



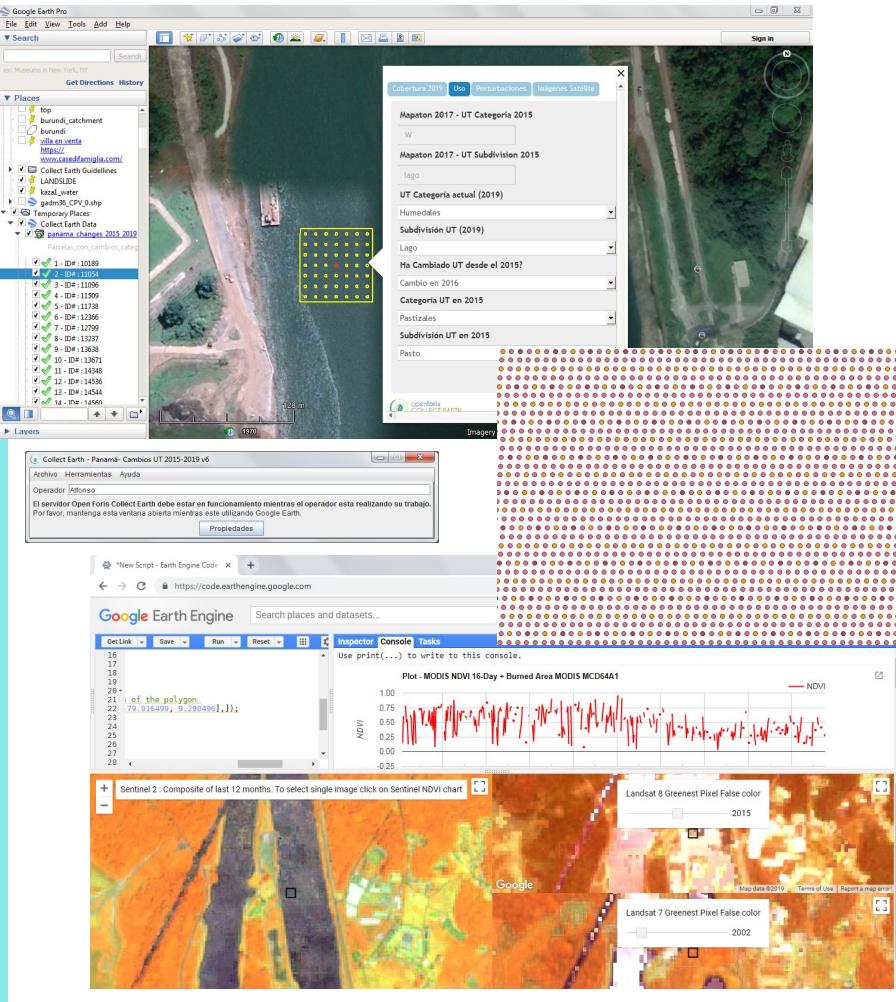
Earth Map

A tool for quick historical environmental and climate analysis
Geo for Good 2019

Alfonso Sanchez-Paus Diaz, Daniel Dionisio
Thursday September 20, 9:45-10:45am (G4G19 Breakout Session #11)

About us

- FAO : Food and Agriculture Organization of the United Nations, our mission :
 - Help eliminate hunger, food insecurity and malnutrition
 - Make agriculture, forestry and fisheries more productive and sustainable
 - Reduce rural poverty
 - Enable inclusive and efficient agricultural and food systems
 - Increase the resilience of livelihoods to threats and crises
- Alfonso Sanchez-Paus Diaz – Collect Earth Product Manager, Earth Map GEE side of things, Land Monitoring Specialist
- Daniel Dionisio – Earth Map UI development, React developer



Collect Earth

Augmented Visual Interpretation

- Google Earth as an interface
- Linked to Google Earth Engine, Bing Maps, others

Free and Open Source

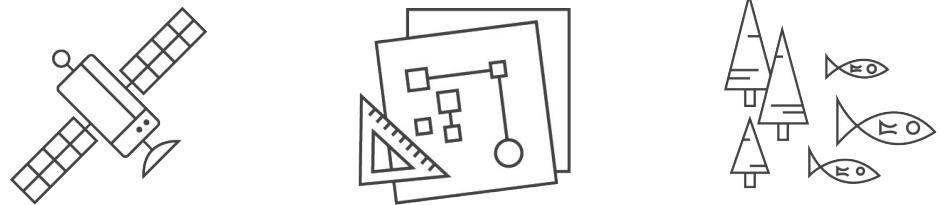
Sampling approach (no wall-to-wall)

Used for data collection :

- LULUCF data for FREL and GHGi
- First phase of NFI
- Agricultural statistics
- Map accuracy assessment
- Archeological sites monitoring!



