# A Regional Scale Modeling Analysis of Aerosol and Trace Gas Distributions over the Eastern Pacific during the INTEX–B Field Campaign

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(Supplemental Information)

Final version for Atmospheric Chemistry and Physics

15 Table S1. Summary statistics of DC-8 observations and STEM model predictions.
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| | Below 1 kilometer | | | | |
|---|---|---|---|---|---|
| | Observed | Obs. Std | Modeled | Mod. Std | R |
| Pressure (hPa) | 9.8E+02 | 2.9E+01 | 9.8E+02 | 2.9E+01 | 1.00 |
| Temperature (K) | 2.8E+02 | 7.2E+00 | 2.8E+02 | 7.2E+00 | 0.99 |
| Relative Humidity (%) | 7.4E+01 | 1.8E+01 | 8.4E+01 | 1.6E+01 | 0.86 |
| Wind Direction (Degs) | 1.8E+02 | 9.4E+01 | 1.7E+02 | 9.0E+01 | 0.71 |
| Wind Speed (m/s) | 8.4E+00 | 4.4E+00 | 8.3E+00 | 4.0E+00 | 0.70 |
| CO (ppbv) | 1.5E+02 | 1.6E+01 | 1.2E+02 | 1.9E+01 | 0.40 |
| Ethane (ppbv) | 1.4E+00 | 2.4E-01 | 1.0E+00 | 2.4E-01 | 0.63 |
| Ethene (ppbv) | 3.0E-02 | 9.1E-02 | 2.9E-02 | 7.1E-02 | 0.56 |
| Ethyne (ppbv) | 2.6E-01 | 8.4E-02 | 2.3E-01 | 9.5E-02 | 0.60 |
| Formaldehyde-NCAR (ppbv) | 3.6E-01 | 3.8E-01 | 3.0E-01 | 3.1E-01 | 0.90 |
| Formaldehyde-URI (ppbv) | 2.9E-01 | 4.3E-01 | 3.6E-01 | 4.0E-01 | 0.94 |
| $H_2O_2$-URI (ppbv) | 8.3E-01 | 5.3E-01 | 9.1E-01 | 5.9E-01 | 0.68 |
| $HNO_3$ (ppbv) | 1.6E-01 | 3.8E-01 | 3.2E-02 | 1.8E-01 | 0.15 |
| $HO_2$ (ppbv) | 1.2E-02 | 8.4E-03 | 6.6E-03 | 5.1E-03 | 0.54 |
| $NO_2$ (ppbv) | 1.6E-01 | 6.2E-01 | 2.5E-01 | 1.2E+00 | 0.45 |
| NOy (ppbv) | 4.6E-01 | 1.0E+00 | 1.1E+00 | 2.8E+00 | 0.71 |
| NO (ppbv) | 4.2E-02 | 3.2E-01 | 6.4E-02 | 4.1E-01 | 0.22 |
| OH (ppbv) | 7.3E-05 | 6.8E-05 | 6.8E-05 | 7.5E-05 | 0.55 |
| $O_3$ (ppbv) | 4.6E+01 | 7.3E+00 | 4.8E+01 | 7.1E+00 | 0.50 |
| PAN (ppbv) | 7.6E-02 | 1.7E-01 | 2.2E-01 | 1.4E-01 | 0.21 |
| Propane (ppbv) | 2.4E-01 | 1.0E-01 | 2.3E-01 | 1.0E-01 | 0.64 |
| $SO_2$ (ppbv) | 5.4E-01 | 8.9E-01 | 9.8E-02 | 5.4E-01 | 0.07 |
| UNH $Ca^{++}$(µg/m3 ) | 2.0E-01 | 2.0E-01 | 2.6E-01 | 3.0E-01 | -0.21 |
| UNH $K^+$ (µg/m3 ) | 7.4E-02 | 4.3E-02 | 1.0E+00 | 8.8E-01 | 0.06 |
| UNH $NH_4^+$ (µg/m3 ) | 2.9E-01 | 2.0E-01 | 1.1E-02 | 2.5E-02 | 0.14 |
| UNH $NO_3^-$ (µg/m3 ) | 2.8E-01 | 2.3E-01 | 2.4E-01 | 2.5E-01 | 0.35 |
| UNH $SO_4^{--}$(µg/m3 ) | 1.1E+00 | 7.0E-01 | 6.3E-01 | 1.6E+00 | -0.01 |
| $JO_3$ (1/s) | 1.7E-05 | 1.1E-05 | 9.5E-06 | 1.1E-05 | 0.43 |
| $JNO_2$ (1/s) | 6.7E-03 | 2.2E-03 | 4.5E-03 | 4.0E-03 | 0.18 |
| $JH_2O_2$ (1/s) | 4.6E-06 | 1.8E-06 | 3.1E-06 | 3.0E-06 | 0.22 |

