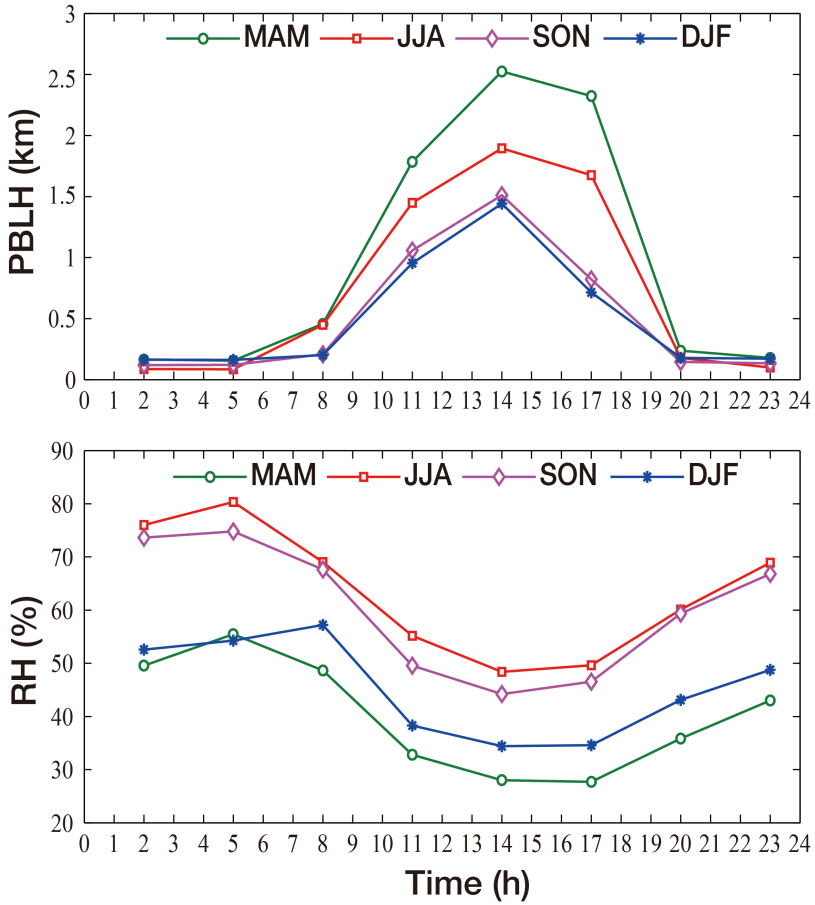

Fig. 5. Diurnal variations of multi-year (2011-2015) averaged RH and PBLH over four seasons in Beijing.

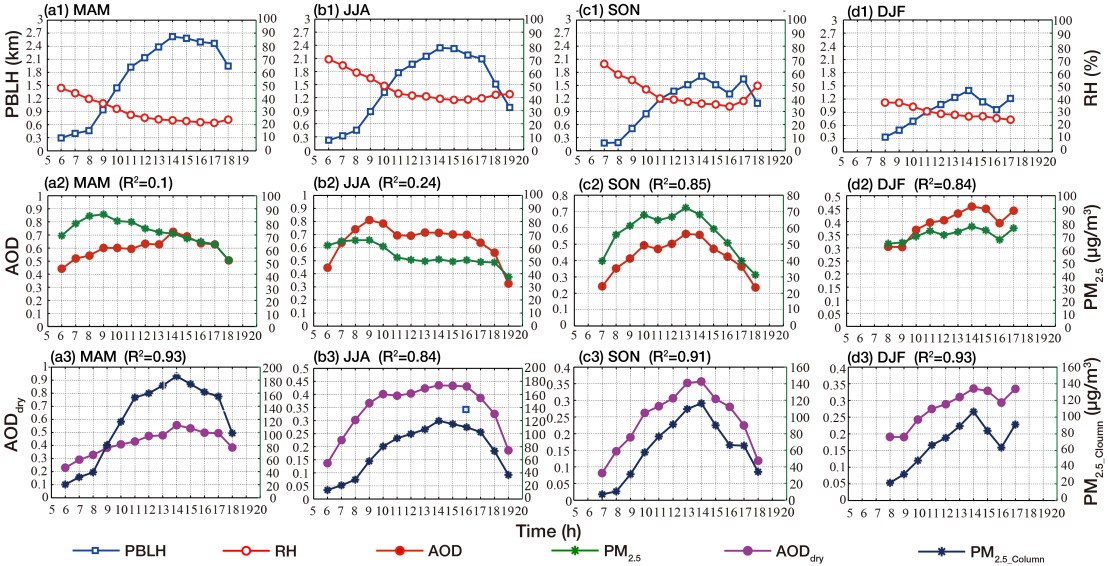

Fig. 6. Comparison of multi-year (2011-2015) averaged RH and PBLH (a1∼d1), AOD and PM2.5 (a2∼d2), AODdry and PM2.5_column (a3∼d3) by time of day in different seasons. The columns represent four seasons and th

