Figure S1. Location of Gucheng measurement station (red star) and the surrounding provinces.
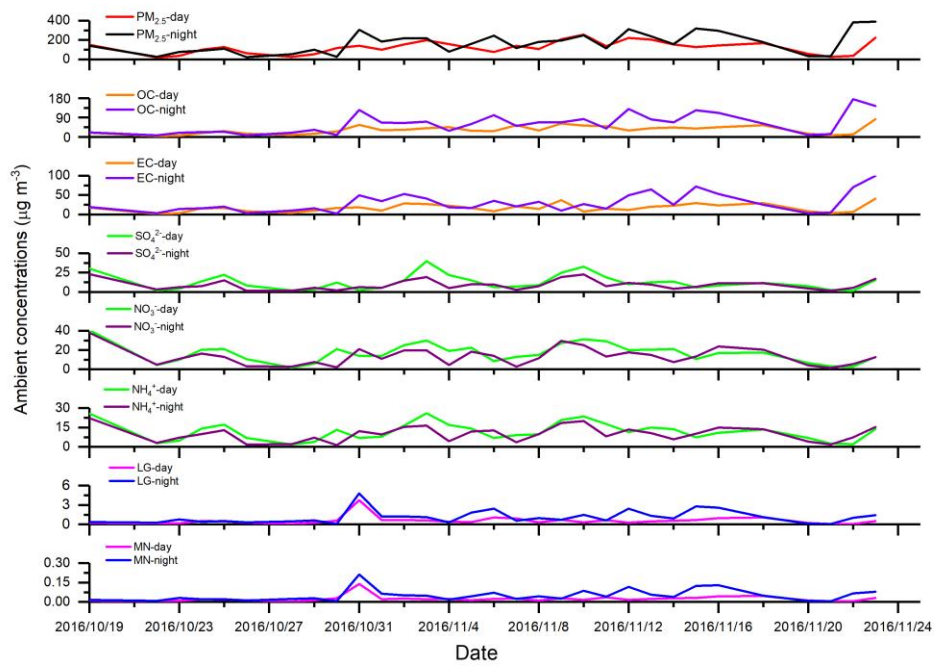
Figure S2. Time-series variation obtained for PM$_{2.5}$ and its major components (OC, EC, SO$_4^{2-}$, NO$_3^-$ and NH$_4^+$), biomass burning tracers (LG and MN) in daytime and nighttime at GC site during the sampling period.
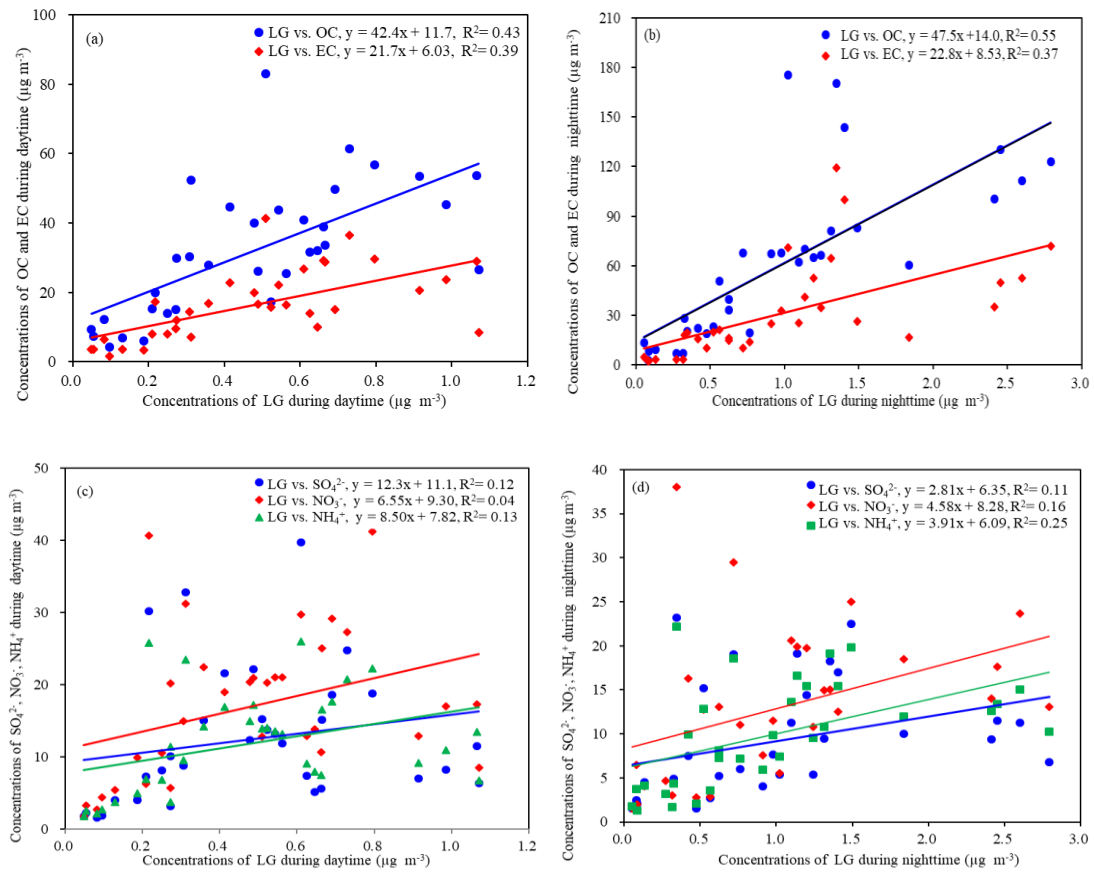
