Fire in recent deforestation at Gleba Abelhas
A public forest in the Canutama city, in southern
Source: Marizilda Cruppe / Greenpeace
03/August/2023

Article on the Brazilian Amazon Region

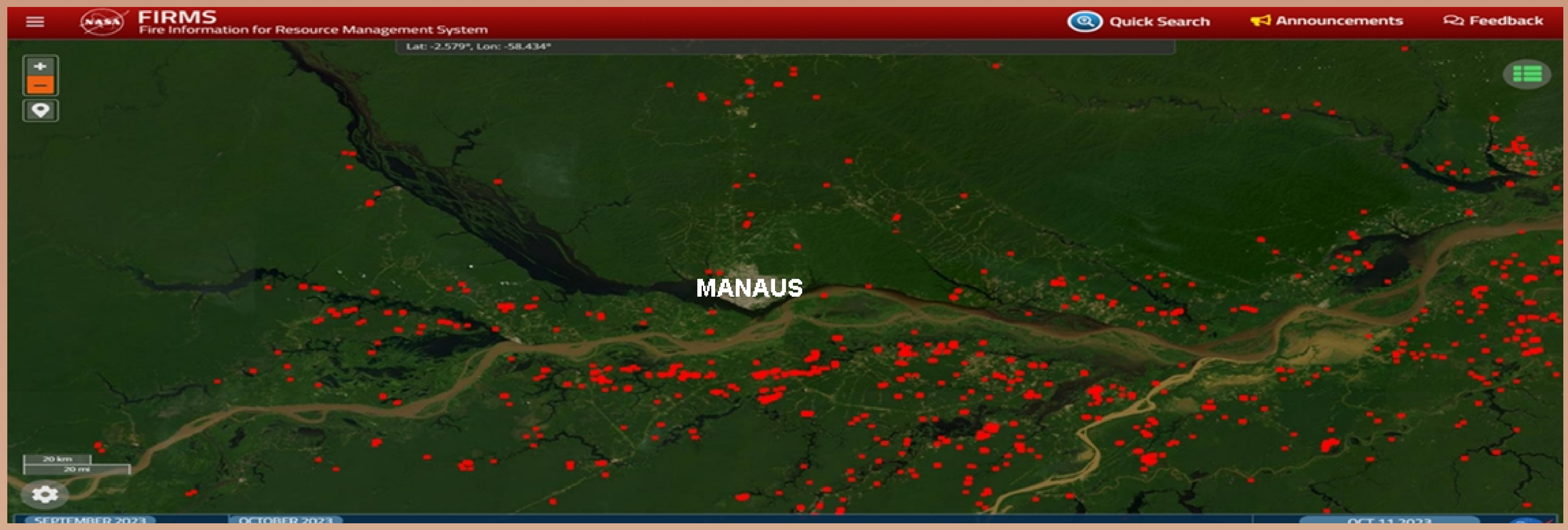
Amazonian cities on fire

Dr. Jonas Gomes da Silva - www.jgsilva.org

Professor at the Federal University of Amazonas
Research Visitor at Sustainable Consumption Institute
Alliance Manchester Business School/The University of Manchester
Columnist at Jornal do Comércio do Amazonas

jgsilva@ufam.edu.br
jgsilva@manchester.ac.uk

Version translated and adapted from the article published in JCAM
8th November 2023



Burning Areas Surrounding Manaus on 11 October 2023
Source: NASA FIRMS

In 2023, the deforestation and wildfires in the Brazilian Amazon are recurrent and generating an unprecedented crisis, with dark skies, unbreathable air and suffocating heat. This article, the first part of a series, investigates the origins of these hotspots of environmental destruction and pollution.

For decades, reputable scientists and organizations have been sounding the alarm about the dangers of climate change, calling on governments to work with sustainable plans to accelerate the use of clean fuels and technologies, promote cleaner transportation, energy efficient buildings and urban planning.

These actions are urgent as the statistics are frightening. For example, regarding air pollution:

a) According to PAHO, over 90% of children worldwide breathe toxic air every day. In 2016, about 600,000 children and teens under 15 years old died due to outdoor and indoor air pollution <**https://tinyurl.com/326nkym8>**. In addition, in 2022 PAHO warned that almost the entire world's population (99%) is breathing air that exceeds the air quality limits recommended by the WHO <**https://tinyurl.com/mwt6fvus>**;

b) According to the UN, air pollution is a "silent killer" that kills about 7 million people per year, including the 600,000 victims mentioned above. Every hour, around 800 people die from cancer and respiratory and cardiac diseases directly caused by inhaling polluted air <**https://tinyurl.com/mr3kb4f7>**.

