SUPPORTING INFORMATION

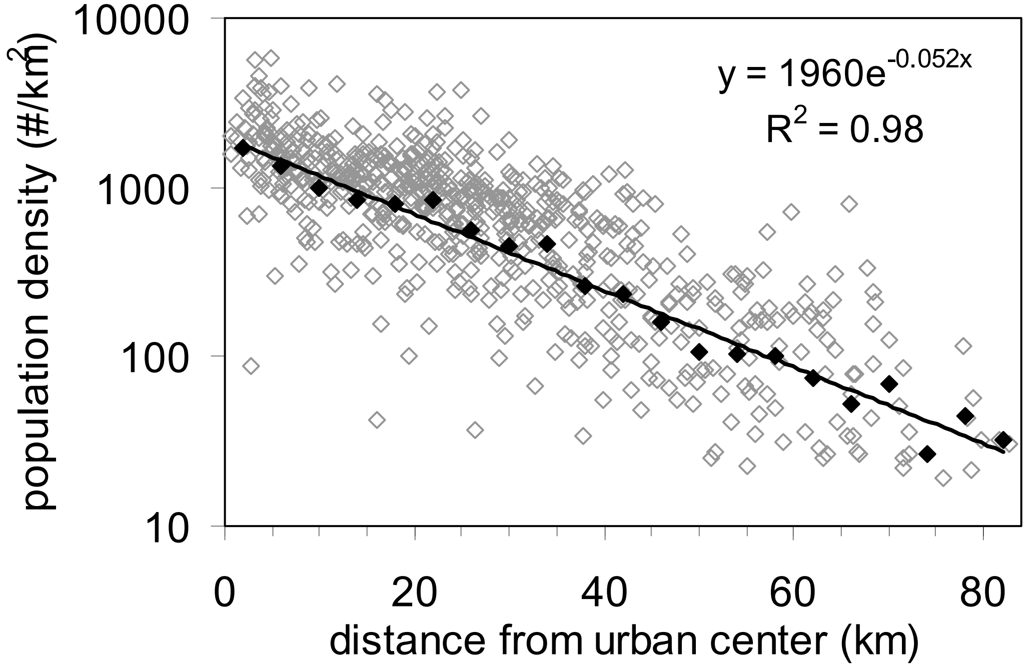

FIGURE S1. Population density versus distance from Site A. Population density for 660 census tracts are plotted (grey) and averaged in 4 km increments (black). Least-squares regression was performed on the population incremental averages.

TABLE S1. Modified semivariogram parameters. Partial sill ($\gamma_e^{'}$) is 1 - $\gamma_o^{'}$.

	semivariogram nugget ($\gamma_o^{'}$)		range, km ($3a_e$)		pop-wt semivariance ($\overline{\gamma}'$)	
	concentration	log concentration	concentration	log concentration	concentration	log concentration
1-h max NO_2	0.040	0.037	153	176	0.461	0.422
1-h max NO_x	0.031	0.023	254	266	0.326	0.311
8-h max O_3	0.008	0.010	2,736	3,021	0.043	0.042
1-h max SO_2	0.053	0.053	98	180	0.596	0.425
1-h max CO	0.036	0.025	231	243	0.352	0.333
24-h PM_{10}	0.053	0.048	731	765	0.170	0.161
24-h $PM_{2.5}$	0.029	0.037	1,873	1,870	0.079	0.086
24-h $PM_{2.5}$-SO_4	0.023	0.017	2,325	2,375	0.063	0.057
24-h $PM_{2.5}$-NO_3	0.013	0.033	1,383	1,067	0.080	0.117
24-h $PM_{2.5}$-NH_4	0.043	0.069	1,071	1,415	0.126	0.131
24-h $PM_{2.5}$-EC	0.047	0.051	251	331	0.340	0.285
24-h $PM_{2.5}$-OC	0.082	0.093	975	1,327	0.169	0.157

