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# JRC TECHNICAL REPORT

## Weekly analysis of wildfires in the Amazon region: September 28 - October 4, 2020

2020



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## Scope of this report and executive summary

This report describes the trends of wildfires in the Amazon in 2020 through the comparison with the fire activity in the region in previous fire seasons. It must be noted that 2019 was a critical year in terms of fire activity in many of the countries in the region. Seasonality and trends on fire activity in the countries can be found at the [JRC Technical Report on the Amazon](#). The current report has been produced by the European Commission's Joint Research Centre (JRC) within its activities on the development of a Global Wildfire Information System (GWIS)<sup>1</sup>. Most of the Amazon region is in Brazil, specifically in the Brazilian Legal Amazon (BLA)<sup>2</sup>, and in other neighbor countries. Paraguay has been included in this report due to the high fire activity observed this year, although it is not part of the Amazon region. Figure 1 shows the geographical extent of the countries analyzed in this report.

- In the Brazil Legal Amazon (BLA), within Brazil, a total of **25.56 Mha burnt since January 1 until October 4, 2020. This value is about 47% higher than that of 2019. In the last 3 weeks, the number of fires in the BLA was about two times the number of fires in those weeks in 2019**, while the fire size was similar to that of 2018 and 2019. **Last week 5,462 fires occurred, which is the highest value since the beginning of the year.**
- **35.23 Mha ha burnt in Brazil since January 1 until October 4, 2020**, with a total 3,7 Mha burnt in the last week. **The value of the last week was about four times the value of the same week in 2019. So far, the total burnt area in Brazil is about 42% higher than that of 2019. 9,128 fires occurred last week, which is the highest value since the beginning of the year** The average fire size is similar to 2019 that was a critical year.
- In Bolivia, **the last two weeks had higher burnt area and number of fires than those weeks in 2019, increasing the burnt area trend of the year 2020 (5,18 Mha) and confirmed by an increase of the fire activity.** However, the average fire size remains similar to previous years and much lower (ten times less) from the peaks of the average fire size reached during July of 2019.
- **In Colombia, the total burnt area in the country (3.15Mha) remains approximately 20.56% above the values of 2019, due to the intensive fire activity from January to April 2020.**
- **Paraguay, with 5.27 Mha burnt since January 1 until October 4, 2020, has reached values nearly two times the values in 2018 and 2019. The average fire size has been higher during the last 3 weeks compared to the same weeks of 2018 and 2019.**
- A total of 2 Mha burnt in Peru since January 1 until October 4, 2020. **This value is almost double than that of 2019, mainly because of the increase of the fire activity during July and August.** The number of fires mapped in GWIS is nearly double of that in 2019.
- Venezuela recorded 6.80 Mha burnt in the current year. **The value of the total burnt area in Venezuela is approximately 15 % higher than that in 2019 due to the intensive fire activity in the country between January and April. The trend in the last week is comparable to those of 2018 and 2019.**
- This week, fire danger conditions are expected to remain extreme in a great part of Brazil, especially in central, northeastern and southeastern Brazil. This area includes the south and eastern parts of BLA, which concentrate the highest amount of fires and burnt areas. Also in northern Paraguay and southern Bolivia the fire danger is expected to be very high or extreme. Moderate or high fire danger is expected in eastern Bolivia and southern Paraguay



Figure 1. Areas analyzed in this report: Brazil Legal Amazon, Brazil, Bolivia, Colombia, Paraguay, Peru and Venezuela

<sup>1</sup> <https://gwis.jrc.ec.europa.eu>

<sup>2</sup> The Brazilian Legal Amazon is a geopolitical region in Brazil, established in the article 2 of the complementary law 124, of 2007, that includes 772 municipalities over 9 states. It comprises approximately five million square kilometres, which correspond to 59% of the Brazilian territory ([IBGE, 2019](#))



# 1 Wildfires in the Brazilian Legal Amazon Region

Figure 2 shows the trends on the extent of burnt areas and the number of fires since January 1, 2020 produced by the Near-Real Time (NRT) fire analysis in GWIS. The last row shows the evolution of active hot spots (thermal anomalies) detected by the satellite sensor VIIRS. A total of 25.56 Mha burnt in the BLA since January 1 until October 4, 2020, with 2 Mha burnt in total the last week, more than the double for the same week in 2019. Until October 4th, the total burnt area in 2020 in BLA is about 47% higher than that of 2019.

The number of fires recorded in GWIS in the last week was 5,462, which is the highest value since the beginning of the year, higher than the value in 2019 and 2018 in that week. The total number of fires in 2020 is above the figures in 2018 and 2019. On average, fires that occurred in the BLA in the last 3 weeks, were of a similar size in 2020 compared to 2019 and 2018. The number of thermal anomalies until October 4, 2020 (790,011) shows a typical trend in the region as compared to the trends in 2018 and 2019. A number of 65,853 thermal anomalies was registered last week.

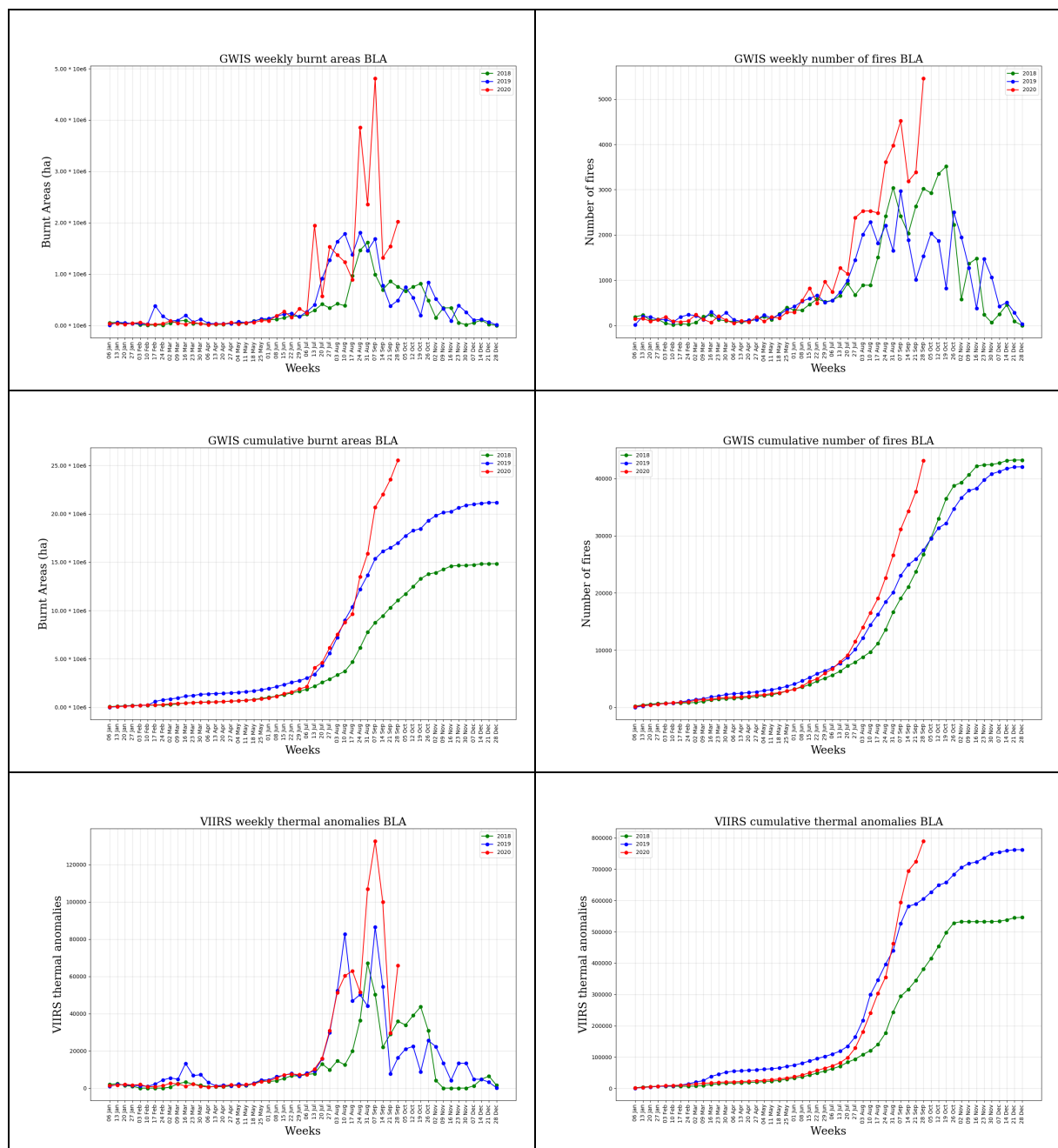


Figure 2. Trend of burnt areas and number of fires as compared to data in the last two years.

## 2 Wildfires in Brazil

Figure 3 shows the trends on the extent of burnt areas and the number of fires since January 1, 2020 produced by the Near-Real Time (NRT) fire analysis in GWIS. The last row shows the evolution of active hot spots (thermal anomalies) detected by the satellite sensor VIIRS. A total of 35.23 Mha ha burnt in Brazil since January 1 until October 4, 2020, with a total 3,7 Mha burnt in the last week. The value of the week was about four times the value of the same week in 2019. Until October 4th, the total burnt area in Brazil is about 42% higher than that of 2019.

The number of fires recorded in GWIS in the last week was 9,128, which is the highest value since the beginning of the year, higher than the value in 2019 and 2018 in that week. The number of fires in 2020 up to October 4 is higher than that of 2019, although the average fire size is similar to 2019 that was a critical year. The number of thermal anomalies until October 4, 2020 (1,090,179) shows a typical trend in the region but higher values as compared to the trends in 2018 and 2019. 124,136 thermal anomalies were registered last week.

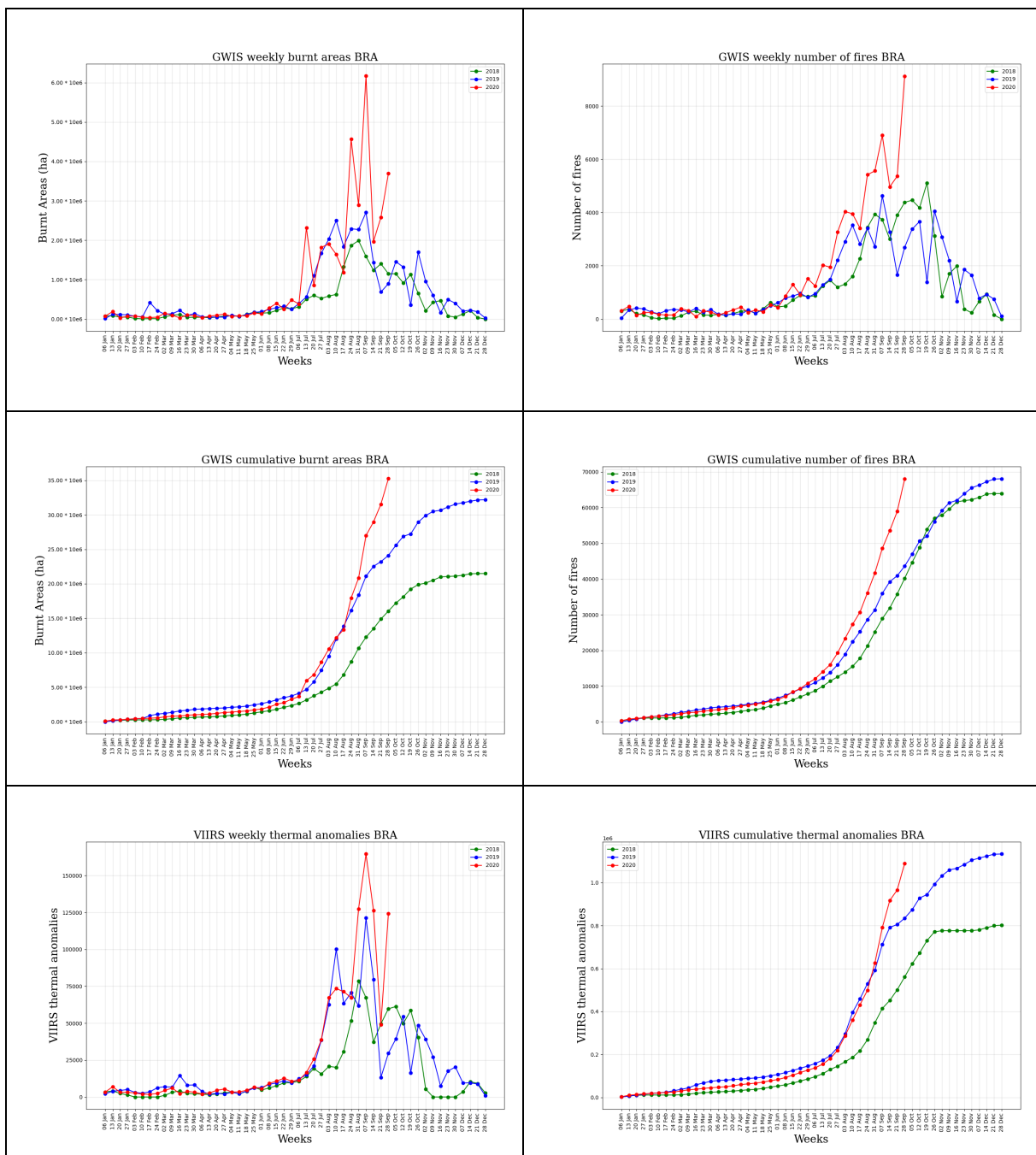


Figure 3. Trend of burnt areas, number of fires and thermal anomalies as compared to data in the last two years.