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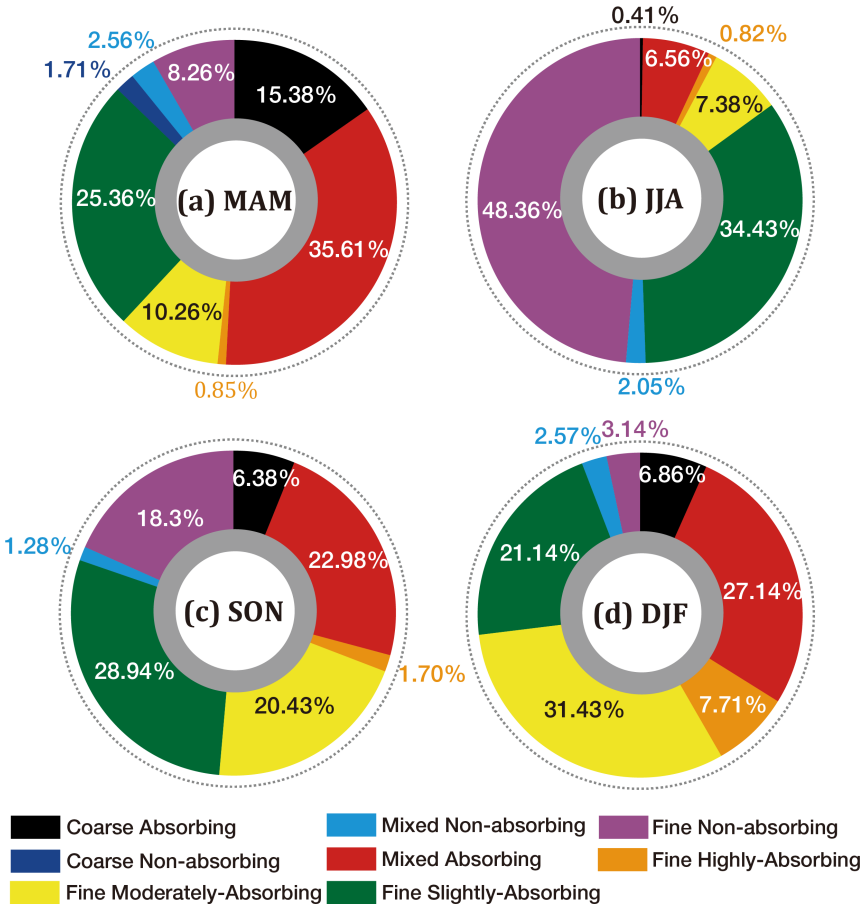

Fig. 7. The frequency distribution of aerosol types over four seasons for the period of 2011 to 2015 in Beijing.

