Informações Suplementares

Article

Extreme Wildfires in Brazil, in 2024, and their Impact on the Air Quality in Urban Areas

Queimadas Extremas no Brasil, em 2024, e seu Impacto na Qualidade do Ar de Áreas Urbanas

Matheus Campelo,[a] Graciela Arbilla,[a] Cleyton Martins da Silva[a,]*

[a] Universidade Federal do Rio de Janeiro, Institute of Chemistry, Zip Code 21941-909, Rio de Janeiro-RJ, Brazil

[b] Universidade Veiga de Almeida, Campus Tijuca, Zip Code 20271-020, Rio de Janeiro-RJ, Brazil

*martins.cleyton@gmail.com

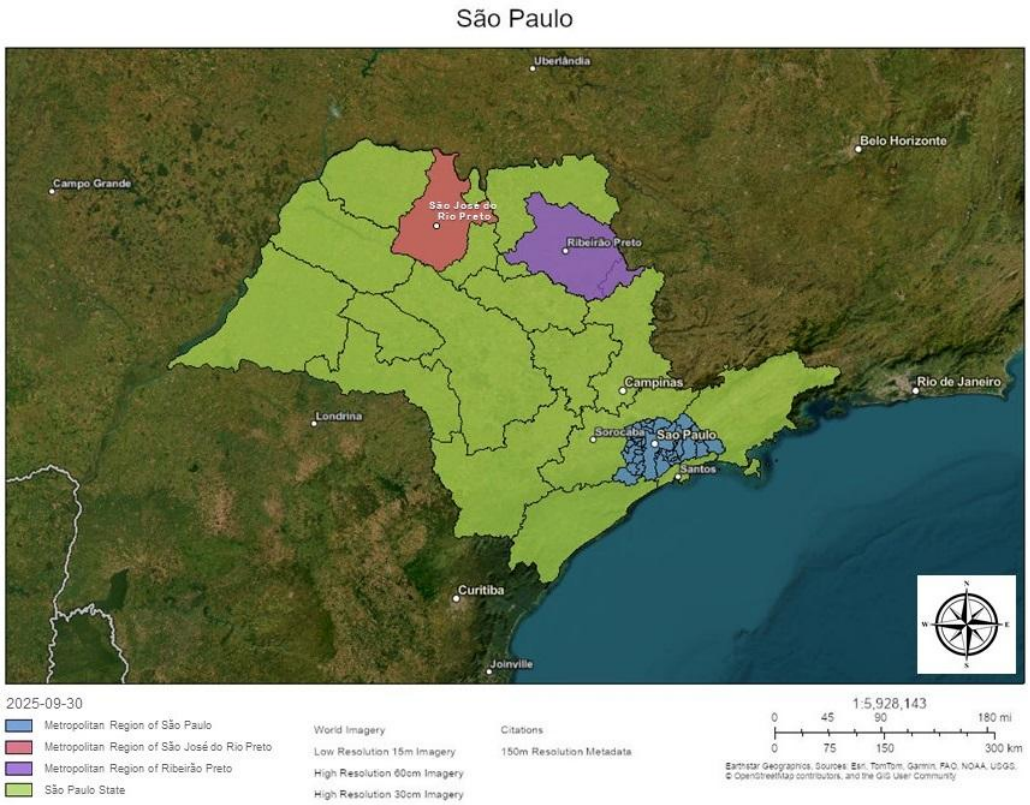


Figure S1a. State of São Paulo - Metropolitan Area of São Paulo: MASP (blue); Ribeirão Preto (purple); São José do Rio Preto (red)

This is an open-access article distributed under the terms of the Creative Commons Attribution Licence.