Both PAHO and the UN and WHO have issued forecasts and recommendations for countries to prepare for heat waves <**https://tinyurl.com/38fvdu2p>** and combat air pollution <**https://tinyurl.com/3kke6j6d>**.

In Brazil, after family members, our health professionals are the ones who suffer the most from the increase in cases involving patients with respiratory problems, especially children <**https://tinyurl.com/mv7eht28>**. The situation is so serious that since 2021 the Brazilian Medical Association and partners have been working on the "Doctors for Clean Air" initiative <**https://tinyurl.com/mt3ffp23>** to combat climate change and fight for improving the quality of atmospheric air.

In addition, a study conducted by Fiocruz and WWF-Brazil, published in 2021, revealed that in 10 years our country spent almost a billion reais on diseases caused by smoke from wildfires in the Amazon, responsible for the rise in rates of hospital admissions involving patients with respiratory problems between 2010 and 2020 <**https://tinyurl.com/5bhyzy5e>**.

Despite all these facts and the numerous losses, once again the surroundings of Manaus city have suffered from excessive heat and a lot of smoke, whose air quality indices (in PM2.5) have remained above 150 µg/m3, considered unhealthy (151-200), very harmful (201-300) or even hazardous (above 300 µg/m3) to health, as was the case on 11/October/23, when PM2.5 equal to 329 µg/m3 was recorded.

Almost every day in October and November 2023 we wake up and go to sleep with a lot of smoke, except when it rains, and the population of Manaus is left wondering where the fires are happening and whether those responsible are being severely punished according to the law.

The Government of the State of Amazonas created the Climate Panel <**https://www.paineldoclima.am.gov.br/>** with information on monitoring, combating and preventing actions on climatic factors. According to the fire panel, between 01/Aug and 31/October/23, when the Amazon summer is considered strong, 16,323 heat sources were recorded in Amazonas, with the worst cities being the municipalities of Lábrea (2209), Novo Aripuanã (1535), Apuí (1360), Boca do Acre (1107) and Humaitá (979).

Although the initiative is good, this panel does not provide details of the locations where this heat is generated, nor is it transparent about the fines applied and who received them, making it difficult for society to really monitor the offending agents.

Given the above, a broad study is being conducted to identify the cities surrounding Manaus that generated the most heat sources and thermal anomalies, the geolocation of these emitters, and the profile of the location where the action is taking place: on land near a river, cleared area, green area near cleared area, green area near river or cleared area near river.

The study involves the following sources and assumptions:

Source 1) NASA's Fire Information for Resource Management System <**https://tinyurl.com/39t2xwp7>**, one of the most advanced in the world, has about 12 satellites (five polar orbiting and seven geostationary) that detect latitude and longitude values of active fires and thermal anomalies in near real time.

Each satellite records two images per day, but due to space limitations, technical explanations of the Confidence Level (CL), Spatial Resolution, Fire Pixel Brightness Temperature (BT) and Fire Radiative Power (FRP) measured by each of the satellites should be read at the link <**https://firms.modaps.eosdis.nasa.gov/>**.

Sources 2 and 3) Two Google geolocation systems, one called Reverse Geocoding <**https://tinyurl.com/3j3k4hz4>** used to identify the approximate location on the map of the latitude and longitude, and another called GPS Coordinate that calculates the distance between two points <**https://www.gps-coordinates.net/distance>**.

Assumptions) Analysis period between 15/September and 31/October/23; area observed within 300 km radius of downtown Manaus; only images with active fires and thermal anomalies with average Fire Pixel Brightness Temperature (BT) above 300 Kelvin and Fire Radiative Power above 3 MW.

To avoid a false positive, all images whose pixel marker was on clouds, liquid surfaces or had a Confidence Level below 30% were discarded.

Based on these assumptions, 2750 images were analysed, the results of which showed that Careiro city was the leader with 664 (24.1%) fire and thermal anomaly spots, followed by Autazes (650; 23.6%), Itacoatiara (340; 12.36%), Manaquiri (256; 9.3%), Careiro da Várzea (175; 6.36%), Manacapuru (129; 4.7%), Rio Preto da Eva (126; 4.5%), Nova Olinda do Norte (95; 3.4%), Borba (94; 3.4%), Iranduba (71; 2.58%), Manaus (69; 2.5%), São Sebastião do Uatumã (27; 0.98%), Maués (17; 0.62%), Novo Airão (17; 0.62%), Caapiranga (12; 0.43%), Presidente Figueiredo (5; 0.18%) and Silves (3; 0.10%).

Among these cities, those that burned and generated the most thermal anomalies from biomass were Nova Olinda do Norte, Autazes, Itacoatiara, Careiro, Manaquiri, São Sebastião do Uatumã and Rio Preto da Eva. The next articles will reveal more details about the profile of the locations that emitted the most heat and smoke around Manaus. So stay tuned.