	LAT	LON	DMAO(KI	CITY	REF POINT	MARKER PO	DATE	DAY	MONTH	TIME PER GM	SAT	INST	CON	BT	BT	XB	FR	C2-adapted Laurent.	D	C
2	-3.547	-58.662	162	Itacoatiara	NS do Perp	AVPAD	Wednesday, October 11, 2023	Wed	Oct	6:01 - 11:59 AM	G16FRP	GOES	100	392.3	301.2	346.75	973.6	VH (FRP>600)	D	1
3	-3.015	-59.057	111	Itacoatiara	Amatari - Lindóia - Rio Urubu	AVPrio	Friday, October 20, 2023	Fri	Oct	12:00 - 18:00 PM	G16FRP	GOES	90	389.7	287.8	338.75	965.1	HIGH (100<FRP<=600)	D	1
4	-3.015	-59.057	111	Itacoatiara	Amatari - Lindóia - Rio Urubu	AVPrio	Friday, October 20, 2023	Fri	Oct	12:00 - 18:00 PM	G16FRP	GOES	67	389	273.5	331.25	949.9	HIGH (100<FRP<=600)	D	1
5	-3.015	-59.076	100	Itacoatiara	Amatari - Lindóia - Rio Urubu	AVPrio	Friday, October 20, 2023	Fri	Oct	12:00 - 18:00 PM	G16FRP	GOES	55	386.4	286.3	336.35	887.2	HIGH (100<FRP<=600)	D	1
6	-3.015	-59.076	100	Itacoatiara	Amatari - Lindóia - Rio Urubu	AVPrio	Friday, October 20, 2023	Fri	Oct	12:00 - 18:00 PM	G16FRP	GOES	64	383.7	269.8	326.75	824.2	HIGH (100<FRP<=600)	D	1
7	-3.547	-58.662	162	Itacoatiara	NS do Perp	AVPAD	Wednesday, October 11, 2023	Wed	Oct	6:01 - 11:59 AM	G16FRP	GOES	96	382.9	299.8	341.35	749.8	VH (FRP>600)	D	1
8	-3.198	-58.958	100	Itacoatiara	Amatari - Caizônia	AVPAD	Friday, October 27, 2023	Fri	Oct	12:00 - 18:00 PM	G16FRP	GOES	89	378.3	290.9	334.6	674.3	VH (FRP>600)	D	1
9	-3.528	-58.662	162	Itacoatiara	NS do Perp	AD	Wednesday, October 11, 2023	Wed	Oct	6:01 - 11:59 AM	G16FRP	GOES	100	378	301.5	339.75	652.1	VH (FRP>600)	D	1
10	-3.292	-58.243	202	Itacoatiara	Vila Batista	AVPRio	Sunday, September 3, 2023	Sun	Sep	6:01 - 11:59 AM	G16FRP	GOES	98	377.6	305.9	341.75	642.5	VH (FRP>600)	D	1
11	-3.198	-58.958	100	Itacoatiara	Amatari - Caizônia	AVPAD	Friday, October 27, 2023	Fri	Oct	12:00 - 18:00 PM	G16FRP	GOES	82	374	290.1	332.05	599.5	HIGH (100<FRP<=600)	D	1
12	-3.528	-58.662	162	Itacoatiara	NS do Perp	AD	Wednesday, October 11, 2023	Wed	Oct	6:01 - 11:59 AM	G16FRP	GOES	100	375.2	302.6	338.9	594.2	HIGH (100<FRP<=600)	D	1
13	-3.124	-59.228	93	Itacoatiara	Amatari - Casa Casimiro - Lago Arumã	AVPRio	Saturday, September 30, 2023	Sat	Sep	12:00 - 18:00 PM	G16FRP	GOES	92	374.1	295.2	334.65	584.9	HIGH (100<FRP<=600)	D	1
14	-3.497	-58.375	191	Itacoatiara	Boa Vista - Rio Atari	AVPRio	Monday, September 4, 2023	Mon	Sep	12:00 - 18:00 PM	Aqua	MODIS	100	393.3	304.87	349.09	569.91	HIGH (100<FRP<=600)	D	1
15	-3.502	-58.388	191	Itacoatiara	Boa Vista - Rio Atari	AVPRio	Monday, September 4, 2023	Mon	Sep	12:00 - 18:00 PM	Aqua	MODIS	87	391.68	305.12	348.4	550.1	HIGH (100<FRP<=600)	D	1
16	-3.292	-58.243	202	Itacoatiara	Vila Batista	AVPRio	Sunday, September 3, 2023	Sun	Sep	6:01 - 11:59 AM	G16FRP	GOES	98	371.3	306.6	338.95	531	HIGH (100<FRP<=600)	D	1
