Wildfire 2019 BRASIL

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CAMPO GRANDE · MATO GROSSO DO SUL

MONITORING STRATEGIES FOR WILDFIRES OPERATIONS IN AMAZON INDIGENOUS LANDS

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PROGRAMA DE PÓS-GRADUAÇÃO GEOGRAFIA — UnB

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INTRODUCTION

Brazilian indigenous Amazonian lands are often impacted by high severity and intensity fires that are unrelated to traditional management. Therefore, strategies are organized to contain them, such as the employment of exclusive brigades for these territories, vehicles and equipment. When the fire reaches level 3, the state of Roraima doesn't have the means to extinguish it, specialized brigades and national resources are requested to assist in the operation.

Fire combat in amazon indigenous lands is complex to monitor due to the tree cover, cloudiness, the existence of isolated peoples, the presence of indigenous villages near the fire lines and the vastness of these territories. In this sense, the purpose of this abstract is to divulge the fire monitoring methodology of 2019 Roraima Verde Operation used for defining the strategy of attack areas.

PROCEDURES

- ### Indigenous lands in Roraima with wildfire combat operations

Roraima is located at the north of the Amazon biome and has fire patterns related to land use and rainfall. The months from January to March are characterized as dry season, when there is also a fire detection increase in "Lavrados" - grasslands used as pastures (Figure 1 and 2).

The indigenous lands that historically have a record of burning associated to this type of vegetation are: Araçá, Tabalascada, São Marcos, Raposa Serra do Sol and Serra da Moça. Although notably forested, Yanomami had fire coming from the conservation unit Flona de RR (bordering the indigenous land), and also suffered illegal mining and deforestation. Therefore, the area was considered within the operational scope of monitoring too.
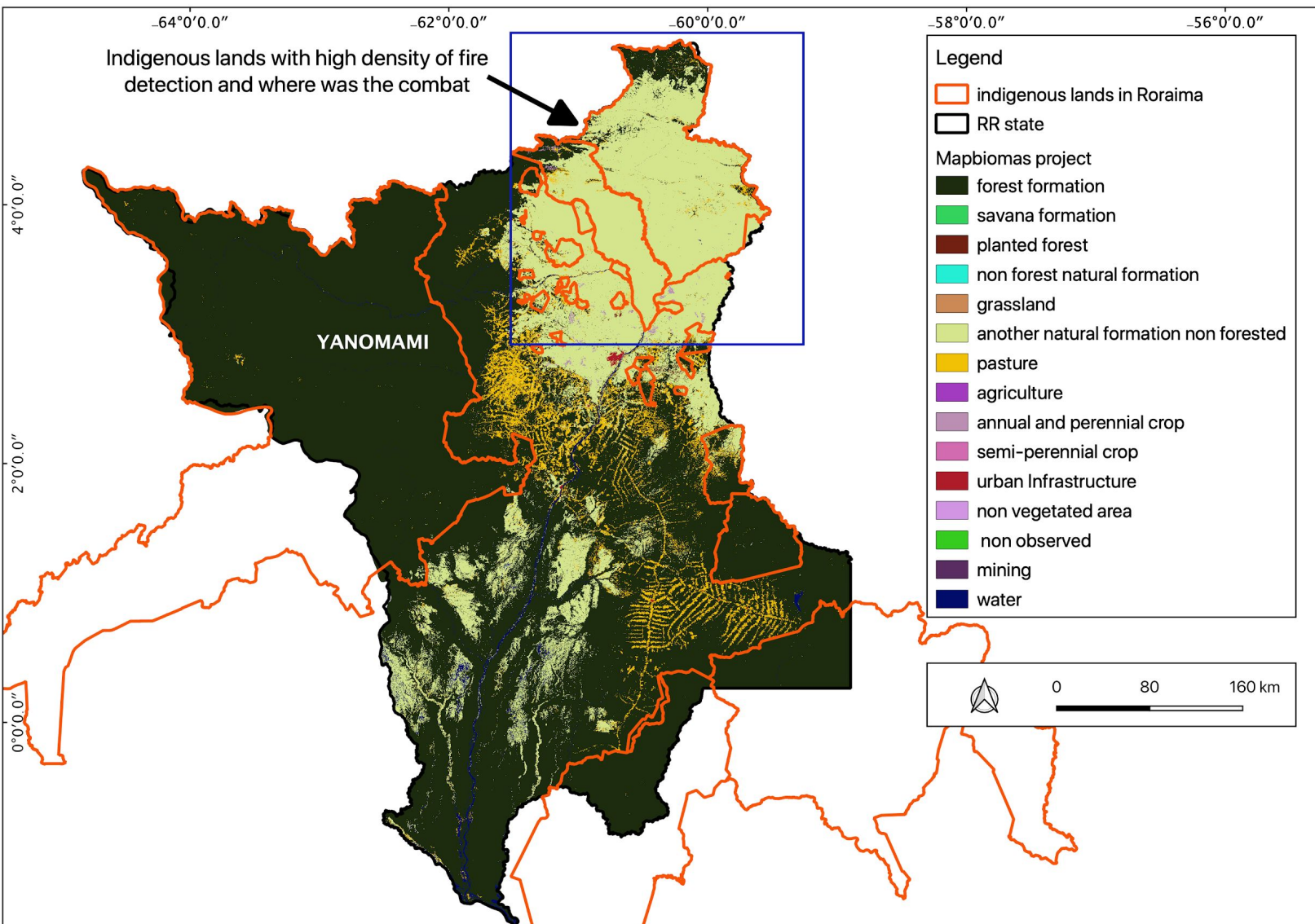

