

# Earth observations for wildfire early warning in the Amazon region of Brazil, Peru, and Bolivia

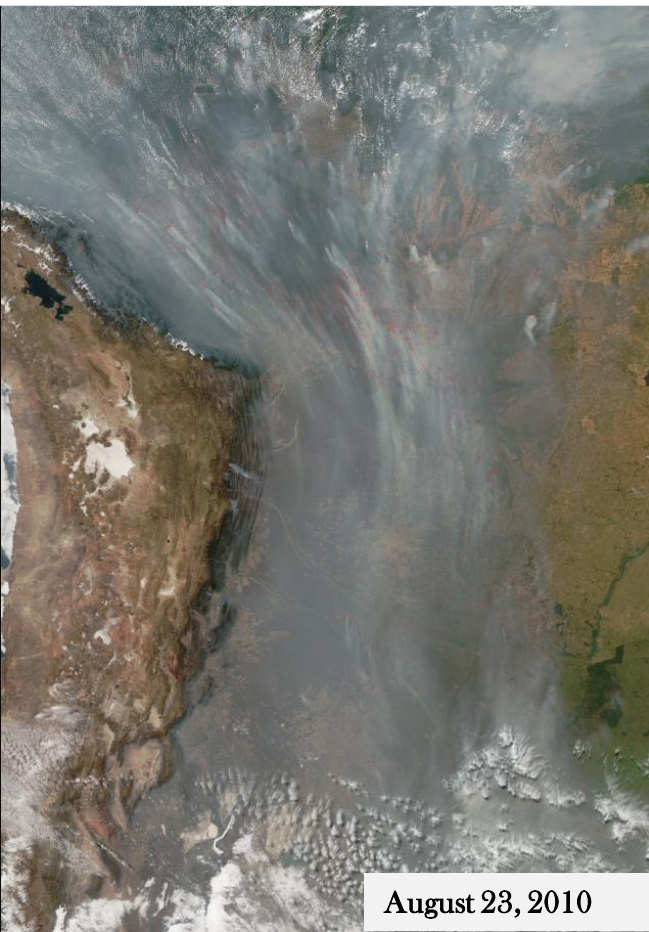
Liana Anderson   [liana.anderson@cemaden.gov.br](mailto:liana.anderson@cemaden.gov.br)  
[www.liana-anderson.org](http://www.liana-anderson.org)

29 June 2021

# Fires in the Amazon

## Direct impacts on South American population health!

Fires associated with deforestation can cause, on average, 2,906 premature deaths per year in South America (95% percentile confidence interval:1,065–4,714).  
Reddington et al., 2015



## Smoke pollution's impacts in Amazonia

The combination of increasing Amazon deforestation and the specter of drought now threatens widespread fire and respiratory health risks that could worsen the coronavirus disease 2019 (COVID-19) pandemic, endangering all Amazonians, but particularly vulnerable traditional and rural peoples (1, 2).

Deforestation in the Brazilian Amazon between January and June (3070 km<sup>2</sup>) was 25% higher than it was during the same period in 2019 (2446 km<sup>2</sup>) and 46% higher than the 4-year average of January through June from 2016 to 2019 (2108 km<sup>2</sup>) (3). Within Indigenous lands, which make up 23% of the Brazilian Amazon (4),

sciencemag.org **SCIENCE**

Oliveira et al., 2020

2.195 hospitalizations attributable to the 2019 fire smoke!



