

# Supplementary Materials: Distribution of PM<sub>2.5</sub> Air Pollution in Mexico City: Spatial Analysis with Land-Use Regression Model

**Table S1.** Description of geographic, demographic, and meteorological variables used for the analysis.

| Variable          | Description                                                                                                           | Source       |                                                                                                                                                       |
|-------------------|-----------------------------------------------------------------------------------------------------------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Elevation         | Topography in meters above the sea level (masl)                                                                       | USGS (2008)  |                                                                                                                                                       |
| Slope             | The topographic slope                                                                                                 | SRTM derived |                                                                                                                                                       |
| Aspect            | Direction faced by the topographic slope                                                                              | SRTM derived |                                                                                                                                                       |
| PD                | Interpolation of the centroids of each electoral section with aggregated data from the 2005 census                    | INEGI (2005) |                                                                                                                                                       |
| Roads speed limit | The whole road system was transformed into a raster file to obtain the average speed in sections of 500 square meters | INEGI (2010) | To estimate endangered areas and standardized data for the analysis, all data was interpolated or re-sampled with a resolution of 500 per 500 meters. |
| RH                | Interpolation and mapping of the calculated annual average relative humidity                                          | SIMAT (2002) |                                                                                                                                                       |
| TEMP              | Interpolation and mapping of the calculated annual average temperature                                                | SIMAT (2002) |                                                                                                                                                       |
| WDR               | Interpolation and mapping of the calculated annual average wind direction                                             | SIMAT (2002) |                                                                                                                                                       |
| WSP               | Interpolation and mapping of the calculated annual average wind speed                                                 | SIMAT (2002) |                                                                                                                                                       |
| NDVI              | Normalized Difference Vegetation Index                                                                                | USGS (2001)  |                                                                                                                                                       |

**Table S2.** Product moment correlation coefficients among studied variables.

| Variables | Altitude  | Slope     | PD        | RSL     | RH        | TEMP      | WSP      | NDVI   |
|-----------|-----------|-----------|-----------|---------|-----------|-----------|----------|--------|
| Slope     | 0.7895 *  | -----     |           |         |           |           |          |        |
| PD        | −0.2820   | −0.2442   | -----     |         |           |           |          |        |
| RSL       | 0.1680    | −0.1906   | −0.1132   | -----   |           |           |          |        |
| RH        | 0.4230 *  | 0.4762 *  | −0.0971   | −0.2776 | -----     |           |          |        |
| TEMP      | −0.6189 * | −0.6491 * | 0.4164 *  | 0.1113  | −0.7296 * | -----     |          |        |
| WSP       | 0.4323 *  | 0.4106 *  | −0.2621   | −0.0764 | 0.5253 *  | −0.7369 * | -----    |        |
| NDVI      | 0.2808    | 0.2749    | −0.2359   | 0.0446  | 0.3324 *  | −0.5106 * | 0.2691   | -----  |
| WIOS      | 0.5567 *  | 0.5807 *  | −0.4487 * | −0.0640 | 0.3145    | −0.6918 * | 0.3751 * | 0.3503 |

\*P values  $\leq 0.05$ . Abbreviations: PD = Population density, RSL = Road speed limit, RH = Relative humidity, TEMP = Temperature, WSP = Wind speed, NDVI = Normalized Difference Vegetation Index, WIOS = Wind incidence over a surface.

**Table S3.** Estimated canonical correlation coefficient.

| Canonical Variables | Linear Coefficients | 95% Confidence Interval | Canonical coefficient           |
|---------------------|---------------------|-------------------------|---------------------------------|
| U1                  | Altitude            | 0.0018 *                | 0.0002; 0.0033                  |
|                     | RH                  | 0.2012 *                | 0.1199; 0.2824                  |
|                     | NDVI,               | 1.5418                  | −0.0847; 3.1682                 |
|                     | WIOS                | 0.3419 *                | 0.1906; 0.4932                  |
|                     | WSP                 | 0.7962 *                | 0.3998; 1.1925                  |
| V1                  | PD                  | 2.72e-06                | −1.5 $\times 10^{-5}$ ; 0.00002 |
|                     | Slope               | 0.0977                  | −0.0065; 0.2020                 |
|                     | TEMP                | −1.7471*                | 2.0859; −1.4084                 |
|                     | RSL                 | −0.0041                 | −0.0132; 0.0050                 |