Figure 3: Indigenous lands with the monitoring strategies in the 2019 RR Verde operation.

- ### The active fire database

All the active fire (AF) products from the INPE's database were used, except the AFs from the satellites NOAA, METOP-B and METEOSAT. Before using them, in order to better understand the detections in the local context, the AFs were evaluated for in a helicopter fly-by using a GPS to mark points over the fire.

Afterward a 4km buffer was created to each collected point. Then the active fires within the buffers were considered correct, the other ones outside the buffer were classified as omissions.

100% of the AF data intersected point collected buffers, on the other hand 61% of those buffers didn't had any spatial relationship, so classified as AF omissions, considered a very high rate.
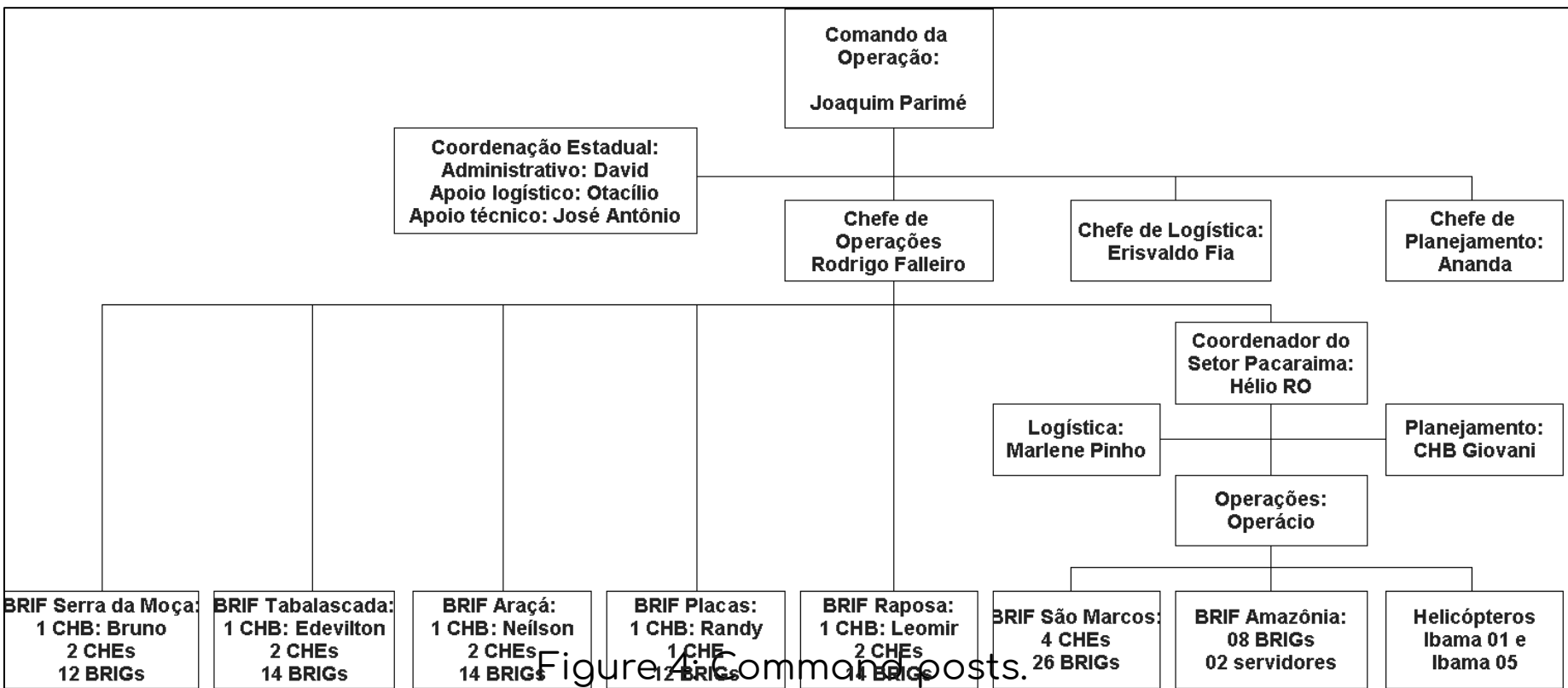
In order to estimate the affected area and the fire line advance, it was generated a 500m buffer around all the active fires. A spatial difference was created whenever the new buffer overlapped a past day buffer.