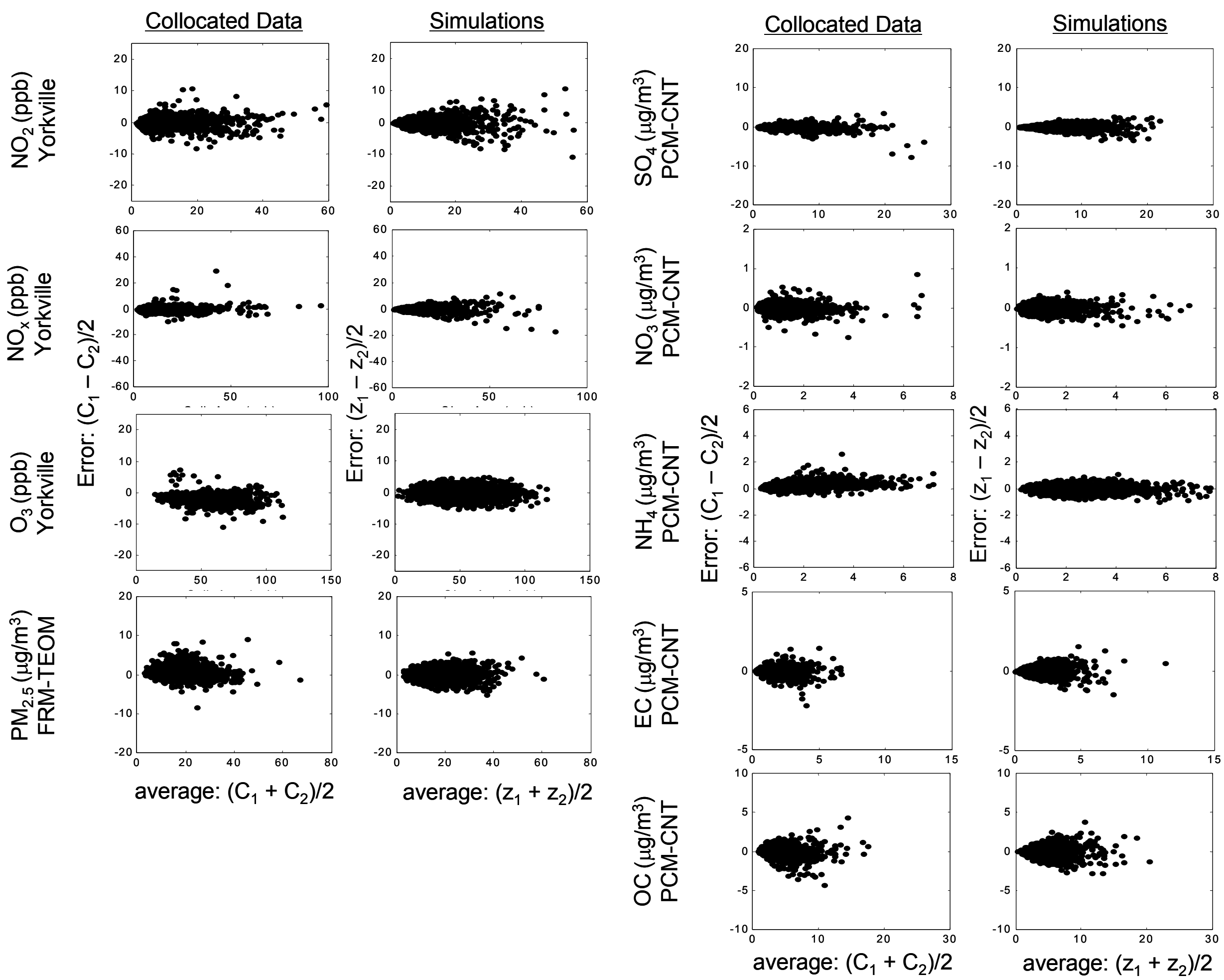

FIGURE S2. Collocated instrument precision error and simulated error. Error is calculated as half the difference between collocated measurements (left panel) and between simulations (right panel) for nine pollutants. Bias in continuous measures (TEOM and CNT) has been removed.

