Referee #1

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This contribution presents analysis of extinction properties of ambient particles in an urban environment in China (Nanjing) based on the information of particle number size distribution and particle phase chemical composition using an κ -EC-Mie model. The modeled results were compared with the measured ones obtained from the visibility data; also the relationship between the extinction properties of ambient particle and RH is discussed in the text.

Major comments:

Q1: The background information of theory and method used in this study is far too simplified, and it could be written out more explicitly in the introduction and method parts. When the author used Mie theory to calculate the extinction coefficient, more back-ground information based on the theory need to be included into the introduction section. Similarly, the background information on the internally mixed model, externally mixed model and especially the core-shell model, which is a major method for the current paper, should be discussed more in the introduction part, for instance, the histories, the situations that the model works, the uncertainties of each model and pros and cons for each model.

A1: First, in the method part, we added section2.3, which includes some information from section3.2 as well as the calculation of the measurement-derived extinction coefficients, on Page7, Line11- Page8, Line27. Second, we analyzed the results of the internally/externally mixed model and found them to be consistent with the core-shell model. The values of the extinction coefficient calculated by the core-shell model are between those of the internally mixed model and the externally mixed model. Considering the article length and structure, we only discussed the core-shell model in this paper. The input/output parameters of the efficiency factor (Q) and the calculation of the model-derived extinction coefficients from the internally/externally mixed model are as follows:

Table1 Input/output parameters of efficiency factor (Q) by internally mixed model

input parameters	output parameters
$X_{\text{internally}} = \frac{\pi \cdot D_0 \cdot GF}{\lambda}$ $m_{\text{internally}} = \left(\frac{\frac{V_{EC}}{V_{tol}} \times 1.8 + \frac{V_{other}}{V_{tol}} \times 1.53 + 1.33(GF-1)^3}{(GF-1)^3+1}, \frac{\frac{V_{EC}}{V_{tol}} \times 0.54}{(GF-1)^3+1}\right)$	Q_{ext}

$$b_{ext,internally} = \sum_{i=1}^{N} \mathrm{Q_{ext}} \times \pi(\mathrm{r} \times \mathrm{GF})_i^2 \times \mathrm{n}(\mathrm{r_i})$$

Table2 Input/output parameters of efficiency factor (Q) by externally mixed model

input parameters	output parameters
$X_{\text{EC}} = \frac{\pi \cdot D_0}{\lambda}$ $X_{\text{other}} = \frac{\pi \cdot D_0 \cdot GF'}{\lambda}$ $m_{\text{EC}} = (1.8, 0.54)$	$Q_{abs,EC}$

$m_{\text{other}} = (\frac{1.53 + 1.33(GF' - 1)^3}{(GF' - 1)^3 + 1}, 0)$	$Q_{sca,other}$

$$b_{ext,externally} = \sum_{i=1}^{N} \mathrm{Q_{abs,i}} \times \pi \cdot \mathrm{r_i^2} \times \mathrm{n(r_i)} \times (\frac{\mathrm{V_{EC}}}{\mathrm{V_{tol}}})_\mathrm{i} + \sum_{i=1}^{N} \mathrm{Q_{sca,i}} \times \pi \cdot (\mathrm{r} \cdot \mathrm{GF'})_\mathrm{i}^2 \times \mathrm{n(r_i)} \times (1 - \frac{\mathrm{V_{EC}}}{\mathrm{V_{tol}}})_\mathrm{i}$$

Q2:The Experiment and methods part was not written in a satisfactory way. It is highlighted in the title that the extinction coefficient of the particles is the major results here, but the author did not include how you calculated or measured this parameter in the method part. Relevant paragraphs in the results section should be moved up into the method section.

A2: In the method part, we added section2.3, which includes the calculation of the model-derived extinction coefficients and the measurement-derived extinction coefficients. The relevant paragraphs in the results section have been moved up to section2.3.1.(on Page7, Line11-Page8,Line27)

Q3:Could the author reproduce some of the figures? The fonts and colors of some of the figures are too difficult to read. Please also consider presenting the figures in some other way. Time series of many parameters might not be necessary, but rather the scatter plots for the comparison of two variables that the author mentioned in the text are needed, for instance, it is really difficult to compare Fig. 7a and Fig. 8a, that I can not fully agree with the author's statement in the text without a direct comparison of the variables from those two figures.

