Fig. S1 The parameterization of the DSWRF-OH concentration curve in the SGPF scheme.
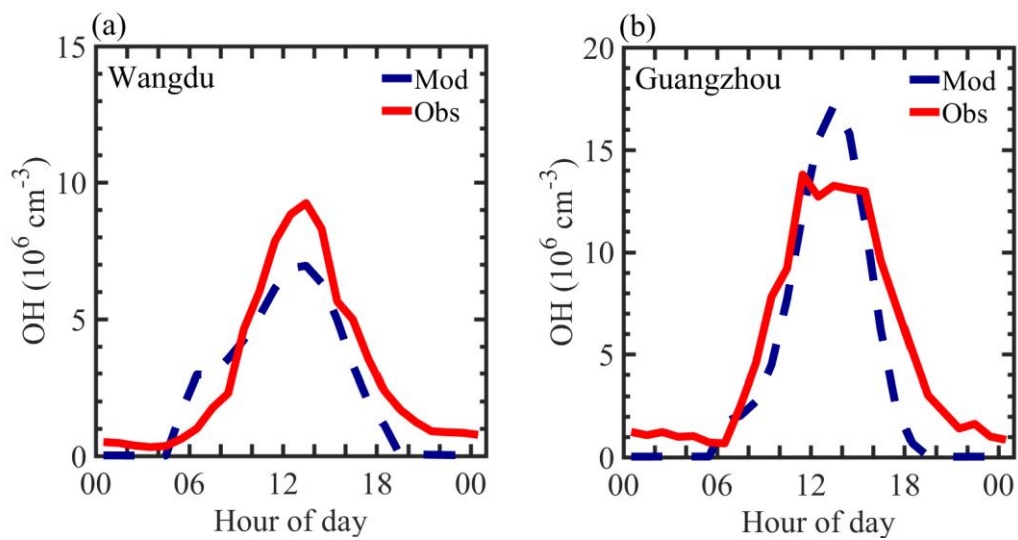
Fig. S2 Comparison of hourly median diurnal profiles (Beijing time) of OH concentration in summer. The observation at (a) Wangdu during 7 June-8 July 2014 and (b) Guangzhou during 3 July-30 July 2006 were collected from Tan et al. (2017) and Lu et al. (2012), respectively.
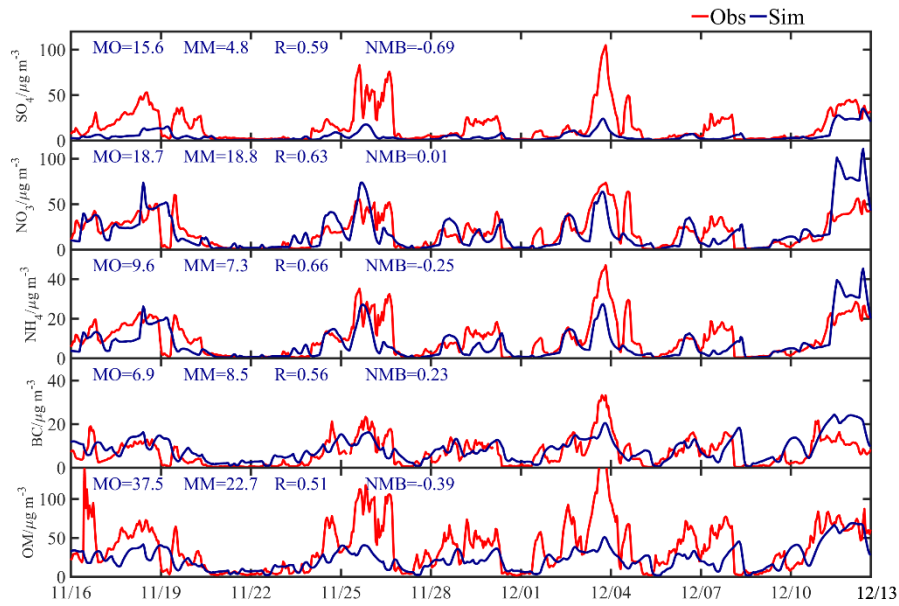
Fig. S3 Comparison of hourly simulated aerosol components against site observations during the APHH-Beijing in 2016. The blue and red line represent simulations with SG scheme and observations, respectively. Statistics of the normalized mean bias (NMB) and correlation coefficient (R) are also given on the subplots in blue texts.
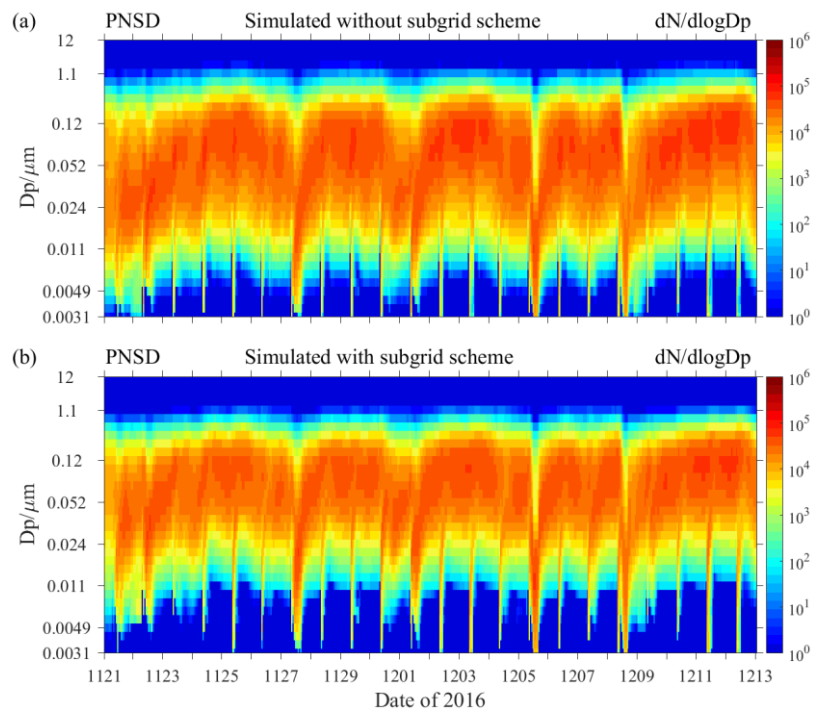
Fig. S4 Simulated particle number size distribution (3-1000 nm) of the IAP-AACM with (a) F2.5 and f_{new} = 5% and (b) SG during the APHH-Beijing in 2016.