Google and FAO



FAO and Google sign, in 2015, a MoU on monitoring of natural resources

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Training everywhere



#GeoForGood19

Really everywhere!



Google Earth Engine

A planetary-scale platform for Earth science data & analysis

Elevation And Temperature - Earth Engine

https://code.earthengine.google.com

Google Earth Engine

Search places and datasets...

Help danielmdionisio

Scripts Docs Assets NEW

Owner (1)

Writer (3)

Reader (3)

Examples

- Image
- Image Collection
- Feature Collection

Charts

- Elevation Histogram
- Elevation Profile
- Image Spectra
- Image Time Series
- Image Time Series By Region
- Seasonal Temperatures
- Table Of Temperatures
- Doy Series
- Column Histogram
- Elevation And Temperature

Arrays

Primitive

Cloud Masking

Code Editor

User Interface

Get Link Save Run Reset

Elevation And Temperature

```
1 // Plot elevation and seasonal temperatures along SF-Reno transect.
2
3 var reno = [-119.821944, 39.527222];
4 var sf = [-122.416667, 37.783333];
5 var transect = ee.Geometry.LineString([reno, sf]);
6
7 // Get brightness temperature data for 1 year.
8 var landsat8Toa = ee.ImageCollection('LANDSAT/LC08/C01/T1_TOA');
9 var temperature = landsat8Toa.filterBounds(transect)
10 .select(['B10'], ['temp'])
11 .map(function(image) {
12   // Kelvin to Celsius.
13   return image.subtract(273.15)
14   .set('system:time_start', image.get('system:time_start'));
15 });
16
17 // Calculate bands for seasonal temperatures and elevations; composite into
18 // a single image.
19 var summer = temperature.filterDate('2014-06-21', '2014-09-23')
20 .reduce(ee.Reducer.mean())
21 .select([0], ['summer']);
22 var winter = temperature.filterDate('2013-12-21', '2014-03-20')
23 .reduce(ee.Reducer.mean())
24 .select([0], ['winter']);
25 var elevation = ee.Image('USGS/NED'); // Extract the elevation profile.
26 var startingPoint = ee.FeatureCollection(ee.Geometry.Point(sf));
27 var distance = startingPoint.distance(500000);
28 var image = distance.addBands(elevation).addBands(winter).addBands(summer);
29
30 // Extract band values along the transect line.
31 var array = image.reduceRegion(ee.Reducer.toList(), transect, 1000)
```

Inspector Console Tasks

Use print(...) to write to this console.

Elevation and temperatures along SF-to-Reno transect

Average seasonal temperature (Celsius)

Elevation (meters)

Distance from SF (m)

Layers Map Satellite

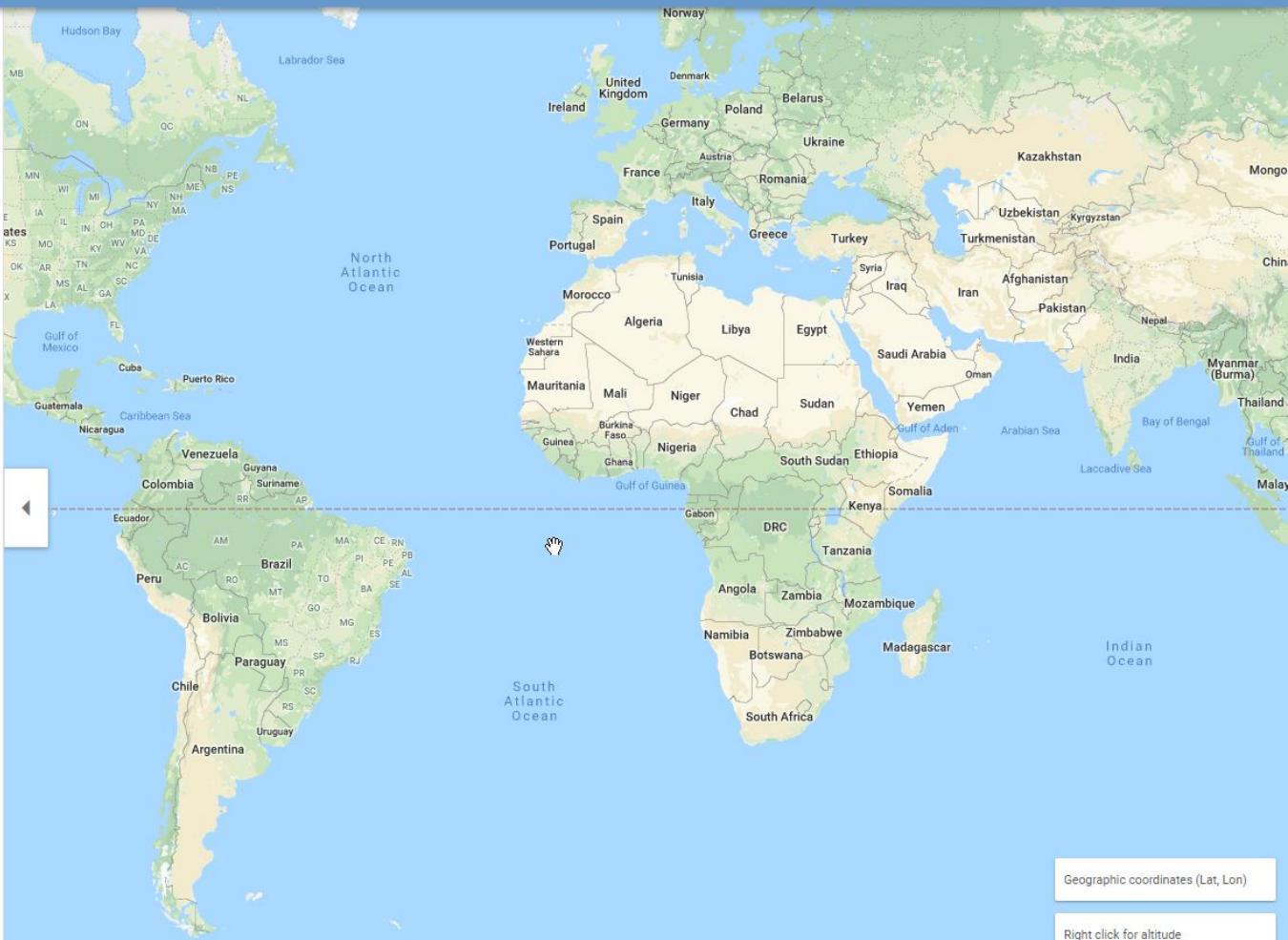
Map data ©2019 Google, INEGI | 50 km | Terms of Use

