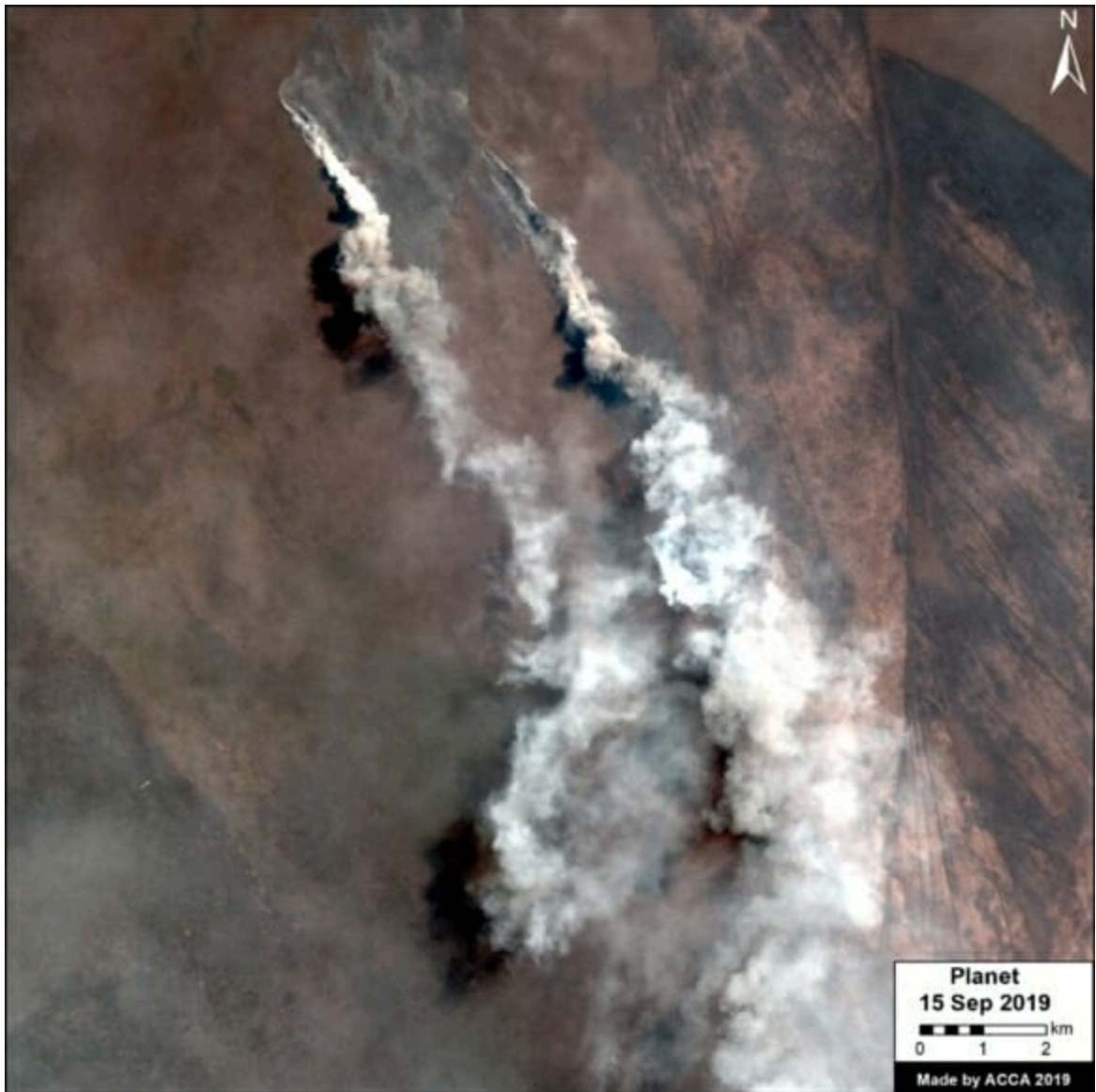


MAAP #111: Fires in the Bolivian Amazon – Using Google Earth Engine to Monitor

September 25, 2019

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(<https://www.maaprogram.org/wp-content/uploads/2019/09/maaproject.org-maap-111-fires-in-the-bolivian-amazon-using-google-earth-engine-to-monitor-Planet-15sep19-TrueColor.jpg>)

Recent fire in the dry forests of the the Bolivian Amazon. Data: Planet.