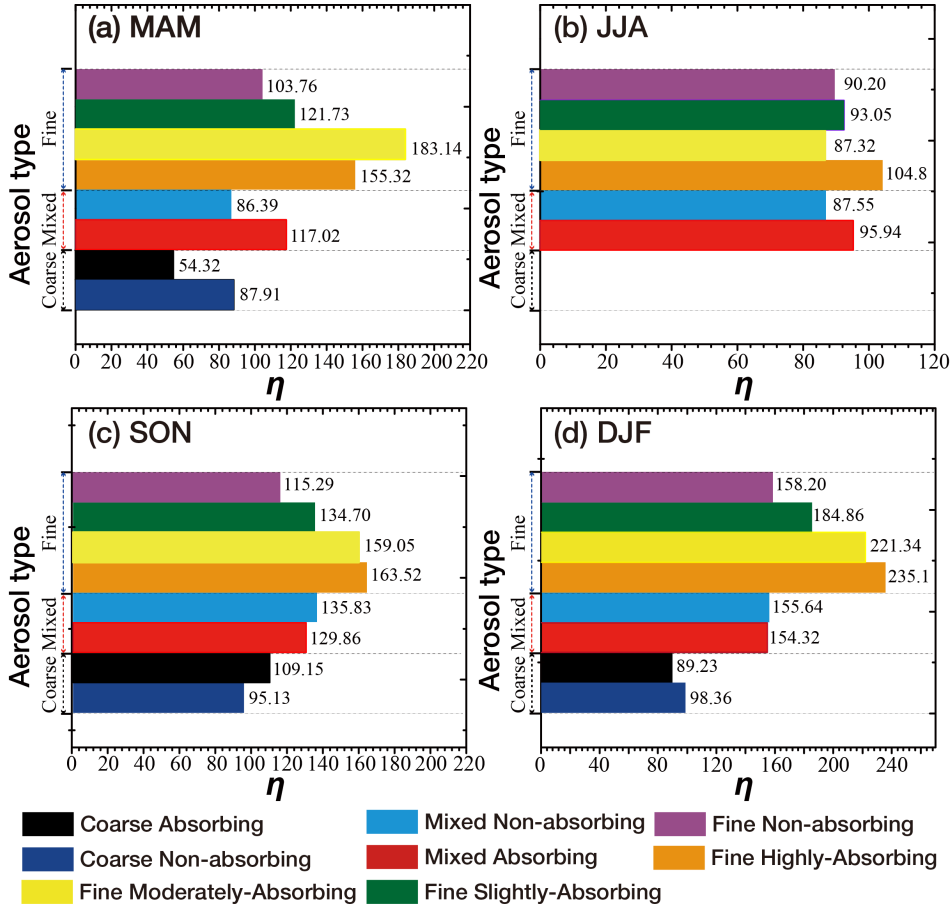

Fig. 8. The variation of η with the aerosol type in four seasons for the period of 2011 to 2015.

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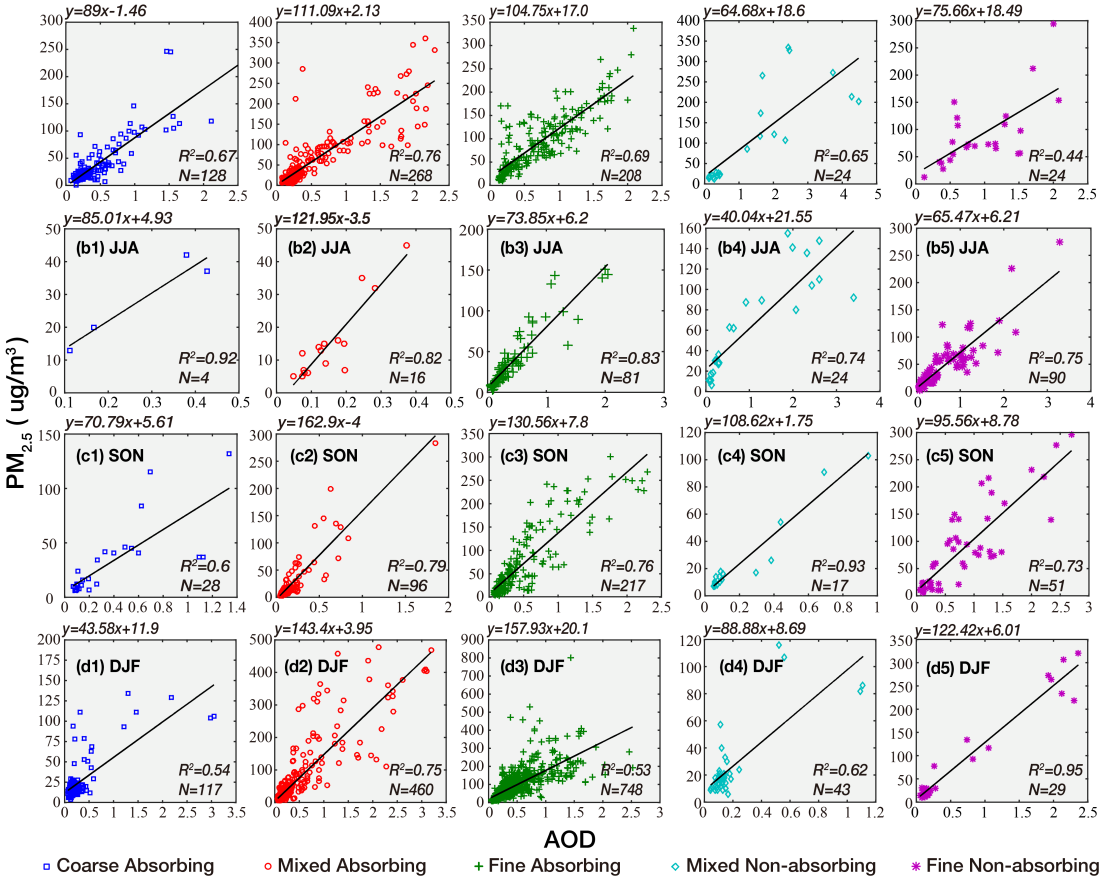