17 Table S1 continued
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| | Between 1-3 kilometer | | | | |
|---|---|---|---|---|---|
| | Observed | Obs. Std | Modeled | Mod. Std | R |
| Pressure (hPa) | 8.0E+02 | 5.4E+01 | 8.0E+02 | 5.3E+01 | 1.00 |
| Temperature (K) | 2.8E+02 | 9.0E+00 | 2.8E+02 | 8.8E+00 | 0.99 |
| Relative Humidity (%) | 4.8E+01 | 3.2E+01 | 5.5E+01 | 2.5E+01 | 0.82 |
| Wind Direction (Degs) | 2.0E+02 | 9.3E+01 | 2.0E+02 | 9.3E+01 | 0.63 |
| Wind Speed (m/s) | 8.7E+00 | 6.2E+00 | 8.5E+00 | 5.5E+00 | 0.88 |
| CO (ppbv) | 1.4E+02 | 2.4E+01 | 1.2E+02 | 1.9E+01 | 0.61 |
| Ethane (ppbv) | 1.3E+00 | 3.4E-01 | 9.5E-01 | 2.6E-01 | 0.82 |
| Ethene (ppbv) | 1.4E-02 | 1.3E-02 | 1.5E-02 | 1.7E-02 | 0.44 |
| Ethyne (ppbv) | 2.2E-01 | 9.8E-02 | 2.3E-01 | 1.1E-01 | 0.71 |
| Formaldehyde-NCAR (ppbv) | 2.7E-01 | 2.6E-01 | 2.7E-01 | 2.0E-01 | 0.83 |
| Formaldehyde-URI (ppbv) | 2.5E-01 | 2.5E-01 | 2.8E-01 | 2.3E-01 | 0.89 |
| $H_2O_2$-URI (ppbv) | 8.3E-01 | 5.3E-01 | 9.1E-01 | 5.9E-01 | 0.68 |
| $HNO_3$ (ppbv) | 1.7E-01 | 1.4E-01 | 3.4E-02 | 6.1E-02 | 0.53 |
| $HO_2$ (ppbv) | 1.5E-02 | 9.3E-03 | 1.3E-02 | 7.1E-03 | 0.69 |
| $NO_2$ (ppbv) | 3.7E-02 | 8.8E-02 | 4.4E-02 | 1.4E-01 | 0.28 |
| NOy (ppbv) | 3.7E-01 | 2.5E-01 | 5.8E-01 | 4.3E-01 | 0.48 |
| NO (ppbv) | 1.7E-02 | 1.6E-02 | 2.5E-02 | 9.6E-02 | 0.27 |
| OH (ppbv) | 9.5E-05 | 8.3E-05 | 1.6E-04 | 1.4E-04 | 0.52 |
| $O_3$ (ppbv) | 5.4E+01 | 1.2E+01 | 5.2E+01 | 8.4E+00 | 0.56 |
| PAN (ppbv) | 1.1E-01 | 1.3E-01 | 2.7E-01 | 1.6E-01 | 0.48 |
| Propane (ppbv) | 1.9E-01 | 1.1E-01 | 2.0E-01 | 1.0E-01 | 0.82 |
| $SO_2$ (ppbv) | 1.1E-01 | 2.9E-01 | 4.1E-02 | 1.2E-01 | 0.02 |
| UNH $Ca^{++}$($\mu g/m^3$) | 2.4E-01 | 2.5E-01 | 9.7E-02 | 4.9E-02 | -0.23 |
| UNH $K^+$ ($\mu g/m^3$) | 4.7E-02 | 3.2E-02 | 3.4E-01 | 1.9E-01 | -0.24 |
| UNH $NH_4^+$ ($\mu g/m^3$) | 3.7E-01 | 2.7E-01 | 5.3E-03 | 1.1E-02 | 0.35 |
| UNH $NO_3^+$ ($\mu g/m^3$) | 1.9E-01 | 1.6E-01 | 2.5E-01 | 2.4E-01 | 0.13 |
| UNH $SO_4^+$($\mu g/m^3$) | 1.0E+00 | 1.1E+00 | 8.3E-01 | 6.5E-01 | 0.27 |
| $JO_3$ (1/s) | 2.3E-05 | 1.5E-05 | 2.4E-05 | 2.3E-05 | 0.75 |
| $JNO_2$ (1/s) | 9.1E-03 | 3.5E-03 | 1.1E-02 | 6.4E-03 | 0.41 |
| $JH_2O_2$ (1/s) | 6.4E-06 | 2.9E-06 | 7.7E-06 | 5.2E-06 | 0.56 |

19 Table S1 continued
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| | Between 3-6 kilometer | | | | |
|---|---|---|---|---|---|
| | Observed | Obs. Std | Modeled | Mod. Std | R |
| | | | | | |
| Pressure (hPa) | 5.8E+02 | 6.4E+01 | 5.9E+02 | 6.4E+01 | 0.99 |
| Temperature (K) | 2.6E+02 | 1.0E+01 | 2.6E+02 | 1.0E+01 | 0.99 |
| Relative Humidity (%) | 4.1E+01 | 3.2E+01 | 4.6E+01 | 2.6E+01 | 0.83 |
| Wind Direction (Degs) | 2.2E+02 | 9.1E+01 | 2.3E+02 | 8.2E+01 | 0.49 |
| Wind Speed (m/s) | 1.4E+01 | 8.6E+00 | 1.3E+01 | 8.5E+00 | 0.95 |
| CO (ppbv) | 1.4E+02 | 2.7E+01 | 1.2E+02 | 2.0E+01 | 0.46 |
| Ethane (ppbv) | 1.2E+00 | 3.6E-01 | 8.3E-01 | 2.6E-01 | 0.83 |
| Ethene (ppbv) | 2.1E-02 | 2.1E-02 | 9.1E-03 | 1.1E-02 | -0.18 |
| Ethyne (ppbv) | 2.2E-01 | 1.1E-01 | 2.1E-01 | 9.1E-02 | 0.64 |
| Formaldehyde-NCAR (ppbv) | 1.1E-01 | 1.0E-01 | 1.2E-01 | 8.3E-02 | 0.70 |
| Formaldehyde-URI (ppbv) | 1.2E-01 | 8.7E-02 | 1.4E-01 | 8.3E-02 | 0.74 |
| $H_2O_2$-URI (ppbv) | 8.8E-01 | 6.2E-01 | 7.1E-01 | 5.1E-01 | 0.69 |
| $HNO_3$ (ppbv) | 8.7E-02 | 1.2E-01 | 2.9E-02 | 4.0E-02 | 0.23 |
| $HO_2$ (ppbv) | 1.4E-02 | 8.3E-03 | 1.1E-02 | 6.5E-03 | 0.77 |
| $NO_2$ (ppbv) | 1.6E-02 | 2.3E-02 | 9.3E-03 | 1.4E-02 | 0.39 |
| NOy (ppbv) | 4.0E-01 | 2.3E-01 | 6.2E-01 | 2.7E-01 | 0.22 |
| NO (ppbv) | 1.4E-02 | 1.1E-02 | 3.8E-03 | 5.0E-03 | 0.18 |
| OH (ppbv) | 1.2E-04 | 9.2E-05 | 1.1E-04 | 1.1E-04 | 0.69 |
| $O_3$ (ppbv) | 6.4E+01 | 1.5E+01 | 6.4E+01 | 1.5E+01 | 0.54 |
| PAN (ppbv) | 1.9E-01 | 2.2E-01 | 3.4E-01 | 1.7E-01 | 0.33 |
| Propane (ppbv) | 1.7E-01 | 1.0E-01 | 1.9E-01 | 8.9E-02 | 0.76 |
| $SO_2$ (ppbv) | 7.3E-02 | 1.1E-01 | 1.8E-02 | 2.3E-02 | 0.11 |
| UNH $Ca^{++}$ ($\mu g/m^3$) | 4.0E-01 | 4.7E-01 | 5.2E-02 | 3.7E-02 | 0.28 |
| UNH $K^+$ ($\mu g/m^3$) | 5.0E-02 | 3.5E-02 | 1.1E-01 | 1.2E-01 | 0.09 |
| UNH $NH_4^+$ ($\mu g/m^3$) | 3.2E-01 | 2.2E-01 | 5.1E-03 | 6.7E-03 | 0.19 |
| UNH $NO_3^-$ ($\mu g/m^3$) | 2.7E-01 | 2.6E-01 | 7.4E-02 | 7.5E-02 | 0.10 |
| UNH $SO_4^{--}$($\mu g/m^3$) | 8.8E-01 | 6.8E-01 | 5.5E-01 | 6.1E-01 | 0.21 |
| $JO_3$ (1/s) | 2.8E-05 | 1.8E-05 | 2.5E-05 | 2.1E-05 | 0.79 |
| $JNO_2$ (1/s) | 1.2E-02 | 3.9E-03 | 1.3E-02 | 6.3E-03 | 0.51 |
| $JH_2O_2$ (1/s) | 8.1E-06 | 3.3E-06 | 8.6E-06 | 4.9E-06 | 0.64 |