Ministério da Saúde

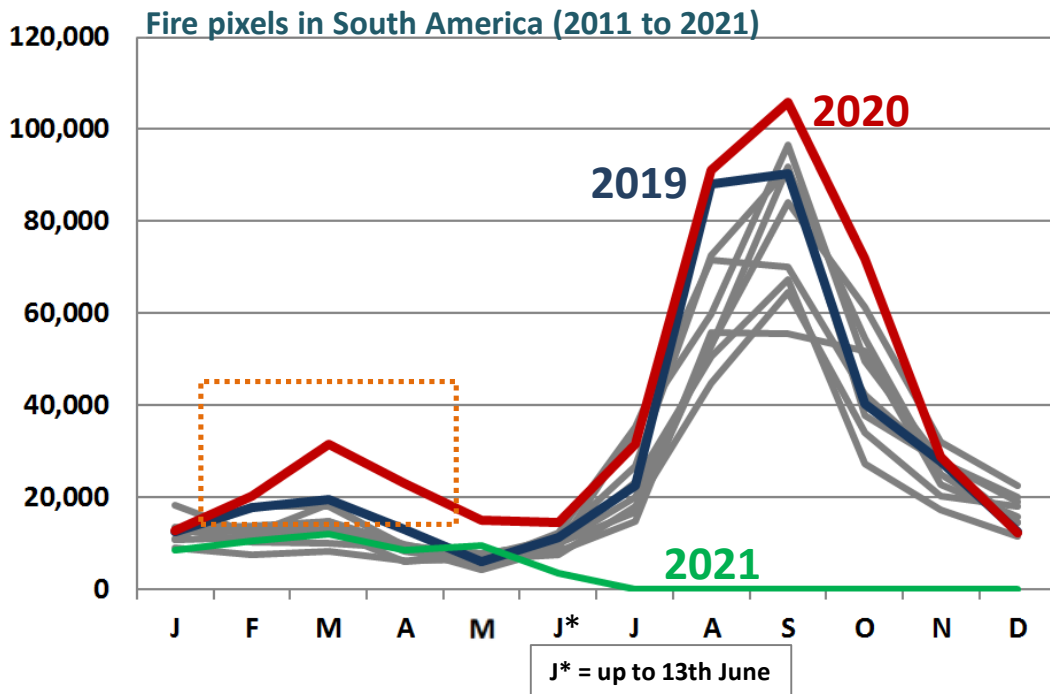
FIOCRUZ  
Fundação Oswaldo Cruz

68%-87% of hospitalizations were associated with fire smoke (2010-2020)!

August 23, 2010

# Overview of the fire problem in the last two years

## Diagnostic in South America:



Data source: CPTEC/INPE

2019-2020

Increase in fires in the pre-dry season **F,M,A**

2020

March, April and May: historical record since 1998  
Long fire-season

2021

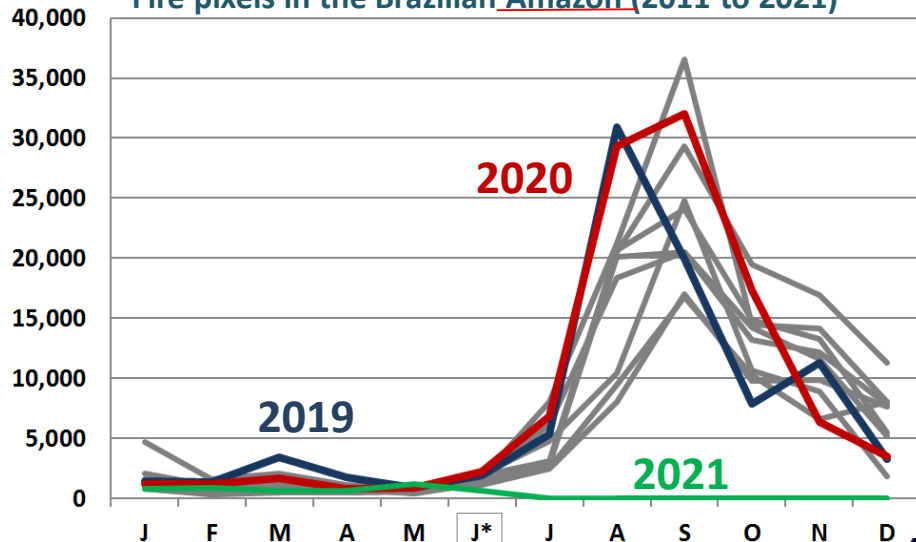
10 yrs maximum peak in May



# Overview of the fire problem in the last two years

## Diagnostic in Brazilian biomes:

Fire pixels in the Brazilian Amazon (2011 to 2021)

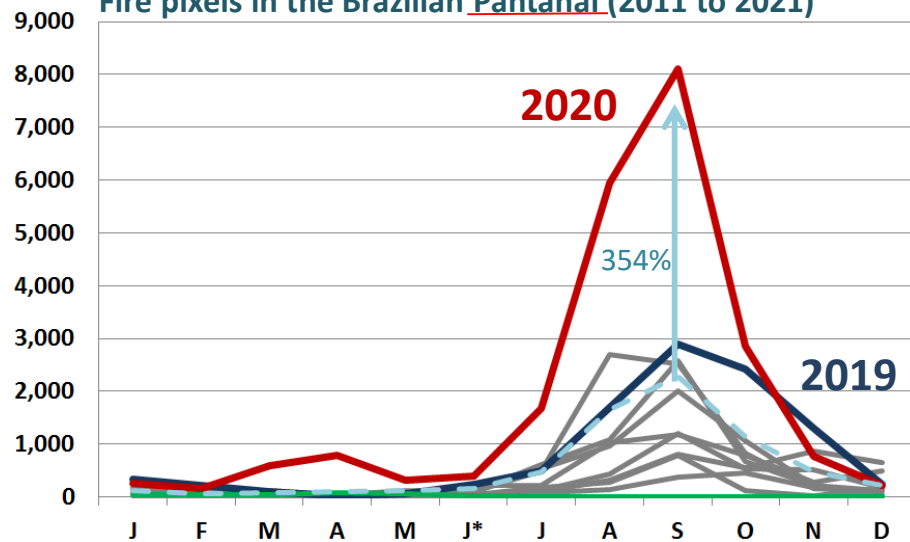


2019

Historical record in M,A  
Historical minimum



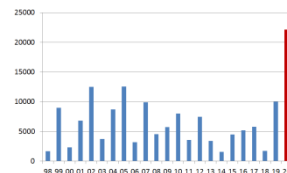
Fire pixels in the Brazilian Pantanal (2011 to 2021)



