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*Supplement of*

## **Vertical profiles of black carbon measured by a micro-aethalometer in summer in the North China Plain**

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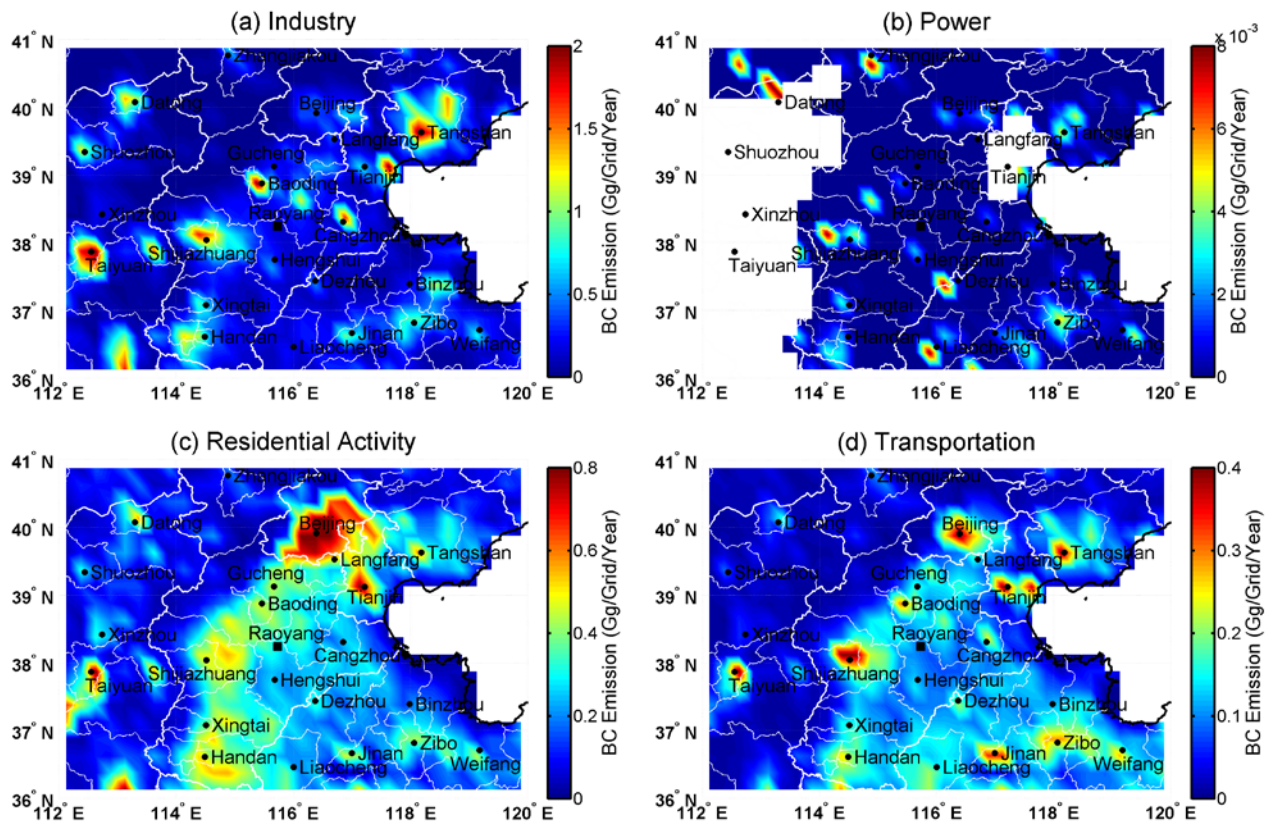


Figure S1. The spatial distribution of BC emissions from the sector of (a) Industry; (b) Power; (c) Residential Activity; (d) Transportation, based upon the emission inventory from the MEIC Model.

