

## Supplementary data

### **Particle-bound PAHs and Chemical Composition, Sources and Health Risk of PM<sub>2.5</sub> in a Highly Industrialized Area**

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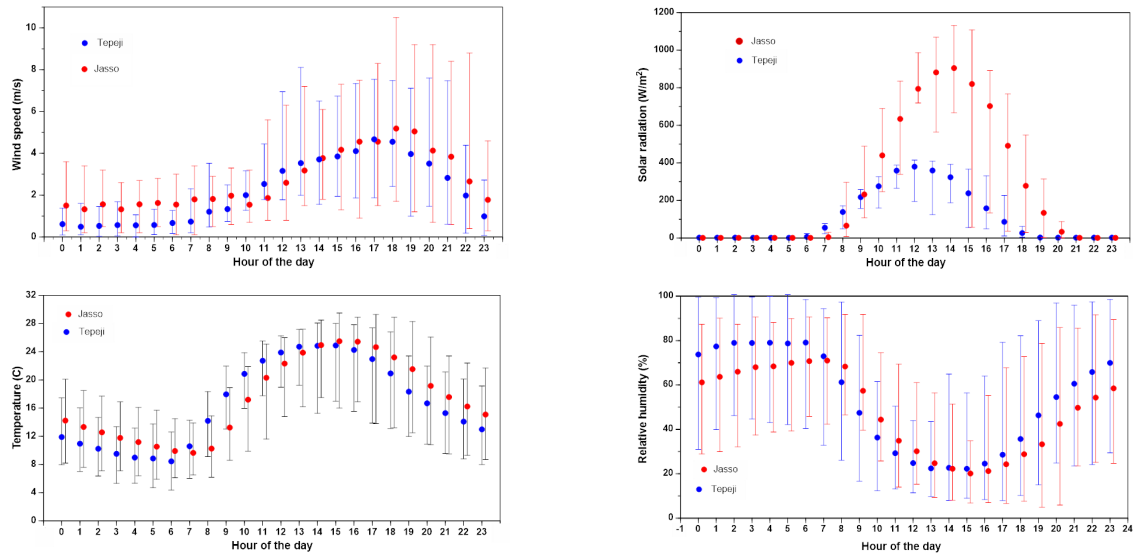


Fig. S1. Hourly averaged surface meteorology (wind speed, solar radiation, temperature and relative humidity) at Jasso (JAS) and Tepeji (TEP) sites during 22 March to 22 April, 2006. Dots represent the average mass concentration. Horizontal lines inside box represent the median. Bottom and top of the boxes represent the 25 and 75% limits, respectively. The bottom and the top whiskers represent the 5% and 95% limits, respectively.

