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Supplement of

A novel method for calculating ambient aerosol liquid water content based on measurements of a humidified nephelometer system

Ye Kuang et al.

Correspondence to: Chun Sheng Zhao (zcs@pku.edu.cn)

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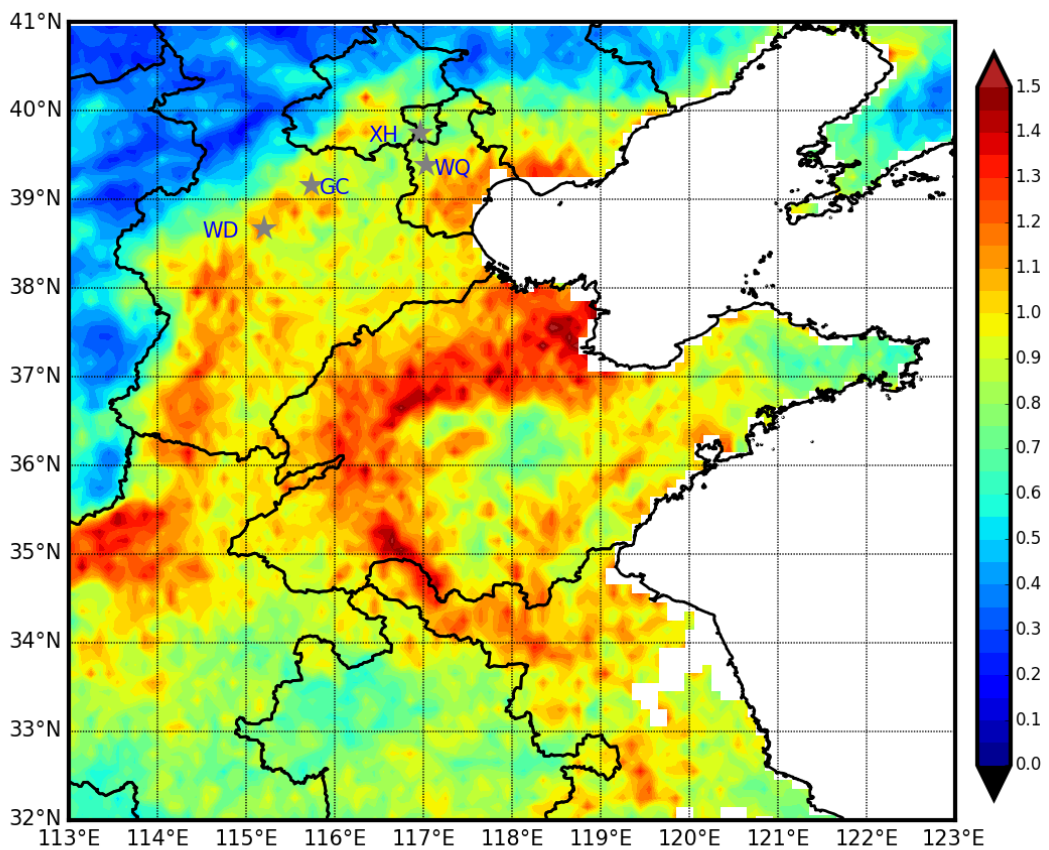
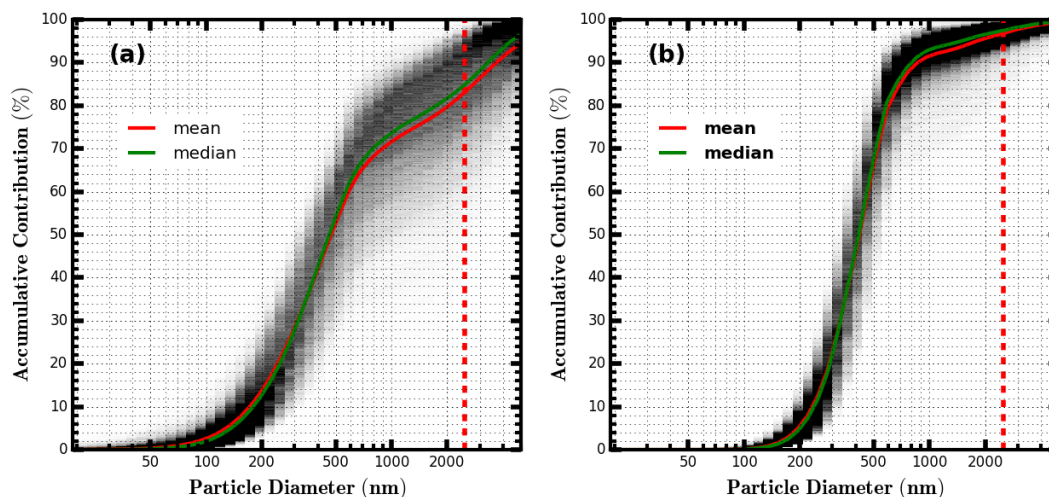