A3: We have enlarged the fonts of all figures in our paper. However, we do not grasp what the reviewer means about the time series of many parameters not being necessary. Could the reviewer point out which parameters are not necessary? The time series of the various parameters are either observation results or data that the core-shell model needs. We consider these parameters to be useful. On Page11 Line5-6, 'Comparing Fig. 7 and Fig. 8, we found that the extinction coefficients of different size segments to the wet aerosol extinction coefficient were larger than for particles under dry conditions'clearly should refer to Fig. 7a and Fig. 8a, which is the foundation for the following figures.

Q4:The author used the core-shell model to calculate the extinction coefficient, considering the particles consisting of a light-absorbing component and a non-light component. When the particles grew in size due to hydration, we ended up with a change in the geometric cross section areas of particles, which affect their scattering. Also the refractive index for scattering also changed as the particles hydrated. So please clarify how you used the core-shell model to calculate the extinction, should be summation from scattering and absorption. As well, the Q values you used in the calculation should be explained more specifically. Should the Q be the summation from scattering parameter and absorption parameter?

A4: We used formula (3) to calculate the extinction coefficients. Section 2.3.1 provides a detailed introduction to this calculation (Page7, Line12– Page8, Line19).The extinction is the summation of the scattering and absorption. Q_{ext} is defined as the extinction cross-section of a particle divided by its geometric cross-section' was added to Page8, Lines 8-9. Q_{ext} was calculated with the BHCOAT program. The input/output parameters of Q_{ext} and the formulas are listed in Table 2. Q_{ext} is the summation of the scattering parameter and absorption parameter.

$$Q_{\text{ext}} = \frac{\sigma_{ext}}{\pi \cdot r^2}$$

Q5:In Fig.2 in your manuscript, ambient RH varied from around 40% to 80%. The author calculated the size-segregated kappa based on the ZSR mixing rule. However, under low RH conditions, the ZSR mixing rule might not hold, as the water activity decreases, solute concentrations increase and the interaction between different solutes might not be neglected.

A5: We agree with the reviewer's statement that under low-RH conditions, the ZSR mixing rule might not hold. Under low-RH conditions, there is no deliquescence and therefore no hygroscopic growth. Not only the ZSR rule, but all of the parameterization schemes of hygroscopic growth have the same problem. However, no reference explicitly gives a minimum RH below which the ZSR rule might not hold. The reasons may be as follows. First, the weathering point is lower than the deliquescence point, especially in the mixed state. There is no explicit weathering point, and hygroscopic growth may occur at low RH. Second, the GF is small at low RH. For example, GF=1.044 and 1.1 when RH=10%, 20%, respectively(κ =0.4). The extinction coefficient under low RH is not very different from the extinction coefficient in the dry condition. The effect of RH mainly appears at high RH.

Q6: The author calculated Eq. 2 in the manuscript from Eq. 1 based on the assumptions that the aerosols were internally mixed. Then the obtained GF was used to calculate the extinction coefficient as in Fig. 6b to verify the core-shell model is reasonable. Did the author try the internally-mixed/externally-mixed model and how is the correlation coefficient between the calculated and measured extinction coefficient. Were they much worse than the current values? It is dangerous to conclude that the core-shell model was reasonable, when the author tested only one model.

A6: We also analyzed the results of the internally/externally mixed model and found them to be consistent with those of the core-shell model. The values of the extinction coefficient calculated by the core-shell model are between those of the internally mixed model and externally mixed model. Considering the article length and structure, we discussed only the core-shell model in this paper. The relationships between the model-derived extinction coefficients and measurement-derived extinction coefficients using the three mixed models are given below (λ =550nm).The result of the internally /externally mixed model is consistent with the current values.

