



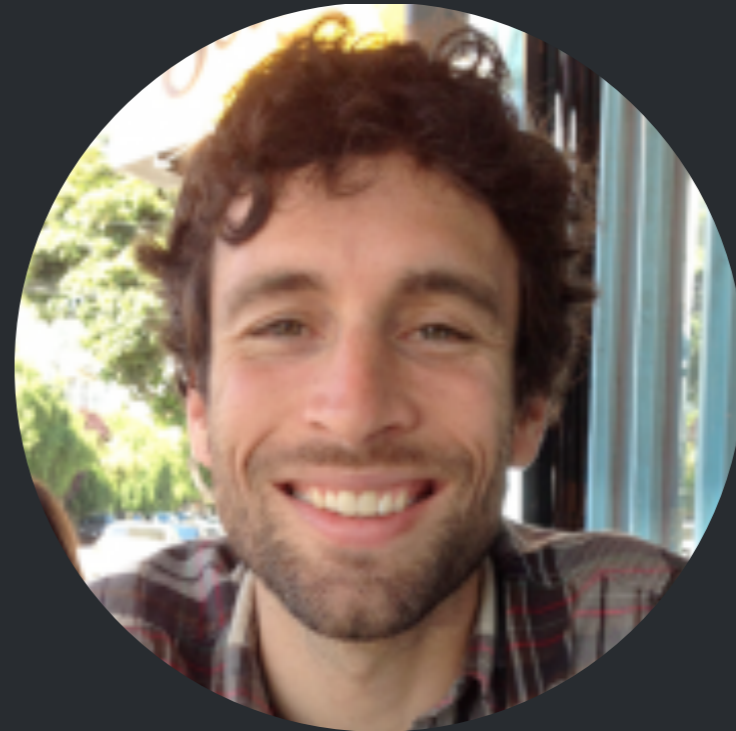
The Power of Visualizing Deforestation Data

[@andrewxhill](#) [@robinkraft](#) [@jatorre](#)



Andrew Hill

Senior Scientist
Vizzuality / CartoDB



Robin Kraft

Data Architect
WRI Data Lab

Working to improve our world, one project at a time.

From data visualization to citizen science, it is all about stories that matter

RECENT WORK

NEEMO MISSION
NASA

The Evolution of Web
Google Chrome Team

Carbon	889,414,127
Carbon	63,509,880
Carbon	0%

Carbon Calculator
UNEP-WCMC

OldWeather

ProtectedPlanet

- Food Aid**
24 projects
- Other**
15 projects
- Environment**
1 project

NGO Aid Map





CART^ÖDB

Geospatial database on the cloud



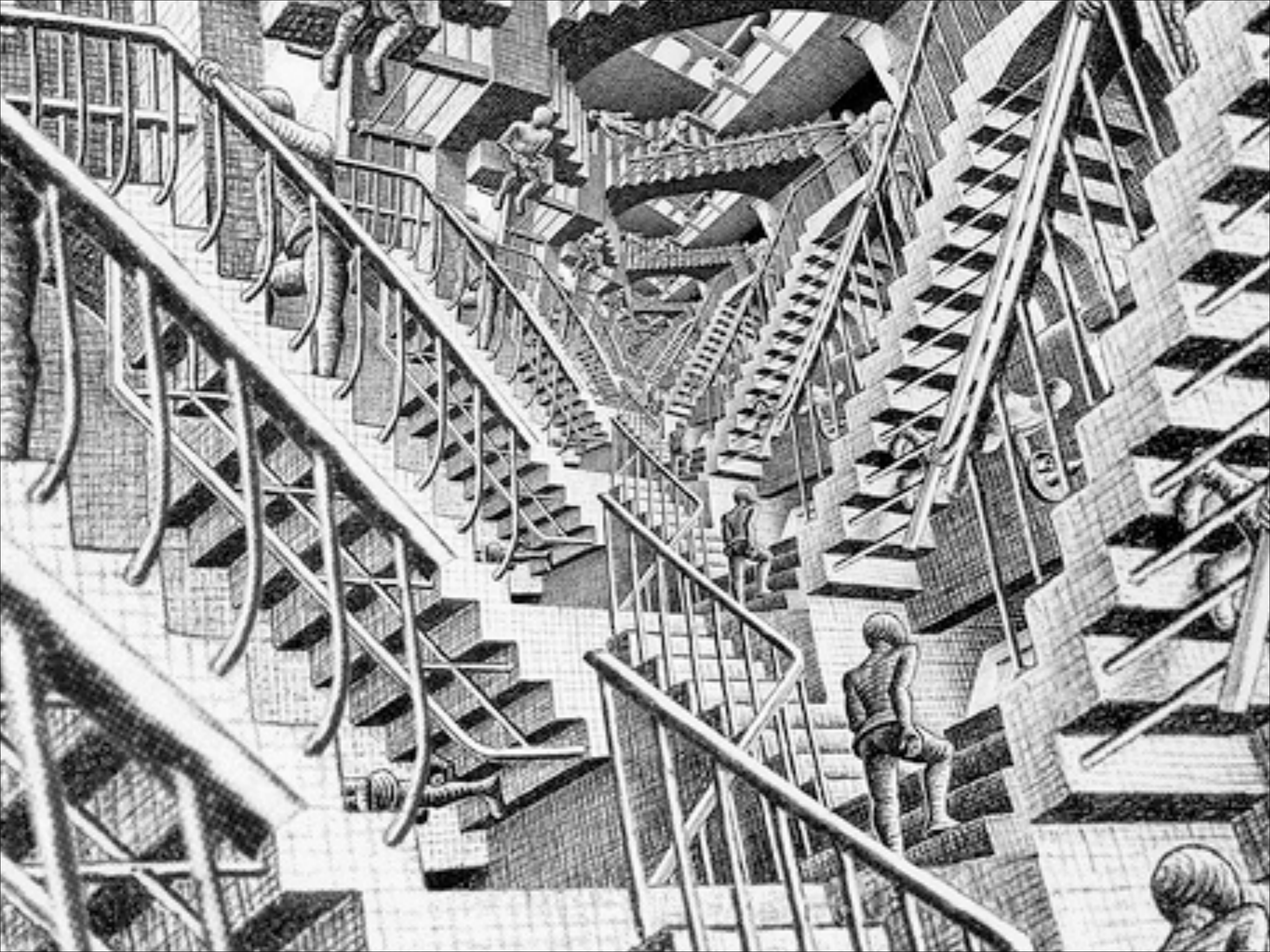
All meteorites fallen on earth





But... this talk is about more

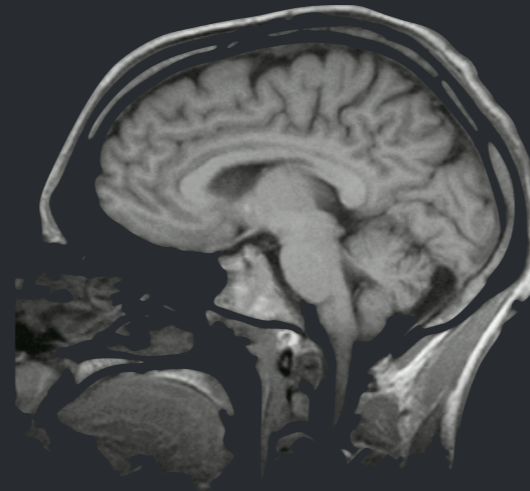
using data visualization to tell stories





This talk is really about storytelling

using data visualization to tell stories




Why storytelling?

thoughts and reflection

Jonathan Gottschall


***Human minds
yield helplessly
to the suction
of story.***



Snow Fall

The Avalanche at Tunnel Creek

By JOHN BRANCH

An aerial photograph of a mountain range. The mountains are covered in patches of snow and dark forest. A road, identified as Highway 2, winds through the lower part of the range. The sky is overcast and grey.

Big Chief Mountain

Cowboy Mountain

Stevens Pass
ski area

Highway 2
from Leavenworth, Wash.

The background is a stylized map of New York City, showing various streets and parks in shades of blue and grey. A white rectangular box is centered on the map, containing text. The text is in a bold, italicized, black sans-serif font. The map includes labels for 'Secaucus', 'Manhattan', 'Nolan Park', and 'DEKALB AVE'.

Philippa Perry

We are primed to use stories. Part of our survival as a species depended upon listening to the stories of our tribal elders...

How Sandy flooded the NY & NJ coastlines, with storm-surge predictions by hurricane size. Sandy was downgraded from Category 1 before landfall.

Zoom to a location

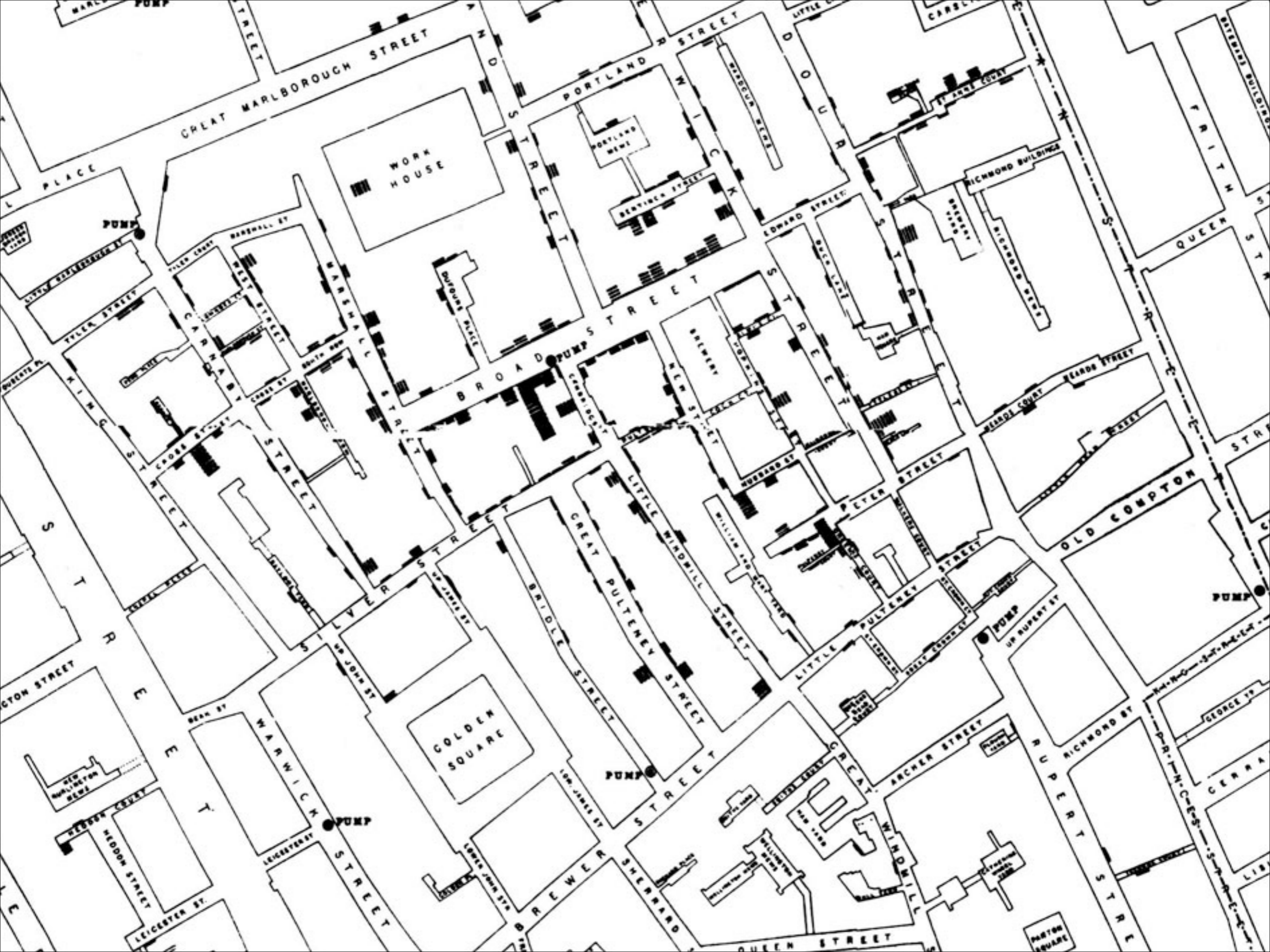
ZOOM IN





Visual storytelling

why maps and data visualization







Storytelling is powerful

The art of storytelling with maps



Let me show you
using data visualization to tell a story



Two non-forest examples

using data visualization to tell a story

1

Tax lots are interesting!



Welcome to NYC Open Data

This catalog supplies hundreds of sets of public data produced by City agencies and other City organizations. The data sets are now available as APIs and in a variety of machine-readable formats, making it easier than ever to consume City data and better serve New York City's residents, visitors, developer community and all!

Take the 2013 NYC Department of Education [Gap App Challenge!](#)

NYC OPEN DATA

Search & Browse Datasets and view

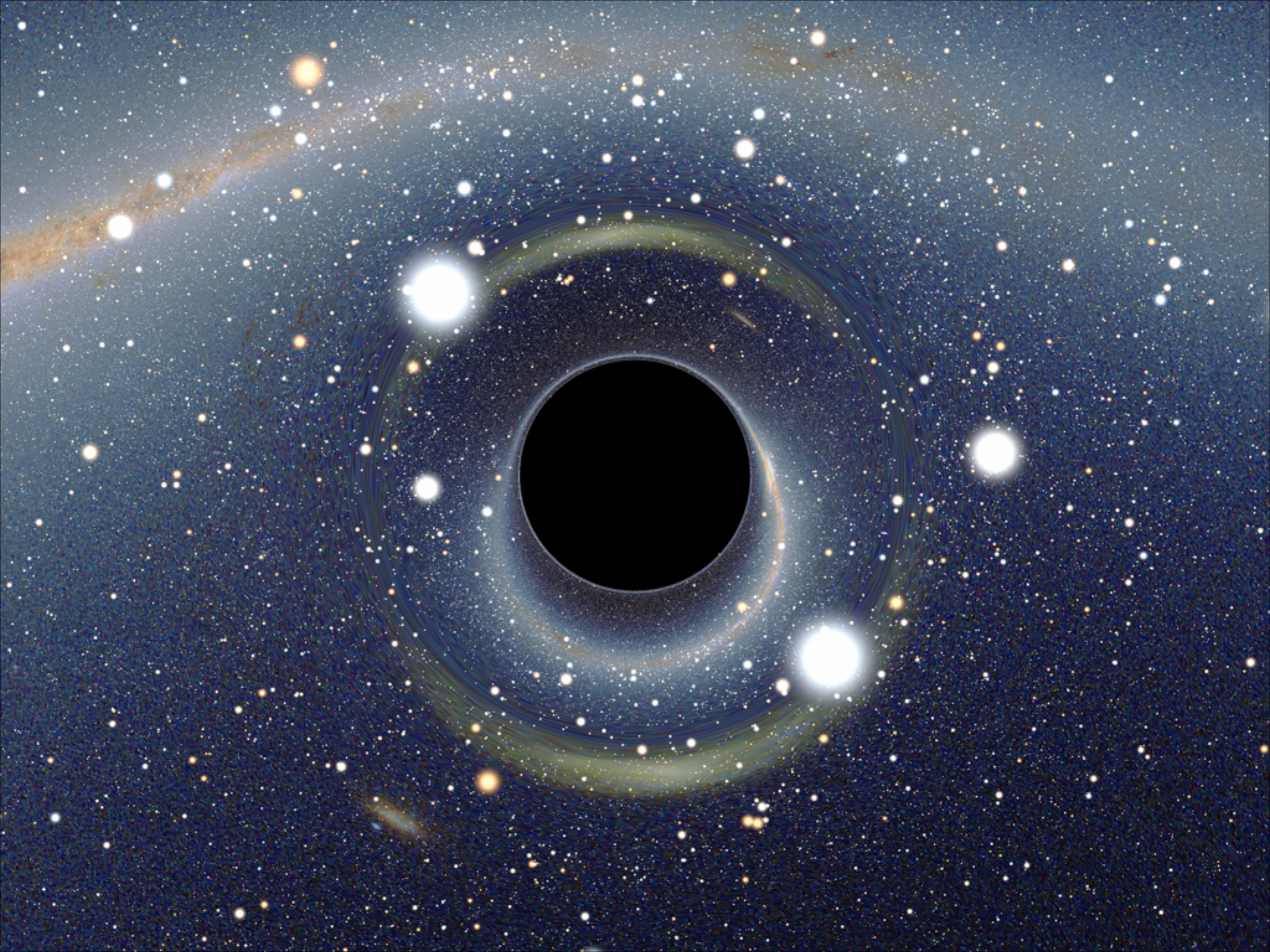
View Types

- Datasets
- External Datasets
- Files and Documents
- Filtered Views
- Charts
- Maps
- Calendars
- Forms

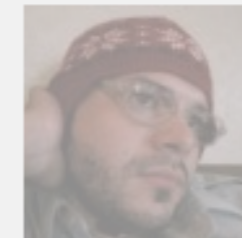
Categories

- Business and Economic
- Community Service
- Construction and Housing
- Cultural Affairs

	Name	
<input checked="" type="checkbox"/>	1. Wifi Hotspot Locations	Media doitt gis, geographic, location, map, cartography, ... Location of wifi hotspots in the city with basic descriptive information.
<input checked="" type="checkbox"/>	2. 311 Service Requests from 2010 to Present	Social Services 311, 311 service requests, 2010, 2011, 2012, ... All 311 Service Requests from 2010 to present. This information is automatically updated daily.
<input checked="" type="checkbox"/>	3. Subway Entrances	Transportation location, map, cartography, basemap, transit, ... Map of NYC Subway Entrances
<input checked="" type="checkbox"/>	4. Map of Parks	Facilities and Structures park, parks, nature, recreation, location, map, ... GIS Map of New York City Department of Parks & Recreation parks.
<input checked="" type="checkbox"/>	5. Electric Consumption by ZIP Code - 2010	Environmental Sustainability electricity, energy, environment, planning, power, ... 2010 electricity consumption in kWh and GJ, by ZIP code, building type, and utility company.
<input checked="" type="checkbox"/>	6. Zip Codes Map	Social Services geographic, location, map, cartography, zip, code, ... Polygon representing the boundary of the zip codes in the city.



