

Summary

SAD detected 437 square kilometers of deforestation in the Brazilian Amazon in August 2014. That represented an increase of 136% in relation to August 2013 when deforestation totaled 185 square kilometers. It was possible to monitor 94% of the forest area in the Brazilian Amazon while in August 2013 monitoring covered a smaller area (80%) of the territory.

In August 2014, deforestation was concentrated in Mato Grosso (33%), and Rondônia (30%), followed by Amazonas (19%), Pará (14%), with a lower occurrence in Acre (3%) and in Roraima (1%).

Degraded forests in the Brazilian Amazon totaled 319 square kilometers in August 2014. In relation to August 2013, when forest degradation totaled 92 square kilometers, there was a 246% increase.

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Deforestation statistics

De acordo com o SAD, o desmatamento (supressão total da floresta para outros usos alternativo do solo) atingiu 437 quilômetros quadrados em agosto de 2014 (Figura 1 e Figura 2).

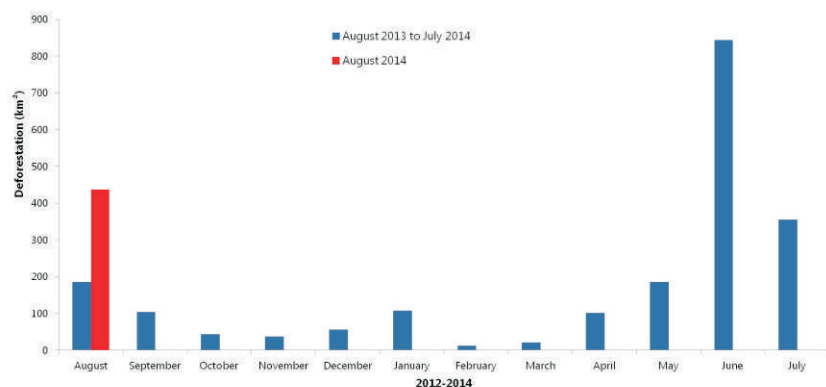


Figure 1. Deforestation from August 2013 to August 2014 in the Brazilian Amazon (Source: Imazon/SAD).

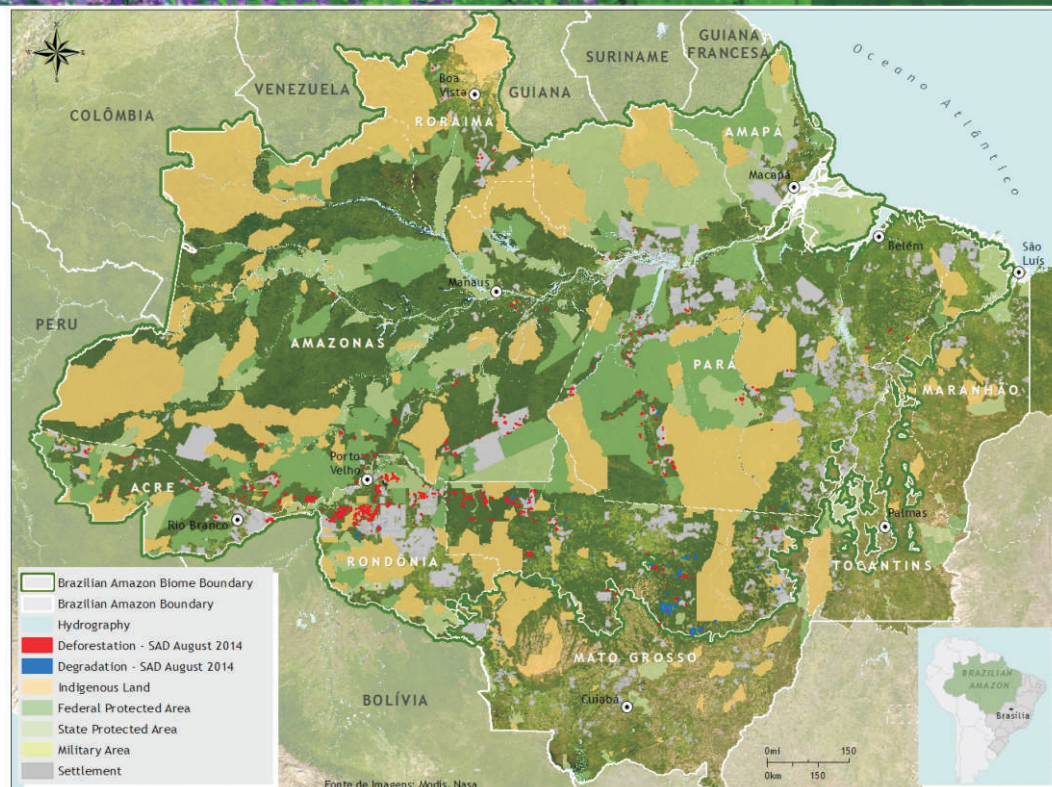


Figure 2. Deforestation and forest degradation in August 2014 in the Brazilian Amazon (Source: Imazon/ SAD).