We begin a new series on how to harness the power of **the cloud** to improve real-time monitoring in the Amazon and beyond.

As the amount of data from satellite images has skyrocketed, so have the challenges of research teams to fully utilize this abundant and heavy (in terms of terabytes) information.

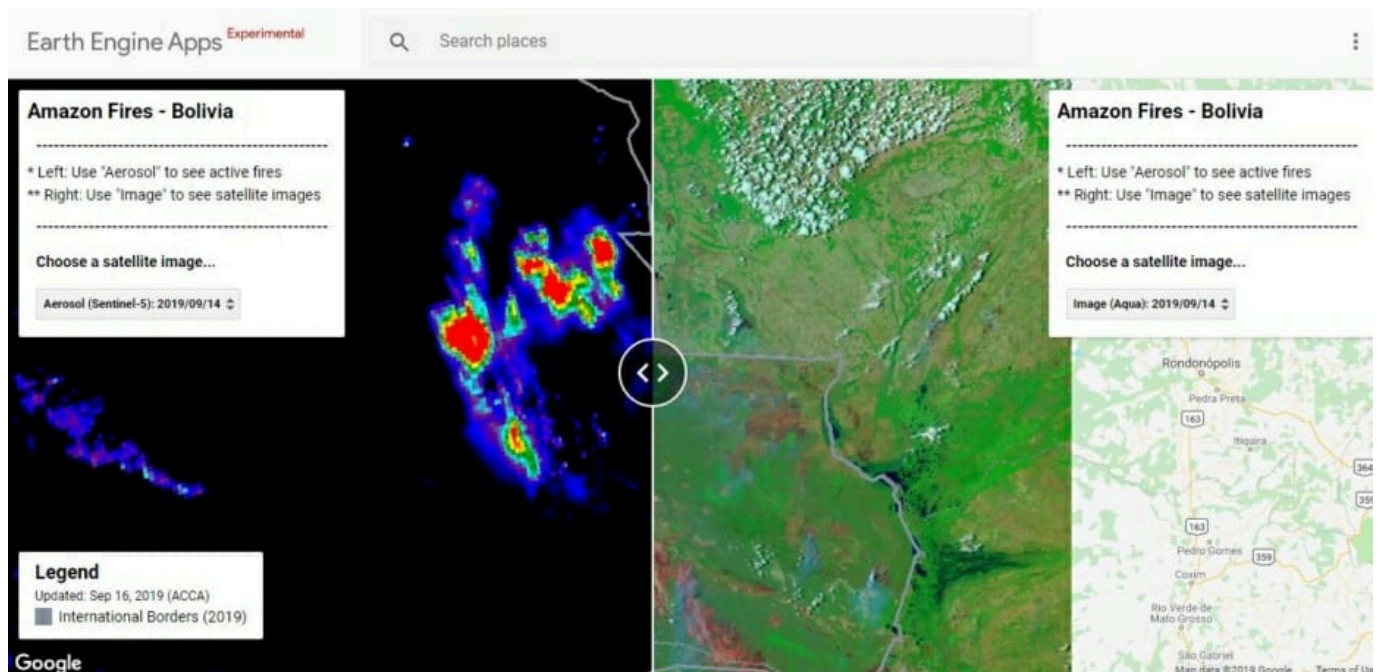
In response, tech companies such as **Google, Amazon, and Microsoft** have been offering their powerful computer power, via the internet (cloud), to help process, analyze, display, and store big data.

Here, we feature **Google Earth Engine**, which is designed for the free processing of geospatial information (including satellite imagery) and publishing results on web applications.