EPIC WIN FOR NYC'S OPEN DATA COMMUNITY! PLUTO IS FREE!



Noel Hidalgo
NONECK
int'l blender repairman... where i go, things get blended together.
[@noneck](#) | [Bio & Posts](#) →

Posted on July 25, 2013 by Noel Hidalgo in Civic Hacking, Collaboration, Gov2.0, News, Open Data, Open Gov

Since the signing of **New York City's Open Data Law on March 7, 2012**, open data and geo-spatial nerds have been wondering *when* the City's extensive land use and geographic data at the tax lot level would be liberated. Today, **New York City Department of City Planning liberated PLUTO and mapPLUTO.**

New York City's City Planning Department is very explicit about when everything should be on the City's portal. The one year milestone "public datasets that agencies make available to the internet shall be accessible through a single web portal." On the March 7 anniversary party and the community celebrated the **one year anniversary**, sadly PLUTO was missing.

Why is this one dataset so important?

MapPLUTO is a mashup of city data that, when plugged into mapping software, opens up a real-world version of Sim City. Tax lot characteristics and building outlines may not be the sexiest topics of conversation, but in New York City the digital information is (almost) invaluable. Real estate developers use MapPLUTO data to plot out their visions;

c4a.me/1dYHKv9/

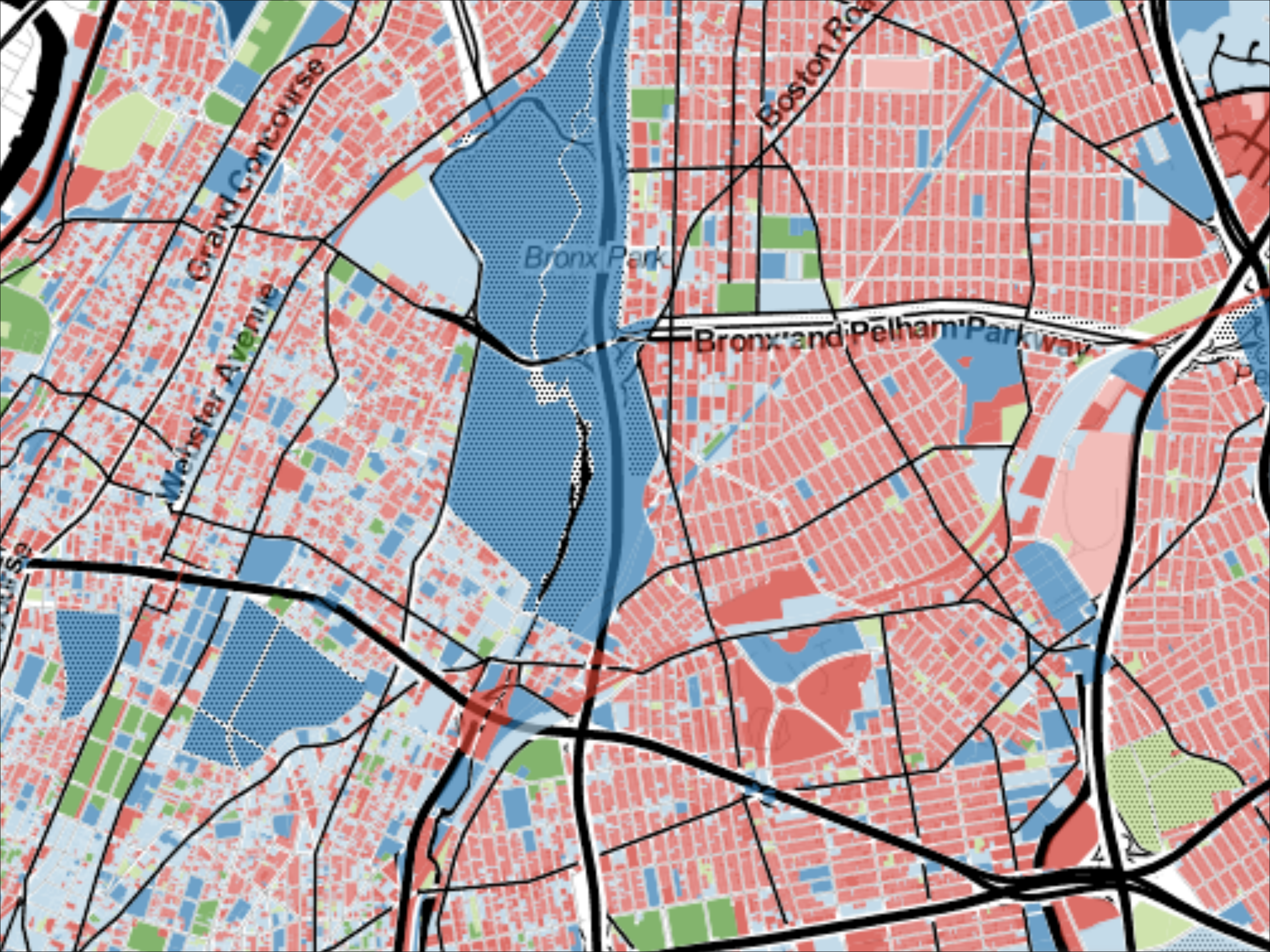
→ **APPLY FOR THE FELLOWSHIP**

→ **SIGN UP FOR UPDATES**

Email →

→ **DONATE**

PLUTO IS FREE



maps created by @andrewxhill on cartodb

WHAT IS PLUTO DATA EXACTLY?

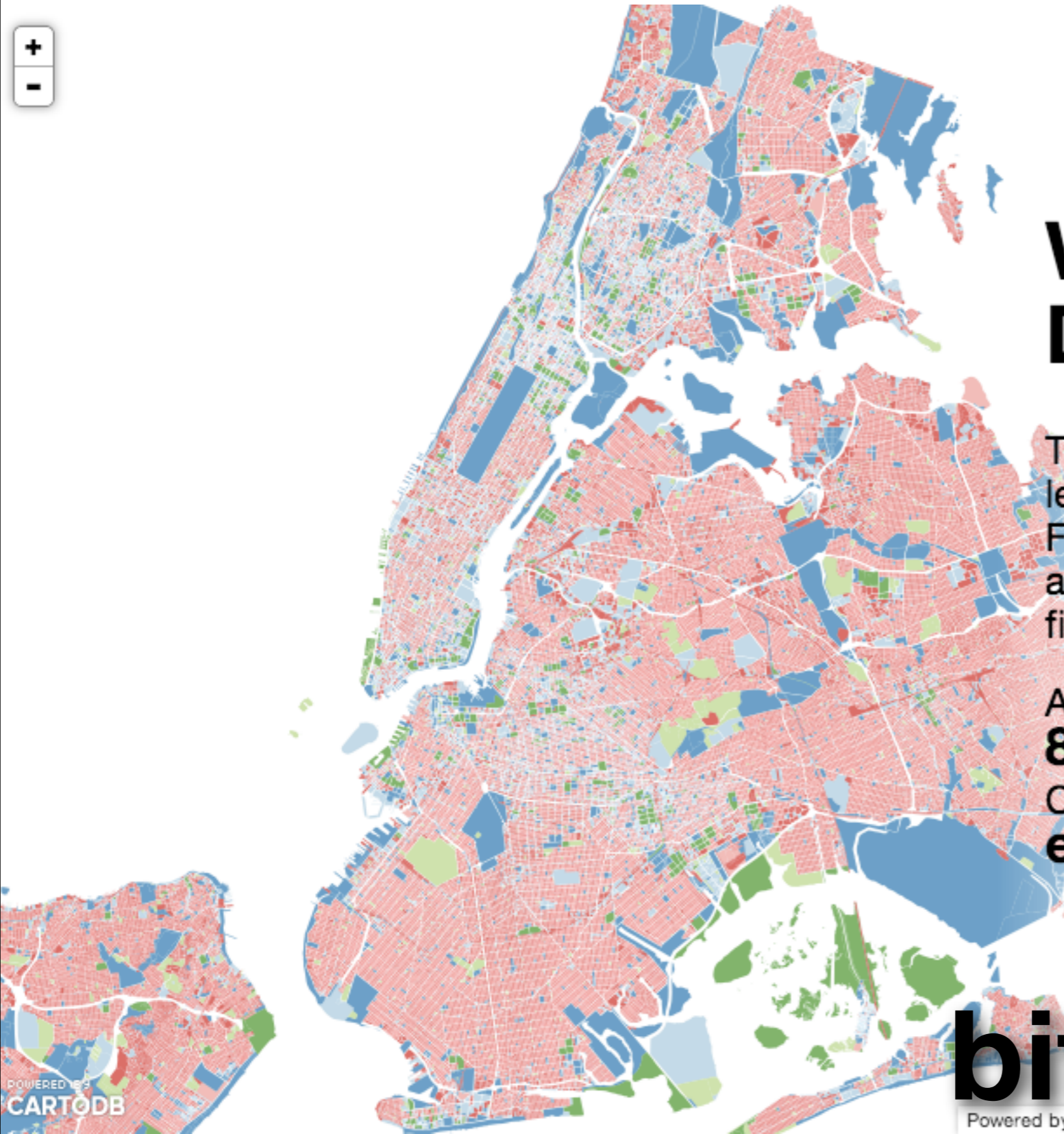
The PLUTO dataset contains tax lot level data from the NYC Department of Finance Tax Map. It contains land use and geographic data about our city's five boroughs

As of today, the dataset contains **857,879** tax lots across New York City. **And many beautiful errors**

bit.ly/19fjB6R

Powered by Leaflet — CartoDB attribution

POWERED BY
CARTODB



maps created by @andrewxhill on cartodb

HOW MANY RESIDENTIAL UNITS PER TAX LOT?

In this visualization, you can take a look into how many units each tax lot contains. Of course, we can't fit all of them on a single map, but play with it online to zoom and dive into small neighborhoods.

bit.ly/19fjB6R

[back](#) [next](#)

ASSUMING # FLOORS = HEIGHT OF BUILDING

How tall is the skyline of New York City? Here you can see all the peaks and valleys of the city.

bit.ly/19fjB6R

[back](#) [next](#)

CartoDB Examples

Contact [@andrewxhill](#)

CartoDB maps with slide layout

These are maps I created to highlight the PLUTO data shortly after its release by the NYC government. It ended up being the first of my experiments to get a ton of press: [Gizmodo](#), [Visual.ly Blog](#), [AnimalNewYork](#), [Gothamist](#), [Wired Maps Lab](#), [Curbed](#), [Brooklyn](#), and [Atlantic Cities](#)

- [demo](#)

Scrolling stories with CartoDB templates and multiple maps

A summary of work I did at the NYPL historical map data hackathon. I just used a scrolling story layout to talk about the maps I created over an afternoon.

- [demo](#)

Yea! This got a little love from [Wired](#)

Sun position plus street orientation

Demo I put together of the VECNIK vector rendering with current sunposition to find streets getting a lot of sun



2

There is science in there!