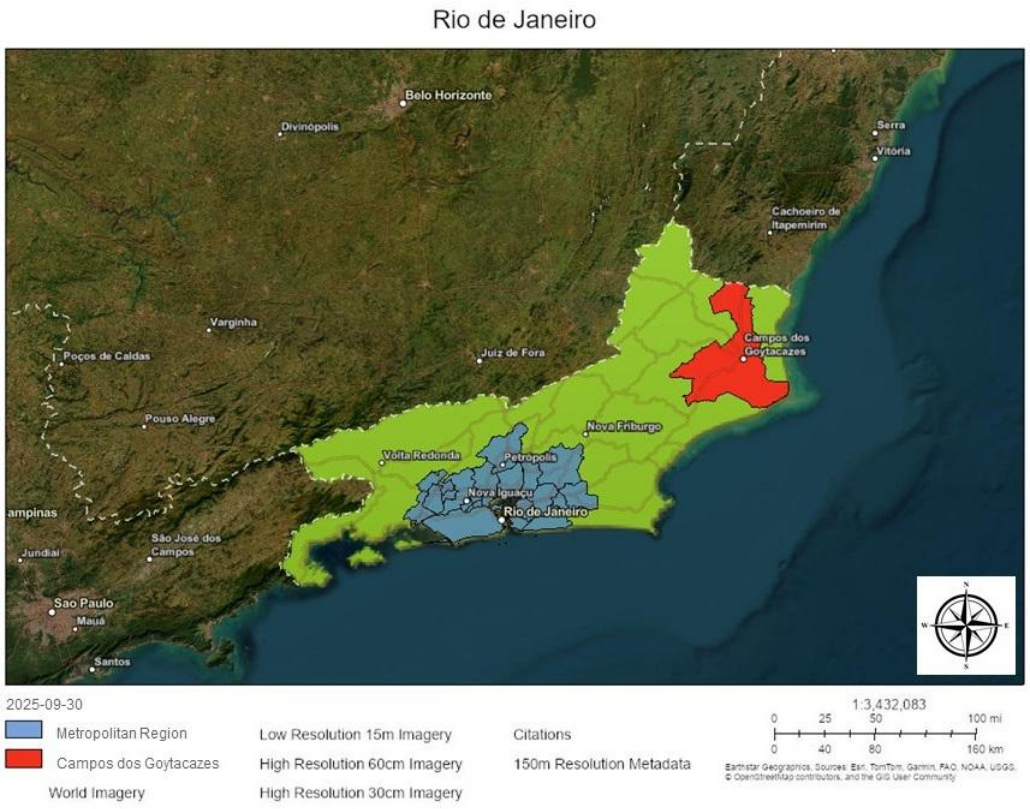


Figure S1b. State of Rio de Janeiro - Metropolitan Region of Rio de Janeiro: MRRJ (blue); Campos dos Goytacazes (red)

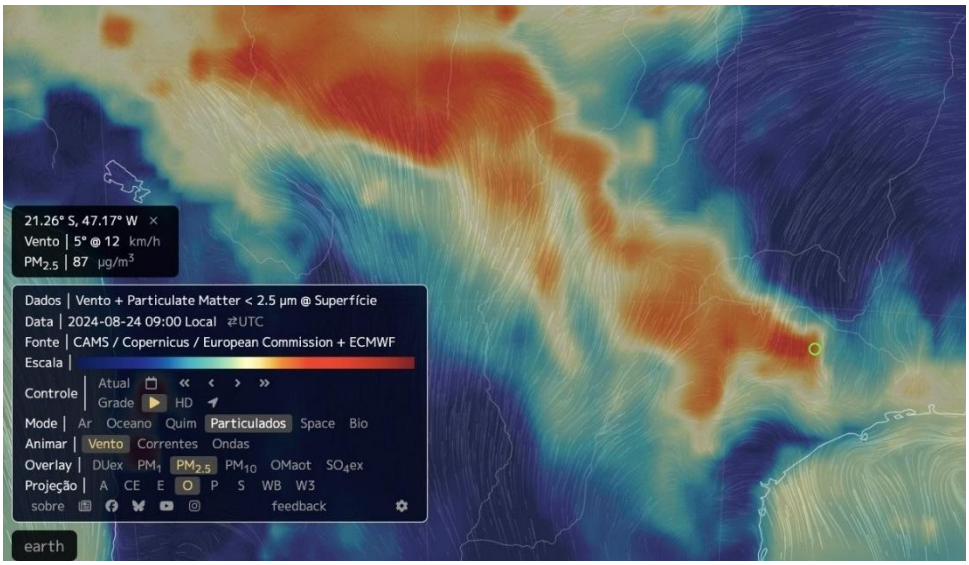


Figure S2a. Satellite image for 24 August 2024 (9:00 AM local time), showing $PM_{2.5}$ levels. Ribeirão Preto (SP) is indicated by the green circle. Source: https://earth.nullschool.net/pt/

This is an open-access article distributed under the terms of the Creative Commons Attribution Licence.