In our first example, we show the power of Google Earth Engine to help with **fire monitoring in the Bolivian Amazon**. As noted in our previous reports (<https://www.maaprogram.org/2019/amazon-fires-part2/>), the 2019 fire season in Bolivia has been intense, with numerous major fires in the Amazonian dry forests and savannas.

There is currently an urgent need for real-time monitoring of **active fires** to assist ongoing fire management efforts at the national level. In response, we developed the application described below.

The App “Amazon Fires – Bolivia (<https://luciovilla.users.earthengine.app/view/monitoring-amazon-fires>)”



(<https://www.maaprogram.org/wp-content/uploads/2019/09/maaproject.org-maap-111-fires-in-the-bolivian-amazon-using-google-earth-engine-to-monitor-app-ss.jpg>)

Screen shot of the “Amazon Fires – Bolivia” app.

We developed the application **“Amazon Fires – Bolivia** (<https://luciovilla.users.earthengine.app/view/monitoring-amazon-fires>)” that allows users to easily access and analyze an archive of recent satellite images of the Bolivian Amazon fires in near real-time.

Specifically, the user can compare **aerosol data** (from the satellite Sentinel-5P), with **recent imagery from five different satellites** (Terra, Aqua, Suomi, Sentinel-2, and Sentinel-1 radar).

We **recommend** viewing the **aerosol data on the left panel** and most recent **imagery on the right panel**.

Aeresol data (http://www.esa.int/Our_Activities/Observing_the_Earth/Copernicus/Sentinel-5P/Monitoring_air_pollution_from_fires) (Ultraviolet Aerosol Index (<http://www.tropomi.eu/data-products/uv-aerosol-index>)) does a strikingly good job of accurately and precisely highlighting the location of active fires because it is showing the actual emissions (pollutants) from the fires (as opposed to the commonly used fire alert data which detect general temperature anomalies, not actual fires). It is important to note that it can be calculated in the presence of clouds so that daily, global coverage is possible. This app represents one of the first major uses of the aerosol data from Sentinel-5P to detect fires in real-time.

Reds indicate the highest levels of aeresol (and likely the largest fires), followed by **orange, yellow, green, light blue, purple, dark blue, and black**.

Note that if you zoom out, the aerosol data also covers much of the **Brazilian Amazon**.

Currently, new images are automatically included in the app when they are added to the Google Earth Engine dataset (typically with a delay of one or two days), but during critical times we will manually upload new imagery daily.