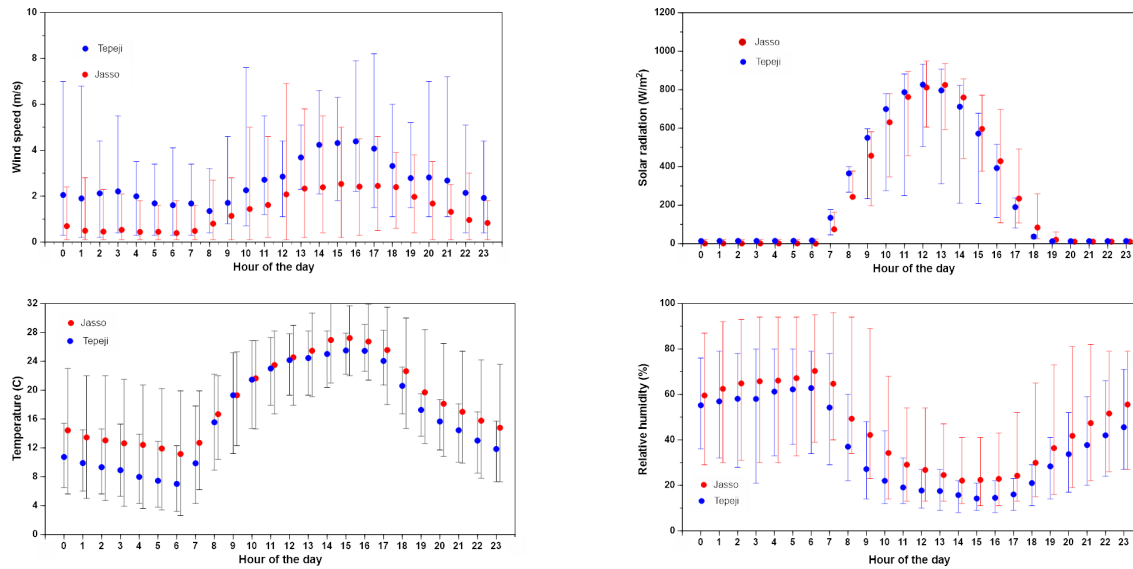


Fig. S2. Hourly averaged surface meteorology (wind speed, solar radiation, temperature and relative humidity) at Jasso (JAS) and Tepeji (TEP) sites during 2010 and 2011. Dots represent the average mass concentration. Horizontal lines inside box represent the median. Bottom and top of the boxes represent the 25 and 75% limits, respectively. The bottom and the top whiskers represent the 5% and 95% limits, respectively.

Table S1. Mexico National Ambient Air Quality Standards for PM<sub>2.5</sub>, average and maxima concentrations (µg/m<sup>3</sup>) at the JAS and TEP sites during 2006, 2010 and 2011 for daily 24 - h samples collected with Mini-Vol.

NOM-025-SSA1-1993: 65 µg/m <sup>3</sup> average 24 h								
Site	2006		2010		2011		Average 2006-2011	
	Ave	Max	Ave	Max	Ave	Max	Ave	Max
JAS	31.0	52.0	27.9	38.6	21.5	30.3	26.8	40.3
TEP	25.7	53.1	25.5	36.2	20.8	28.5	24.0	39.3
Num. of samples	200		60		60			

Table S2. Average and maxima of 12 - h and 24-h PM<sub>2.5</sub> measurements ( $\mu\text{g}/\text{m}^3$ ,  $\text{ng m}^{-3}$ ) in Jasso (JAS), Tula Industrial Corridor.

