

AIR QUALITY IMPACT ESTIMATION DUE TO UNCONTROLLED EMISSIONS FROM  
CAPUAVA PETROCHEMICAL COMPLEX IN THE METROPOLITAN AREA OF SÃO PAULO  
(MASP), BRAZIL

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**Table S1.** Summary of statistical analysis for hourly concentrations ( $\mu\text{g m}^{-3}$ ) in the Capuava AQS, during 2017-2022 and modeled data provided by AERMOD.

<b>BENZENE</b>								
Year	Mean	S.D.	Max.	Min.	Median	1 <sup>st</sup> quartile	3 <sup>th</sup> quartile	N
2017	2.70	3.98	52.6	0.1	1.2	0.54	2.92	8277
2018	1.55	2.6	46.2	0.1	0.62	0.32	1.63	6561
2019	2.70	4.25	74.5	0.1	1.3	0.58	2.95	7567
2020	2.48	4.19	52.2	0.1	0.91	0.48	2.42	1630
Episode	4.60	8.73	79.1	0.02	1.45	0.64	4.26	1141
2021	4.19	7.1	77.7	0.1	1.6	0.75	4.38	4878
2022	3.06	4.93	49.4	0.1	1.3	0.6	3.3	3154
<b>TOLUENE</b>								
2017	5.37	4.89	44.7	0.14	4.1	1.94	7.16	8291
2018	4.74	4.8	55.3	0.15	3.34	1.63	6.17	6562
2019	4.71	5.29	64.6	0.1	3.26	1.45	6.18	7564
2020	3.74	3.96	48.2	0.14	2.7	1.21	5.1	1628
Episode	7.10	7.34	58.7	0.3	5.07	2.04	9.4	1154
2021	5.97	6.4	69.4	0.1	4.1	1.64	7.83	4867
2022	5.55	6.25	72.8	0.1	3.7	1.30	7.5	3153
<b>PM<sub>10</sub></b>								
2017	26.0	21.5	184	1.0	21.0	12.0	35.0	8585
2018	24.6	20.7	192	1.0	19.0	11.0	33.0	8305
2019	21.6	17.3	222	1.0	18.0	9.0	29.0	7951
2020	21.7	19.8	171	1.0	16.0	8.0	28.0	7221
Episode	29.3	25.5	174	1.0	21.0	11.0	39.0	1450
2021	28.1	22.8	201	1.0	22.0	13.0	36.0	7021
2022	29.4	21.4	185	1.0	25.0	15.0	38.0	4321
<b>Modeled data - April and May, 2021</b>								
PM	5.8	13.9	119.1	0.03	0.81	0.24	3.81	1464
VOC	27.84	61.0	433.8	0.3	4.2	2.1	9.94	1464

**Table S2.** Summary of AERMOD input data extracted from Environmental Licenses of Braskem and RECAP.

<b>BRASKEM</b>	<b>COORDINATES (m)</b>		<b>FLOW RATE</b>	<b>POLLUTANTS (mg/Nm<sup>3</sup>)</b>	
<b>STACK</b>	<b>UTM X</b>	<b>UTM Y</b>	<b>(Nm<sup>3</sup>/s)</b>	<b>PM</b>	
1	348568	7384835	17.372	91.820	
2	348568	7384835	17.927	24.780	
3	348588	7384829	19.936	31.410	
4	348611	7384825	14.572	11.030	
5	348580	7384809	16.846	30.670	
6	348562	7384812	18.149	12.410	
7	348604	7384802	18.740	13.860	
8	348595	7384773	18.140	80.240	
9	348572	7384778	6.923	99.560	
10	348623	7384797	8.607	44.380	
11	348642	7384784	2.195	23.240	
12	348532	7384771	18.033	11.450	
13	348527	7384775	16.853	0.000	
14	348443	7384959	2.534	0.000	
15	348443	7384949	0.975	0.000	
16	348446	7384972	5.194	0.000	
17	348487	7385054	3.497	0.000	
18	348478	7385023	1.003	0.000	
19	348490	7385064	11.804	0.000	
20	348552	7384838	12.148	0.000	
21	348546	7384818	12.148	0.000	
22	348475	7384810	86.027	17.800	
23	348759	7385190	30.920	8.820	
24	348756	7385208	20.900	5.360	
25	348581	7384731	56.192	0.000	
26	348557	7384736	56.192	0.000	
27	348595	7384740	54.290	0.000	
28	348570	7384746	54.290	0.000	
<b>RECAP</b>	<b>COORDINATES (m)</b>		<b>FLOW RATE</b>	<b>POLLUTANTS (mg/Nm<sup>3</sup>)</b>	
<b>STACK</b>	<b>UTM X</b>	<b>UTM Y</b>	<b>(Nm<sup>3</sup>/s)</b>	<b>VOC</b>	<b>PM</b>
<b>1</b>	7384480	349130	12.500		31.340
<b>2</b>	7384470	349140	12.500		42.650
<b>3</b>	7384450	349150	12.500		33.620
<b>4</b>	7384400	349290	61.111		45.690
<b>5</b>	7384390	349270	12.500		94.580
<b>6</b>	7384330	349340	13.889		37.710
<b>7</b>	7384500	349180	1.111		211.480
<b>8</b>	7384510	349230	1.667	0.01	0.010
<b>9</b>	7384150	349840	1.667	0.01	0.010
<b>10</b>	7384447	349377	1.667	0.001	36.660

<b>11</b>	7384319	349508	1.667	0.001	39.07
<b>12</b>	7384331	349517	1.667	0.001	39.07
<b>13</b>	7384283	349456	8.333	0.04	0.320
<b>14</b>	7384414	349580	25.000		38.300
<b>15</b>	7384362	349371	1.389		188.900

Table S3. Summary of statistical analysis of AERMET input data.