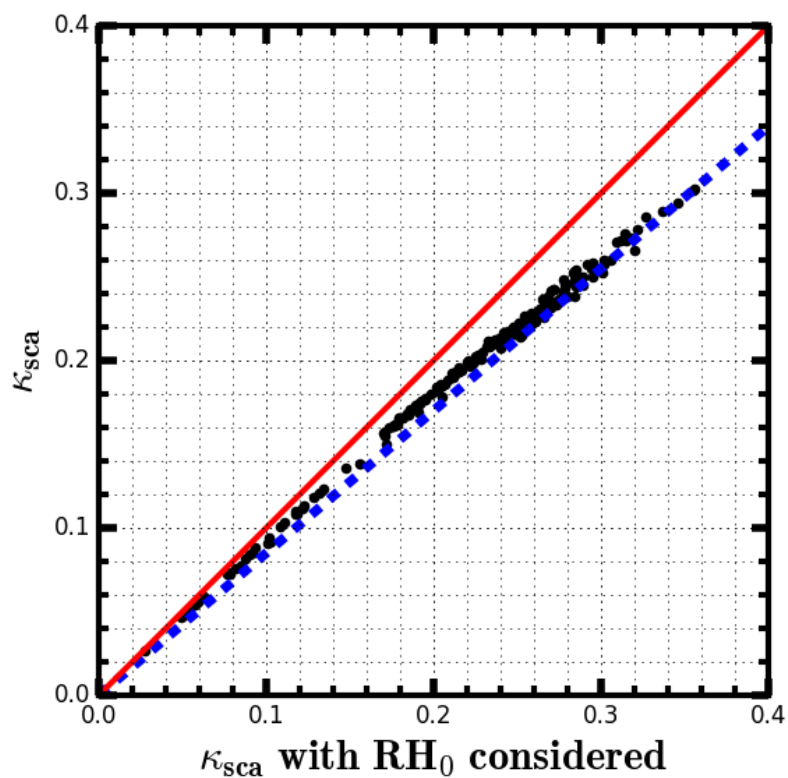
Figure S1. Locations of sites are marked with star markers. The four locations are Wangdu (WD), Gucheng (GC) and Xianghe (XH) in Hebei province and Wuqing (WQ) in Tianjin . Colors represent average distribution of aerosol optical depth at 550 nm during summer from 2012 to 2014. The dataset of aerosol optical depth at 550 nm is from Moderate Resolution Imaging Spectroradiometer onboard satellite Aqua.



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24 **Figure S2.** (a) Calculated size-resolved accumulative contribution to $V_a(\text{dry})$ of PM_{10} for all PNSDs
 25 measured during six field campaigns listed in Table 2 and (b) Simulated size-resolved accumulative
 26 contribution to σ_{sp} at 550 nm. The color scales (from light gray to black) represent occurrences.

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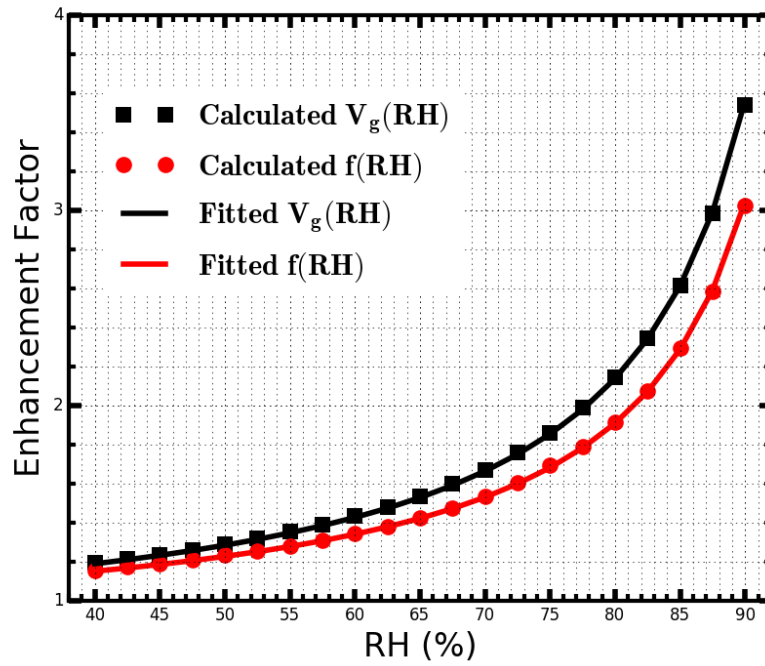
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29 **Figure S3.** X-axis and y-axis represent κ_{sca} are fitted with and without consideration of RH_0
 30 in the “dry” nephelometer, respectively. The red line is 1:1 line, the blue dashed line is the 15%
 31 relative difference line.

