Supporting tables for

# Comprehensive evaluations of diurnal $NO_2$ measurements during DISCOVER-AQ 2011: Effects of resolution dependent representation of $NO_x$ emissions

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**Table S1.** Summary of information for the 11 inland Pandora sites in the DISCOVER-AQ campaign

| Site # | Site name | Latitude / ° N | Longitude / ° W | Land type | $NO_x$ emission in 36-km REAM[1] / $10^{21}$ molecules $km^{-2}$ $s^{-1}$ | $NO_x$ emission in 4-km REAM / $10^{21}$ molecules $km^{-2}$ $s^{-1}$ | Availability of P-3B aircraft observations[2] | Availability of surface $NO_y$ | Availability of surface $NO_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | UMCP | 38.991 | 76.943 | urban | 10.9 | 19.5 | | | |
| 2 | UMBC | 39.255 | 76.709 | urban | 12.9 | 14.8 | | | |
| 3 | SERC | 38.880 | 76.550 | rural/coastal | 5.0 | 0.8 | | | |
| 4 | Padonia | 39.461 | 76.631 | suburban | 2.9 | 12.8 | Y | Y | Y |
| 5 | Oldtown | 39.291 | 76.596 | urban | 12.9 | 33.0 | | | Y |
| 6 | GSFC | 38.993 | 76.840 | urban/suburban | 5.0 | 6.2 | | | |
| 7 | Fairhill | 39.701 | 75.860 | rural | 6.6 | 0.6 | Y | | |
| 8 | Essex | 39.311 | 76.474 | coastal/urban | 12.9 | 6.4 | Y | | Y |
| 9 | Edgewood | 39.410 | 76.297 | coastal/urban | 1.7 | 1.3 | Y | Y | Y |
| 10 | Beltsville | 39.055 | 76.878 | suburban | 5.0 | 4.4 | Y | Y | Y |
| 11 | Aldino | 39.563 | 76.204 | rural/suburban | 1.7 | 4.2 | Y | Y | Y |

[1] Here, $NO_x$ emissions refer to the mean values in one week (Monday – Sunday). Since we scale weekend emissions based on weekday emissions in this study, the relative differences among different sites and between the 36-km REAM and the 4-km REAM are the same for weekdays and weekends.

[2] "Y" denotes that P-3B aircraft observations were available at the corresponding site during the DISCOVER-AQ campaign. And blank indicates that no aircraft observations were available. Similar to the "availability of surface $NO_y$" and the "availability of surface $NO_2$."

**Table S2.** Setup of the 36-km and nested 4-km WRF simulations

| | 36-km WRF | Nested 4-km WRF |
|---|---|---|
| Horizontal resolution | 36 km | Nested (36 km, 12 km, 4 km) |
| Domain center | 40° N, 97° W | 38.94° N, 75.76° W |
| Microphysics | WRF Single-Moment 3-class simple ice scheme | Same as 36-km WRF |
| Surface layer | Revised MM5 Monin-Obukhov scheme | Same as 36-km WRF |
| Land surface | Unified Noah land-surface model | Same as 36-km WRF |
| Longwave radiation | RRTM scheme | Same as 36-km WRF |
| Shortwave radiation | Dudhia scheme | Same as 36-km WRF |
| Planetary boundary layer | Yonsei University (YSU) scheme | Same as 36-km WRF |
| Cumulus parameterization | Kain-Fritsch (new Eta) scheme | Kain-Fritsch scheme for outer domains (36-km and 12-km); no cumulus parameterization for the 4-km domain |
| Urban surface | 3-category urban canopy model | Same as 36-km WRF |