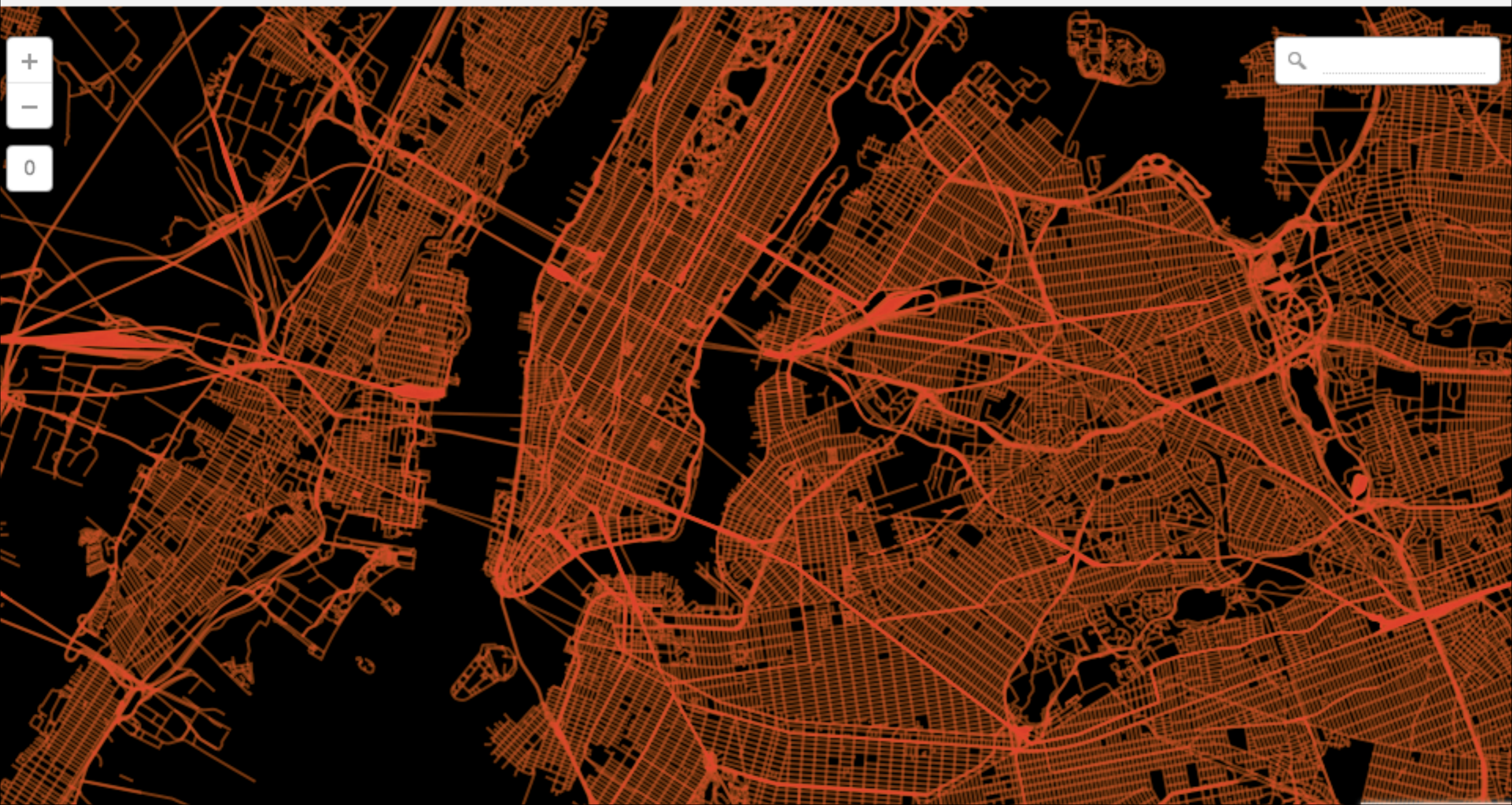
sotmus demo

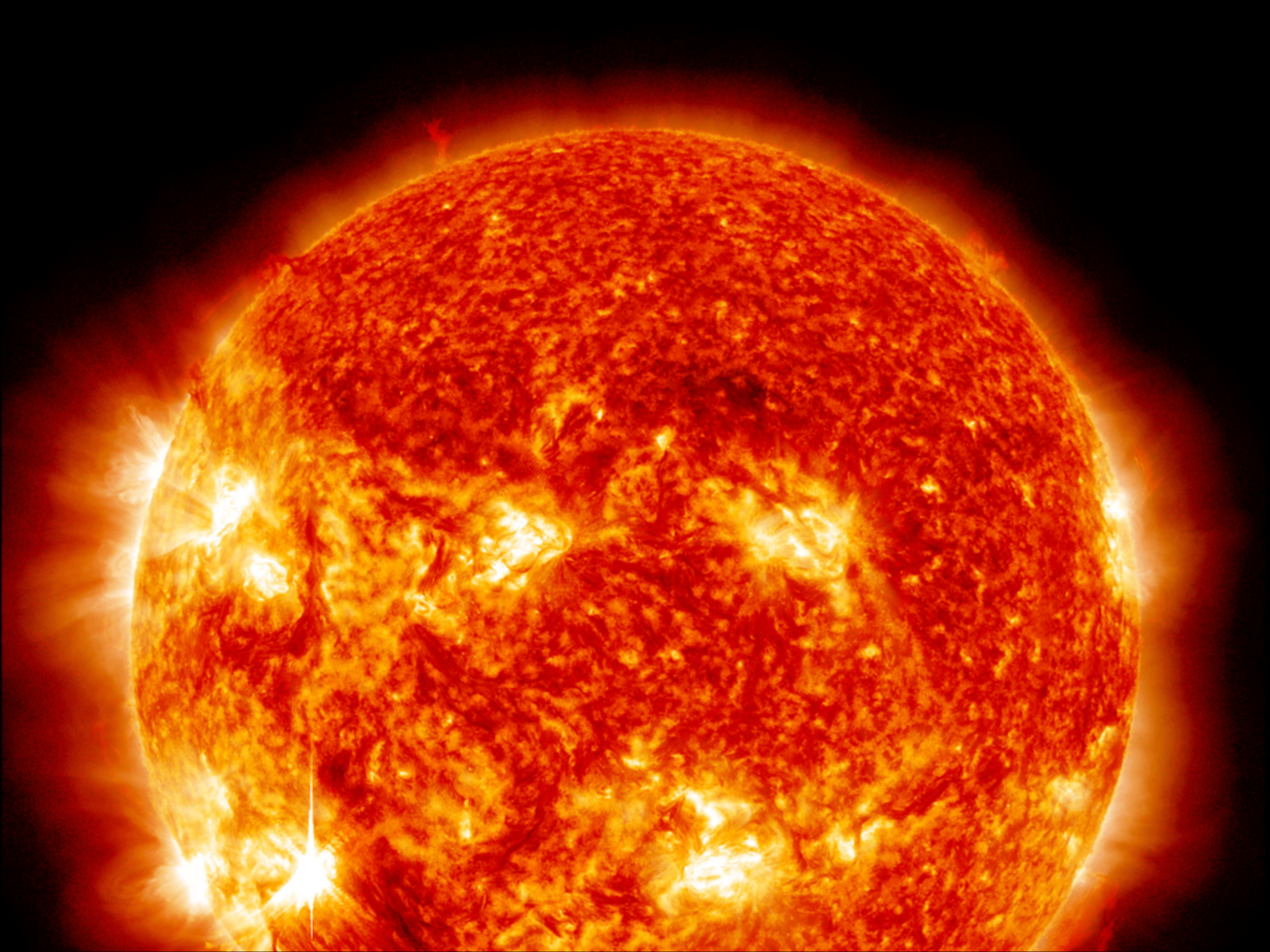
Table

Map view

Basemap
Color: #000000

share







DROID DOES APPS

DROID

verizon wireless

NYC

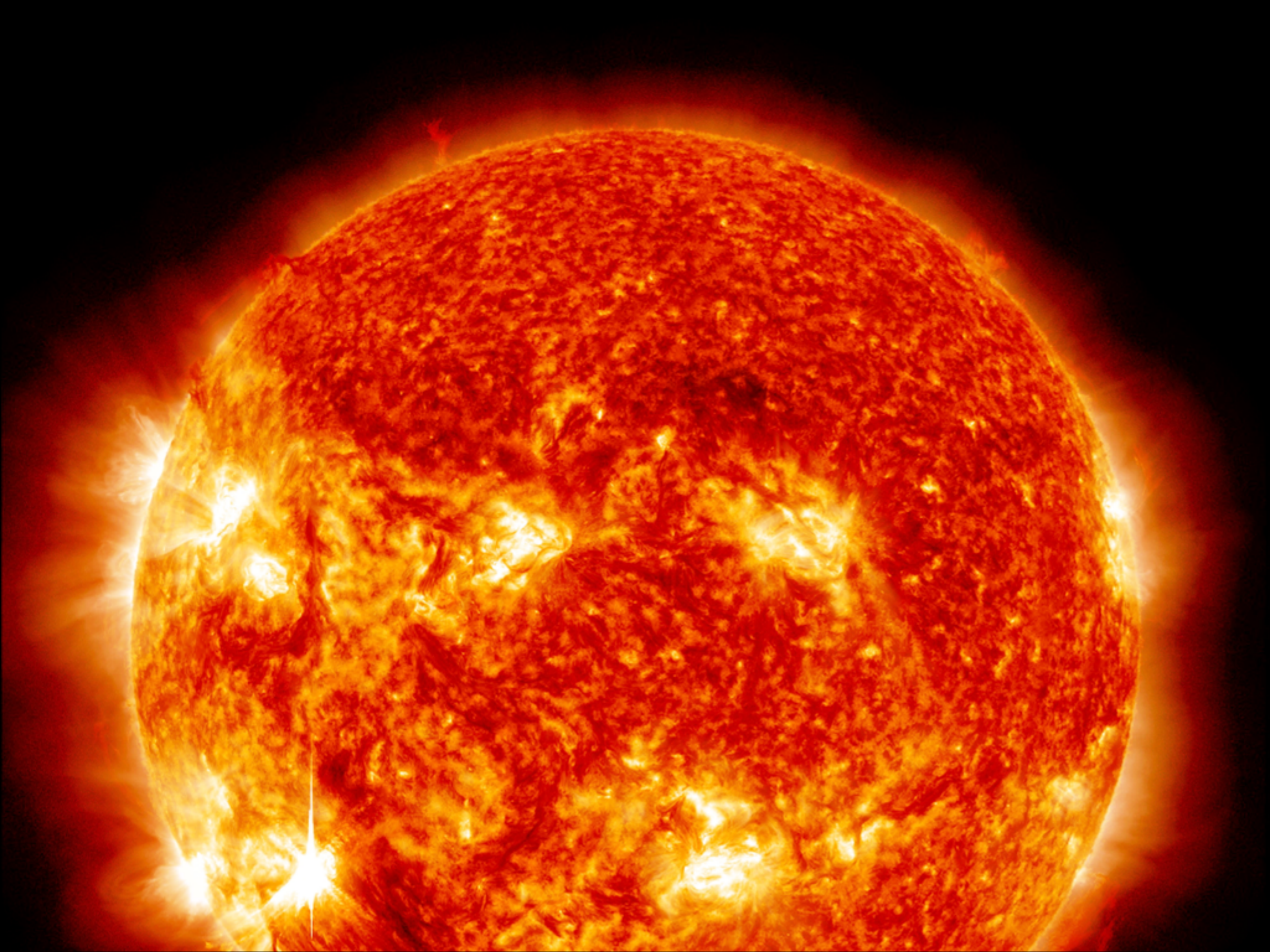
look

W 42nd St

W 42nd St

FIRE

3



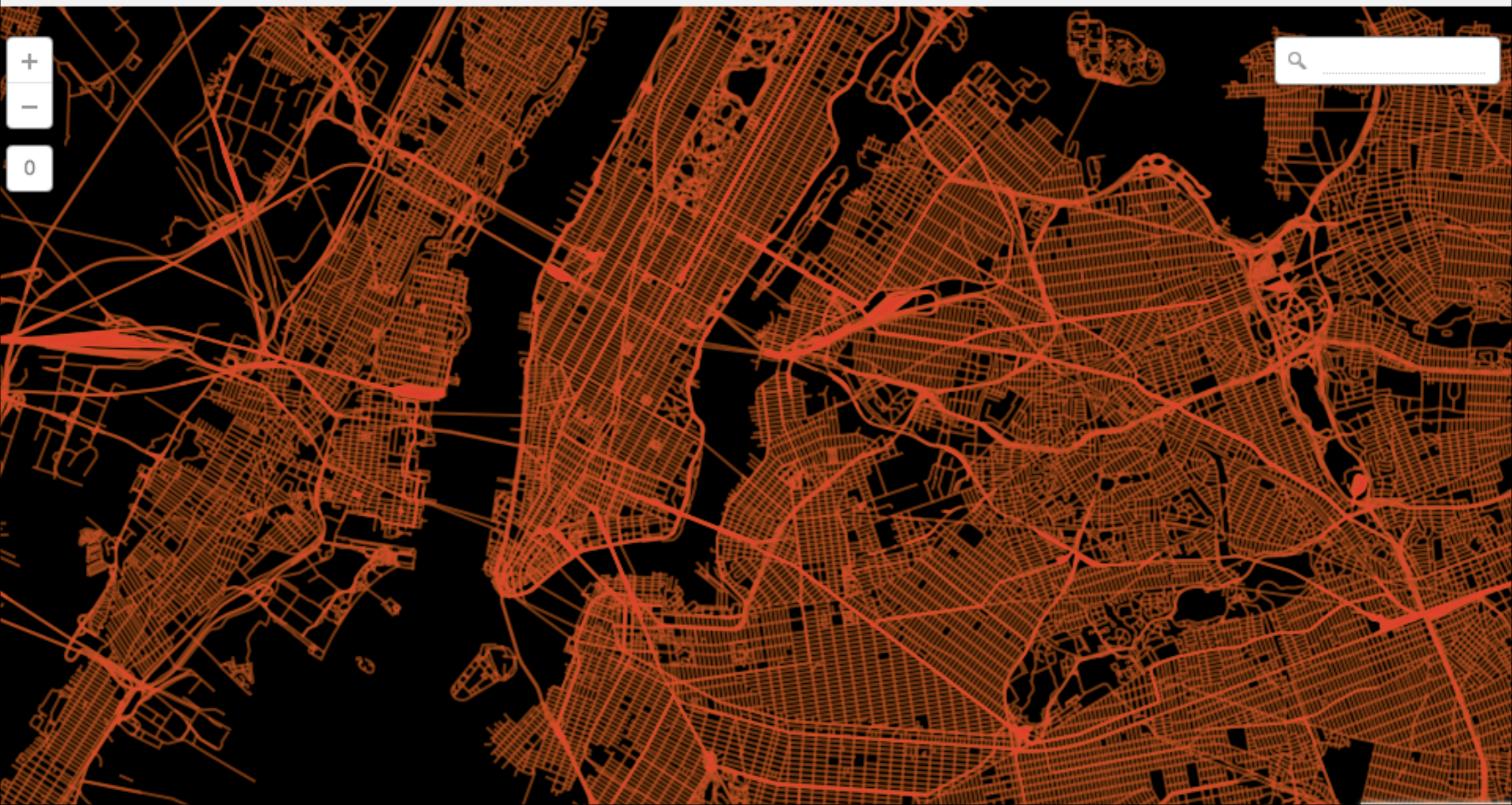
sotmus demo

Table

Map view

Basemap
Color: #000000

share



January						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

February						
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

March						
S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

April						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

May						
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

June						
S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
						W

July						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

August						
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

September						
S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

October						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

November						
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

December						
S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
						W



www.nychenge.com

NYCHenge on July 24th

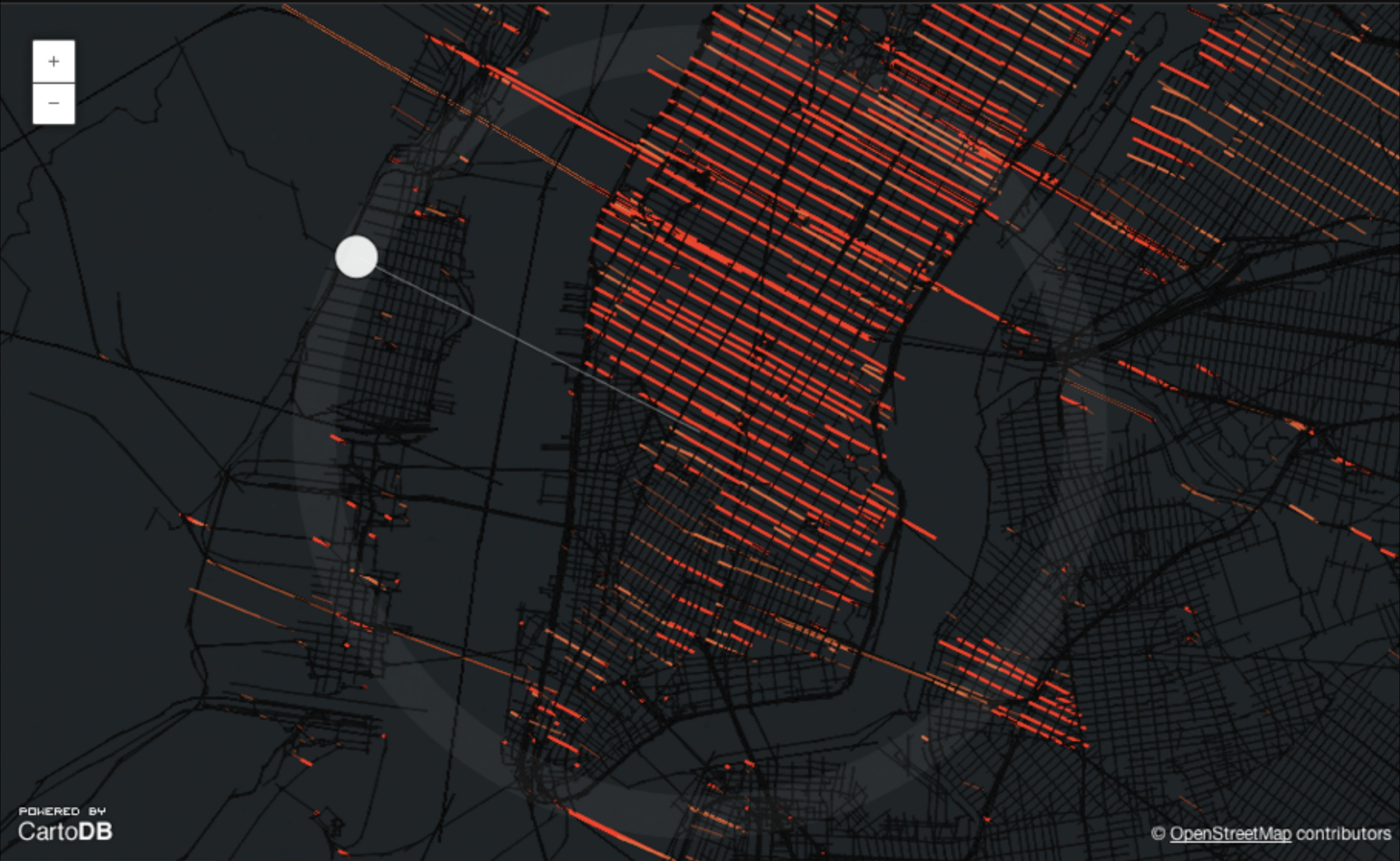
Embed this map [Learn about this](#)

