Google Earth Engine

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Earth Engine is...

A google.org project leveraging Google's strengths to affect social change.

A platform for remote sensing data mining.

Shaping up as 3 tools:
A data catalog / publishing platform
A global scale operations center
Rapid prototyping system for scientists

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A Data Catalog

Landsat
- 900,000 Landsat 5 & 7 scenes

MODIS
- 8 & 1-day composites, working towards individual scenes

DEM: SRTM & NED
Atmosphere: NCEP, TOMS, ...

Sample Hyperion & ALI
Sample PALSAR
Sample Vector data
Sample commercial data (SPOT, Rapid-Eye, DG)

Your dataset here

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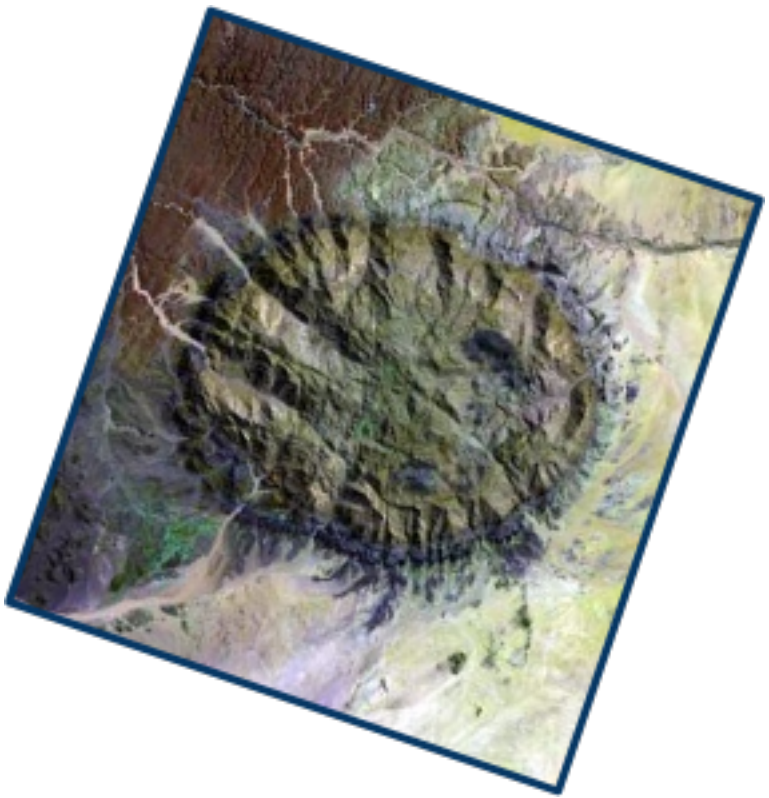
What can it do?

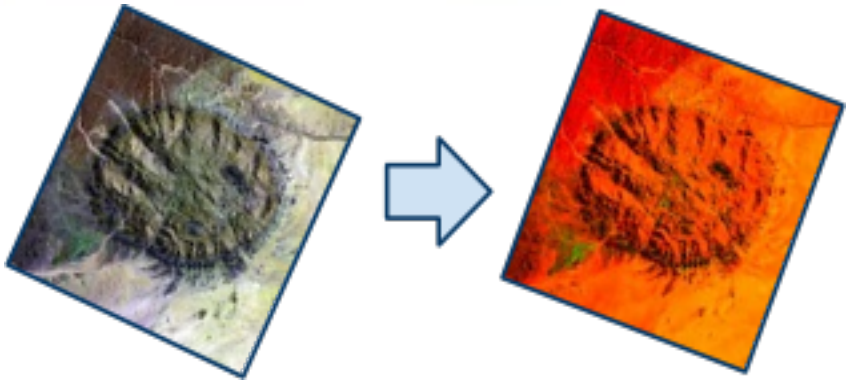
Get an Image



Pick your: projection, resolution, bands, bounding-box, visualization
Access as: Web map, KML, GeoTIFF, WMS, ESRI plug-in

What can it do?