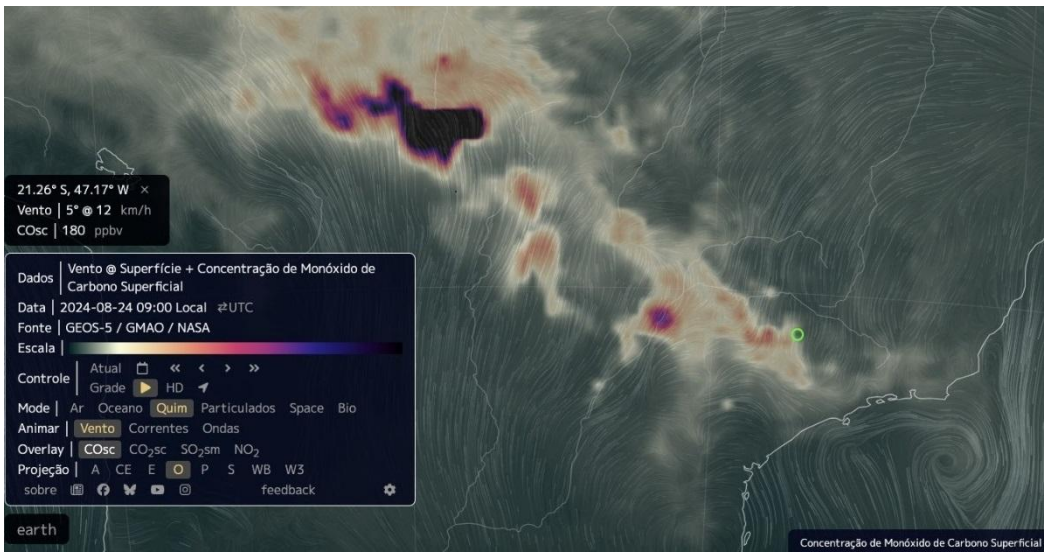


Figure S2b. Satellite image for 24 August 2024 (9:00 AM local time), showing CO levels. Ribeirão Preto (SP) is indicated by the green circle. Source: https://earth.nullschool.net/pt/

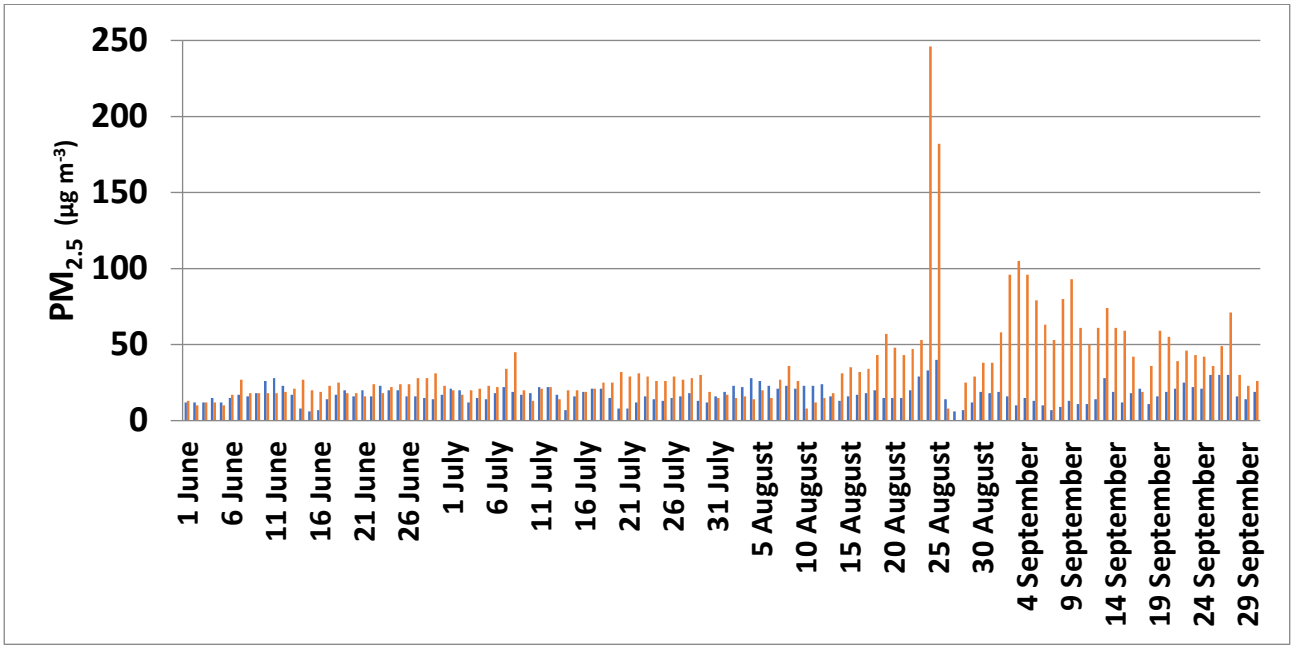


Figure S3. 24-hour $PM_{2.5}$ concentrations in the city of Ribeirão Preto for the period June- September 2023 (blue); 2024 (red) (CETESB, 2024)

This is an open-access article distributed under the terms of the Creative Commons Attribution Licence.