Select an area of interest

Select an area of interest

Boundaries

Select a boundary



Geographic coordinates (Lat, Lon)

Right click for altitude



Select an area of interest

Angola



Boundaries

Districts

Climate

Vegetation

Land Degradation Neutrality

Water

Satellite images

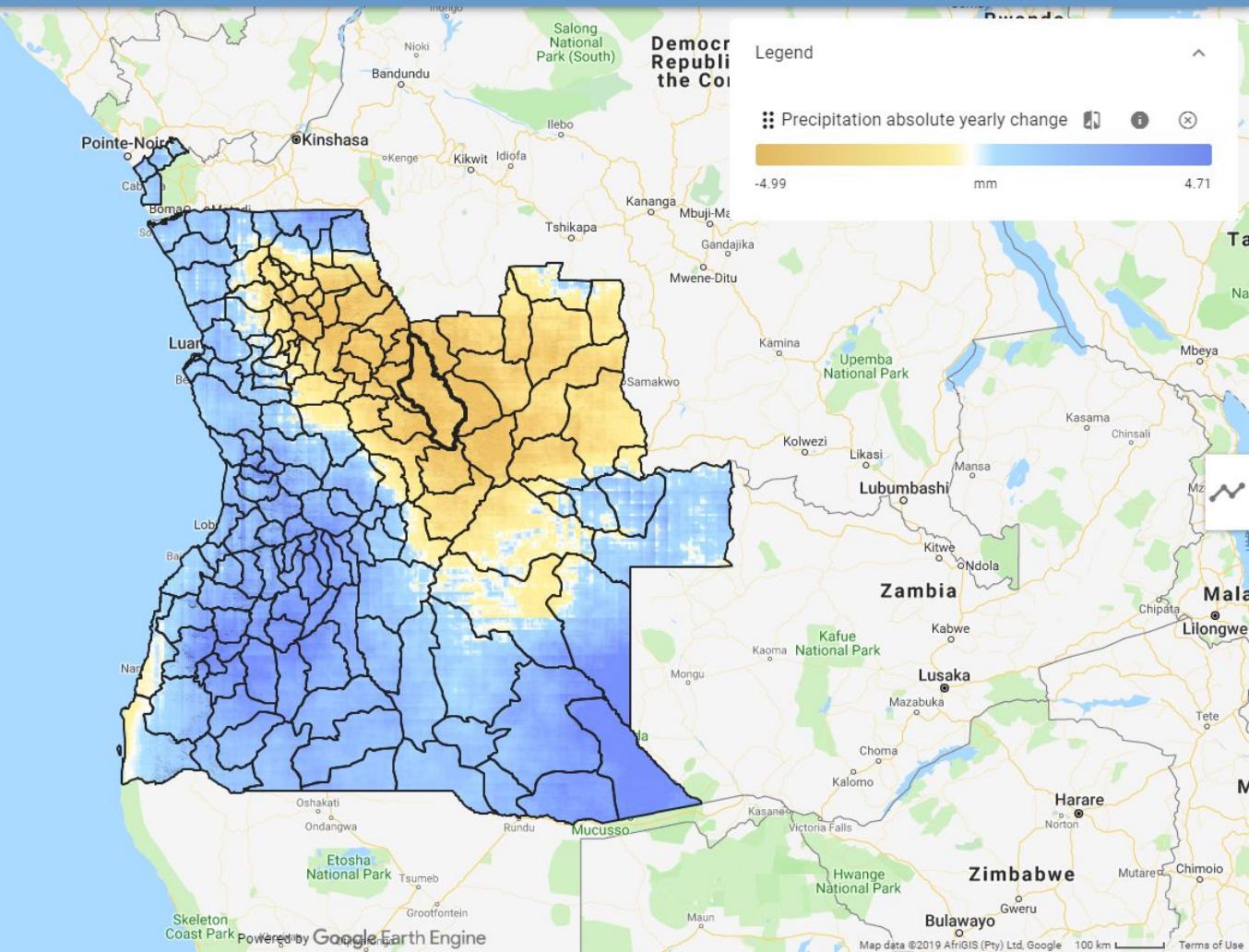
Land maps

Geosocial

Forestry

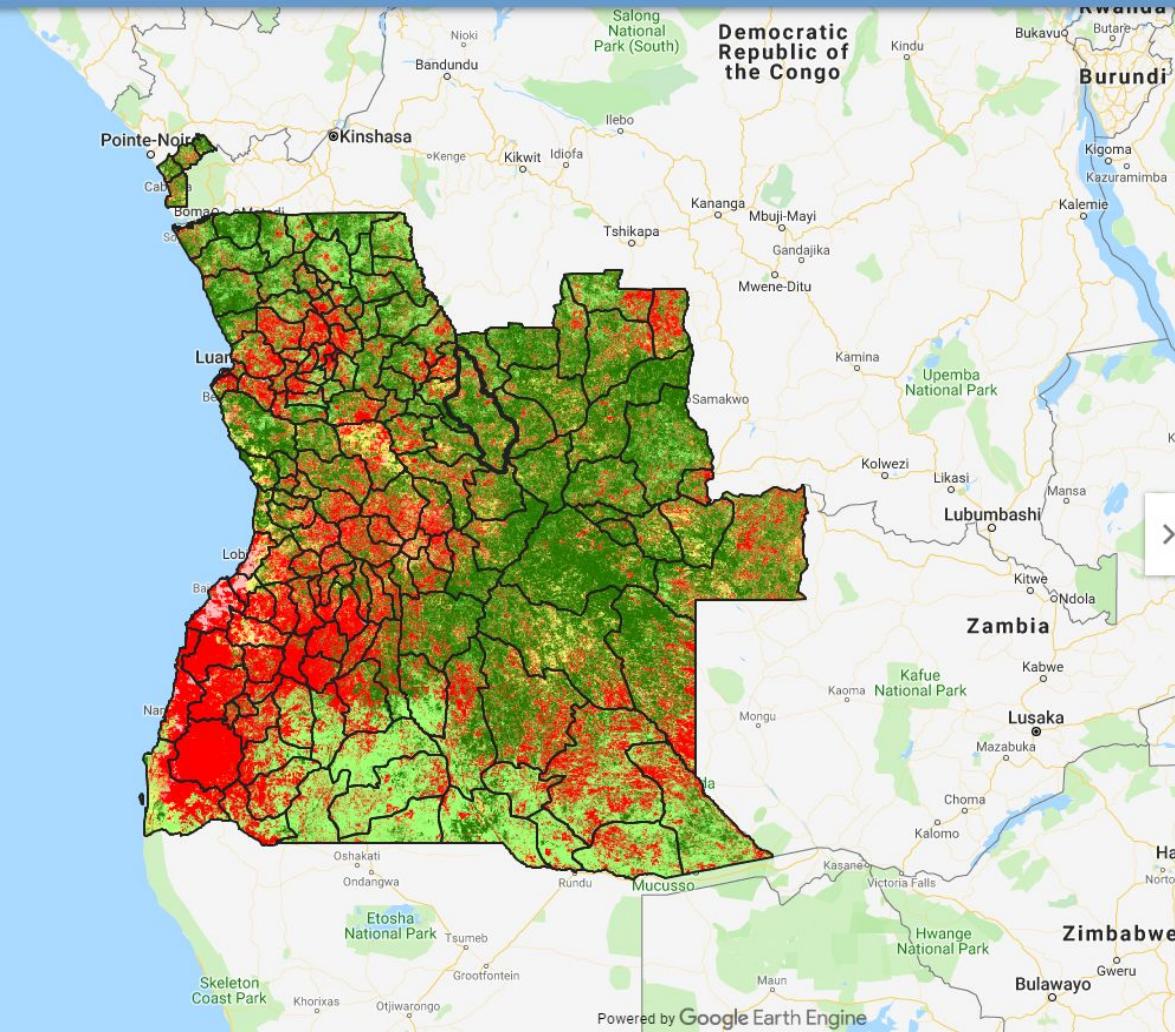