2019

Fires up to November

Data source: CPTEC/INPE



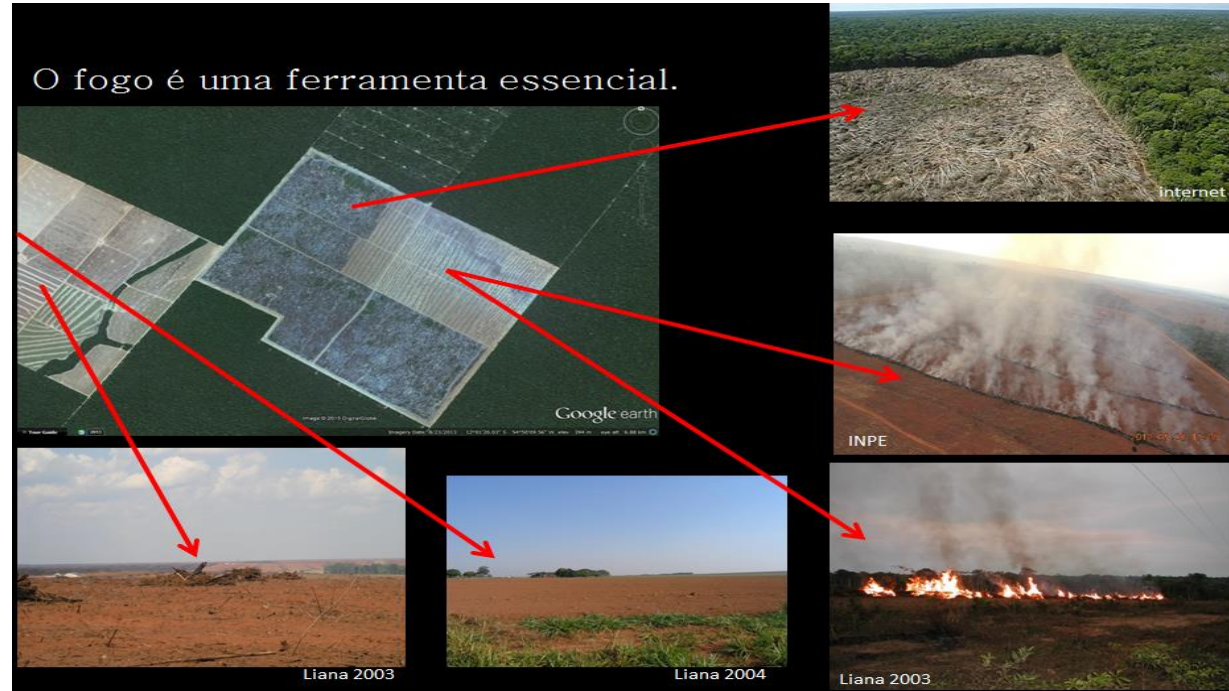


# Fires in the Amazon

## Deforestation *fires*



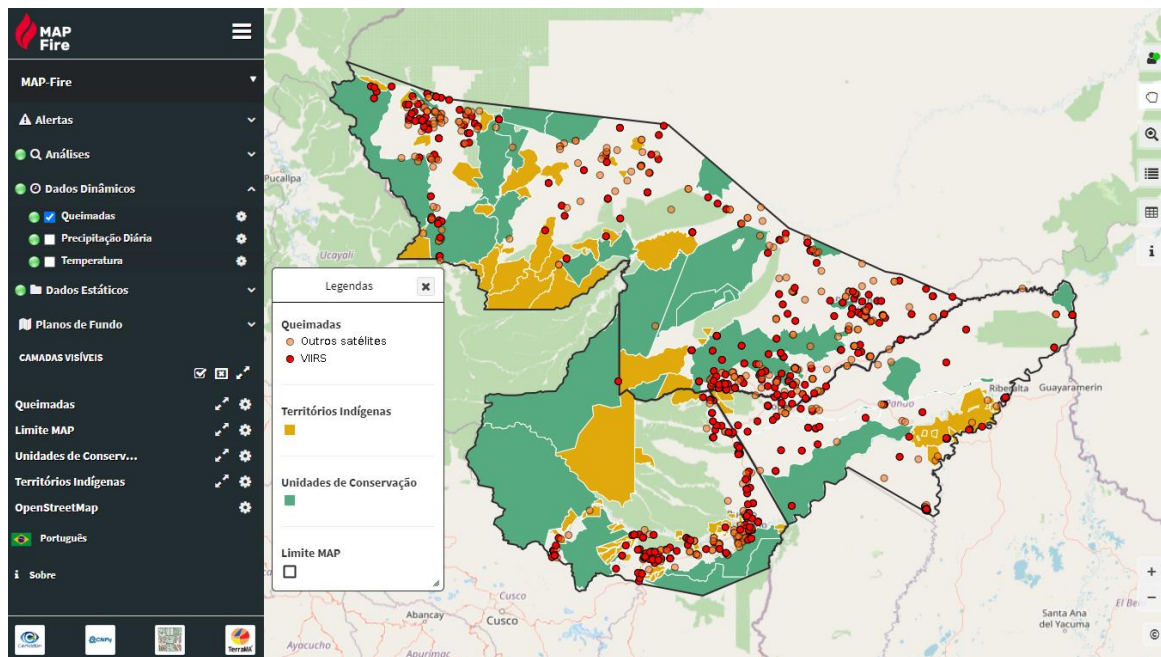
## Land management *fires*



# Science and action pathways

**Technical information translated to the general public**

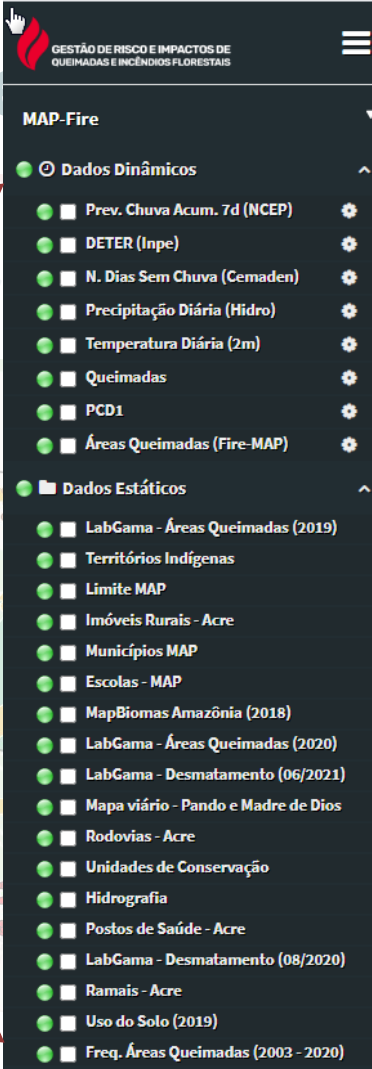
