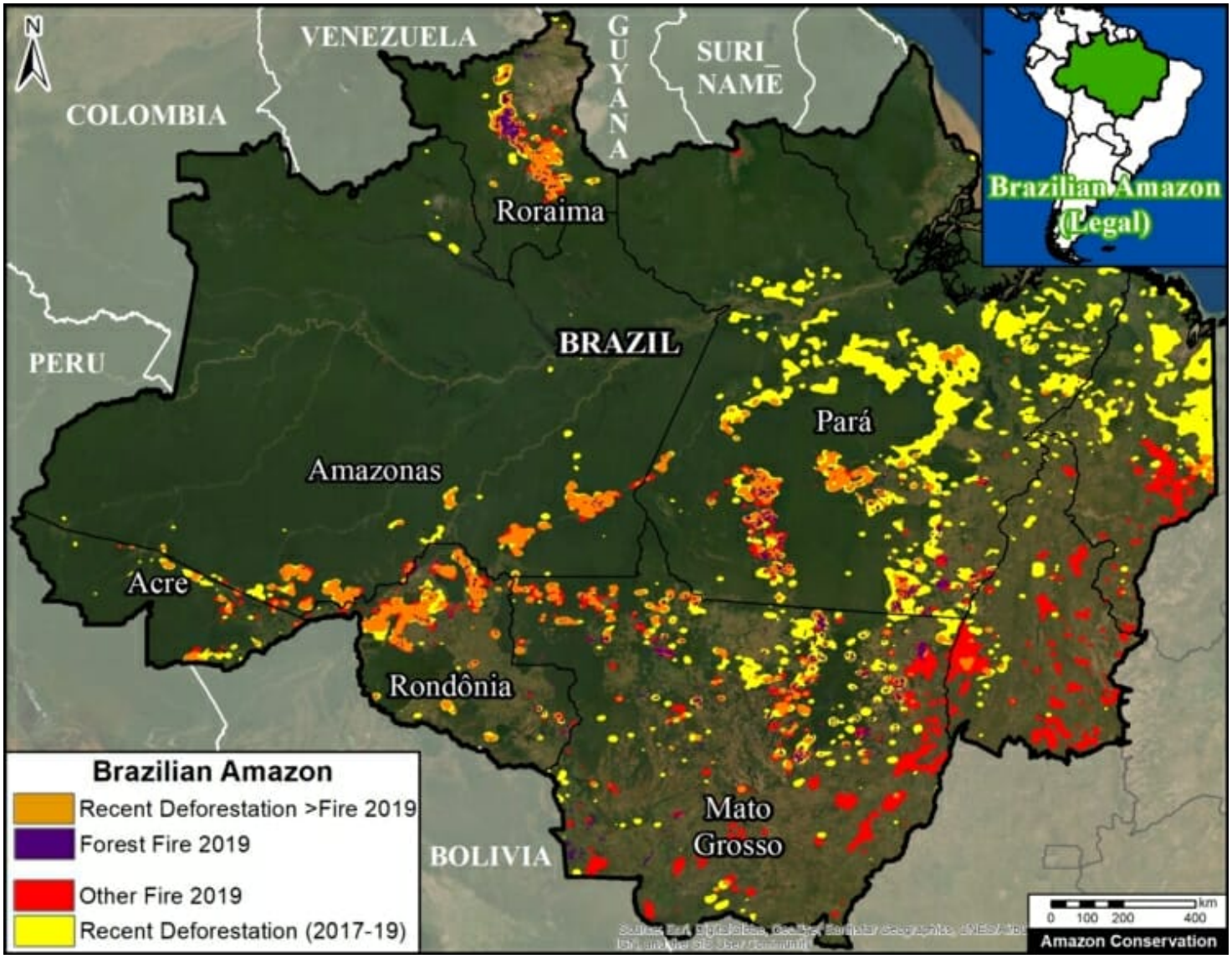
MAAP #113: Los Satélites Revelan qué impulsó los Fuegos en la Amazonía Brasilera



Mapa Base. Amazonía brasilera 2019. Datos: UMD/GLAD, NASA (MODIS), DETER, Hansen/UMD/Google/USGS/NASA

Presentamos **dos nuevos hallazgos clave** sobre los **incendios de la Amazonía brasilera** que captaron la atención mundial en agosto (vea nuestra novedosa metodología de base satelital, abajo).

Primero, encontramos que muchos de los incendios, cubriendo **450,000 hectáreas,** quemaron áreas recientemente deforestadas desde el 2017 (**anaranjado** en el Mapa Base). Es un área masiva equivalente a 615 mil campos de fútbol.

Cabe destacar que el 65% (298,000 hectáreas) de esta área fue deforestada y quemada este **2019.**

Segundo, encontramos **160,400 hectáreas** de **bosque primario** quemado en el 2019 (**morado** en el Mapa Base). * La mayor parte de estas áreas circundan tierras deforestadas y probablemente el fuego fue generado por pastoreo o agricultura, y luego escapó hacia el bosque.