TABLE S2. Error model optimization parameters and correlation between simulation (*Z*) and base case (*Z).**

		a	***b***	**R (*Z, Z**)**
instrument precision error	1-h max NO_2	0.77 ± 0.12	-0.28 ± 0.04	0.960 ± 0.002
	1-h max NO_x	0.20 ± 0.02	-0.03 ± 0.03	0.969 ± 0.002
	8-h max O_3	1.05 ± 0.09	-0.62 ± 0.02	0.992 ± 0.0004
	1-h max SO_2	0.59 ± 0.03	-0.26 ± 0.02	0.948 ± 0.003
	1-h max CO	0.23 ± 0.01	0.09 ± 0.03	0.963 ± 0.004
	24-h PM_{10}	0.55 ± 0.07	-0.17 ± 0.03	0.948 ± 0.003
	24-h $PM_{2.5}$	1.24 ± 0.15	-0.58 ± 0.04	0.971 ± 0.002
	24-h $PM_{2.5}$-SO_4	0.18 ± 0.01	0.02 ± 0.03	0.977 ± 0.002
	24-h $PM_{2.5}$-NO_3	0.18 ± 0.01	-0.55 ± 0.03	0.987 ± 0.001
	24-h $PM_{2.5}$-NH_4	0.53 ± 0.02	-0.70 ± 0.04	0.957 ± 0.002
	24-h $PM_{2.5}$-EC	0.33 ± 0.01	-0.18 ± 0.03	0.953 ± 0.003
	24-h $PM_{2.5}$-OC	0.60 ± 0.05	-0.22 ± 0.05	0.920 ± 0.005
error due to spatial variability	1-h max NO_2	2.28 ± 0.14	0.03 ± 0.09	0.361 ± 0.034
	1-h max NO_x	1.43	-0.28	0.499 ± 0.031
	8-h max O_3	0.42 ± 0.01	-0.09 ± 0.03	0.916 ± 0.007
	1-h max SO_2	2.37 ± 0.17	-0.07 ± 0.09	0.325 ± 0.034
	1-h max CO	1.69 ± 0.11	0.02 ± 0.19	0.462 ± 0.032
	24-h PM_{10}	0.93 ± 0.03	-0.12 ± 0.06	0.709 ± 0.020
	24-h $PM_{2.5}$	0.62 ± 0.02	-0.18 ± 0.03	0.853 ± 0.011
	24-h $PM_{2.5}$-SO_4	0.50 ± 0.01	-0.05 ± 0.04	0.879 ± 0.010
	24-h $PM_{2.5}$-NO_3	0.66 ± 0.02	-0.47 ± 0.04	0.850 ± 0.011
	24-h $PM_{2.5}$-NH_4	0.80 ± 0.03	-0.19 ± 0.04	0.774 ± 0.016
	24-h $PM_{2.5}$-EC	1.12 ± 0.18	-0.67 ± 0.21	0.489 ± 0.053
	24-h $PM_{2.5}$-OC	0.93 ± 0.03	-0.10 ± 0.06	0.709 ± 0.020