Get an Image



Apply an algorithm to an image

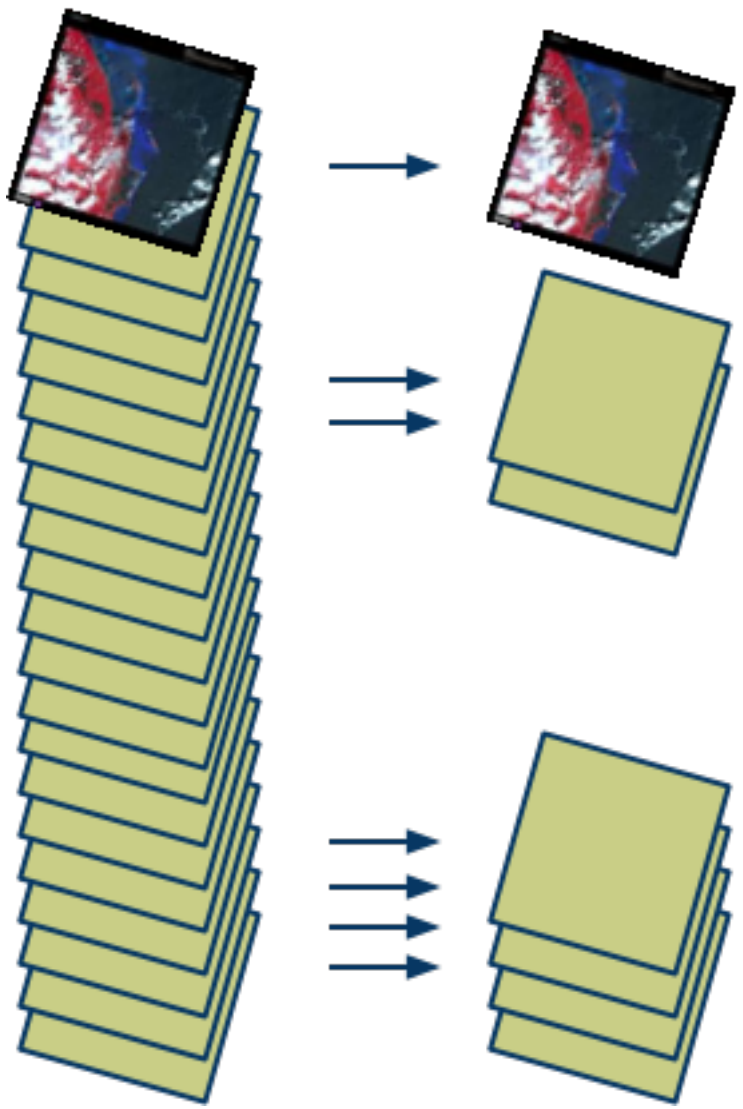
Library functions or script your own.

What can it do?

Get an Image

Apply an algorithm to an image

Filter a collection



Time, Space & Metadata search

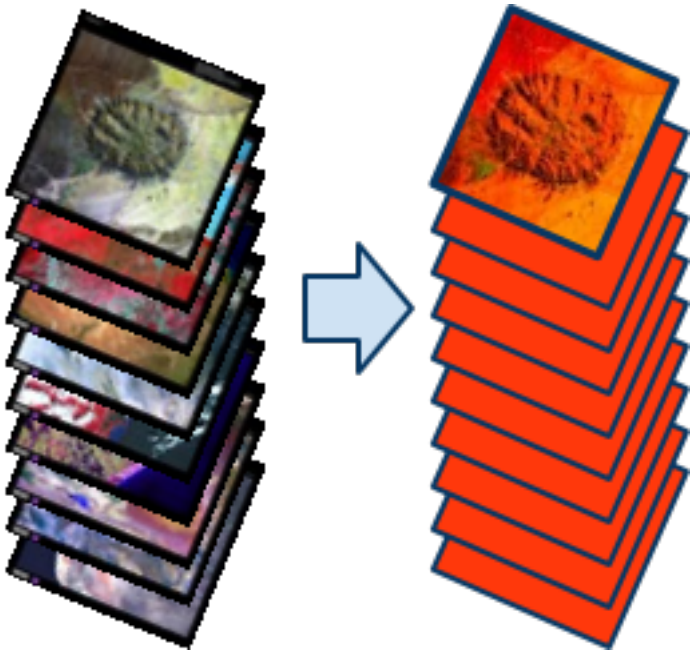
What can it do?