### 3 Wildfires in Bolivia

Figure 4 shows the trends on the extent of burnt areas and the number of fires since January 1, 2020 produced by the Near-Real Time (NRT) fire analysis in GWIS. The last row shows the evolution of active hot spots (thermal anomalies) detected by the satellite sensor VIIRS. A total of 5,18 Mha ha burnt in Bolivia since January 1 until October 4, 2020, with 431,814 ha burnt in the last week. The last two weeks had higher burnt area and number of fires than those weeks in 2019, increasing the burnt area trend of the year 2020. However, the average fire size remains similar to previous years and much lower (ten times less) from the peaks of the average fire size reached during July of 2019 (see Figure 18).

The number of fires recorded in GWIS in the last week was 1144, higher than the number of fires in the same week in 2018 and 2019. The number of thermal anomalies until October 4, 2020 (155835) shows a typical trend in the region. 24,290 thermal anomalies were detected by VIIRS in the last week, the highest values since the beginning of the year.

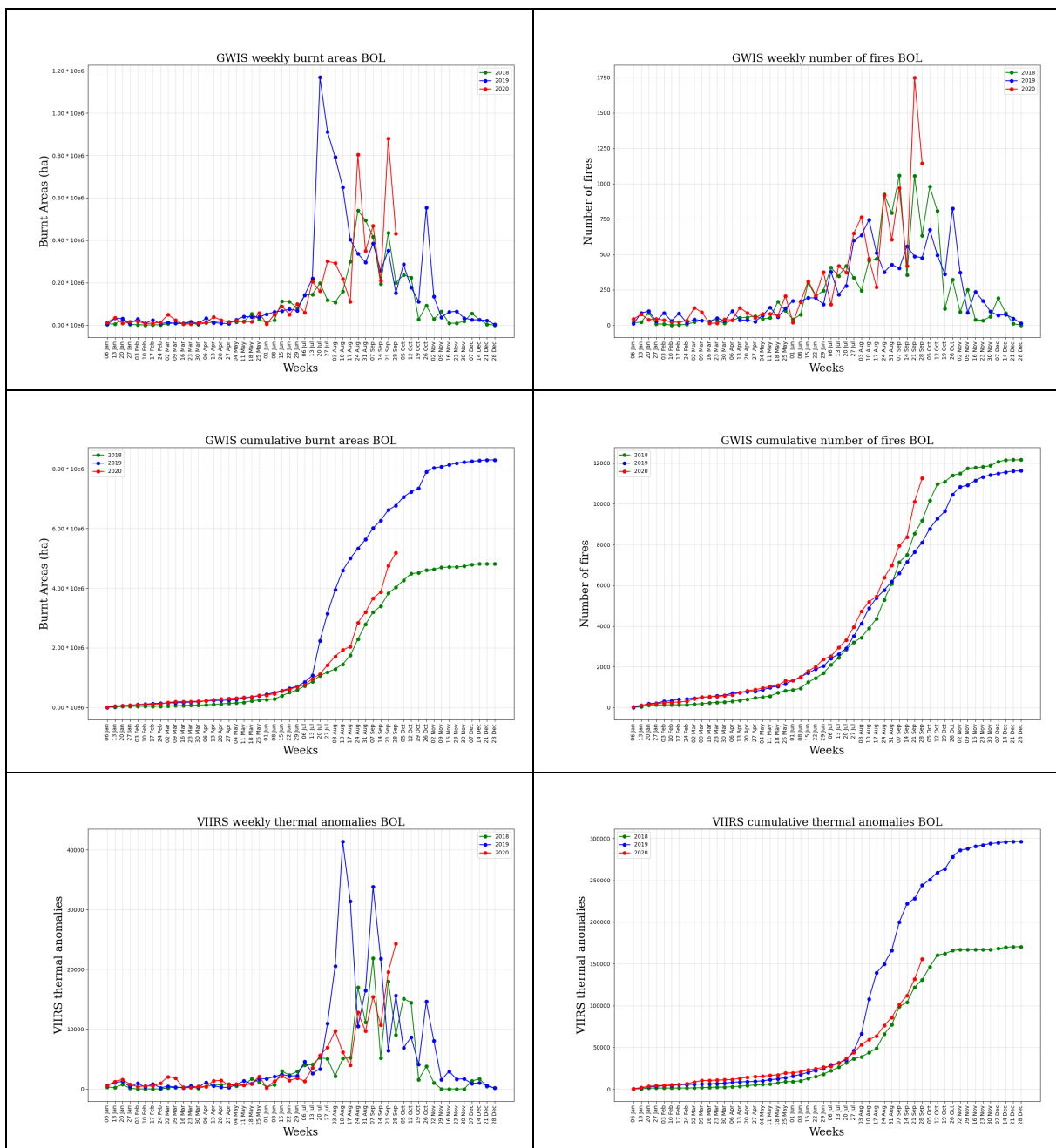


Figure 4. Trend of burnt areas, number of fires and thermal anomalies as compared to data in the last two years.

## 4 Wildfires in Colombia

Figure 5 shows the trends on the extent of burnt areas and the number of fires since January 1, 2020 produced by the Near-Real Time (NRT) fire analysis in GWIS. The last row shows the evolution of active hot spots (thermal anomalies) detected by the satellite sensor VIIRS. A total of 3.15 Mha burnt in Colombia since January 1 until October 4, 2020, with 16,366 ha burnt in the last week. Although the fire activity last week is similar to those of previous years, the total burnt area in the country remains approximately 20.56 % above the values of 2019, due to the intensive fire activity from January to April 2020.

The number of fires recorded in GWIS in the last week was 79, which shows a stable trend in the last weeks, as compared to 2018 and 2019. The number of fires is approximately 22% higher than that of last year. The number of thermal anomalies until October 4, 2020 (111564) shows a typical trend in the region as compared to the trends in 2018 and 2019, with values approximately 20% higher than those in 2019. 566 thermal anomalies were detected by VIIRS during the last week, which is similar to the values in the same week in 2019 and slightly below the values in the same week in 2018.

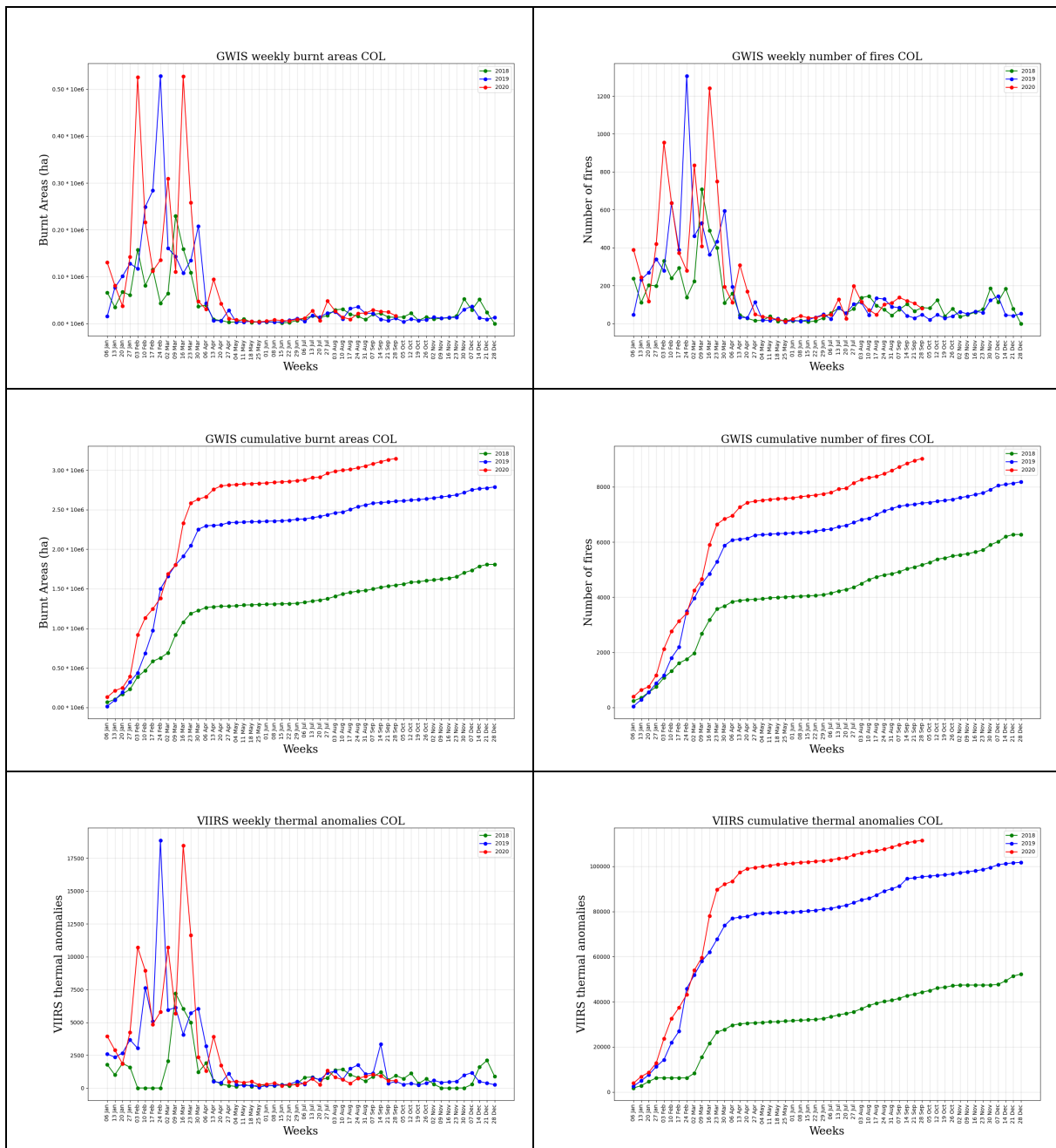


Figure 5. Trend of burnt areas, number of fires and thermal anomalies as compared to data in the last two years.

## 5 Wildfires in Paraguay

Figure 6 shows the trends on the extent of burnt areas and the number of fires since January 1, 2020 produced by the Near-Real Time (NRT) fire analysis in GWIS. The last row shows the evolution of active hot spots (thermal anomalies) detected by the satellite sensor VIIRS. A total of 5.27 Mha burnt in Paraguay since January 1 until October 4, 2020, which is nearly two times the values in 2018 and 2019. Approximately 2.77 Mha burnt in the country the last week, which is about one third less than the previous week, but higher than the value of the same week of 2018 and 2019.

The number of fires recorded in GWIS in the last week was 575, which is lower than the value in 2019 but higher than 2018. The average fire size has been higher during the last 3 weeks compared to the same weeks of 2018 and 2019. The same happened from the week of July 15 to August 3. Those weeks with higher average fire size matches with the weeks that contribute to increase the current burnt area for the current fire season. The number of thermal anomalies until October 4, 2020 (166,770) follows a typical trend in the region, but with higher values, nearly the double as compared to 2018 and 2019. 29,821 thermal anomalies detected by VIIRS last week, the highest value since the beginning of the year.