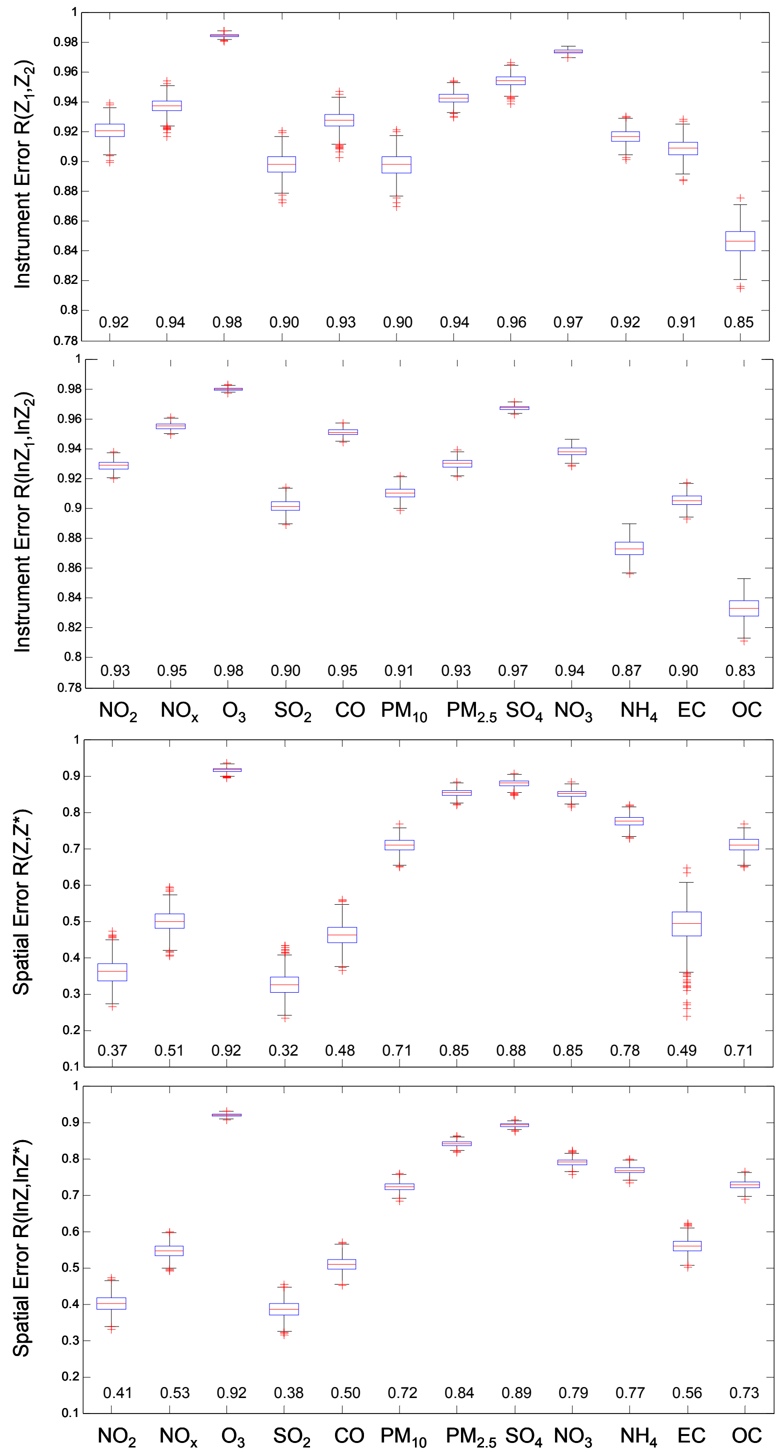

FIGURE S3. Boxplots of the distribution of correlation coefficients between 1000 simulations for instrument error and between 1000 simulations and the base case time-series for spatial error. Target values shown at bottom.