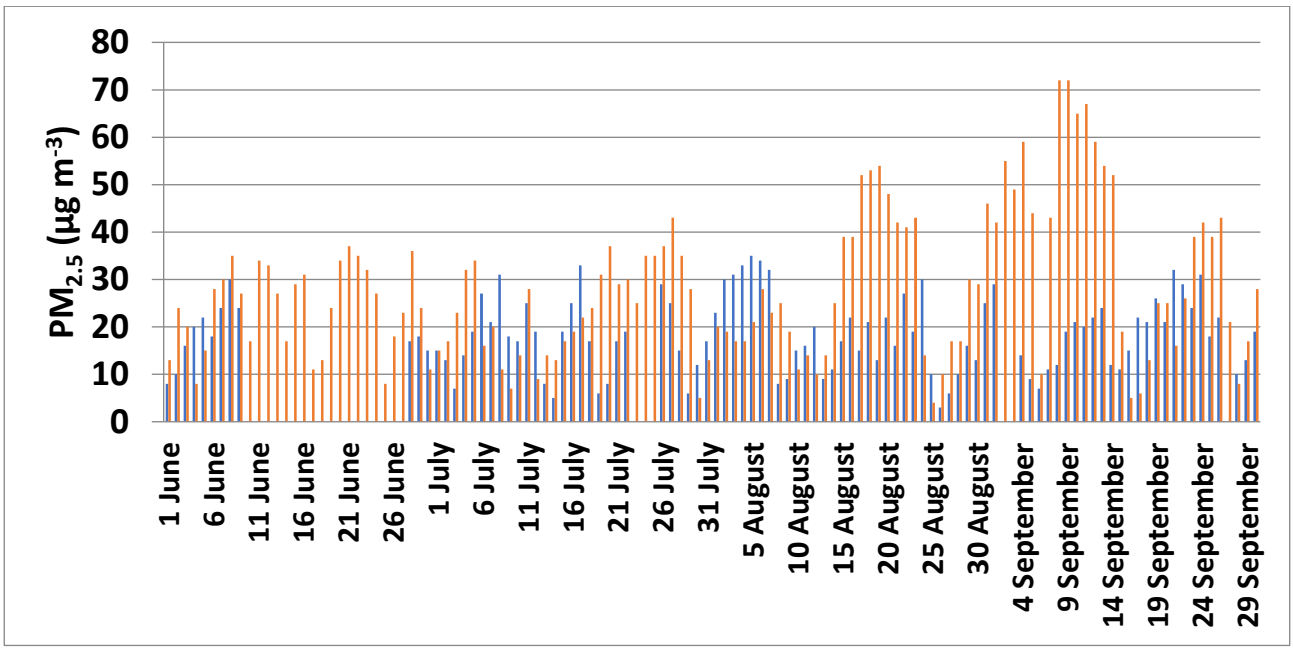


Figure S4. 24-hour $PM_{2.5}$ concentrations in Santana (MASP) for the period June-September 2023 (blue); 2024 (red) (CETESB, 2024)