Fire

Geophysical



Map

Satellite



Xa-muteba

Metrics

Burned Area per year

Temporal aggregation

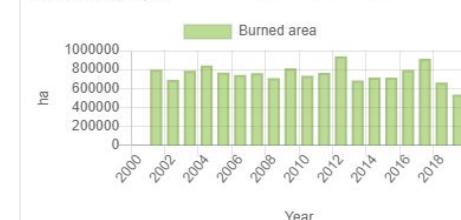
Annual

2000 - 2019

PROCESS

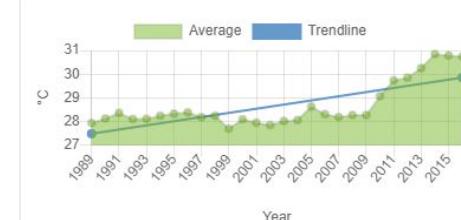
Xa-muteba

Burned Area per year



Xa-muteba

Max Temperature



Map Satellite



Legend

- GlobCover 2009
- Mosaic Grassland (50-70%) / Forest/S...
- Closed to open (>15%) shrubland (<5m)
- Closed to open (>15%) grassland
- Sparse (>15%) vegetation (woody vege...
- Closed (>40%) broadleaved forest regu...

Layers



Climate



Vegetation



Fires



Forestry



Water

Land
DegradationSatellite
images

Geophysical



Geosocial



Land maps

Statistics



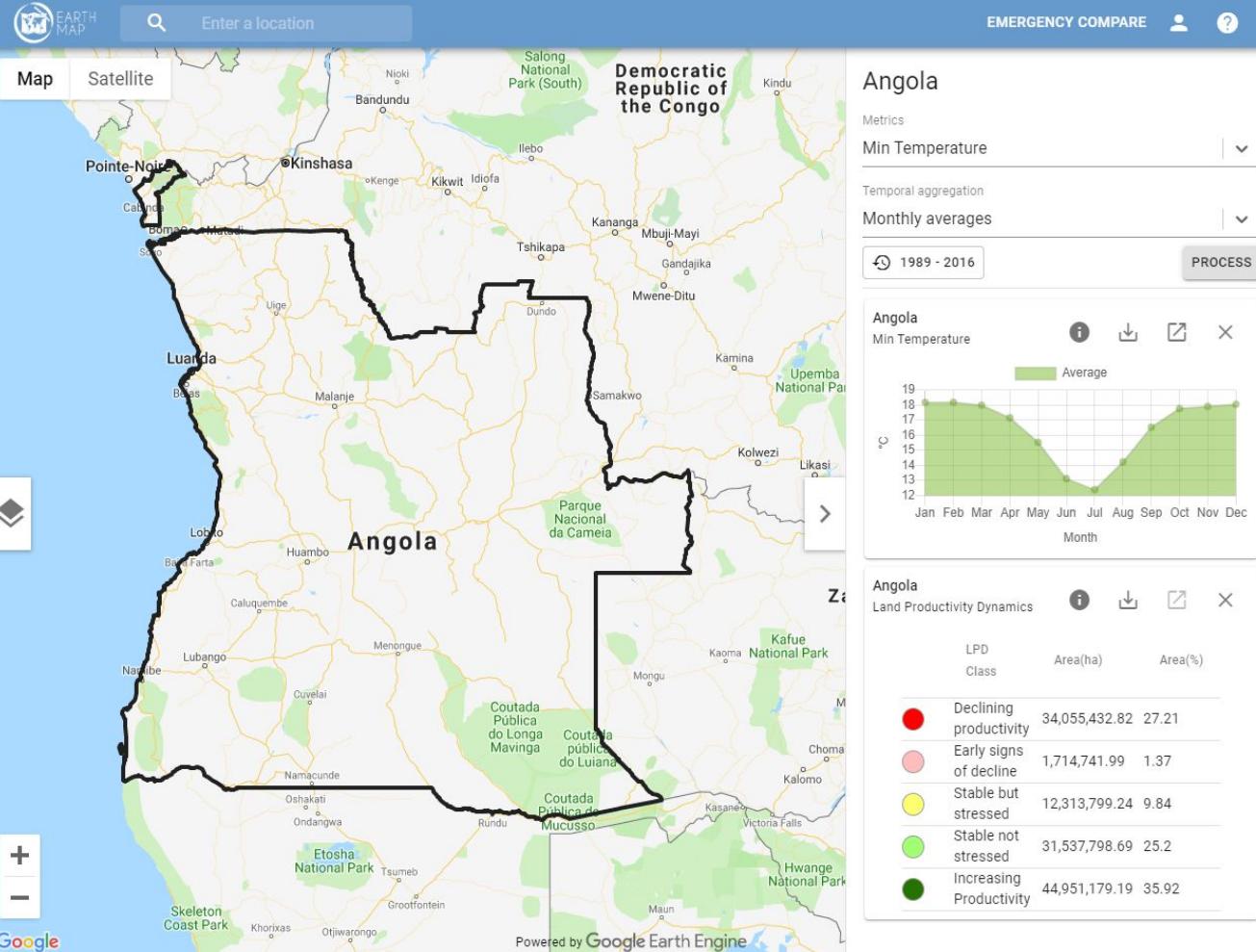
Statistical data runs on Google Earth Engine



