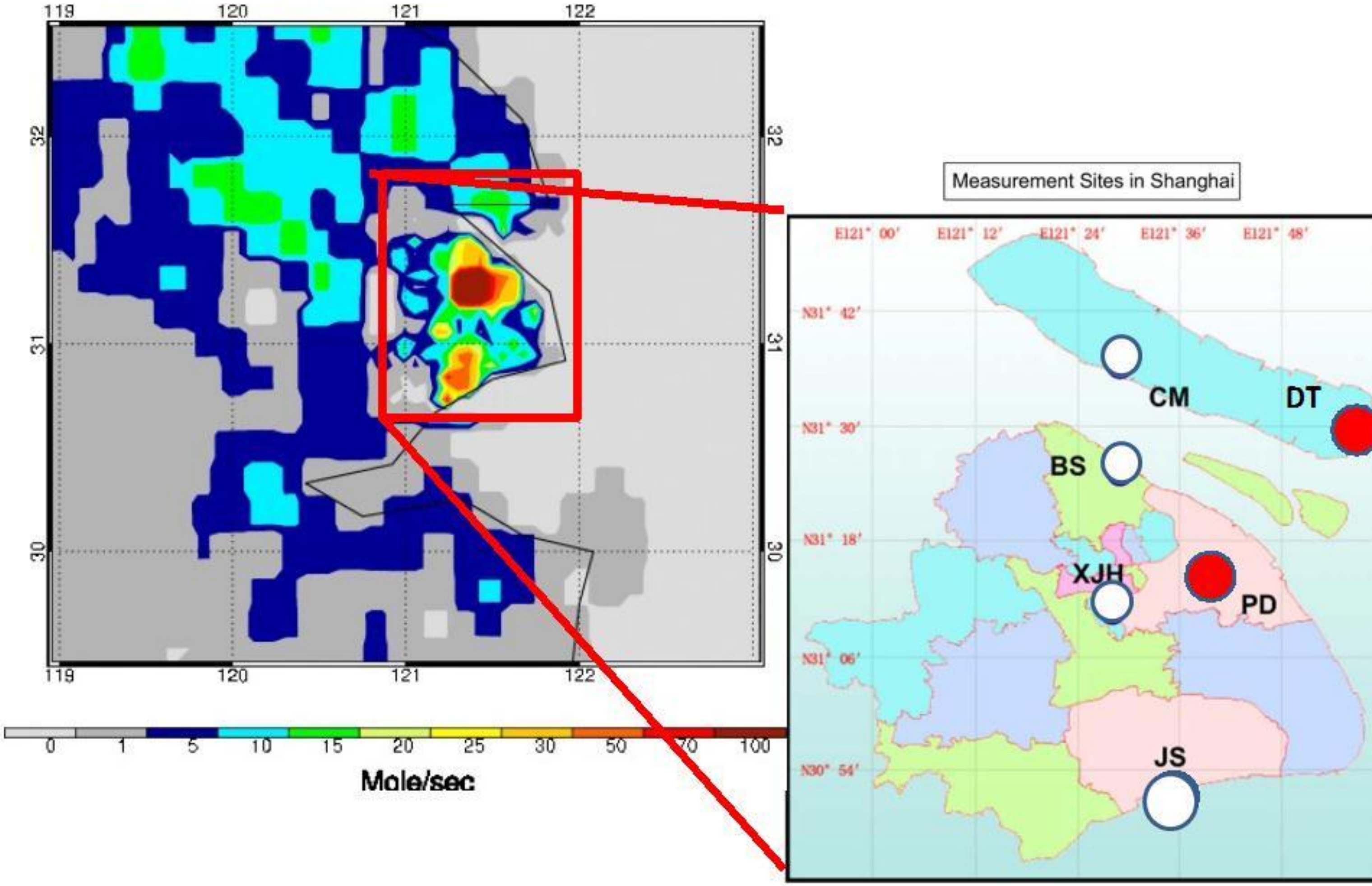

Figure 1. The measurement sites (right panel) and the corresponding emission distribution of CO (left panel) in the Shanghai region. The large red points show the 2 super sites during the field experiment. The white points indicate the routine measurement sites operated by SMB,

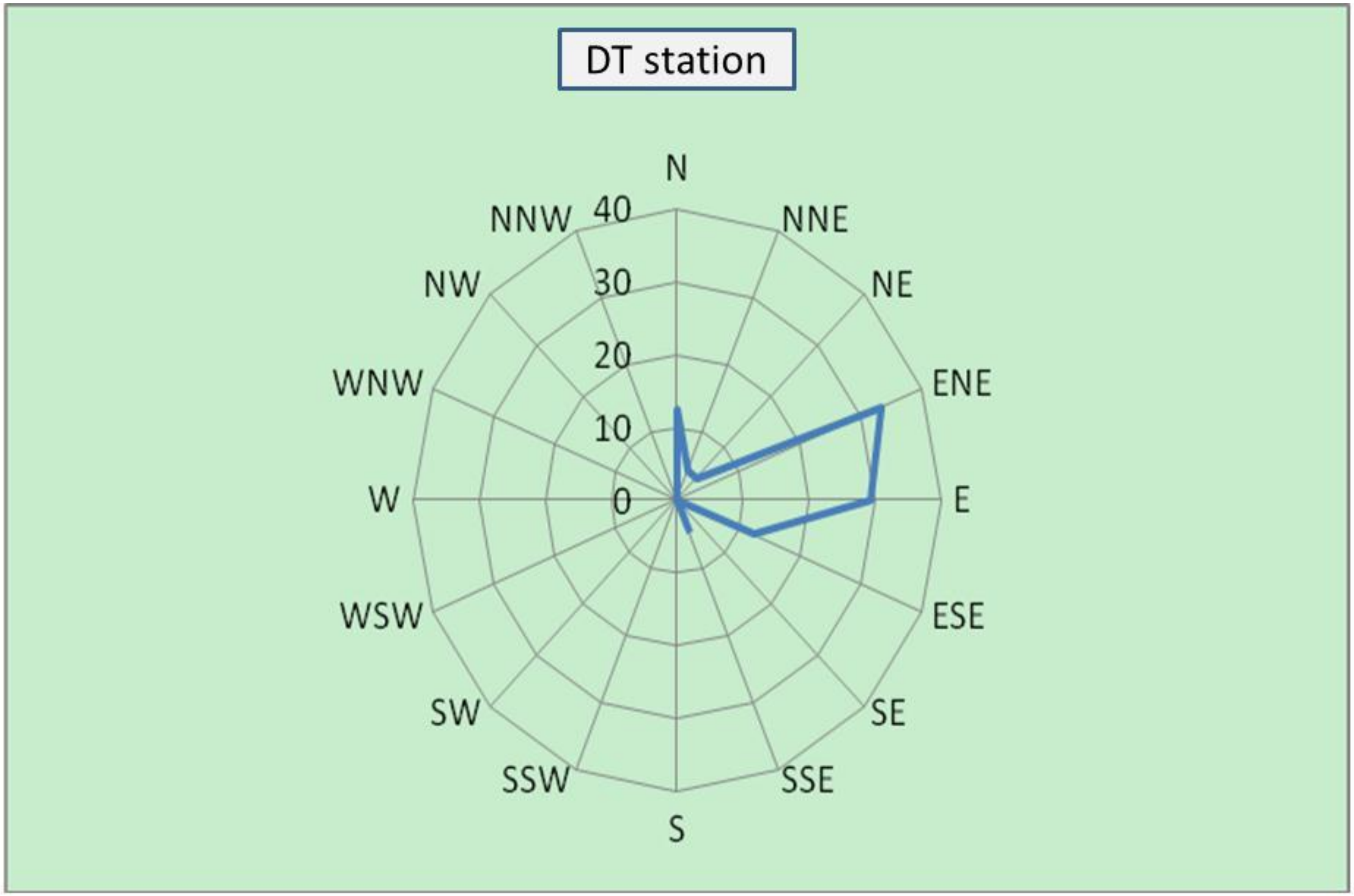

Figure 2. The rose plot of wind direction at DT station during Aug 30 to Sept. 23, 2009. The main wind direction is E and ENE (62%). There is also N wind (10%), which can transport pollutants to the city center of Shanghai.