In August 2014, deforestation was concentrated in Mato Grosso (33%) and in Rondônia (30%), followed by Amazonas (19%), Pará (14%), and with lower occurrences in Acre (3%) and in Roraima (1%). There was a significant increase in the area de deforestation alerts in relation to August 2013 in Mato Grosso (+2.360%), Roraima (+649%), Rondônia (+208%), Amazonas (+60) and Acre (+14%). On the other hand, a reduction in deforestation occurred in Pará (-20%).

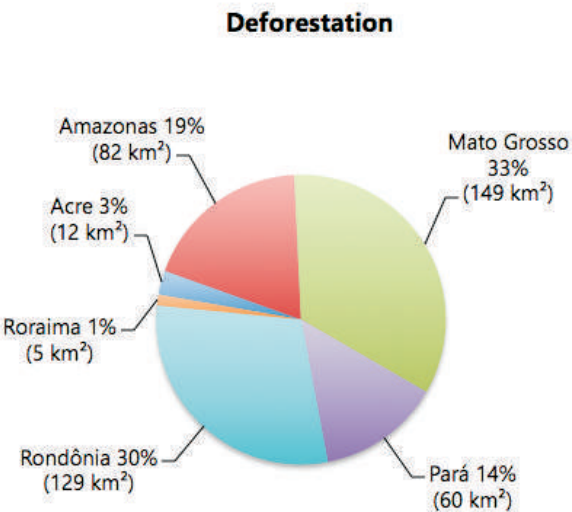


Figure 3. Percentage of deforestation in States of the Brazilian Amazon in August 2014 (Source: Imazon/SAD).

Table 1. Evolution of deforestation among the States of the Brazilian Amazon in August 2013 and August 2014 (Source: Imazon/SAD).

State	August 2013	August 2014	Variation (%)
Pará	75	60	-20
Mato Grosso	6	149	+2,360
Rondônia	42	129	+208
Amazonas	51	82	+60
Roraima	1	5	+649
Acre	10	12	+14
Tocantins	-	-	-
Amapá	-	-	-
Total	185	437	+136

* Data from Maranhão were not analyzed.

Forest degradation

In August 2014, SAD recorded 319 square kilometers of degraded forests (forests intensely exploited by logging activity and/or burned) (Figures 2 and 4). Of that total, the great majority (94%) occurred in Mato Grosso, followed by Rondônia (3%) and Pará (3%).

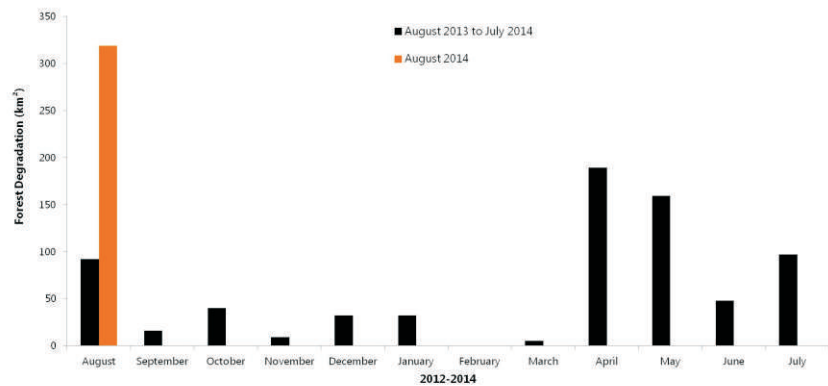


Figure 4. Forest degradation from August 2013 to August 2014 in the Brazilian Amazon (Source: Imazon/SAD).

Table 2. Evolution of forest degradation among the States of the Brazilian Amazon in August 2013 and August 2014 (Source: Imazon/SAD).

