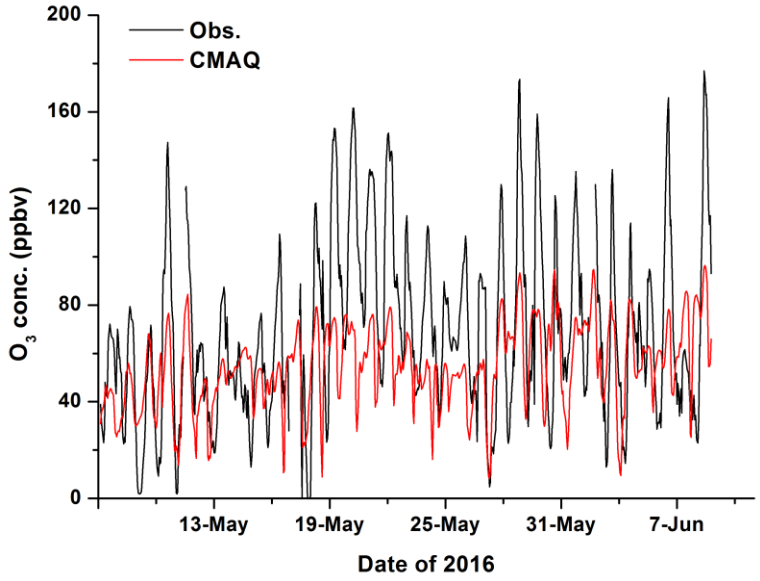
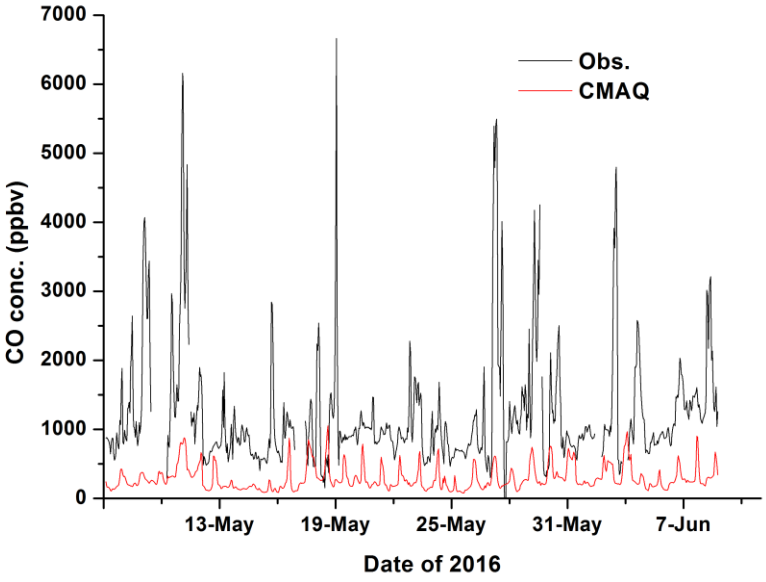
Supplementary Material

Figure S1. Comparison of surface hourly observations of air pollutants and CMAQ simulations at the Xingtai supersite from May to mid-June 2016. a) O_3, b) CO, c) NO_2^*, d) NO_x and e) HCHO. *Surface NO_2 is inferred as NO_x-NO from surface observations.

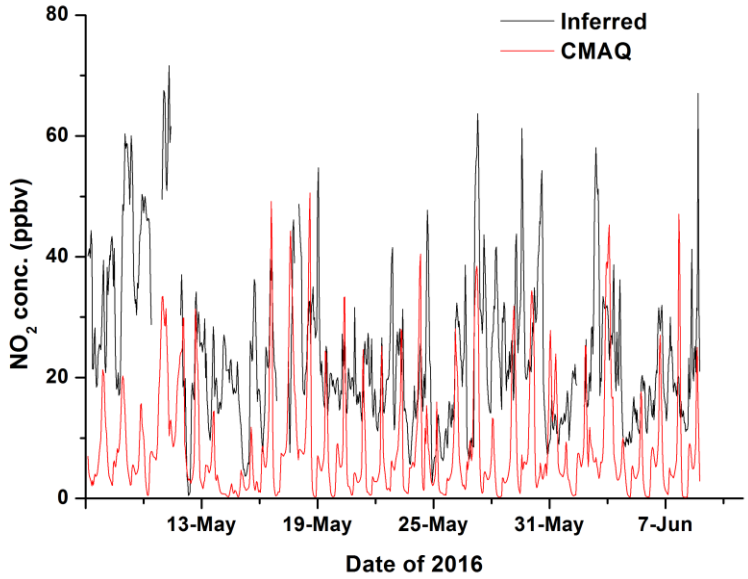
a)