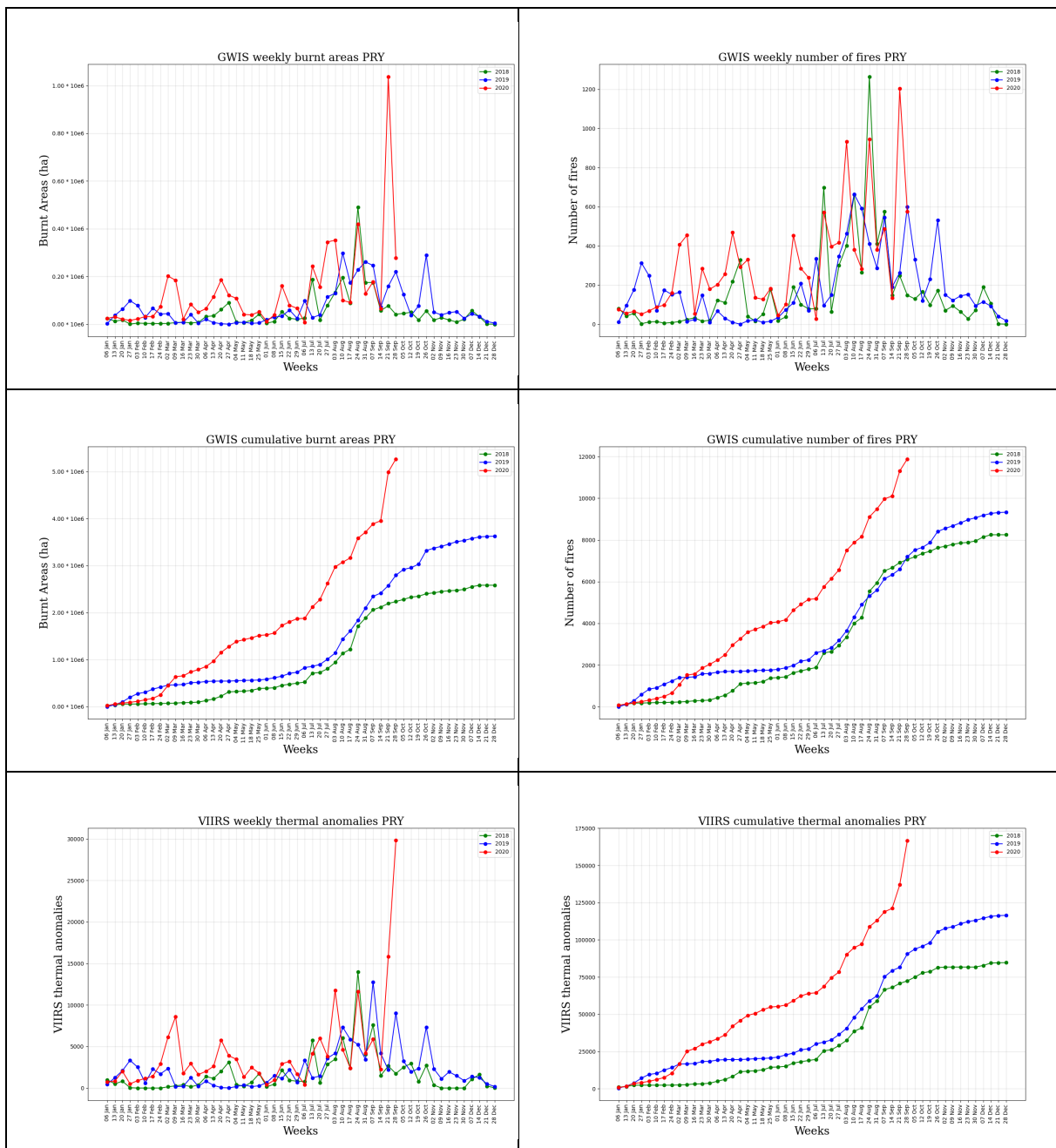


Figure 6. Trend of burnt areas, number of fires and thermal anomalies as compared to data in the last two years.

## 6 Wildfires in Peru

Figure 7 shows the trends on the extent of burnt areas and the number of fires since January 1, 2020 produced by the Near-Real Time (NRT) fire analysis in GWIS. The last row shows the evolution of active hot spots (thermal anomalies) detected by the satellite sensor VIIRS. A total of 2 Mha burnt in Peru since January 1 until October 4, 2020. This value is almost the double than that of 2019. Approximately 33,145 ha burnt in the last week, similar values to ones of 2018 and 2019 for the same week.

The number of fires recorded in GWIS in the last week was 157, decreasing from the last week but similar to ones of 2018 and 2019 for the same week. The total number of fires since the beginning of the year, above 8,000, is about double of that of 2019. The number of thermal anomalies until August 30, 2020 (61,130) shows a typical trend in the region, with values higher than in 2018 and 2019. 1,425 thermal anomalies registered last week, decreasing after the last week.

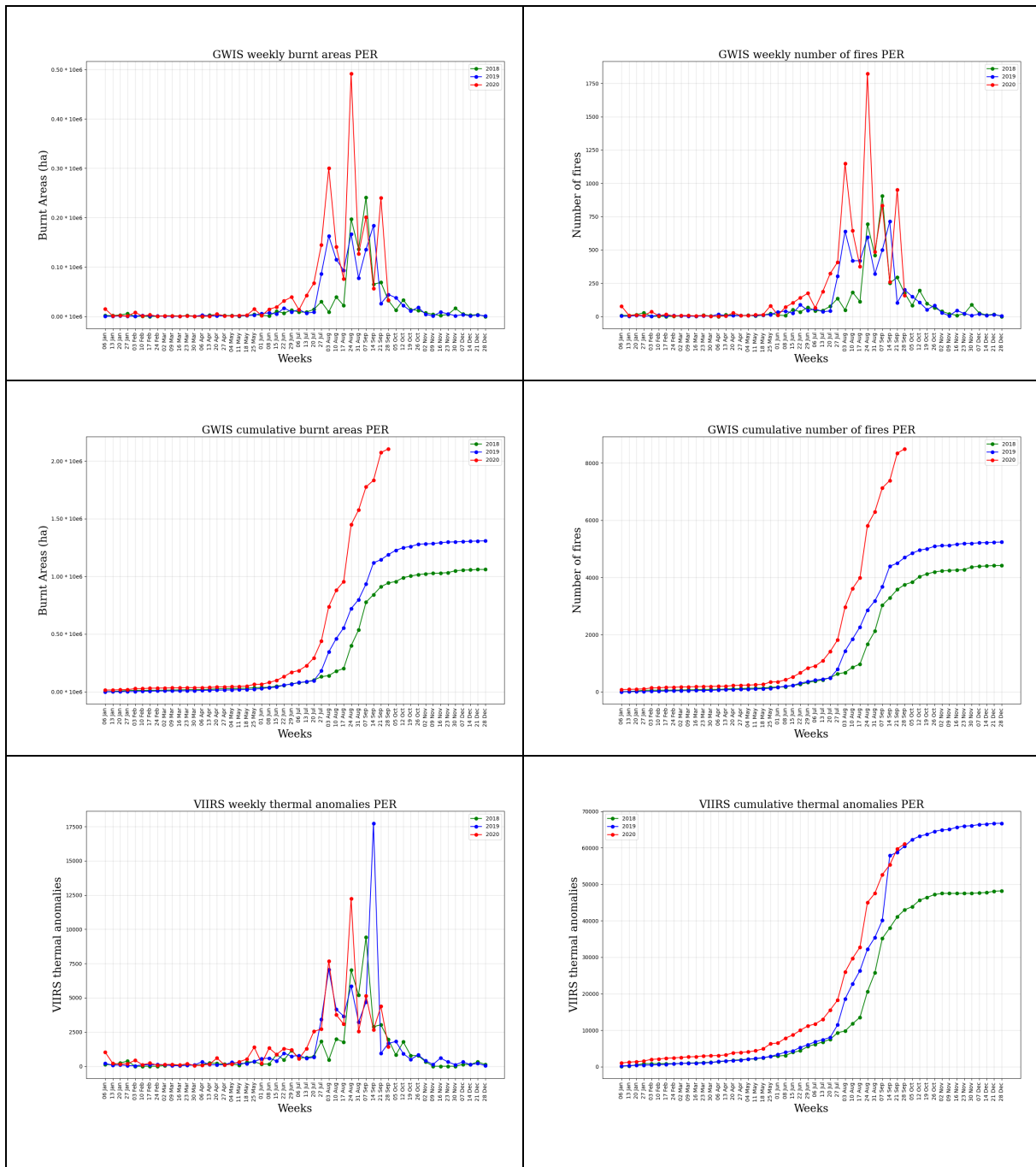


Figure 7. Trend of burnt areas, number of fires and thermal anomalies as compared to data in the last two years.

## 7 Wildfires in Venezuela

Figure 8 shows the trends on the extent of burnt areas and the number of fires since January 1, 2020 produced by the Near-Real Time (NRT) fire analysis in GWIS. The last row shows the evolution of active hot spots (thermal anomalies) detected by the satellite sensor VIIRS. A total of 6.80 Mha burnt in Venezuela since January 1 until October 4, 2020, with 20,245 ha burnt in the last week. The value of the total burnt area in the country is approximately 15 % higher than that in 2019 due to the intensive fire activity in the country between January and April. The trend in the last week is comparable to that of 2018 and 2019.

The number of fires recorded in GWIS in the last week was 80, which shows a stable trend comparable to those of the previous two years, although the total number of fires remains approximately 17% higher than in 2019. The number of thermal anomalies until October 4, 2020 (268,089) shows a typical trend in the region as compared to the trends in 2018 and 2019, but with approximately 30% higher value than the previous years. 823 thermal anomalies were recorded by VIIRS during the last week, a value that is like those recorded in that week the previous two years.

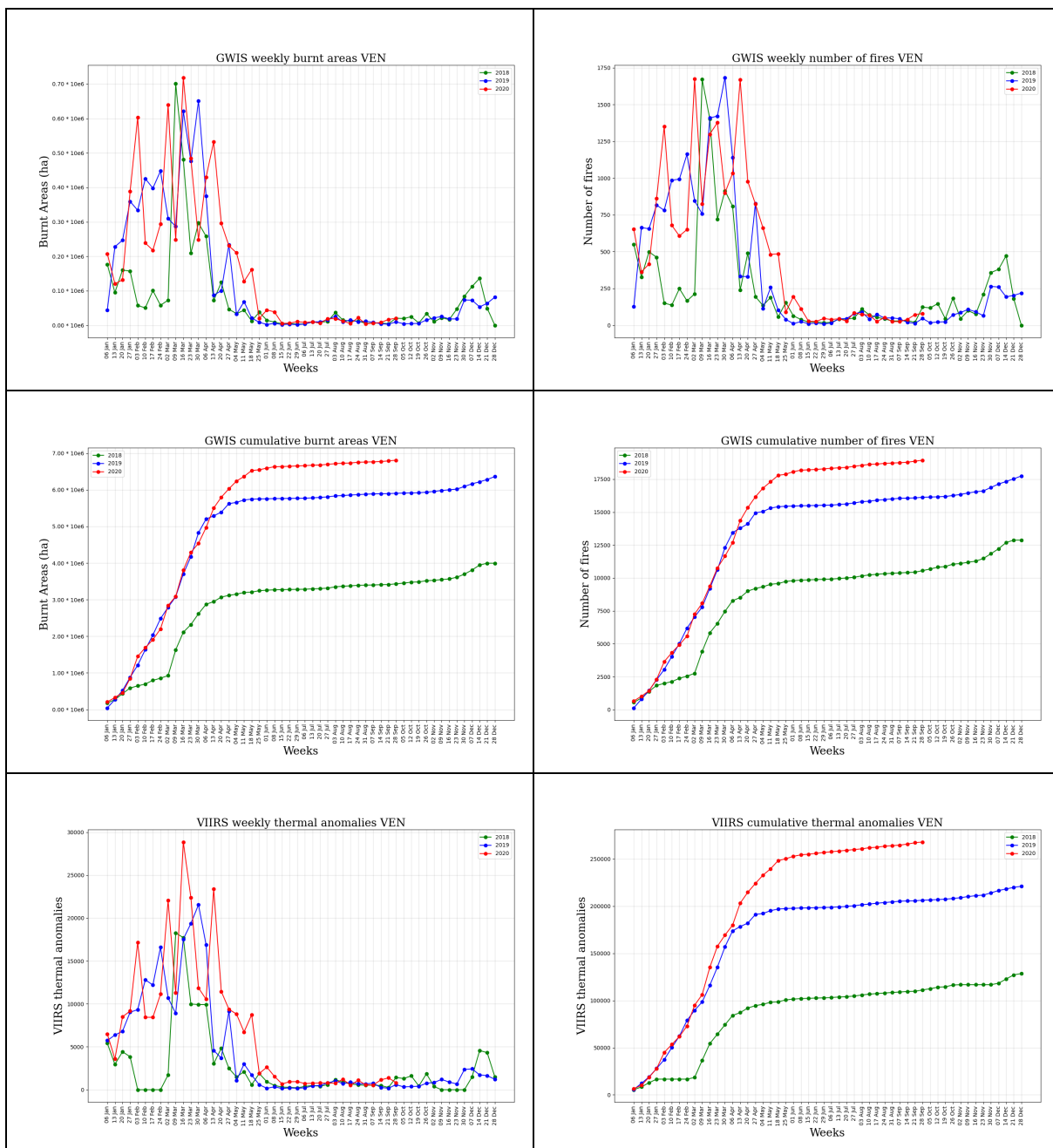


Figure 8. Trend of burnt areas, number of fires and thermal anomalies as compared to data in the last two years.



## 8 Fire danger and fire weather forecast in the Amazon region

This section provides information on the fire danger forecast in the Amazon region for the current week. High levels of fire danger facilitate fire ignitions and the propagation of ongoing fires. Figure 9 provides the average fire danger for the week of September 7 to September 13, 2020. This information is based on the daily fire danger forecast that is provided online in GWIS<sup>3</sup>. According to this forecast, it is expected that fire danger conditions will remain extreme in a great part of Brazil, especially in central, northeastern and southeastern Brazil. This area includes the south and eastern part of BLA, which concentrates the highest amount of fires and burnt areas. Also in northern Paraguay and southern Bolivia the fire danger is expected to be very high or extreme. Moderate or high fire danger is expected in eastern Bolivia and southern Paraguay.

