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Power plant fuel switching and air quality in a tropical, forested environment

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Figure S1. Bar chart of observed daily rain amount taken as an average across five meteorological stations located in the Manaus urban region during February 2014. The station network is part of the Climatical Changes Network project (REMCLAM) of Brazilian Financier of Studies and Projects (FINEP).

Figure S2. Box-whisker plots comparing observed and simulated (a) NO_x concentrations and (b) ozone concentrations. Observation data were obtained from G-1 flights during six days of March 2014 during GoAmazon2014/5. There were no flight data from February 2014 applicable for comparison. The G-1 data correspond to an altitude window of 500 to 650 m high and an afternoon time window (11:00 to 15:00, local time; 15:00 to 19:00 UTC). Simulation data were selected from a similar vertical level and compatible flights paths and times. The simulation used the methodology described in Section 2 and emissions for Case B (real case). The comparison in the figure shows that there is good agreement in the range of simulated and observed ozone concentrations.

Figure S3. Maps of near-surface ozone concentrations for historic emissions (Case A), present-day emissions (Case B), and planned future emissions (Case C). The left column shows afternoon means for February 2014. The right column shows afternoon standard deviations. See caption of Figure 3 for further information.

Table S1. Power plant information in the study region in each month of 2014. Power plants listed here are the same as Table 2. Electricity produced (10^7 kWh) are described by fuel types, abbreviated as fuel oil (F), diesel (D), and natural Gas (G) (ELETROBRAS, 2014).

Power Plant	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Aparecida (G)	9.42	8.61	10.10	9.90	9.74	9.39	9.87	9.72	8.50	9.26	9.24	8.00
Aparecida (D)	0.03	0.48	0.08	0.37	0.62	0.12	0.32	1.06	0.74	0.57	0.85	0.64
Mauá / Electron (F)	2.72	2.37	0.74	1.79	2.44	0.93	0.97	0.89	0.69	1.12	1.41	1.41
Mauá / Electron (G)	7.98	7.08	5.88	5.34	2.99	7.58	8.22	7.97	7.43	8.23	6.96	4.56
Mauá / Electron (D)	10.30	10.60	10.00	12.50	14.00	11.20	11.40	8.11	10.80	9.69	7.97	10.20
Flores (D)	2.98	2.37	2.46	2.98	3.91	3.56	3.47	2.11	2.89	2.65	3.22	3.68
Cidade Nova (D)	0.48	0.48	0.42	0.61	0.82	0.61	0.67	0.34	0.74	0.65	0.71	1.02
São José (D)	1.78	1.12	1.11	1.37	1.71	1.43	1.56	0.93	0.94	0.98	1.09	1.03
Iranduba (D)	1.39	1.34	1.31	1.66	2.46	2.09	1.79	1.30	1.67	1.44	1.26	1.49
Breitener Tambaqui (G)	4.46	4.13	4.61	4.43	4.71	4.44	4.64	4.78	4.47	4.59	4.49	4.51
Breitener Jaraqui (G)	4.59	4.11	4.55	4.41	4.62	4.46	4.58	4.70	4.44	4.40	4.38	4.58
Ponta Negra (G)	4.87	4.43	4.90	4.75	4.90	4.75	4.89	4.83	4.72	4.84	4.62	4.55
Manauara (F)	1.17	0.73	0.43	0.48	0.48	0.39	0.34	0.48	0.53	0.39	0.39	0.48
Manauara (G)	6.63	3.60	4.46	4.23	4.33	4.18	4.49	4.11	4.26	4.37	4.27	4.29
Cristiano Rocha (F)	1.55	1.62	0.84	0.79	1.34	0	0	0	0	0	0	0
Cristiano Rocha (G)	3.38	2.82	4.11	3.98	3.30	4.98	5.19	5.14	5.05	5.18	5.10	5.17

References

ELETROBRAS: Relatory of energy generation., Personal Communication, Environment Departament of Eletrobras Amazonas Energia., 2014.