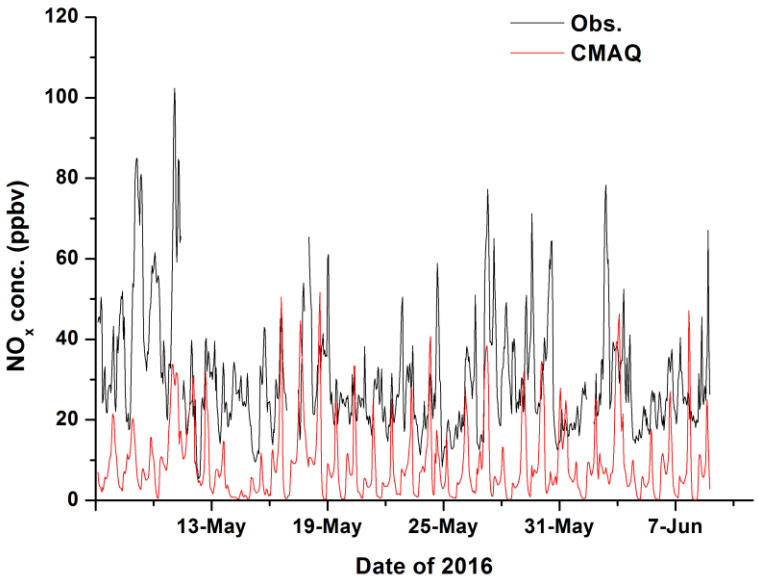
b)



c)


Inferred
CMAQ
NO2 conc. (ppbv)
0
20
40
60
80
13-May
19-May
25-May
31-May
7-Jun
Date of 2016

d)


Obs.
CMAQ
NOx conc. (ppbv)
0
20
40
60
80
100
120
13-May
19-May
25-May
31-May
7-Jun
Date of 2016

e)

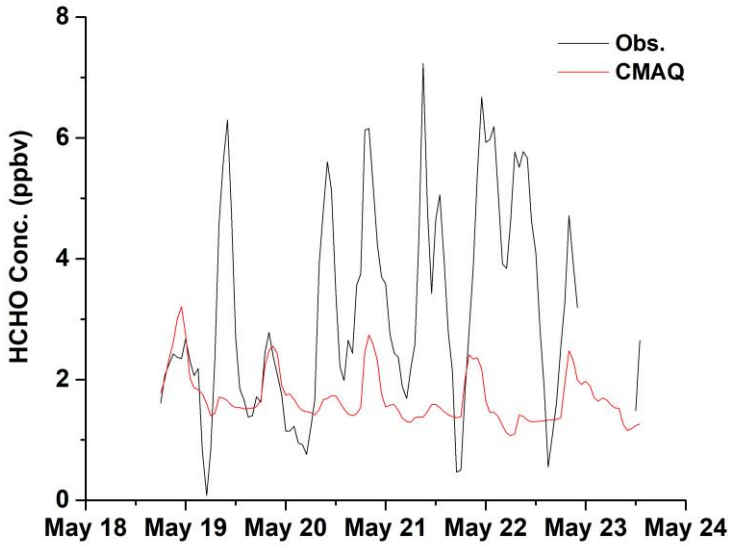


Figure S2. A case study comparing aircraft observations and the baseline CMAQ modeling results on June 11, 2016. Background: CMAQ simulations. Overlay: 1 min Y12 measurements. a) O_3, b) NO_2, c) NO, d) NO_y, e) CO.