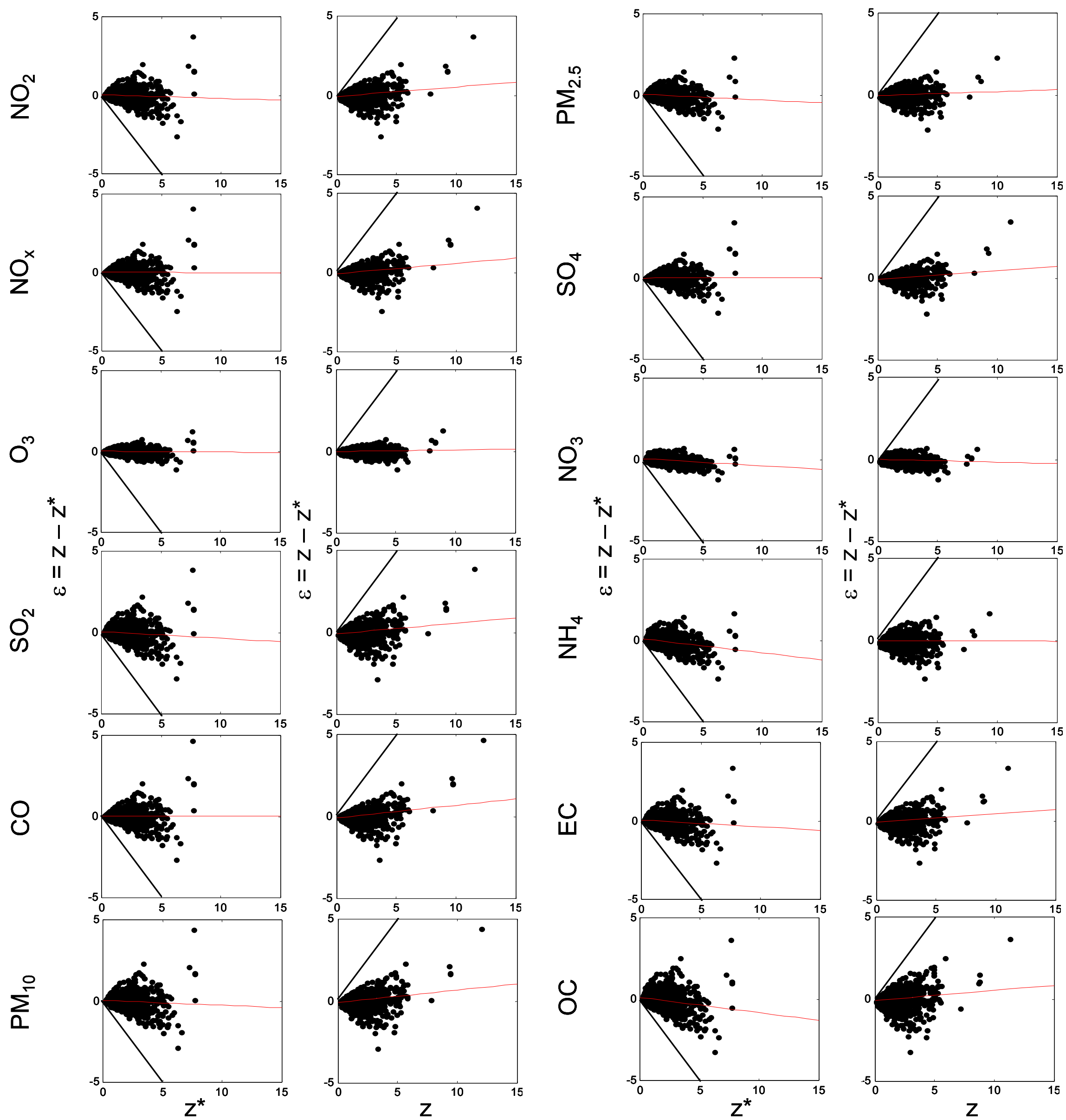

FIGURE S4. Scatterplots of error versus the base case (Z^*) and versus the simulation (Z) for a sample Monte Carlo simulation of instrument error. When error is independent of the true value (here, defined as the base case monitor data), the error type is classical. When error is independent of the measurement (here, defined as the simulation which has error added), the error type is Berkson. The above plots suggest that this error is neither classical nor Berkson.

