

AP2 PM Calibration

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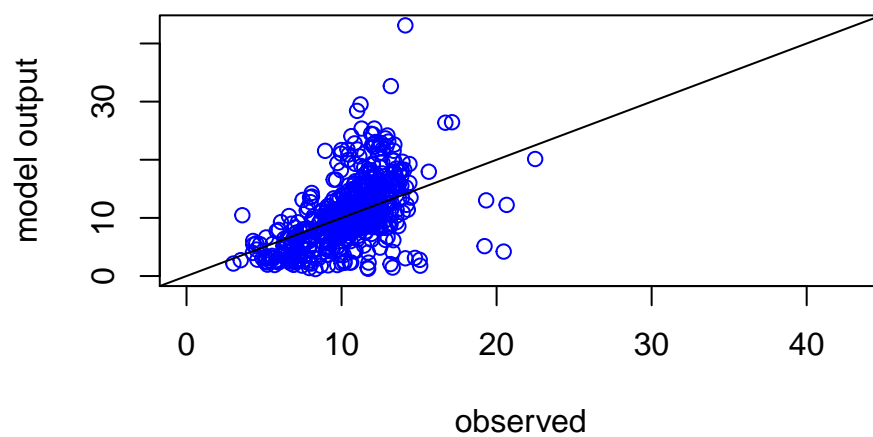
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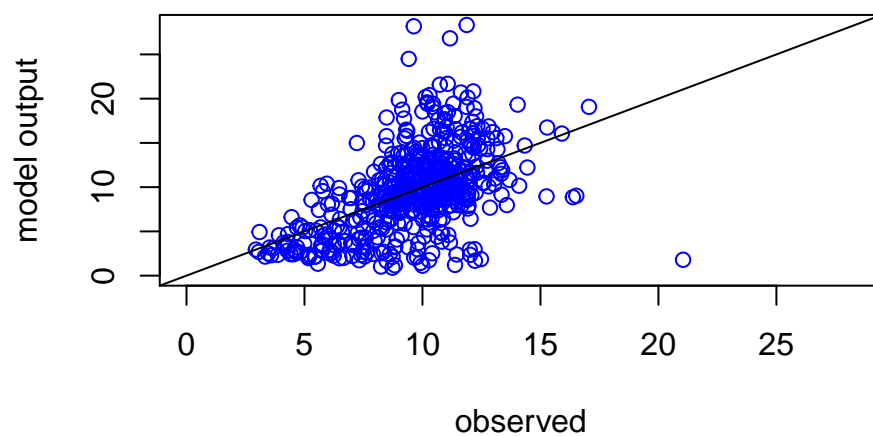
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1 Total PM correlation plots

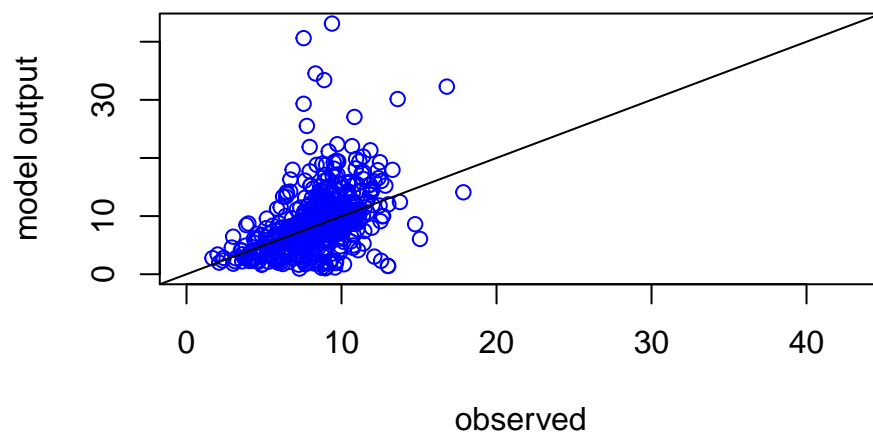
2008 calibration



2011 calibration



2014 calibration



pdf

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2 Summary statistics & monitor comparisons

2.1 All years

Table 1: Total PM2.5

YEAR	COR	MFE	MFB	OBS
2008	0.537	0.334	-0.096	584
2011	0.516	0.332	-0.097	547
2014	0.459	0.338	-0.050	592

Table 2: Sulfate

YEAR	COR	MFE	MFB	OBS
2008	0.863	0.512	-0.130	314
2011	0.839	0.491	-0.212	310
2014	0.857	0.455	-0.214	302

Table 3: Nitrate

YEAR	COR	MFE	MFB	OBS
2008	0.554	0.498	-0.031	307
2011	0.631	0.484	0.114	306
2014	0.563	0.514	0.043	299

Table 4: VOCs

YEAR	COR	MFE	MFB	OBS
2008	0.653	0.369	0.125	154
2011	0.564	0.446	0.312	151
2014	0.584	0.419	0.261	146

Table 5: NH4

YEAR	COR	MFE	MFB	OBS
2008	0.442	0.436	-0.106	186
2011	0.476	0.422	0.251	182
2014	0.307	0.514	0.367	177

2.2 2008

Table 6: 2008 Model output and total PM monitor data

PM25	Min. : 1.204	1st Qu.: 7.432	Median :10.171	Mean :10.669	3rd Qu.:13.500	Max. :43.114
monitor.PM	Min. : 3.024	1st Qu.: 9.154	Median :10.825	Mean :10.524	3rd Qu.:12.030	Max. :22.488