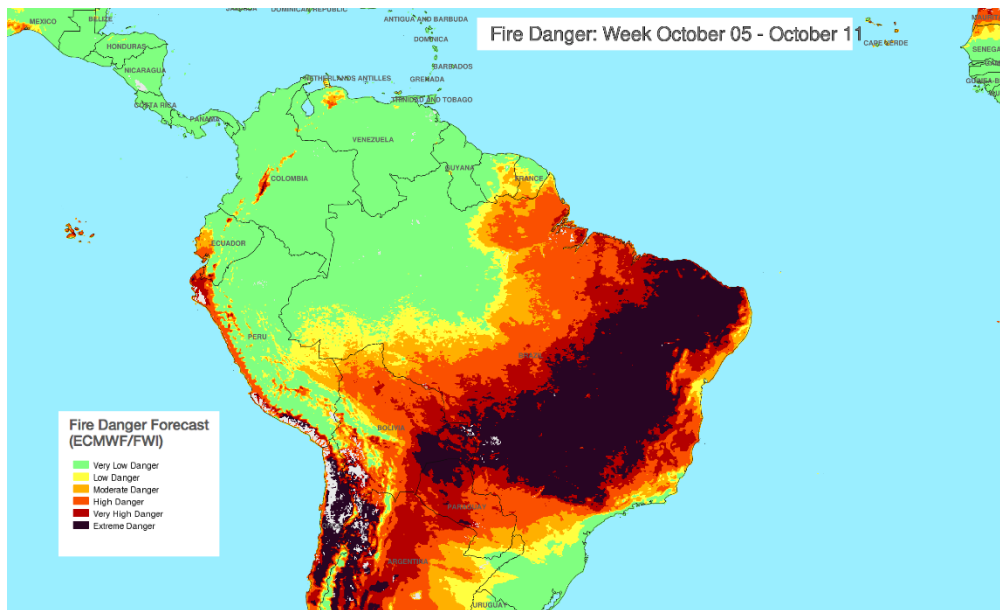


Figure 9. Average Fire danger forecast. Week, October 05-October 11, 2020.

The weekly fire weather forecast of temperature and precipitation anomalies for this week is presented in Figure 10. Above average temperatures are forecasted for south/southeastern Brazil, eastern Bolivia and northern Paraguay. Moderate values also are expected on the BLA, Bolivia, Peru. The models estimate an above average precipitation rates for this week mainly in areas of the north of Brazil and Venezuela. Below average precipitation is foreseen in Peru, most of Bolivia, Paraguay and western Brazil.

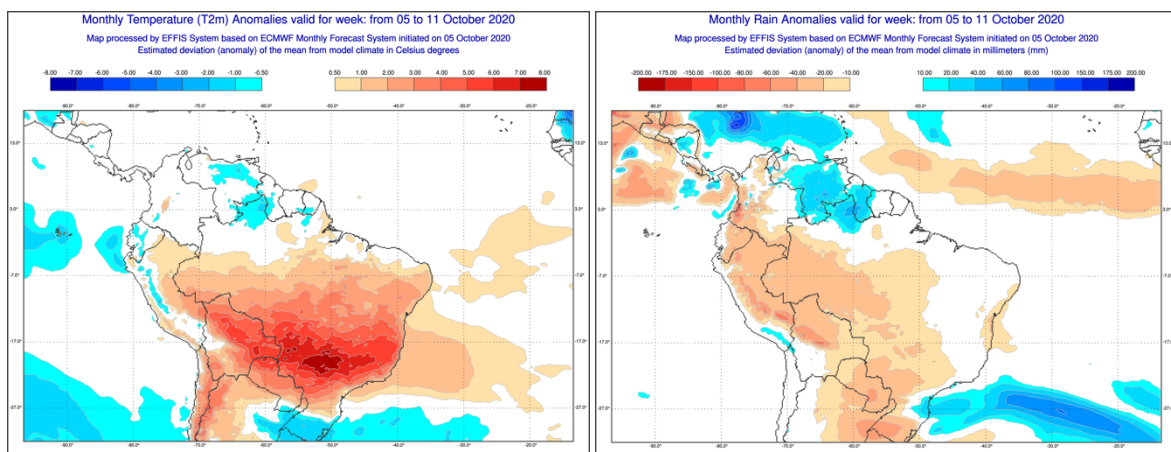


Figure 10. Fire weather anomalies of the current week, October 05-October 11, 2020.

<sup>3</sup> [https://gwis.jrc.ec.europa.eu/static/gwis\\_current\\_situation/public/index.html](https://gwis.jrc.ec.europa.eu/static/gwis_current_situation/public/index.html)



## 9 Monthly analysis (up to 31 August 2020)

### 9.1 Brazilian Legal Amazon (BLA)

Figure 11 shows the spatial distribution of burnt areas for 2020 mapped by the Near-Real Time (NRT) process in GWIS in the Brazilian Legal Amazon region, within Brazil.

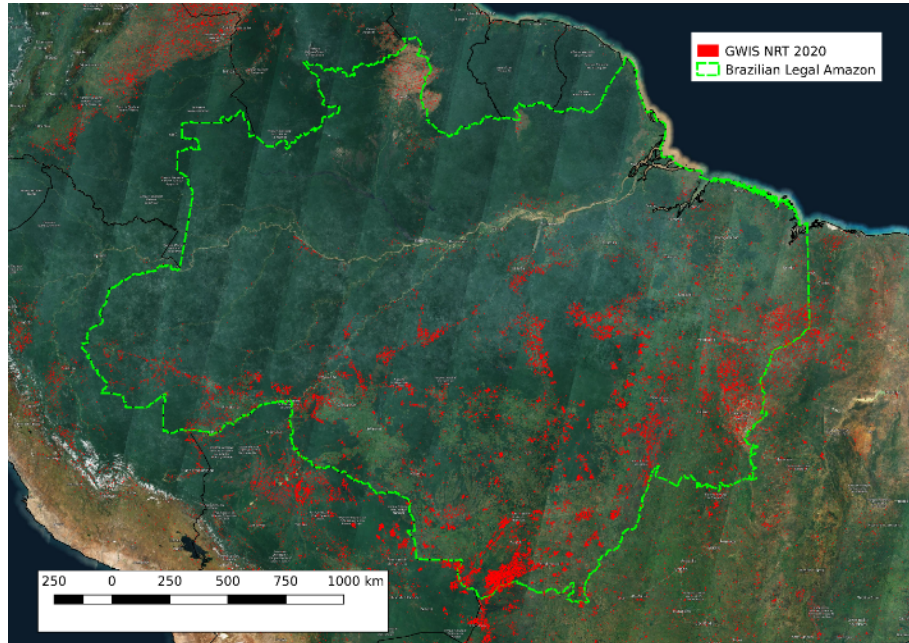


Figure 11. GWIS burnt areas for 2020 in Brazilian Legal Amazon (BLA). Burnt areas until 4 October.

The 2020 fire season in the BLA was following similar trends of the last year until September as shown in Figure 12. However, this year the burnt area of September is more than twice (10.66Mha) than the previous last two years for the same month (4.3 and 4.4 Mha for 2018 and 2019). The numbers of fires is also higher, almost double compared to 2018 (17033 in 2020 compared with 10675 in 2018 and 7906 in 2019). During September 2019 the fire season decreased but this year keeps burning contributing to higher value of accumulated burnt area (24.45Mha) and higher average fire size than the same month for previous years. This year the fires are about the same size of last year but in more quantity and during a longer period of time. The 2020 fire season has a similar behavior of the one in 2018 but with an average fire size similar to the one of the last year 2019.

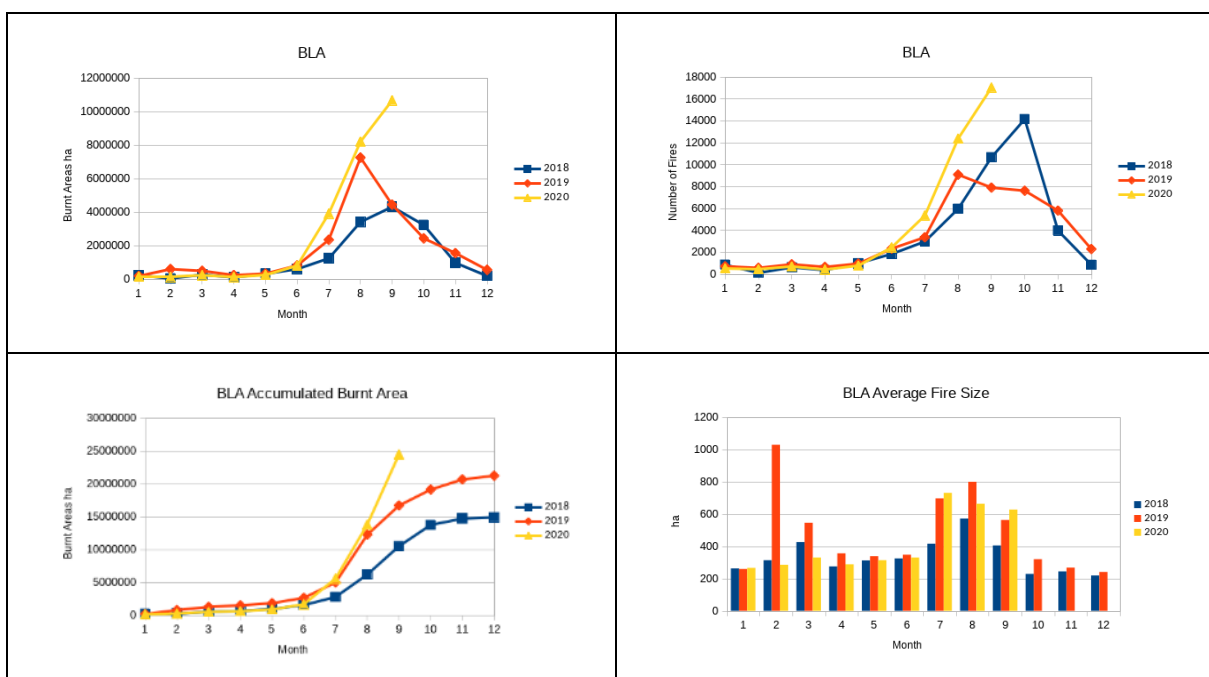


Figure 12. Trend of burnt areas and number of fires as compared to data in the last two years.

In terms of the number of **active fire spots retrieved directly by the VIIRS sensor, 2020 presents a number of active fire spots from May to September above the average for the period between 2012 and 2019** as shown in Figure 13. These type of data are those often reported in the media, which point out to a higher number of fires this year as compared to past years.

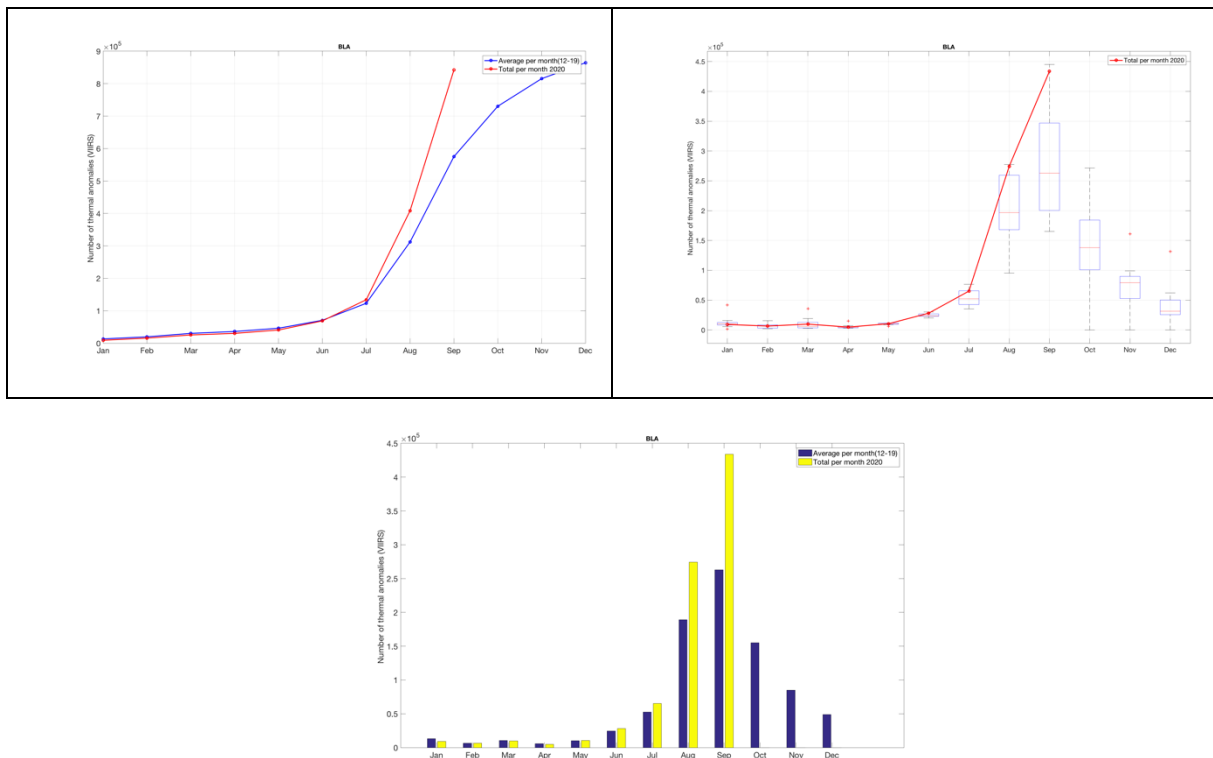


Figure 13. Trend of burnt areas and number of fires as compared to data in the last two years.