	Temperature (° C)	Relative humidity (%)	Atmospheric pressure (hPa)	Wind direction (°)	Wind speed (m.s <sup>-1</sup> )	Cloud coverage level	Cloud height level
<b>Availability (%)</b>	99.9	99.9	100.0	99.8	100.0	100.0	100.0
<b>Mín.</b>	11.6	18.0	919.4	0.0	0.0	0.0	0.0
<b>Mean</b>	19.4	71.4	927.0	134.8	1.3	4.5	4882.9
<b>Máx.</b>	30.2	93.0	934.8	360.0	3.2	10.0	9999.0
<b>S.D.</b>	3.6	16.1	2.6	93.6	0.6	3.9	4011.3

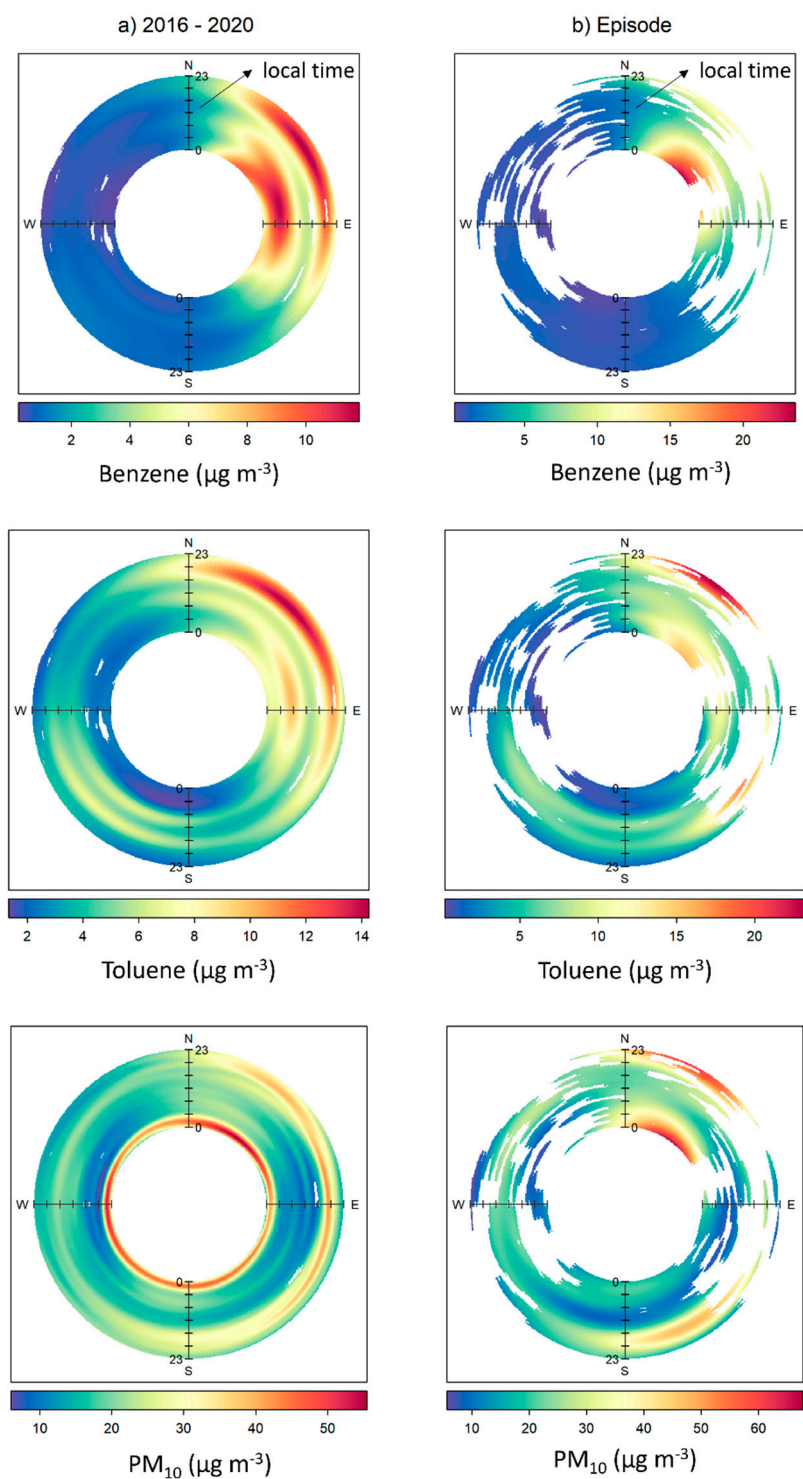


Figure S1. Changes in benzene, toluene and  $\text{PM}_{10}$  mean hourly concentrations at Capuava station, depending on wind directions. a) Polar annulus plots from 2017 – 2020 and b) Polar annulus plots for episode from April to May 2021. Color scale represents concentrations ( $\mu\text{g m}^{-3}$ ), the thickness in the circle represents the hour of the day: 00:00 inside to 11:00 p.m. outside. Blank spaces are missing values.