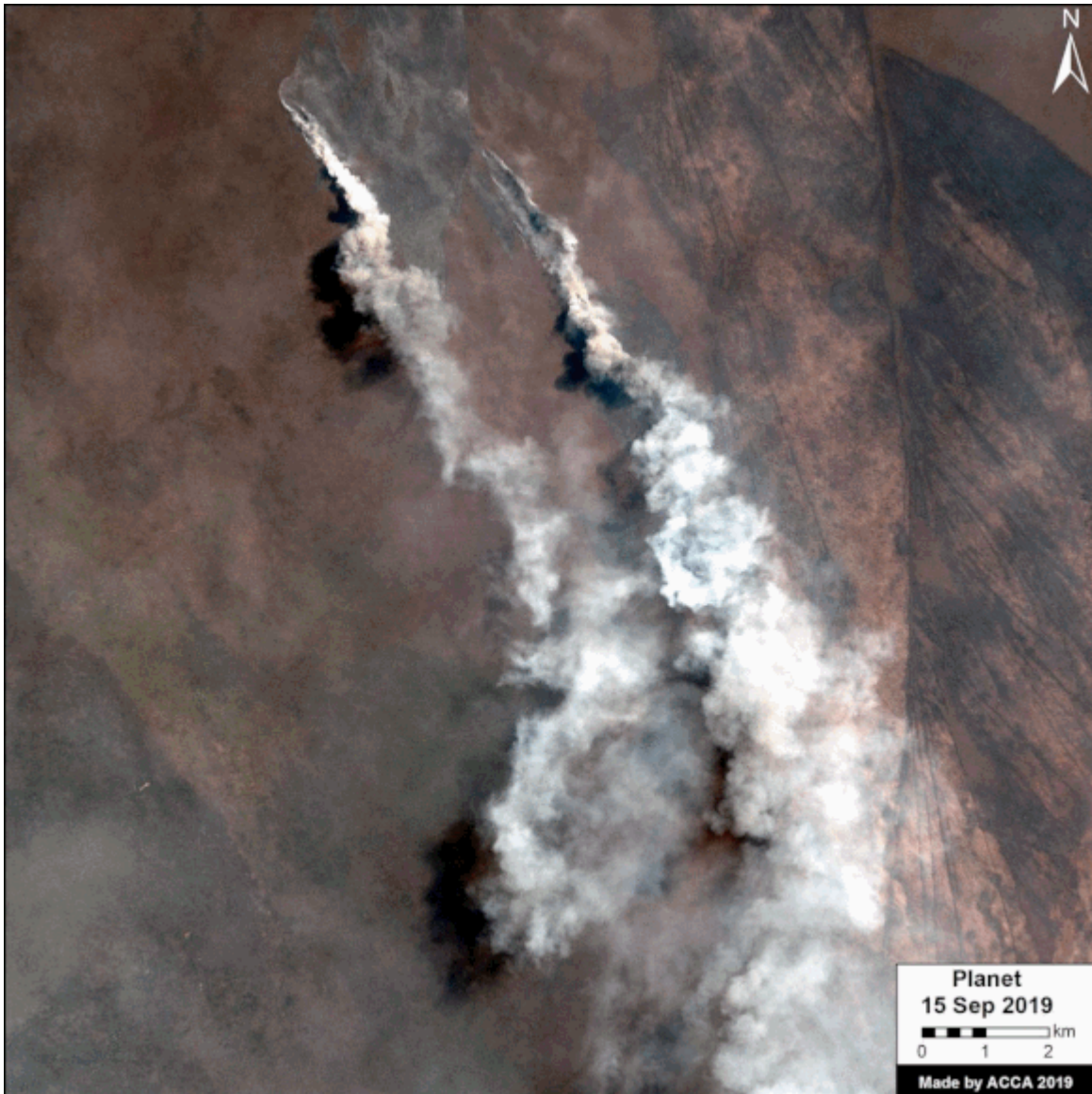
Our hope is that relevant actors, including government and fire-fighting crews, can use this real-time information to better address the fires.

Link to the App “Amazon Fires – Bolivia”:

<https://luciovilla.users.earthengine.app/view/monitoring-amazon-fires>
(<https://luciovilla.users.earthengine.app/view/monitoring-amazon-fires>)