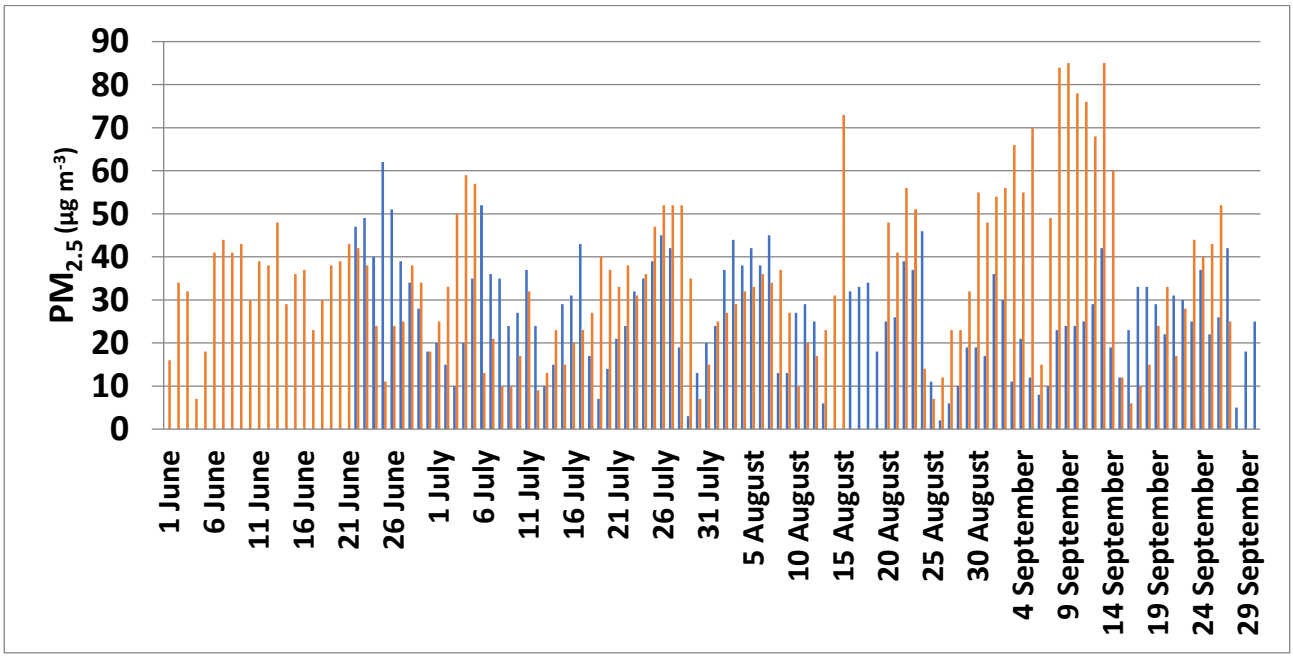


Figure S5. 24-hour $PM_{2.5}$ concentrations in Osasco (MASP) for the period June-September 2023 (blue); 2024 (red) (CETESB, 2024)

This is an open-access article distributed under the terms of the Creative Commons Attribution Licence.

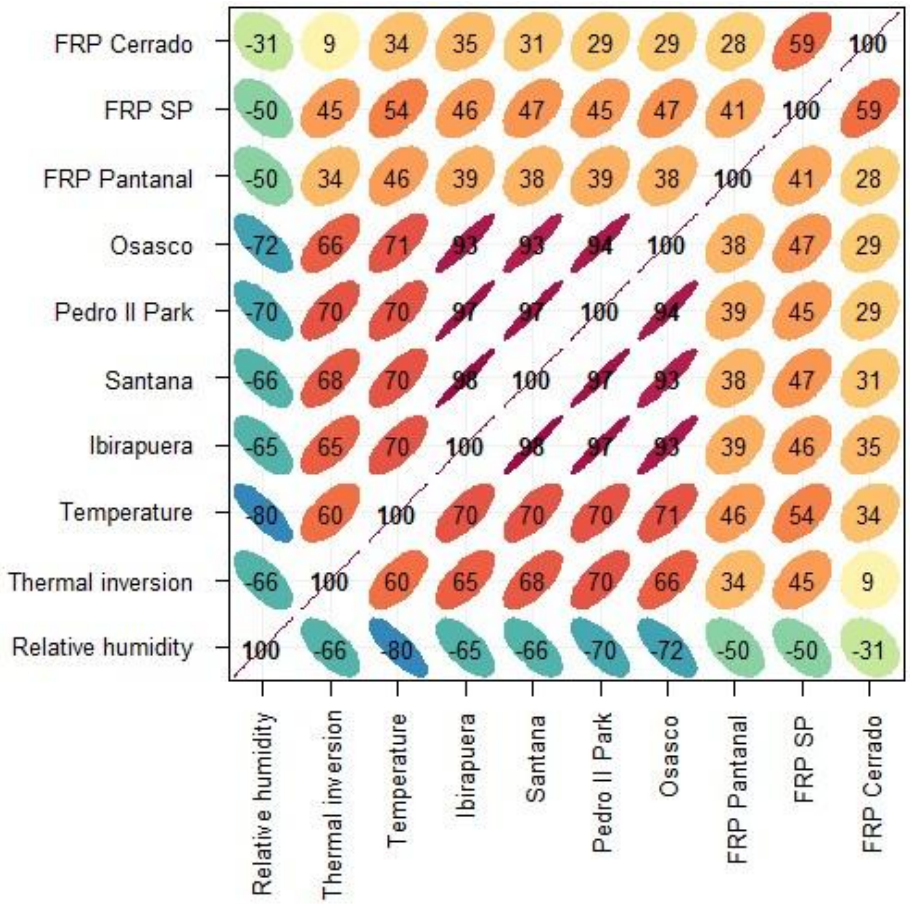


Figure S6. Correlation analysis for the period June-September 2024 is shown which includes: 24-hour $PM_{2.5}$ concentrations determined in Ibirapuera, Pedro II Park, Osasco and Santana (CETESB, 2024), the mean FRP in Cerrado, Pantanal and São Paulo State (INPE, 2024), temperature, relative humidity and thermal inversion (CETESB, 2024)