State	August 2013	August 2014	Variation (%)
Mato Grosso	48	300	+528
Pará	43	9	-79
Rondônia	-	10	-
Amazonas	1	-	-100
Roraima	-	-	-
Acre	-	-	-
Tocantins	-	-	-
Amapá	-	-	-
Total	92	319	+246

* Data from Maranhão were not analyzed.

Geography of deforestation

In August 2014, the great majority (62%) of deforestation occurred in areas that were private or under various stages of possession. The remaining deforestation was recorded in Conservation Units (20%), Land Reform Settlements (17%) and Indigenous Lands (1%) (Table 3).

Table 3. Deforestation by land title category in August 2014 in the Brazilian Amazon (Source: Imazon/ SAD).

Category	August 2014	
	km ²	%
Land Reform Settlement	74	17
Conservation Units	84	20
Indigenous Lands	4	1
Private, Possession & Untitled Public Lands	275	62
Total (km²)	437	100

Land Reform Settlements

SAD recorded 74 square kilometers of deforestation in Land Reform Settlements in August 2014 (Figure 5). The Settlements most affected by deforestation were PA Zumbi dos Palmares (Cláudia; Mato Grosso), PA Rio Juma (Apuí; Amazonas) and PA Monte (Boca do Acre; Amazonas).

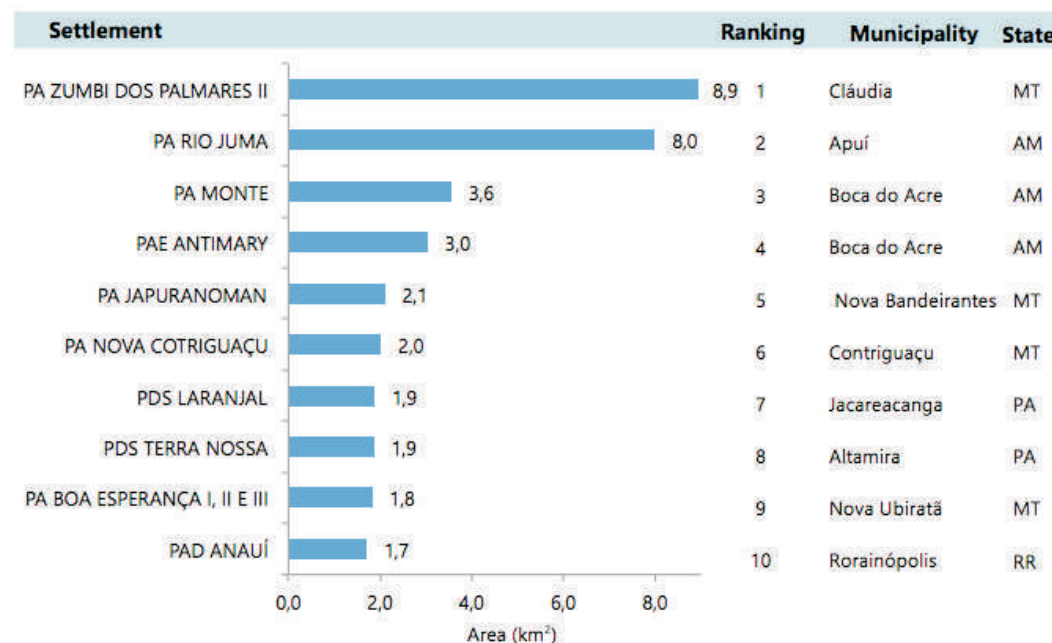


Figure 5. Land Reform Settlements deforested in August 2014 in the Brazilian Amazon (Source: Imazon/SAD).

Protected Areas

In August 2014, SAD detected 84 square kilometers of deforestation in Conservation Units (Figure 6). In the case of Indigenous Lands, in August 2014, 4 square kilometers of deforestation were detected (Figure 7).