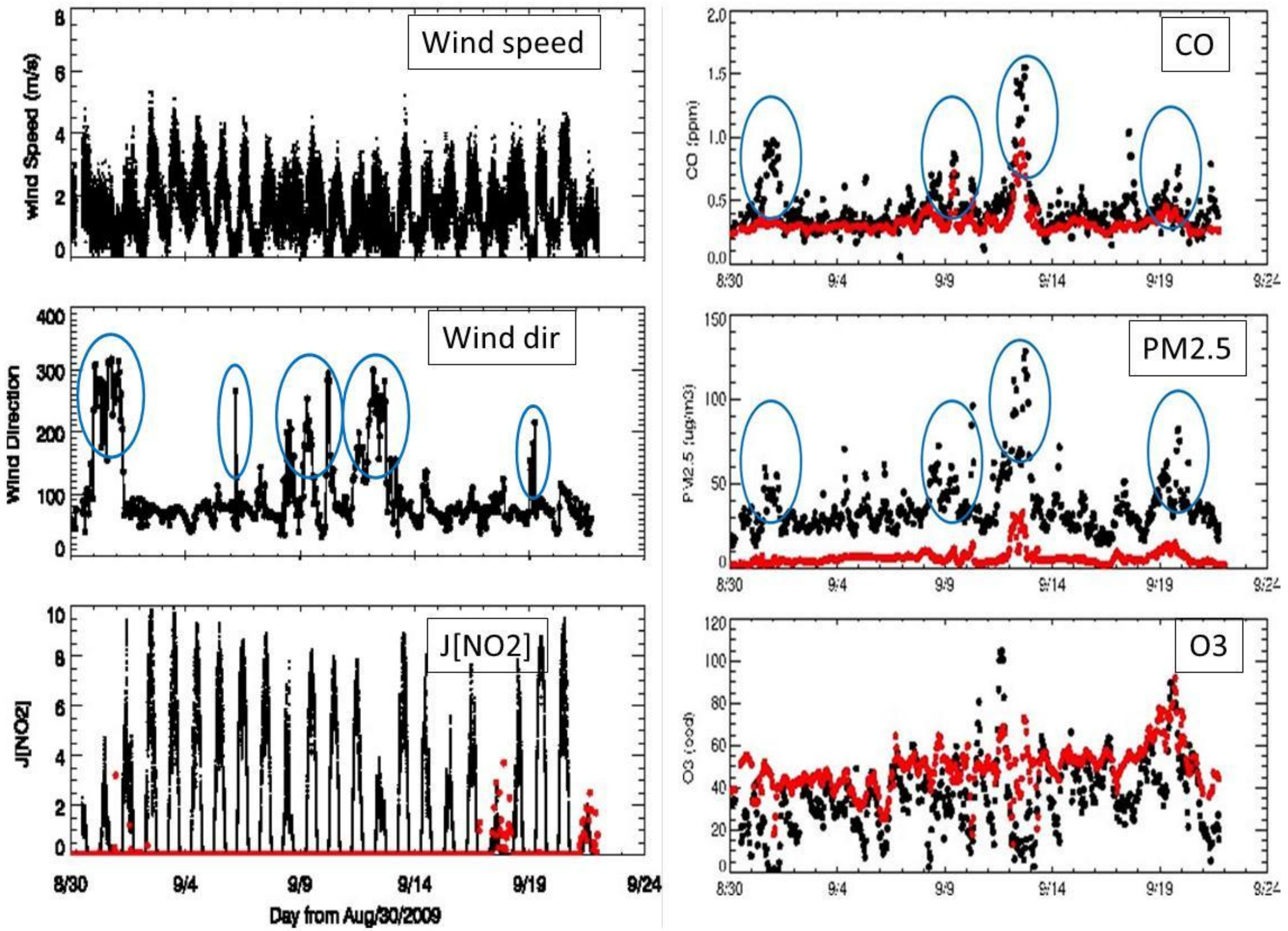

Figure 3. Measured temporal variations of wind speed (m/s), wind direction (degree), and photolysis rate (J[NO_2]) (left panels) at DT site (the red dots in this panel indicates the amount of precipitation). The right panels show the corresponding measured temporal variations CO, $PM_{2.5}$, and O_3 concentrations at PD (black dots) and at DT (red dots).

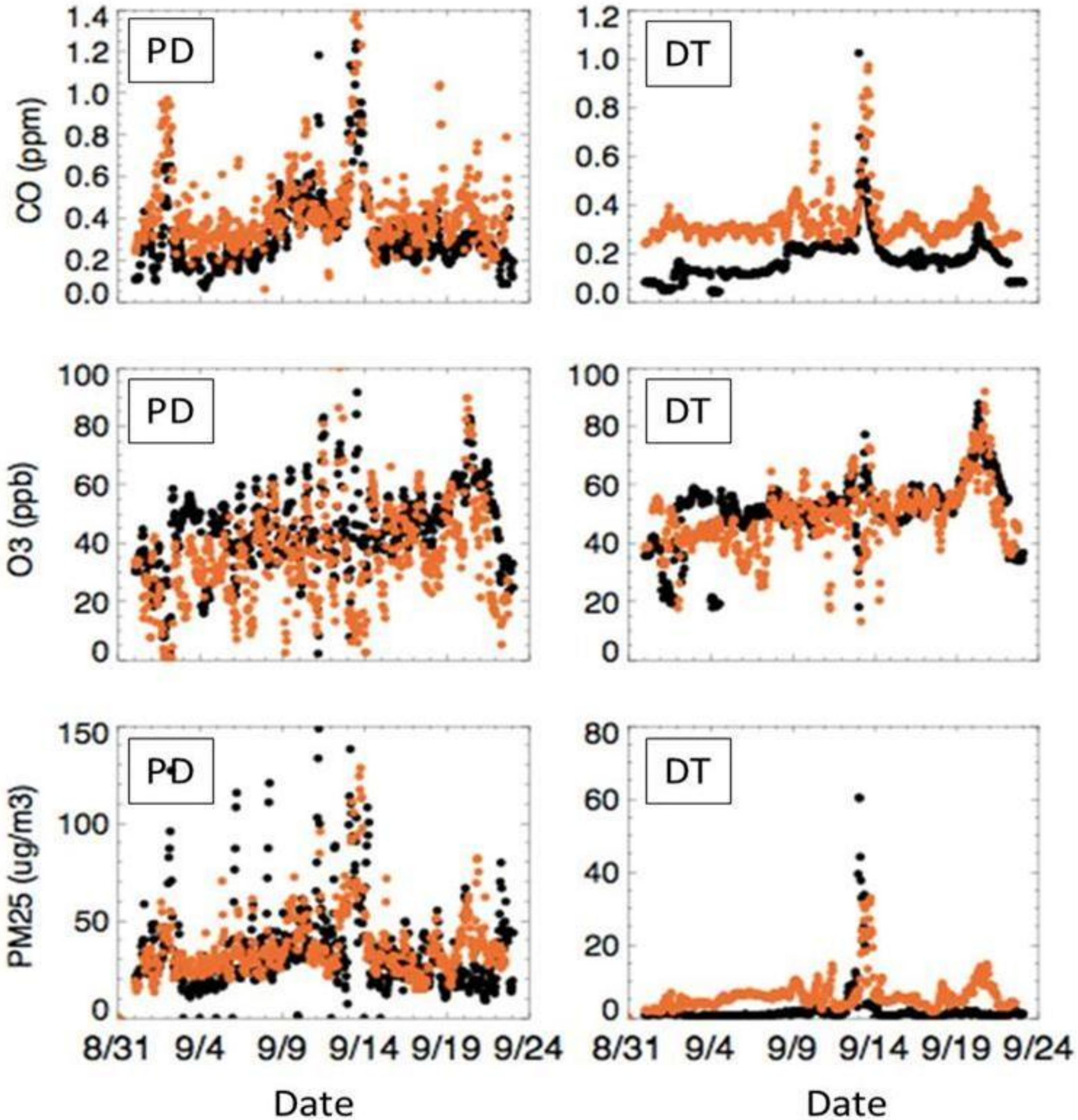

Figure 4. The measured and calculated CO and O_3 variability at PD (left panels) and DT sites (right panels). The measured results are represented by the orange dots and calculated results by the black dots, respectively.