Table S1 continued

| | Between 6 - 10 kilometer | | | | |
|---|---|---|---|---|---|
| | Observed | Obs. Std | Modeled | Mod. Std | R |
| Pressure (hPa) | 3.6E+02 | 6.8E+01 | 3.7E+02 | 6.3E+01 | 0.99 |
| Temperature (K) | 2.4E+02 | 1.2E+01 | 2.4E+02 | 1.1E+01 | 0.99 |
| Relative Humidity (%) | 5.0E+01 | 3.4E+01 | 4.3E+01 | 2.0E+01 | 0.69 |
| Wind Direction (Degs) | 2.5E+02 | 6.8E+01 | 2.5E+02 | 6.8E+01 | 0.78 |
| Wind Speed (m/s) | 2.5E+01 | 1.5E+01 | 2.3E+01 | 1.3E+01 | 0.96 |
| CO (ppbv) | 1.2E+02 | 3.3E+01 | 1.2E+02 | 1.7E+01 | 0.39 |
| Ethane (ppbv) | 8.8E-01 | 3.2E-01 | 5.1E-01 | 2.2E-01 | 0.59 |
| Ethene (ppbv) | 1.4E-02 | 1.1E-02 | 1.0E-02 | 8.4E-03 | -0.04 |
| Ethyne (ppbv) | 1.8E-01 | 1.0E-01 | 1.5E-01 | 7.0E-02 | 0.39 |
| Formaldehyde-NCAR (ppbv) | 4.8E-02 | 5.4E-02 | 5.3E-02 | 2.8E-02 | 0.34 |
| Formaldehyde-URI (ppbv) | 9.1E-02 | 4.5E-02 | 5.9E-02 | 2.9E-02 | 0.20 |
| $H_2O_2$-URI (ppbv) | 5.6E-01 | 4.2E-01 | 4.1E-01 | 3.1E-01 | 0.51 |
| $HNO_3$ (ppbv) | 1.5E-01 | 3.4E-01 | 4.0E-02 | 4.1E-02 | 0.66 |
| $HO_2$ (ppbv) | 1.1E-02 | 6.9E-03 | 9.0E-03 | 4.7E-03 | 0.79 |
| NO2 (ppbv) | 3.1E-02 | 3.7E-02 | 2.6E-03 | 2.1E-03 | 0.28 |
| NOy (ppbv) | 4.7E-01 | 3.2E-01 | 5.8E-01 | 2.0E-01 | 0.23 |
| NO (ppbv) | 2.4E-02 | 2.2E-02 | 3.0E-03 | 2.7E-03 | 0.46 |
| OH (ppbv) | 1.5E-04 | 9.6E-05 | 8.8E-05 | 5.9E-05 | 0.73 |
| $O_3$ (ppbv) | 1.1E+02 | 1.0E+02 | 8.6E+01 | 3.1E+01 | 0.69 |
| PAN (ppbv) | 1.6E-01 | 1.4E-01 | 3.4E-01 | 1.2E-01 | 0.25 |
| Propane (ppbv) | 1.2E-01 | 8.8E-02 | 1.3E-01 | 6.6E-02 | 0.59 |
| $SO_2$ (ppbv) | 3.9E-02 | 4.9E-02 | 1.6E-02 | 1.9E-02 | -0.01 |
| UNH $Ca^{++}$ ($\mu g/m^3$) | 2.0E-01 | 2.4E-01 | 2.7E-02 | 2.4E-02 | 0.03 |
| UNH $K^+$ ($\mu g/m^3$) | 3.1E-02 | 2.1E-02 | 2.0E-02 | 1.9E-02 | -0.14 |
| UNH $NH_4^+$ ($\mu g/m^3$) | 2.1E-01 | 1.2E-01 | 3.5E-03 | 2.7E-03 | -0.07 |
| UNH $NO_3^-$ ($\mu g/m^3$) | 1.6E-01 | 1.8E-01 | 3.6E-02 | 5.5E-02 | -0.21 |
| UNH $SO_4^{--}$($\mu g/m^3$) | 5.0E-01 | 3.1E-01 | 3.3E-01 | 3.8E-01 | -0.22 |
| $JO_3$ (1/s) | 3.0E-05 | 1.9E-05 | 2.3E-05 | 1.9E-05 | 0.74 |
| $JNO_2$ (1/s) | 1.2E-02 | 4.2E-03 | 1.3E-02 | 6.7E-03 | 0.48 |
| $JH_2O_2$ (1/s) | 8.6E-06 | 3.4E-06 | 8.5E-06 | 4.8E-06 | 0.60 |