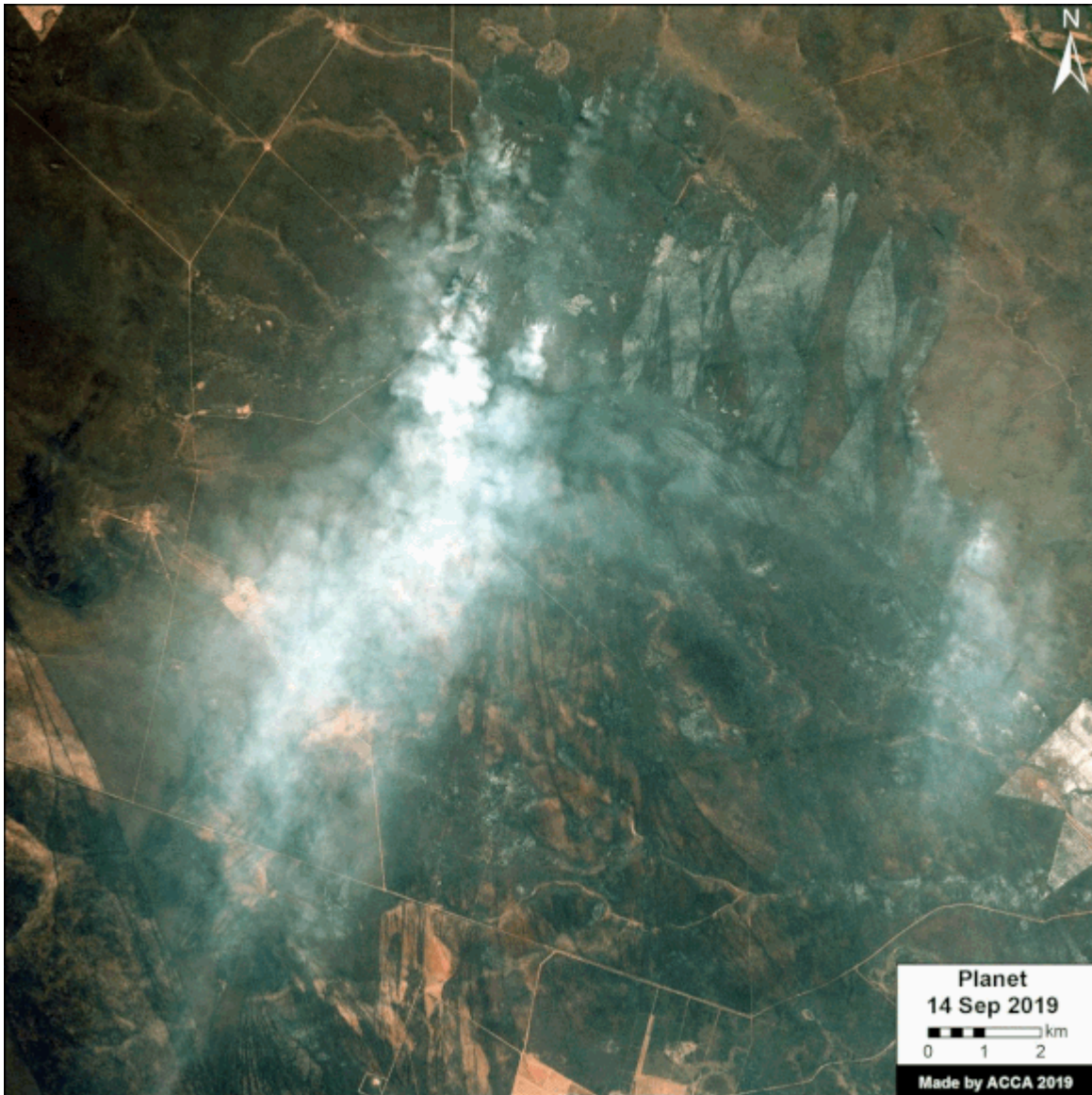
Imagery Guide

The app shows images in natural color. As a guide, below we show a series of natural color images in relation to “false color” infrared images, which better highlight burn scars (black) in relation to the vegetation (red).