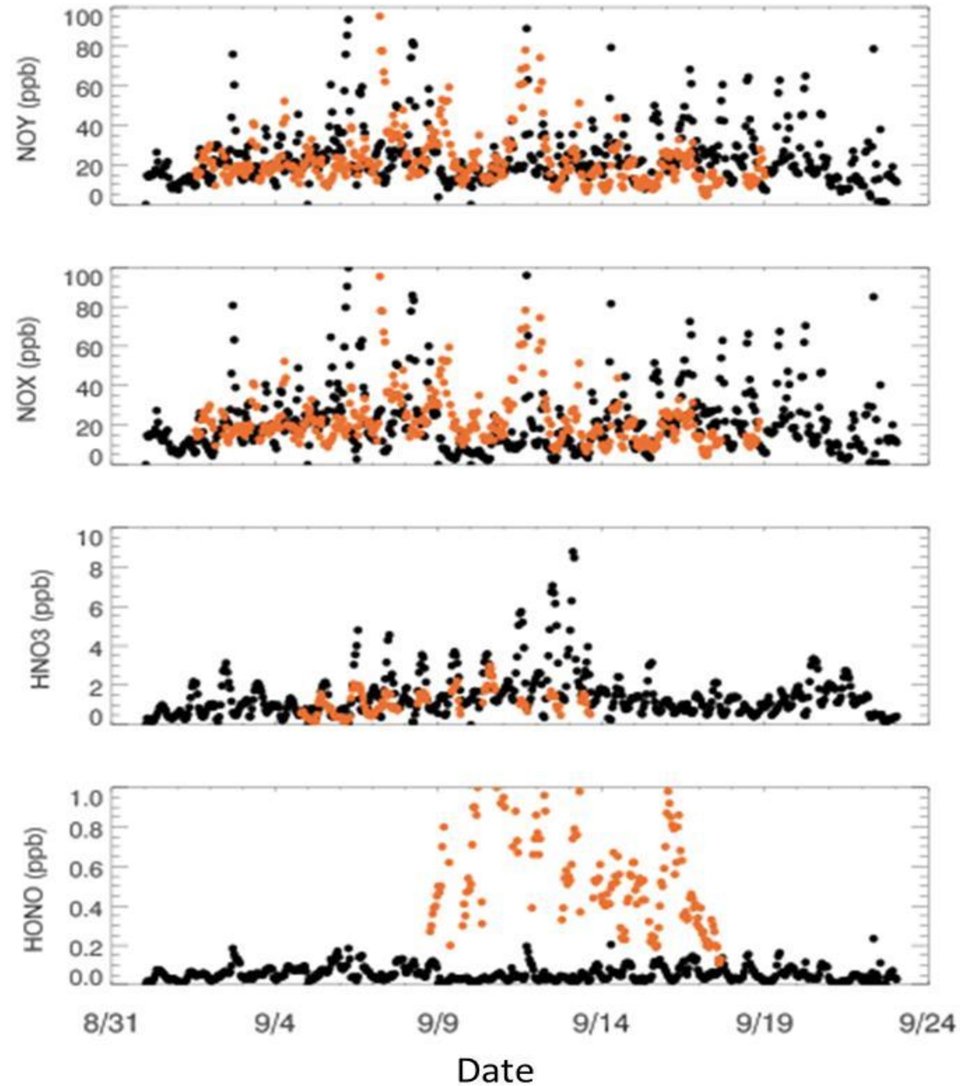

Figure 5. The measured (orange dots) and calculated (black dots) temporal variability of NOy, NOx, HNO_3, and HONO concentrations at PD station.

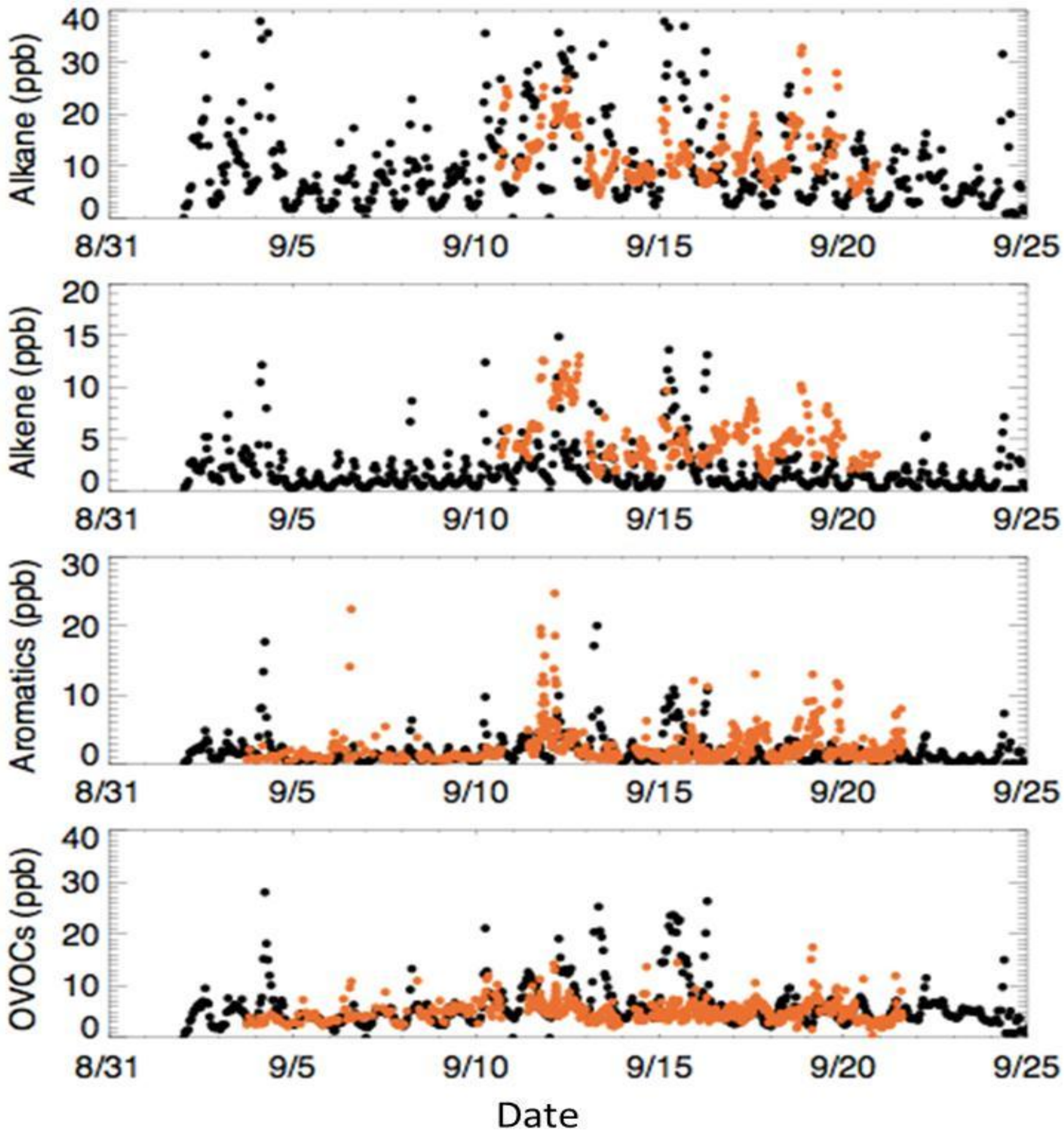

Figure 6. The measured (orange dots) and calculated (black dots) temporal variability of VOC concentrations as alkanes, alkenes, aromatics, and OVOCs at the PD site.