## 9.2 Brazil

The spatial extent of the burnt areas mapped by the Near-Real Time (NRT) process in GWIS is presented in Figure 14. Although most of the burnt areas occurred in the center of the country (Cerrado Biome), the fire activity and the resulting burnt areas show a wide spread from north to south, including the humid Amazon forest.

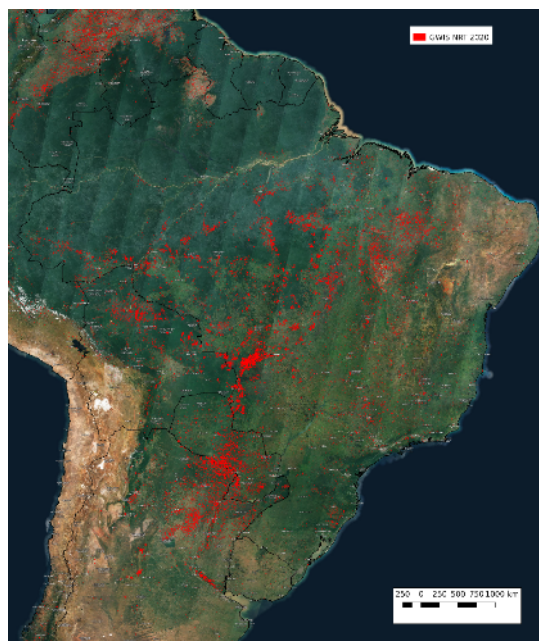


Figure 14. GWIS burnt areas for 2020 in Brazil. Burnt areas until 04 October.

The 2020 fire season in Brazil is showing similar behavior of 2018 but with magnitudes of the season of 2020 that was a critical year. This year the peak of the fire season is by now in September, like in the 2018 fire season. However, the average fire size is higher, more similar to the 2019 fire season. Therefore, the burnt area and the number of fires of 2020 is considerable higher than others years. Last year 2019 had, in average, smaller fires during September than in August. But this year is the opposite and the number of fires is much higher than the last month. During September 2020 the burnt area reached 14.9Mha with 26132 fires contributing to a total burnt area of 33.23Mha for 2020, 41.19% higher than in 2019.

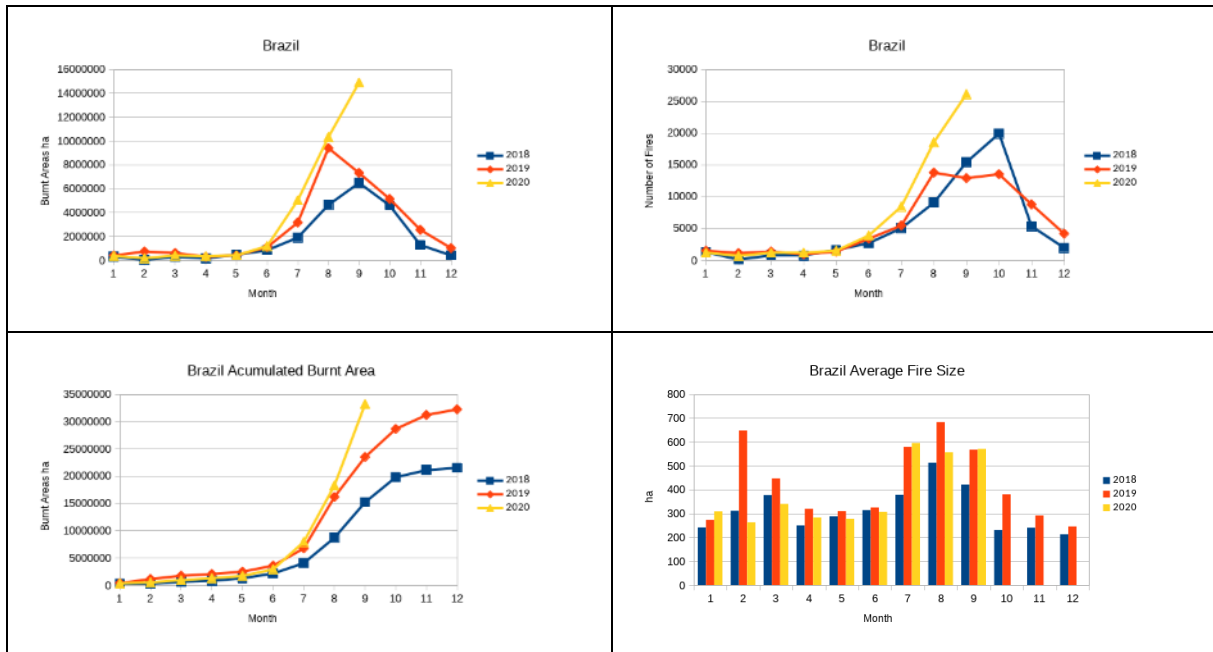


Figure 15. Trend of burnt areas and number of fires as compared to data in the last two years.

In terms of active fire spots detected by VIIRS, 2020 presents a number of active fire spots in the period between March and September (especially August and September) above the average for the period between 2012 and 2019 as shown in Figure 16.

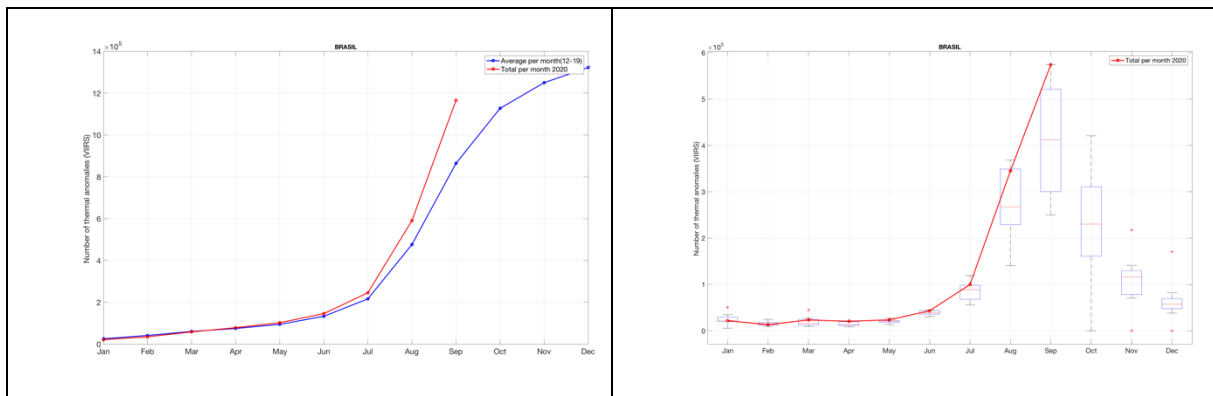


Figure 16. Trend of burnt areas and number of fires as compared to data in the last two years.

### 9.3 Bolivia

The spatial distribution of burnt areas in Bolivia in 2020 mapped by the Near-Real Time (NRT) process in GWIS is shown in Figure 17.

In Bolivia the 2020 fire season is following a similar trend to the 2018 fire season with slightly more burnt area and number of fires during the peak season in August and September. Bolivia has 4.86 Mha of burnt area and 10437 fires up to September. However, the current year is clearly better compared with the critical 2019 fire season that had clear peak in August and an anomalous average fire during July, August and September as can be seen in Figure 18.

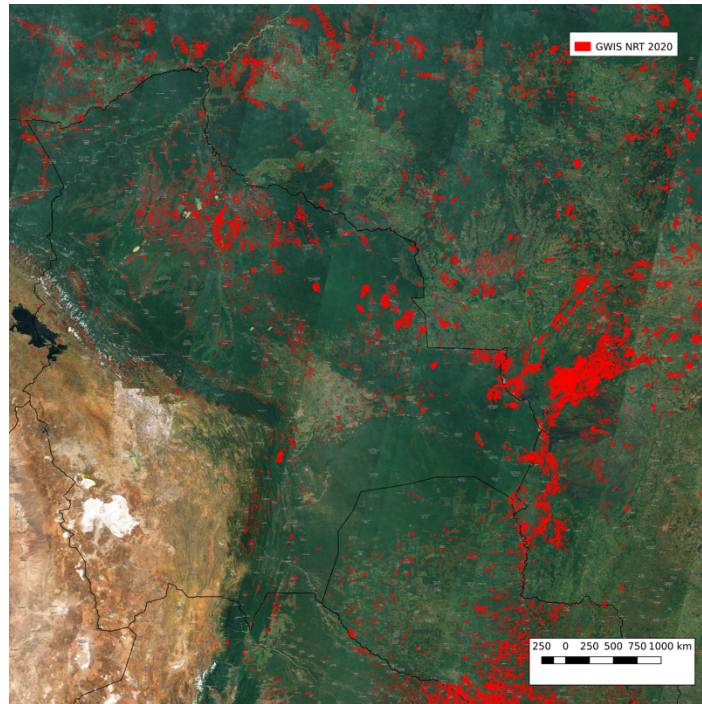


Figure 17. GWIS burnt areas for 2020 in Bolivia. Burnt areas until 4 October.

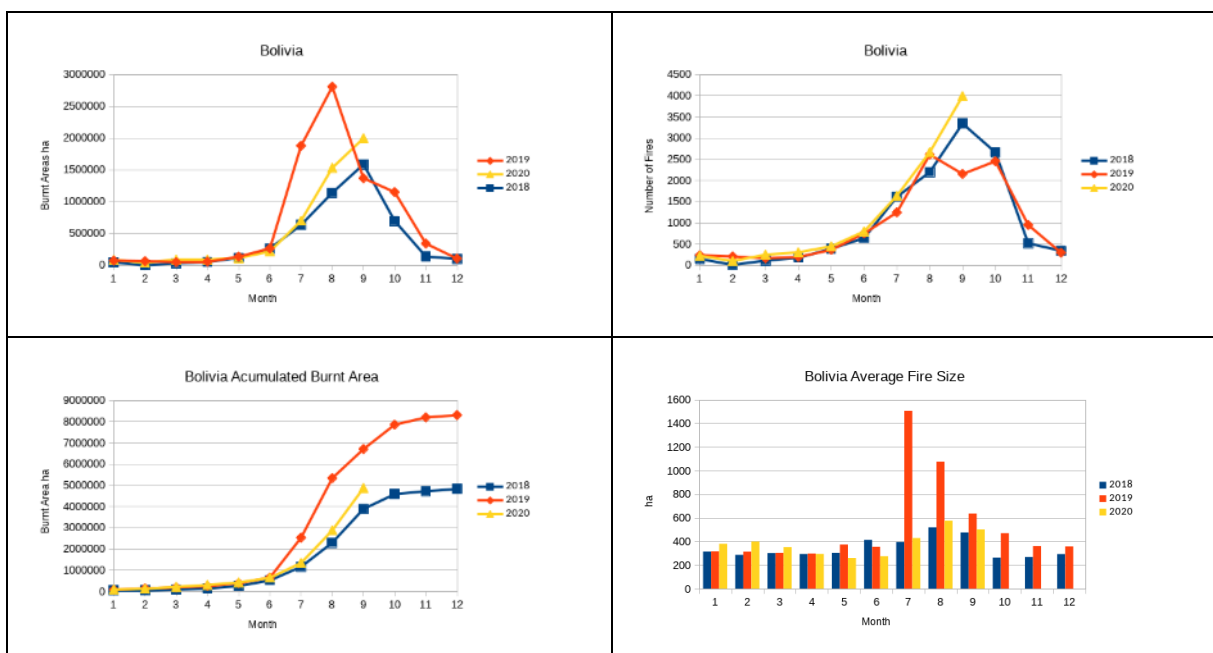


Figure 18. Trend of burnt areas and number of fires as compared to data in the last two years.



In terms of active fire spots detected by VIIRS, 2020 presents a number of active fire spots in the period above between January and July and September above the average and below the average in August compared with the average for the period between 2012 and 2019 as shown in Figure 19.