17	-3.051	-59.267	88	Itacoatiara	Amatari - Leal - Igarapé Paracurá	AVPAD	Tuesday, October 3, 2023	Tue	Oct	12:00 - 18:00 PM	G16FRP	GOES	95	367.5	298.7	333.1	471.5	HIGH (100<FRP<=600)	D	1
18	-3.62	-58.622	162	Itacoatiara	NS do Perp	AVPAD	Thursday, September 14, 2023	Thu	Sep	12:00 - 18:00 PM	G16FRP	GOES	100	367.8	308.2	338	468.5	HIGH (100<FRP<=600)	D	1
19	-3.033	-59.076	100	Itacoatiara	Amatari - Lindóia - Rio Urubu	AVPrio	Friday, October 20, 2023	Fri	Oct	12:00 - 18:00 PM	G16FRP	GOES	66	363.8	279.2	321.5	463.3	HIGH (100<FRP<=600)	D	1
20	-3.493	-58.374	191	Itacoatiara	Boa Vista - Rio Atari	AVPRio	Monday, September 4, 2023	Mon	Sep	12:00 - 18:00 PM	G16FRP	GOES	95	366.1	306.8	336.45	436.3	HIGH (100<FRP<=600)	D	1
21	-3.198	-58.977	120	Itacoatiara	Amatari - Caizônia	AVPAD	Friday, October 27, 2023	Fri	Oct	12:00 - 18:00 PM	G16FRP	GOES	89	363.1	285.8	324.45	419.5	HIGH (100<FRP<=600)	D	1
22	-3.602	-58.603	162	Itacoatiara	NS do Perp	AVPAD	Friday, October 13, 2023	Fri	Oct	12:00 - 18:00 PM	G16FRP	GOES	85	363	301.5	332.25	417.5	HIGH (100<FRP<=600)	D	1
23	-3.62	-58.602	162	Itacoatiara	NS do Perp	AVPAD	Thursday, September 14, 2023	Thu	Sep	12:00 - 18:00 PM	G16FRP	GOES	100	364.1	311.6	337.85	404.9	HIGH (100<FRP<=600)	D	1
24	-3.051	-59.267	88	Itacoatiara	Amatari - Leal - Igarapé Paracurá	AVPAD	Tuesday, October 3, 2023	Tue	Oct	12:00 - 18:00 PM	G16FRP	GOES	96	362.9	297.7	330.3	402.7	HIGH (100<FRP<=600)	D	1
25	-3.051	-59.287	88	Itacoatiara	Amatari - Casa Casimiro - Igarapé Tapaiúna	AVPRio	Tuesday, October 3, 2023	Tue	Oct	12:00 - 18:00 PM	G16FRP	GOES	96	362.5	299.9	331.2	398.4	HIGH (100<FRP<=600)	D	1
26	-3.4995	-58.503	162	Itacoatiara	Santa Maria	AVPAD	Monday, Augu			12:00 - 18:00 PM	1	VIIRS	n	335.11	292.12	313.62	398.39	HIGH (100<FRP<=600)	D	1
27	-3.528	-58.624	162	Itacoatiara	NS do Perp	AVPAD	Friday			- 11:59 AM	G16FRP	GOES	100	360.6	292.6	326.6	390.6	HIGH (100<FRP<=600)	D	1
28	-3.492	-58.393	191	Itacoatiara	Boa Vista - Lago do Moura	AVPRio	M			00 PM	G16FRP	GOES	96	362.5	305.4	333.95	387.3	HIGH (100<FRP<=600)	D	1
29	-3.583	-58.622	162	Itacoatiara	NS do Perp	AD				PM	G16FRP	GOES	84	359.2	282.9	321.05	384.7	HIGH (100<FRP<=600)	D	1
30	-3.198	-58.977	120	Itacoatiara	Amatari - Caizônia	AVPAD					G16FRP	GOES	82	360.2	287	323.6	383.5	HIGH (100<FRP<=600)	D	1
31	-3.033	-59.057	100	Itacoatiara	Amatari - Lindóia - Rio Urubu	AVPrio					G16FRP	GOES	63	356.9	280.7	318.8	366.3	HIGH (100<FRP<=600)	D	1
32	-3.0771	-59.272	100	Itacoatiara	Amatari - Casa Casimiro	AVPAD					Aqua	MODIS	72	348.68	294.7	321.69	365.09	HIGH (100<FRP<=600)	D	1
33	-3.602	-58.583	162	Itacoatiara	NS do Perp	AVPA					FRP	GOES	91	358.7	302.4	330.55	357.6	HIGH (100<FRP<=600)	D	1