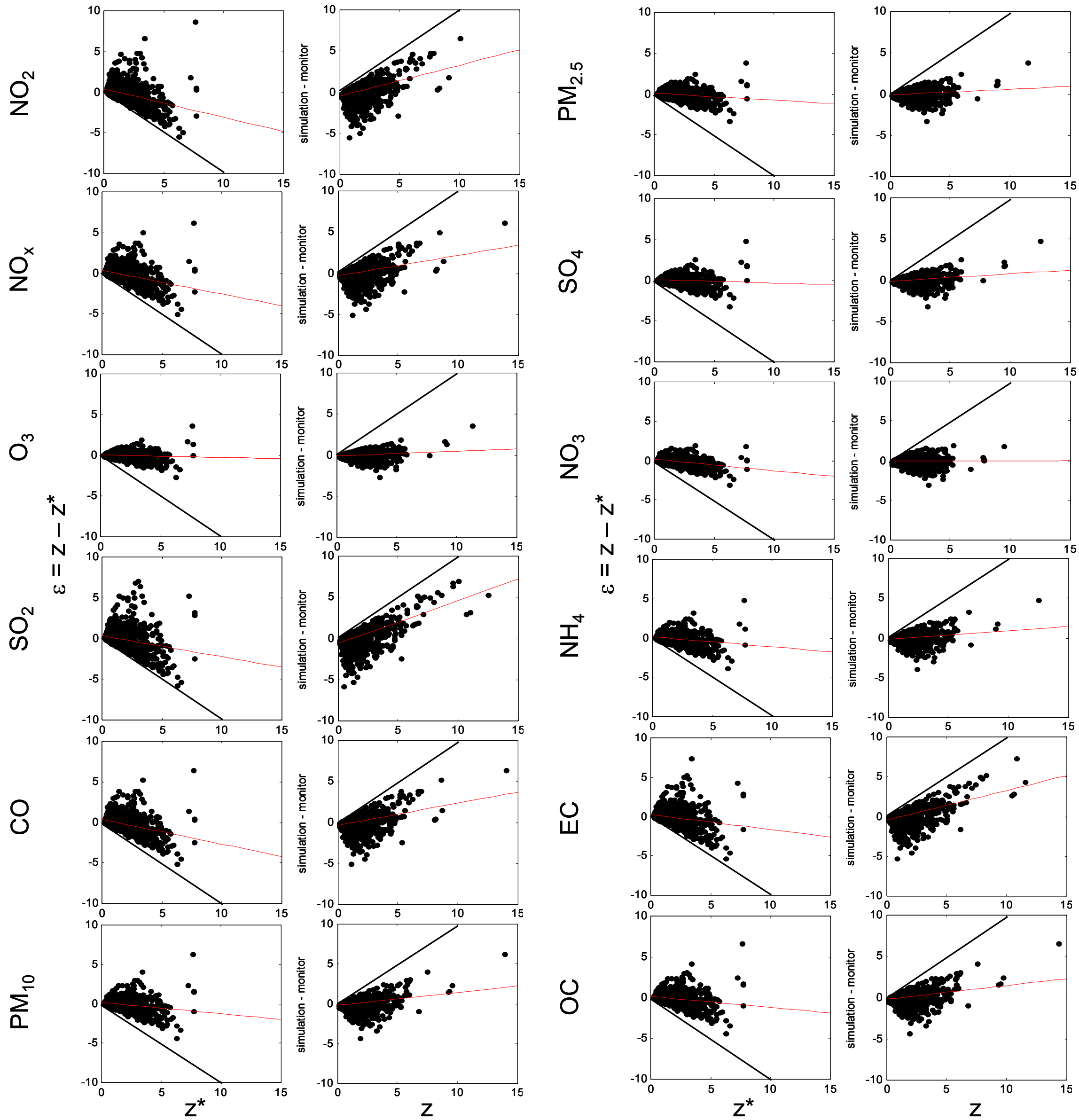

FIGURE S5. Scatterplots of error versus the base case (*Z) and versus the simulation (*Z*) for a sample Monte Carlo simulation of spatial error. When error is independent of the true value (here, defined as the base case monitor data), the error type is classical. When error is independent of the measurement (here, defined as the simulation which has error added), the error type is Berkson. The above plots suggest that this error is neither classical nor Berkson.**