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e Incendios Forestales



**GOBIERNO
DE COLOMBIA**



INSTITUTO GEOGRÁFICO AGUSTÍN CODAZZI

*“Supporting forest fire risk
management in Colombia”*

10 de Octubre de 2018



La Información Geográfica de Colombia



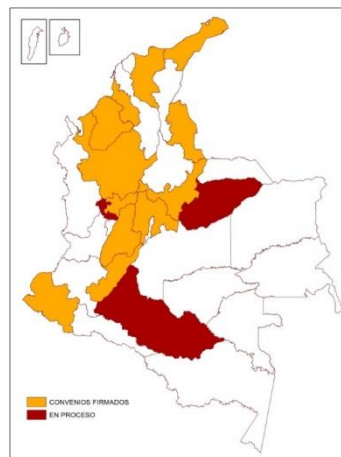
Instituto Geográfico Agustín Codazzi (IGAC), it's the head of producing the basic cartography of the country, elaborating the national **cadastre**, carrying out the inventory and characterizing the country's **soils**, advancing **geographical investigations** as support for territorial development, training professionals in the information networks and coordinating the Colombian Data Infrastructure Space (ICDE).



Center for Research and Development in Geographic Information - **CIAF**

Research Center on Geospatial Technologies

- The CIAF- Important Actor of the SNCTel. CIAF
- Research Center recognized by COLCIENCIAS.
- Recognized "Geomatics" Research Group



Academic Offer. F. Advanced:
(8) graduate programs:
2 Specializations
5 Masters (MbA)
1 PhD

Knowledge Transfer	2018
university	36
Formed / Trained	1,253 (Advanced training) 7.036 (Short courses).

RESEARCH IN GEOSPATIAL TECHNOLOGIES	13 R & D Projects (Remote Sensing and GIS). Executive Secretary Colombian Space Commission (CCE)
TRANSFER OF KNOWLEDGE	Advanced training (IGAC-Universities Agreements) Informal education.
ASSISTANCE AND TECHNICAL COOPERATION	Territorial entities, Entities of National Order and International Cooperation.



NATIONAL SYSTEM OF DISASTER RISK MANAGEMENT (SNGRD)

Law 1523/2012

Direction of the National System



Instances for the Orientation and Coordination

- National Council for Risk Management.
 - National Unit for Disaster Risk Management.
 - National Committee for the Knowledge of Risk.
 - National Committee for Risk Reduction.
 - National Committee for Disaster Management.
- Departmental, district and municipal councils for risk management.

- Torrential avenues - rains
- Mass removal
- Floods

- Forest Fire





UNITED NATIONS
Office for Outer Space Affairs

UN-SPIDER KNOWLEDGE PORTAL

Space-based information for Disaster Management and Emergency Response

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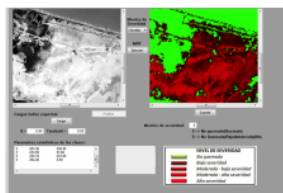
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IGAC: Development of Forest Fire Detection and Classification App



Classification of a Forest Fire in Salamanca Island Road Park, Colombia, based on a 8 LDCM Landsat image (Image: IGAC)

SEMARK creates classifications of spectral indices derived from [satellite](#) imagery (NBR, NDVI, and SAVI) classifiers using Markov random fields (MRF). Based on the results, SEMARK can be used as an initial tool in the identification and quantification of areas affected by forest fires.

More information: [alexander.ariza \[at\] igac.gov.co](mailto:alexander.ariza@igac.gov.co) and [sergio.rojas \[at\] igac.gov.co](mailto:sergio.rojas@igac.gov.co)

Read full story:

Publishing Date: 17/09/2014

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Detecting forest fires with satellites (MODIS and VIIRS)

Booklet on Forest Fires by LAPAN

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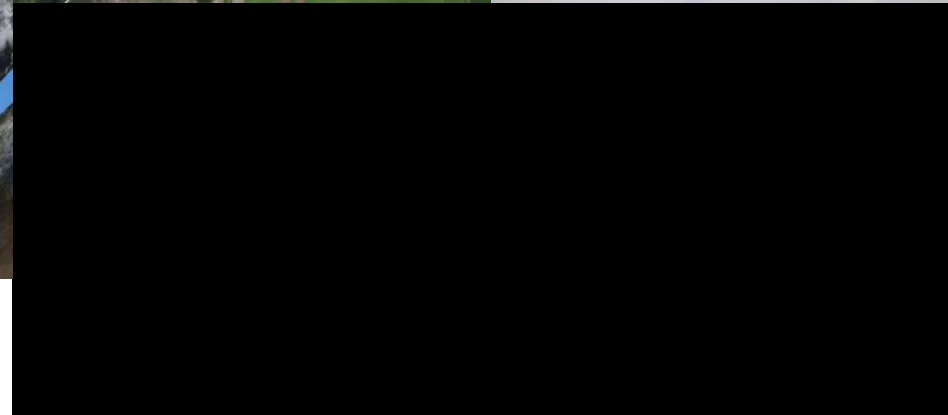
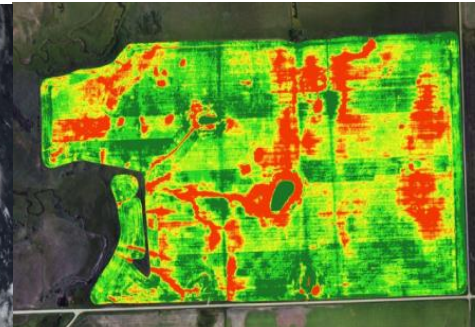
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<http://www.un-spider.org/news-and-events/news/igac-development-forest-fire-detection-and-classification-app>

Username*

La Información Geográfica de Colombia

IGAC through its Research Center "CIAF", promotes and develops the work of **knowledge management** in geospatial matters. Bring development and geographic technology to the support of government entities and the country..