Statistical data is exportable



Yearly and Monthly data aggregations



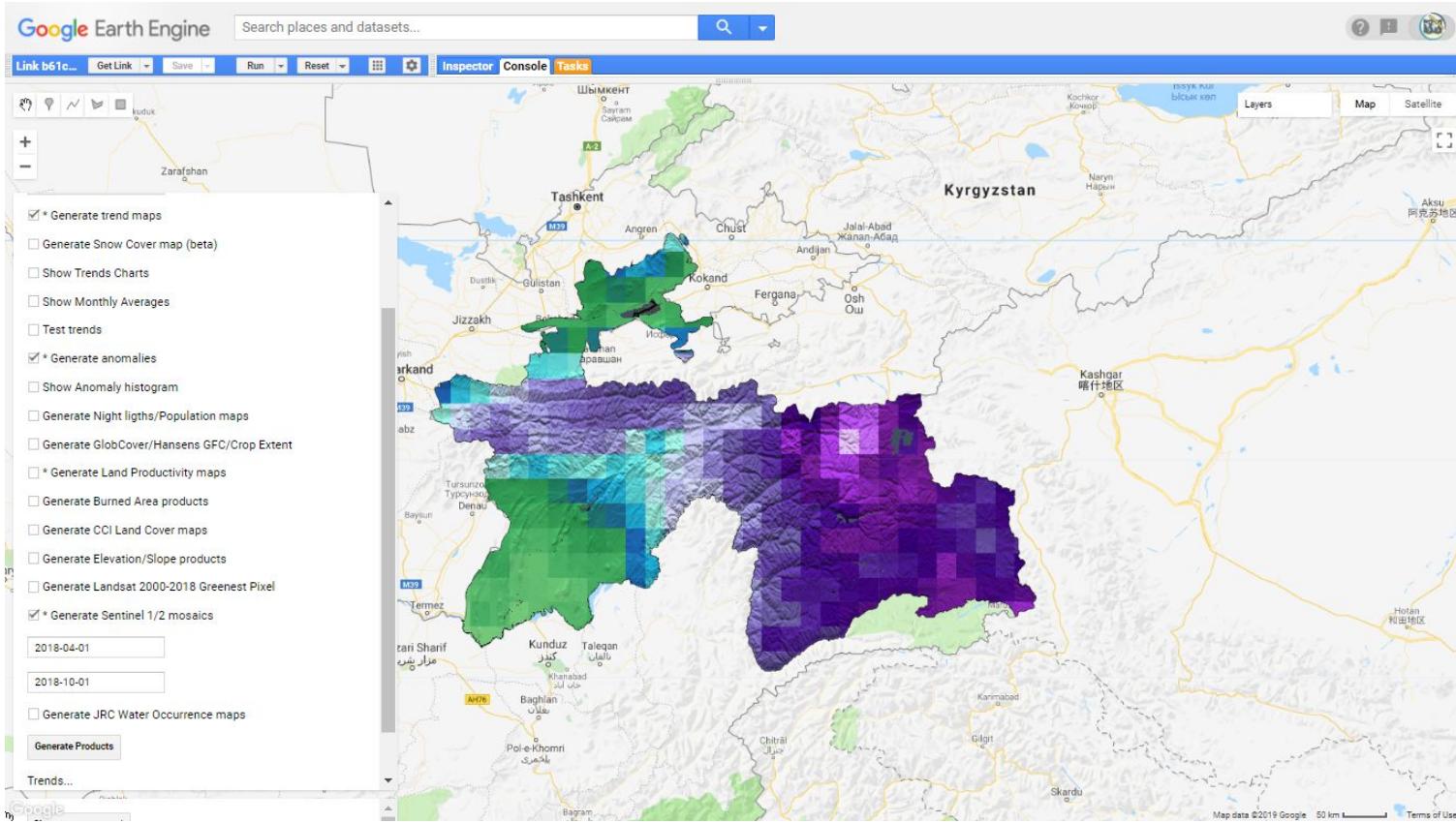
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Google Earth Engine