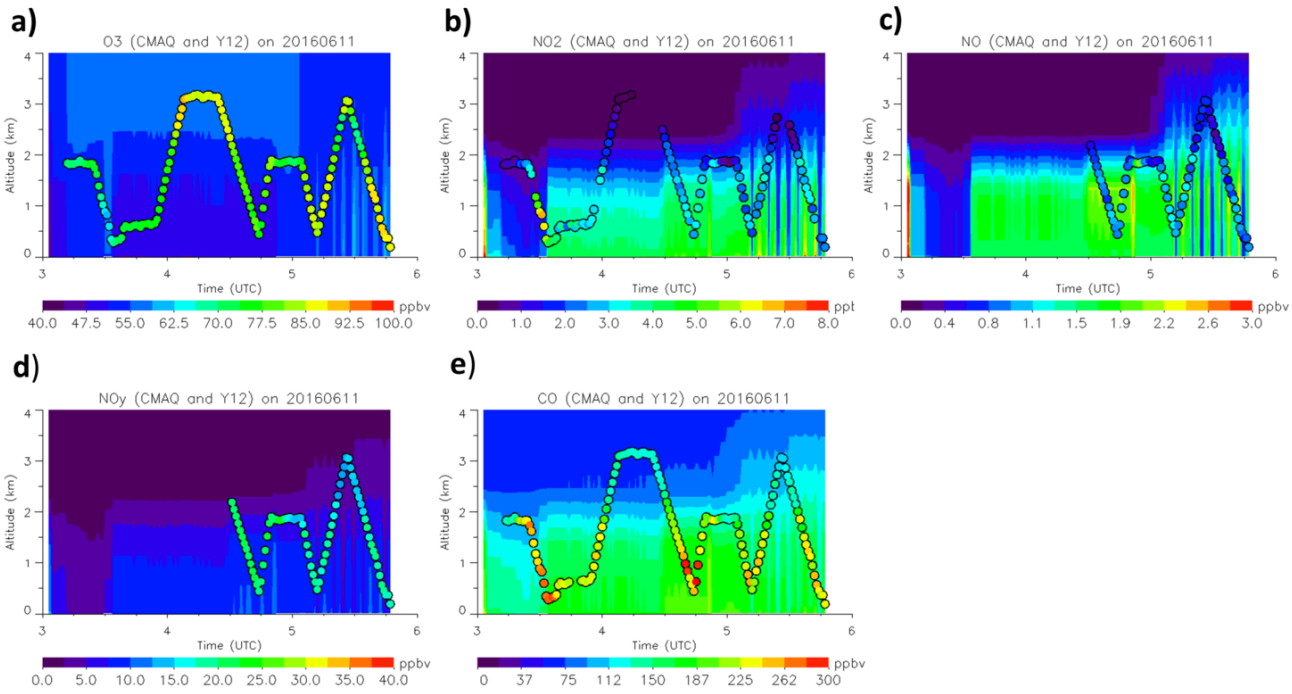
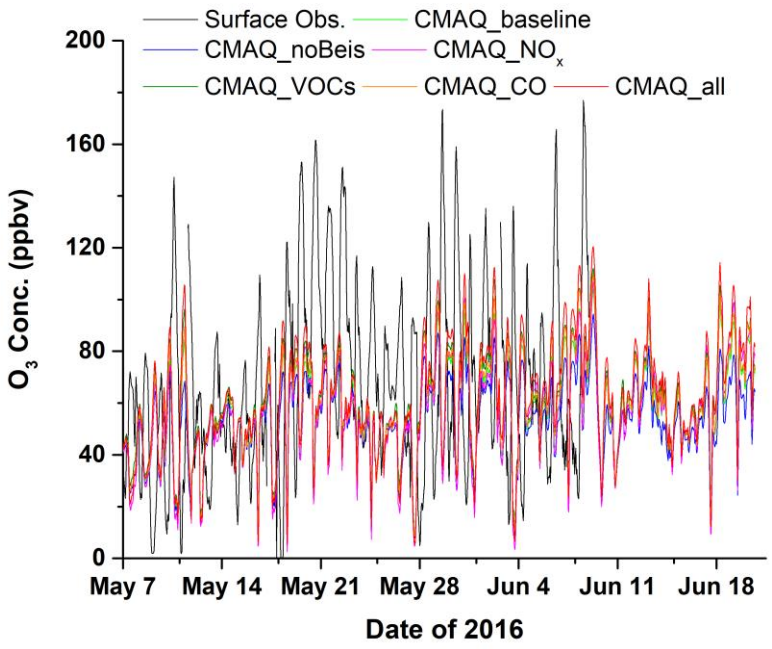
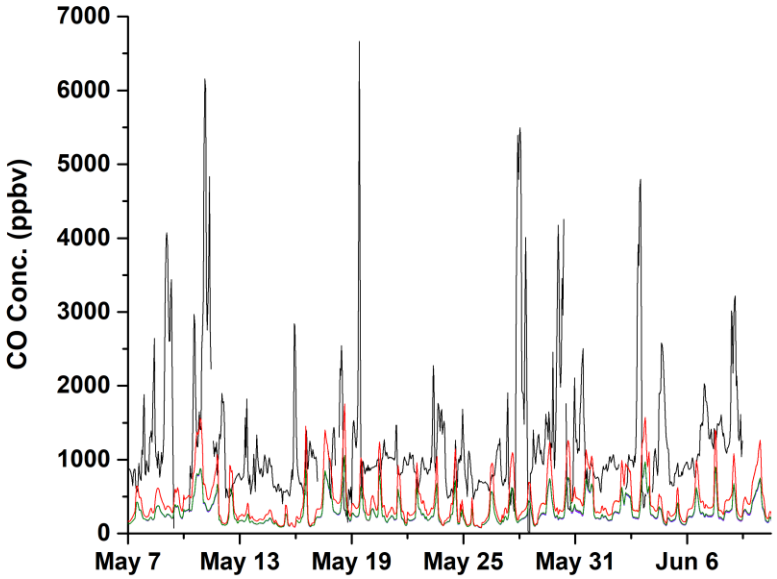