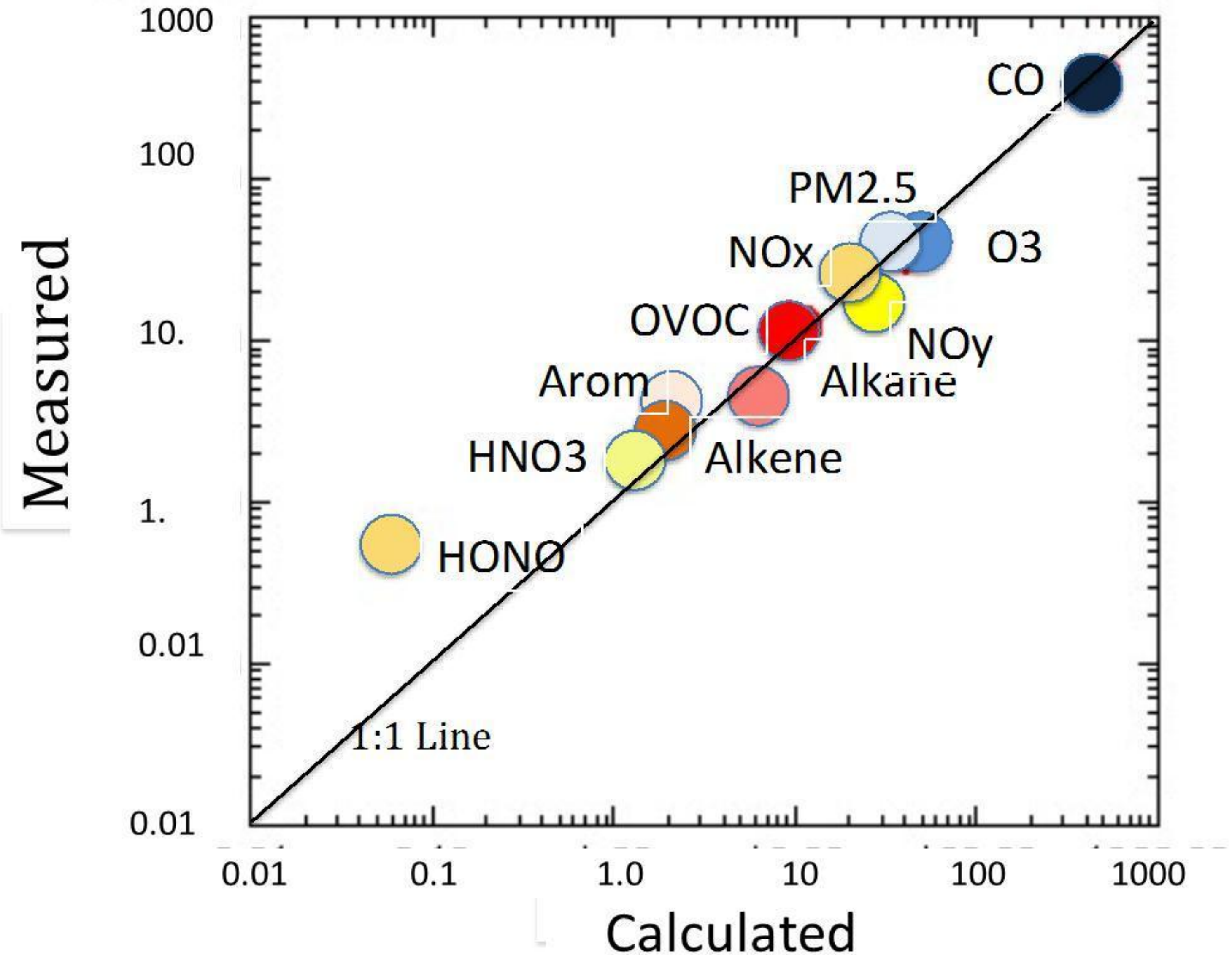

Figure 7. Comparisons of the mean values of measured (y-coordinate) and calculated (y-coordinate) air pollutants (CO, O_3, $PM_{2.5}$, etc) at the PD site.

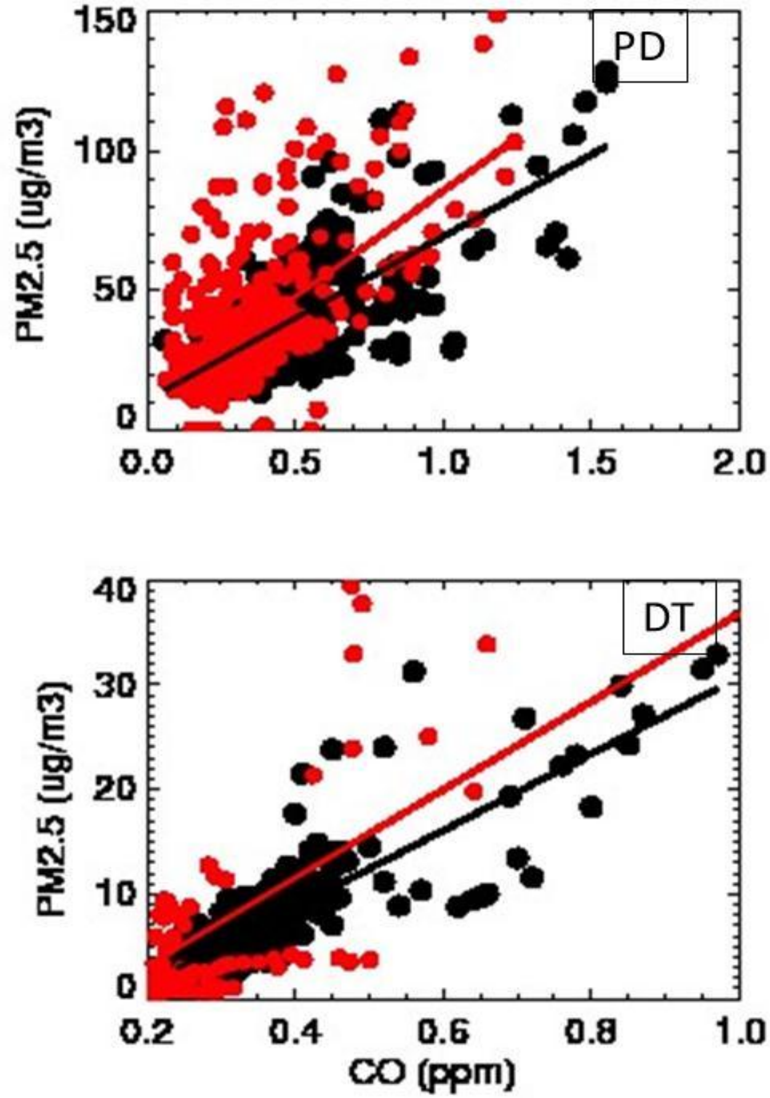

Figure 8. The measured (black dots) and calculated (red dots) correlation of CO-$PM_{2.5}$ at the PD (upper panel) and DT (lower panel) sites.