New Method

planet. Remote Sensing Adquisition

170 satellites
3.1 m
150 millón km²/Day

CubeSat 3U (10 cm x10 cm x 30 cm)
500 Mb/Escena - 6 TB/ día

FOREST FIRES MANAGEMENT

*“Machine Learning
application in the
generation of severity
maps”*

STATISTICS OF INTEREST

Most primary forest cover, All countries

1	Brazil	415,890
2	Russian Federation	255,470
3	Canada	165,424
4	United States of America	104,182
5	Peru	61,065
6	Colombia	53,062
7	Indonesia	48,702
8	Mexico	32,850
9	Bolivia	29,360
10	Papua New Guinea	25,211

Most number of native tree species. All countries

1	Brazil	7,880
2	Colombia	5,000
3	Madagascar	5,000
4	Belize	4,000
5	Philippines	3,000
6	Bolivia	2,700
7	Malaysia	2,650
8	Zambia	2,621
9	Peru	2,500
10	China	2,500
11	Guinea-Bissau	2,243
12	Australia	2,100
13	Singapore	2,013
14	Brunei Darussalam	2,000
15	Myanmar	2,000
16	Zimbabwe	1,747
17	Mali	1,739
18	Lao People's Democratic Republic	1,457
19	Togo	1,451
20	Venezuela (Bolivarian Republic of)	1,360

Most primary forest cover, Tropical countries

1	Brazil	415,890
2	Peru	61,065
3	Colombia	53,062
4	Indonesia	48,702
5	Mexico	32,850
6	Bolivia	29,360
7	Papua New Guinea	25,211
8	Suriname	14,214
9	Sudan	13,509
10	Madagascar	10,347
11	Guyana	9,314
12	French Guiana	7,701
13	Congo	7,464
14	Thailand	6,451
15	Ecuador	4,794

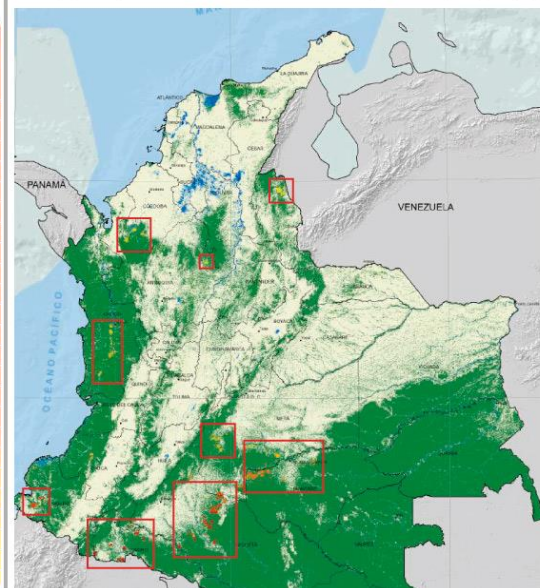
(FAO)
2005

ALERTAS TEMPRANAS DE DEFORESTACIÓN 2017-IV 25 MUNICIPIOS CON MAYOR CANTIDAD DE ALERTAS

MUNICIPIO	% del total de AT-D
SAN VICENTE DEL CAGUÁN	21,1%
CARTAGENA DEL CHAIRÁ	6,1%
SOLANO	5,0%
PUERTO GUZMÁN	4,3%
PUERTO RICO	4,1%
SAN JOSÉ DEL GUAVIARE	3,6%
ISTMINA	3,6%
URIBE	3,5%
LA MACARENA	3,3%
PUERTO ASÍS	3,1%
PUERTO LEGUIZAMO	2,6%
TIBÚ	2,5%
FRONTINO	2,0%
ORITO	2,0%
MESETAS	1,8%
URRAO	1,5%
DABEIBA	1,4%
VALLE DEL GUAMUEZ (La Hormiga)	1,4%
CALAMAR	1,3%
RIOSUCIO	1,3%
BAJO BAUDÓ (Pizarro)	1,2%
TUMACO	1,2%
MEDIO SAN JUAN (Andagoya)	1,2%
FLORENCIA	1,1%
TIERRALTA	1,0%

2017. Ideam.

PERSISTENCIA DE ALERTAS TEMPRANAS DE DEFORESTACIÓN



Highest average annual deforestation of primary forests, by area. Tropical

- Annually 25,000 - 22,000 ha 84.2% in natural forest.
- 2009 9,770 ha were burned, 2,130 ha Denso Native Forest.

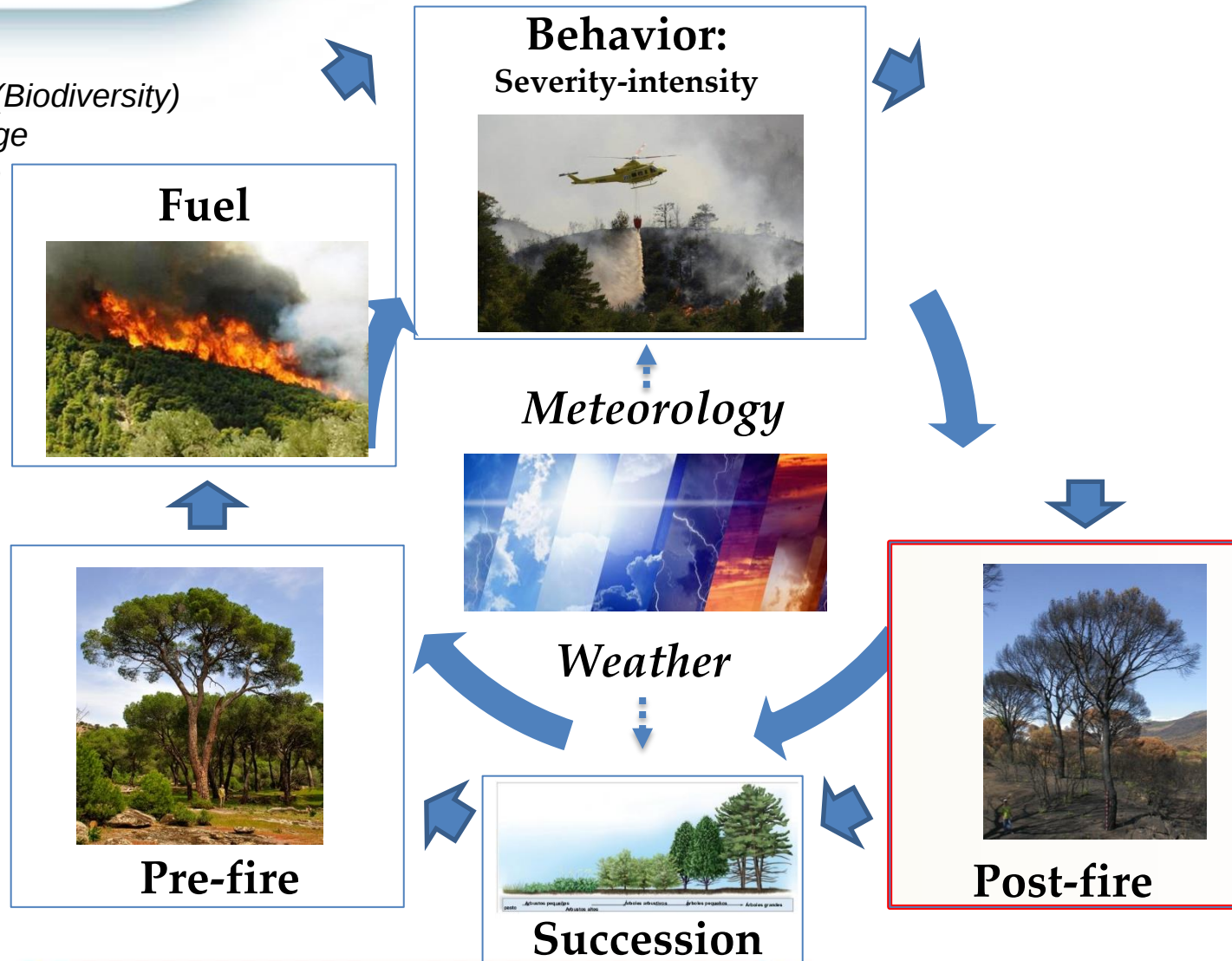
1	Brazil	-
2	Indonesia	3,466,000
3	Mexico	-395,000
4	Papua New Guinea	-250,200
5	Peru	-224,600
6	Bolivia	-135,200
7	Sudan	-117,807
8	Nigeria	-82,000
9	Cambodia	-66,800
10	Colombia	-56,160
11	Panama	-43,200
12	Malawi	-39,600
13	Guatemala	-26,834
14	Viet Nam	-20,400
15	Democratic People's Republic of Korea	-17,400
16	French Guiana	-12,000