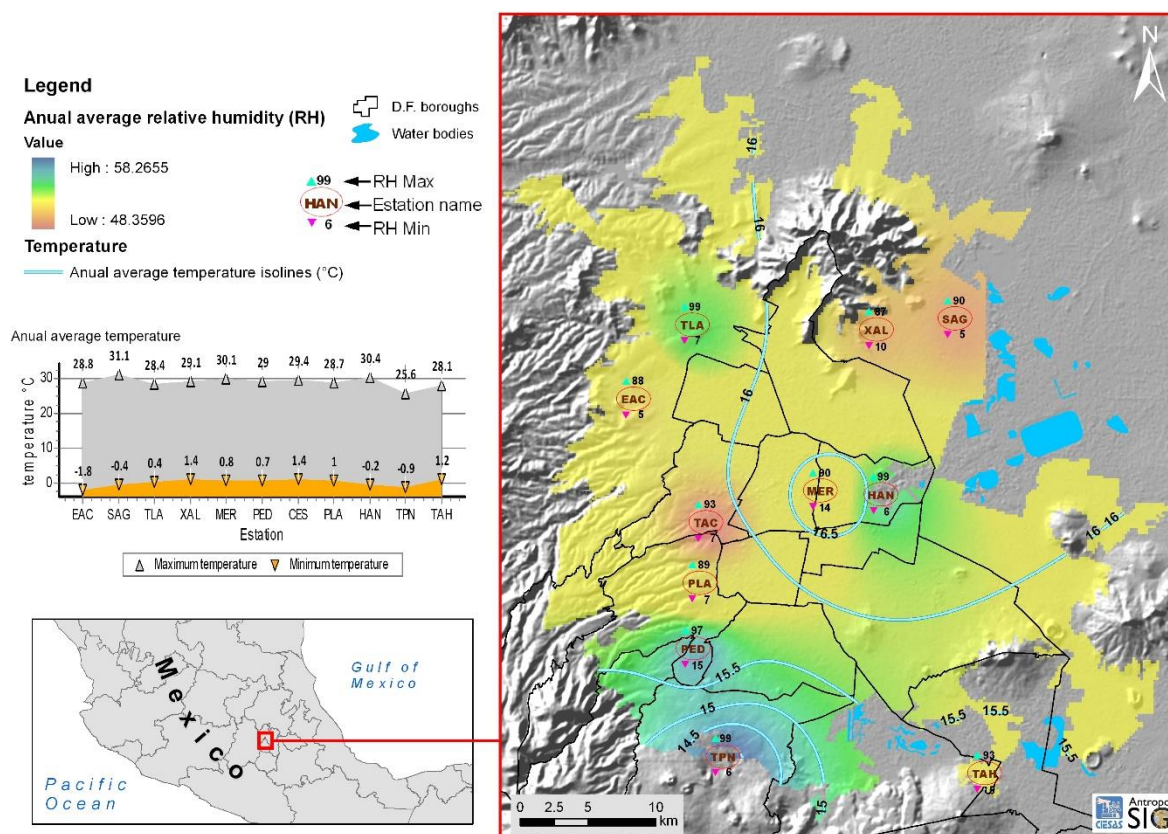
0.9457

Note: Significance of the model  $p = 0.0000$  Wilks' Lambda. \* P values  $< 0.05$  for linear coefficients.