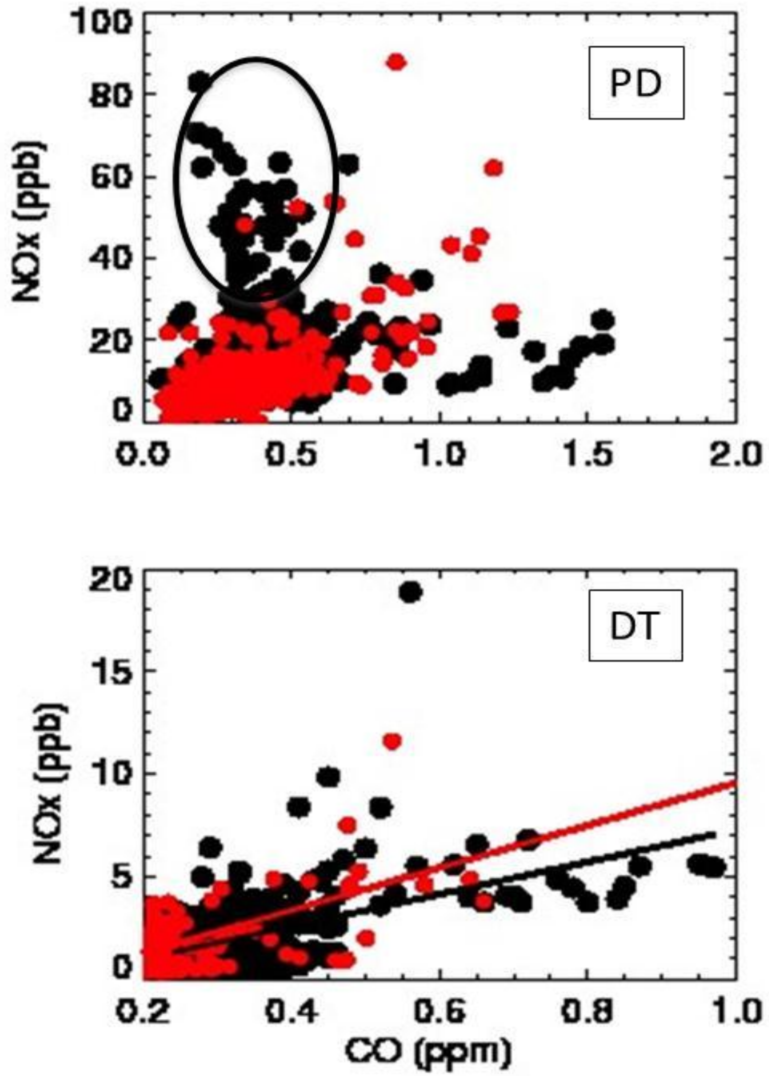

Figure 9. Same as Fig.8, except for the correlation of CO-NOx. The dashed circle in the upper panel indicates the local NOx pollution at the urban area of Shanghai (PD).

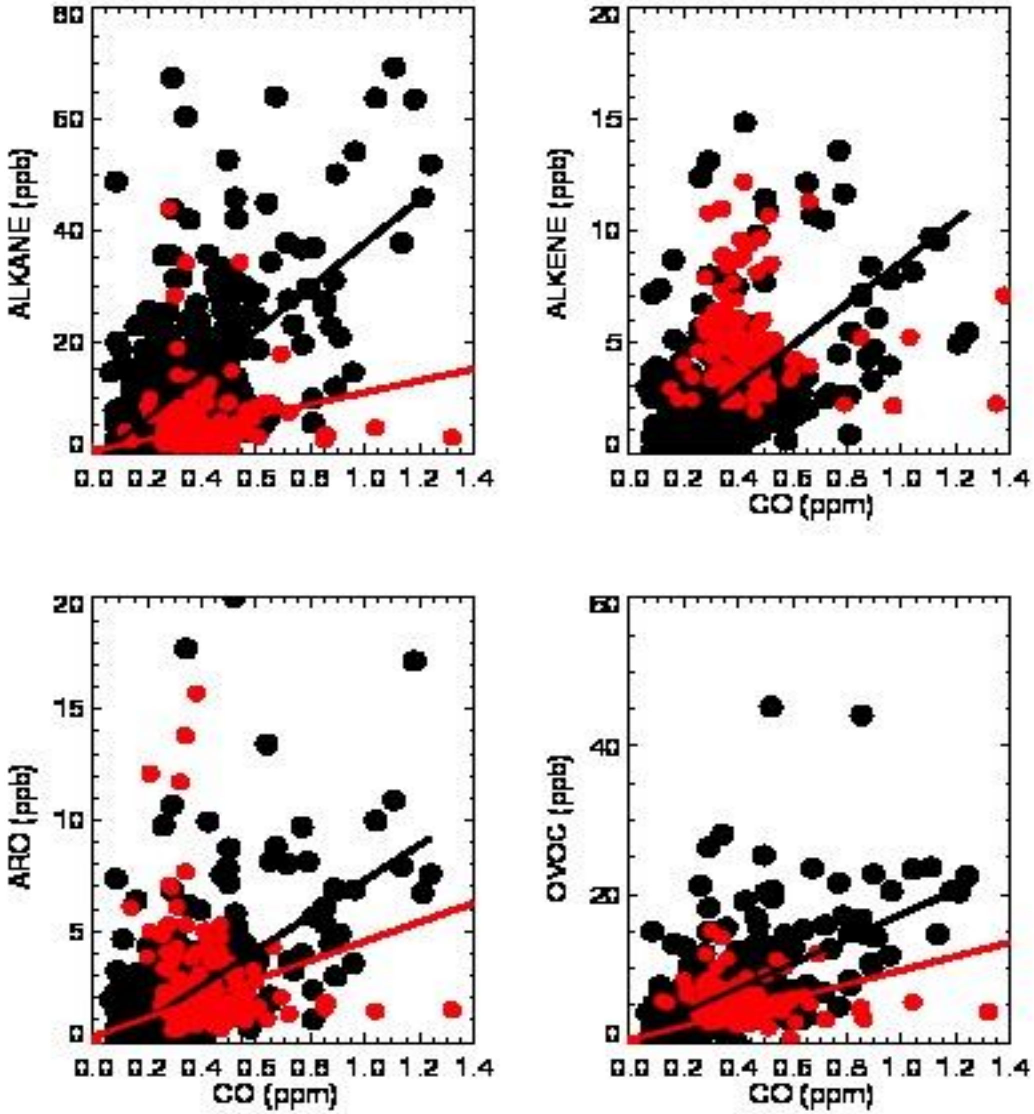

Figure 10. Same as Fig.8, except for the correlation of CO-VOCs.

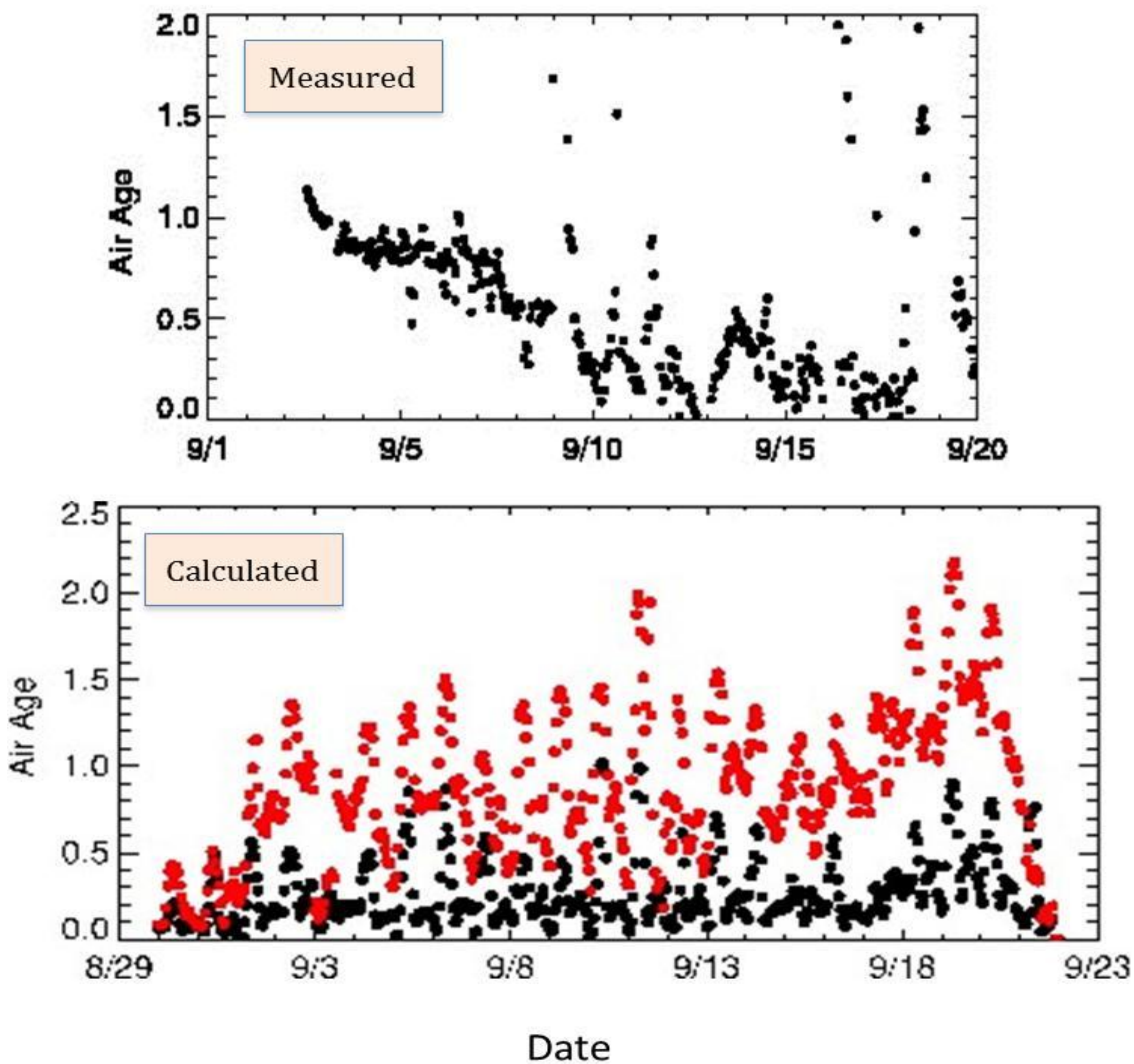

Figure 11. The measured (upper panel) and calculated (lower panel) chemical ages during the experiment. In the calculated ages, the black and red dots represent the ages at the PD and DT sites, respectively.