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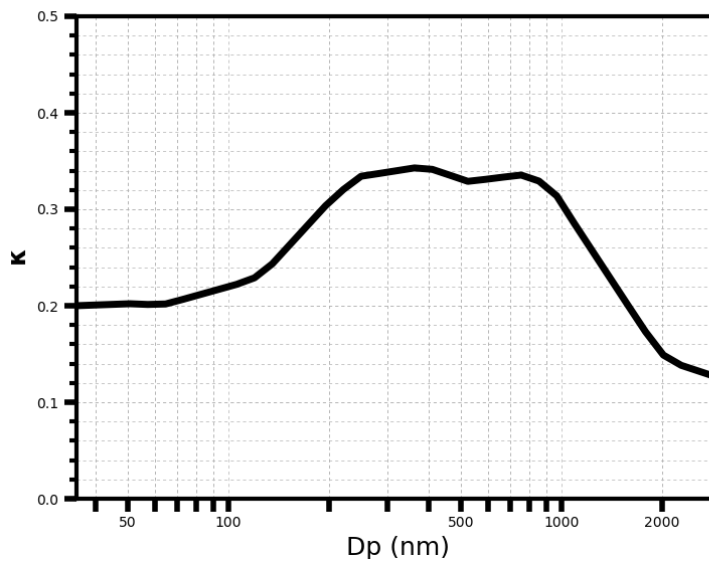
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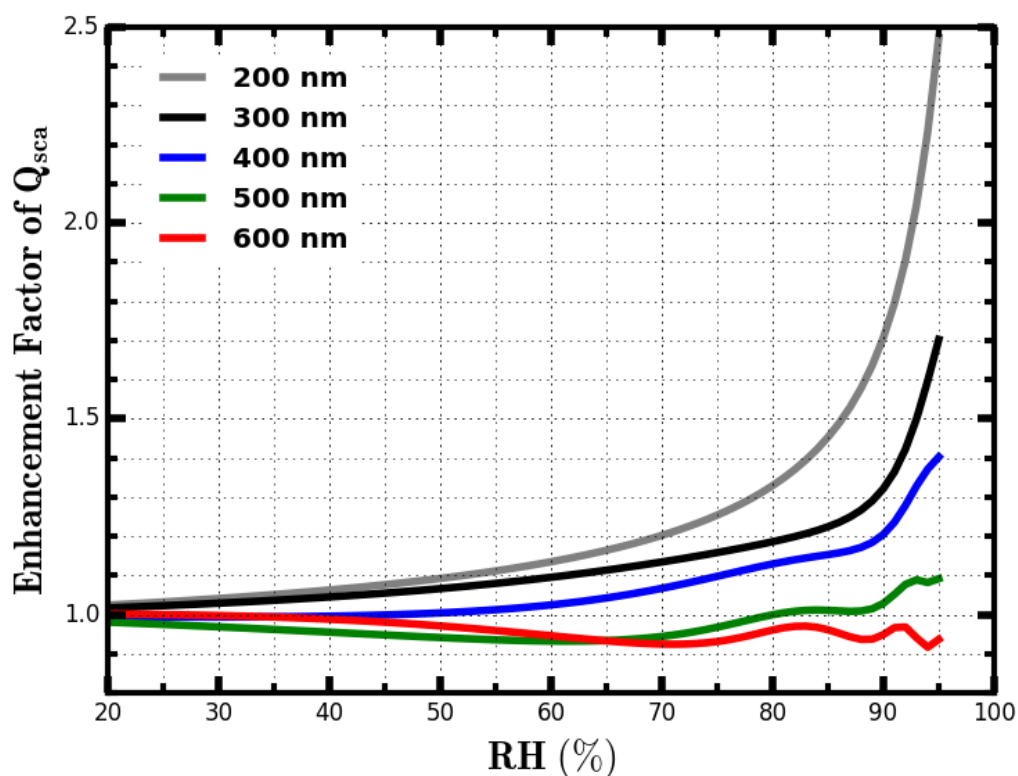
37 **Figure S4.** Modelled f (RH) and V_g (RH) (scatter points) and fitted f (RH) and V_g (RH) (solid
 38 lines) using formula form of equation (5).

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41 **Figure S5.** The average size-resolved κ distribution during Haze in China campaign (Liu et al.,
 42 2014).



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44 **Figure S6.** The enhancement factor of particle scattering efficiency at different RHs due to aerosol
 45 hygroscopic growth for different diameters of dry aerosol particles. The used hygroscopicity parameter
 46 κ is 0.3.

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52 **References:**

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