Table S2. Summary statistics of C-130 observations and STEM model predictions.

| | Below 1 kilometer | | | | |
|---|---|---|---|---|---|
| | Observed | Obs. Std | Modeled | Mod. Std | R |
| Pressure (hpa) | 9.5E+02 | 2.7E+01 | 9.5E+02 | 2.8E+01 | 0.96 |
| Temperature (K) | 2.8E+02 | 7.0E+00 | 2.8E+02 | 6.3E+00 | 0.97 |
| RH (%) | 5.3E+01 | 2.9E+01 | 6.0E+01 | 2.4E+01 | 0.85 |
| Wind direction (Degs) | 2.3E+02 | 1.2E+02 | 2.2E+02 | 1.2E+02 | 0.51 |
| Wind speed (m/s) | 7.3E+00 | 4.9E+00 | 7.3E+00 | 4.1E+00 | 0.64 |
| CO (ppbv) | 1.5E+02 | 2.2E+01 | 1.4E+02 | 2.5E+01 | 0.48 |
| Ethene (ppbv) | 8.5E-02 | 1.3E-01 | 7.0E-02 | 8.5E-02 | 0.31 |
| Ethyne (ppbv) | 3.0E-01 | 1.0E-01 | 3.2E-01 | 1.4E-01 | 0.62 |
| $H_2O_2$ (ppbv) | 6.5E-01 | 4.5E-01 | 9.0E-01 | 4.9E-01 | 0.62 |
| $H_2SO_4$ (ppbv) | 4.8E-04 | 4.5E-04 | 4.5E-04 | 6.8E-04 | 0.10 |
| $HNO_3$ (ppbv) | 2.6E-01 | 2.4E-01 | 1.8E-01 | 4.9E-01 | 0.49 |
| $HO_2$ (ppbv) | 2.0E-02 | 1.3E-02 | 1.1E-02 | 5.8E-03 | 0.29 |
| $NO_2$ (ppbv) | 6.5E-01 | 1.2E+00 | 6.8E-01 | 1.5E+00 | 0.45 |
| NOy (ppbv) | 1.8E+00 | 2.4E+00 | 1.9E+00 | 2.5E+00 | 0.53 |
| NO (ppbv) | 2.1E-01 | 4.6E-01 | 2.4E-01 | 5.7E-01 | 0.45 |
| OH (ppbv) | 2.7E-04 | 1.9E-04 | 1.3E-04 | 7.4E-05 | 0.06 |
| Ozone (ppbv) | 5.7E+01 | 1.1E+01 | 5.8E+01 | 9.9E+00 | 0.44 |
| PAN (ppbv) | 2.7E-01 | 2.6E-01 | 3.6E-01 | 2.3E-01 | 0.57 |
| Propane (ppbv) | 3.8E-01 | 2.0E-01 | 2.8E-01 | 1.3E-01 | 0.57 |
| $SO_2$ (ppbv) | 2.3E-01 | 5.3E-01 | 1.1E-01 | 2.5E-01 | 0.26 |
| AMS $SO_4^{--}$ ($\mu g/m^3$) | 7.4E-01 | 4.3E-01 | 5.8E-01 | 4.9E-01 | 0.43 |
| AMS $NO_3^-$ ($\mu g/m^3$) | 1.3E-01 | 2.9E-01 | 7.2E-01 | 1.3E+00 | 0.55 |
| AMS OM converted to OC ($\mu g/m^3$) | 7.1E-01 | 9.8E-01 | 3.5E-01 | 2.0E-01 | 0.68 |
| $JO_3$ (1/s) | 2.4E-05 | 8.9E-06 | 2.6E-05 | 1.5E-05 | 0.57 |
| $JNO_2$ (1/s) | 8.2E-03 | 2.4E-03 | 9.5E-03 | 4.9E-03 | 0.25 |
| $JH_2O_2$ (1/s) | 5.8E-06 | 1.8E-06 | 7.1E-06 | 3.8E-06 | 0.33 |

Table S2 continued

| | Between 1-3 kilometer | | | | |
|---|---|---|---|---|---|
| | Observed | Obs. Std | Modeled | Mod. Std | R |
| Pressure (hpa) | 8.0E+02 | 5.6E+01 | 8.0E+02 | 5.6E+01 | 0.99 |
| Temperature (K) | 2.8E+02 | 6.6E+00 | 2.7E+02 | 5.9E+00 | 0.98 |
| RH (%) | 4.2E+01 | 3.1E+01 | 4.8E+01 | 2.6E+01 | 0.80 |
| Wind direction (Degs) | 2.3E+02 | 1.0E+02 | 2.5E+02 | 9.5E+01 | 0.69 |
| Wind speed (m/s) | 7.8E+00 | 4.9E+00 | 8.1E+00 | 4.4E+00 | 0.76 |
| CO (ppbv) | 1.4E+02 | 2.5E+01 | 1.4E+02 | 1.8E+01 | 0.23 |
| Ethene (ppbv) | 4.0E-02 | 4.7E-02 | 4.2E-02 | 4.4E-02 | 0.27 |
| Ethyne (ppbv) | 2.7E-01 | 1.1E-01 | 3.0E-01 | 1.2E-01 | 0.49 |
| $H_2O_2$ (ppbv) | 7.6E-01 | 5.7E-01 | 7.7E-01 | 5.3E-01 | 0.74 |
| $H_2SO_4$ (ppbv) | 2.5E-04 | 2.5E-04 | 7.1E-04 | 1.6E-03 | -0.02 |
| $HNO_3$ (ppbv) | 1.4E-01 | 1.2E-01 | 8.6E-02 | 3.4E-01 | 0.34 |
| $HO_2$ (ppbv) | 1.7E-02 | 1.3E-02 | 1.2E-02 | 5.7E-03 | 0.37 |
| $NO_2$ (ppbv) | 1.2E-01 | 3.9E-01 | 3.2E-01 | 8.5E-01 | 0.26 |
| NOy (ppbv) | 6.5E-01 | 8.7E-01 | 1.3E+00 | 1.7E+00 | 0.28 |
| NO (ppbv) | 5.0E-02 | 1.6E-01 | 1.4E-01 | 3.6E-01 | 0.22 |
| OH (ppbv) | 1.5E-04 | 1.7E-04 | 1.4E-04 | 9.5E-05 | 0.19 |
| Ozone (ppbv) | 6.2E+01 | 1.5E+01 | 5.8E+01 | 8.5E+00 | 0.47 |
| PAN (ppbv) | 2.3E-01 | 1.6E-01 | 3.6E-01 | 1.8E-01 | 0.34 |
| Propane (ppbv) | 3.6E-01 | 1.9E-01 | 2.7E-01 | 1.1E-01 | 0.47 |
| $SO_2$ (ppbv) | 1.1E-01 | 1.7E-01 | 1.2E-01 | 3.0E-01 | 0.35 |
| AMS $SO_4^{--}$ ($\mu g/m^3$) | 8.8E-01 | 8.0E-01 | 4.9E-01 | 4.6E-01 | 0.26 |
| AMS $NO_3^-$ ($\mu g/m^3$) | 5.9E-02 | 1.1E-01 | 4.8E-01 | 8.8E-01 | 0.09 |
| AMS OM converted to OC ($\mu g/m^3$) | 4.8E-01 | 6.4E-01 | 3.0E-01 | 1.4E-01 | 0.32 |
| $JO_3$ (1/s) | 2.4E-05 | 1.2E-05 | 2.8E-05 | 2.1E-05 | 0.80 |
| $JNO_2$ (1/s) | 9.4E-03 | 2.6E-03 | 1.1E-02 | 6.5E-03 | 0.54 |
| $JH_2O_2$ (1/s) | 6.4E-06 | 2.1E-06 | 8.3E-06 | 5.2E-06 | 0.66 |