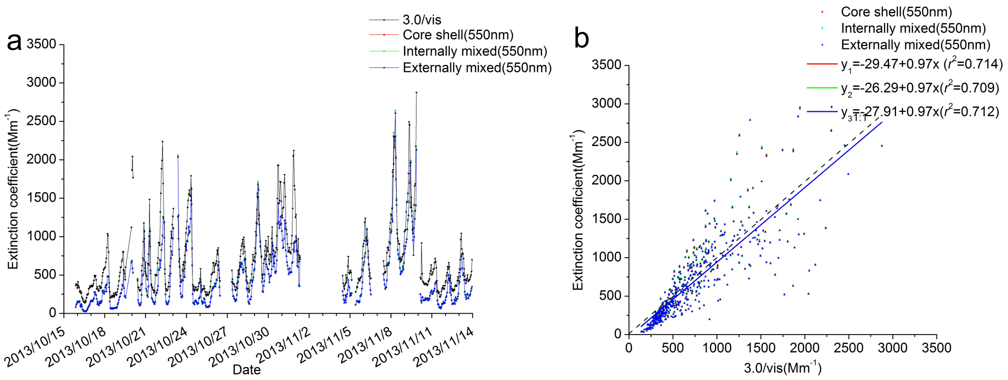

Fig.1 Time series of model-derived extinction coefficients (core-shell/internally/externally model) and measurement-derived extinction coefficients (a); Correlation coefficient of model-derived extinction coefficients (core-shell/internally/externally model) and measurement-derived extinction coefficients (b)

Minor comments:

Q7: Page 1, Line 13: Please give the full name for an abbreviation, which was mentioned for the first time in the article.
A7: Thank you for reviewer's comment. We have modified the 'BHCOAT program' to 'program of coated spheres form Bohren& Huffman (BHCOAT)' on Page1 Line 15

Q8: Page 1, Line 27-28: Please recheck the references and the literatures for the last 2-3years could be added.
A8: We reviewed several related papers according to the reviewer's suggestion and added two papers from the last 2-3 years to Page2, Line1.

Liu, X., Hui, Y., Yin, Z. Y., Wang, Z., Xie, X., and Fang, J.: Deteriorating haze situation and the severe haze episode during December 18–25 of 2013 in Xi'an, China, the worst event on record, Theoretical & Applied Climatology, 1-15, 2015.

Yang, Y. Q., Wang, J. Z., Gong, S. L., Zhang, X. Y., Wang, H., Wang, Y. Q., Wang, J., Li, D., and Guo, J. P.: PLAM - a meteorological pollution index for air quality and its applications in fog-haze forecasts in North China, Atmospheric Chemistry & Physics, 16, 9077-9106, 2015.

Q9:Page 2, Line 4: Do you mean particle number concentration or mass concentration, please clarify, also in Page 2, Line 9.
A9: We have clarified the expression 'particle concentration' to' particle number or mass concentration' on Page2, Line6 and 'particle size distribution' to' particle number size distribution' on Page2, Line 12.

Q10:Page 2, Line 16-17: Please rephrase the sentence, as the information given is not clear.
A10: We have modified 'Furthermore, the physicochemical properties of aerosols lead to variable hygroscopic growth, and the extinction associated with different particles is significantly different under the same RH.' to 'Furthermore, the physicochemical properties of aerosols can lead to variable hygroscopic growth, and the extinction associated with different particles (with differences in size and chemistry) is significantly different under the same RH. ' on Page2 Lines 19-21.

Q11:"Page 2, Line 25: Avoid using words like 'if' or 'of course (Page 3, Line 1, Line 14)', or' oldest' (Page 3, Line 27). Tell the facts about the results; avoid using too many oral statements. Please check this through the whole text.
A11:'if' was revised to 'as long as' on Page2, Line29 andPage3Line18. 'Of course' was revised to 'However' on Page3, Line6.

Q12: Page 2, Line 28: please change 'thought' to 'though'.
A12: We have changed 'thought' to 'though' on Page3,Line2

Q13: Page 3, Line 2: What kind of uncertainties? From where, please clarify.
A13: We have modified the 'this method leads to great uncertainty' to 'this empirical formula may not be suitable for other locations' on Page3 Line6.

Q14:Page 3, Line 5: I guess you mean 'The real and imaginary parts of the refractive index for EC'. EC cannot have imaginary part.

A14: EC has an imaginary part, as noted in the previous literature. For example,

EC /soot (1.97-0.65i) in Hasan and Dzubay(1983)

EC /soot (1.9-0.55i) in Sloane(1984)

EC /soot (1.75-0.4i) in Redemann(2000)

Hasan H, Dzubay TG. Apportioning light extinction coefficients to chemical species in atmospheric aerosol[J]. Atmospheric Environment. 1983, 17(8): 1573-1581.