FOREST FIRES IN LANDSCAPE DYNAMICS

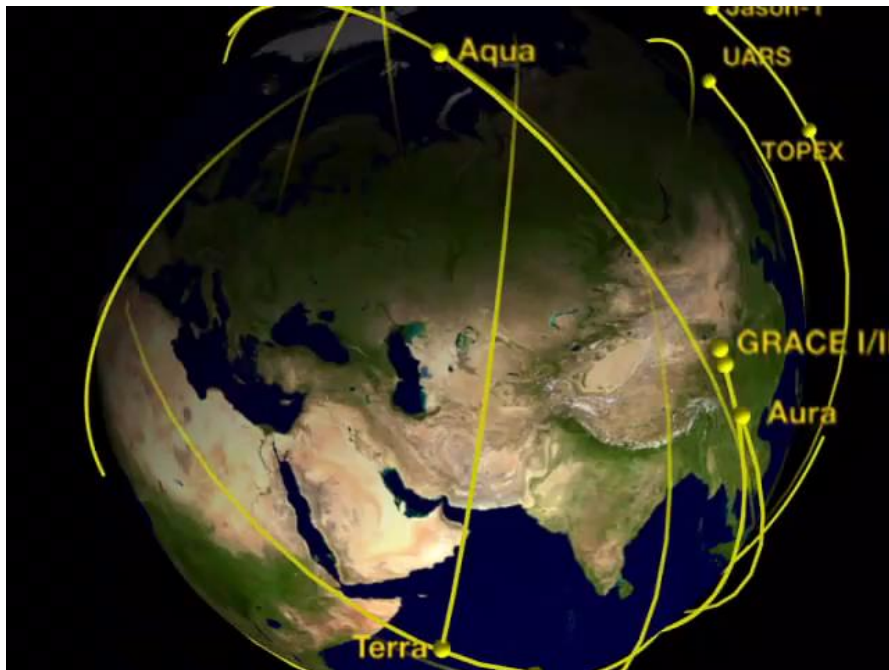
Unknowledge:

- *Impact on ecosystems - (Biodiversity)*
- *Emissions - Global change*
- *Change in the landscape*

Role of fire as landscape regulator:



SYSTEM OF MANAGEMENT AND MONITORING IN FOREST FIRES



Before the fire:
Hazard estimation:
Fuel Maps



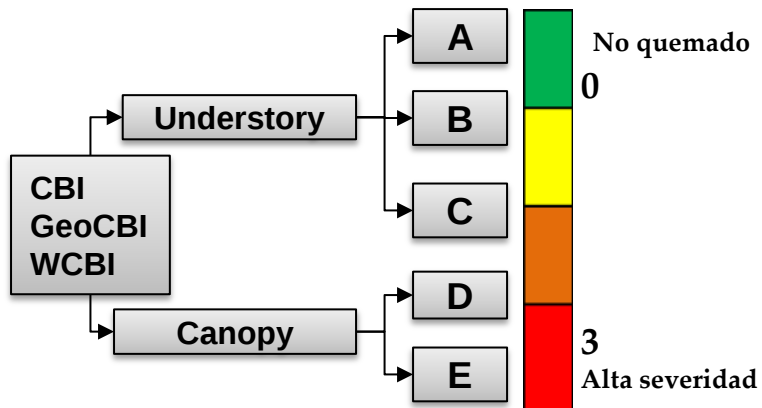
During:
Active fires
Detection: Hot
Spots



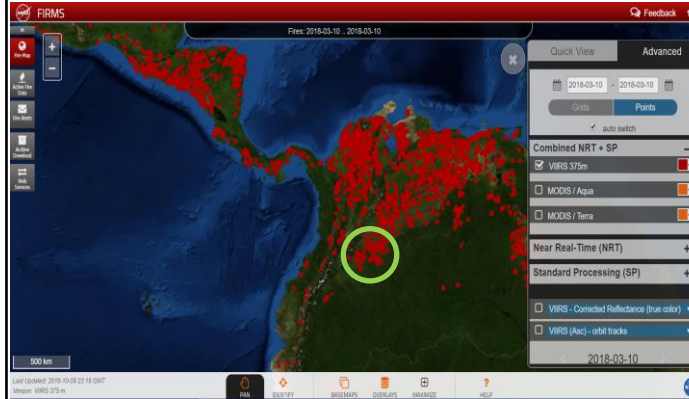
After:
burned areas
mapping:
BA - Severity

SEVERITY MAPPING

Field data:



Hot spots:



FIRMS. NASA, 2018

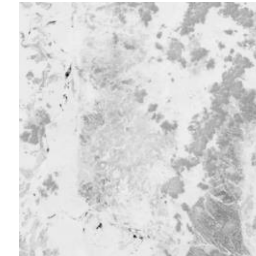
New Image:



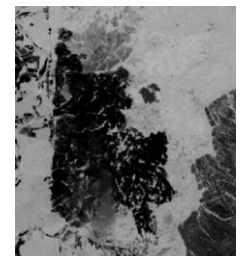
I. Pre-fire index

I. Post-fire index

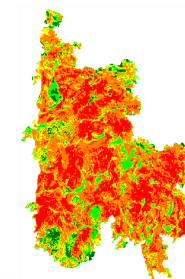
III. Differential index



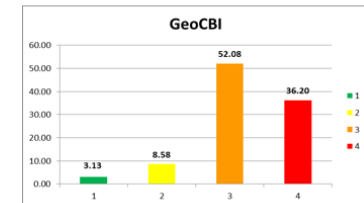
Pre



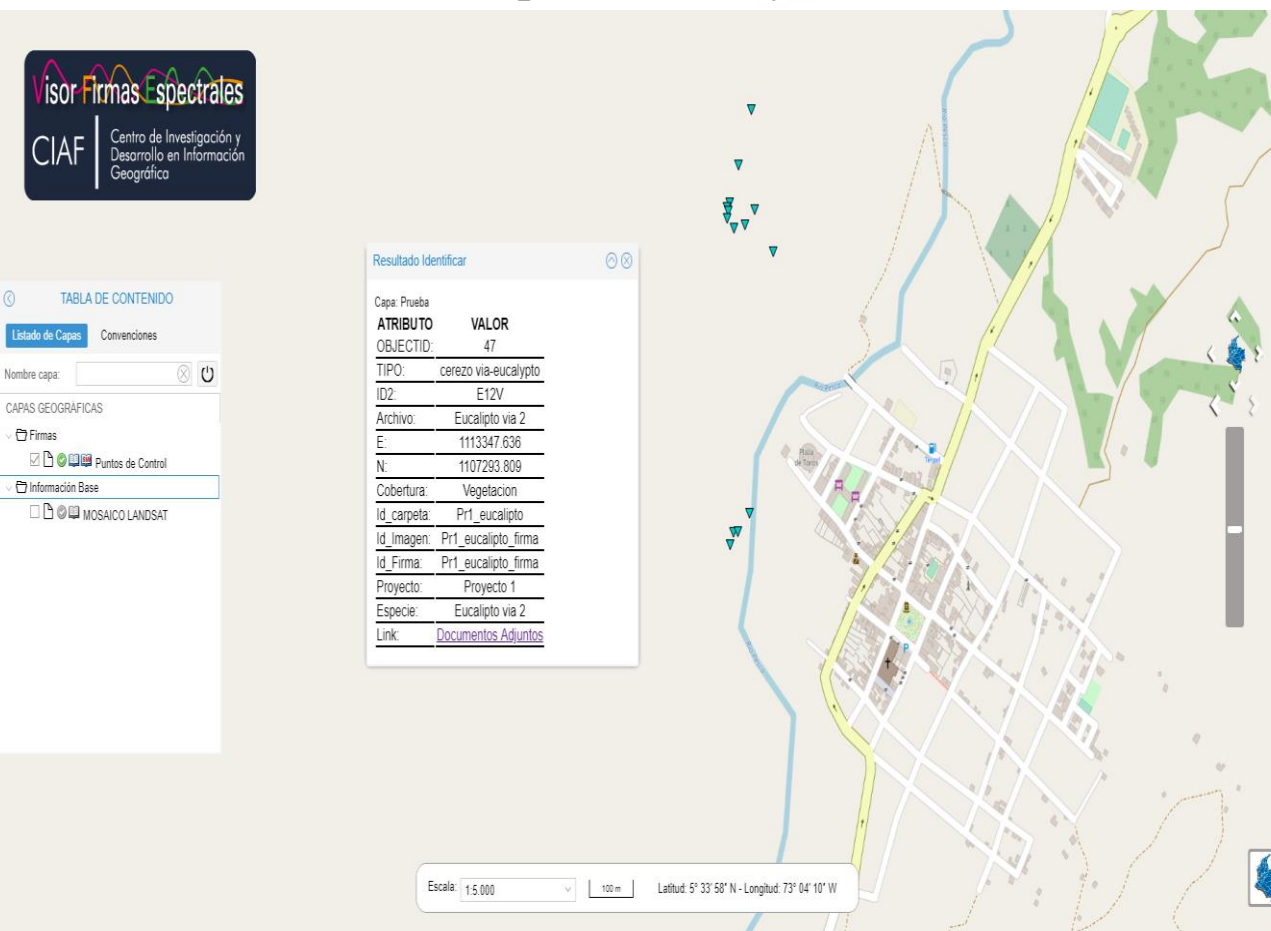
Post



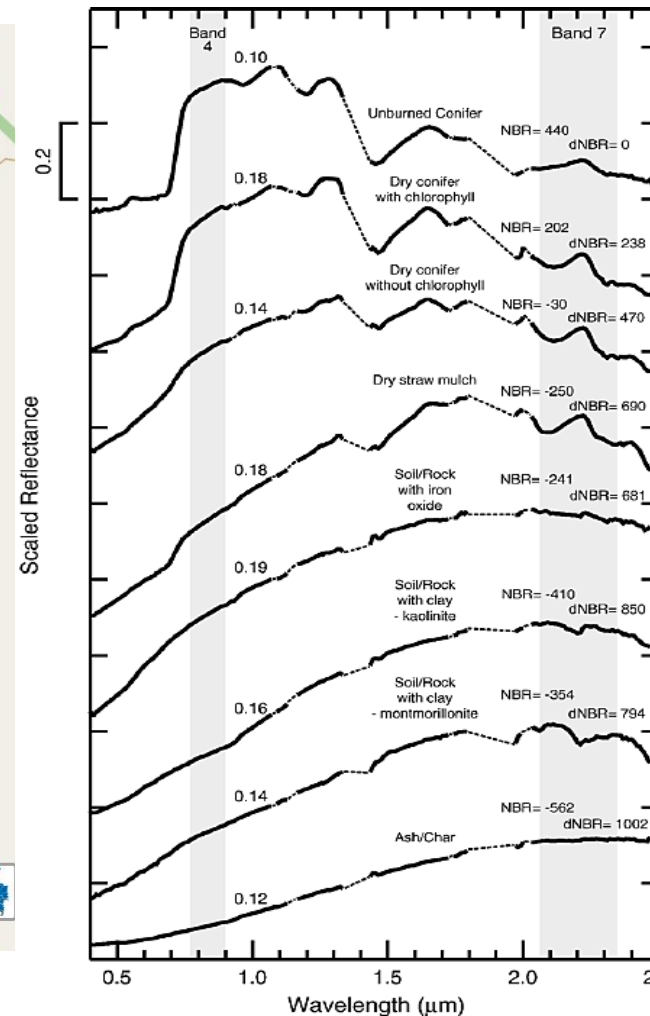
Nivel de Severidad



Spectral library

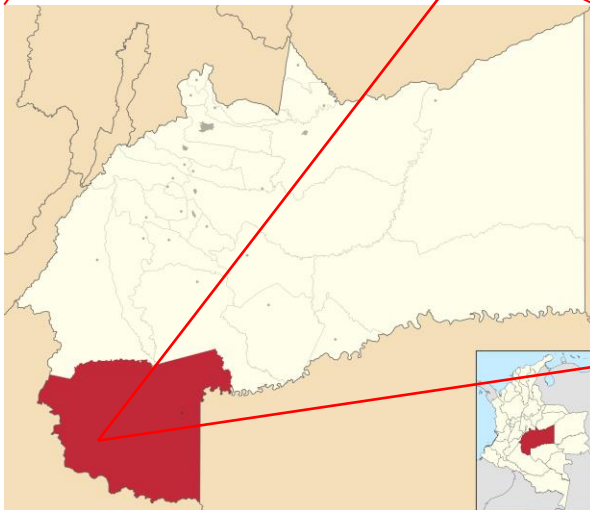


IGAC, 2018



STUDY AREA

National Natural Park: Sierra de la Macarena



- 5,868 of 117,500 ha - Affected (16 days)
- 39,500 ha - Natural Forest
- 85 Tn - Particulate Material
- (1500 Tn / year - Antioquia)
- (Estimates: Bottom-up)
- IPCC Model