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Assets in GEE – precooked or global



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www.earthmap.org

The global tree restoration potential

Jean-Francois Bastin^{1,*}, Yelena Finegold², Claude Garcia^{3,4}, Danilo Mollicone², Marcelo Rezende², Devin Routh¹, Constantin...

* See all authors and affiliations

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DOI: 10.1126/science.aax0848

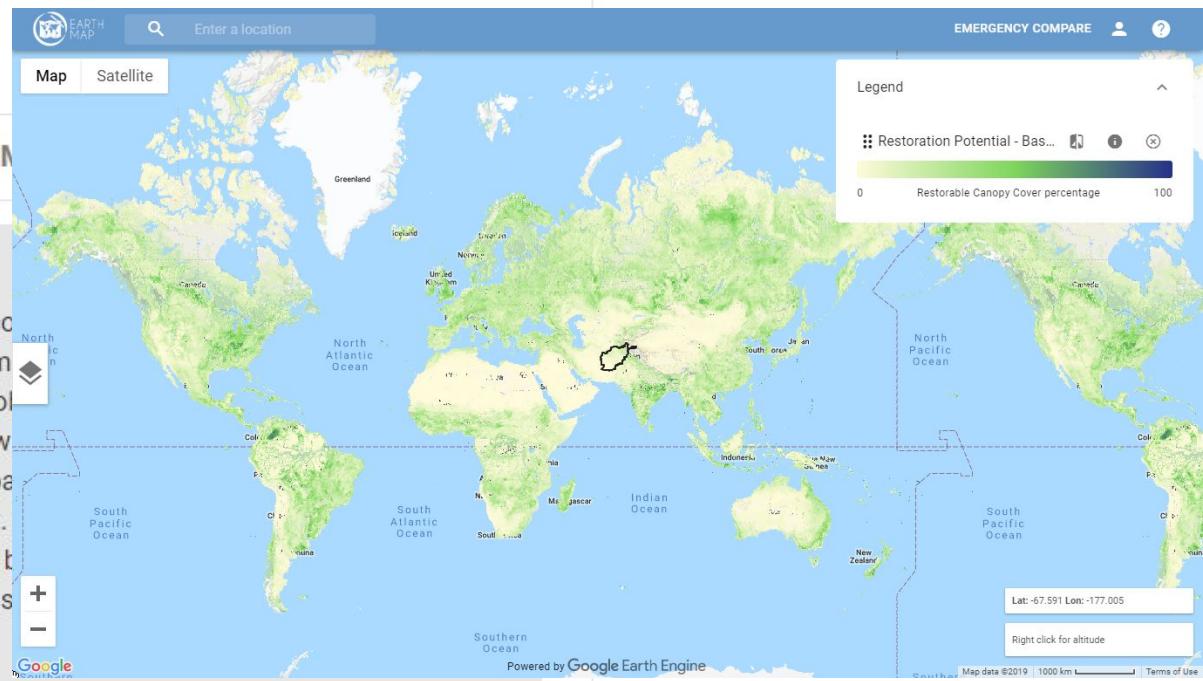
Article

Figures & Data

Info & M

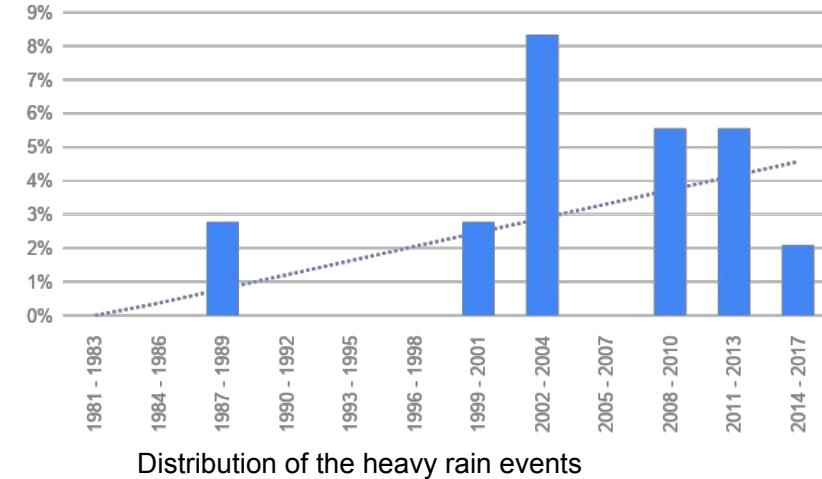
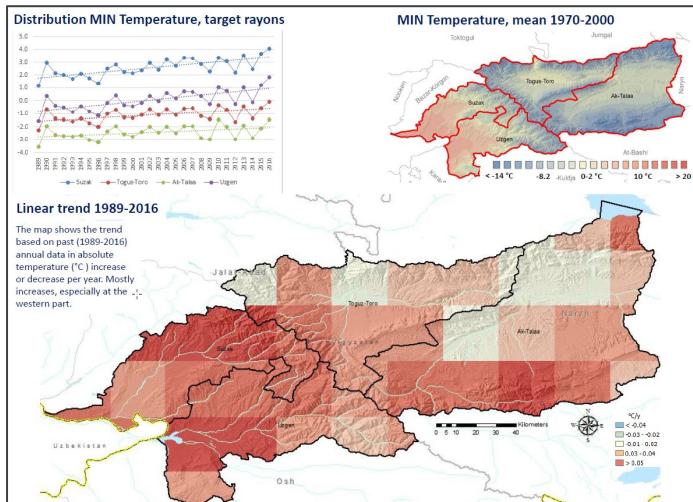
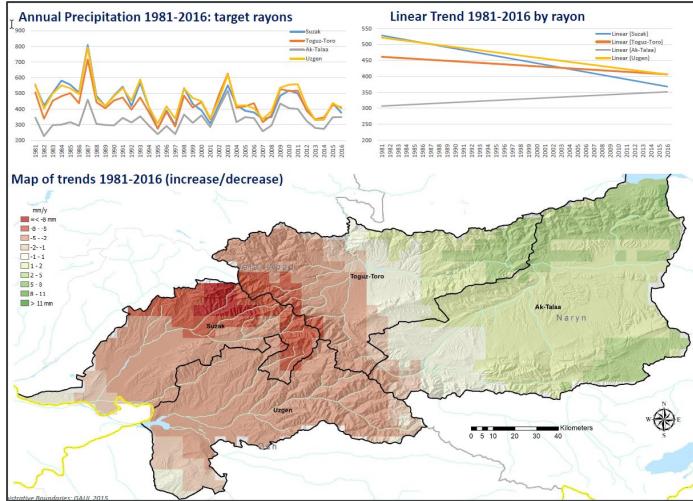
The potential for global forest cover

The restoration of forested land at a global scale could mitigate climate change. Bastin et al. used direct modeling to create a spatially explicit map of forest restoration potential across the globe (see the figure; see the article by Brancalion). Their spatially explicit maps show how much land outside of existing forests and agricultural and urban