 Tweet

155

 Like

203



POWERED BY
CartoDB

© [OpenStreetMap](#) contributors

JUN

JUL

AUG

SEP

OCT

NOV

DEC

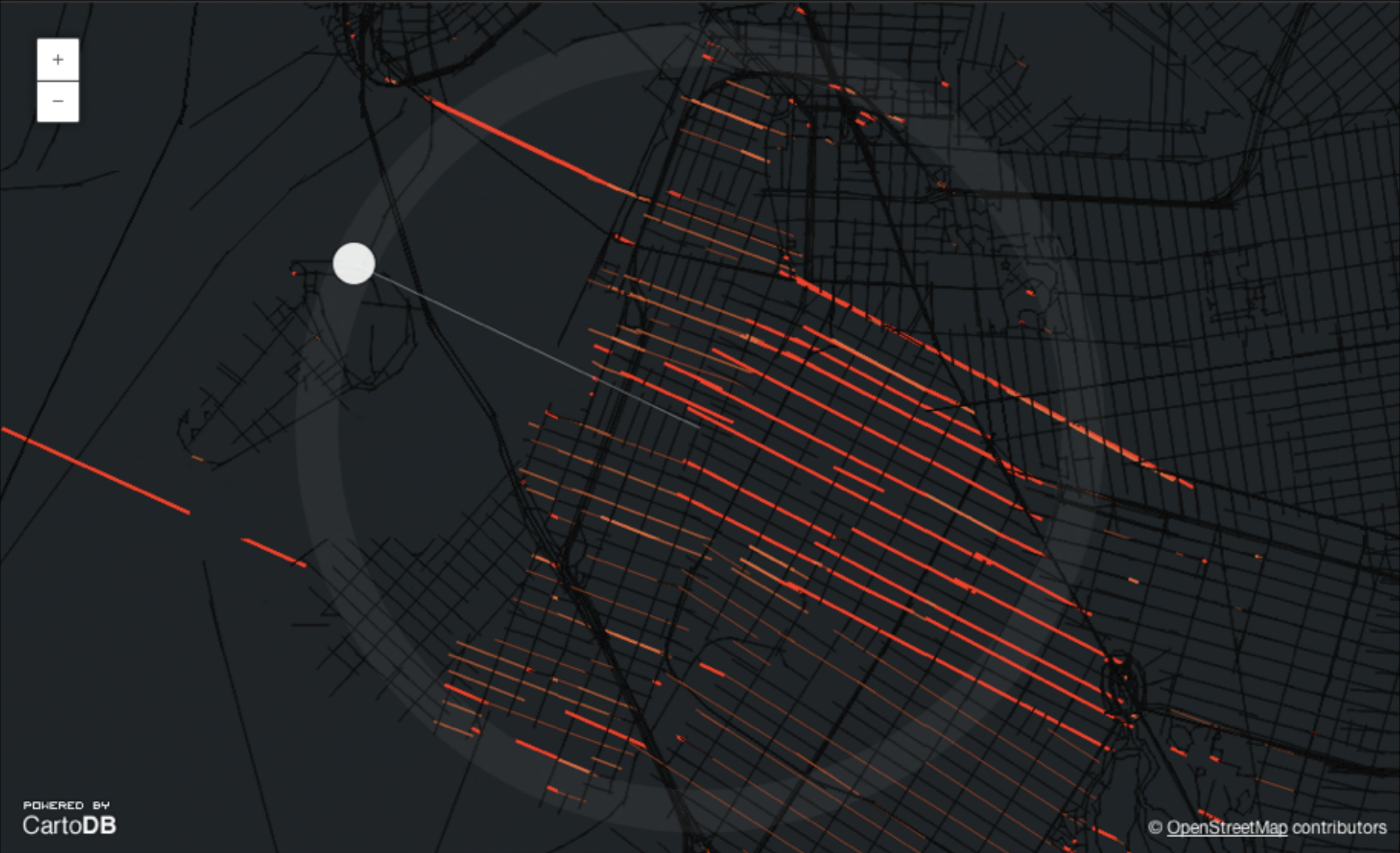
JAN

FEB

MAR

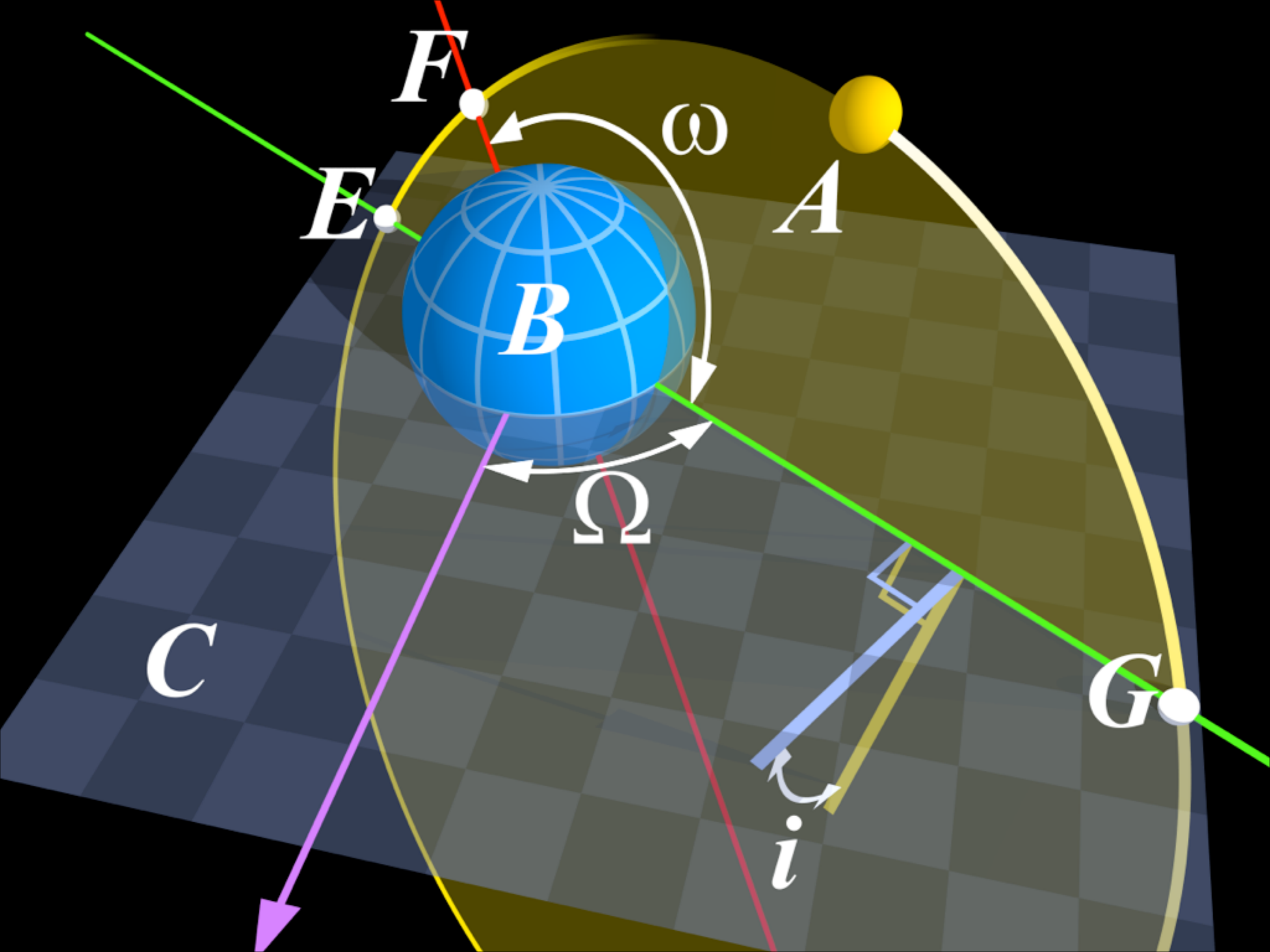
APR

MAY



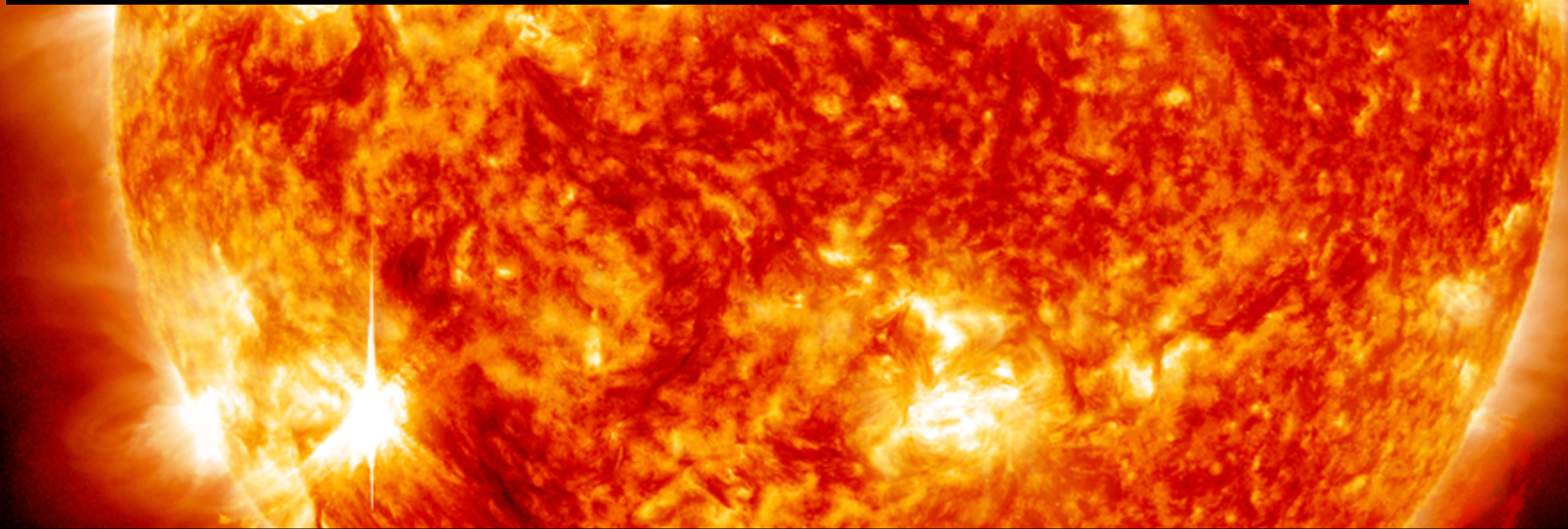
POWERED BY
CartoDB

© [OpenStreetMap](#) contributors



David Byrne

***When we can quickly see
the effects on something
over time... there's an
instant "Aha!"***





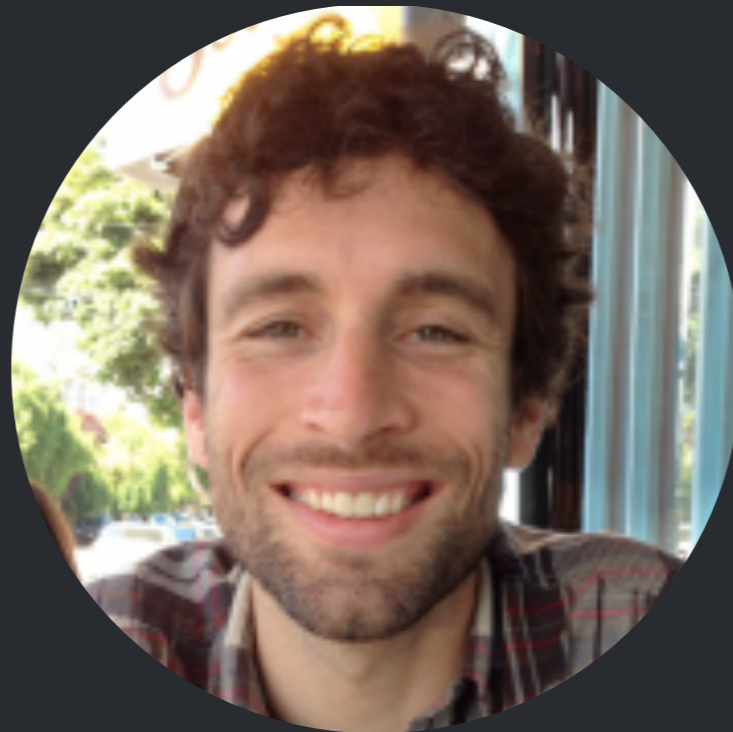
When we make maps, we try to tell stories.

the power of data visualization



Let's tell the story of deforestation

using data visualization to tell it different



Robin Kraft

**Lead Data Architect, Data Lab
World Resources Institute**

@robinkraft



Global Forest Watch



It's a website

GFW



Big data analysis, visualization, and communication

GFW



Data exploration

GFW



Temporal data!

GFW



How do we create temporal deforestation data?

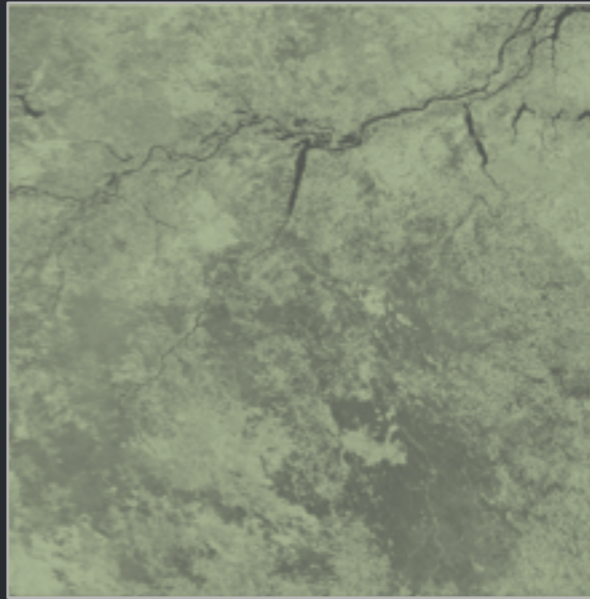
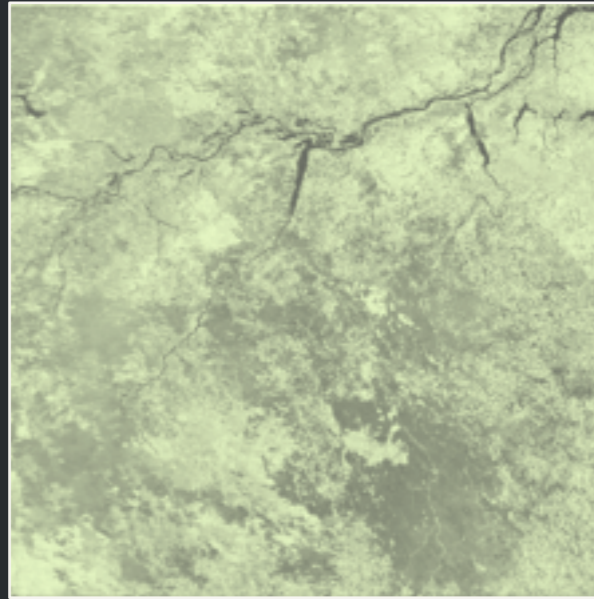
FORMA - Forest Monitoring for Action



Scan complete MODIS

Every 16 days

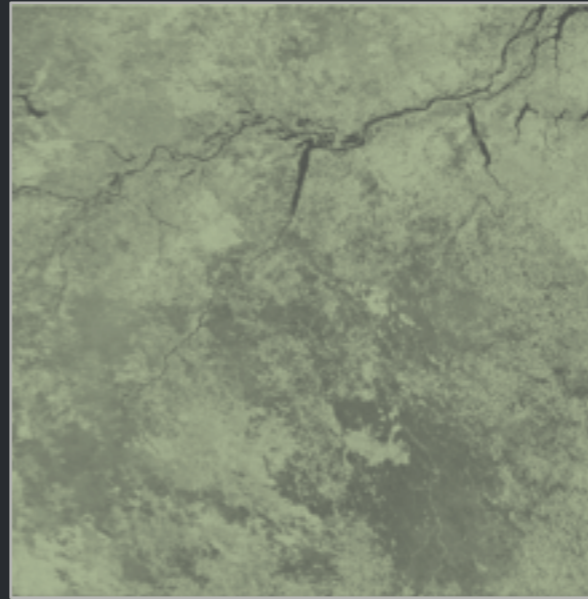
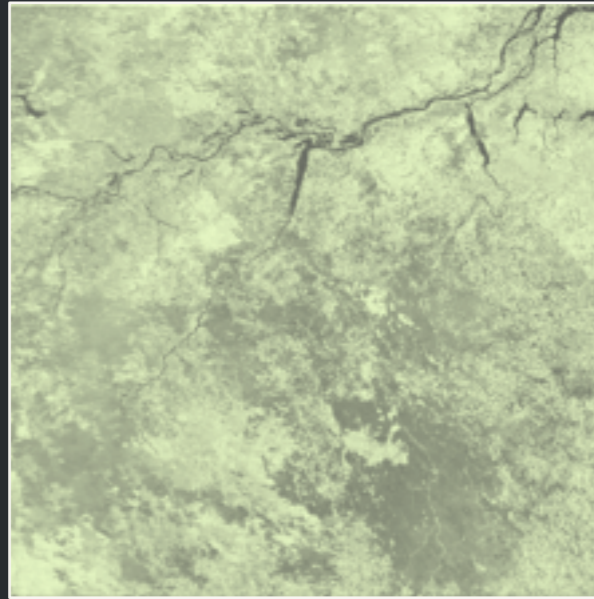
FORMA - Forest Monitoring for Action