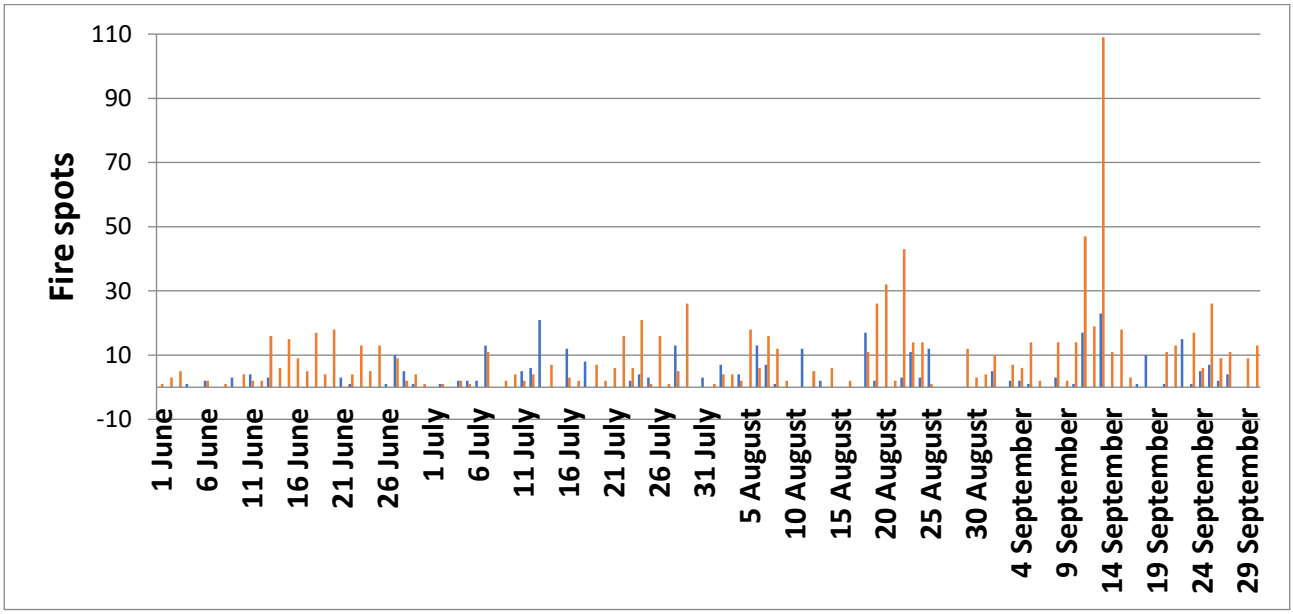


Figure S7. Fire spots in the State of Rio de Janeiro in the period June-September 2023 (blue); 2024 (red) (INPE, 2025)

This is an open-access article distributed under the terms of the Creative Commons Attribution Licence.

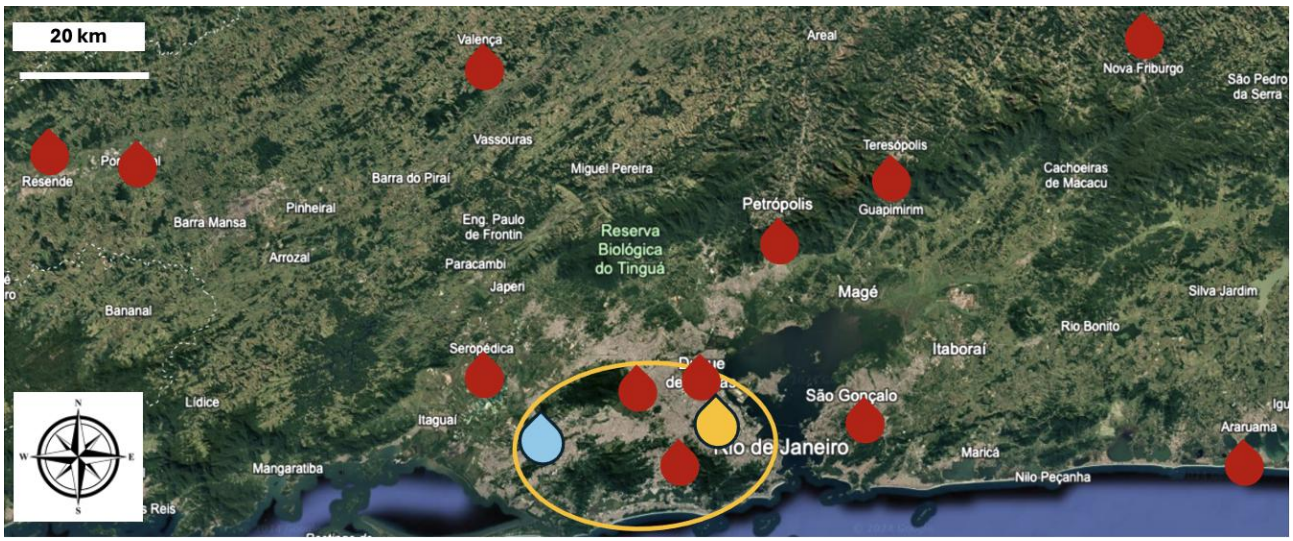


Figure S8. Main fire spots (in red) in the vicinity of the MRRJ (indicated in orange) on 13 and 14 September 2024. Monitoring stations: Manguinhos (yellow); Largo do Bodegão (Santa Cruz, blue)