Table S2 continued

| | Between 3-6 kilometer | | | | |
|---|---|---|---|---|---|
| | Observed | Obs. Std | Modeled | Mod. Std | R |
| Pressure (hpa) | 5.8E+02 | 6.7E+01 | 5.9E+02 | 6.8E+01 | 0.99 |
| Temperature (K) | 2.6E+02 | 7.5E+00 | 2.6E+02 | 6.9E+00 | 0.98 |
| RH (%) | 3.5E+01 | 2.9E+01 | 4.1E+01 | 2.6E+01 | 0.80 |
| Wind direction (Degs) | 2.6E+02 | 8.2E+01 | 2.5E+02 | 8.9E+01 | 0.83 |
| Wind speed (m/s) | 1.6E+01 | 8.6E+00 | 1.5E+01 | 7.7E+00 | 0.93 |
| CO (ppbv) | 1.3E+02 | 2.8E+01 | 1.2E+02 | 1.5E+01 | 0.43 |
| Ethene (ppbv) | 1.5E-02 | 1.8E-02 | 1.2E-02 | 1.1E-02 | 0.07 |
| Ethyne (ppbv) | 2.2E-01 | 1.2E-01 | 2.3E-01 | 8.6E-02 | 0.61 |
| $H_2O_2$ (ppbv) | 8.1E-01 | 4.3E-01 | 6.0E-01 | 4.7E-01 | 0.72 |
| $H_2SO_4$ (ppbv) | 1.4E-04 | 1.3E-04 | 4.1E-04 | 9.0E-04 | 0.19 |
| $HNO_3$ (ppbv) | 9.4E-02 | 9.4E-02 | 2.4E-02 | 5.6E-02 | 0.08 |
| $HO_2$ (ppbv) | 1.6E-02 | 1.1E-02 | 1.1E-02 | 4.9E-03 | 0.58 |
| $NO_2$ (ppbv) | 2.6E-02 | 3.8E-02 | 1.2E-02 | 4.2E-02 | 0.38 |
| NOy (ppbv) | 3.7E-01 | 2.7E-01 | 6.2E-01 | 2.9E-01 | 0.38 |
| NO (ppbv) | 1.2E-02 | 2.2E-02 | 7.2E-03 | 2.3E-02 | 0.17 |
| OH (ppbv) | 1.4E-04 | 1.0E-04 | 1.1E-04 | 7.5E-05 | 0.47 |
| Ozone (ppbv) | 6.7E+01 | 1.8E+01 | 6.4E+01 | 1.3E+01 | 0.60 |
| PAN (ppbv) | 2.2E-01 | 1.3E-01 | 3.5E-01 | 1.4E-01 | 0.39 |
| Propane (ppbv) | 3.6E-01 | 1.5E-01 | 2.2E-01 | 9.4E-02 | 0.56 |
| $SO_2$ (ppbv) | 1.2E-01 | 2.4E-01 | 2.8E-02 | 5.4E-02 | 0.11 |
| AMS $SO_4^{--}$ ($\mu g/m^3$) | 9.4E-01 | 7.8E+00 | 5.6E-01 | 5.7E-01 | 0.00 |
| AMS $NO_3^-$ ($\mu g/m^3$) | 5.5E-02 | 2.6E-01 | 1.5E-01 | 2.1E-01 | 0.10 |
| AMS OM converted to OC ($\mu g/m^3$) | 3.7E-01 | 5.2E-01 | 2.8E-01 | 1.2E-01 | 0.19 |
| $JO_3$ (1/s) | 3.0E-05 | 1.2E-05 | 2.9E-05 | 1.7E-05 | 0.87 |
| $JNO_2$ (1/s) | 1.1E-02 | 2.5E-03 | 1.2E-02 | 5.7E-03 | 0.64 |
| $JH_2O_2$ (1/s) | 7.8E-06 | 2.0E-06 | 8.7E-06 | 4.2E-06 | 0.75 |