A ton of data

All the rain forests in ~90 countries

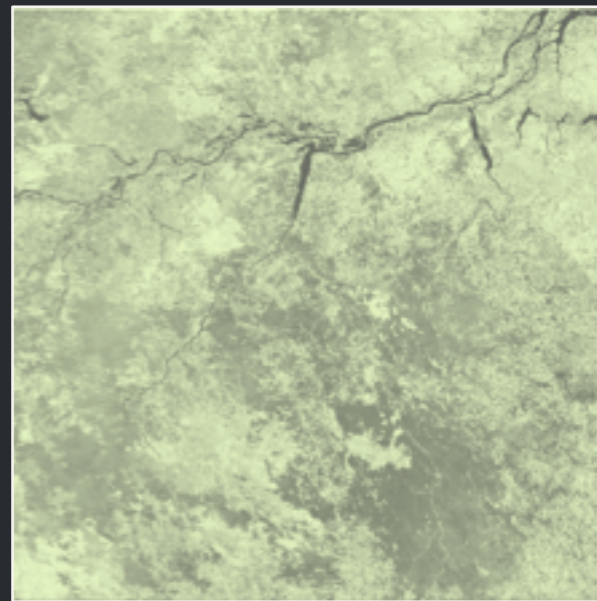
FORMA - Forest Monitoring for Action



A ton of data

300 time periods (every 16 days over 13 years)

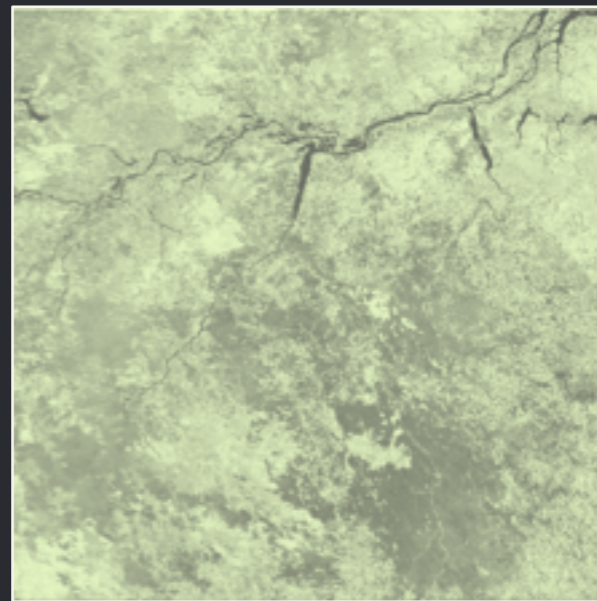
FORMA - Forest Monitoring for Action



High resolution

500m, soon 250m, pixels

FORMA - Forest Monitoring for Action



A ton of data

60 million forested pixels

4-5 million w/ deforestation alerts

FORMA - Forest Monitoring for Action



Lots of challenges

Scale, speed, clouds etc.

FORMA - Forest Monitoring for Action

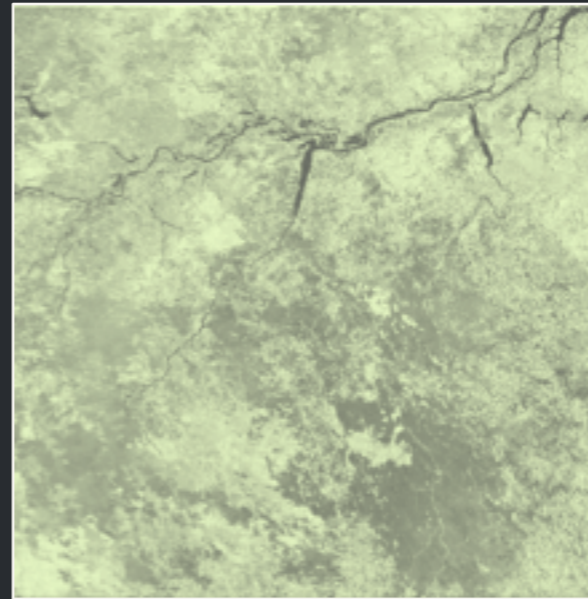


So how do we do it?

Besides coffee

FORMA - Forest Monitoring for Action

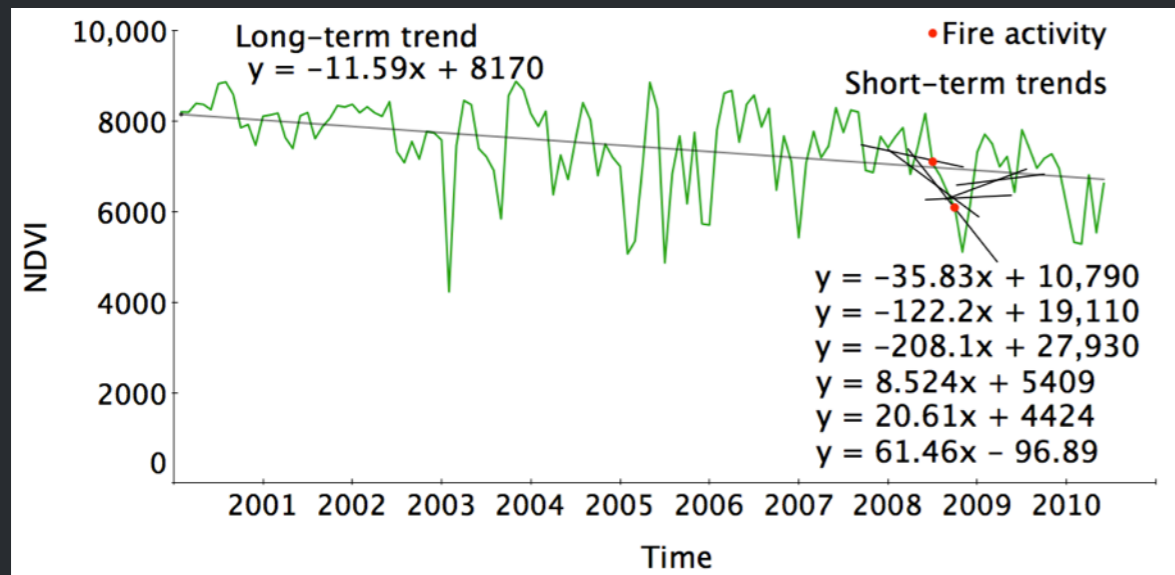
Satellite data



Machine learning

+

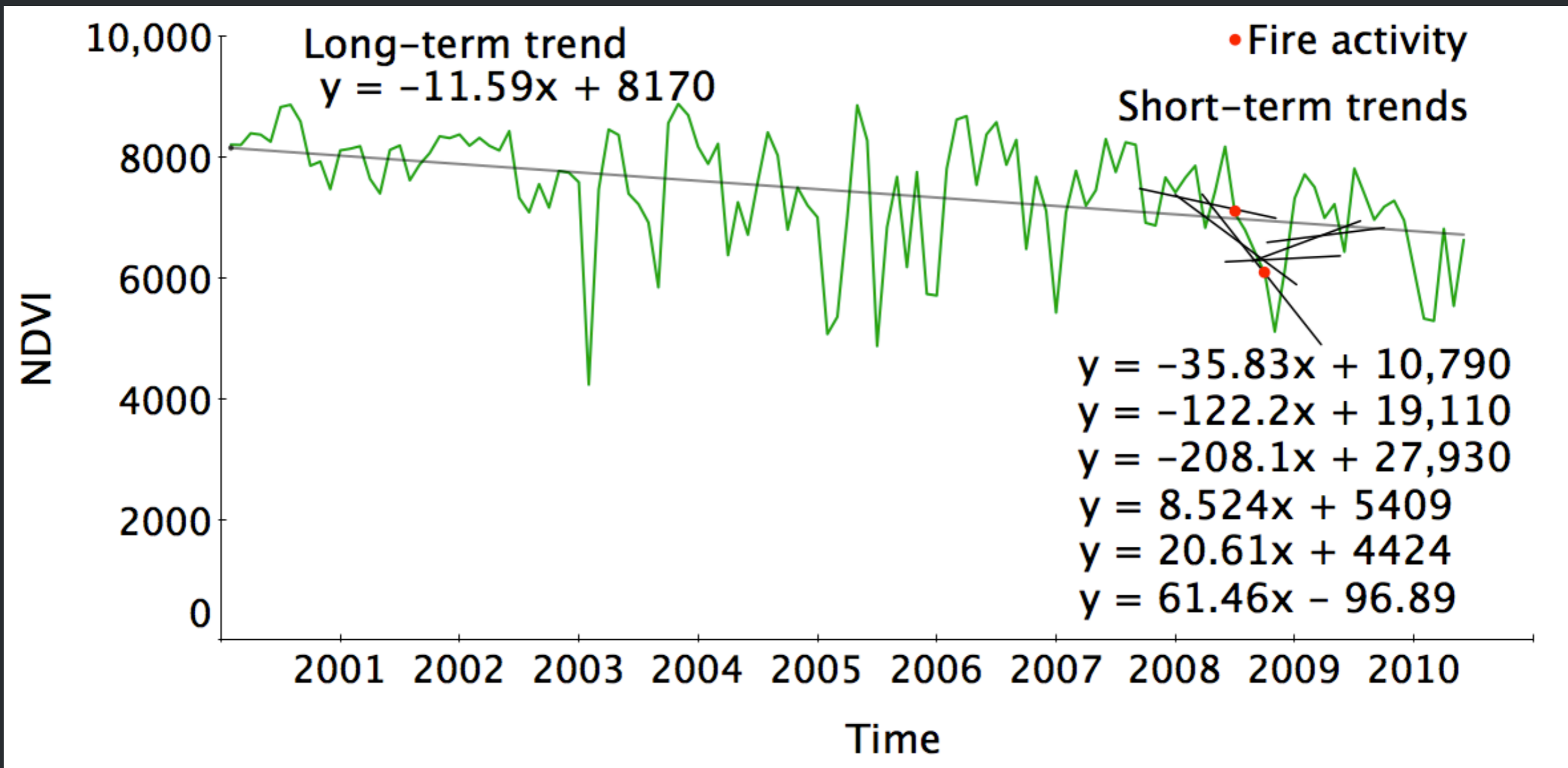
OSS & the cloud



python



Machine learning!





Outputs dumped into CartoDB

Time to see it online!



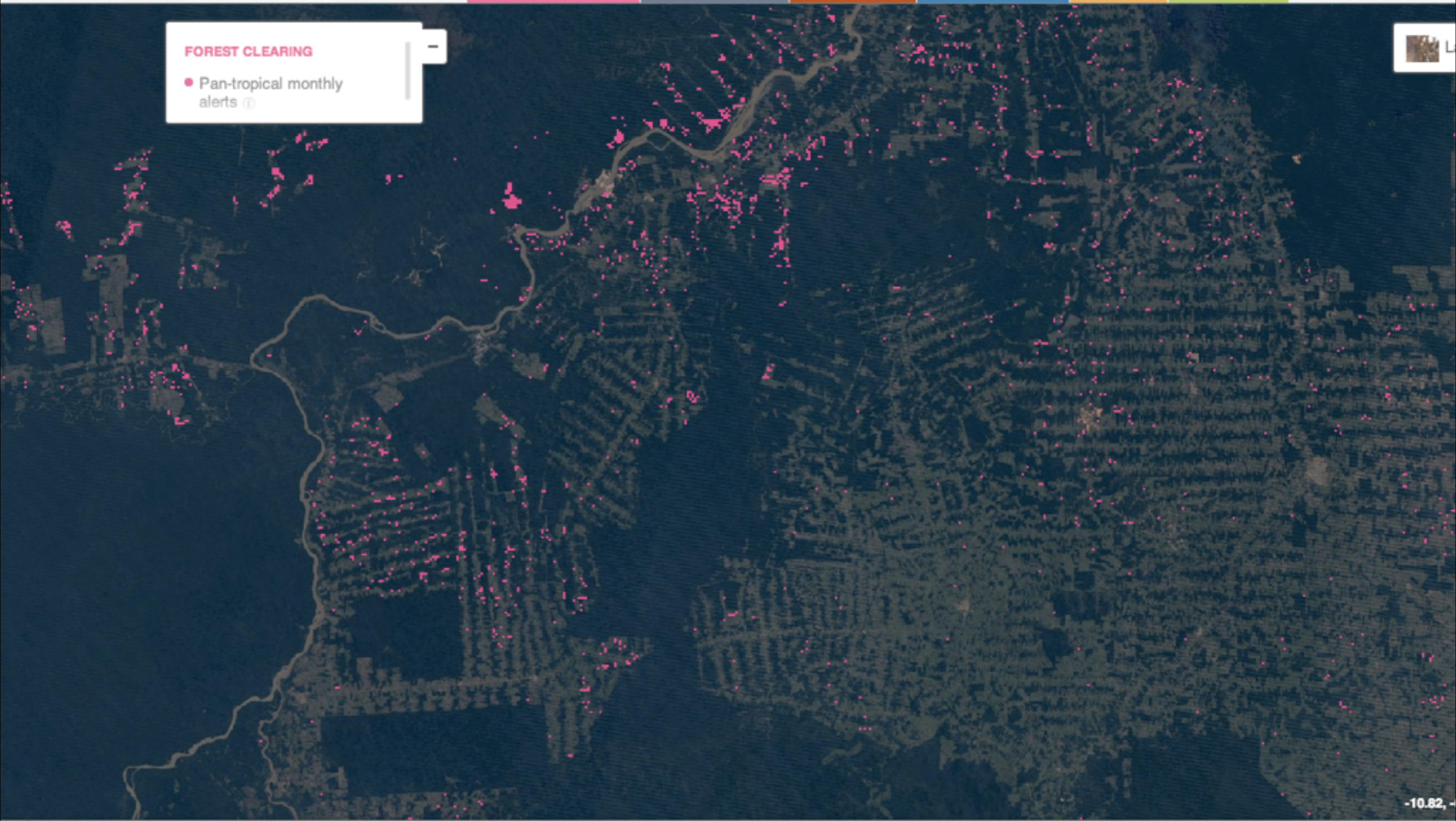
This is what it looks like...