Get an Image

Apply an algorithm to an image

Filter a collection

Map an algorithm over a collection



$N \rightarrow N$

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What can it do?

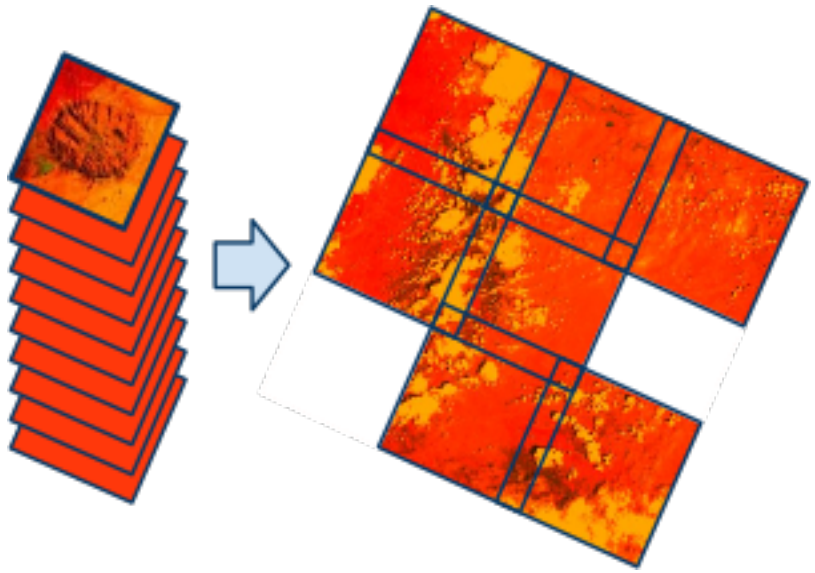
Get an Image

Apply an algorithm to an image

Filter a collection

Map an algorithm over a collection

Reduce a collection



N → 1 or N → M

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What can it do?

Get an Image

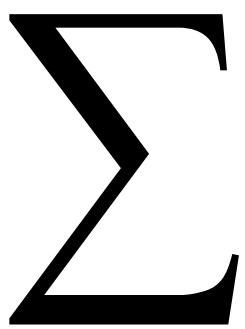
Apply an algorithm to an image

Filter a collection

Map an algorithm over a collection

Reduce a collection

Compute an aggregate



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Example

Make a collection
    L7 L1T, 2007Q1, SoCal.

Surface reflectance
Clearest pixel mosaic
BAI

Difference
Threshold
Segment
Affected Area

Example

Caution: Not for navigational purposes

Make a collection
L7 L1T, 2007Q1, SoCal.

```
L7 = GetAsset("USGS/L7_L1T")
L7.filterByRegion("[[-116, 31], [-118, 33]]")
L7.filterByTime("2007/01/01", "2007/03/30")
```

Surface reflectance
Clearest pixel mosaic
BAI

```
refl = map(SurfaceReflectance, L7)
mos = reduce(ClearestPixel, refl)
bai1 = apply(BurnAreaIndex, mos)
```

Difference
Threshold
Segment
Affected Area

```
diff = apply(Difference, bai1, bai2)
thres = apply(Threshold, diff, 0.5, 0.7)
segments = apply(Segment, thres, 2)
area = aggregate(Area, segments)
```

Sample Algorithms

- TOA, Surface Reflectance
- Mosaicing
- Band math
- Classification
  - Spectral unmixing
  - Classification and regression trees
- Segmentation
- Aggregate statistics

- Spectral Analysis
- Template matching
- Texture analysis

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How do you use it?

Data Catalog Portal (earthengine.googlelabs.com)

Web API

- Scripting language (Javascript)
- Java API

Components

Standalone client

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Demo

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Goals

Improve access and use of data and algorithms

- Make these readily available, easier to use, easier to develop

Enhance transparency and reproducibility of results

- Promote open science, public trust in outcomes

Provide Speed and Scale

- Make planet-sized operations easy

Data Liberation

- It's your data, use it any way you want

Non-Goals

- Doing global monitoring ourselves
- Scientific algorithm research

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CLASlite Forest Monitoring

CLASlite | Website | Code | About | More
gorelick@google.com | My account | Help | Sign out