Figure S3. Comparison of surface hourly observations of air pollutants and six CMAQ simulations at the Xingtai supersite from May to mid-June 2016. a) O_3, b) CO, c) NO_2^*, d) NO_x, and e) HCHO. *Surface NO_2 is inferred as NO_x-NO from surface observations.

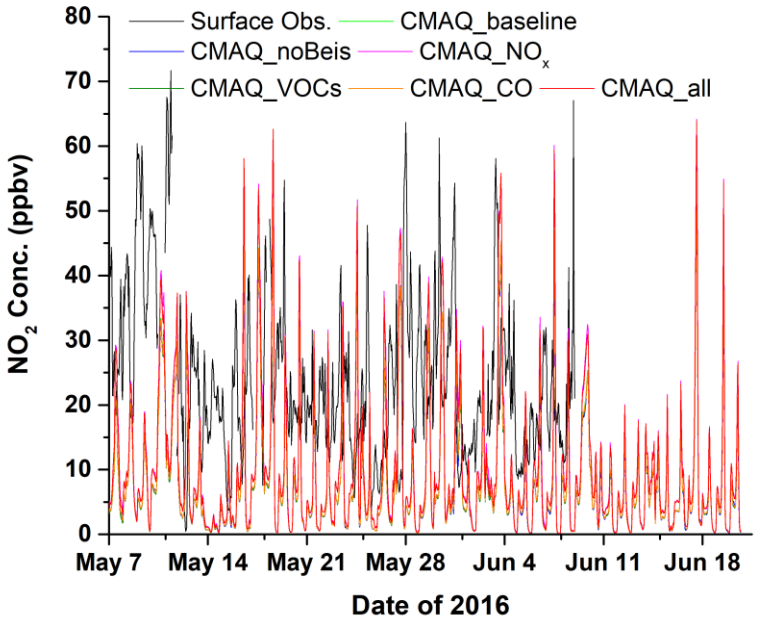
a)