Article on the Brazilian Amazon Region

Geolocalisation of intense wildfires in Itacoatiara city

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Translation with updates from the article published in JCAM
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Figure 12: Burned green area near Urubu River (Itacoatiara city-20/Oct/2023
Source: NASA FIRMS, da Silva (2023) and Google Maps

According to NASA records, Itacoatiara is the second city around Manaus with the highest number of active fire hotspots and intense thermal anomalies recorded between August and October 2023 (Figures 12 to 15). This article reveals the locations, intensity and timings of these events, while urging authorities to take concrete and transparent action to reduce green area degradation, improve local climate and air quality.
Itacoatiara is 149 years old with about 103,598 residents living in a 8,892 km2 area. It is 176 km from Manaus city, near the following cities: Silves, Urucurituba, Boa Vista do Ramos, Maués, Nova Olinda do Norte, Autazes, Careiro, and Rio Preto da Eva.
Itacoatiara is well known for its cuisine and the Itacoatiara Song Festival (FECANI). In economic terms, according to a report by SEDECTI (https://tinyurl.com/bnddjra9), in 2019, Itacoatiara had the third highest GDP in Amazonas state, only trailing behind Manaus and Coari cities, and was among the three cities that stand out in agriculture and livestock.
To learn more, when accessing the Itacoatiara city hall website in search of the municipality's multi-year plan (PPA) in the section supposedly related to transparency (https://tinyurl.com/y6sweppb), it was not possible to identify and download the document. However, an alternative search through the city's municipal chamber identified only the PPA from 2014 to 2017 (https://tinyurl.com/52vaeef5); in it (p. 3) it is evident that in the primary sector, Itacoatiara has small and medium-sized owners who focus on raising beef cattle and pigs.
Furthermore, the city stands out for products derived from plant extraction, such as açaí, Brazil nuts, and timber. During the extraction process, the timber is transformed into charcoal, firewood, and logs. This may explain the high number of intense or very intense fires (337 records) documented in the city during the study, ranking it as the second-worst within a 300 km radius of the center of Manaus, surpassed only by Autazes.