- ### Local data

The database about the RR's physic, administrative, political and cultural geography was organized using the shapefile data available on governamental Brazilian websites.

- ### Strategies to organize the information flow

The operation was organized with incident command system, a management tool for planning an organizational structure. For this, it was identified the profile of the team and distributed according to the command post (Figure 4).

Figure 4: command posts.

Every day the chiefs (planning, operation and logistic) made meetings to discuss the strategies and to measure the fire progress with active fires that were detected from 6:01 PM of the day before the meeting to 6:00 PM from the meeting day. As results were generated diary maps with the pyro-regions that were sent to the field technician (Figure 5 and 6).
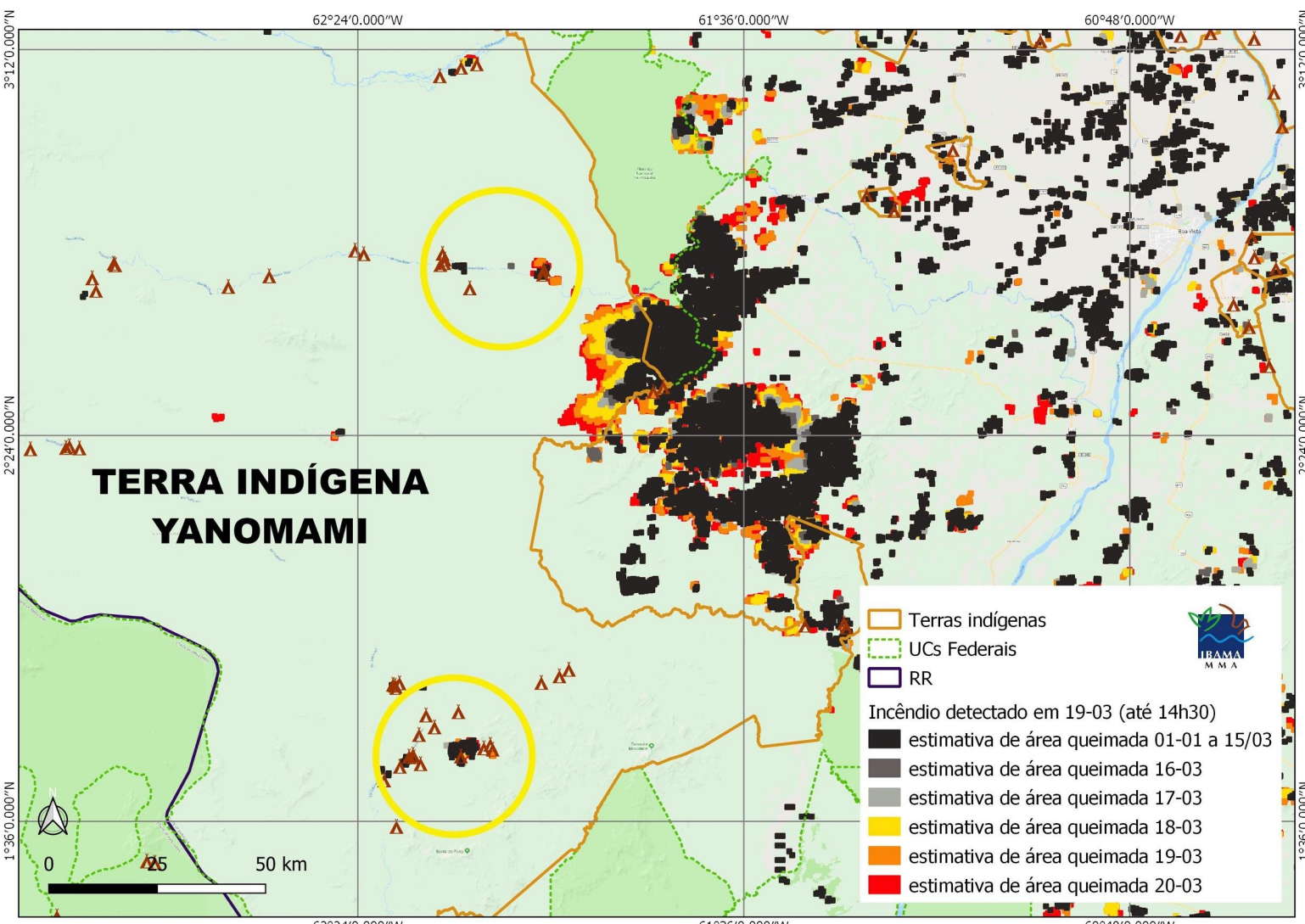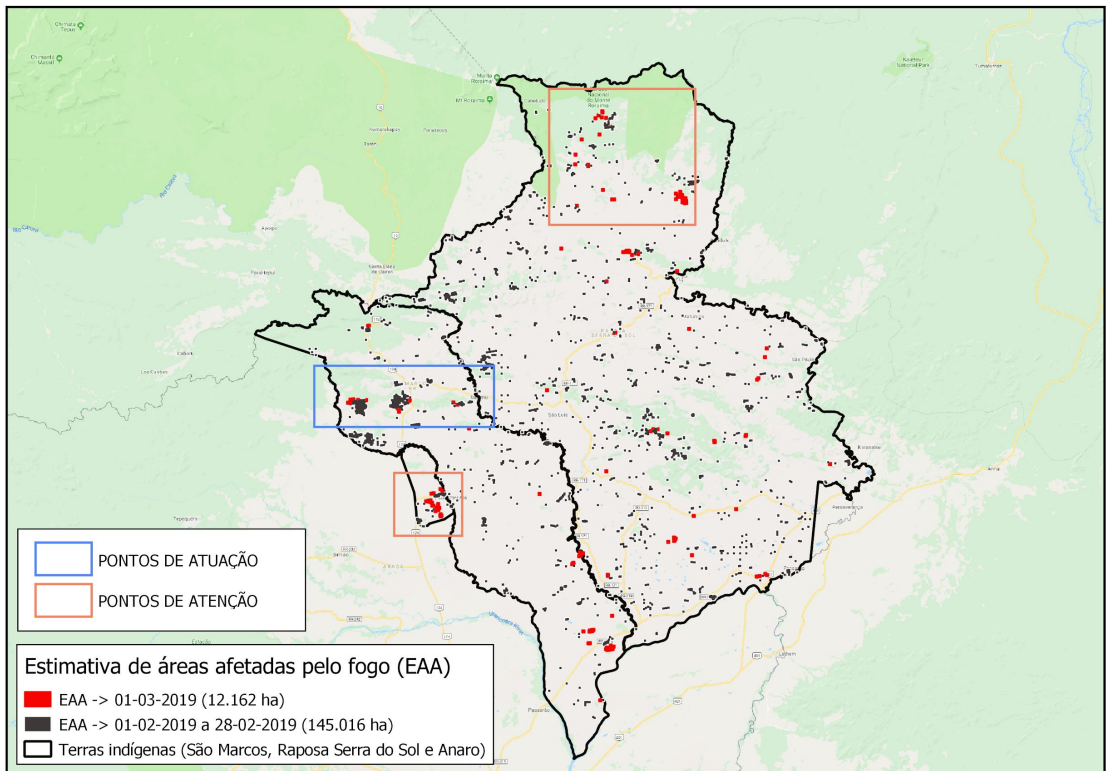