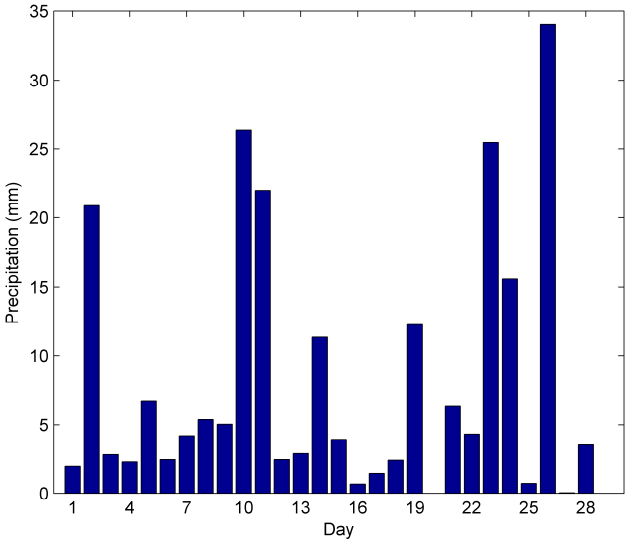

Figure S1

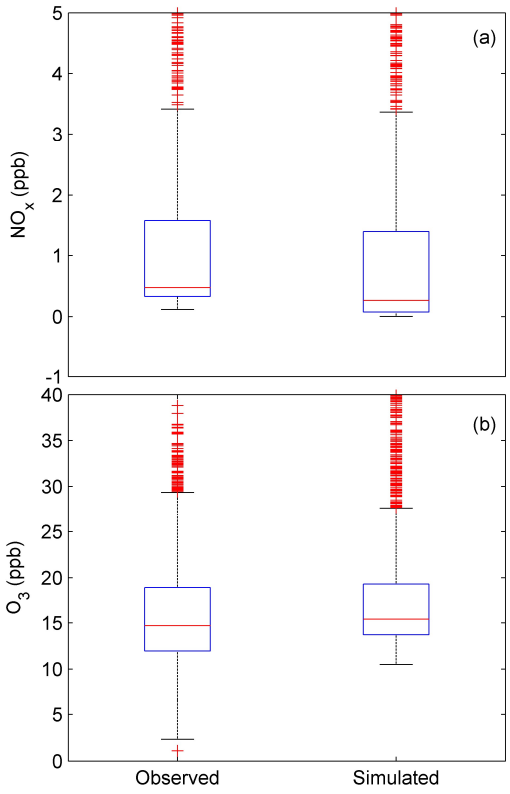
(a)
NO_x (ppb)
5
4
3
2
1
0
-1
(b)
O_3 (ppb)
40
35
30
25
20
15
10
5
0
Observed
Simulated

Figure S2

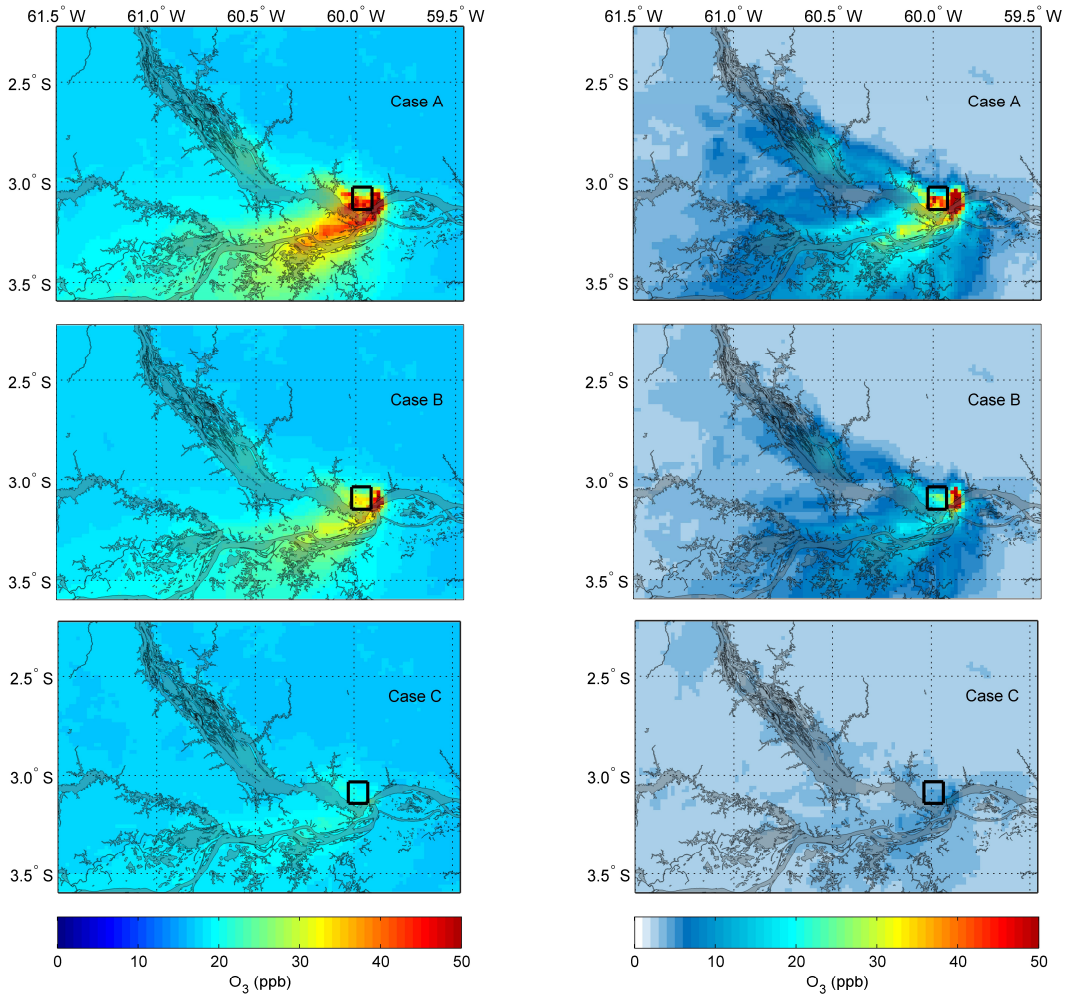
61.5° W
61.0° W
60.5° W
60.0° W
59.5° W
2.5° S
3.0° S
3.5° S
Case A
Case B
Case C
0
10
20
30
40
50
O3 (ppb)

Figure S3