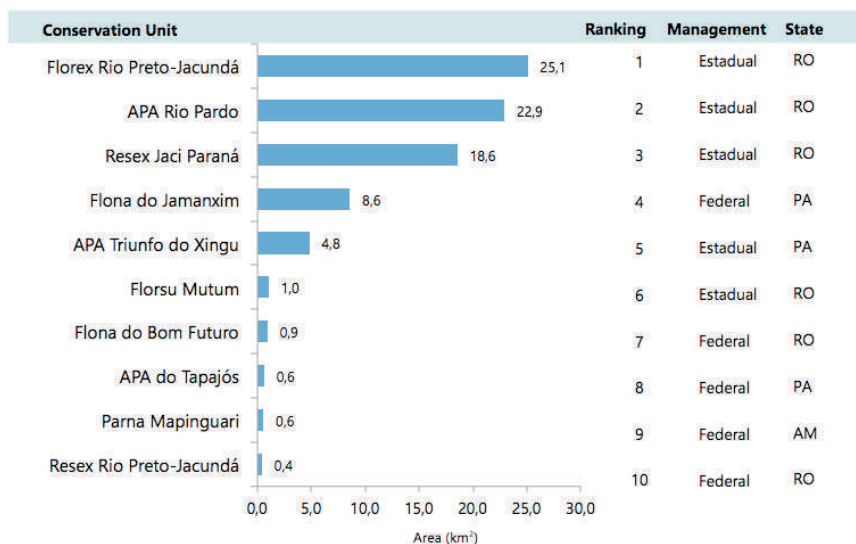


Figure 6. Conservation Units deforested in the Brazilian Amazon in August 2014 (Source: Imazon /SAD).

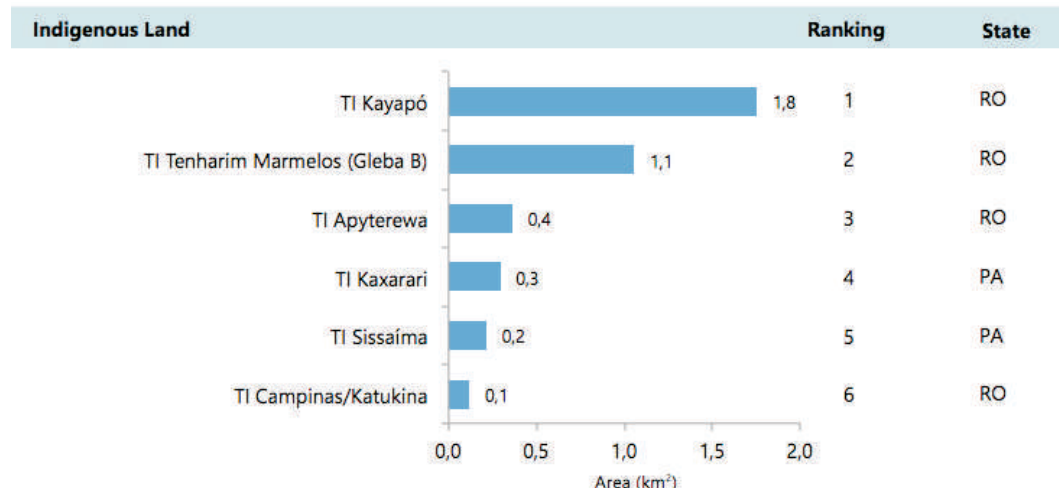


Figure 7. Indigenous Lands deforested in the Brazilian Amazon in August 2014 (Source: Imazon /SAD).

Critical municipalities

In August 2014, the most deforested municipalities were: Porto Velho (Rondônia) and Lábrea (Amazonas) (Figure 8 and 9).

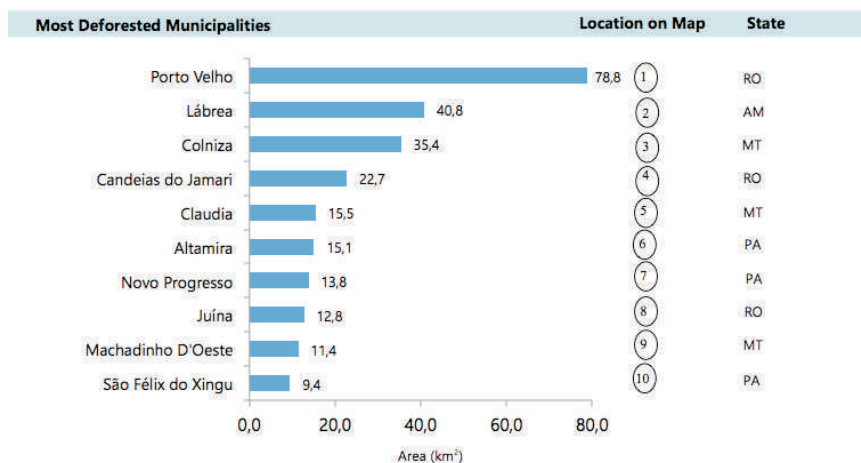


Figure 8. Most deforested municipalities in the Brazilian Amazon in August 2014 (Source: Imazon /SAD).