Fig. 9. Scatter plots between AERONET AOD and PM2.5 concentrations in four different seasons for five different types of aerosols. The first to 5th columns represent the aerosol types of coarse absorbing, mix

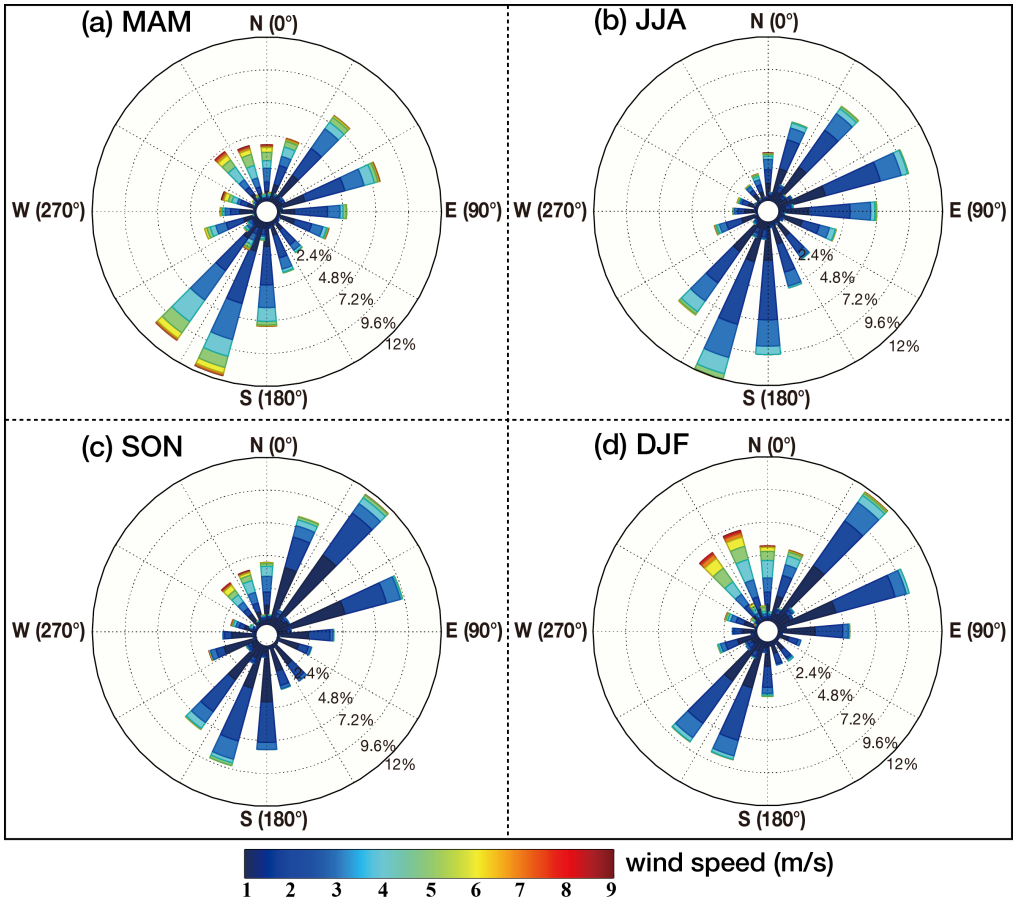

Fig. 10. Wind rose of Beijing in four seasons for the period of 2011 to 2015.