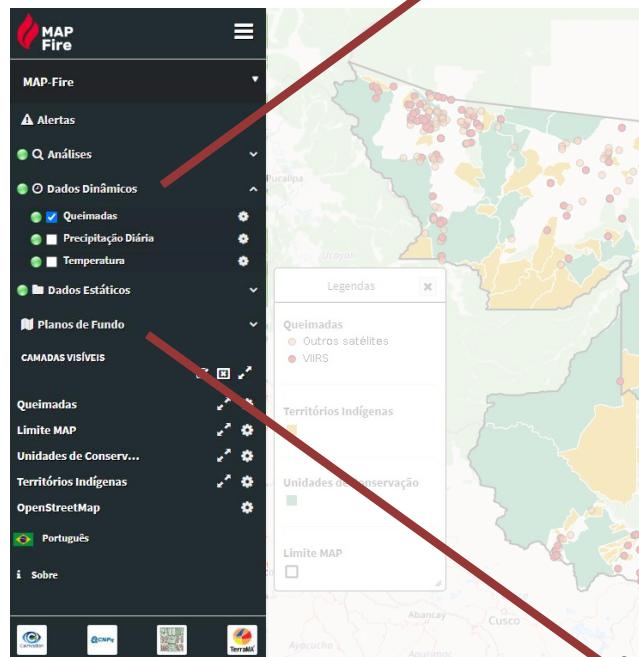
**Monitoring and Alert System tailored for the MAP region: co-design**



**2017/2018 stakeholders meetings**



<http://terrama.cemaden.gov.br/griif/mapfire/monitor/>



## 2017/2018 stakeholders meetings





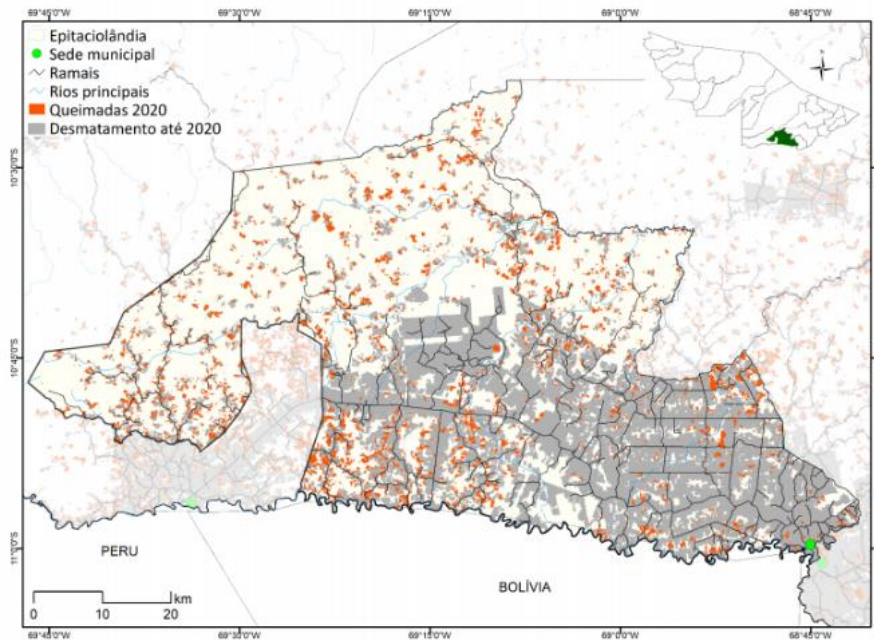
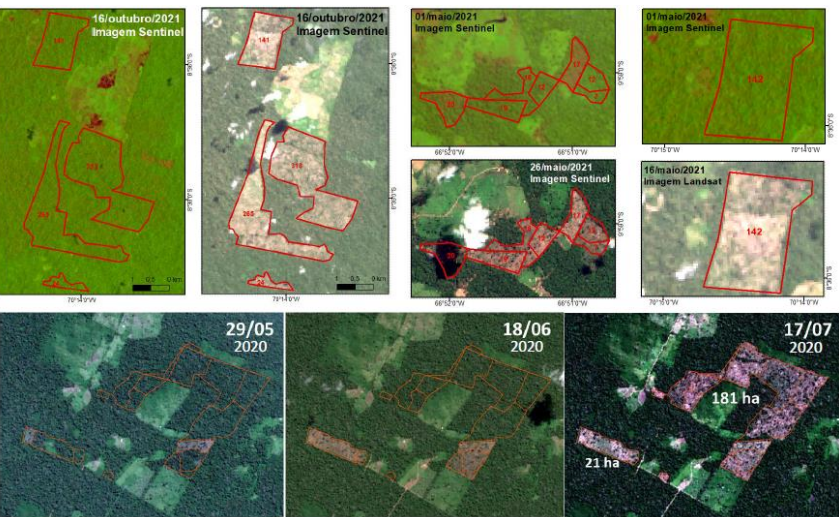
# Science and action pathways