Sloane CS. Optical properties of aerosols of mixed composition[J]. Atmospheric Environment. 1984, 18(18): 871-878.

Redemann J, Turco R, Liou K et al. Retrieving the vertical structure of the effective aerosol complex index of refraction from a combination of aerosol in situ and remote sensing measurements during TARFOX[J]. Journal of Geophysical Research: Atmospheres (1984–2012). 2000, 105(D8): 9949-9970.

Q15:Page 3, Line 8: similar to what? With water or EC, please clarify.

A15: Similar to each other not water or EC. We have clarified'…with very similar refractive indexes ' to '…and their refractive indices were very similar,…'on Page3 Line13.

Q16: Page 3, Line 11: Please give a little bit more details about Wex's study.

A16:'She found that, under dry conditions, there was no statistically significant effect on the deviation between the measured and calculated scattering coefficients when varying the mass fractions of the nearly pure light-scattering compositions within their general concentration levels' on Page3 Line16-19 refers to Wex's study.

Q17:Page 3, Line 15: I think some particles did not show hygroscopic growth when RHincreases from 20% to 30%. Please recheck your statement.

A17:In the sentence 'Particles show hygroscopic growth as the RH increases' on Page3, Line 20, we describe the general trend of the particles' hygroscopic growth.

Q18: Page 3, Line 27-28: Please consider changing the sentence.

A18: We delete this sentence because we do not think it has a proper meaning.

Q19: Page 3, Line 30: The Zdanovskii-Stokes-Robinson (ZSR) mixing rule (Zdanovskii, 1948;Stokes and Robinson, 1966) is not correctly cited here.

A19: Thank you for providing this reference. We cited'(Petters and Kreidenweis, 2007)' here because in this paper, the ZSR rule was linked up with κ after the establishment of the Köhler equation. However, we also added the original source that the reviewer provided here on Page4, Line8. '…κ was calculated according to the ZSR rule(Petters and Kreidenweis, 2007; Stokes and Robinson, 1966). '

Q20:Page 4, Line 12: of which measurement error is high at high RH. And what kind of error, please specify.

A20: We modified '…measurement error is high at high RH' to '…system measurement error is high at high RH' on Page4, Line20. The measurement of the RH is not accurate at high RH. The system measurement error is approximately 2% at low RH, while it could exceed 5% when the RH is higher than 90%. Small perturbations in the temperature will also affect the measurement of the RH when the RH is high. Because the RH is such an important parameter in our study, we need to exclude the data for which RH >90%.

Q21:Page 4, Line 25: please check the full name of the instrument.
A21: The full name of the instrument is Anderson. We have verified this.

Q22:Page 4, Line 26: Change ‘the size distributions‘ to ‘the ranges of each size distribution‘. What is the time resolution of your impact sampler measurement?
A22:We have modified the sentence expression according to Referee #2 Q10.'The size distributions were' to 'The size distributions are provided in section as follows ' on Page5,Lines7-8. We have added the Anderson's time resolution on Page5 Line12.'Every sample was collected continuously for 23h and then kept in a refrigerator before analyzing '

Q23: Page 5, Line 22: Please rephrase the sentence.
A23: We rephrase the sentence into ' Moreover, we considered the hygroscopic effect of water-soluble organic components (WSOC) and assumed κ_{org}=0.1 (Jimenez et al., 2009; King et al., 2010).'

Q24: Page 6, Line 1: For Eq. 1, please give proper explanation of each variable.
A24:We explained the parameters in formula (1) 'where N is the number of pure materials, κ_i is the hygroscopic parameter of the i^{th} pure material, $v_{i,dry}$ is the volume of the i^{th} pure material in the dry condition, and $v_{tol, dry}$ is the total volume of the dry particle.'

Q25:Page 6, Line 17: delete ‘a‘. It is ‘Time series of : : :‘.
A25: We have deleted 'a' on Page9 Line3.