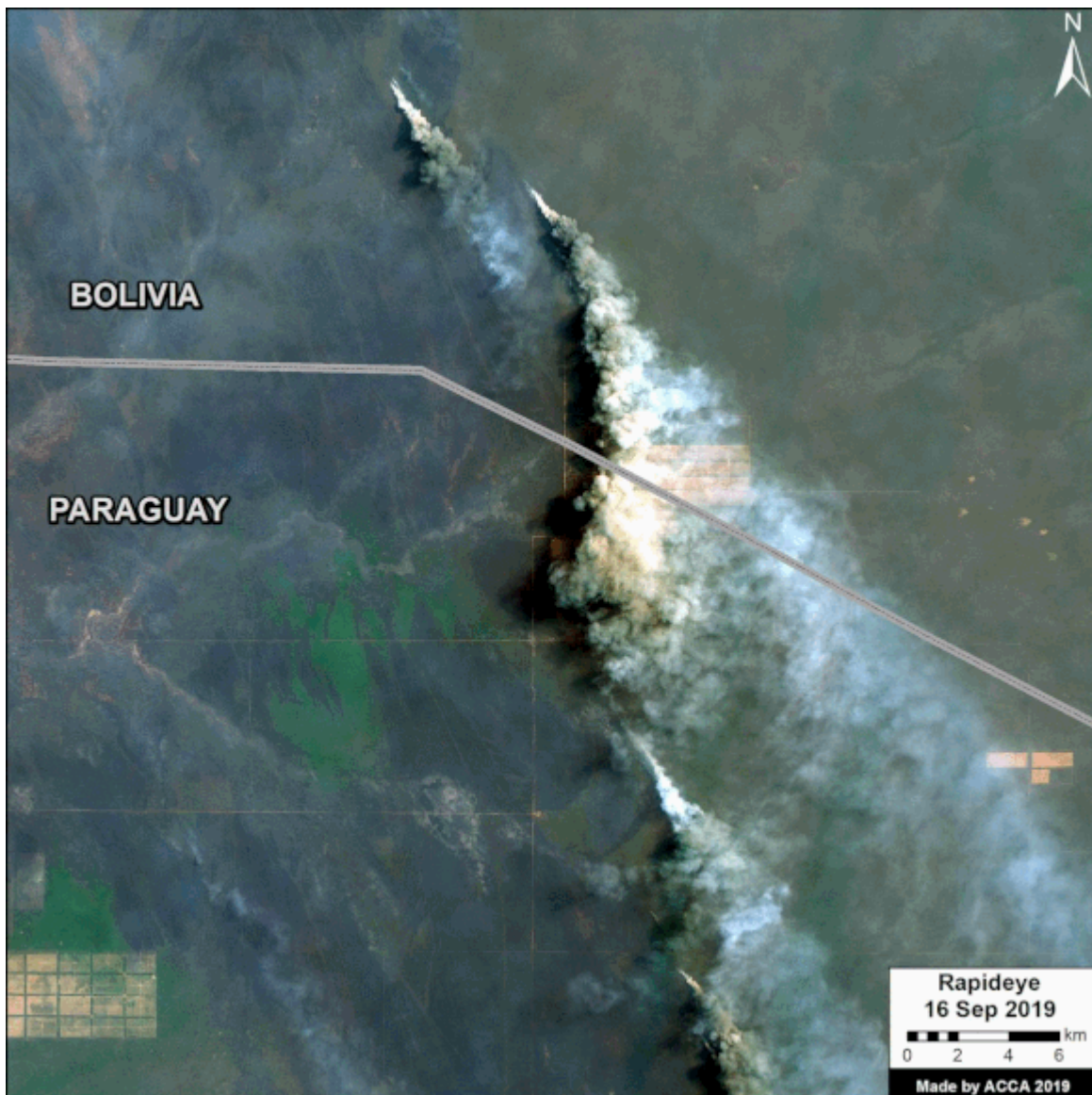
(<https://www.maaprogram.org/wp-content/uploads/2019/09/maaproject.org-maap-111-fires-in-the-bolivian-amazon-using-google-earth-engine-to-monitor-Planet-15sep19-GIF.gif>)

Guide 1. Data: Planet.



(<https://www.maaprogram.org/wp-content/uploads/2019/09/maaproject.org-maap-111-fires-in-the-bolivian-amazon-using-google-earth-engine-to-monitor-Planet-14sep19-Robore-GIF.gif>)

Guide 2. Data: Planet.



(<https://www.maaprogram.org/wp-content/uploads/2019/09/maaproject.org-maap-111-fires-in-the-bolivian-amazon-using-google-earth-engine-to-monitor-RE-16sep19-Chiquitos-GIF.gif>)

Guide 3. Data: Planet.

Acknowledgements

We thank D. Larrea (ACEAA), M. Terán (ACEAA), C. de Ugarte (ACEAA), and A. Condor (ACCA) for helpful comments to earlier versions of this report.

The development of this application was made possible thanks to the support provided by the Google Earth Engine team, with the support of SilvaCarbon (technical advisory program that provides spaces for countries to learn about new tools) and the SERVIR Amazonia program.

This work was supported by the following major funders: MacArthur Foundation, International Conservation Fund of Canada (ICFC), Metabolic Studio, and Global Forest Watch Small Grants Fund (WRI).

Citation

Villa L, Finer M (2019) Fires in the Bolivian Amazon – Using Google Earth Engine to Monitor. MAAP: 111.