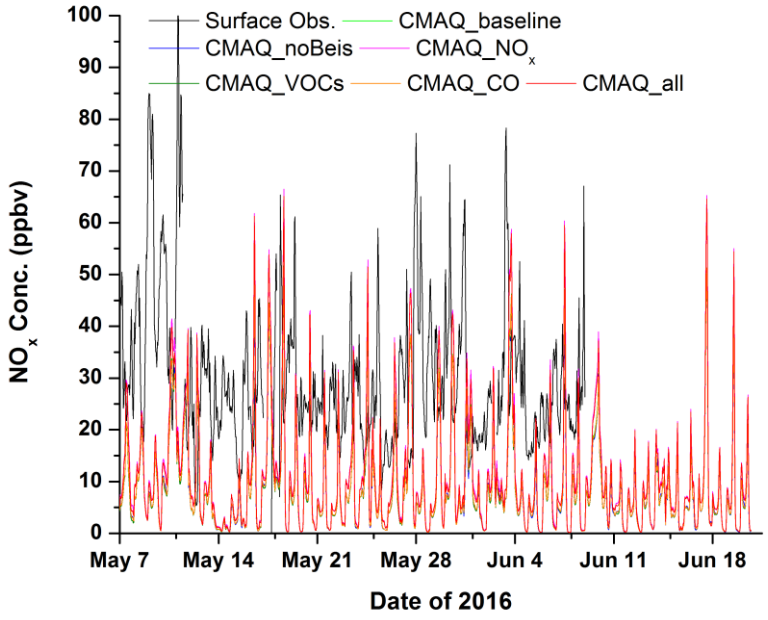
b)



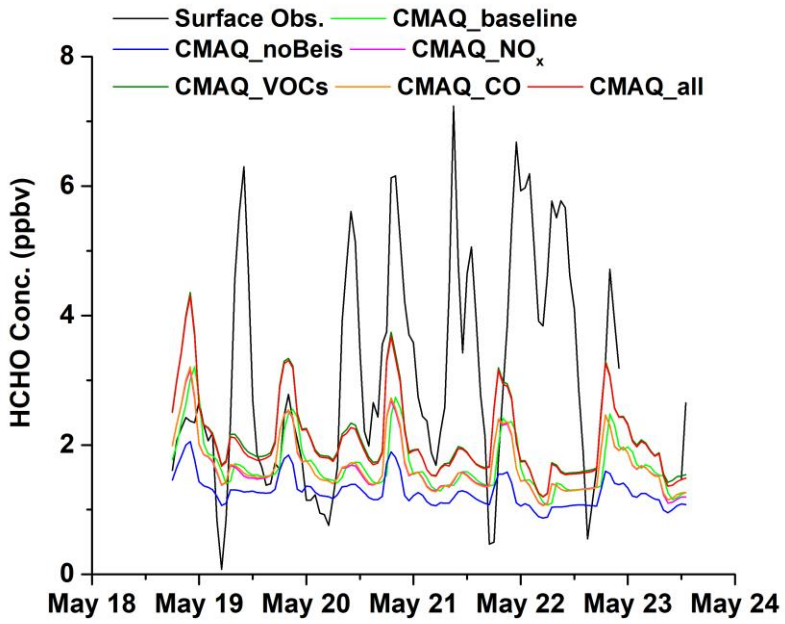
c)


Surface Obs.
CMAQ_baseline
CMAQ_noBeis
CMAQ_NOx
CMAQ_VOCs
CMAQ_CO
CMAQ_all
NO2 Conc. (ppbv)
0
10
20
30
40
50
60
70
80
May 7
May 14
May 21
May 28
Jun 4
Jun 11
Jun 18
Date of 2016

d)


Surface Obs.
CMAQ_baseline
CMAQ_noBeis
CMAQ_NOx
CMAQ_VOCs
CMAQ_CO
CMAQ_all
NOx Conc. (ppbv)
0
10
20
30
40
50
60
70
80
90
100
May 7
May 14
May 21
May 28
Jun 4
Jun 11
Jun 18
Date of 2016

e)


Surface Obs.
CMAQ_baseline
CMAQ_noBeis
CMAQ_NOx
CMAQ_VOCs
CMAQ_CO
CMAQ_all
HCHO Conc. (ppbv)
0
2
4
6
8
May 18
May 19
May 20
May 21
May 22
May 23
May 24