Q26:Page 6, Line 18: Should the author put this sentence ‘the extinction coefficient was calculated: : :‘ to method part. Also, please specify it more clearly, as you also have had other method to calculate this parameter, avoid confusing. For instance, you can define this one as measurement-derived extinction coefficient and the other one as model-derived one. Also, should the extinction coefficient was calculated as 3.9/visibility. Please check the equation.
A26: We added section 2.3 and moved some of the information in section3.2 to section 2.3.1. The extinction coefficients have been clarified as measurement-derived and model-derived throughout the whole paper. The derivation of the term3.0/visibility was provided in section 2.3.2.

Q27: Page 6, Line 19: The author wrote that Fig. 2 shows that the visibility has a strong negative correlation with $PM_{2.5}$ and RH and also gave the correlation coefficient. Please consider add scatter plot of these three variables.
A27: In our paper, the correlation among the visibility, $PM_{2.5}$ and RH is not the main content. We therefore consider the correlation coefficient to be sufficient.

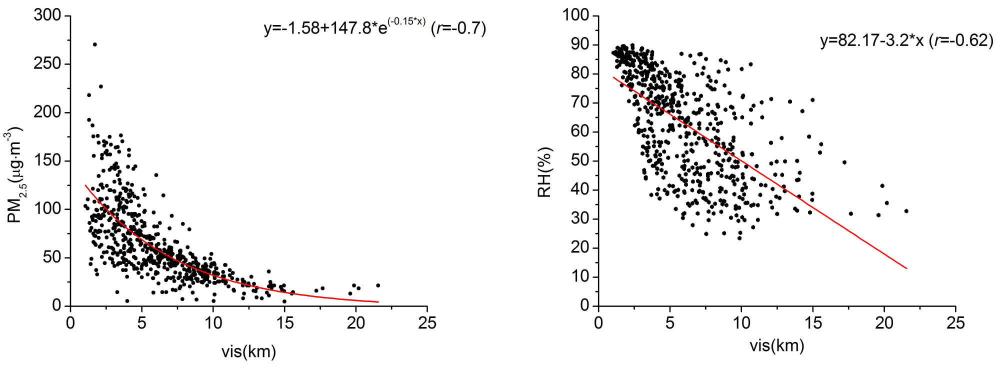

Fig.2 Scatter plot of visibility, $PM_{2.5}$ mass concentration, and RH

Q28:Page 6, Line 21: For ‘had a good consistent with periods of high PM2.5‘, please consider either highlighting the periods or making a scatter plot.

A28: We added a correlation coefficient to Page9, Lines7-8. '…the periods with a high number concentration had a good consistency with the periods of a high $PM_{2.5}$ mass concentration (r=0.7)'

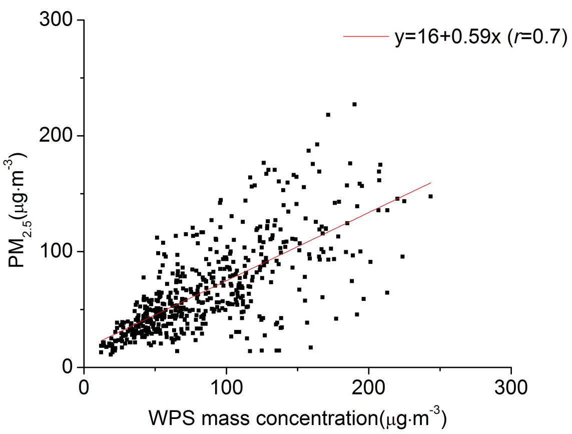

Fig.3 Scatter plot of WPS mass concentration and $PM_{2.5}$ mass concentration

Q29:Page 6, Line 25: I would like to see in which particle size range the particles mass dominated.

A29: We added Table3 on Page11, Lines 12-13. The particle mass dominated in the ranges of 2.0-10.0μm and 0.5-1.0μm. The mass concentrations of the particles in the different size segments were calculated by the WPS data.

Table 3 Contribution fraction of the model-derived extinction coefficients at dry/wet condition and mass fraction in PM10 at dry condition

	0.01-0.2μm	0.2-0.5μm	0.5-1.0μm	1.0-2.0μm	2.0-10.0μm
Contribution fraction of the model-derived extinction coefficients at dry condition	3.4%	28.3%	52.6%	7.6%	8.0%
Contribution fraction of the model-derived extinction coefficients at wet condition	4.6%	33.3%	47.6%	7.8%	6.9%

Mass fraction in PM_{10} at dry condition	8.5%	17.4%	27.6%	13.2%	33.3%

Q30:Page 6, Line 27: How could the particle size relate to the sources? Please specify, and which sources?
A30: Particles from different sources have different sizes. For example, particles from dust are larger than particles from biomass or traffic.