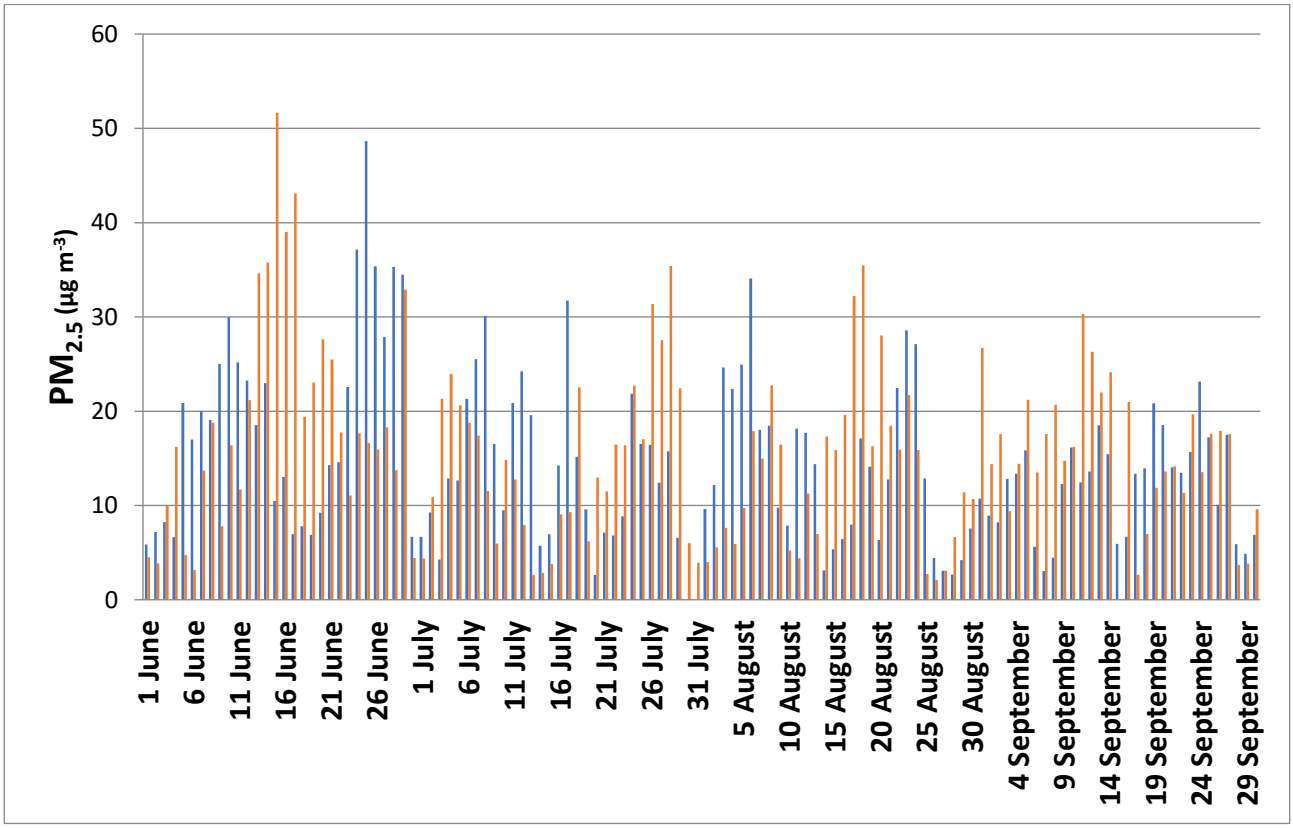


Figure S9. 24-hour $PM_{2.5}$ concentrations in Manguinhos (RMRJ) for the period June-September 2023 (blue); 2024 (red) (INEA, 2024)

This is an open-access article distributed under the terms of the Creative Commons Attribution Licence.