Según sabemos, estos son los **primeros estimados precisos** basados en un análisis detallado de imágenes satelitales. Otros estimados se basan únicamente en las alertas de fuego que, por su amplia resolución espacial, tienden a sobreestimar las áreas quemadas.

A continuación, presentamos una serie de **videos satelitales** mostrando ejemplos de los diferentes tipos de incendios que hemos documentado.

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Implicancias Políticas

Las **implicancias políticas** de estos hallazgos son críticamente importantes: el enfoque nacional e internacional tiene que ser en **minimizar la deforestación,** además de la prevención y manejo del fuego.

Necesitamos reconocer que muchos de los fuegos son en efecto un **indicador rezagado** de deforestación previa. Entonces, para **minimizar los fuegos necesitamos minimizar la deforestación.**

Por ejemplo, uno de los drivers principales de la deforestación en la Amazonía brasilera es la ganadería (1, 2, 3). ¿Qué medidas se pueden tomar para prevenir la expansión de la frontera ganadera?

Videos de Imágenes Satelitales

Incendios de Deforestación

El **Video A** muestra la deforestación de 1,760 hectáreas en el estado de Mato Grosso en el 2019 (mayo a julio), seguida de los incendios en agosto. Planet link

https://www.maaproject.org/wp-content/uploads/2019/10/maaproject.org-maap-113-satellites-reveal-what-fueled-brazilian-amazon-fires-MG2.mp4

El V**ideo B** muestra la deforestación de 650 hectáreas en el estado de Rondônia, en el 2019 (abril a julio), seguida de los incendios en agosto. Planet link.

https://www.maaproject.org/wp-content/uploads/2019/10/maaproject.org-maap-113-satellites-reveal-what-fueled-brazilian-amazon-fires-Rondonia.mp4

Incendios Forestales

El **video C** muestra la deforestación del 2019 seguida de los incendios del 2019 que queman al bosque circundante.

https://www.maaproject.org/wp-content/uploads/2019/10/maaproject.org-maap-113-satellites-reveal-what-fueled-brazilian-amazon-fires-movie-2.mp4

*Notas

Además del hallazgo de las 160,000 hectáreas de bosque primario quemado en el 2019, también encontramos:
25,800 hectáreas de bosque secundario quemado en el 2019;
35,640 hectáreas de bosque primario quemado en la parte norte del estado de Roraima, en marzo del 2019 (más un adicional de 16,500 hectáreas de bosque secundario).

Metodología

Deforestation Fires

We created two “hotspots” layers, one for deforestation and the other for fires, by conducting a kernel density analysis. This type of analysis calculates the magnitude per unit area of a particular phenomenon, in this case forest loss alerts (proxy for deforestation) and temperature anomaly alerts (proxy for fires)

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Specifically, we used the following data three sets:

2019 GLAD alert forest loss data (30 meter resolution) from the University of Maryland and available on Global Forest Watch.

2017 and 2018 forest loss data (30 meter resolution) from the University of Maryland and available on Global Forest Watch (4).

NASA's Fire Information for Resource Management System (FIRMS) MODIS-based fire alert data (1 km resolution).

We conducted the analysis using the Kernel Density tool from Spatial Analyst Tool Box of ArcGIS, using the following parameters:

Search Radius: 15000 layer units (meters)
Kernel Density Function: Quartic kernel function
Cell Size in the map: 200 x 200 meters (4 hectares)
Everything else was left to the default setting.

For the Base Map, we used the following concentration percentages: Medium: 10%-25%; High: 26%-50%; Very High: >50%. We then combined all three categories into one color (yellow for deforestation and red for fire). **Orange** indicates areas where both layers overlap. As background layer, we also included pre-2019 deforestation data from Brazil's PRODES system.

We prioritized the orange overalp areas for further analysis. For the major orange areas in Rondônia, Amazonas, Mato Grosso, Acre, and Pará, we conducted a visual analysis using the satellite company Planet's online portal, which includes an extensive archive of Planet, RapidEye, Sentinel-2, and Landsat data. Using the archive, we identified areas that we visually confirmed a) were deforested in 2017-19 and b) were later burned in 2019 between July and September. We then used the area measure tool to estimate the size of these areas, which ranged from large plantations (~1,000 hectares) to many smaller areas scattered across the focal landscape.

Forest Fires:

To estimate forests burned in 2019 we combined analysis of several datasets. First, we started with 30 meter resolution 'burn scar' data produced by INPE (National Institute for Space Research) DETER alerts, updated through October 2019. In order to avoid overlapping areas, we eliminated alerts previously reported from 2016 to 2018, and alerts from other land use categories (selective logging, deforestation, degradation and mining, and other). Second, we eliminated previously reported 2001-18 forest loss from University of Maryland and INPE (PRODES). Third, to distinguish burning of primary and secondary forest, we incorporated primary forest data from the University of Maryland (5).

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