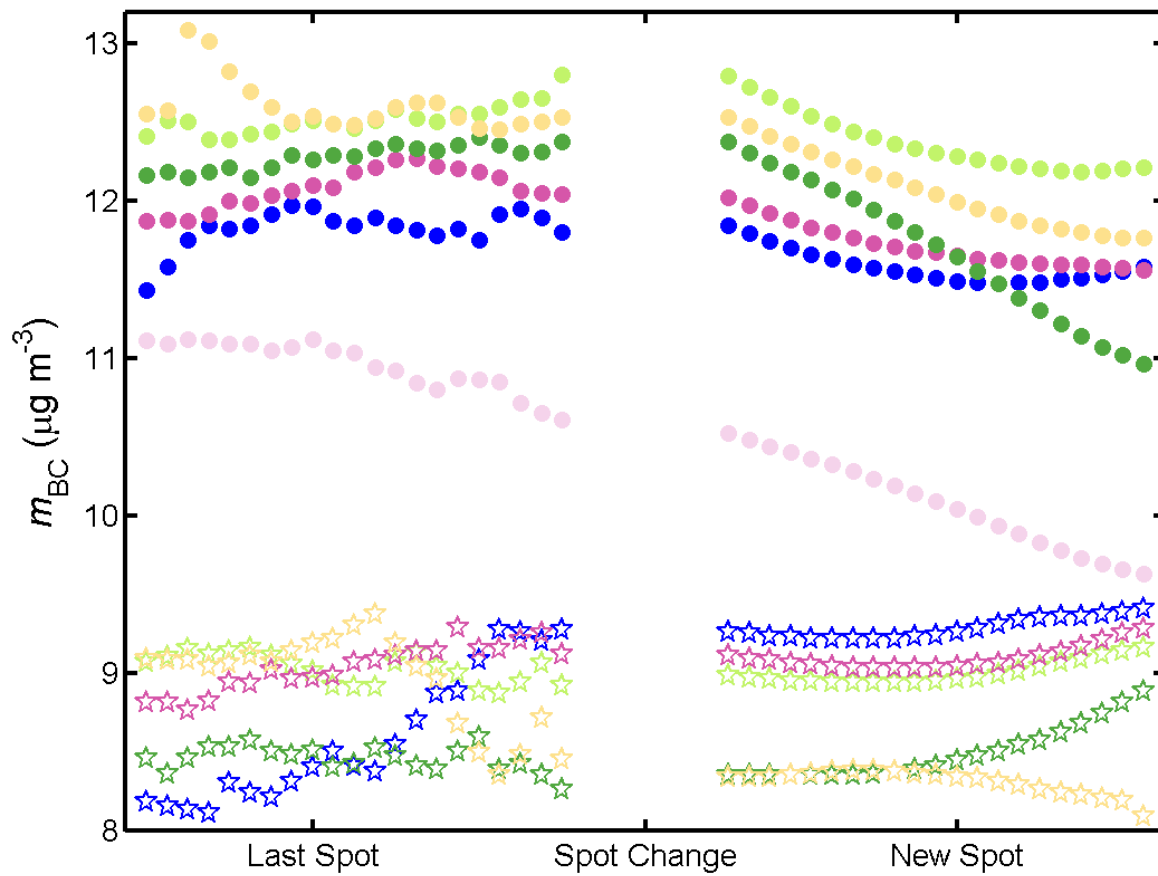


Figure S2. A comparison between measurements using MAAP across filter spot changes for cases where BC mass concentrations exceeded  $8 \mu g m^{-3}$ . Data points (with a temporal resolution of 1 min) collected before and after a spot change were denoted by the same marker in the same color.

