



Supplement of

An inversion of NO_x and non-methane volatile organic compound (NMVOC) emissions using satellite observations during the KORUS-AQ campaign and implications for surface ozone over East Asia

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Figure S1. A comparison of the impact of the reference correction on the amount of HCHO total columns (not corrected for shape factors and systematic biases). Daily and monthly denote that the OMPS HCHO vertical columns were computed using the daily and the monthly means (2004-2017) of the GEOS-Chem profiles, respectively. The difference is about 4% on average.



Figure S2. The comparison of the corrected GEOS-Chem model using DC8 observations during the KORUS-AQ campaign (left), and OMPS HCHO columns (corrected for shape factors) (right). The method is fully described in Zhu et al. [2016; 2020].



Figure S3. The sensitivity of tropospheric NO_2 columns to VOC emission estimated by CMAQ-DDM over May-June 2016 at 1:30 local time. The unit is molec.cm⁻².



Figure S4. Comparison of the simulated model using the prior/posterior emissions and DC-8 measurements in terms of NO_2 mixing ratios. We included all 10-secs observations available from DC-8 four-channel NCAR's chemiluminescence in May-June 2016. The profiles are the mean average.



Figure S5. Comparison of the simulated model using the prior/posterior emissions and DC-8 measurements in terms of isoprene. We included all 10-secs observations available from DC-8 in May-June 2016. The profiles are the mean average.



Figure S6. Comparison of the simulated model using the prior/posterior emissions and DC-8 measurements in terms of ethane. We included all 10-secs observations available from DC-8 in May-June 2016. The profiles are the mean average.



Figure S7. Comparison of the simulated model using the prior/posterior emissions and DC-8 measurements in terms of ethene. We included all 10-secs observations available from DC-8 in May-June 2016. The profiles are the mean average.



Figure S8. Comparison of the simulated model using the prior/posterior emissions and DC-8 measurements in terms of acetaldehyde. We included all 10-secs observations available from DC-8 in May-June 2016. The profiles are the mean average.



Figure S9. Comparison of the simulated model using the prior/posterior emissions and DC-8 measurements in terms of methanol. We included all 10-secs observations available from DC-8 in May-June 2016. The profiles are the mean average.



Figure S10. Comparison of the simulated model using the prior/posterior emissions and DC-8 measurements in terms of HCHO. We included all 10-secs observations available from DC-8 in May-June 2016. The profiles are the mean average.



Figure S11. The simulations of surface OH before and after the inversion at 1200-1600 CST.



Figure S12. The simulations of surface HO₂ before and after the inversion at 1200-1600 CST.