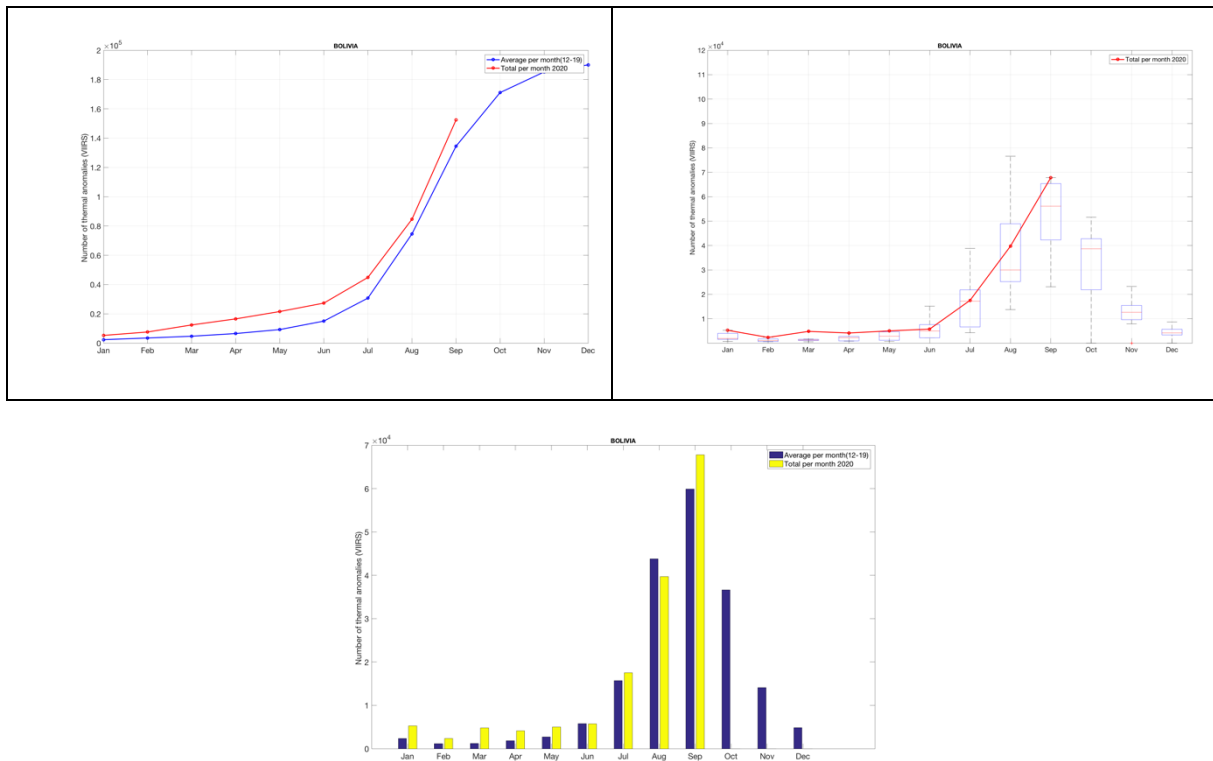


Figure 19. Trend of burnt areas and number of fires as compared to data in the last two years.

## 9.4 Colombia

The spatial distribution of burnt areas in Colombia in 2020 mapped by the Near-Real Time (NRT) process in GWIS is shown in Figure 20.



Figure 20. GWIS burnt areas for 2020 in Colombia. Burnt areas until 4 October.

The current fire season has been more severe than the last two years, 2018 and 2019, with larger burnt areas and number of fires. About 3.1 Mha of burnt areas have been mapped in the country until end of August. Figure 21 shows how the number of fires is considerable higher in March of 2020. The same happens with the burnt area and the average monthly fire size. This fact points out to a considerable increase of fire activity, having more uncontrolled fires. The fires are mainly located on the center and south-west of the country, a region designated as “Llanos”, a complex savanna ecosystem which undergoes periodic, human-induced and natural biomass burning during the dry season, usually between November and April.

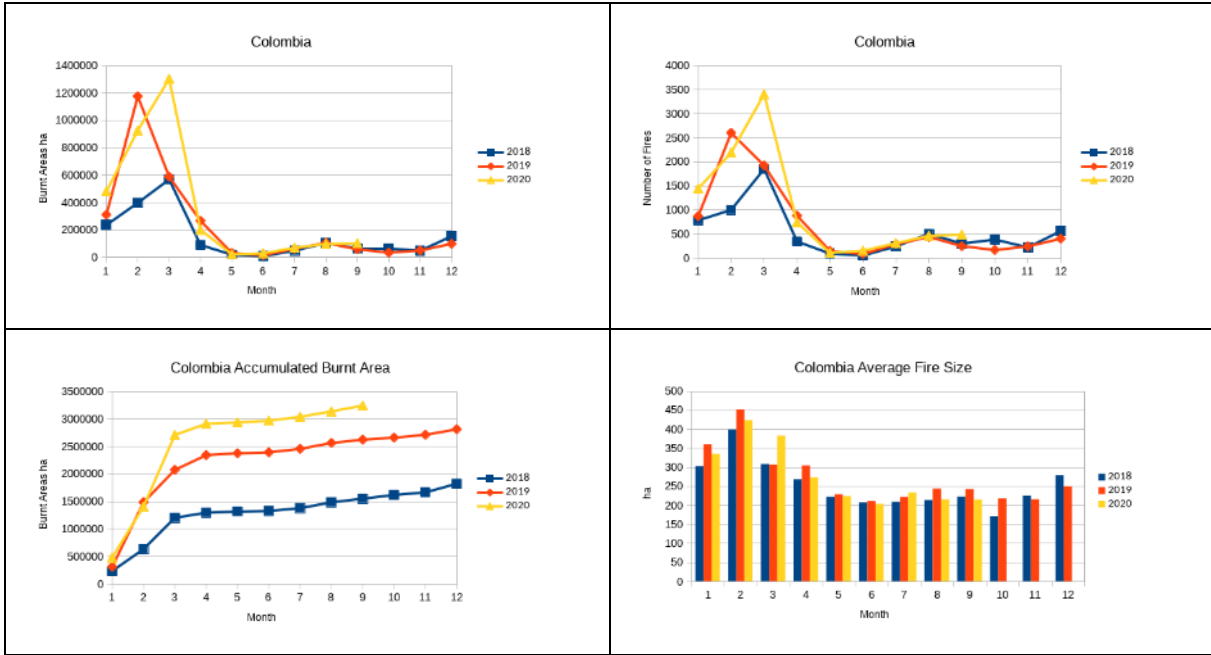


Figure 21. Trend of burnt areas and number of fires as compared to data in the last two years.

In terms of active fire spots detected by VIIRS, 2020 presents a number of active fire spots in the period between January and May above the average for the period between 2012 and 2019 as shown in Figure 22.

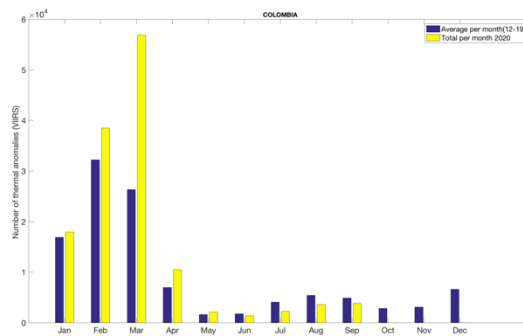
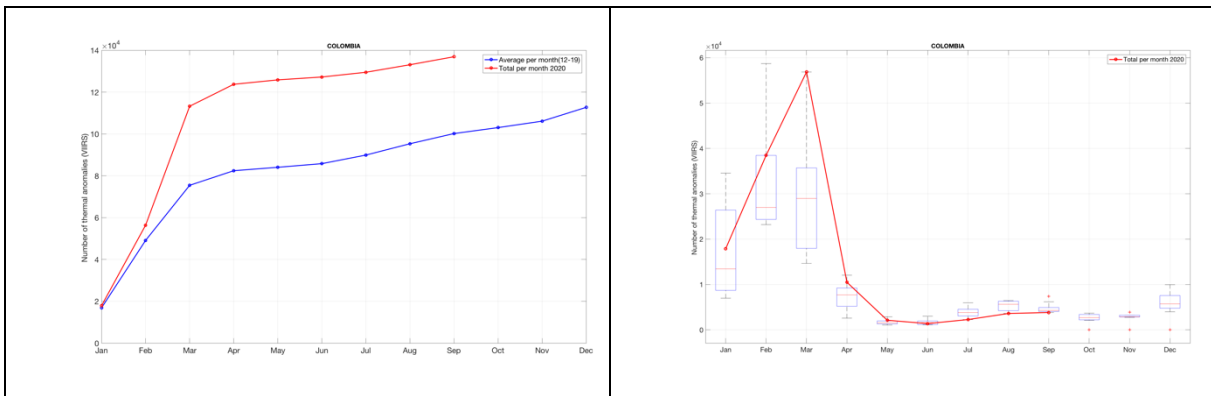


Figure 22. Trend of burnt areas and number of fires as compared to data in the last two years.

## 9.5 Paraguay

In 2020, the spatial extent of the burnt areas in the country mapped by the Near-Real Time (NRT) process in GWIS is presented in Figure 23.

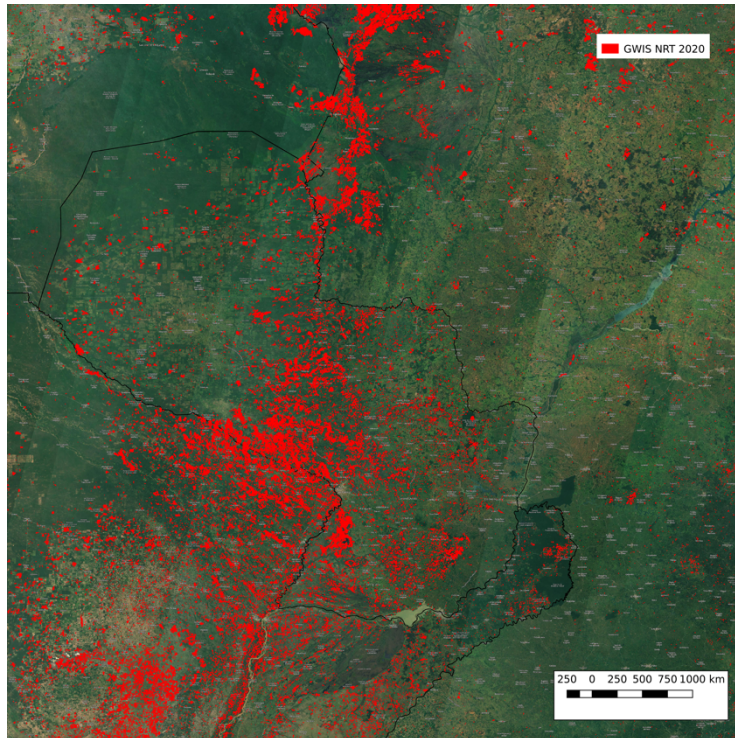
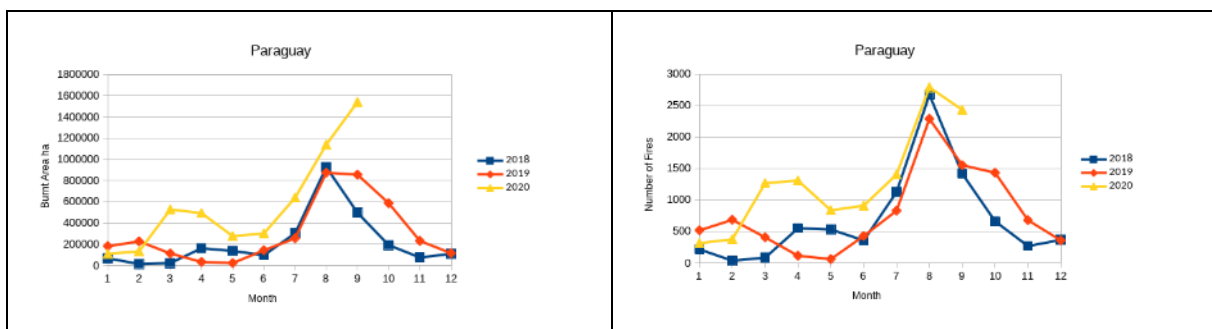


Figure 23. GWIS burnt areas for 2020 in Paraguay. Burnt areas until 4 October.

The 2020 fire season in Paraguay is showing an atypical behavior compared with the two previous years. March and April had a peak with is not present in 2018 and 2019 (Figure 24). In addition, in September 2020 the burnt area is almost twice than previous years caused by big fires. This fact already happened last year but in September 2020 the fires were even larger than the same month in 2019. In September we had a record of average fire size regarding to all the months from 2018, 2019 and 2020. The current burnt area is 5.25 Mha and 11639 fires. The anomalous peak of burnt area for September 2020 is 1.54 Mha, 80.11% higher than 2019 (which was already critical compared with 4.96 Mha of 2018) .



