

**Reviewer:** *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 Chemistry and Physics.*

**Response:** Thanks for the comments, which are appreciated very much.

**Comments:**

**Reviewer:** *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.*

**Response:** According to the comments from all of three reviewers, we have significantly shortened the chapter 2 “Data and methods” and condensed other chapters. The detailed descriptions of the moments of growth factor distribution functions have been shortened, and the formulations have been excluded. The description of the results has also been shortened.

**Reviewer:** *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.*

**Response:** A paragraph regarding the data quality control procedures has been added to the chapter 2.2.1 in the revised paper. The criteria for data screening and the fraction of data being excluded have been provided.

The section of RH correction has been rewritten in the revised paper to make it more straightforward.

The stability of the relative humidity was defined by the standard deviation of RH values measured by the dew point mirror (calibrated using ammonium sulphate particles). This information has been included in the revision of chapter 2.2.1.

**Reviewer:** *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. HHTDMA 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.*

**Response:** The first part of section 3.3 has been omitted in the revised paper. The comparison of the LACIS and the HH-TDMA will appear in another paper in this issue.

**Editorial:**

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

**Response:** This has been corrected.

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

**Response:** This has been corrected.