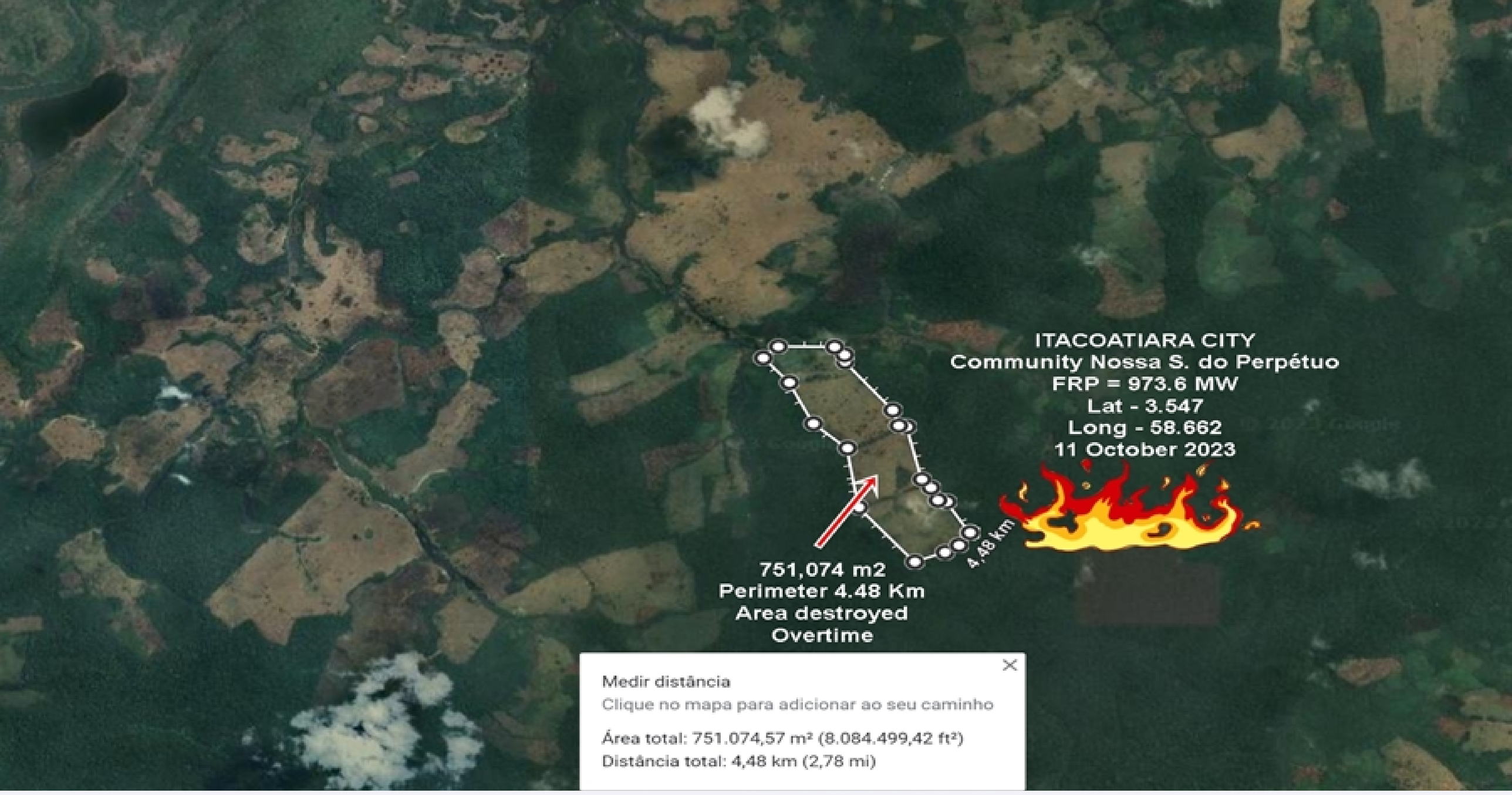

Figure 13: Intense wildfire in Itacoatiaracity - 11 October 2023
Source: NASA FIRMS, da Silva (2023) and Google Maps

Following the articles published in JCAM, an analysis of 337 records from NASA/FIRMS satellites revealed the following statistics:

1. In terms of Fire Radiative Power (FRP), the majority of the events (332; 98.52%) were classified as High, meaning above 100 MW and at or below 600 MW. Meanwhile, five records (1.48%) were considered very high (FRP>600 MW), representing major fires.
2. The most critical days in terms of the number of hotspots and thermal anomalies were Wednesday (58; 17.21%), Saturday (56; 16.62%), Friday (55; 16.32%), and Thursday (54; 16.02%).
As for the Average FRP (AFRP), the most critical days were Friday (AFRP=287.50MW), Monday (AFRP=210.18MW), and Wednesday (AFRP=202.09MW), followed by Tuesday (AFRP=193.07MW) and Thursday (AFRP=187.40MW).
The majority of the events were recorded by NASA satellites during the Day (336; 99.70%), while only one was recorded at Night (0.30%).
The time with the highest number of detected records was between 12 PM and 6 PM, with 283 cases observed (83.98%), followed by the time from 6:01 AM to 11:59 AM (53; 15.73%), and from 6:01 PM to 11:59 PM, representing just one case (0.3%). There were no records between midnight and 6 AM.
3. In terms of the number of hotspots and thermal anomalies per month, it was observed that September (166; 49.26%) was the most critical month, followed by October (99; 29.38%), while August recorded 72 cases (21.36%).