**Technical information translated to the general public**

**Monitoring and Alert System tailored for the MAP region: co-design**



Integration of global and **local data!**





# Science and action pathways

**Technical information translated to the general public**

**Monitoring and Alert System tailored for the MAP region: co-design**

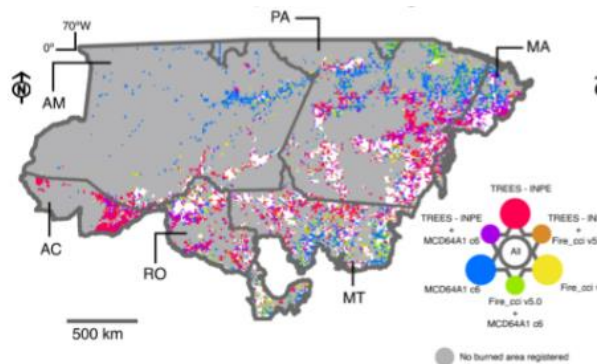
<https://www.mdpi.com/2072-4292/12/23/3864#cite>



Open Access Article

## Intercomparison of Burned Area Products and Its Implication for Carbon Emission Estimations in the Amazon

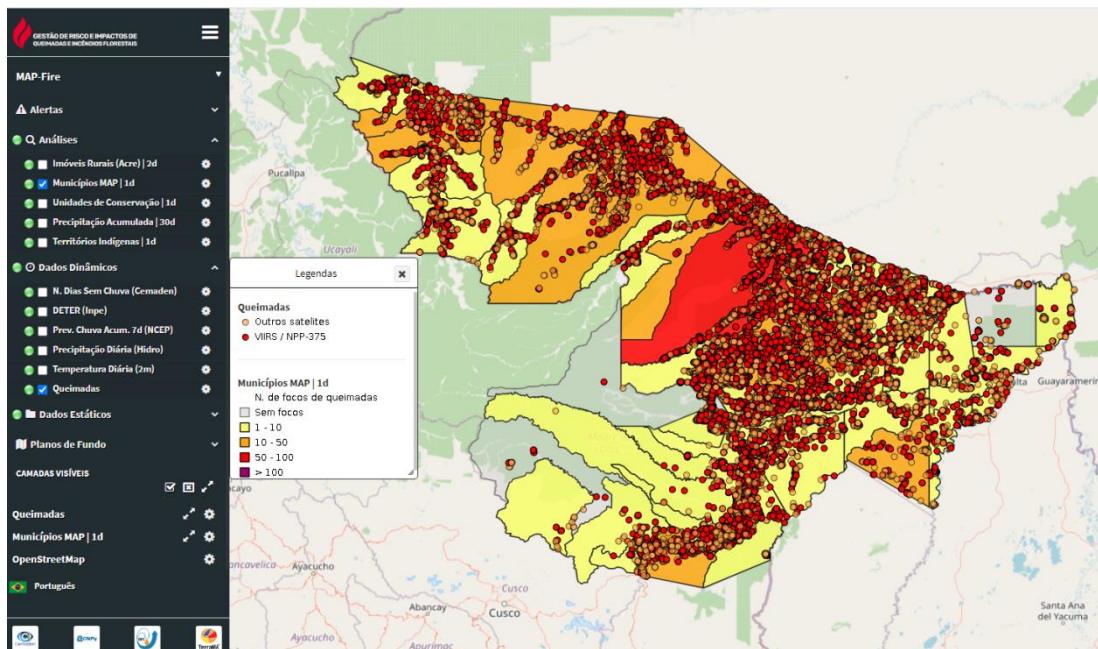
by  Ana Carolina M. Pessoa <sup>1,\*</sup> ,  Liana O. Anderson <sup>2</sup> ,  Nathália S. Carvalho <sup>1</sup> ,  
 Wesley A. Campanharo <sup>1</sup> ,  Celso H. L. Silva Junior <sup>1</sup> ,  Thais M. Rosan <sup>3</sup> ,  João B. C. Reis <sup>2</sup> ,  
 Francisca R. S. Pereira <sup>1</sup> ,  Mauro Assis <sup>4</sup> ,  Aline D. Jacou <sup>5</sup> ,  Jean P. Ometto <sup>5</sup> ,  
 Yosio E. Shimabukuro <sup>1</sup> ,  Camila V. J. Silva <sup>6</sup> ,  Aline Pontes-Lopes <sup>1</sup> ,  Thiago F. Morello <sup>7</sup>  and  
 Luiz E. O. C. Aragão <sup>1,3</sup> 