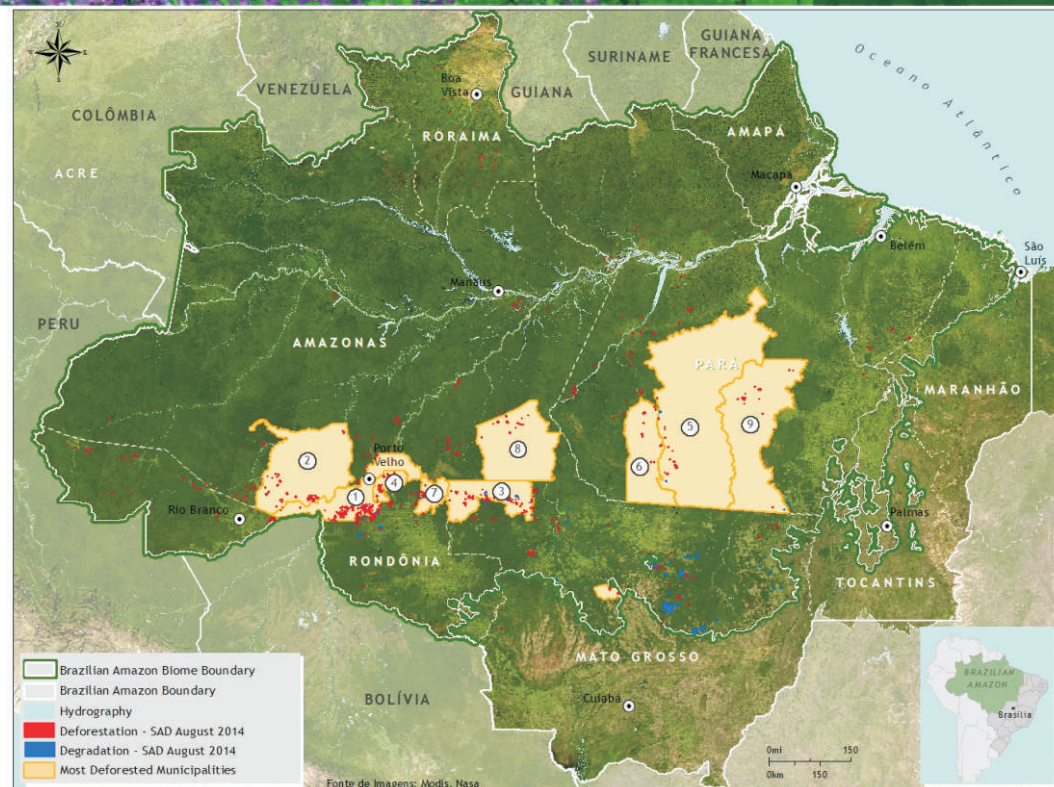


Figure 9. Municipalities with the largest areas deforested in August 2014 (Source: Imazon/SAD).

Cloud and shadow cover

In August 2014, it was possible with SAD to monitor 94% of the forest area in the Brazilian Amazon. The other 6% of forest territory was covered by clouds, which made it difficult to detect deforestation and forest degradation. The States with the highest cloud cover were Amapá (54%) and Pará (11%). Because of that, the data on deforestation and forest degradation for August 2014 may be underestimated (Figure 10).