Table 7: 2008 species means

	obs	model	monitor
NH4	186	1.2946465	1.2517572
SO4	314	2.5991190	2.1099411
PM25-PRI	51	5.6130018	0.8613242
VOC_C	154	1.4648873	1.2704157
NO3	307	0.9441601	0.9983817
total		11.9158146	6.4918199

2.3 2011

Table 8: 2011 Model output and total PM monitor data

PM25	Min. : 0.8966	1st Qu.: 6.5132	Median : 9.4861	Mean : 9.6269	3rd Qu.:12.2155	Max. :28.3280
monitor.PM	Min. : 2.940	1st Qu.: 8.471	Median : 9.829	Mean : 9.601	3rd Qu.:11.132	Max. :21.044

Table 9: 2011 species means

	obs	model	monitor
NH4	182	1.1855892	0.8325461
SO4	310	1.6817749	1.5885828
PM25-PRI	179	4.3122586	0.6329489
VOC_C	151	1.4619880	1.0548562
NO3	306	0.8664846	0.8483638
total		9.5080953	4.9572979

2.4 2014

Table 10: 2014 Model output and total PM monitor data

PM25	Min. : 0.9685	1st Qu.: 5.9902	Median : 8.5180	Mean : 9.0477	3rd Qu.:11.0945	Max. :43.1240
monitor.PM	Min. : 1.674	1st Qu.: 7.425	Median : 8.705	Mean : 8.490	3rd Qu.: 9.761	Max. :17.862

Table 11: 2014 species means

	obs	model	monitor
NH4	177	1.2224589	0.6925505
SO4	302	1.2833386	1.2515862
PM25-PRI	175	4.9550909	0.5465459
VOC_C	146	1.2012135	0.8809678
NO3	299	0.8695669	0.8766944
total		9.5316687	4.2483447

3 Calibration coefficients

Table 12: Model Calibration coefficients

	NH4	NOx	PM25	SO2	VOC_A	VOC_B
2008	0.30	0.52	0.58	1.10	0.03	0.032
2011	0.30	0.54	0.64	1.20	0.03	0.035
2014	0.31	0.58	0.62	1.25	0.03	0.028

4 Marginal damage estimates

All values are arithmetic means for all counties in \$2014 per U.S. (short) ton.

	PM25	NH3	SO2	NOx	VOCs
Area	79,000	54,400	32,100	12,000	4,080
Low	66,700	45,200	29,500	10,800	3,450
Medium	40,700	25,200	23,300	8,390	2,100
Tall	35,100	20,100	25,000	8,200	1,820
New Tall	34,200	19,900	24,200	7,960	1,770
Average	60,300	40,200	28,100	10,300	3,120

2008

	PM25	NH3	SO2	NOx	VOCs
Area	85,600	56,000	33,900	12,400	4,010
Low	72,300	46,600	31,200	11,200	3,390
Medium	44,100	26,100	24,600	8,690	2,070
Tall	38,100	21,100	26,300	8,510	1,790
New Tall	37,100	20,500	25,500	8,270	1,740
Average	65,400	41,400	29,600	10,600	3,070

2011

	PM25	NH3	SO2	NOx	VOCs
Area	89,900	62,800	38,300	14,800	4,350
Low	75,900	52,300	35,100	13,300	3,670
Medium	46,300	29,400	27,700	10,300	2,240
Tall	39,900	24,000	29,400	10,000	1,930
New Tall	38,900	23,300	28,600	9,720	1,880
Average	68,700	46,600	33,400	12,600	3,320

2014

	PM25	NH3	SO2	NOx	VOC_A
Area	113,689	59,276	60,608	23,685	8,946
Low	106,688	103,694	40,273	15,070	5,741
Medium	62,985	37,449	29,056	9,476	3,032
Tall	39,161	11,408	26,097	8,066	1,548
New Tall	32,450	14,124	25,203	8,026	1,438
Average	70,994	45,190	36,247	12,865	4,141

2008 marginal damage summary (weighted by emissions)

	PM25	NH3	SO2	NOx	VOC_A
Area	115,544	52,157	58,217	22,046	7,759
Low	112,336	94,740	40,499	15,279	5,524
Medium	62,323	42,847	28,068	9,540	2,849
Tall	37,600	10,937	26,438	8,324	1,535
New Tall	33,824	15,499	25,554	8,331	1,384
Average	72,327	43,236	35,755	12,704	3,810

2011 marginal damage summary (weighted by emissions)

	PM25	NH3	SO2	NOx	VOC_A
Area	125,050	65,364	56,267	25,516	8,076
Low	123,290	99,751	44,753	18,416	6,019
Medium	63,257	43,974	29,782	11,405	3,000
Tall	38,288	17,018	28,742	9,782	1,649
New Tall	41,062	18,919	30,562	9,923	1,583
Average	78,190	49,005	38,021	15,008	4,066

2014 marginal damage summary (weighted by emissions)

5 Total mortality

Total mortalities from all emissions

2008	2011	2014
169460	141730	152940

%% # Monitor data

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%% # Verification against previous PM data
%% # Histograms of errors
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