Q31: Page 7, Line 1-3: Please specify how these assumptions relate to the different time resolution of film sampling and WPS measurements.
A31: The time resolution of the WPS is 5min, and that of the Anderson is 23h. According to the hypothesis on Page7, Line28- Page8, Lines1-3, '1) the chemical compositions of particles were unchanged for a given diameter segment of Anderson' we can unify the particle size segments of the Anderson with those of the WPS. '2) the chemical composition of particles remained unchanged over the course of a day ' we can unify the time resolutions of the Anderson and the WPS to 1h.

Q32:Page 7, Line 10-20: Put this section into the method part.
A32: We added section2.3 and have moved Page 7, Lines 10-20 to this part.

Q33:Page 7, Line 18: What kind of calculation results?
A33: The results were calculated results of extinction coefficient. We have modified 'The calculated results ' to 'The calculated results of the extinction coefficient…' onPage7 Line20.

Q34: Page 7, Line 21-26: In this article, you have light-absorbing component as well as non-light absorbing component. But you used visibility meter to measure scattering coefficient. Please check your visibility data. Then you ended up with the comparison of extinction from different method. Moreover, when the particles undergo hygroscopic growth, the scattering from the non-light-absorbing component was be enhanced. Please specify all of these relationships more explicitly. Clarify what the author really wants to tell.
A34: The visibility meter measures the scattering coefficient of particles, the extinction coefficient is calculated according to the single scattering albedo obtained in the calibration of the visibility meter, and then the visibility is calculated from the extinction coefficient. The measurement-derived extinction coefficient in this paper is calculated by an empirical formula according to the visibility value that is output from the visibility meter.

Q35: Page 8, Line 1: Give proper reference for Q, and explain it more specifically. Give the full name for BHCOAT.
A35: First, 'efficiency factor (Q_{ext}) is defined as the extinction cross section of particle divided by the geometric cross section of particle.' was added on Page8 Line9. Q_{ext} was calculated using the BHCOAT program. The input/output parameters of Q_{ext} and the formulas are listed in Table 2. Q_{ext} is the summation of the scattering parameter and absorption parameter.

$$Q_{\text{ext}} = \frac{\sigma_{ext}}{\pi \cdot r^2}$$

Second, we modified the 'BHCOAT program' to 'program of coated spheres form Bohren& Huffman

(BHCOAT)' on Page1 Line 15 according to Q7.

Q36: Page 8, Line 6: Please rephrase the sentence: its calculated value was consistent with human eye. How could the scientific results consistent with human eye?

A36: We have modified '550 nm is the most sensitive wavelength for the human eye, and its calculated value was consistent with the human eye.' to '550 nm is the most sensitive wavelength for the human eye, and its calculated value was consistent with the value that the most sensitive for human eye' on Page 8 Lines 13-15.

Q37:Page 8, Line 7: For 'If RH=0, GF=1', I guess you want to say under dry conditions, the particles did not take up water, thus GF as 1 was used as the input in Eq. 3 for calculating the extinction coefficient of particles under dry conditions.

A37: Yes. A GF of 1 was used as the input in Eq.3 for calculating the extinction coefficient of particles under dry conditions in this paper.

Q38: Page 8, Line 12: Please specify which values.

A38:The value here was extinction coefficient, and we have modified 'the relative values of the calculated and observed values from the core-shell model' to 'the relative values of the model and measurement values of the extinction coefficient from the core-shell model ' on Page9 Line22-23.

Q39: Page 8, Line 13: How could the time series be in good agreement, please rephrase the sentence.

A39:We have modified '…the time series of calculated and observed values were in good agreement,…' to '…the calculated and measured values of extinction coefficient were in good agreement,…' onPage9 Line23-24.

Q40:Page 8, Line 19: You cannot compare the results when different wavelength was used.
Only compare the one using wavelength as 940 nm and specify that for the analysison chemical composition and RH dependency, wavelength of 550 nm was used.