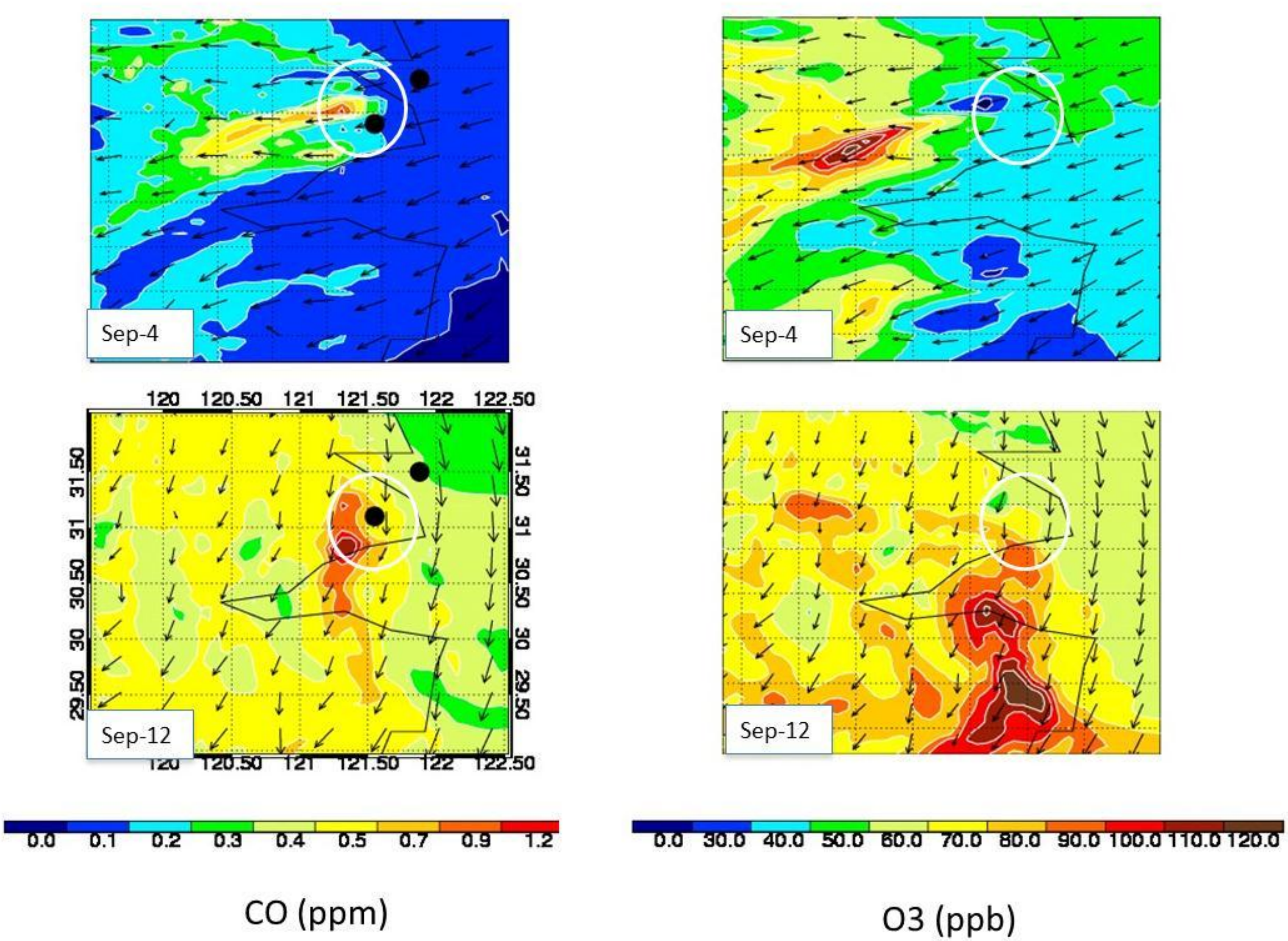

Figure 12. The calculated horizontal distribution of CO in different meteorological conditions. The upper panel shows a typical eastern wind condition in Sept-04, resulting ina lower CO concentrations in the Shanghai region. The lower panel shows a typical northern wind condition, producing higher CO concentration in the Shanghai region.

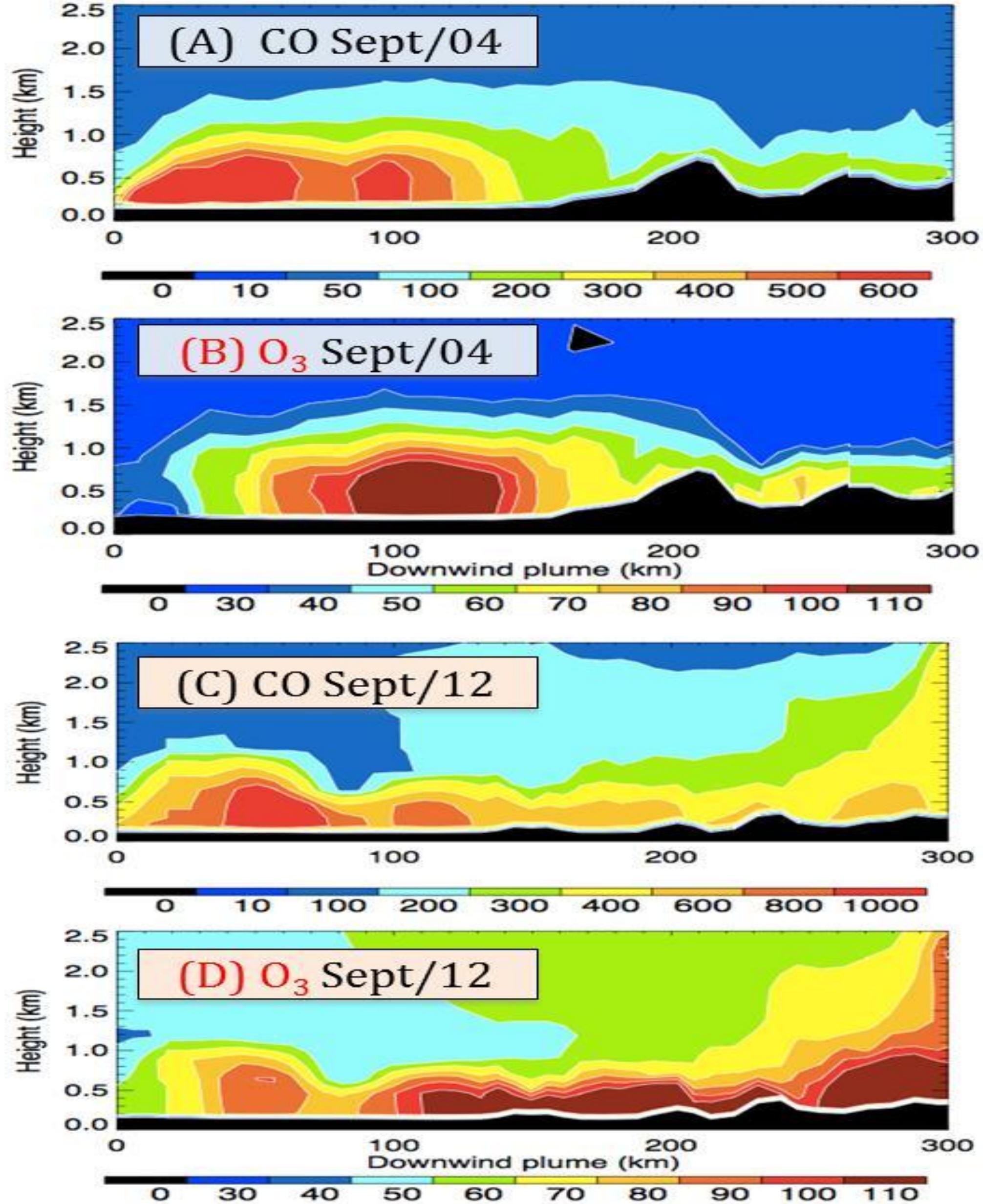

Figure 13. The calculated cross-section (altitude-downwind distances) of the city plumes of CO and O_3 on 04 Sept (clean period) and 12 Sept (polluted period), respectively.