# Science and action pathways

Technical information translated to the general public

Monitoring and Alert System tailored for the MAP region: capacity building



**16 e 18 de junho**

Manhã 9h às 14h00

**Capacitação sobre a plataforma MAP-Fire**

Dr. João Reis  
Coordenador

**JUEVES CON CIENCIA**

Amazonia: Monitoreo y Gestión del Riesgo de Incendios Forestales

Dr. João Reis  
Centro Nacional de Monitoramento e Alertas de Desastres Naturais - Cemaden

27 de agosto 9am  
Acesso: Gratuito (Link: <https://tinyurl.com/3u7qy37>)  
Inscrição: Grátis

Un encuentro con la actualidad científica

CENTRO DE INVESTIGACIONES CIENTÍFICAS AMAZONICAS

**MAP-Fire**

Capacitación virtual sobre la plataforma MAP-Fire

Gestión de riesgo e impacto de quemas e incendios forestales en la región MAP

Dr. João Reis  
Coordenador

**WEBINAR**

Amazonia: Monitoreo y Gestión del Riesgo de Incendios Forestales

Dr. João Reis  
Centro Nacional de Monitoramento e Alertas de Desastres Naturais - Cemaden

20 10:00

A.C.B.N.

MÊS DO MEIO AMBIENTE - JUNHO DE 2020

**CONECTADOS COM A Biodiversidade**

Ative integralidade com desenvolvimento com sustentabilidade

**WEBINAR AMBIENTAL**

O DESAFIO DO BRASIL PARA CONTER O DESMATAMENTO E AS QUEIMADAS NA AMAZÔNIA DURANTE A PANDEMIA DE COVID-19 EM 2020: IMPLICAÇÕES AMBIENTAIS, SOCIAIS E DE GOVERNANÇA NO ESTADO DO ACRE

5 DE JUNHO DE 2020

DAS 9H30 ÀS 11H30

TRANSMISSÃO NO YOUTUBE DO MINISTÉRIO PÚBLICO DO ACRE (MPAC)

<https://youtu.be/3u7qy37>

**Plataforma para Gestão de Risco e Impactos de Incêndios Forestais: Projeto MAP-Fire**

Dr. João Reis  
Coordenador

2020

Minicursos Plataforma MapFire 16/06 - Workshop Queimadas na Amazônia Sul Ocidental

**UNIVERSIDAD AMAZONICA DE PANDO**

AREA DE CIENCIAS BIOLÓGICAS Y NATURALES

MONITOREO DE QUEMA

GESTIÓN DE RIESGO EN LA AMAZONIA BOLIVIANA

28 JUNIO 9:00

Dr. João Reis  
Coordenador

Dr. João Reis  
Coordenador

Dr. João Reis  
Coordenador

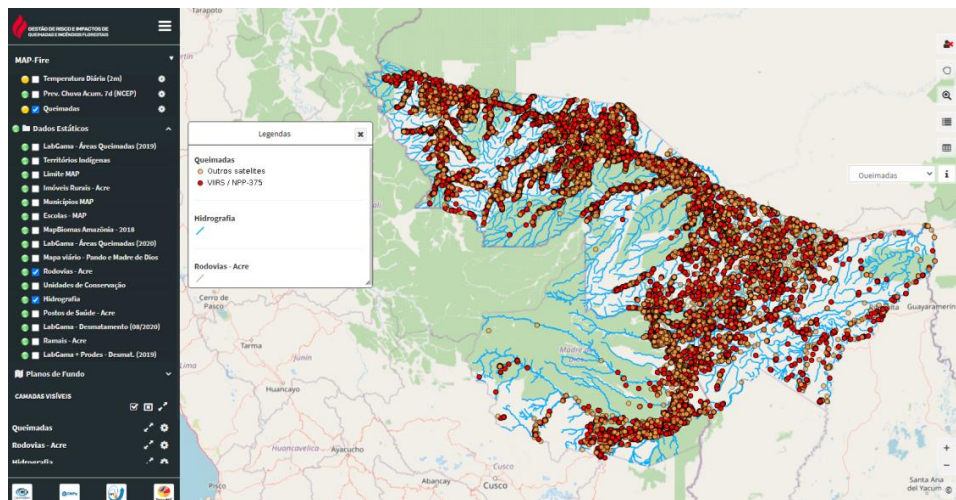
Dr. João Reis  
Coordenador

<http://terramma.cemaden.gov.br/griif/mapfire/monitor/>

# Science and action pathways

## Technical information translated to the general public

### Monitoring and Alert System: dissemination on social media



<https://youtu.be/n6ZoBoSEmnA>



Multi-Actor Adaptation Plan to cope with Forests under Increasing Risk of Extensive Fires