Element	PM <sub>2.5</sub> 06:00 to 18:00 h			PM <sub>2.5</sub> 18:00 to 06:00 h			PM <sub>2.5</sub> Midnight to midnight		
	Average $\pm$ SD	Max	Date	Average $\pm$ SD	Max	Date	Average $\pm$ SD	Max	Date
Mass	45.46 $\pm$ 0.45	70.33	08/April	31.03 $\pm$ 0.62	59.17	07/April	31.03 $\pm$ 0.93	52.04	10/April
Nitrate (NO <sub>3</sub> <sup>-</sup> )	1.06 $\pm$ 0.08	1.59	09/April	1.01 $\pm$ 0.08	1.74	07/April	1.03 $\pm$ 0.10	2.11	25/March
Sulfate (SO <sub>4</sub> <sup>2-</sup> )	8.47 $\pm$ 0.59	14.89	09/April	7.25 $\pm$ 0.50	10.62	10/April	7.52 $\pm$ 0.59	12.04	11/April
Chloride (Cl <sup>-</sup> )s	0.09 $\pm$ 0.01	0.174	16/April	0.09 $\pm$ 0.01	0.13	07/April	0.08 $\pm$ 0.01	0.14	16/April
Ammonium (NH <sub>4</sub> <sup>+</sup> )	3.08 $\pm$ 0.21	5.41	09/April	2.66 $\pm$ 0.18	3.56	19/April	2.81 $\pm$ 0.19	4.35	11/April
Soluble sodium (Na <sup>+</sup> )	0.20 $\pm$ 0.02	0.40	09/April	0.22 $\pm$ 0.02	0.61	08/April	0.15 $\pm$ 0.02	0.42	09/April
Soluble potassium (K <sup>+</sup> )	0.28 $\pm$ 0.02	0.42	16/April	0.24 $\pm$ 0.02	0.41	07/April	0.23 $\pm$ 0.02	0.43	06/April
Soluble magnesium (Mg <sup>2+</sup> )	0.10 $\pm$ 0.01	0.16	11/April	0.07 $\pm$ 0.01	0.11	16/April	0.07 $\pm$ 0.02	0.11	08/April
Soluble calcium (Ca <sup>2+</sup> )	3.87 $\pm$ 0.27	7.46	11/April	2.37 $\pm$ 0.16	7.32	07/April	2.07 $\pm$ 0.15	6.22	07/April
Organic Carbon (OC)	9.585 $\pm$ 1.351	14.310	16/April	4.104 $\pm$ 0.578	7.888	07/April	7.955 $\pm$ 1.121	14.722	03/April
Elemental Carbon (EC)	4.125 $\pm$ 0.575	8.716	11/April	1.289 $\pm$ 0.180	2.980	20/April	3.551 $\pm$ 0.495	7.506	06/April
Sodium (Na)	0.13 $\pm$ 0.01	0.23	10/April	0.11 $\pm$ 0.01	0.27	08/April	0.09 $\pm$ 0.01	0.22	08/April
Magnesium (Mg)	0.14 $\pm$ 0.01	0.21	08/April	0.09 $\pm$ 0.01	0.20	16/April	0.08 $\pm$ 0.01	0.16	08/April
Aluminum (Al)	0.188 $\pm$ 0.01	0.31	17/April	0.13 $\pm$ 0.01	0.46	16/April	0.09 $\pm$ 0.01	0.30	16/April
Silicon (Si)	0.53 $\pm$ 0.06	0.89	20/April	0.31 $\pm$ 0.03	0.96	16/April	0.26 $\pm$ 0.03	0.66	16/April
Potassium (K)	0.18 $\pm$ 0.01	0.25	10/April	0.12 $\pm$ 0.01	0.21	07/April	0.13 $\pm$ 0.01	0.19	07/April
Calcium (Ca)	3.89 $\pm$ 0.21	9.89	08/April	1.72 $\pm$ 0.01	5.38	07/April	1.69 $\pm$ 0.09	5.27	08/April
Vanadium (V) <sup>a</sup>	40.6 $\pm$ 4.4	106.5	13/April	19.9 $\pm$ 3.4	52.0	19/April	28.3 $\pm$ 3.2	64.2	03/April
Chromium (Cr) <sup>a</sup>	0.0 $\pm$ 0.0	0.0	09/April	0.0 $\pm$ 0.0	0.0	09/April	29.0 $\pm$ 1.6	37.4	06/April
Iron (Fe) <sup>a</sup>	275.7 $\pm$ 63.0	457.7	08/April	166.6 $\pm$ 30.2	458.0	16/April	148.6 $\pm$ 25.3	332.3	16/April
Nickel (Ni) <sup>a</sup>	0.4 $\pm$ 0.0	0.5	08/April	0.3 $\pm$ 0.0	0.4	16/April	0.4 $\pm$ 0.0	0.8	06/April
Zinc (Zn) <sup>a</sup>	9.8 $\pm$ 0.7	15.1	13/April	7.5 $\pm$ 0.6	10.4	19/April	10.4 $\pm$ 0.6	16.0	03/April
Arsenic (As) <sup>a</sup>	10.6 $\pm$ 0.6	33.2	10/April	10.2 $\pm$ 0.5	22.4	17/April	11.9 $\pm$ 0.6	20.9	29/March
Molybdenum (Mo) <sup>a</sup>	0.8 $\pm$ 0.1	1.1	08/April	0.7 $\pm$ 0.0	1.0	07/April	1.0 $\pm$ 0.1	1.8	06/April
Cadmium (Cd) <sup>a</sup>	3.0 $\pm$ 0.2	3.9	08/April	2.6 $\pm$ 0.1	3.1	08/April	3.7 $\pm$ 0.2	5.6	06/April
Tin (Sn) <sup>a</sup>	3.9 $\pm$ 0.2	5.6	08/April	3.2 $\pm$ 0.2	5.5	07/April	5.6 $\pm$ 0.4	11.5	06/April
Antimony (Sb) <sup>a</sup>	2.3 $\pm$ 0.1	3.1	08/April	2.2 $\pm$ 0.1	2.8	07/April	3.2 $\pm$ 0.2	6.8	06/April
Barium (Ba) <sup>a</sup>	8.9 $\pm$ 0.5	11.5	08/April	7.6 $\pm$ 0.4	10.1	07/April	10.0 $\pm$ 0.5	15.4	06/April
Mercury (Hg) <sup>a</sup>	7.4 $\pm$ 0.4	9.8	09/April	7.3 $\pm$ 0.4	8.2	14/April	10.5 $\pm$ 0.5	17.5	06/April
Lead (Pb) <sup>a</sup>	12.1 $\pm$ 0.6	23.5	08/April	11.9 $\pm$ 0.6	30.7	07/April	19.5 $\pm$ 1.0	59.8	06/April