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AGUSTÍN CODAZZI



SISTEMA DE GESTIÓN Y MONITOREO EN
INCENDIOS FORESTALES

GESTIÓN Y MONITOREO

DE INCENDIOS FORESTALES



La Información Geográfica de Colombia

APPLICATION: SUPERVISED CLASSIFICATION FOR COVER MONITORING

IMAGE
Sentinel 2A-MSI
Planet Scope

R, G, B, NIR,
SWIR
TOA - BOA

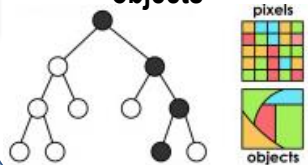
**PRE AND POST
PROCESSING**

dNBR
RdNBR
RBR

Field data

Temporal series

**Classifiers based on
objects**

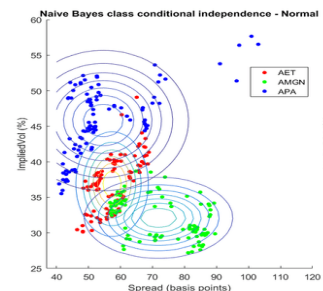


Segmentation



CLASSIFICATION

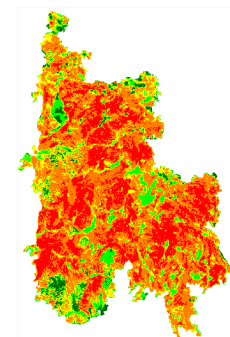
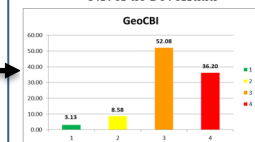
Bayesian