<http://terrama.cemaden.gov.br/gruf/mapfire/monitor/>



# Science and action pathways

**Technical information translated to the general public**

**Monitoring Air Quality: website with data & charts**



Mapa da Rede de Monitoramento da Qualidade do Ar do Acre



**Universities  
Research Centres  
The Public Ministry**

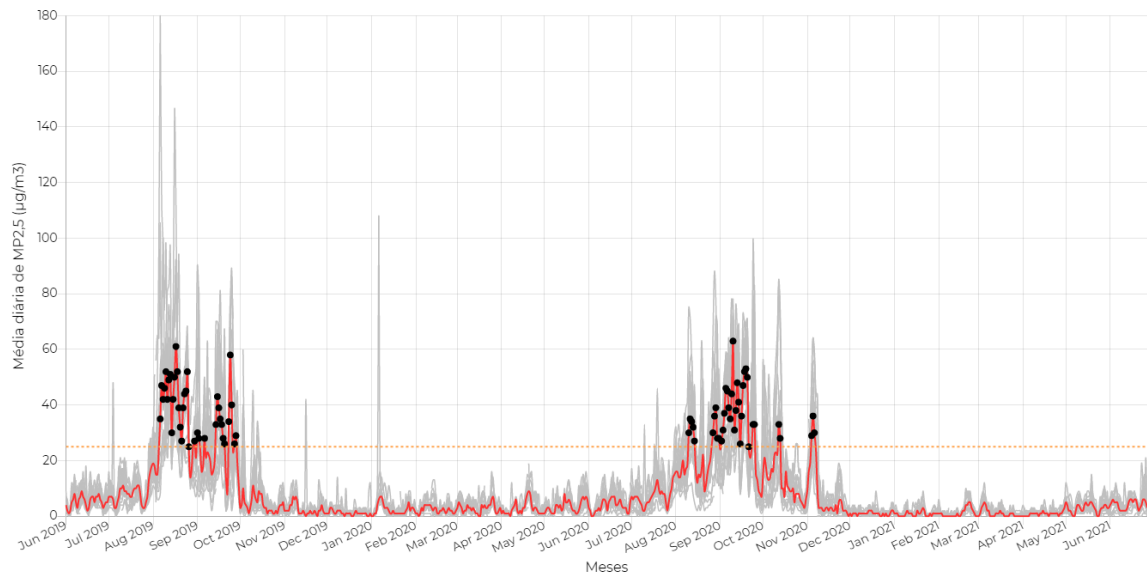
[www.acrequalidadedoar.info](http://www.acrequalidadedoar.info)





### Concentração de material particulado no Acre

Série Histórica



● Dias com PM2,5 superior a 25 µg/m³ ● Mediana ● Municípios ● Limite de média diária da OMS



**Q Acre**  
Qualidade do Ar

HOME

GRÁFICOS GERAIS

GRÁFICOS MUNICIPAIS

MAPAS


# Science and action pathways

Technical information translated to the general public

## Fire probability forecast: South American protected areas


Nota Técnica  
Technical Note

**O DESAFIO DO BRASIL PARA CONTER O DESMATAMENTO E AS QUEIMADAS NA AMAZÔNIA DURANTE A PANDEMIA POR COVID-19 EM 2020:**  
IMPLICAÇÕES AMBIENTAIS, SOCIAIS E SUA GOVERNANÇA



BRAZIL'S CHALLENGE TO RESTRAIN DEFORESTATION AND FIRES IN THE AMAZON DURING COVID-19 PANDEMIC IN 2020:  
ENVIRONMENTAL, SOCIAL IMPLICATIONS AND THEIR GOVERNANCE