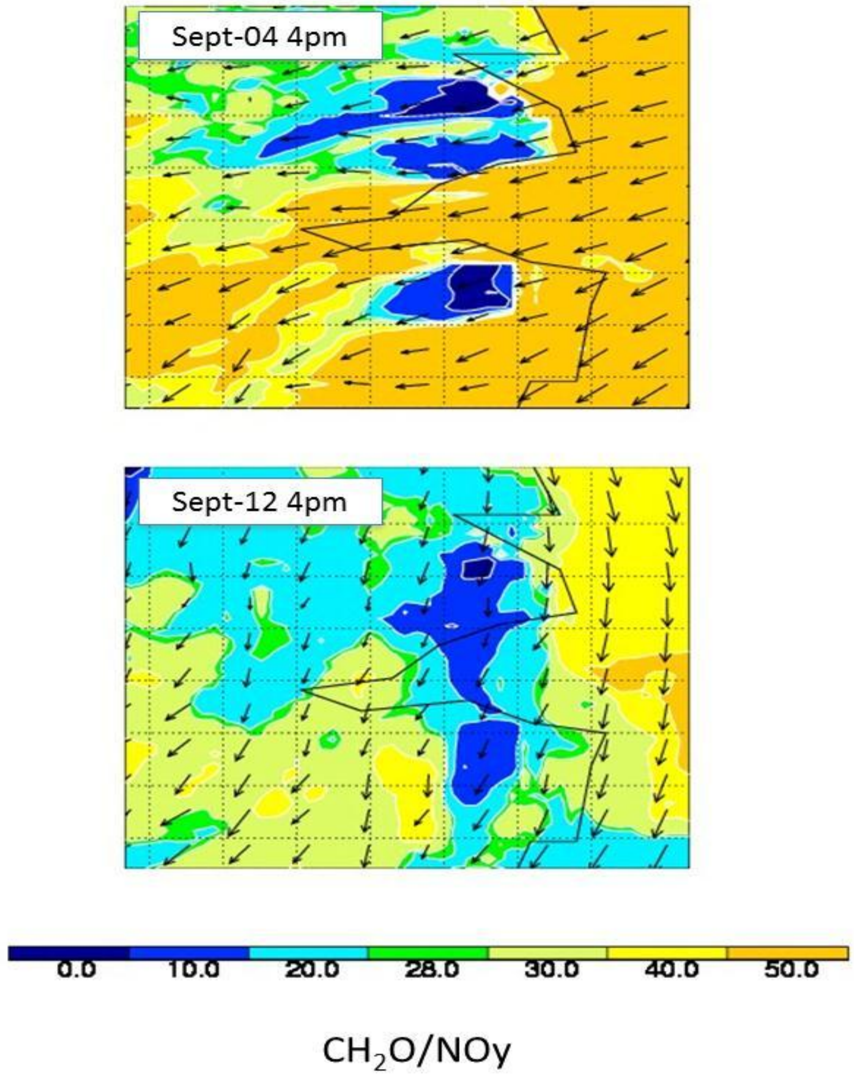

Figure 14. The calculated ratio of CH_2O/NOy on 04 Sept (clean period) and 12 Sept (polluted period), respectively. When the ratio is less than 0.28 (as indicated by the blue area), the area is under the VOC-limited condition for ozone formation, while a higher ratio indicates that the area is under the NOx-limited condition.

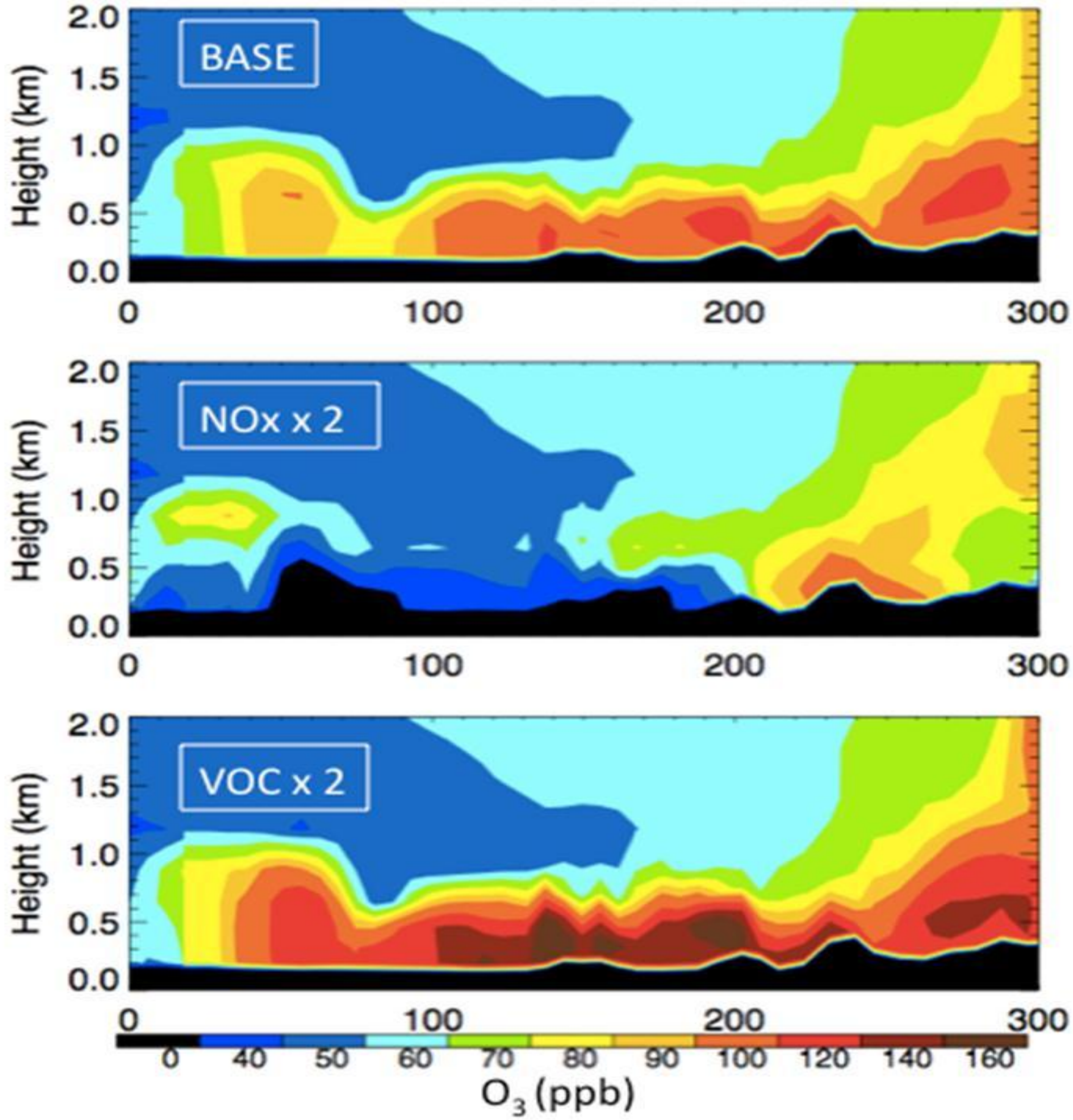

Figure 15. The calculated cross-section (altitude-downwind distances) of the city plumes of O_3 on 12 Sept, due to different emissions, such as the base model run (upper panel), doubled NOx emissions (midel panel), and doubled VOC emissions (lower panel).