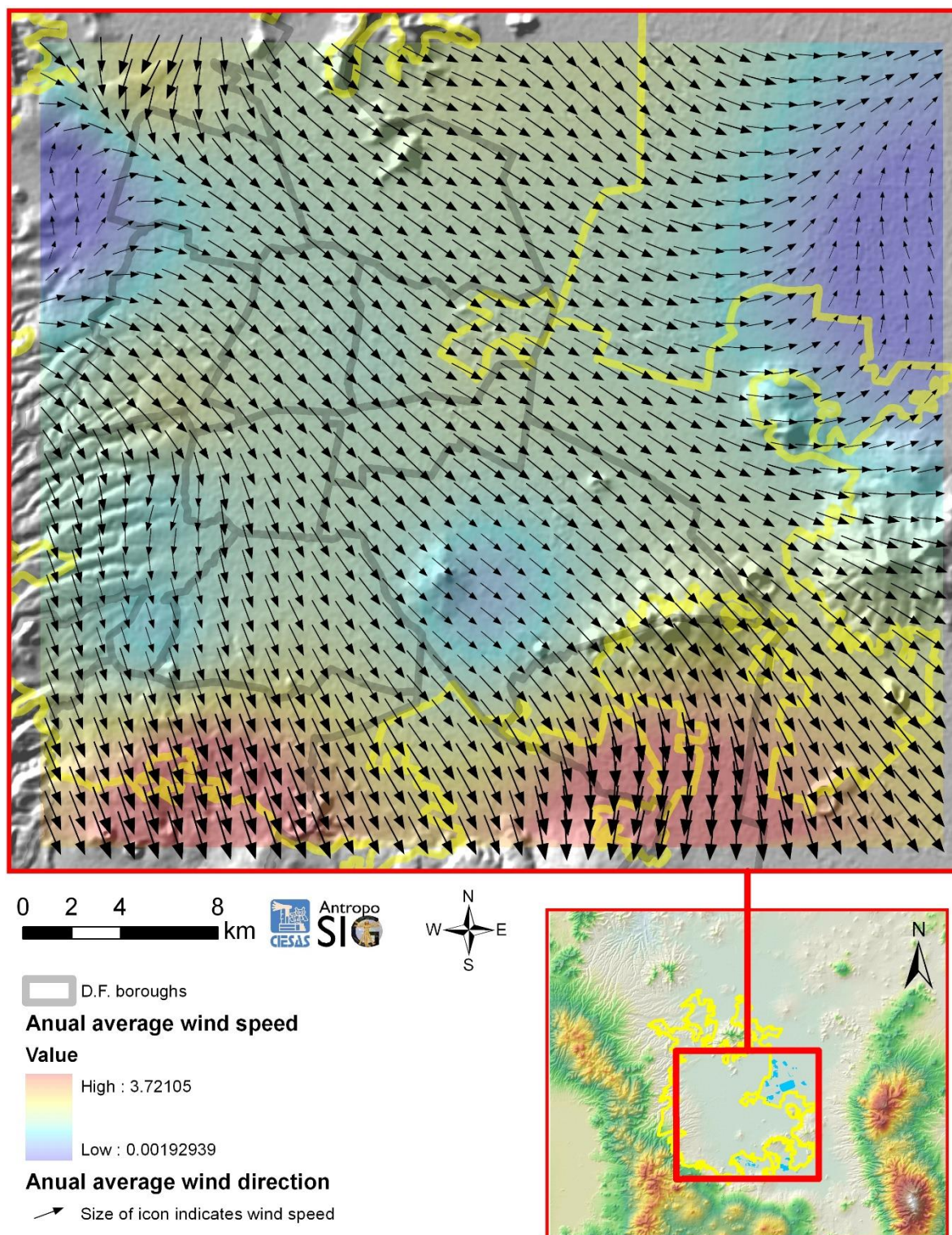
**Table S4.** Weather conditions by geographical locations and between day and night.

| Geographical Location | RH (%)           | TEMP (°C)         | WSP (m/s)      | PM <sub>2.5</sub> (µg/m <sup>3</sup> ) |
|-----------------------|------------------|-------------------|----------------|----------------------------------------|
| Days                  |                  |                   |                |                                        |
| North <sup>a</sup>    | 53.9             | 19.7              | 1.04           | 111.6                                  |
| Center                | 54.4 (49.6-56.9) | 19.4 (19.1-19.7)  | 1.2 (1.04-1.3) | 118 (108-160)                          |
| Southwest             | 41.3 (37.5-60.2) | 19.8 (17.4-22.7)  | 1.2 (0.95-1.5) | 80 (77-81)                             |
| Southeast             | 62.4 (51.9-63.4) | 19.9 (17.5-22.2)  | 1.5 (1.1-1.6)  | 69 (63-133)                            |
| Nights                |                  |                   |                |                                        |
| North                 | 70.7 (67.9-72.8) | 16.3 (116.1-16.7) | 1.5 (1.2-2.9)  | 41 (34-46)                             |
| Center                | 67.5 (66.9-68)   | 16.6 (15.8-17.4)  | 1.6 (0.75-1.7) | 47 (46.5-55)                           |
| Southwest             | 64.4 (51-83.5)   | 16.6 (14.7-18.8)  | 2.2 (1.1-3.8)  | 64 (41-112)                            |
| Southeast             | 76.7 (68.5-81)   | 16 (13.9-16.3)    | 1.3 (0.76-2.4) | 58 (37-87)                             |
| Day                   | 54.1 (45.4-61.3) | 19.7 (18.3-21.1)  | 1.2 (1.1-1.5)  | 94 (73-126)                            |
| Night                 | 71.1 (65.5-79.9) | 16.3 (14.8-16.8)  | 1.5 (0.95-2.3) | 49 (39-74)                             |
| P value <sup>#</sup>  | 0.0035           | 0.0002            | NS             | 0.0006                                 |

Note: data is presented as median (percentile 25-75). <sup>a</sup> there was one measurement of PM<sub>2.5</sub> personal concentrations. <sup>#</sup> p value of the models.



**Figure S1.** Annual average relative humidity and temperature in Mexico City.



**Figure S2.** Average annual wind speed and direction vectors along Mexico City.