São José dos Campos – São Paulo  
Maio/2020



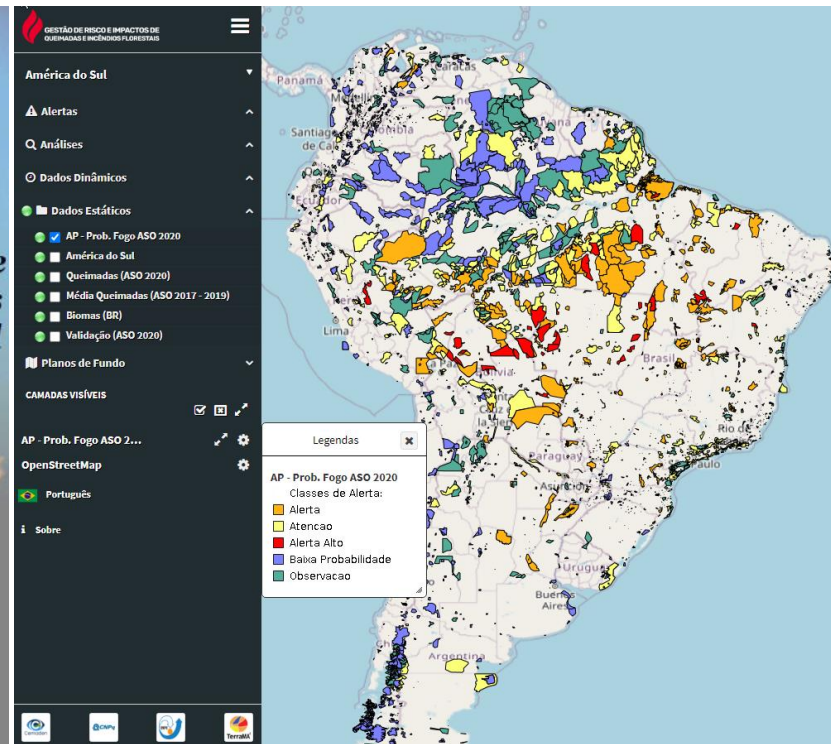
Nota Técnica

**Probabilidade de queimadas e incêndios florestais nas áreas protegidas da América do Sul**

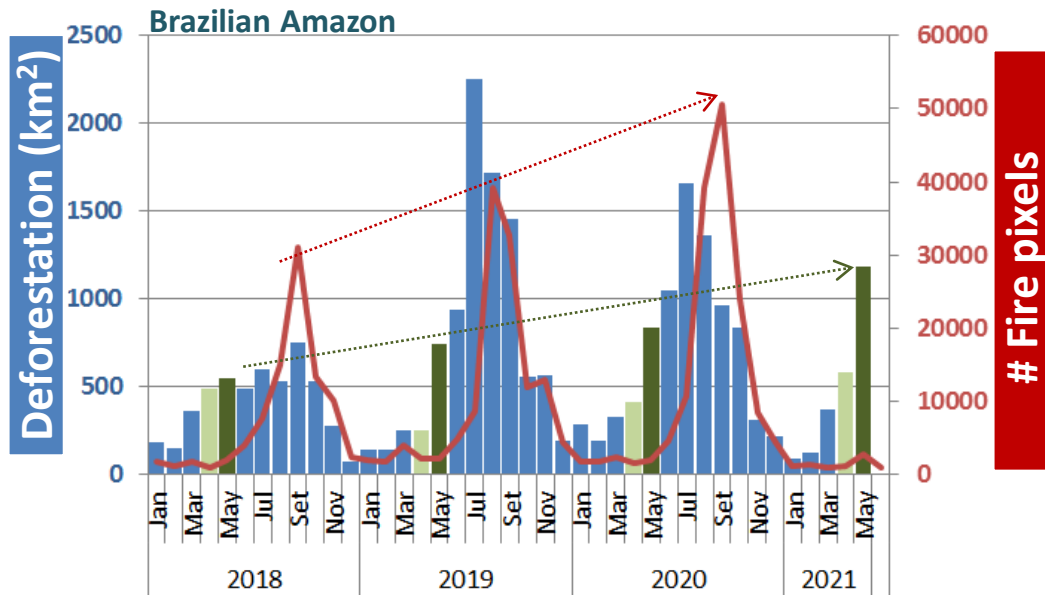
Agosto a Outubro de 2020

**Autores Sul Americanos:** Liana O. Anderson, João B. C. dos Reis, Ana Carolina M. Pessoa, Galia Selaya, Luiz Aragão  
**Autores do Reino Unido:** Chantelle Burton, Philip Bett, Chris Jones, Karina Williams, Inika Taylor, Andrew Wiltshire

Agosto 2020



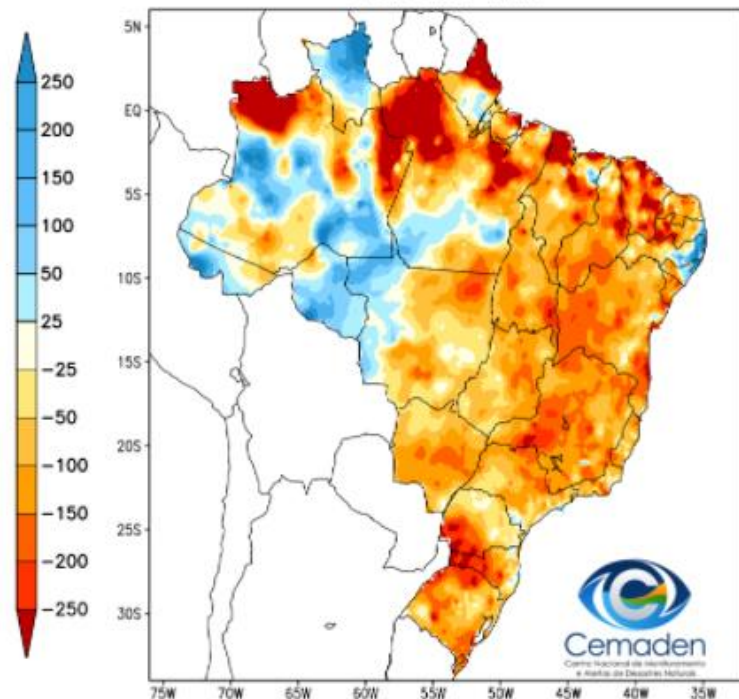
# What to expect for this year?



Data source: CPTEC & PRODES/INPE

## Rainfall anomaly

Anomalia de Precipitação (mm)  
Trimestre: MAM



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29 June 2021