A40: In our study, the light source wavelength of the visibility meter was 940nm. We calculated the extinction coefficient of 940nm to perform a correlation between the model-derived extinction coefficients and the measurement-derived extinction coefficients. However, the output visibility value is calculated by an extinction coefficient of 550nm. Therefore, we used 550nm to calculate the absolute extinction coefficients. Because 550 nm is the most sensitive wavelength for the human eye, the following section focuses on the calculations at λ=550 nm for discussion.

Q41: Page 8, 13-19: When you talk about something in good agreement, not only the correlation coefficient, but also the fitting Line and its deviation from 1 to 1 Line should be discussed.

A41: For λ=550nm, the mean deviation of the model-derived extinction coefficients and he measurement-derived extinction coefficients is approximately 13% ([measurement-derived extinction coefficient -model-derived extinction coefficient]/ measurement-derived extinction coefficient). The measurement error of the visibility meter is approximately 10%, so we believe that the result is credible.

Q42: Page 8, Line 19: What are scale parameters, where did you define them?

A42: We mentioned the scale parameter on Page8, Line10 ('X is a scale parameter'), and we provided the formula in table 2.

Q43: Page 8, Line 27-28: I guess you mean you fitted the measured particle number size distribution into five segments. Please clarify.

A43: The data on the particle number size distribution is from the WPS. We divided it into five segments for comparison with other studies in the literature. What we fitted in the study is the extinction coefficient, not the size distribution.

Q44: Page 9, Line 3-5: Please rephrase the sentence 'On average: : :.'. The information is not clear. And when did you measure PM10 mass fraction?

A44: First, we have modified 'On average, the 0.2-0.5μm and 0.5-1.0μm ranges together contributed more than 81% of the extinction coefficients, much higher than their PM_{10}mass fraction (45%).' to 'On average, the 0.2-0.5μm and 0.5-1.0μm ranges together contributed more than 81% of the extinction coefficients, much higher than their total PM_{10} mass fraction (45%).' on Page10 Lines 14-15. 81% and 45% can been seen in Table3.

Second, The PM_{10} mass concentration was calculated from the WPS data. The mass fraction in the five size segments can be seen in Table3 (on Page11, Lines 12-13).

Q45: Page 9, Line 4-6: You mean an increase in the mass concentration or number concentration? What do you mean 'unit mass' here, please consider changing the sentence.

A45: What we mean here is an increase in the mass fraction. The phrase 'extinction capacity relative to the unit mass of the particles' is equivalent to (extinction coefficient/ mass concentration of the particles). Fig.9, which we added, shows the extinction capacity relative to a unit mass in the different size ranges.

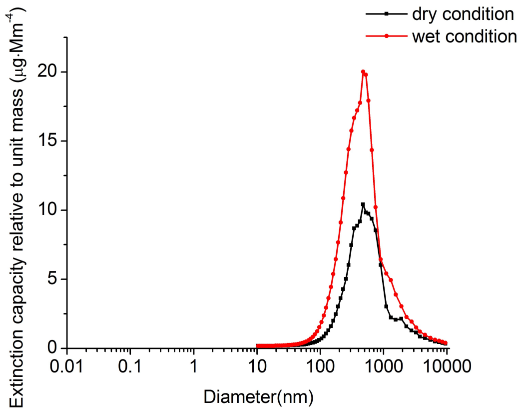

Fig.4 Extinction capacity relative to unit mass in different size segments under dry/wet condition

Q46: Page 9, Line 7: The results of Kang et al., (2013) are from a different season, please clarify.

A46: The result we obtained was that the extinction capacity of the particles in the 0.2-1.0μm range was stronger than that in the other size range. This result has nothing to do with the seasons.

Q47: Page 9, any results/figures on chemical composition in particle phase should be given.

A47: We do not understand what the reviewer means here. It appears that the reviewer wants us to emphasize the results of the specific chemical composition. In our study, we have been using κ-EC to describe the chemical composition.

Q48: Page 9, Line 20: It is not obvious to see the contribution fraction of the extinction coefficients from the mentioned size ranges increased, as well as the decreasing trend. Consider presenting it in another way.
A48: We added Table 3 on Page11 Line12-13. In this table we can see the obvious change.