Project | Location | Forest Cover | Forest Change | Help

Carnegie Institution for Science

Powered by Google Earth Engine

Map | Statistics

Years: 2005 – 2006 View

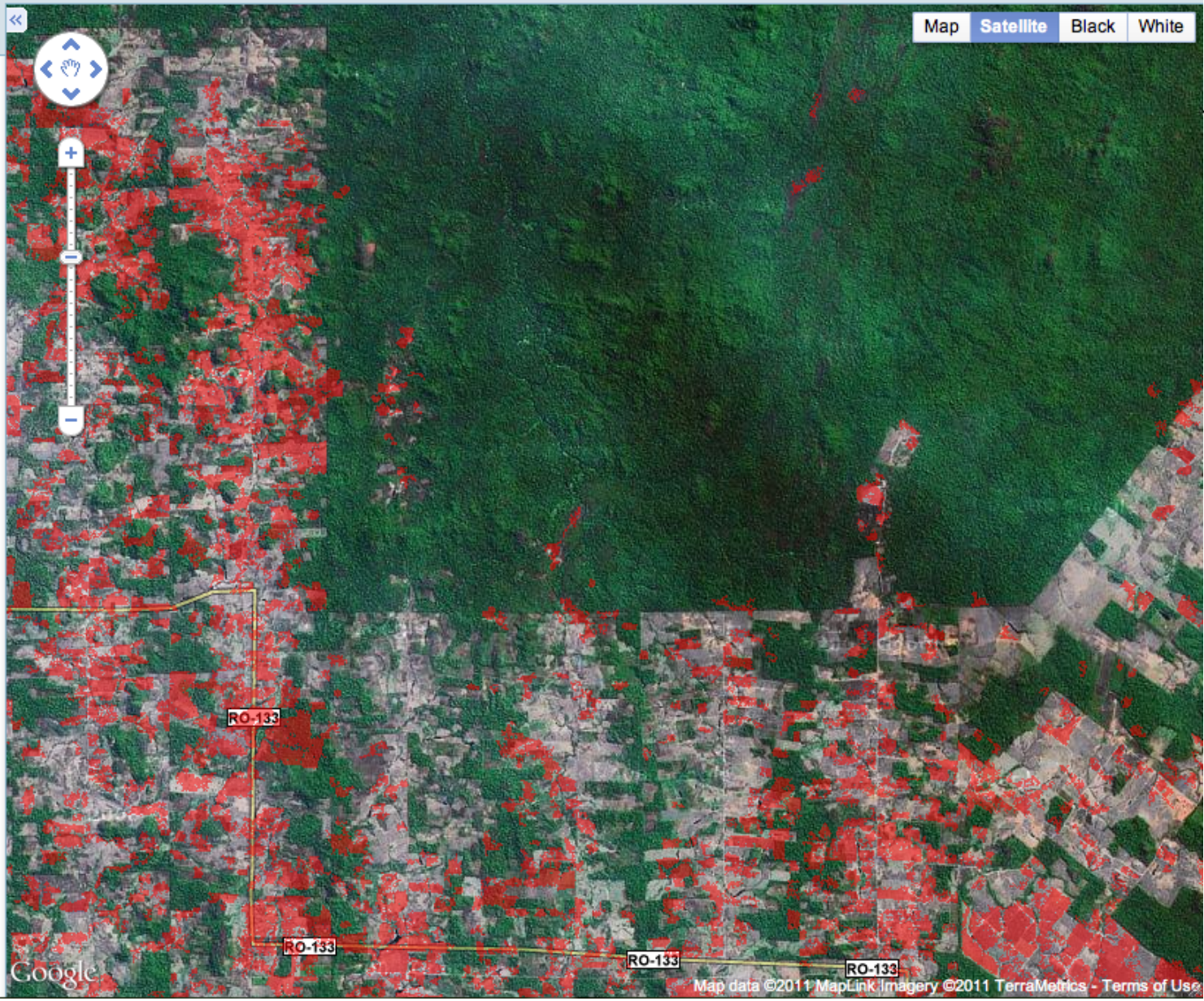
Source: Landsat 5 TM

Layers:

- Deforestation
  - Opacity 50
  - Set Colors
- Forest Disturbance
  - Opacity 50
  - Set Colors
- Both