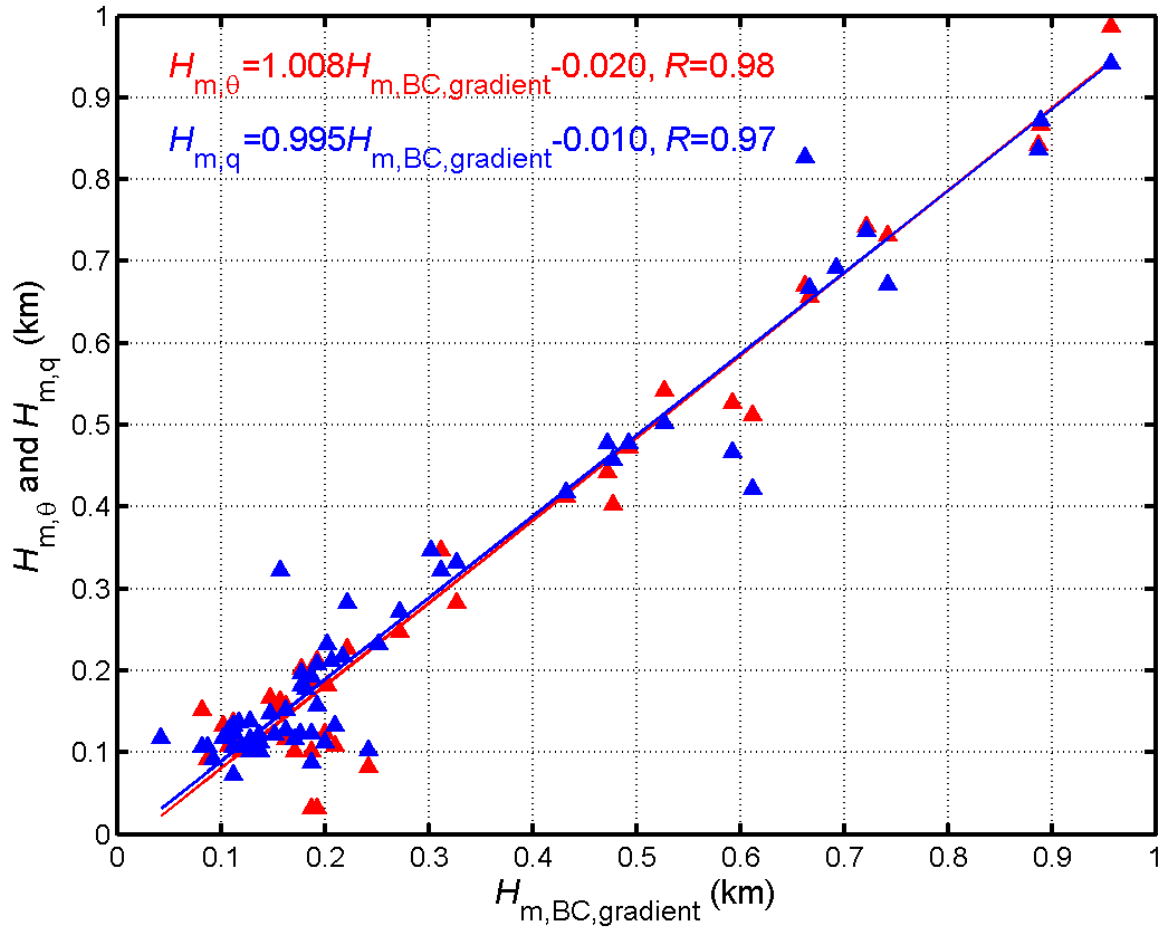


Figure S3. A comparison among mixing heights estimated from vertical profiles of  $m_{BC}$  using the gradient method ( $H_{m,BC,gradient}$ ) and that of  $\theta$  ( $H_{m,\theta}$ ) and  $q$  ( $H_{m,q}$ ) for the entire dataset.

2014-07-08 10:41-11:27

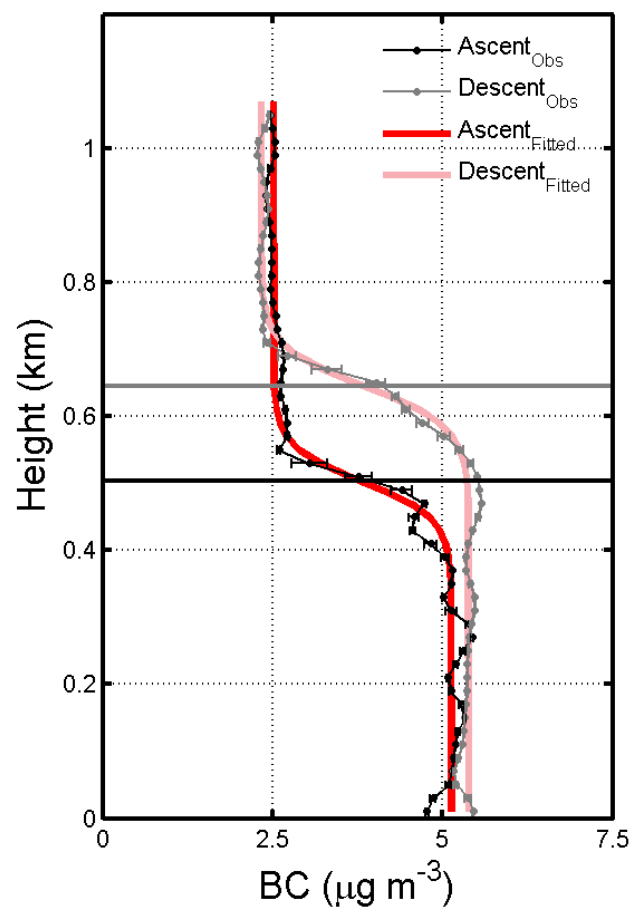


Figure S4. An example of fitting BC vertical profiles using the sigmoid function. Measurements were conducted on July 8, 2014 (10:41-11:27 LT).