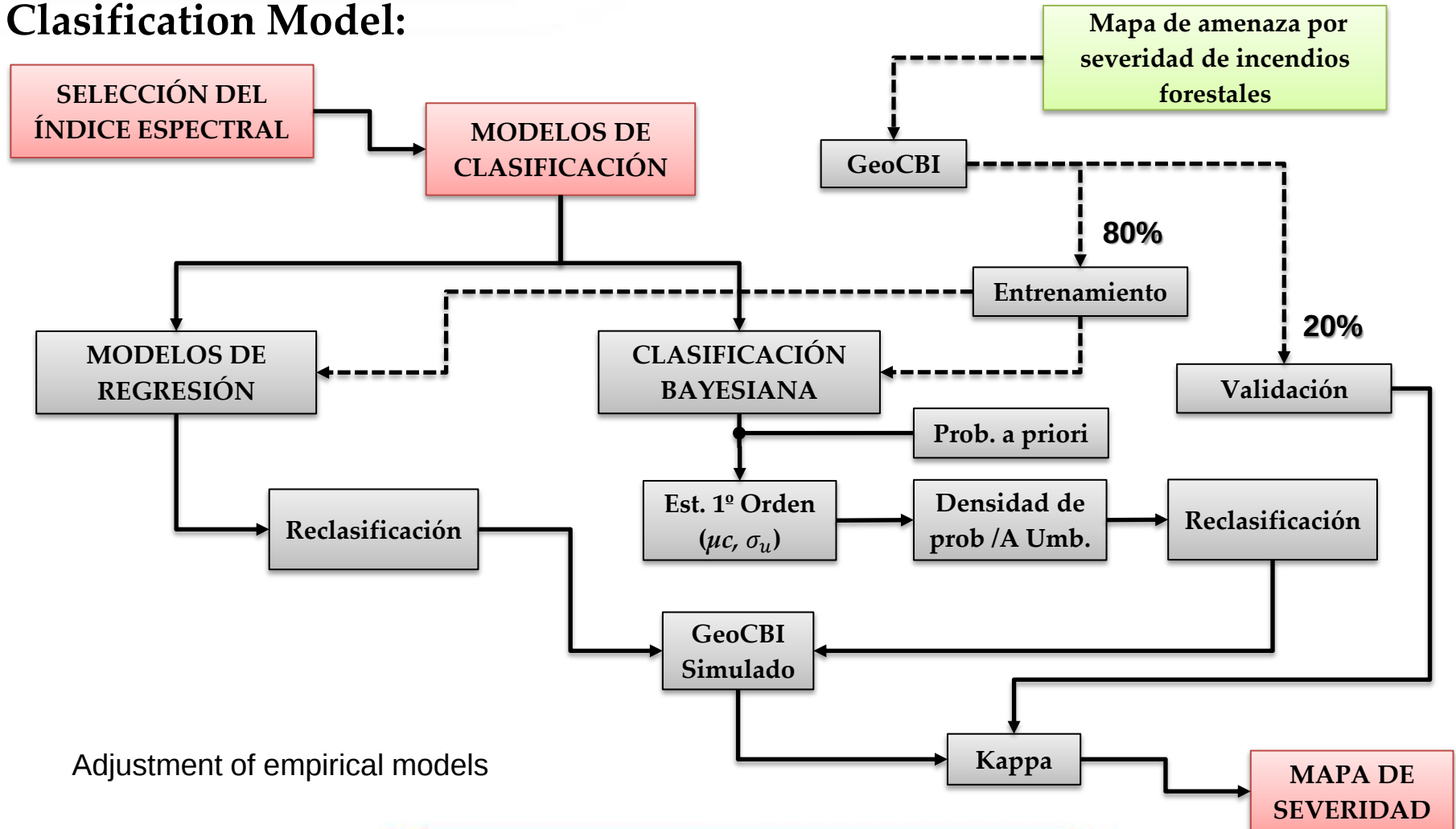
ACCURACY

**Post
Classification**

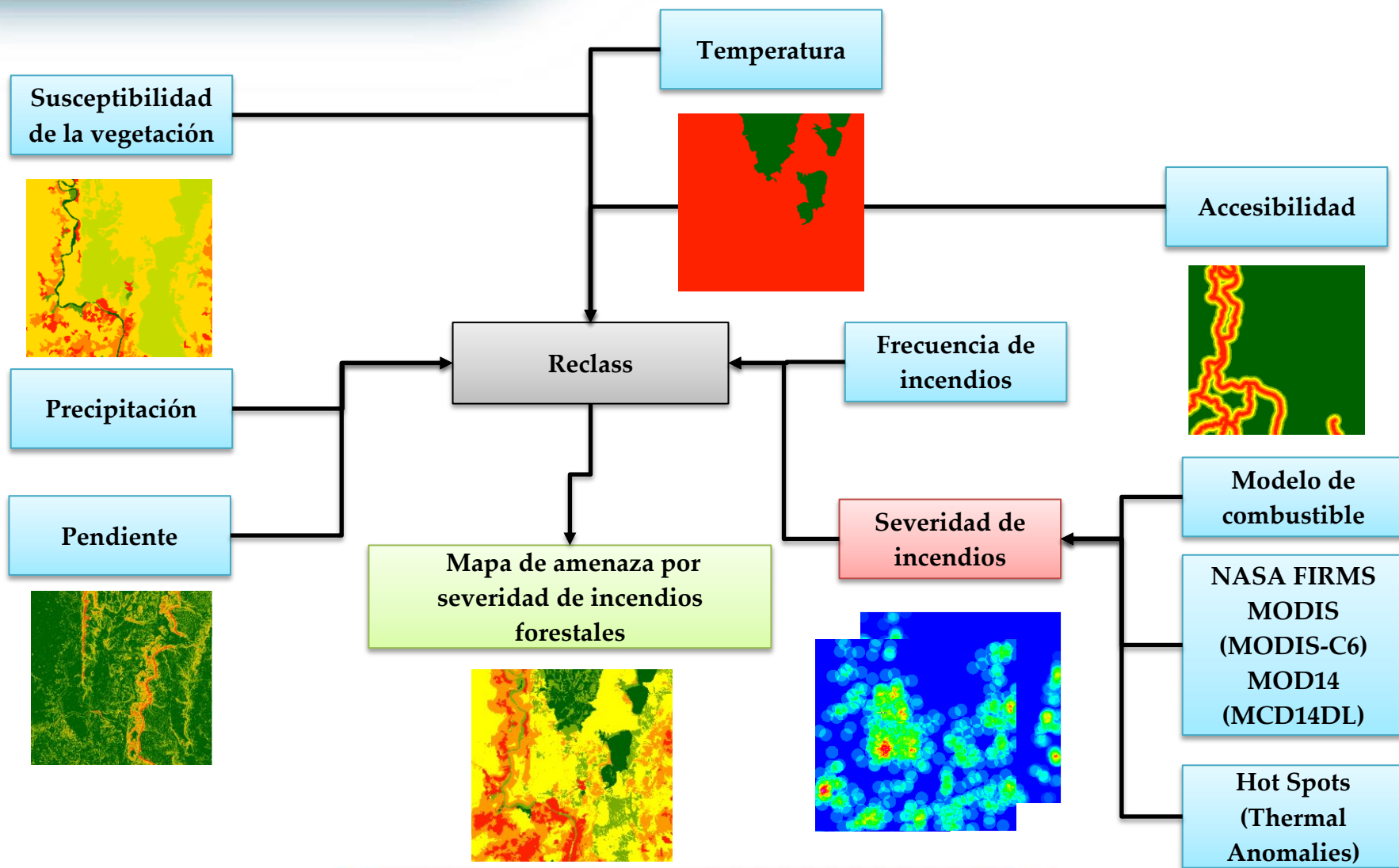
Nivel de Severidad



Classification Model:

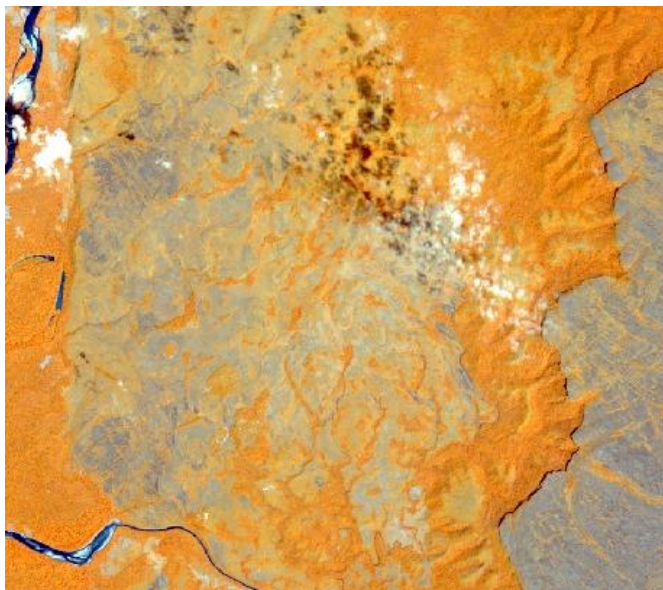


THREATS DUE TO SEVERITY IN FOREST FIRES MODEL

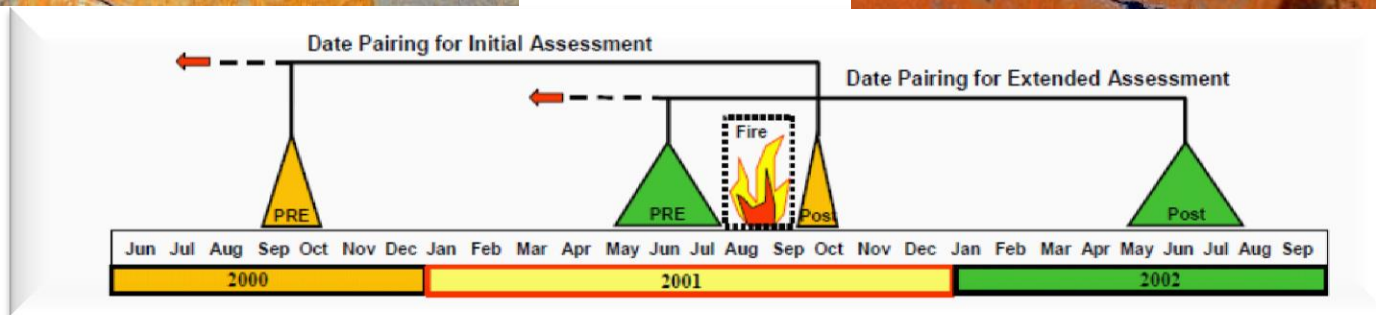
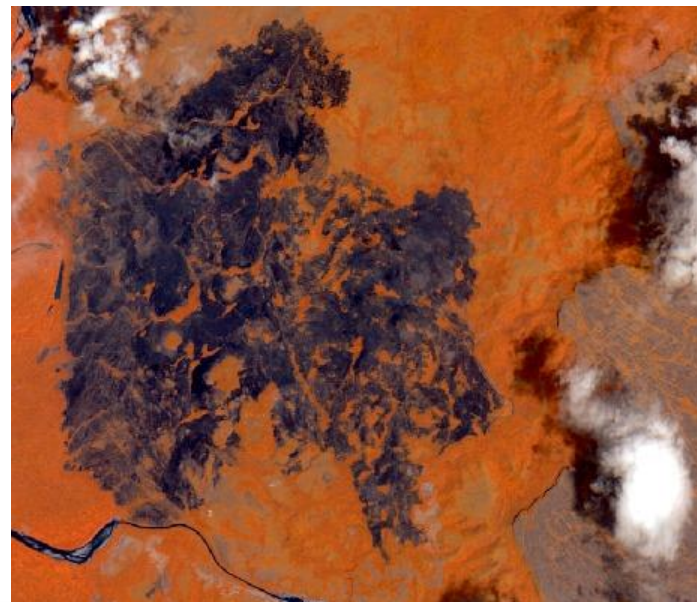


ANTES
(10/02/2018)

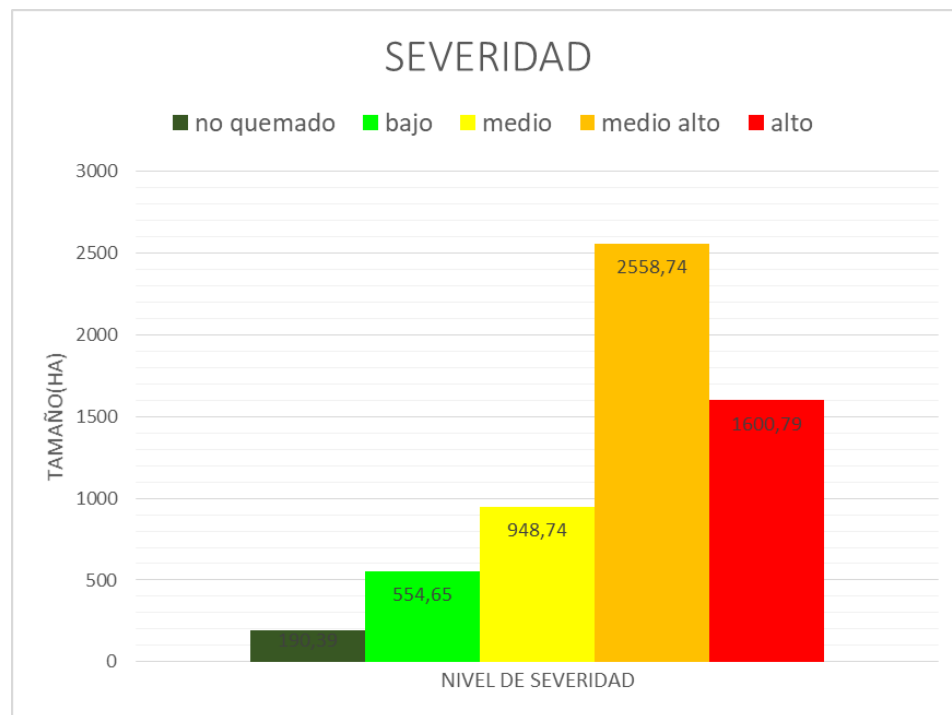
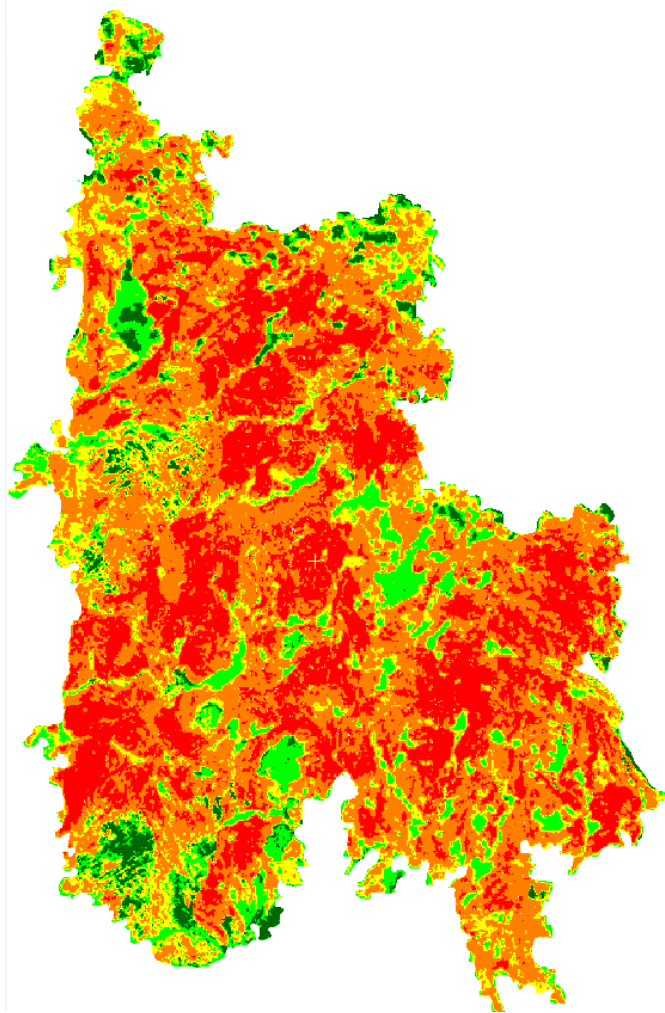
DESPUES
(13/03/2018)