<http://www.gfw-beta.org>

PM me for the password: @robinkraft

FOREST CLEARING

- Pan-tropical monthly alerts ⓘ



FOREST CLEARING

- Pan-tropical monthly alerts ⓘ



FOREST CLEARING

- Pan-tropical monthly alerts ⓘ



FOREST CLEARING

- Pan-tropical monthly alerts ⓘ



FOREST CLEARING

- Pan-tropical monthly alerts ⓘ



FOREST CLEARING

- Pan-tropical monthly alerts ⓘ



-10.58



FOREST CLEARING

- Pan-tropical monthly alerts ⓘ



FOREST CLEARING

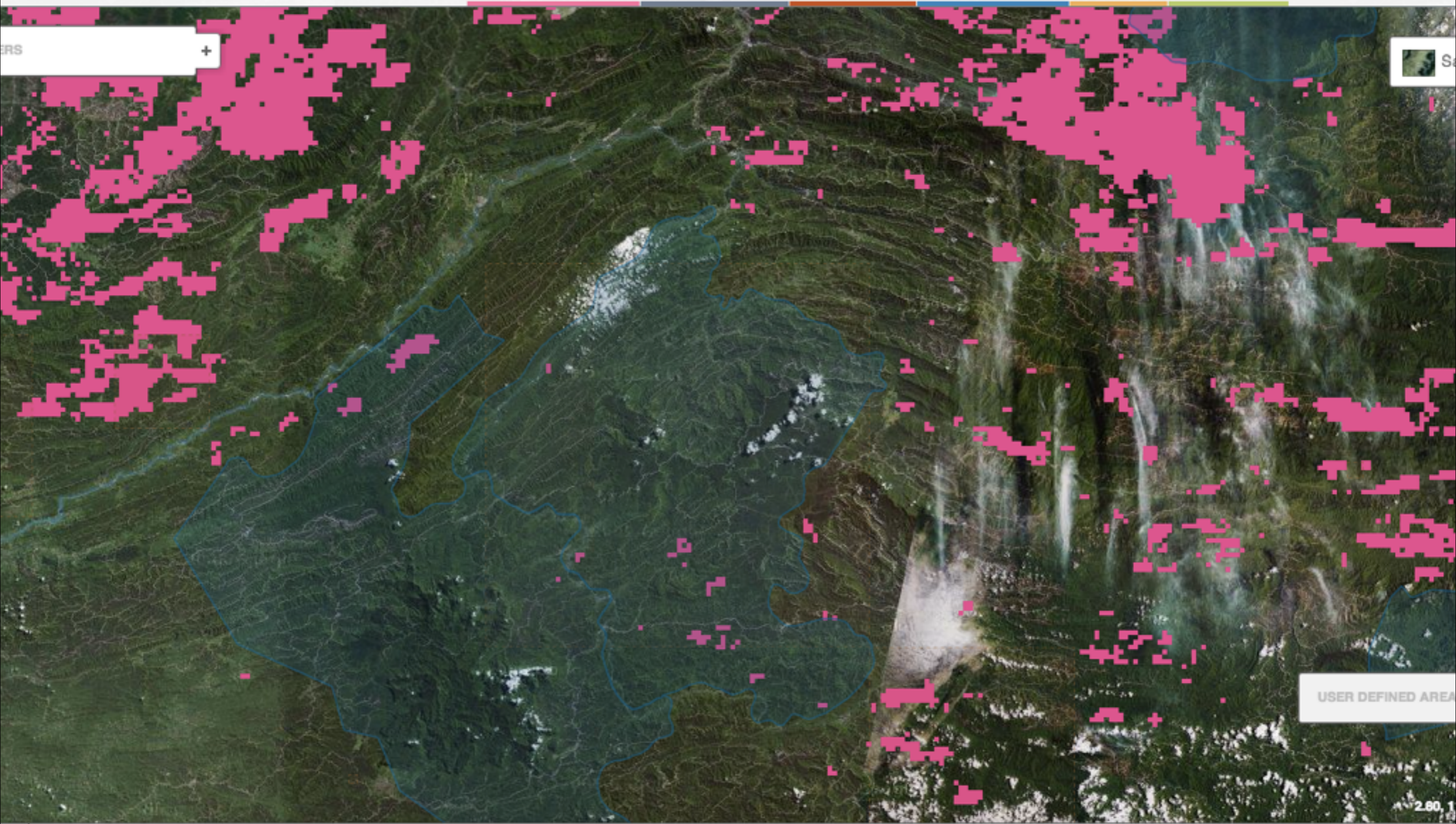
- Pan-tropical monthly alerts ⓘ

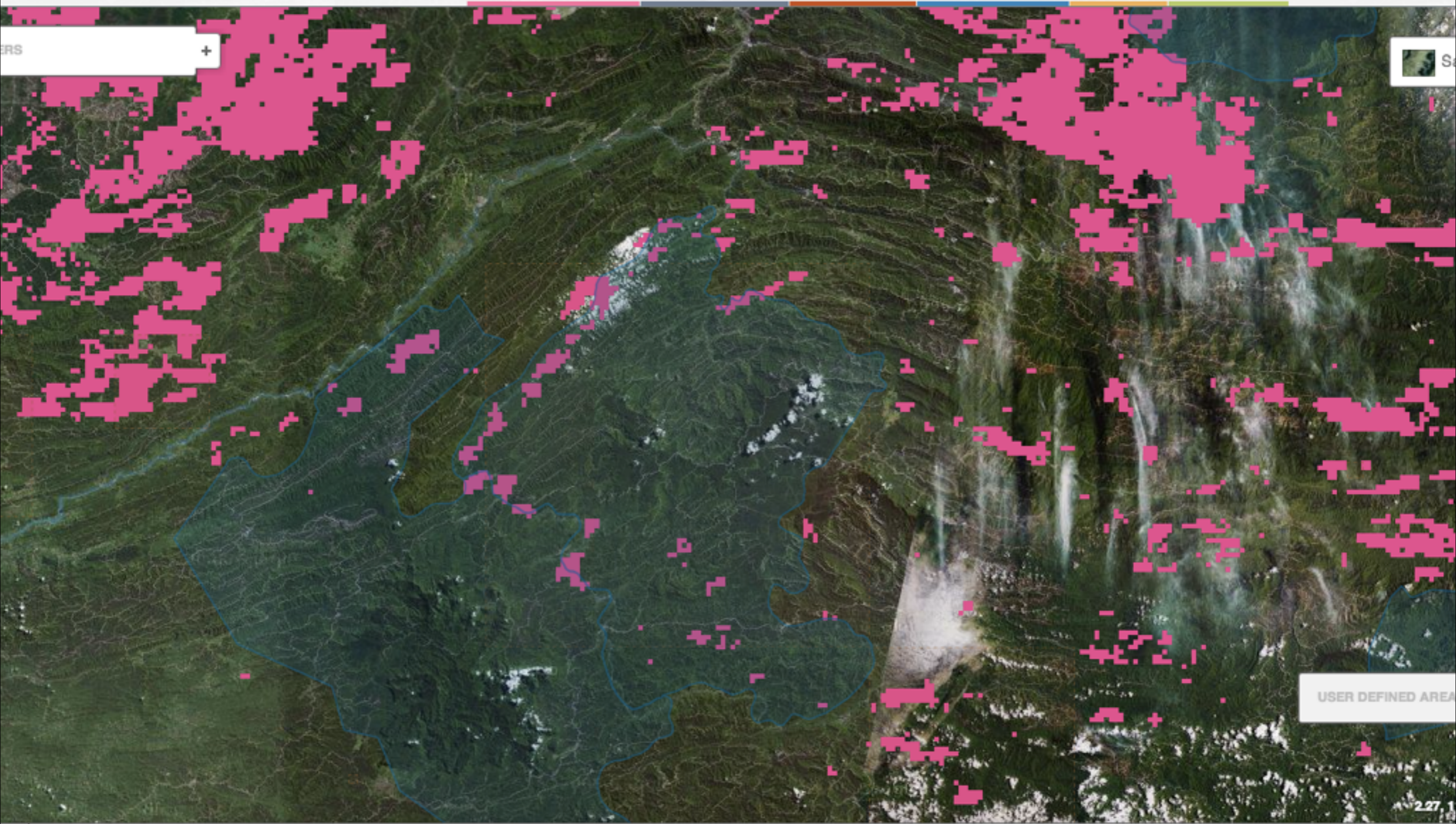


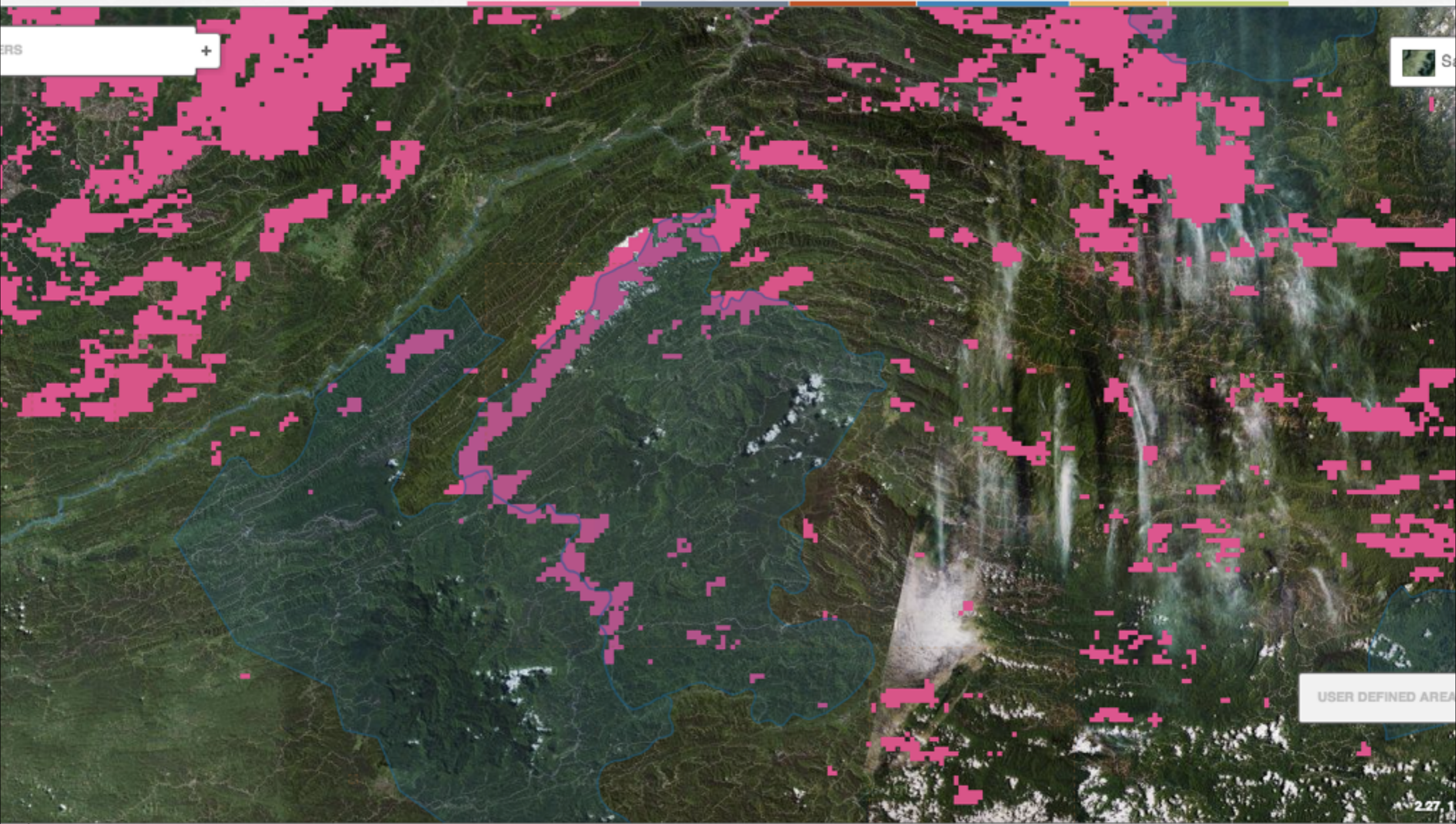


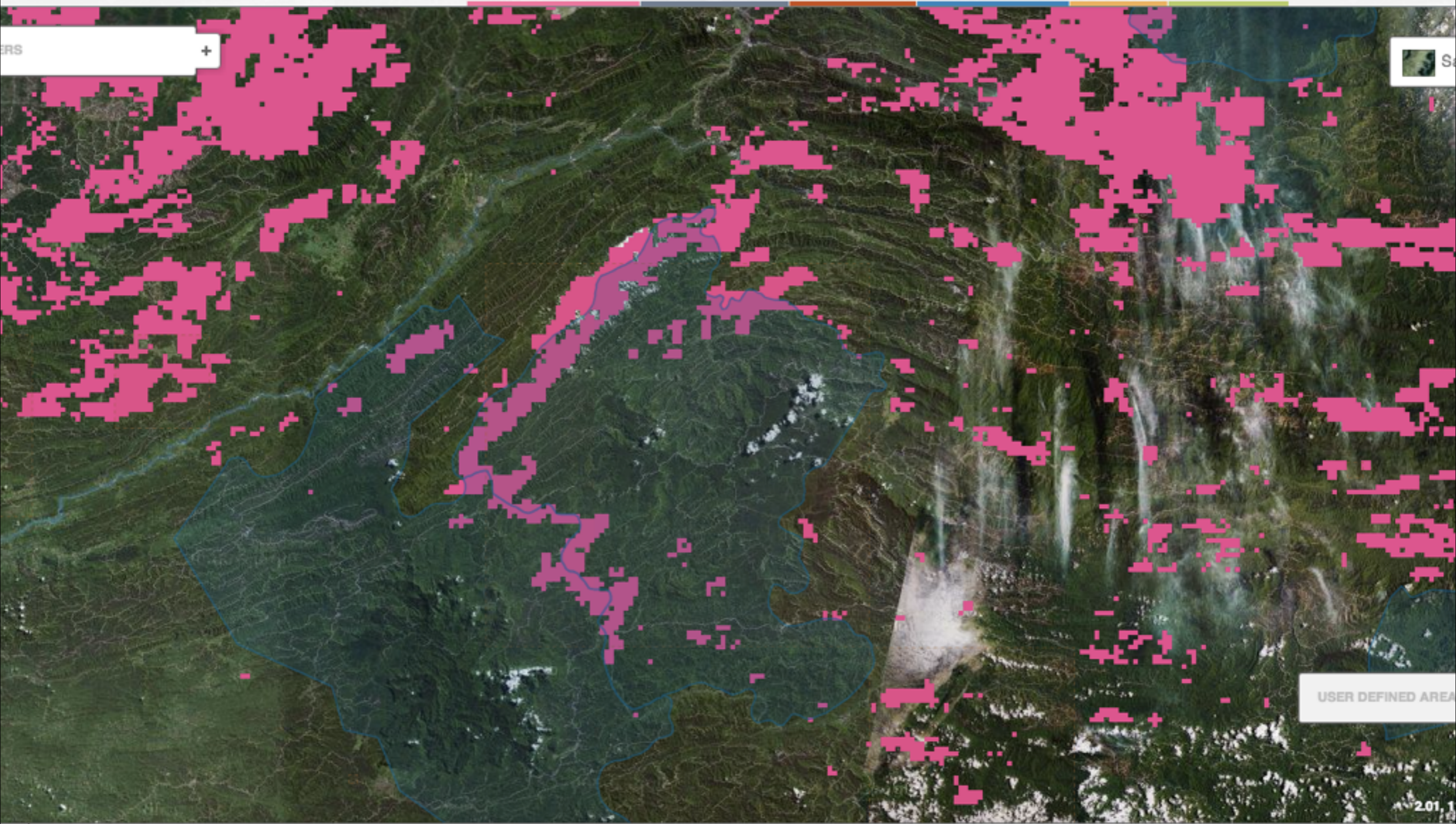
**And these are the things
we can find...**