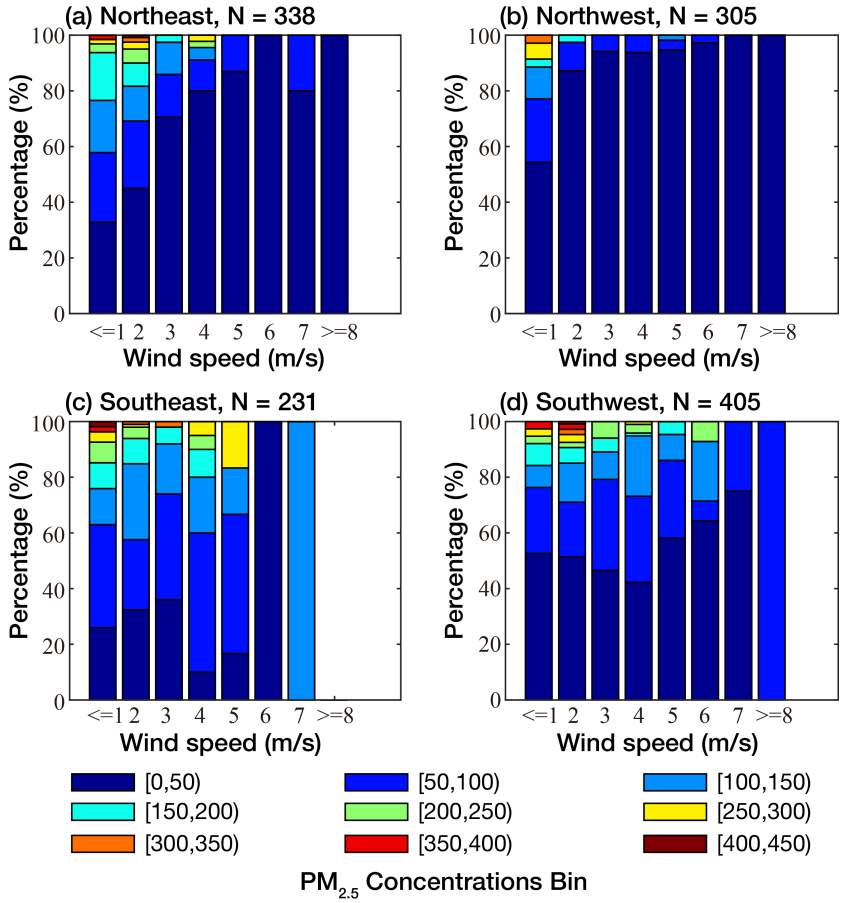

Fig. 11. The relative distribution of PM2.5 within different value ranges at Beijing for different surface wind speed in different wind direction.

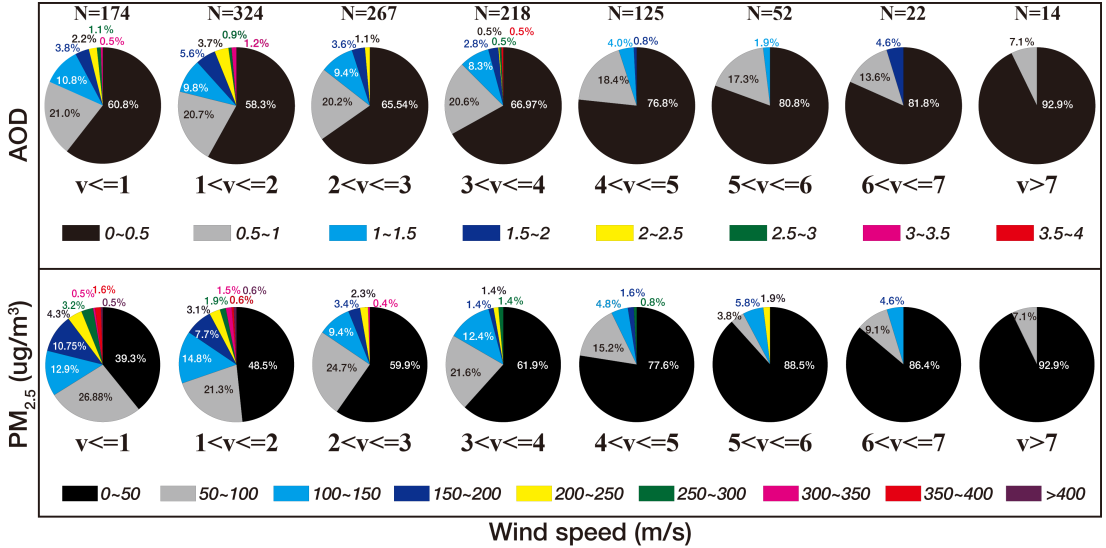

Fig. 12. The relative distribution of AOD (upper panel) and PM2.5 (lower panel) within different value ranges at Beijing for different surface wind speed ranges from 2011 to 2015. v and N represent the wind sp

