

***Interactive comment on “Examination of parameterizations for CCN number concentrations based on in-situ aerosol activation property measurements in the North China Plain” by Z. Z. Deng et al.***

**Anonymous Referee #1**

Received and published: 27 February 2013

1. Does the paper address relevant scientific questions within the scope of ACP?  
Yes.
2. Does the paper present novel concepts, ideas, tools, or data?  
Fair
3. Are substantial conclusions reached?  
Fair

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4. Are the scientific methods and assumptions valid and clearly outlined?  
Yes.
5. Are the results sufficient to support the interpretations and conclusions?  
Fair
6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)?  
Yes.
7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution?  
Yes.
8. Does the title clearly reflect the contents of the paper?  
Yes.
9. Does the abstract provide a concise and complete summary?  
Yes.
10. Is the overall presentation well structured and clear?  
Fair.
11. Is the language fluent and precise?  
Yes.
12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used?  
Yes.

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13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated?
  - (a) Explain Table 1 in more detail. (Table 1 shows .....the slopes (k) and correlation coefficients ( $R^2$ ) between fitted lines of calculated and measured concentrations.....)
  - (b) Describe text in more detail.
  - (c) Correct  $N_{CCN,m}(S)N_{CN}>10nm$  to  $N_{CCN,m}(S)/N_{CN}>10nm$  in caption of Fig.3.
14. Are the number and quality of references appropriate?  
Yes.

Questions:

1. Is aerosol activation property in the North China Plain quite similar with mixed particles containing hygroscopic substances ?
2. It is estimated that most of aerosol particles larger than 10nm in diameter in the North China Plain are activated as CCN at higher super-saturation than about 0.20% for example from Fig.3 and 9. Are critical size of the aerosol particles as CCN activation quite close to those of hygroscopic materials such as ammonium sulfate ?.
3. Are  $D_{50}$  and  $D_{inf}$  almost constant regardless of time or place in the North China Plain ?
4. You recommended that CCN number concentrations are predicted using particle number size distribution with inferred critical diameters or size resolved activation ratios. Size distribution and material composition of aerosol particles in the world vary greatly in time and place. Can you recommend the prediction in general for these particles?

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Interactive comment on *Atmos. Chem. Phys. Discuss.*, 13, 145, 2013.

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