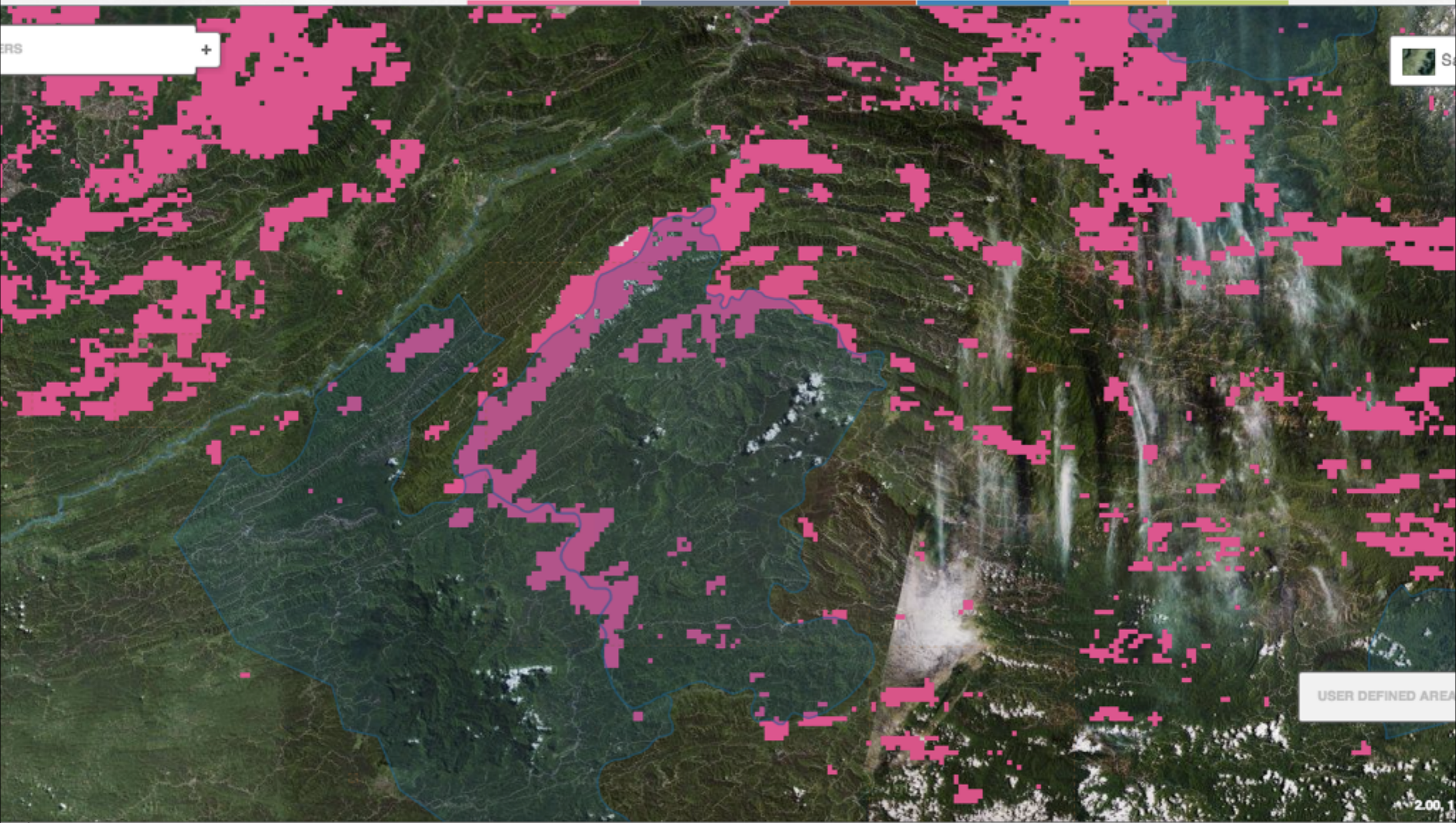
GFW

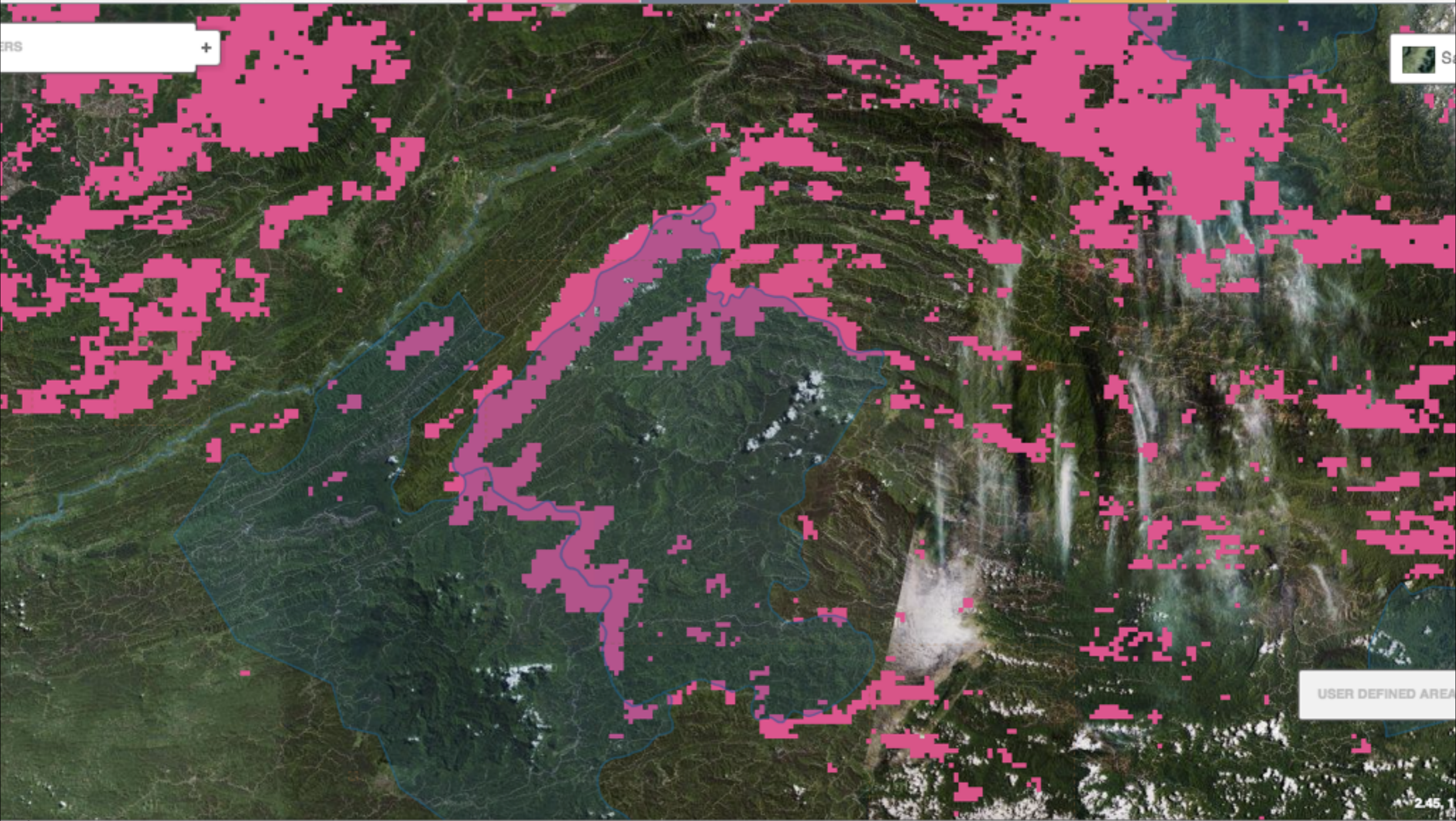


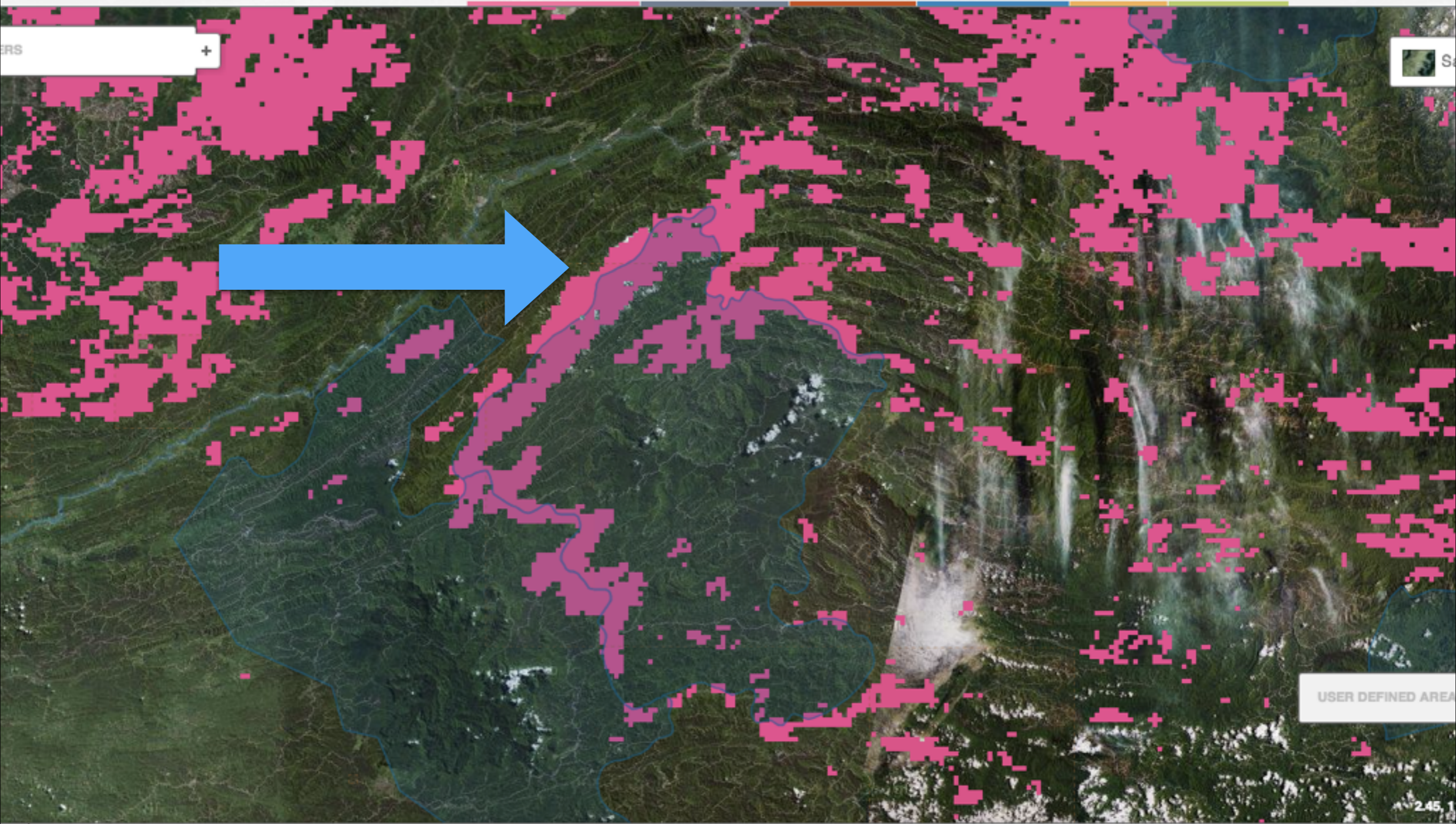


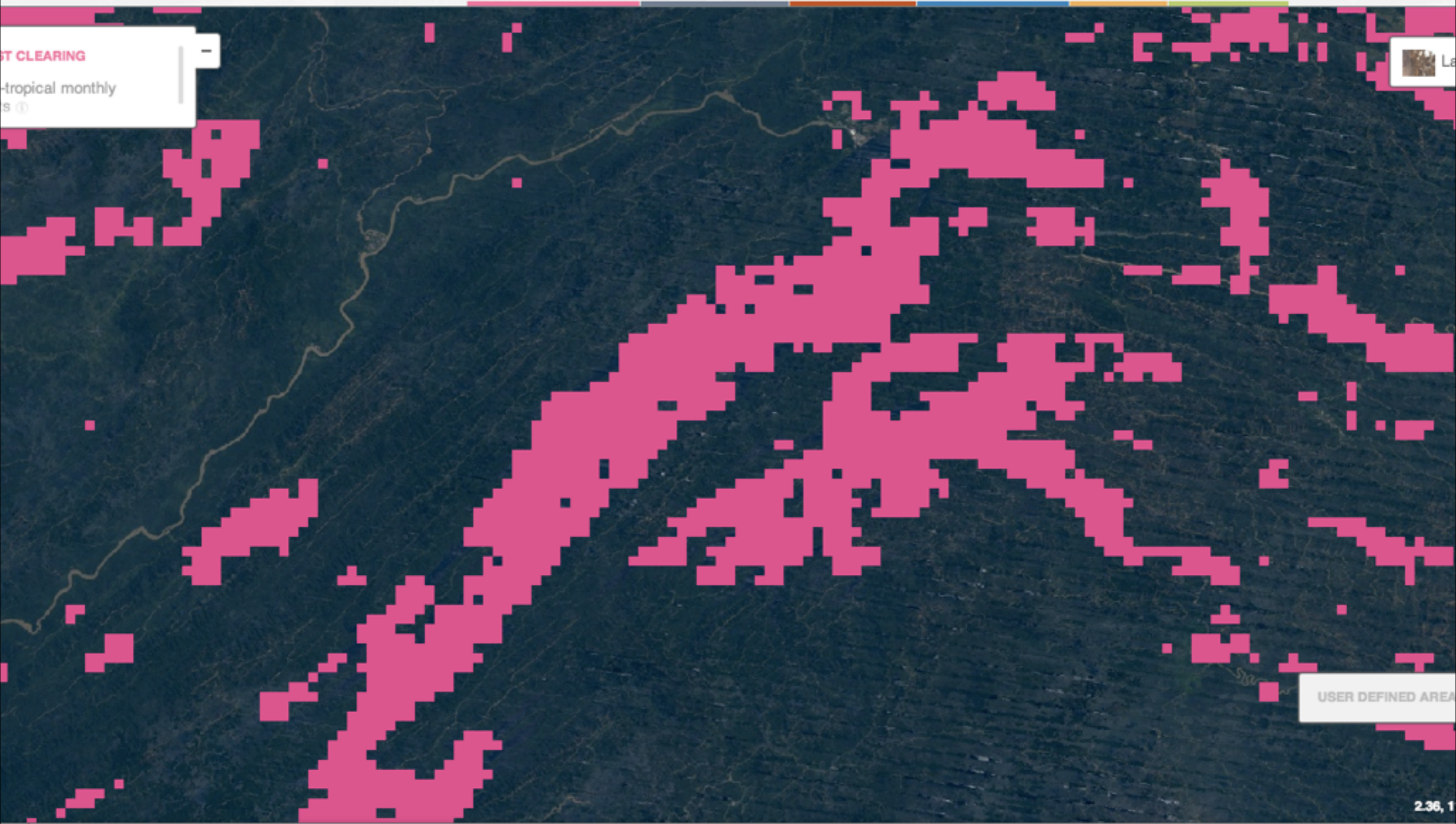




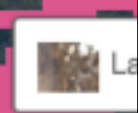








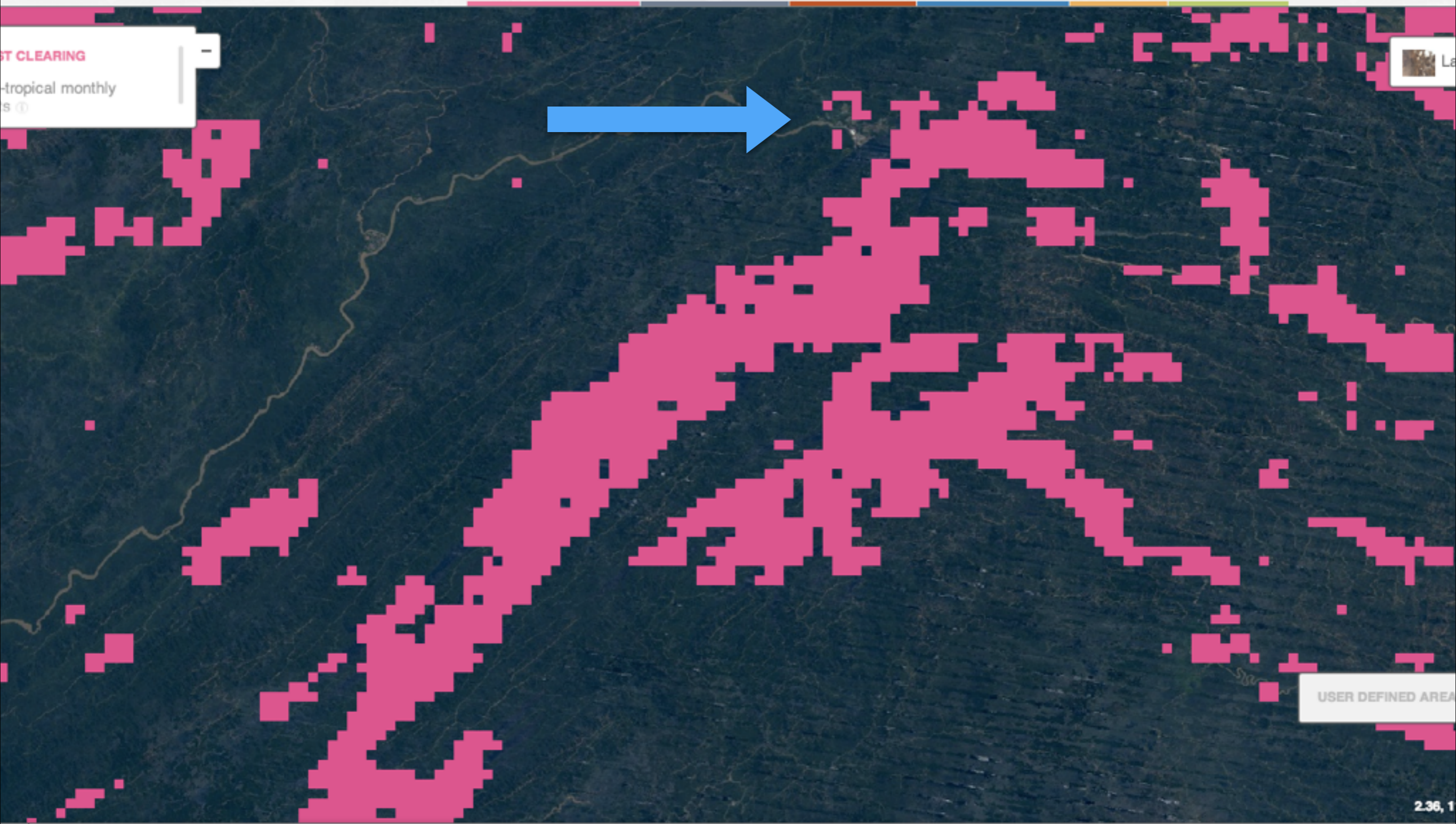
FOREST CLEARING
Tropical monthly
5/1



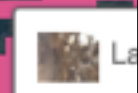
USER DEFINED AREA

2.36, 1





ST CLEARING
-tropical monthly
5.1



USER DEFINED AREA

2.36, 1



FOREST CLEARING
Tropical monthly
...



