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Comment

***Interactive comment on “Hygroscopic properties of aerosol particles at high relative humidity and their diurnal variations in the North China Plain” by P. F. Liu et al.***

**Anonymous Referee #2**

Received and published: 18 March 2011

Liu et al. present hygroscopic growth factor distributions collected during a field campaign in Northern China. The main contributions of this manuscript are (1) a one-month series of hygroscopic growth factor data in one of the most polluted and generally undersampled region of the world, (2) ambient hygroscopic growth factor data at RH > 95%, a humidity range that is not accessible with most instruments and important for understanding aerosol cloud interactions, and (3) a model that can successfully explain the number fraction of hydrophobic particles and hygroscopicity parameter  $\kappa$  in terms of aerosol emissions, boundary layer dynamics, and particle mixing processes. The methodology used in the paper is sound, the data are novel, and the observations are explained. I therefore recommend this paper for publication in Atmospheric

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Comments:

The paper could be written more concisely. Some parts are repetitive and some sections are unnecessary. For example, many of the details on the moments of the growth factor distribution functions could go into a supplement or could be just stated in words. The description of the results in the text can be shortened.

The text mentions that invalid data were excluded. Please expand this section, to state how much data was excluded, and what the exclusion criteria were.

The description of the RH correction (Pg. 3005) is very difficult to follow. Also, please define the stability of the relative humidity and in what locations it was measured/calculated.

The first part of Section 3.3 should either be expanded or omitted. LACIS is introduced here for the first time. Unless the reader is familiar with LACIS the section cannot be understood. If the authors feel the need to validate their data against LACIS, a description of the instrument should be included in the experimental section. The data in Figure 6 should then also be quantitatively compared, i.e.  $\kappa$  LACIS vs. HH-TDMA in form of a scatter plot and correlation coefficient. The authors may also opt to leave the comparison to the LACIS paper that will undoubtedly appear in the literature soon.

Editorial:

Pg. 2996 “an intensive field campaigns” -> omit plural

Pg. 3003 “can be implied from” -> “can be derived from”

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Interactive comment on Atmos. Chem. Phys. Discuss., 11, 2991, 2011.

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