Figure 5

Figure 6: Map of the fire line and the estimation of affected area.

- ### training the aerial staff and brigadists for georeferencing fires

The aerial staff and the brigadistes were trained for georeferencing the flames during the overflights using the mobile app Avenza maps, because of the active fires' high omission. The information that they generated were sent everyday to the planning chief at 5:30 PM by the app What's App.

CONSIDERATIONS

The operation was very expensive (almost USD 1 million) and quite complex for several reasons: 1. lack of technicians in the operation control room and in the field; 2. fires near indigenous villages (Figure 7 and 8) and the transmission line that is responsible for the distribution of electricity in the state of RR (Figure 9); 3. occurrence of INPE's active fire database; 4. No fire monitoring platform consistent with local situation; 5. difficulty in communication between teams located in the field with the command team located in the state capital, Boa Vista; 6. Absence of interinstitutional measures to extinguish fires from illegal mining activities; 8. Difficulty accessing some regions.

Figure 7 and 8: indigenous villages affected by the fire.

Figure 9: Fire line and estimation of affected area.

RECOMMENDATIONS

- Course for training field technicians focusing on use of cartographic and data mapping.
- Improvements on the INPE's active fire data system;
- Formulation of Prevfogo/Ibama app to collect data and disseminate the information between the chiefs of command in near real time;
- Development of active fire product with low omission rates and burned area product for the region.