Advanced

About



IMAZON
INSTITUTO DO HOMEM E MEIO AMBIENTE DA AMAZÔNIA

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1. Select reference map

Reference map: PRODES 2009

2. Select date range for temporal mosaic

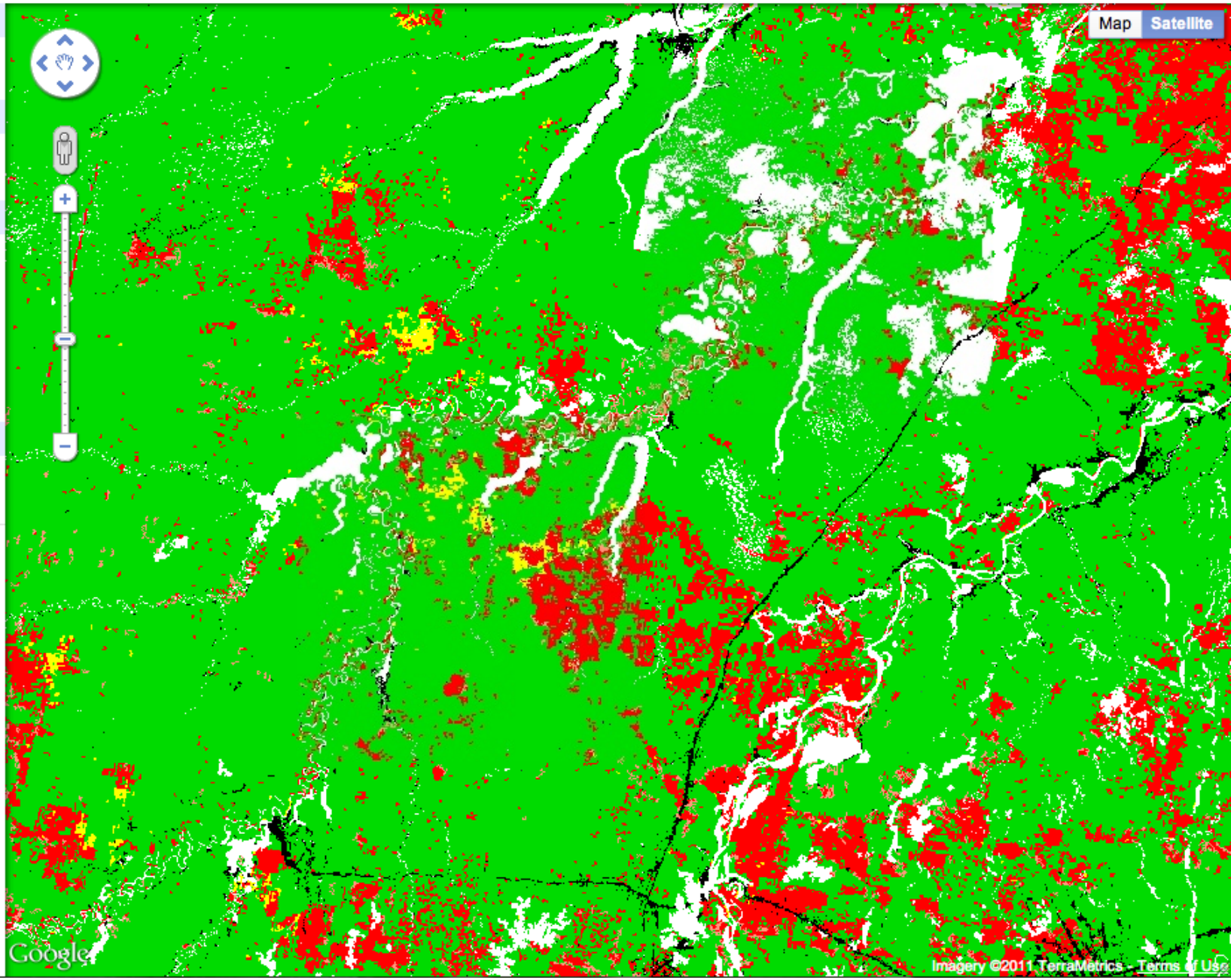
Date range: 12/1/2009 to 1/1/2010

3. View output

- NDFI t0
- NDFI t1
- NDFI Change
- SMA
- RGB
- Change Detection

4. Select region

Search



I want some!

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