Table S3. Average and maxima of 12 - h PM<sub>2.5</sub> measurements ( $\mu\text{g}/\text{m}^3$ ,  $\text{ng m}^{-3}$ ) in Tepeji (TEP), Tula Industrial Corridor.

Element	PM <sub>2.5</sub> 06:00 to 18:00 h			PM <sub>2.5</sub> 18:00 to 06:00 h			PM <sub>2.5</sub> Midnight to midnight		
	Average $\pm$ SD	Max	Date	Average $\pm$ SD	Max	Date	Average $\pm$ SD	Max	Date
Mass	35.52 $\pm$ 1.07	75.12	16/April	24.86 $\pm$ 0.25	37.59	11/April	25.73 $\pm$ 0.26	53.10	11/April
Nitrate (NO <sub>3</sub> <sup>-</sup> )	0.79 $\pm$ 0.07	2.68	19/April	0.86 $\pm$ 0.07	1.28	27/March	0.84 $\pm$ 0.08	2.19	11/April
Sulfate (SO <sub>4</sub> <sup>2-</sup> )	7.87 $\pm$ 0.55	15.45	11/April	6.90 $\pm$ 0.48	11.46	11/April	6.40 $\pm$ 0.45	10.89	12/April
Chloride (Cl <sup>-</sup> )s	0.090 $\pm$ 0.01	0.18	11/April	0.06 $\pm$ 0.01	0.13	26/March	0.10 $\pm$ 0.01	0.25	20/April
Ammonium (NH <sub>4</sub> <sup>+</sup> )	3.00 $\pm$ 0.21	5.99	11/April	2.70 $\pm$ 0.18	4.45	12/April	2.52 $\pm$ 0.17	4.16	12/April
Soluble sodium (Na <sup>+</sup> )	0.18 $\pm$ 0.02	0.41	09/April	0.15 $\pm$ 0.01	0.28	09/April	0.13 $\pm$ 0.02	0.31	11/April
Soluble potassium (K <sup>+</sup> )	0.23 $\pm$ 0.02	0.38	19/April	0.20 $\pm$ 0.02	0.30	19/April	0.18 $\pm$ 0.02	0.30	20/April
Soluble magnesium (Mg <sup>2+</sup> )	0.07 $\pm$ 0.02	0.23	16/April	0.06 $\pm$ 0.01	0.08	11/April	0.05 $\pm$ 0.02	0.14	11/April
Soluble calcium (Ca <sup>2+</sup> )	0.67 $\pm$ 0.06	3.11	08/April	0.35 $\pm$ 0.04	0.56	11/April	0.37 $\pm$ 0.04	1.77	11/April
Organic Carbon (OC)	8.477 $\pm$ 1.147	12.255	09/April	7.166 $\pm$ 0.970	10.175	25/March	8.037 $\pm$ 1.093	14.882	17/April
Elemental Carbon (EC)	2.928 $\pm$ 0.400	8.685	10/April	2.254 $\pm$ 0.305	3.945	03/April	3.392 $\pm$ 0.462	6.709	20/April
Sodium (Na)	0.12 $\pm$ 0.01	0.25	09/April	0.10 $\pm$ 0.01	0.18	09/April	0.09 $\pm$ 0.01	0.18	11/April
Magnesium (Mg)	0.10 $\pm$ 0.01	0.35	16/April	0.06 $\pm$ 0.00	0.13	11/April	0.06 $\pm$ 0.00	0.20	11/April