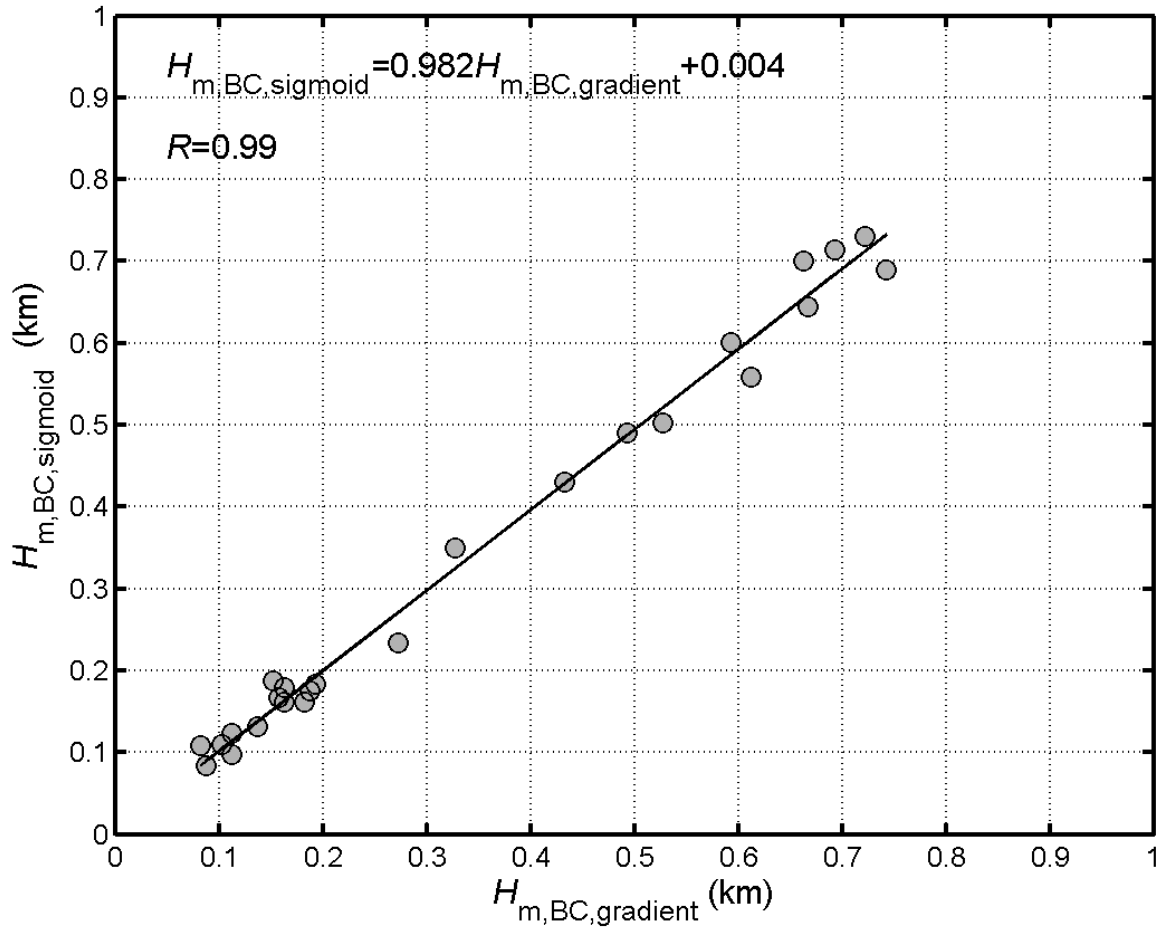


Figure S5. A comparison between mixing heights estimated from vertical profiles of  $m_{BC}$  using the gradient method ( $H_{m,BC,gradient}$ ) and the sigmoid function ( $H_{m,BC,sigmoid}$ ) for typical daytime profiles.