Figure S3. Correlations between LG and OC as well as EC during (a) daytime and (b) nighttime, and scatter

plot of LG versus SNA (i.e., SO_4^{2-}, NO_3^- and NH_4^+) during (c) daytime and (d) nighttime.
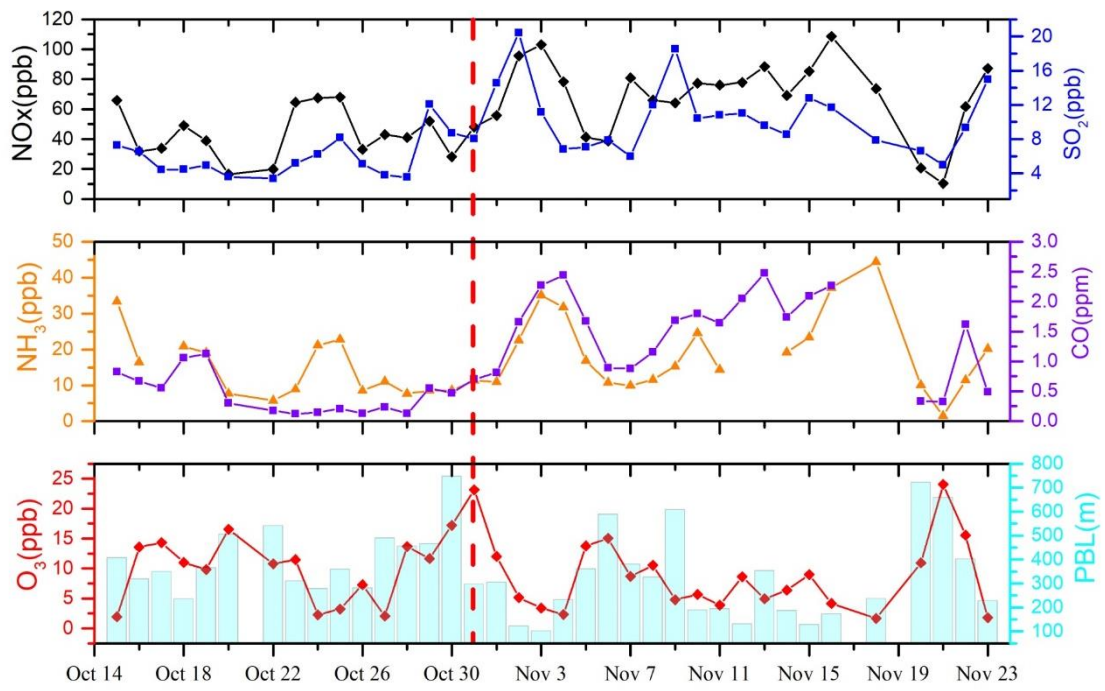
Figure S4. Concentrations of reactive gases and PBL collected at GC site during the observation period from15 Oct to 23 Nov 2016.