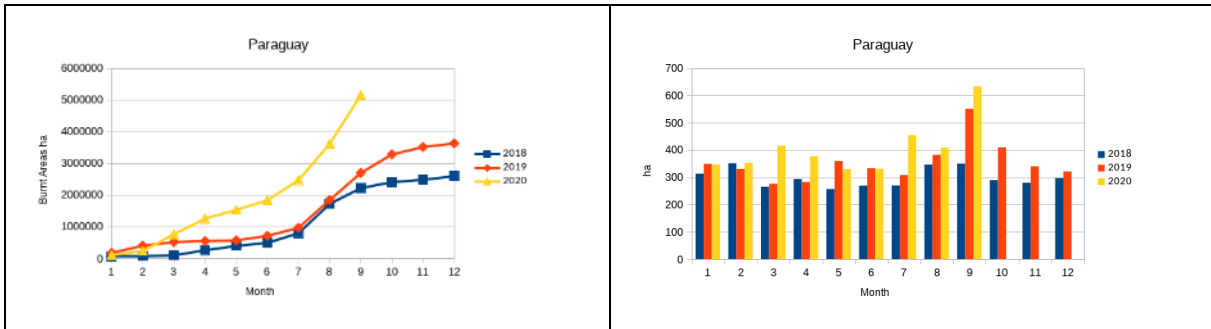


Figure 24. Trend of burnt areas and number of fires as compared to data in the last two years.

In terms of active fire spots detected by VIIRS, 2020 presents the same atypical trend of the burned area and number of fires shown in Figure 24, with a number of active fire spots in the first nine months of the year above the average for the period between 2012 and 2019, as shown in Figure 25.

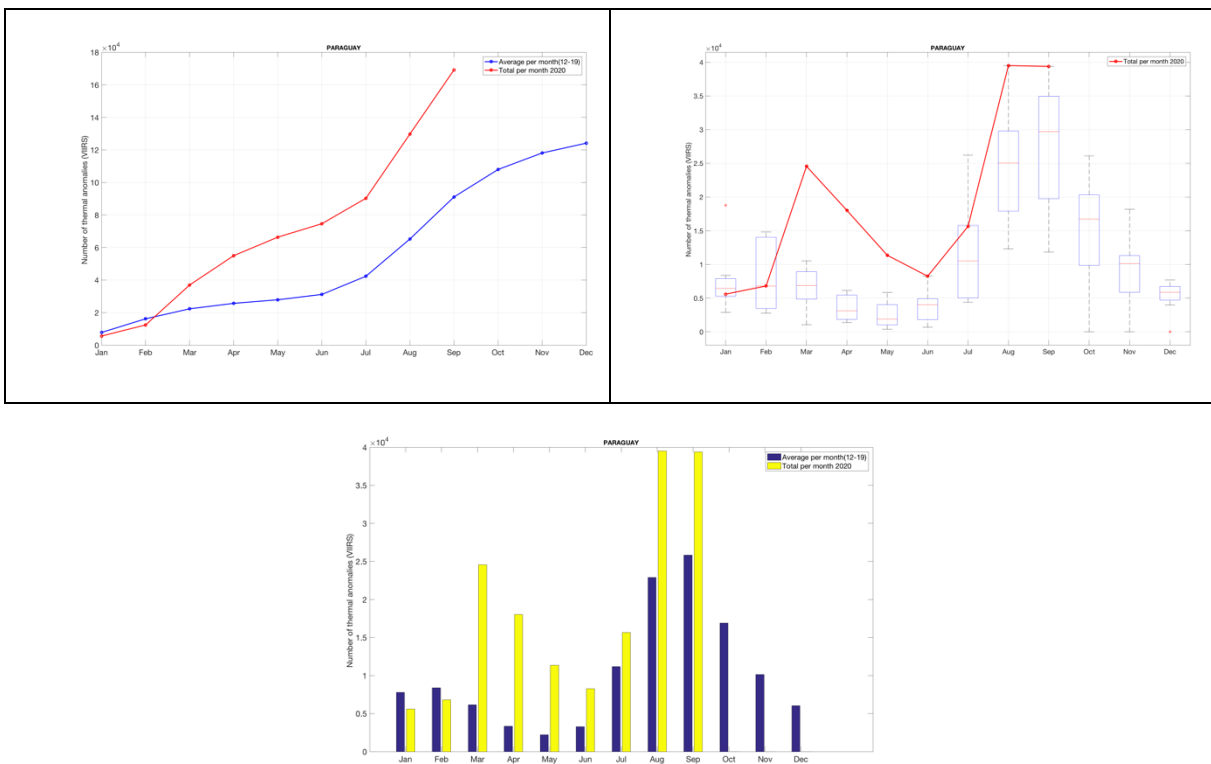


Figure 25. Trend of burnt areas and number of fires as compared to data in the last two years.

### 9.6 Peru

The spatial extent of the burnt areas in the country in 2020 mapped by the Near-Real Time (NRT) process in GWIS is presented in Figure 26.



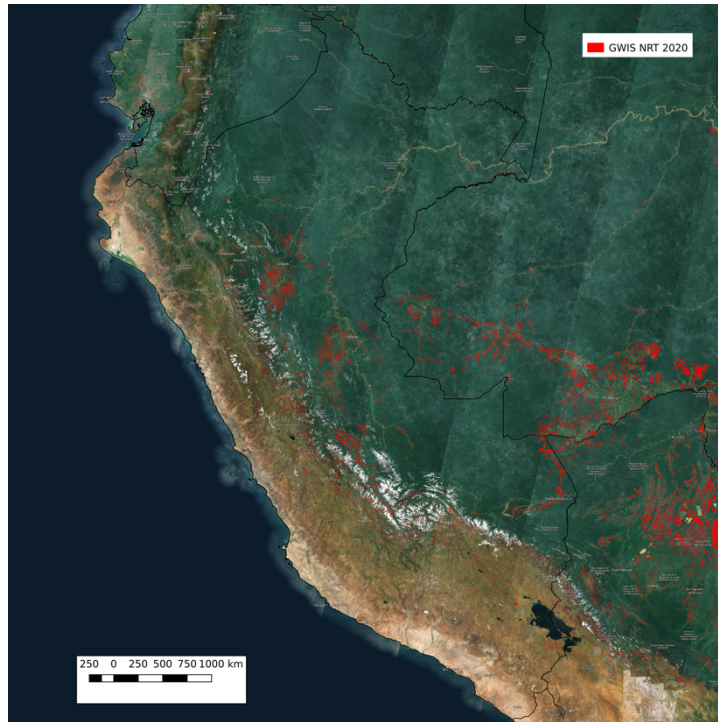


Figure 26. GWIS burnt areas for 2020 in Peru. Burnt areas until 4 October.

Despite the 2020 fire season may look much worse than previous years, it is worth to mention that the average fire size remains quite constant during the years and also considerably low, see Figure 27. Therefore, the data for Peru is much more sensitive to uncertainty in the data when monitoring small fires for large areas for long time periods. Despite this last fact, it is clear that there is an increase of fire activity in 2020 compared to other years. The fact that the fire size remains constant during the year could point out to a very low amount of uncontrolled burnt area and a strong relation of fire activity with human activity in forested areas.

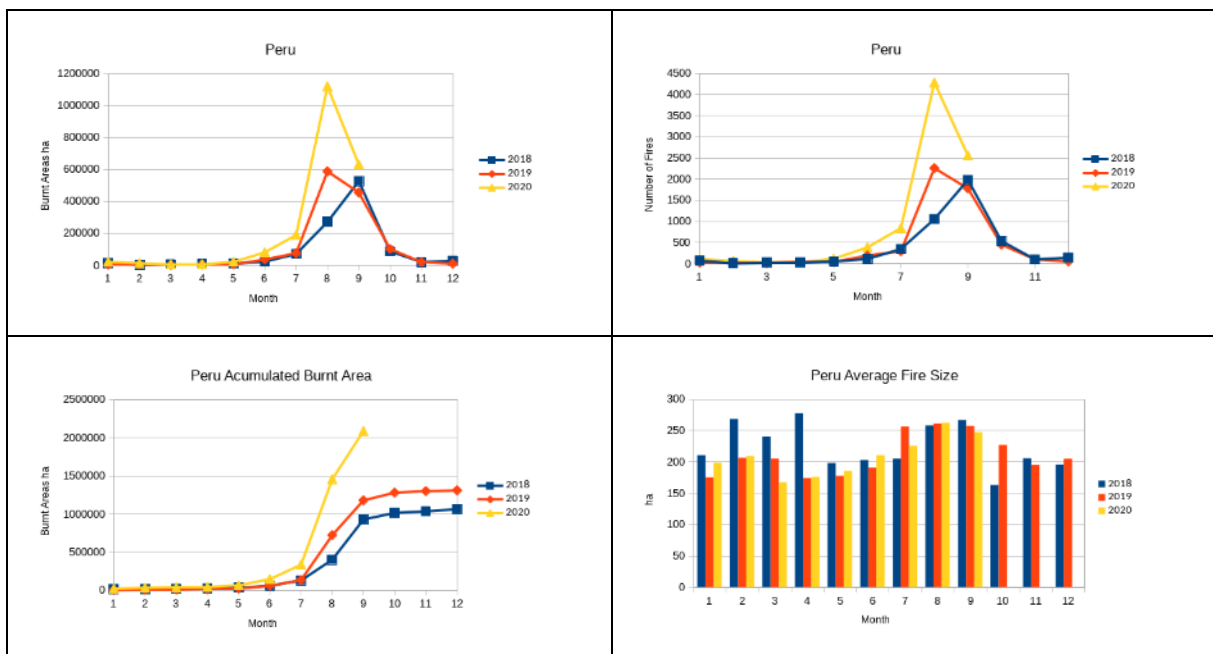


Figure 27. Trend of burnt areas and number of fires as compared to data in the last two years.

In terms of active fire spots detected by VIIRS, 2020 presents the same trend of the burned area and number of fires shown in Figure 27, with a number of active fire spots in the first eight months of the year above the average for the period between 2012 and 2019, especially in August, as shown in Figure 28.

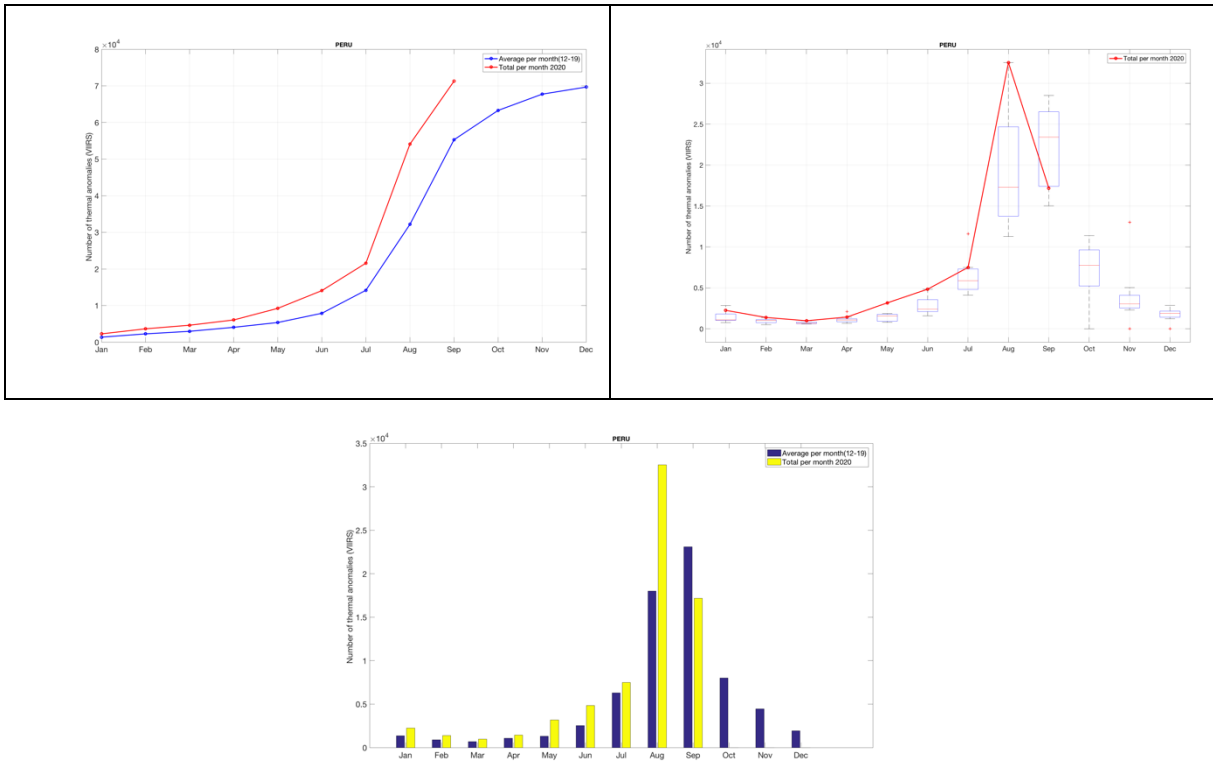


Figure 28. Trend of burnt areas and number of fires as compared to data in the last two years.