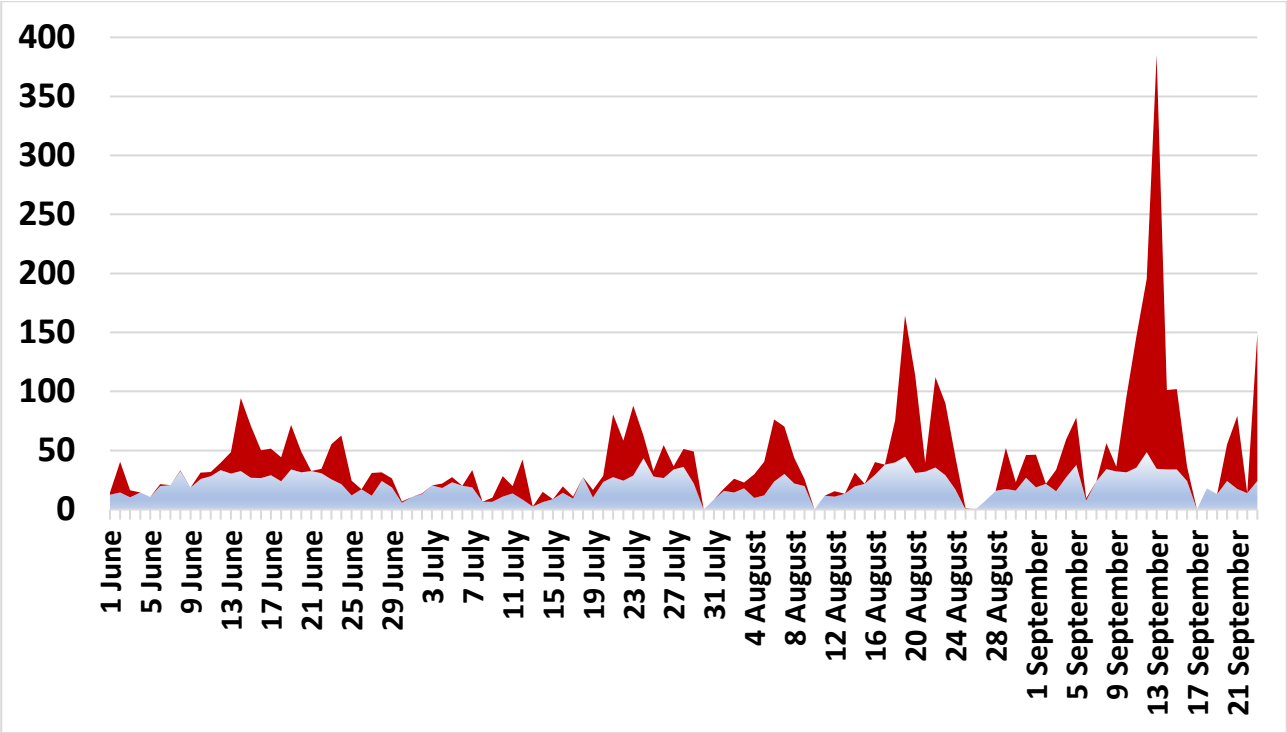


Figure S10. Number of fire spots (red) and 24-hour $PM_{2.5}$ concentrations in μg m^{-3} (blue), determined in Santa Cruz, Rio de Janeiro, in June-September 2024

Table S1. Number of fires and their % contribution considering a total of 278299 spots in 2024

Location	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total 2024
Caatinga	700	151	175	101	169	336	542	1207	2910	4777	4842	4325	20235
Caatinga (%)	0,3	0,1	0,1	0,0	0,1	0,1	0,2	0,4	1,0	1,7	1,7	1,6	7,3
Cerrado	1044	795	1806	930	3437	5217	7463	18620	29319	8024	2944	1869	81468
Cerrado (%)	0,4	0,3	0,6	0,3	1,2	1,9	2,7	6,7	10,5	2,9	1,1	0,7	29,3
Pantanal	310	73	176	94	246	2639	1218	4411	2688	2437	191	15	14498
Pantanal (%)	0,1	0,0	0,1	0,0	0,1	0,9	0,4	1,6	1,0	0,9	0,1	0,0	5,2
Pampa	12	31	25	14	8	33	82	98	59	35	13	14	424
Pampa (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,2
Amazônia	2049	3157	2654	1117	1670	2842	11434	38266	41463	16169	14158	5367	140346
Amazônia (%)	0,7	1,1	1,0	0,4	0,6	1,0	4,1	13,7	14,9	5,8	5,1	1,9	50,4
Mata Atlântica	440	359	612	357	794	1365	1739	6033	6715	1914	515	485	21328
Mata Atlântica (%)	0,2	0,1	0,2	0,1	0,3	0,5	0,6	2,2	2,4	0,7	0,2	0,2	7,7

Source: INPE [Link]

This is an open-access article distributed under the terms of the Creative Commons Attribution Licence.