

A method to represent ozone response to large changes in precursor emissions using high-order sensitivity analysis in photochemical models

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Supplemental Information

Table S1. Statistical evaluation for January in 22 cities of using Equation 3 to predict ozone with 100%, 25% and zero anthropogenic emissions.

City	Monitors	100% Emissions		25% Emissions		Zero Emissions	
		Bias (ppb)	Error (ppb)	Bias (ppb)	Error (ppb)	Bias (ppb)	Error (ppb)
Atlanta	12	-0.38	2.05	0.21	0.98	0.61	0.61
Birmingham	10	-0.71	1.64	0.31	0.56	0.32	0.32
Boston	20	0.20	2.54	1.53	2.60	0.86	0.86
Chicago	25	0.66	2.06	-0.01	1.45	0.83	0.89
Cleveland	11	-0.63	1.95	0.58	1.09	0.66	0.66
Dallas	17	-0.07	1.36	-0.10	0.49	0.21	0.22
Denver	11	0.28	1.18	-0.22	0.71	0.34	0.36
Detroit	11	0.50	2.24	0.25	1.77	0.84	0.87
Houston	21	0.40	2.00	-0.34	0.93	0.72	1.00
Los Angeles	43	0.43	1.63	-0.54	1.10	1.01	1.23
Minneapolis	8	0.01	1.23	0.18	0.80	0.32	0.33
New York	28	0.38	2.60	0.23	2.45	1.25	1.46
Philadelphia	16	0.59	2.42	-0.26	2.05	1.21	1.21
Phoenix	13	0.72	2.13	-0.36	1.26	0.69	0.70
Pittsburgh	14	-0.54	1.97	0.54	1.20	0.71	0.71
Sacramento	14	0.67	2.22	-0.10	1.05	0.48	0.49
Salt Lake City	11	-0.03	1.07	0.03	0.35	0.26	0.28
San Antonio	3	-0.44	0.90	0.09	0.25	0.11	0.13
San Francisco	22	0.44	1.90	-0.21	0.87	0.54	0.55
Seattle	9	-0.11	0.24	0.04	0.14	0.08	0.09
St Louis	15	-0.16	1.65	0.23	0.84	0.39	0.40
Washington DC	27	-0.15	2.59	0.63	1.70	0.84	0.84
All Cities	361	0.19	1.93	0.09	1.27	0.71	0.78

Table S2. Statistical evaluation for July in 22 cities of using Equation 3 to predict ozone with 100%, 25% and zero anthropogenic emissions.

City	Monitors	100% Emissions		25% Emissions		Zero Emissions	
		Bias (ppb)	Error (ppb)	Bias (ppb)	Error (ppb)	Bias (ppb)	Error (ppb)
Atlanta	12	-2.51	2.62	0.52	0.56	0.27	0.30
Birmingham	10	-1.91	1.92	0.39	0.40	0.15	0.18
Boston	20	-1.85	1.91	0.18	0.33	0.38	0.39
Chicago	25	-1.18	3.22	0.25	1.07	0.80	0.81
Cleveland	11	-2.11	2.21	0.35	0.60	0.43	0.44
Dallas	17	-1.25	1.43	0.28	0.33	0.24	0.25
Denver	11	-1.45	2.40	0.56	0.91	0.47	0.50
Detroit	11	-1.37	2.65	0.30	0.77	0.46	0.48
Houston	21	-0.93	2.67	0.24	1.13	1.15	1.34
Los Angeles	43	-3.09	4.12	1.21	1.85	2.02	2.06
Minneapolis	8	-0.77	1.49	0.12	0.42	0.21	0.23
New York	28	-2.17	2.74	0.24	0.81	0.78	0.79
Philadelphia	16	-2.09	3.39	0.40	0.87	0.71	0.71
Phoenix	13	-0.92	2.81	0.68	0.91	0.29	0.30
Pittsburgh	14	-1.93	2.21	0.20	0.34	0.31	0.32
Sacramento	14	-1.37	1.41	0.24	0.32	0.31	0.32
Salt Lake City	11	-1.08	1.12	0.40	0.42	0.18	0.20
San Antonio	3	-0.81	0.82	0.15	0.18	0.13	0.14
San Francisco	22	-1.16	1.42	0.25	0.47	0.67	0.69
Seattle	9	-0.98	1.05	0.07	0.42	0.20	0.22
St Louis	15	-1.37	2.31	0.36	0.62	0.30	0.32
Washington DC	27	-2.50	2.70	0.45	0.56	0.42	0.43
All Cities	361	-1.77	2.49	0.42	0.78	0.68	0.70