Aluminum (Al)	0.12 $\pm$ 0.01	0.47	16/April	0.01 $\pm$ 0.00	0.03	11/April	0.05 $\pm$ 0.00	0.24	11/April
Silicon (Si)	0.42 $\pm$ 0.04	1.70	16/April	0.04 $\pm$ 0.00	0.11	11/April	0.16 $\pm$ 0.01	0.86	11/April
Potassium (K)	0.13 $\pm$ 0.01	0.22	19/April	0.09 $\pm$ 0.01	0.12	06/April	0.09 $\pm$ 0.01	0.18	11/April
Calcium (Ca)	0.46 $\pm$ 0.03	2.38	16/April	0.05 $\pm$ 0.00	0.08	11/April	0.18 $\pm$ 0.01	1.22	11/April
Vanadium (V) <sup>a</sup>	21.3 $\pm$ 1.6	57.1	11/April	18.6 $\pm$ 1.6	57.2	11/April	20.6 $\pm$ 7.0	55.9	12/April
Chromium (Cr) <sup>a</sup>	98.2 $\pm$ 5.3	107.5	13/April	77.8 $\pm$ 4.2	96.8	06/April	101.5 $\pm$ 10.7	292.6	20/April
Iron (Fe) <sup>a</sup>	275.9 $\pm$ 22.0	1,071.2	16/April	65.3 $\pm$ 10.2	206.4	16/April	109.9 $\pm$ 9.6	638.8	16/April
Nickel (Ni) <sup>a</sup>	0.3 $\pm$ 0.0	0.5	16/April	0.3 $\pm$ 0.0	0.4	06/April	0.4 $\pm$ 0.0	1.4	11/April
Zinc (Zn) <sup>a</sup>	7.4 $\pm$ 0.5	12.1	11/April	7.4 $\pm$ 0.6	11.1	06/April	9.3 $\pm$ 0.6	23.5	12/April
Arsenic (As) <sup>a</sup>	8.0 $\pm$ 0.4	11.4	13/April	8.6 $\pm$ 0.5	13.5	06/April	12.5 $\pm$ 0.7	36.3	20/April
Molybdenum (Mo) <sup>a</sup>	0.7 $\pm$ 0.0	1.3	16/April	0.7 $\pm$ 0.1	0.9	06/April	0.9 $\pm$ 0.1	2.6	11/April
Cadmium (Cd) <sup>a</sup>	2.5 $\pm$ 0.1	3.0	13/April	2.5 $\pm$ 0.1	3.1	06/April	3.7 $\pm$ 0.2	10.5	12/April
Tin (Sn) <sup>a</sup>	5.5 $\pm$ 0.3	18.2	16/April	3.1 $\pm$ 0.2	4.8	06/April	8.4 $\pm$ 0.6	26.7	20/April
Antimony (Sb) <sup>a</sup>	2.3 $\pm$ 0.1	3.9	13/April	2.0 $\pm$ 0.1	2.3	06/April	3.6 $\pm$ 0.2	10.9	20/April
Barium (Ba) <sup>a</sup>	7.7 $\pm$ 0.4	11.7	16/April	7.0 $\pm$ 0.4	10.2	06/April	10.1 $\pm$ 0.5	28.3	11/April
Mercury (Hg) <sup>a</sup>	6.6 $\pm$ 0.3	8.2	13/April	7.1 $\pm$ 0.4	9.2	06/April	10.8 $\pm$ 0.6	33.9	20/April
Lead (Pb) <sup>a</sup>	129.7 $\pm$ 6.9	792.8	08/April	19.7 $\pm$ 1.2	75.5	29/March	199.0 $\pm$ 10.9	784.8	20/April