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Interactive comment on "Estimation of cloud condensation nuclei concentration from aerosol optical quantities: influential factors and uncertainties" *by* J. Liu and Z. Li

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General

This is a welcome addition to the literature on the relationship between CCN concentration and aerosol optical properties. Previous manuscripts have addressed the relationship, but not with such a large set of data spanning diverse regions of the world. It has practical value for satellite remote sensing studies of aerosol effects on clouds. The figures are quite clear, but the English needs much work; I did not identify all of the problems, and recommend the authors get professional help with the English.

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Specific

Page 3, lines 16-17. Ghan et al. (2006) is an odd reference here, as that manuscript does nothing to establish the sentence preceding it. Page 4, lines 23-24. You could mention here that Ghan and Collins (2004) and Ghan et al. (2006) tried to account for the influence of RH. Page 10, line 12. Note that at NIM the correlation between CCN and AI even increases with wavelength. Can you explain this? Page 10, lines 24-25. Why is the correlation between CCN and scattering lowest at Grasiosa? Page 11, line 3. You should reference the Ghan papers here, which tried to determine vertical profiles. It is also worth mentioning here that the ARM program is producing vertical profiles of CCN at its sites using the Ghan algorithm. I do NOT ask that you compare the surface CCN measurements with the values from the Ghan algorithm, because it uses the surface CCN as input. Page 16, line 5. GCMs do NOT use such relationships. The relationships are most commonly used in cloud-aerosol interaction studies with satellite data. See e.g., Quaas et al., Atmos. Chem. Phys., 2009.

Technical

Page 2, line 2. Add "values" after "obtain". Page 2, line 26. I do not understand what the authors are trying to say. Get help with the English. Page 4, last line. Change "made" to "measured". Page 5, line 1. Add "of this study" after "goal". Page 5, lines 4-7. Replace "Influences on the relationship is investigated of RH, aerosol hygroscopicity and aerosol single scattering albedo (SSA) for reducing the uncertainty in estimating CCN from aerosol optical measurements" with "To reduce the uncertainty in estimating CCN from aerosol optical measurements, we investigate the influences of RH, aerosol hygroscopicity and aerosol single scattering albedo (SSA) on the relationship between CCN aerosol optical properties." There are many other problems with the English. Get professional help, because I will not spend my time identifying all of them for you. Page 11, line 11. Change "arguments" to "enhances". Page 12, lines 16-17. Replace "AOD is measured at low and/or constant ambient RH conditions" with "RH is low enough for humidification to be negligible". Page 14, lines 6-7. Add "as functions of SSA" after

"450 nm". Page 15, lines 13 and 25. Are these correlations for data from all sites? Page 17, line 18. Cite the Ghan papers here.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 23023, 2013.

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