USER DEFINED AREA

2.75, 1







Andrew Hill

Senior Scientist
Vizzuality / CartoDB



Allowing people to *see* stories of deforestation

Putting time on the map



How are we doing this on the web?

GFW 2.0

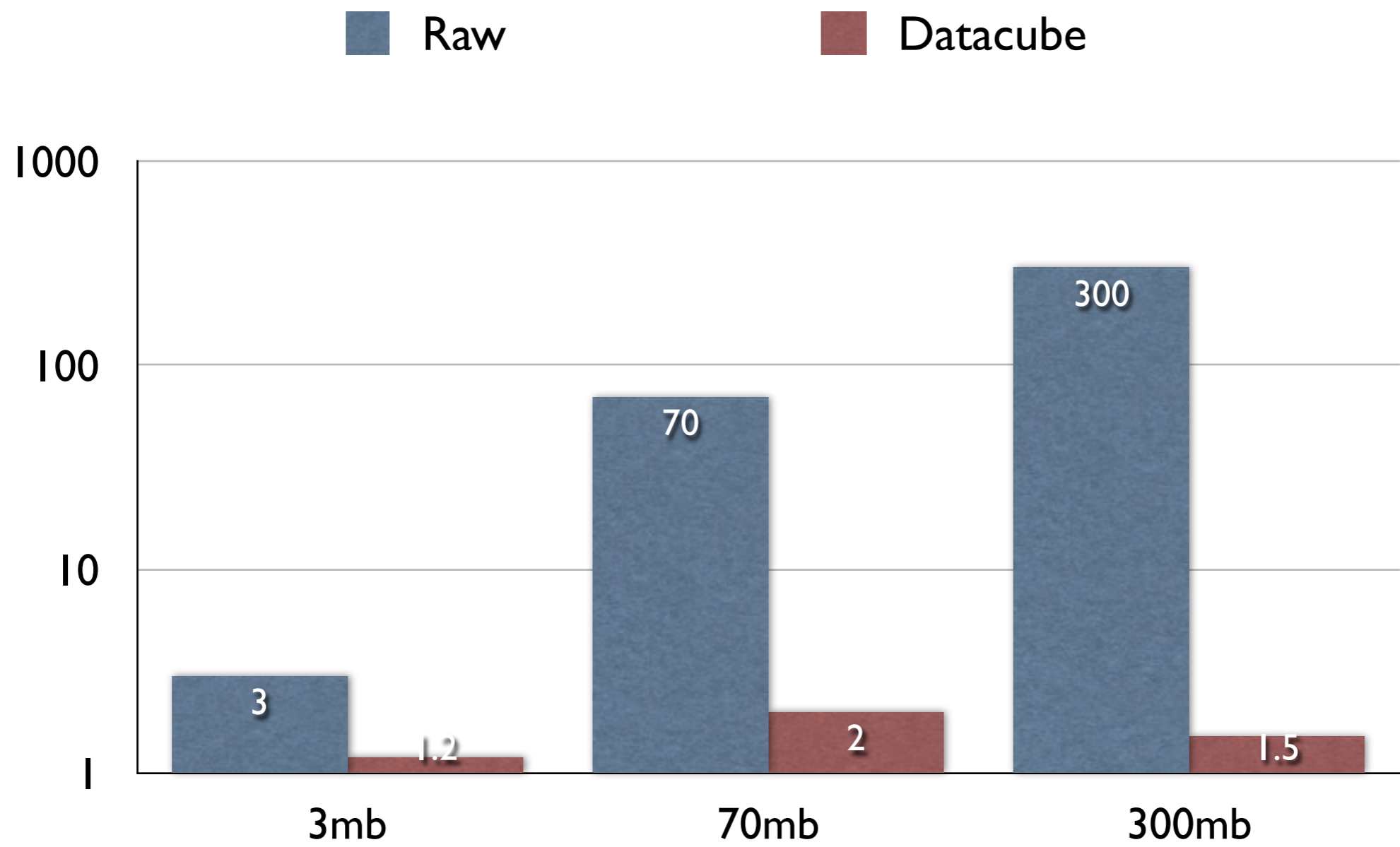



```

WITH hgrid
  AS (SELECT Cdb_rectanglegrid(Cdb_xyz_extent(8, 12, 5),
    Cdb_xyz_resolution(5) * 4,
    Cdb_xyz_resolution(5) * 4) AS cell)
SELECT x,
  y,
  Array_agg(c) vals,
  Array_agg(d) dates
FROM (SELECT St_xmax(hgrid.cell) x,
  St_ymax(hgrid.cell) y,
  Count(i.cartodb_id) c,
  Floor(( Date_part('epoch', built) - -10418716800 ) / 32837875) d
  FROM hgrid,
  us_po_offices i
  WHERE St_intersects(i.the_geom_webmercator, hgrid.cell)
  GROUP BY hgrid.cell,
  Floor(( Date_part('epoch', built) - -10418716800 ) / 32837875)
) f
GROUP BY x,
  y

```

```
{
  rows: [
    {
      x: 0,
      y: 0,
      vals: [2],
      dates: [457]
    },
    {
      x: 1,
      y: 0,
      vals: [1,1,4],
      dates: [2,3,4]
    }
  ]
}
```



Data payload



This is powerful!

GFW 2.0



Temporal visualization is powerful

GFW 2.0



Mapping is powerful

GFW 2.0



Chicago

Capital of the Midwest

☀️
10:48



LivingCities

MacBook Pro

Select a city ▾ About ⓘ

Animated city traffic maps



Mobile ready.



Challenges and solution

Big data + Dynamic data in the browser



Big data without visualization is a failure

We are trying to help fix that



Maps are one of the most popular types

High literacy, popular appeal, personal context

But making a good map. A storytelling map can be hard

gly
ap!





CARTO^{DB}

Geospatial on the cloud

ELECTION 2012

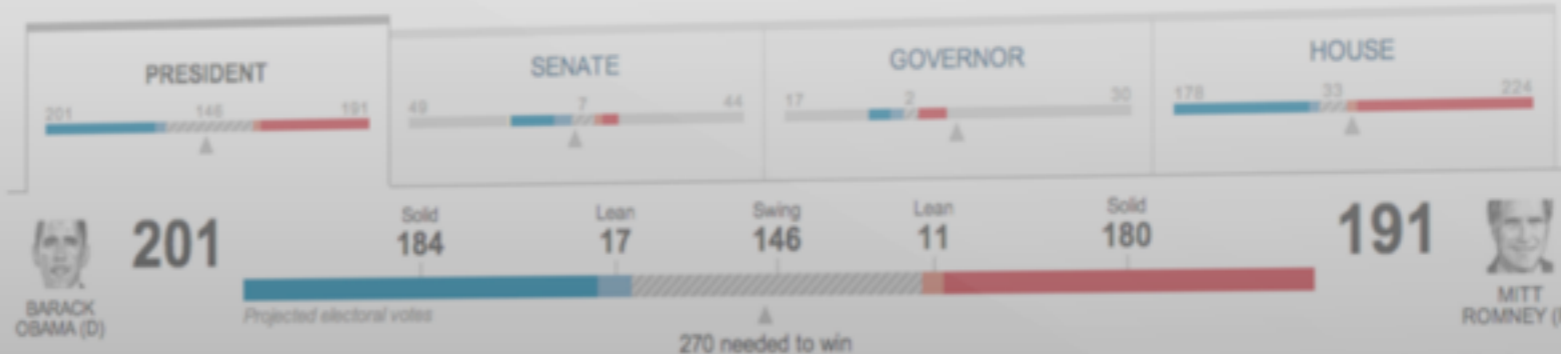
FOLLOW WSJ ELECTION COVERAGE: [f](#) [t](#)

SUBSCRIBE NOW FOR FULL ELECTION COVERAGE >

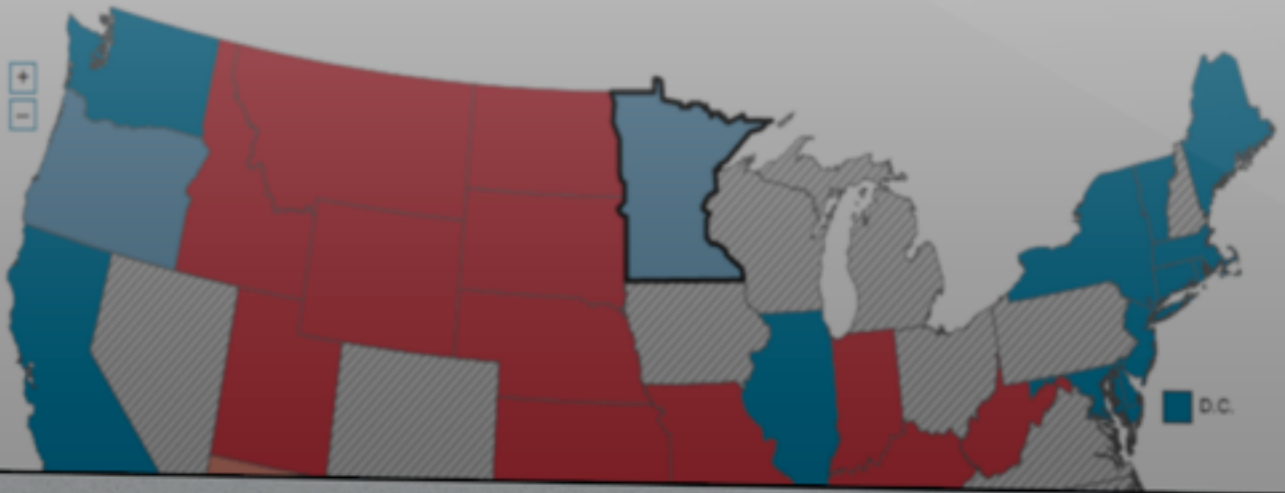
- LATEST NEWS
- WASHINGTON WIRE
- RACES
- VIDEO
- POLLS
- MAPS
- FINANCE

State of the Race

In 2012's "economy election," voters will make their choices based on their local unemployment rates, gasoline prices and other key measures of the quality of daily life. Use WSJ's interactive map to browse economic data by state and county and review state vote projections. Alternatively, draw your own map and share it on Twitter.



- Views
- Low unemployment and mortgage delinquency might push Virginia and Iowa over to Obama >
 - Evangelicals are sparse in contested states >
 - But immigrants and Hispanics are more numerous >
 - And why the senior vote is still essential >
 - Democrats could be in big trouble in New Jersey >



Your filters
Show: STATES COUNTIES

Share this view:
[f](#) Like [t](#) Tweet

MacBook Air

Wall Street Journal US election maps



ABOUT **SHARE THIS REPORT**

AOI #1
1135432 km²

+

SUMMARY

2 polygons. [Add another?](#)



CARBON ① **383,596,290 T**

Algeria	352,971,462 T
Mauritania	178,210 T
Morocco	30,446,618 T

C. SEQ. ① **84,930,779 T**

COVERED BY PAs ① **0 %**
Overlapping with 12 Protected Area(s)

COVERED BY KBAs ① **0 %**
Overlapping with 1 Key Biodiversity Area(s)

FOREST RESTORATION POTENTIAL ①

WIDE-SCALE	MOSAIC	REMOTE	NONE
0%	6%	0%	85%

Big data analysis and reporting tool – UNEP Carbon calculator



Putting time on the map

Telling stories about change



Announcing Torque!

Making maps to improve the world



Javier de la Torre

CEO

Vizzuality / CartoDB



Demo

Torque + CartoDB



Making maps to save the forest

Making maps to improve the world



Making maps to tell stories

Making maps to improve the world



You can do it too!

here are some ways



Come see me at Office Hours

Today - 2:47 pm



CARTO^{DB}

Geospatial on the cloud

Tweet 229

Like 151

Online mapping for beginners

— A FREE ONLINE SESSION ORGANIZED BY [CARTODB](#) —

Tuesday, December 3, 2013 from 4:00 PM to 5:30 PM (EST)



Take the first steps toward becoming an expert online mapper. In this session, we will show you the skills you need to start making beautiful and informative maps online. The session will be based on [CartoDB](#). **The course will be 100% free.**

Register for free



www.cartodb.com/academy

spread the word!

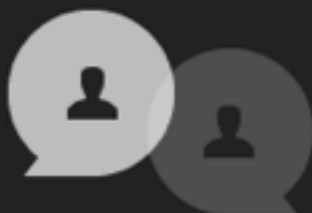
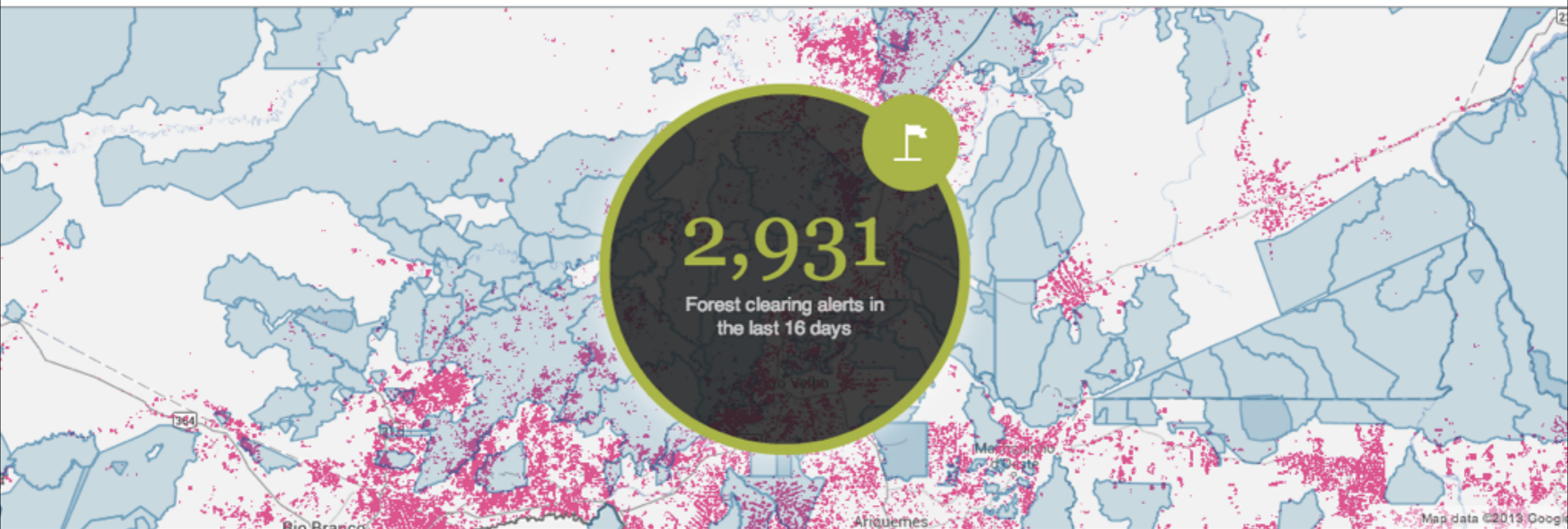
Find out what is happening
in forests right now

9,657

ALERTS IN THE PAST
YEAR

3

NEW FOREST
STORIES



Join the community

Subscribe to the Global Forest Watch discussion group to stay up to date with the latest news on forest clearing.



Analysis & alerts

Perform forest clearing analysis on the fly and get your answers in real time, or subscribe to change alerts.



Submit your story

Participate in detecting forest change. Send your story about forest clearing and we will add it to our collection



**Let us know how you are telling
stories with data**

@andrewxhill @robinkraft @jatorre



thanks!

@andrewxhill @robinkraft @jatorre