Figure 14: Intense wildfire located 379m far from Urubu River - Itacoatiara city - 20 October 2023
Source: NASA FIRMS, da Silva (2023) and Google Maps

When analyzing the Average FRP per month, October was the most critical month (AFRP= 259.63 MW), with 95 records of hotspots considered high (100 < FRP ≤ 600) having an AFRP of 238.46 MW, followed by four records of major fires (FRP > 600 MW) which had an AFRP of 762.45 MW.
The second critical month was August (AFRP=187.98 MW), with 72 records of hotspots considered high (100 < FRP ≤ 600).
4. Regarding the profile of the locations, out of the 337 records, the majority (283; 83.48%) occurred in green areas, with 178 (52.82%) happening near previously destroyed areas. Additionally, 105 (31.16%) were in areas near rivers, lakes, or streams, with waterways being one of the main channels for the flow of products derived from destruction.
The rivers, lakes, and streams preferred by arsonists, requiring increased vigilance and preventive action from public authorities to promote sustainable development actions in riverside communities, are: Rio Urubu (16 records), Igarapé Paracurá (13), Igarapé Tapaiúna (11), Rio Atari (9), Lago Arumã (6), Rio Preto da Eva (5), Rio Curupira (5), Rio Amazonas (3), Igarapé Cinza, Lago do Moura (2), Igarapé Tapagem (2), and Lago do Papucu (1).
For instance, one of the green areas near a river that experienced significant destructive force is approximately 366 meters away from Rio Urubu and about 592 meters away from RM Pedras, passing through Amatari and the Lindóia community. The location is at Latitude -3.015 and Longitude -59.057 (Figure 12), with two records made on October 20, 2023, with FRP values of 965.1 MW and 949.9 MW, respectively.

Figure 15: Intense fire in Itacoatiara city - 11 October 2023
Source: NASA FIRMS, da Silva (2023) and Google Maps

Approximately 241 meters from the hotspot, there is an already destroyed area with an estimated area of 47,295.60 square meters and a perimeter of 1.76 km. To give an idea of the wastefulness of the energy power in this fire, if there were wise management of energy sources in the Amazon or the municipality of Itacoatiara, with the implementation of a solar power plant with an annual capacity of 965 MW, it would be able to supply approximately 965 houses for a year. This calculation takes into account the average monthly household consumption of 200 kWh and an efficiency factor of 20%. All of this could be achieved while keeping the forest standing, generating revenue, and providing numerous benefits to the population.

5. The most critical regions of Itacoatiara are:

- Nossa Senhora do Perpétuo with about 147 records, which is almost 44% of the total cases.
- Amatari, with 131 records (39%), notably including Caxinauá (36 records), Casa Casimiro (35 records), Caizônia (15 records), Leal (15), and Lindóia (10). It's noteworthy that “Casa Casimiro” appears again, as the same name was identified in the community of Bom Sucesso located around Manaus, as published in JCAM two weeks ago (https://tinyurl.com/yckpteky).

Besides these regions, there are São Paulo (19 records), Santa Maria (15), Vila Batista (4), São José (2), and the Community of NS do Livramento (1). Figures 12, 13, 14 and 15, the geolocation of each of the 337 records, as well as basic statistics, are available in the digital repository of Harvard University at DOI https://doi.org/10.7910/DVN/UOZQ5O.

Finally, it is essential that public authorities, especially environmental and security agencies, act urgently to increase surveillance in the critical areas mapped, providing more transparency in the process of identifying and holding accountable those responsible for the fires. Additionally, it is necessary to restore the degraded sites, with reforestation and technical support to the local farmers, so they can develop new sustainable ways of generating income without irrationally devastating the forest.