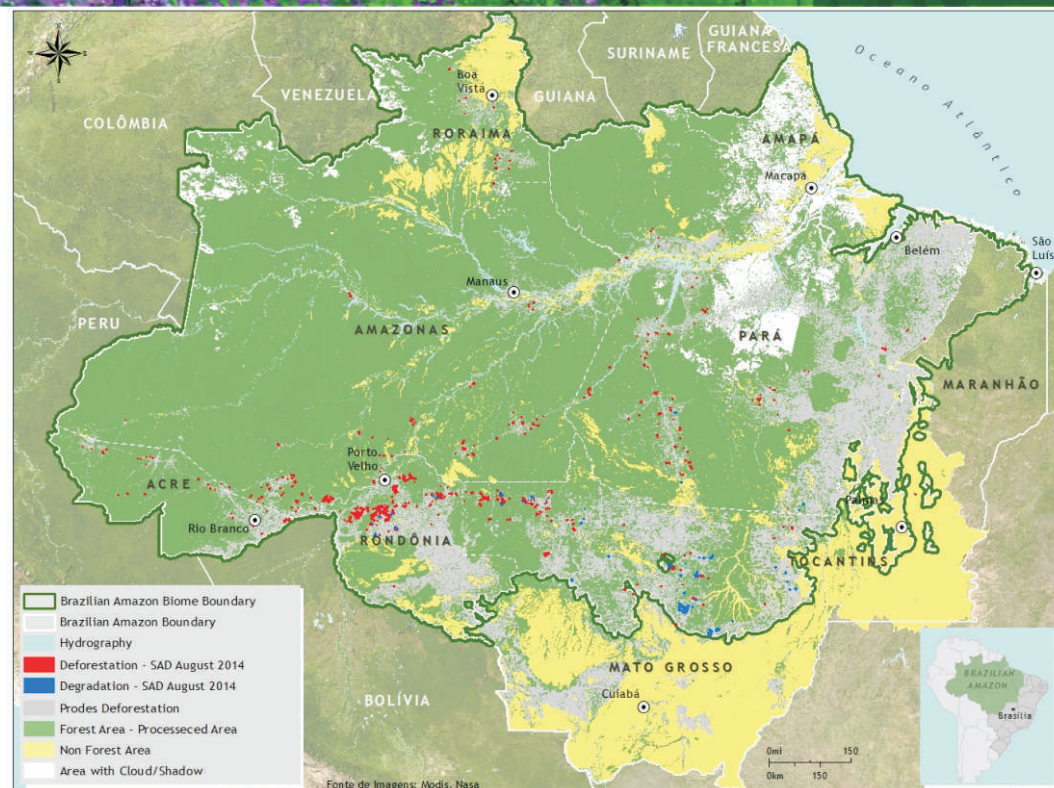


Figure 10. Area with cloud and shadow in August 2014 in the Brazilian Amazon.

SAD-EE

Since July 2012 deforestation and forest degradation detection alerts have been performed using the Google Earth Engine platform (EE), with the new SAD EE version. That system was developed in collaboration with Google and uses the same process already employed by SAD 3.0 (Box I), with reflectance images from MODIS to generate the deforestation and forest degradation alerts.

* The portion of Maranhão that is part of the Brazilian Amazon was not analyzed.

BOX I: SAD 3.0

Since August 2009, SAD has had some new features. First, we created a graphic interface to integrate all of the image processing programs used in SAD. Next, we began to compute deforestation in areas that were covered by clouds in the previous months in a new class. Finally, deforestation and degradation are detected with pairs of NDFI images using a change detection algorithm. The principal method continues to be the same as with SAD 2.0 as described below.

SAD generates a temporal mosaic of daily MODIS images from the MOD09GQ and MOD09GA products for filtering clouds. Next, we use a technique for fusing different spectral resolution bands, i.e. with pixels of different sizes. In this case, we made a change in scale from 5 bands with 500 meter pixels in MODIS to 250 meters. That allowed us to improve the spectral mixture model and provided the capacity for estimating the abundance of Vegetation, Soils and Non-Photosynthetic Vegetation (NPV) components (Vegetation, Soil and Shadow) to calculate the NDFI, with the following equation:

$$\text{NDFI} = \frac{\text{VGs} - (\text{NPV} + \text{Soil})}{(\text{VGs} + \text{NPV} + \text{Soil})}$$

Where VGs is the Vegetation component normalized for shadow given by:

$$\text{Vgs} = \text{Vegetation} / (1 - \text{Shadow})$$

The NDFI varies from -1 (pixel with 100% of exposed soil) to 1 (pixel with > 90% of forest vegetation). Thus, we have a continuous image that shows the transition from deforested areas, going through degraded forests, until reaching forest without signs of disturbances.

Detection of deforestation and degradation this month involved a difference in the NDFI images from consecutive months. Thus, a reduction in the NDFI values of from -200 to -50 indicates possible deforested areas and from -49 to -20 indicates signs of degradation.

SAD 3.0 Beta is compatible with previous versions with a (SAD 1.0 and 2.0), because the threshold for detecting deforestation was calibrated to generate the same type of response obtained by the previous method.

SAD has been in operation in the State of Mato Grosso since August 2006 and in the Legal Amazon since August 2008. In this bulletin, we present the monthly data generated by SAD from August 2013 to August 2014.

Team reasponsible

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Data source

Statistics for deforestation are generated using data from SAD (Imazon);
Data from INPE- Deforestation (PRODES)
<http://www.obt.inpe.br/prodes/>

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Google Earth Engine Team
<http://earthengine.google.org/>

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State Public Prosecution Service of Mato Grosso
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Support