areas could support additional 0.9 billion hectares of continuous forest. This increase in forested area, including more than 500 teragrams of additional carbon at maturity. Such a change has the potential to double the global carbon pool by about 25%.

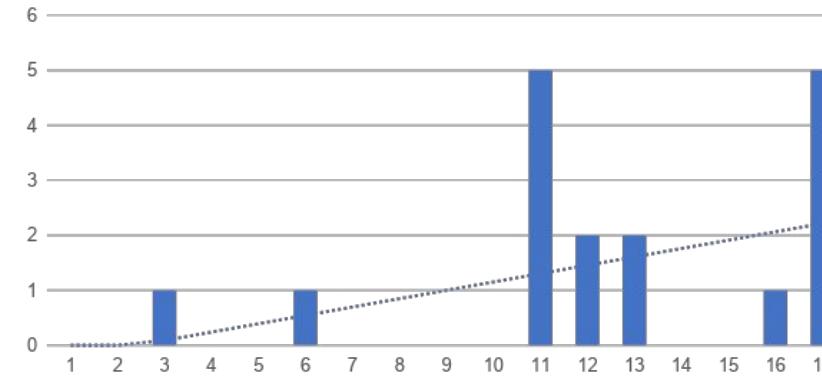


Science, this issue p. 76; see also p. 24

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Days <-25 (not Dec, Jan and Feb)



Number of days with min temperature < -2

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Next Steps

- Adding user layers (customization)
- Sharing workspaces
- Extreme events statistics
- ECMWF data for Temperature/Precipitation
- Other datasets

More Links

Git Repository [LINK](#)

Emergency compare [LINK](#)

- Generate EE Assets [LINK](#)
 - Can use GAUL or shapefiles
 - Assets are referenced in the Firebase JSON database
- Generate Boundaries [LINK](#)
 - For GAUL boundaries
 - For other boundaries export to GeoJSON (QGis)
 - Upload to Firebase storage

Thank you!
NDC-Land-Monitoring@fao.org