Table S2 continued

| | Greater than 6 kilometer | | | | |
|---|---|---|---|---|---|
| | Observed | Obs. Std | Modeled | Mod. Std | R |
| Pressure (hpa) | 4.4E+02 | 2.5E+01 | 4.4E+02 | 2.8E+01 | 0.94 |
| Temperature (K) | 2.5E+02 | 6.2E+00 | 2.5E+02 | 4.9E+00 | 0.94 |
| RH (%) | 2.9E+01 | 2.6E+01 | 3.4E+01 | 1.9E+01 | 0.65 |
| Wind direction (Degs) | 2.4E+02 | 9.3E+01 | 2.4E+02 | 1.0E+02 | 0.85 |
| Wind speed (m/s) | 2.2E+01 | 1.1E+01 | 2.1E+01 | 9.0E+00 | 0.90 |
| CO (ppbv) | 1.3E+02 | 5.0E+01 | 1.2E+02 | 1.8E+01 | 0.47 |
| Ethene (ppbv) | 1.6E-02 | 1.3E-02 | 5.6E-03 | 2.3E-03 | -0.34 |
| Ethyne (ppbv) | 2.6E-01 | 2.1E-01 | 2.0E-01 | 6.8E-02 | 0.42 |
| $H_2O_2$ (ppbv) | 5.8E-01 | 3.1E-01 | 3.4E-01 | 3.1E-01 | 0.66 |
| $H_2SO_4$ (ppbv) | 1.4E-04 | 1.8E-04 | 2.9E-04 | 5.1E-04 | 0.48 |
| $HNO_3$ (ppbv) | 1.4E-01 | 2.4E-01 | 3.2E-02 | 5.3E-02 | 0.07 |
| $HO_2$ (ppbv) | 1.1E-02 | 1.1E-02 | 8.5E-03 | 2.8E-03 | 0.28 |
| $NO_2$ (ppbv) | 3.2E-02 | 4.0E-02 | 1.1E-03 | 6.4E-04 | 0.26 |
| NOy (ppbv) | 4.6E-01 | 5.7E-01 | 6.1E-01 | 2.3E-01 | 0.24 |
| NO (ppbv) | 1.6E-02 | 2.0E-02 | 1.2E-03 | 7.5E-04 | 0.06 |
| OH (ppbv) | 8.3E-05 | 4.2E-05 | 6.4E-05 | 3.5E-05 | 0.65 |
| Ozone (ppbv) | 7.6E+01 | 2.1E+01 | 7.4E+01 | 1.5E+01 | 0.54 |
| PAN (ppbv) | 2.3E-01 | 1.9E-01 | 3.6E-01 | 1.6E-01 | 0.36 |
| Propane (ppbv) | 4.6E-01 | 2.1E-01 | 1.9E-01 | 7.2E-02 | 0.52 |
| $SO_2$ (ppbv) | 3.8E-01 | 9.5E-01 | 2.9E-02 | 4.3E-02 | 0.19 |
| AMS $SO_4^{--}$ ($\mu g/m^3$) | 1.9E+00 | 3.0E+00 | 5.6E-01 | 9.5E-01 | 0.12 |
| AMS $NO_3^-$ ($\mu g/m^3$) | 7.5E-02 | 1.0E-01 | 5.6E-02 | 6.2E-02 | -0.11 |
| AMS OM converted to OC ($\mu g/m^3$) | 4.5E-01 | 8.0E-01 | 2.5E-01 | 1.2E-01 | 0.08 |
| $JO_3$ (1/s) | 2.3E-05 | 1.2E-05 | 2.0E-05 | 1.5E-05 | 0.89 |
| $JNO_2$ (1/s) | 1.1E-02 | 2.5E-03 | 1.1E-02 | 5.6E-03 | 0.46 |
| $JH_2O_2$ (1/s) | 7.3E-06 | 2.0E-06 | 7.3E-06 | 4.1E-06 | 0.69 |

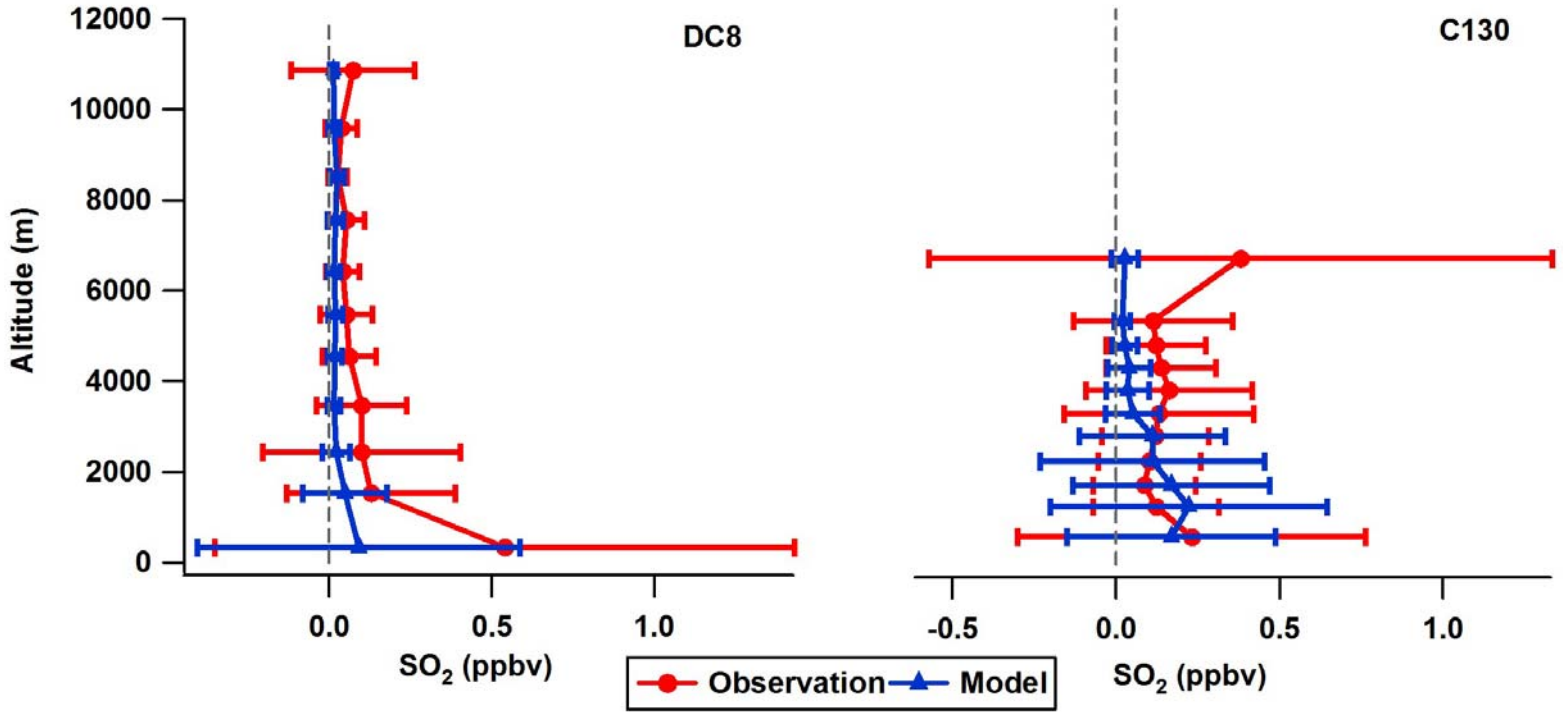


Fig. S1. DC-8 and C-130 observed and modeled $SO_2$ vertical profiles during the INTEX–B study period