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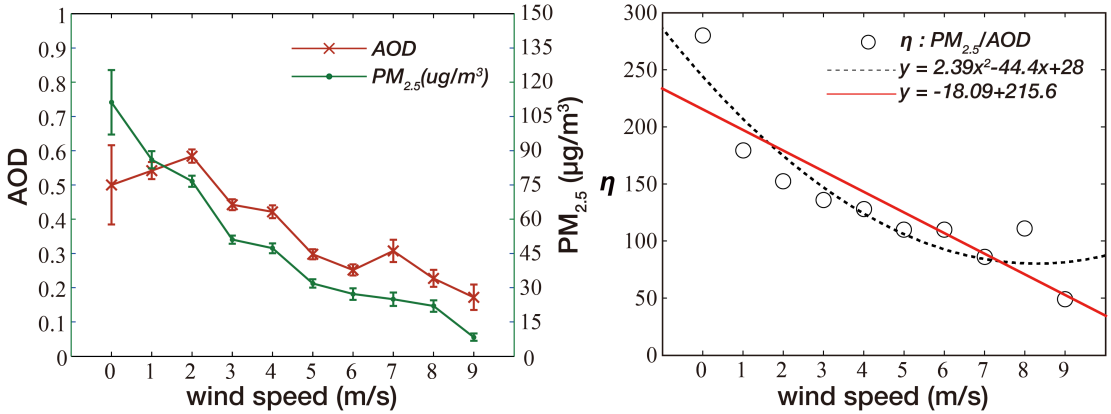

Fig. 13. Variation of averaged AOD, PM2.5 (left panel) and η (right panel) with the surface wind speed.

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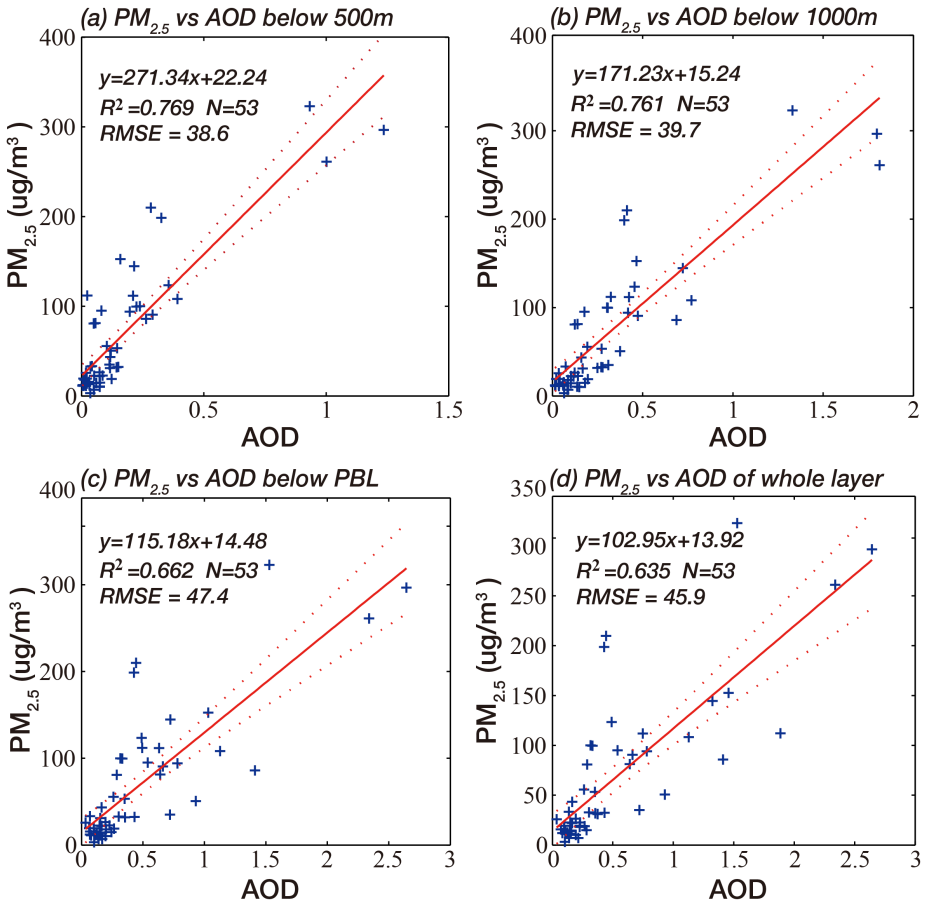

Fig. 14. Scatter plots of stratified AOD vs. PM2.5 concentrations. The red solid line is the linear fitting regression lines. It shows the relationship between (a) AOD below 500m, (b) AOD below 1000m, (c) AOD