## 9.7 Venezuela

In 2020, wildfires in Venezuela spread over the central and northern areas of the country, with very large fires on the west of the country, such as those on the west side of Maracaibo lake. (Figure 29). This region is part of the designated “Llanos”, a complex savanna ecosystem where it undergoes periodic, human-induced and natural biomass burning during the dry season, usually between November and April.

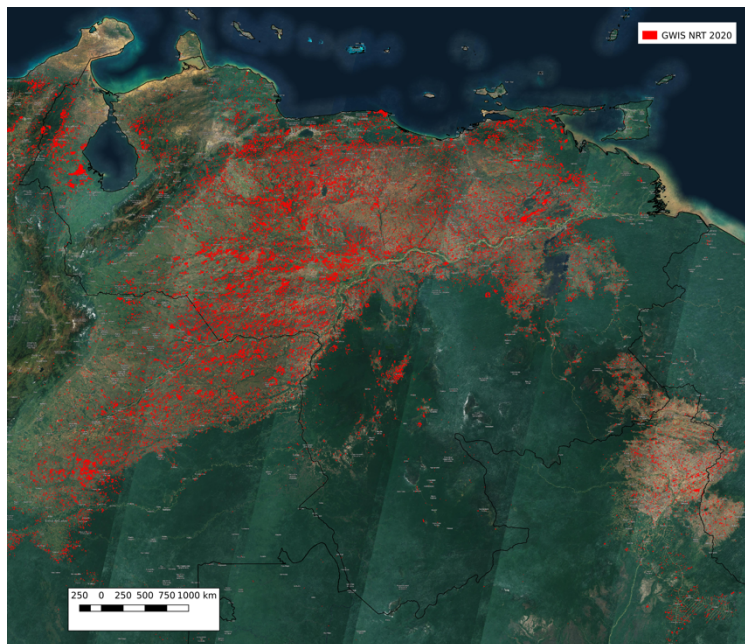


Figure 29. GWIS burnt areas for 2020 in Venezuela. Burnt areas until 4 October.

The current fire season for 2020 is above the last two years in all terms, see Figure 30. The total burnt area is slightly above the previous year, 2019, and considerable higher than that of the 2018 fire season. Besides, the number of fires also increased. Looking at the average fire size, the largest fires occurred in March, instead of February, as in 2018 and 2019. The average fire size was like previous years until February, afterwards the monthly average fire size in 2020 is above the 2018 and 2019. During March, there was an increase of burnt areas, number of fires, and size of the fires. Until September, almost 7 Mha of burnt areas have been mapped by GWIS in the region, which are higher values than that in 2019 and almost double the value of 2018.

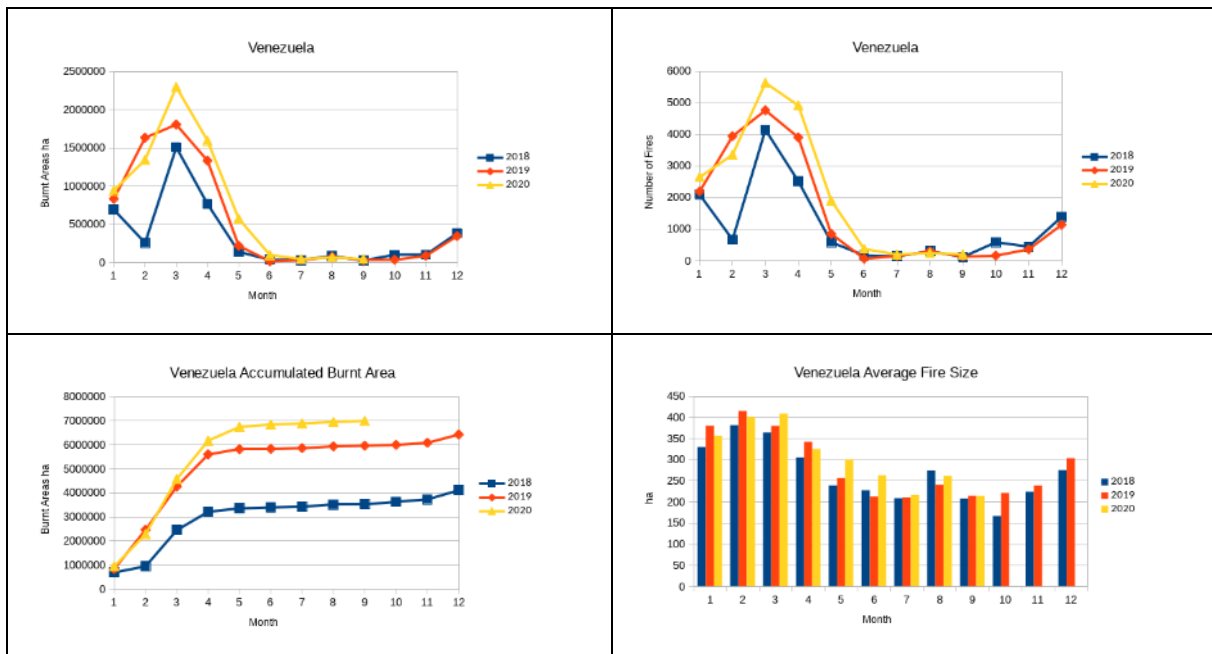


Figure 30. Trend of burnt areas and number of fires as compared to data in the last two years.

In terms of active fire spots detected by VIIRS, 2020 presents the same trend of the burned area and number of fires shown in Figure 30, with a number of active fire spots in the first five months of the year above the average for the period between 2012 and 2019, especially in March, as shown in Figure 31.

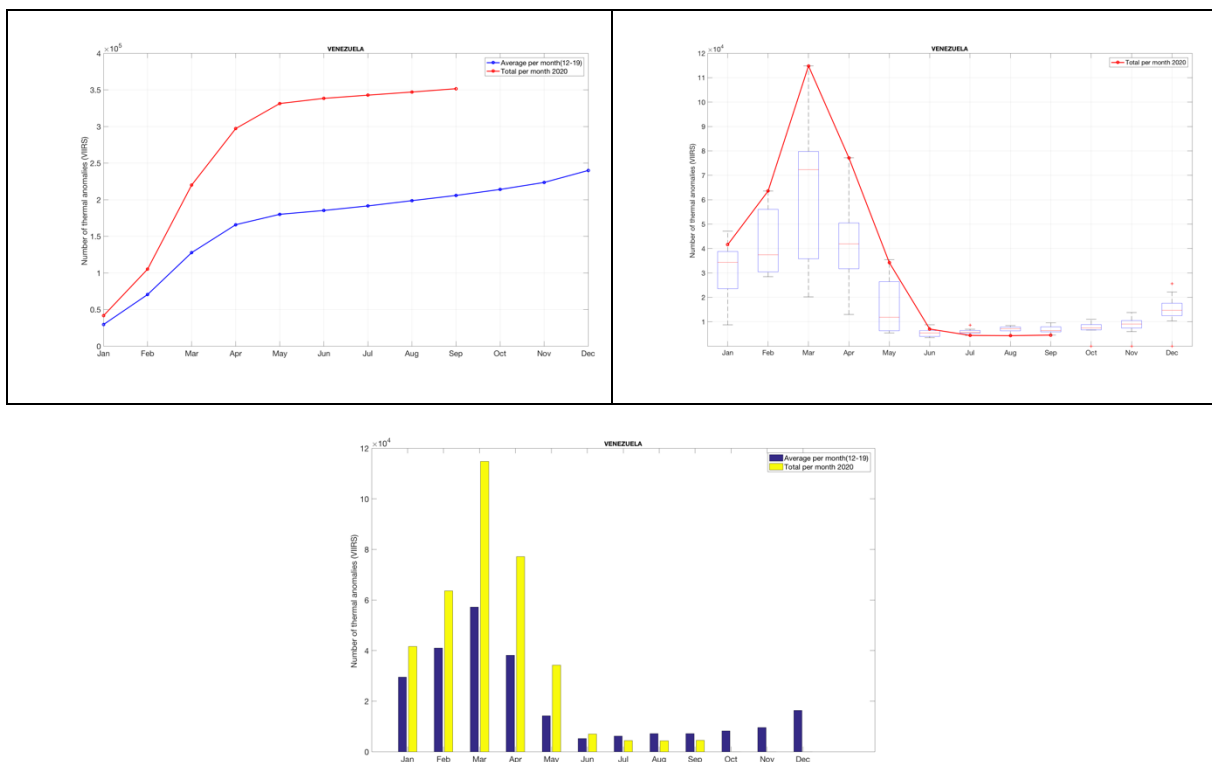


Figure 31. Trend of burnt areas and number of fires as compared to data in the last two years.

## 9.8 Fire danger and fire weather forecast in the Amazon region

The monthly fire weather forecast of temperature and precipitation anomalies for October is presented in Figure 32. **A strong average temperature anomaly is forecasted for southern Brazil, extending to Bolivia and Paraguay. However above average temperatures are also expected in the BLA, Peru and southern Colombia.** Additionally, negative trends on temperature are only in Venezuela. The models estimate a decrease on precipitation rates for this month in eastern Brazil, in states like Ceará, R.G do Norte, Paraíba and Pernambuco. The rest of area does not show precipitation anomalies.

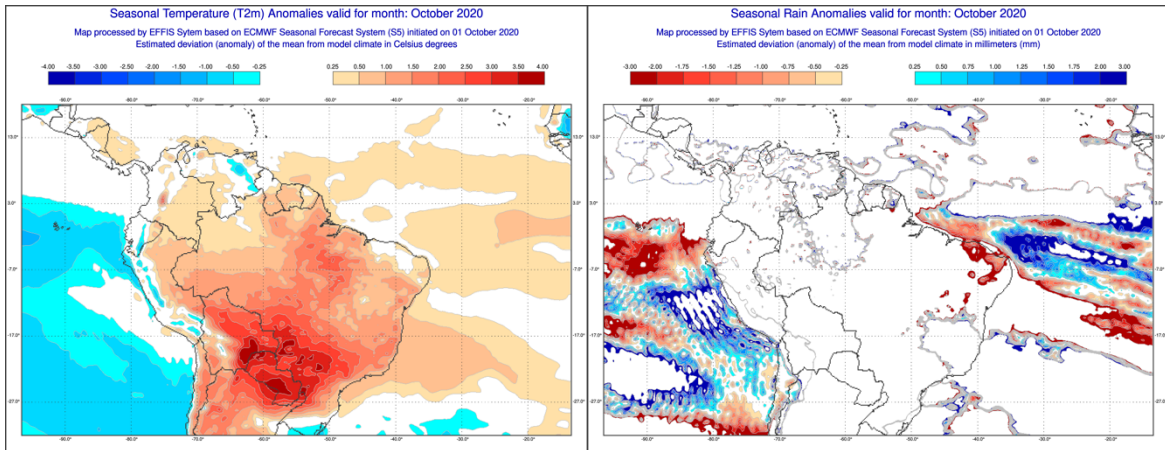


Figure 32. Fire weather anomalies of the current month, October, 2020.

At the current date, its foreseen that November will present slight above average temperature anomalies values over Bolivia and Paraguay and increasing precipitation rates over Brazil (Figure 33). All northern Brazil and the eastern part shows an increase of precipitation. In southern Paraguay, central Bolivia and northwest of Peru the precipitation rates decreases. The forecast for November will be updated at the beginning of the November.

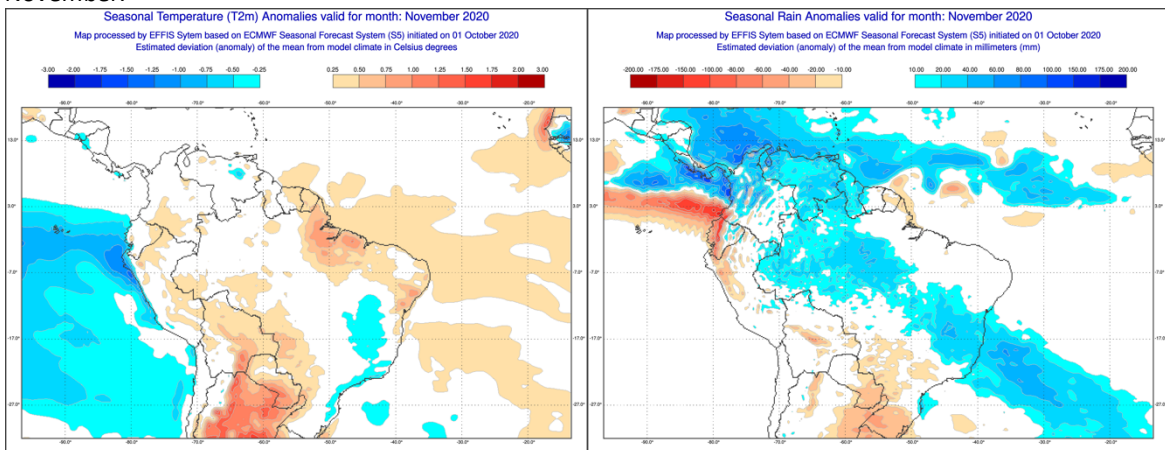


Figure 33. Fire weather anomalies of November, 2020.

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