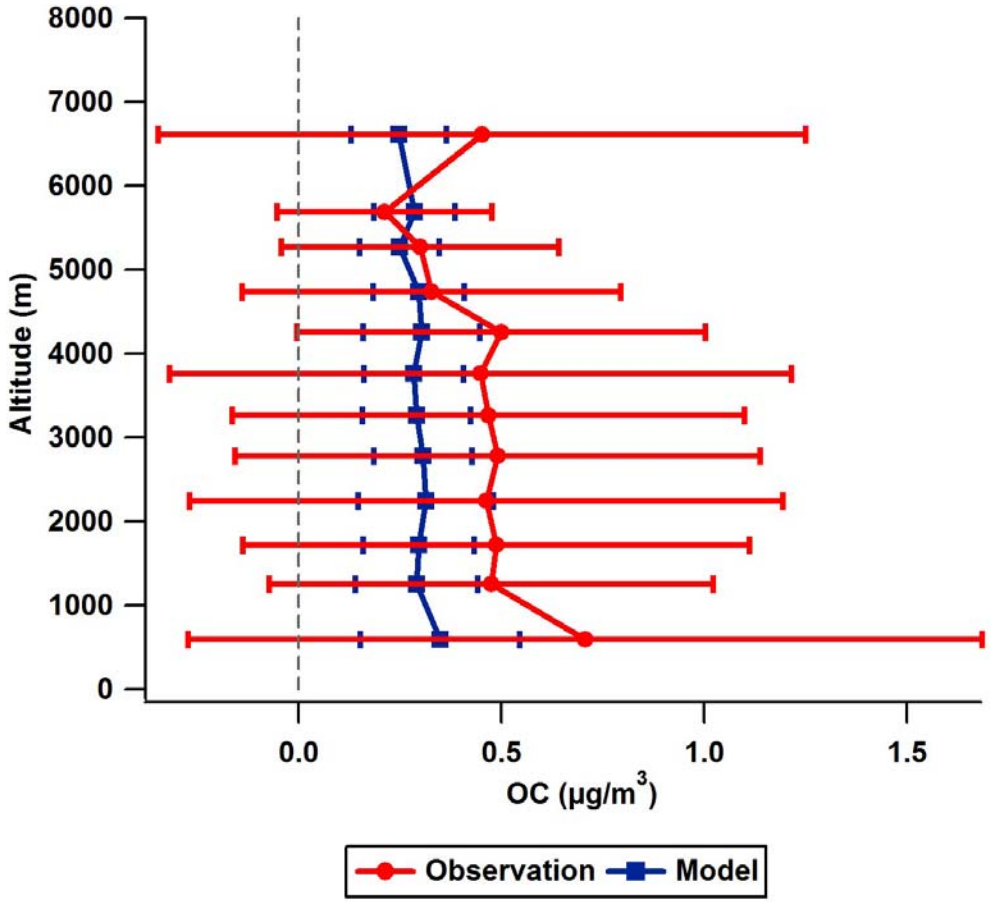


Fig. S2. Observed and modeled OC vertical profiles for INTEX–B C–130 flights

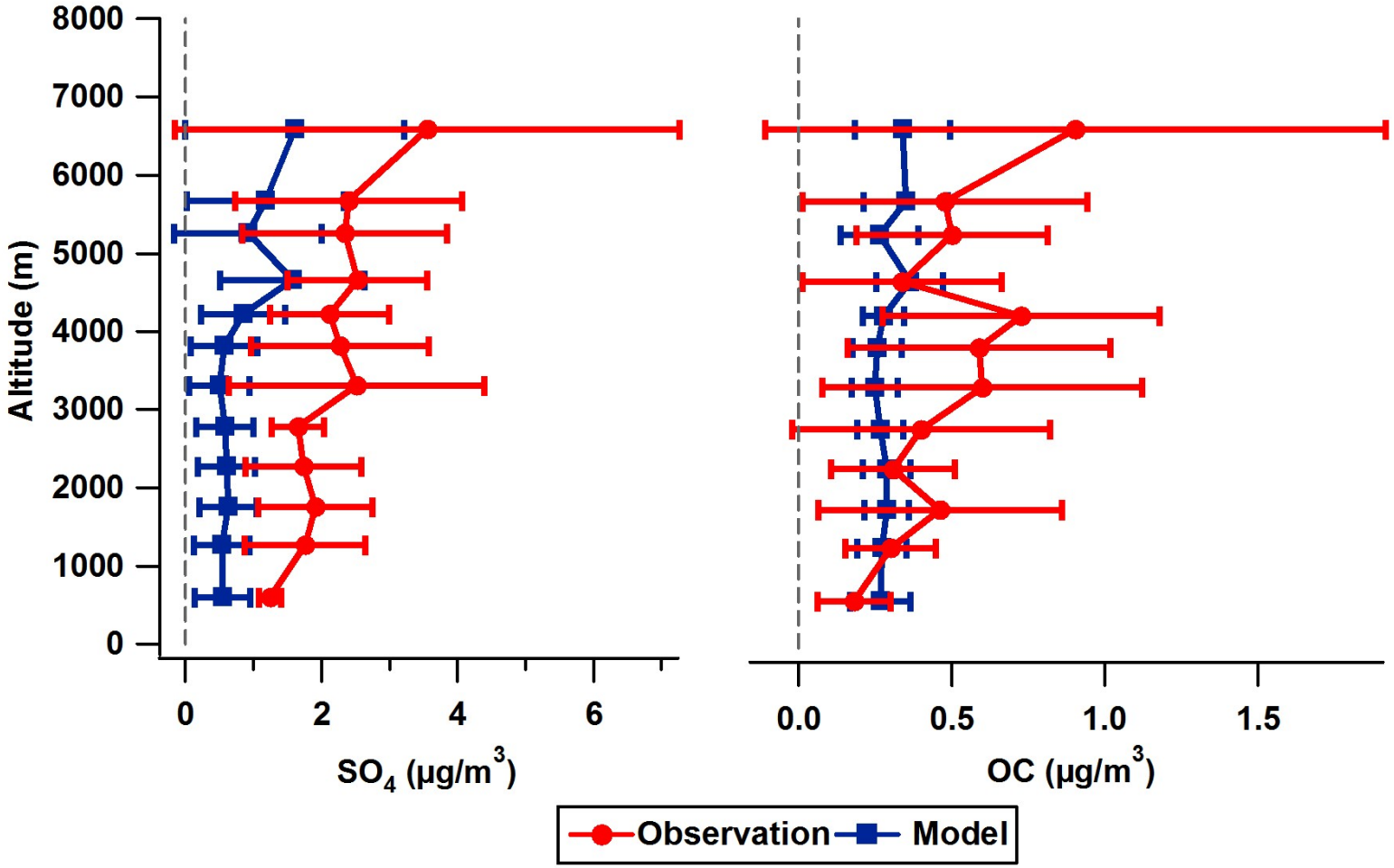


Fig. S3. Observed AMS and modeled $SO_4$, and OC vertical profiles for INTEX–B C–130 flights using criteria similar to Dunlea et al., 2009 (i.e. Observed AMS $SO_4 > 1$ µg/m$^3$ and sampled west of 125º W longitude)