Rapideye 4-7-3



SEVERITY MAPPING



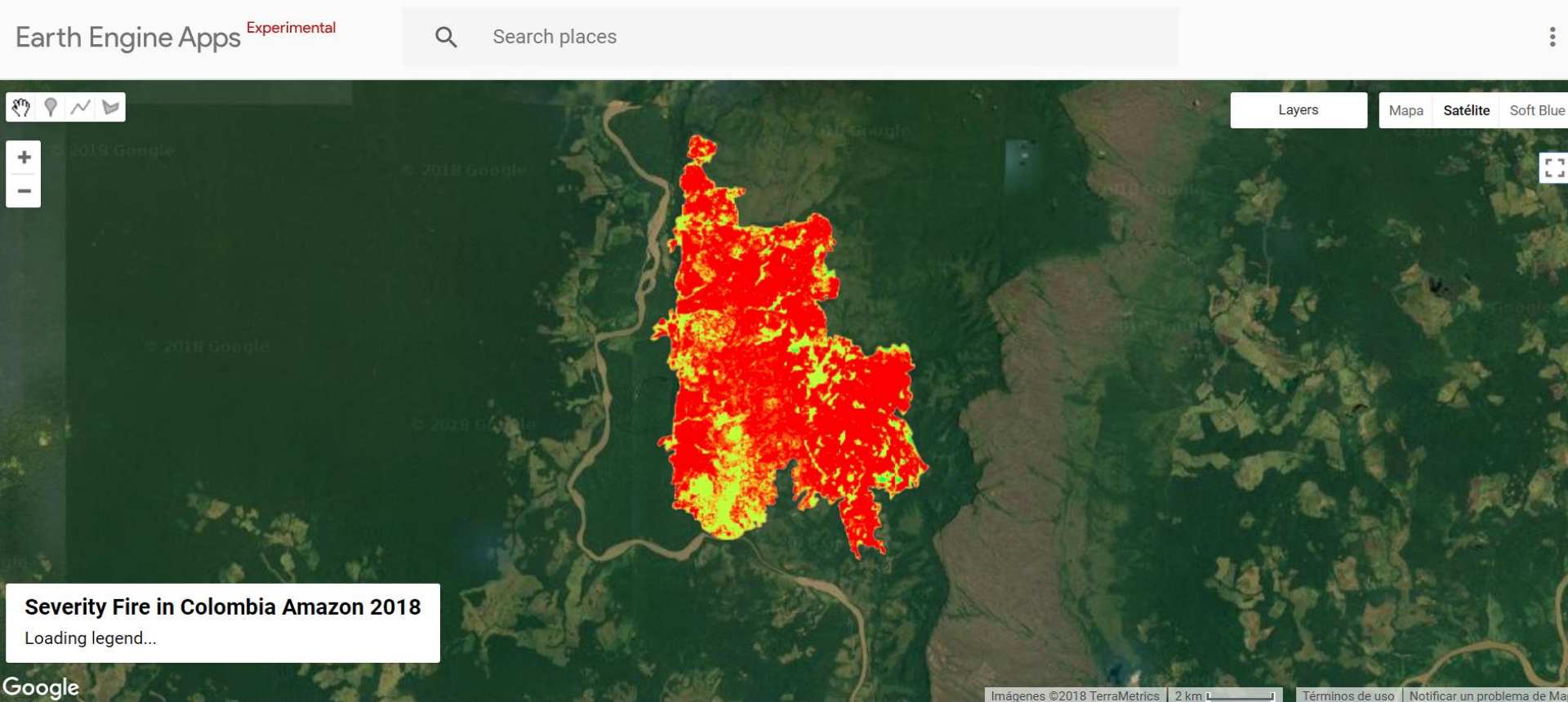
Clase	Severidad	Área (ha)	%
1	No quemado	190,39	3,25
2	Bajo	554,65	9,48
3	Medio - bajo	948,74	16,21
4	Medio - alto	2558,74	43,71
5	Alto	1600,79	27,35
Total		5853,31	100,00

1/2014

SEVERITY MAPPING BY CLOUD COMPUTING “GEE”

Alexander Ariza
Centro de Investigación CIAF – IGAC

Hernando Hernández
Programa de Maestría en Gestión de la Información y Tecnologías Geoespaciales
Universidad Sergio Arboleda



SEVERITY MAPPING BY CLOUD COMPUTING “GEE”

Google Earth Engine

Search places and datasets...



Help

alexanderariza

Scripts Docs Assets

SEVERITY FIRE

Get Link

Save

Run

Reset



Inspector

Console

Tasks

Owner (2)

users/alexanderariza/default

AREA_QUEMADA_2

Area_Quemada

SEVERITY FIRE

Severity Fire

Severity Fire_2

Severity Fire_2 (copy)

users/alexanderariza/IISA

```
36 // Create and add the legend title.
37 var legendTitle = ui.Label({
38   value: 'Severity Fire in Colombia Amazon 2018',
39   style: {
40     fontWeight: 'bold',
41     fontSize: '18px',
42     margin: '0 0 4px 0',
43     padding: '0'
44   }
45 });
46
```



Geometry Imports



Layers

Mapa

Satélite

Soft Blue

Severity Fire in Colombia Amazon 2018

Loading legend...

Google

Imágenes ©2018 TerraMetrics

2 km

Términos de uso

Notificar un problema de Maps

Thanks



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