Table 3 Contribution fraction of the model-derived extinction coefficients at dry/wet condition and mass fraction in PM10 at dry condition

	0.01-0.2μm	0.2-0.5μm	0.5-1.0μm	1.0-2.0μm	2.0-10.0μm
contribution fraction of the model-derived extinction coefficients at dry condition	3.4%	28.3%	52.6%	7.6%	8.0%
contribution fraction of the model-derived extinction coefficients at wet condition	4.6%	33.3%	47.6%	7.8%	6.9%
mass fraction in PM_{10}at dry condition	8.5%	17.4%	27.6%	13.2%	33.3%

Q49:Page 9, Line 23: Which results, please clarify.
A49: We have modified the sentence 'The results shown in Fig. 8(a) were divided by those in Fig. 7(a) to produce the results in Fig. 9(a)' to 'The calculated results of extinction coefficients shown in Fig. 8(a) was divided by the calculated results of extinction coefficients in Fig. 7(a) to produce the growth multiples results in Fig. 9(a).'on Page11 Line14-15.

Q50: Page 9, Line 27: It is actually not the extinction coefficient any more, but the extinction enhancement. Please be careful with your statement.
A50: We have modified 'extinction coefficient' to 'extinction enhancement' on Page 11, Line 19, according to the reviewer's comment

Q51: Page 9, Line 12-30, please consider rewriting this paragraph. The information is not clearly given in the text. You cannot say divide a figure with another figure to get a third figure.
A51: We have modified the sentence 'The results shown in Fig. 8(a) were divided by those in Fig. 7(a) to produce the results in Fig. 9(a)' to 'The calculated results of extinction coefficients shown in Fig. 8(a) was divided by the calculated results of extinction coefficients in Fig. 7(a) to produce the growth multiples results in Fig. 9(a).'on Page11 Line14-15.

Q52: Page 10, Conclusions: This is more like a summary but not a conclusion. When you only tested the core-shell model, you cannot say it is reasonable without the information from other model results. And where did you get the PM10 mass fraction information. Where does your 45% come from?
A52: First, the answer to Q6 applies here. We also analyzed the results of the internally/externally

mixed model and found that the result is consistent with that of the core-shell model. The values of the extinction coefficient calculated by the core-shell model are between those of the internally mixed model and externally mixed model. Considering the article length and structure, we discussed only the core-shell model in this paper. The relationships between the model-derived extinction coefficients and measurement-derived extinction coefficients by the three mixed models are given below (λ =550nm). The result of the internally/externally mixed model is consistent with the current values.

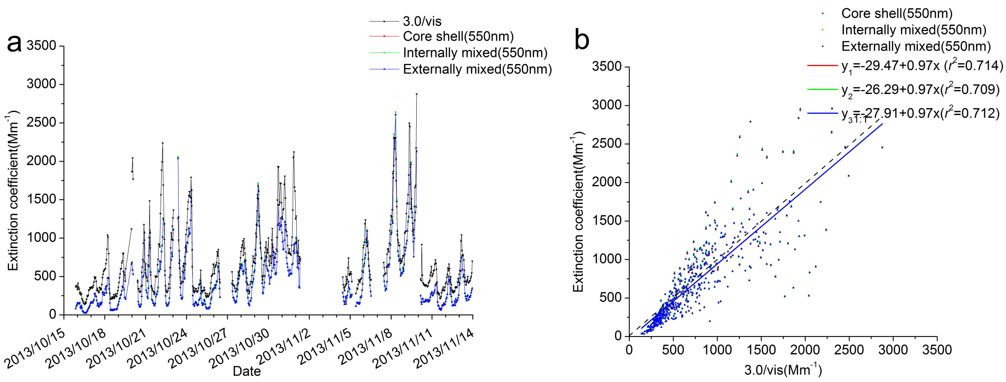

Fig.1 Time series of model-derived extinction coefficients (core-shell/internally/externally model) and measurement-derived extinction coefficients (a); Correlation coefficient of model-derived extinction coefficients (core-shell/internally/externally model) and measurement-derived extinction coefficients (b)

Second, The PM_{10} mass concentration in our study was calculated from the WPS data. From table3, 45%= 17.4%+27.6%.

Please also note the supplement to this comment:
http://www.atmos-chem-phys-discuss.net/acp-2016-119/acp-2016-119-RC2-supplement.pdf

A: The comment in the supplement is the same as that made by Referee #1, to whom we have replied.