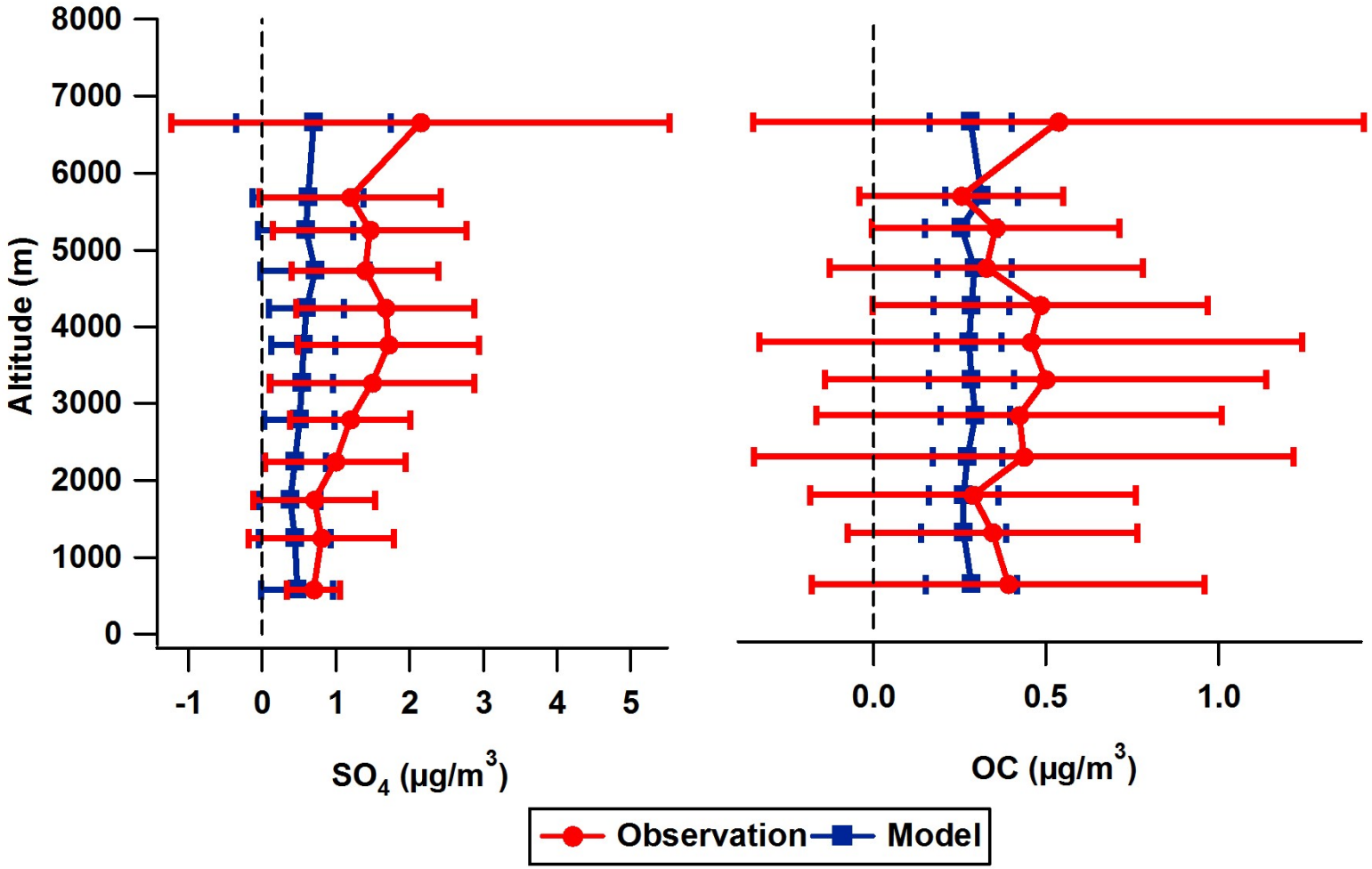


Fig. S4. Observed AMS and modeled $SO_4$, and OC vertical profiles for INTEX–B C–130 flights using criteria similar to Peltier et al., 2008 (i.e Modeled CO > 100 ppb and predicted China anthropogenic CO > 50% of the predicted total anthropogenic CO)