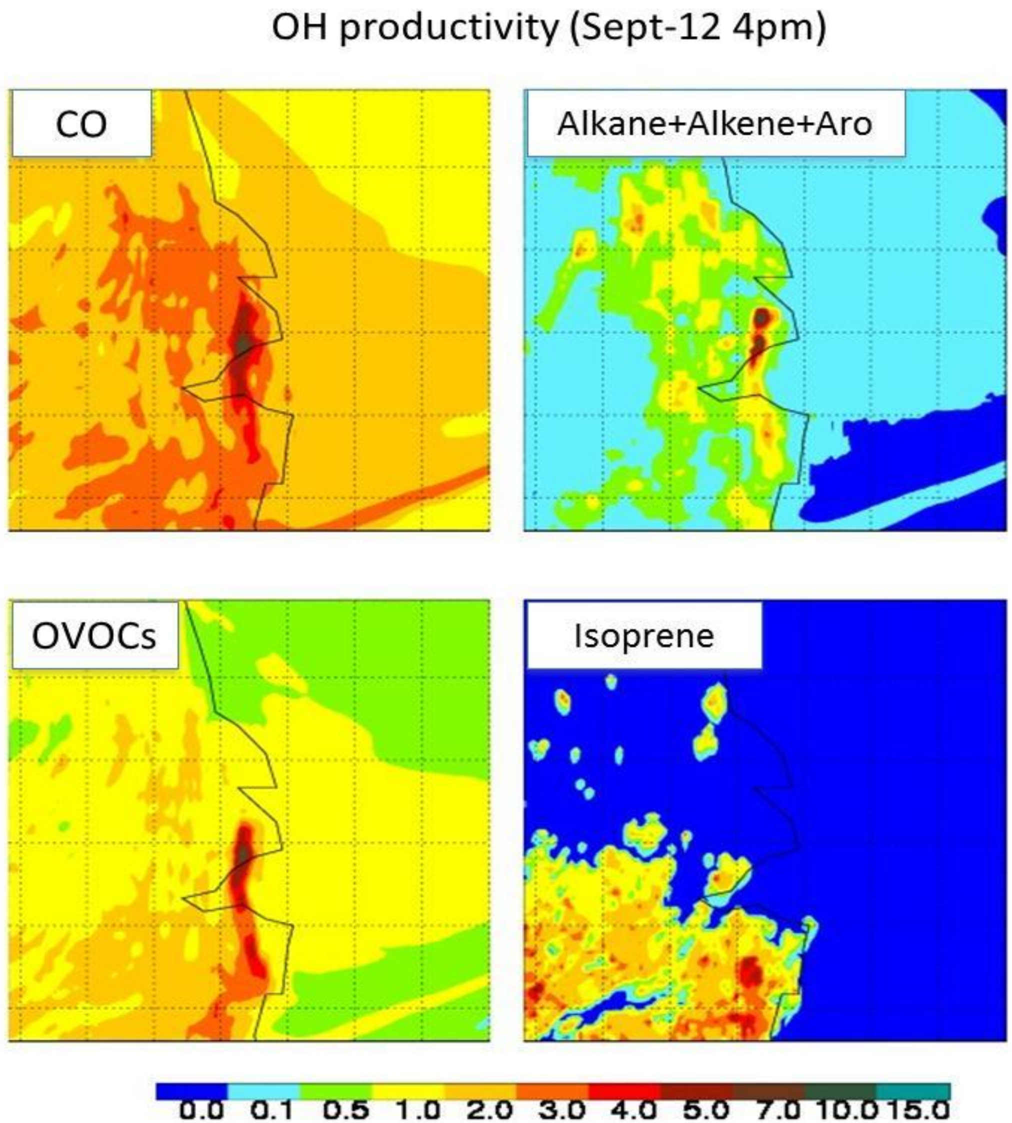

Figure 16. The calculated OH reactivity for different species in the Shanghai region, including CO, alkane+alkene+aromatics, OVOCs, and isoprene, respectively.

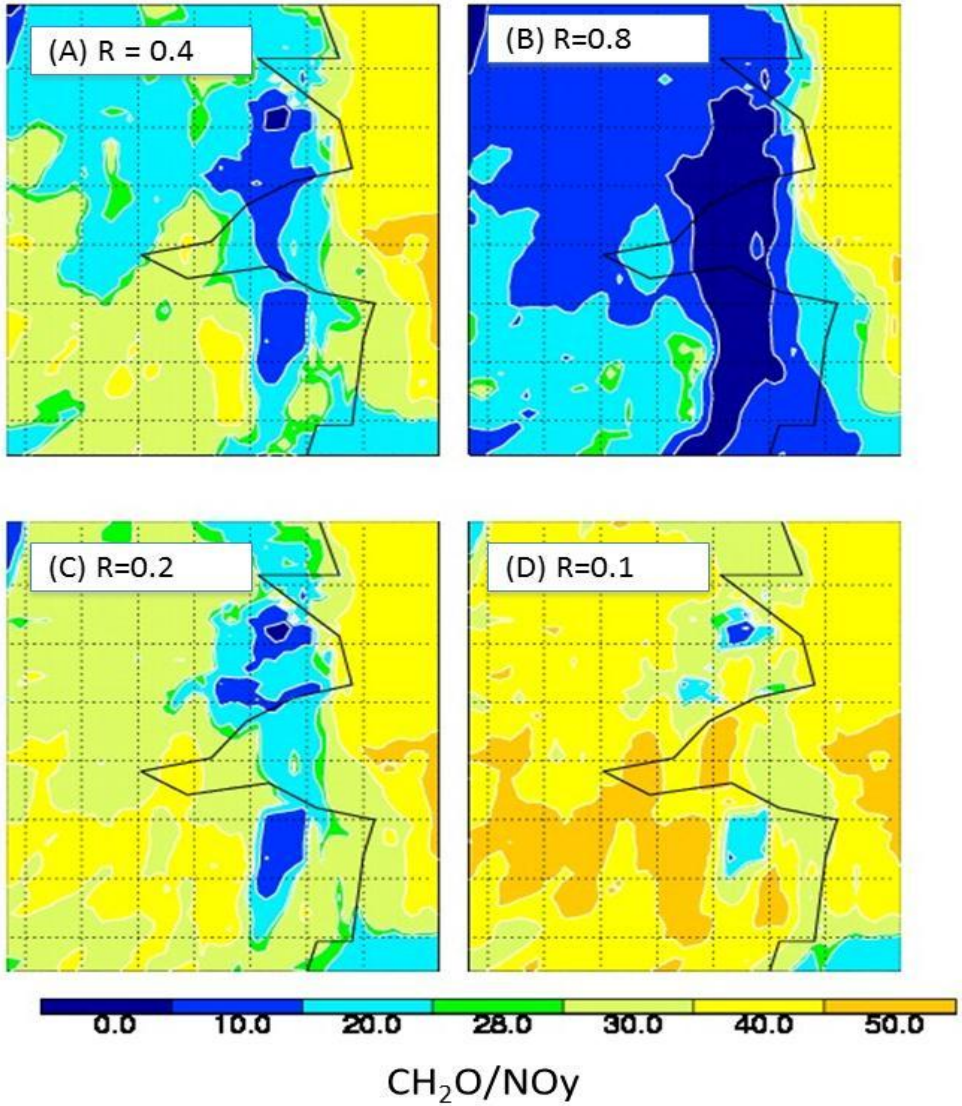

Figure 17. The calculated ratio of CH_2O/NOy on 12 Sept in the Shanghai region, with different emission ratios of NOx/VOCs in the model. The 4 panels represent different emission ratios, such as (A) with the ratio of 0.4, (B) with the ratio of 0.8, (C) with the ratio of 0.2, and (D) with the ratio of 0.1.