



# Global Rangelands Monitoring System

## Overview and update

Juan Guerschman  
 16 May 2017

LAND AND WATER  
[www.csiro.au](http://www.csiro.au)

# Why I'm not there

# Why I'm not there – Field work



# Why I'm not there – remote sensing



# Summary

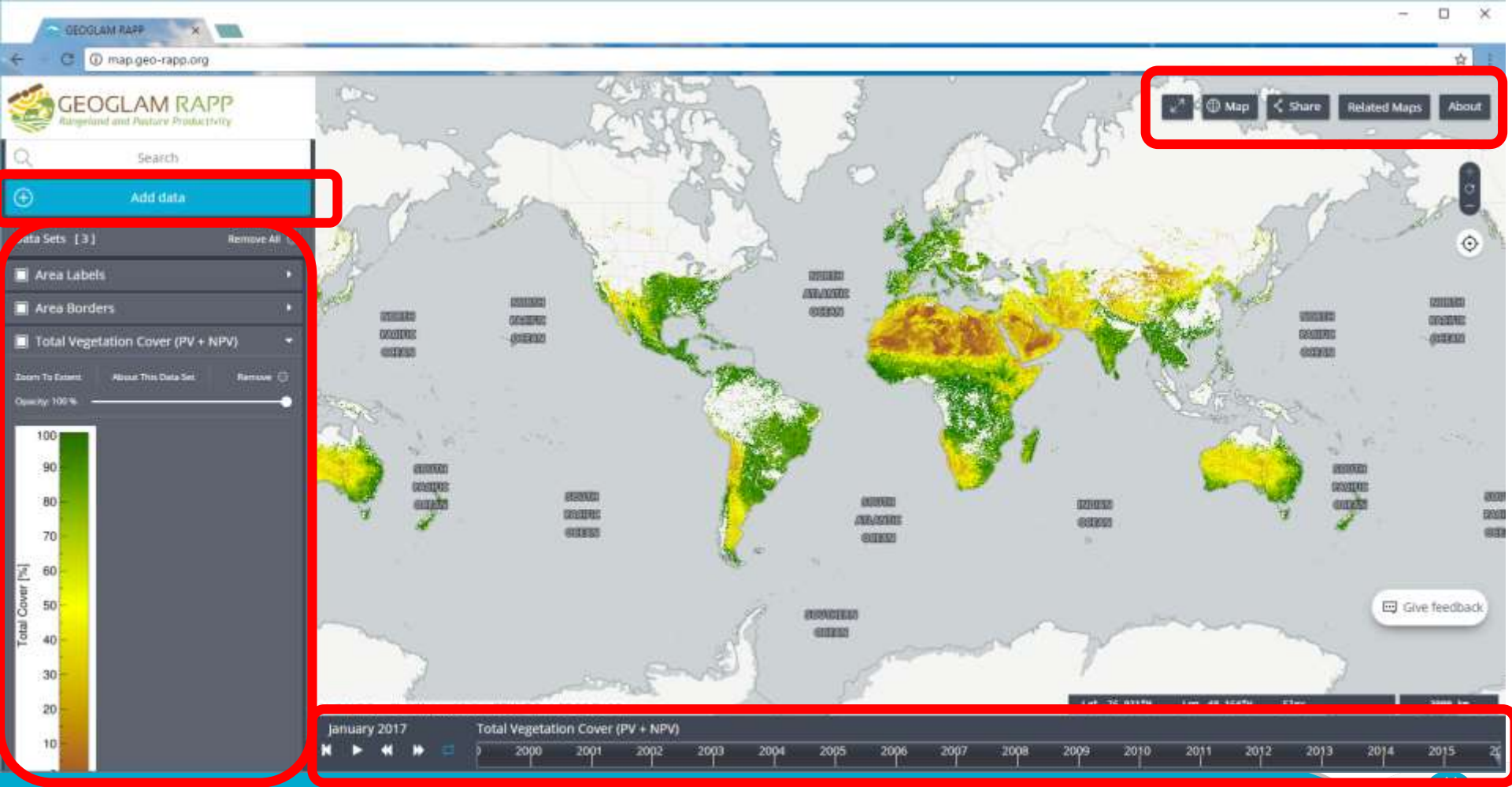
- Goals of RAPP Map
- “Open beta” version released
  - current functionality
  - Examples
  - Updates in progress
- Planned steps forward
  - Rangeland “mask”
  - Country-specific layers
  - Landsat/Sentinel data for selected locations
- Discussion

# Goals of RAPP Map

- **Visualise and interrogate** spatio-temporal data on the state and condition of global rangelands
- Spatial and temporal **tracking of vegetation cover and productivity** and **climate drivers**
- **Global to local** scale
- Seamless **addition of user's data** and **retrieving of time series** for plotting and downloading

[map.geo-rapp.org](http://map.geo-rapp.org)







GEOGLAM RAPP  
Rangeland and Pasture Productivity

map.geo-rapp.org

Search

Add data

Data Sets [3] Remove All

- Area Labels
- Area Borders
- Total Vegetation Cover (PV + NPV)

Zoom To Extent About This Data Set Remove

Opacity: 100%

Total Cover [%]

100  
90  
80  
70  
60  
50  
40  
30  
20  
10

ANGOLA

Data Catalogue My Data Done

Search

Query Data

Vegetation Dynamics

- Vegetation Cover
  - Vegetation Fractional Cover (PV, NPV & BS)
  - Normalised Difference Vegetation Index (NDVI)
- Total Cover
  - Total Vegetation Cover (PV + NPV)
  - Total Vegetation Cover Anomaly
- Climate
- Land Use & Land Cover
- Livestock
- Ancillary

DATA PREVIEW

ORTHAMERICA EUROPE ASIA NORTHAMERICA EUROPE ASIA NORTHAMERICA EUROPE ASIA SOUTHAMERICA AFRICA AUSTRALIA SOUTHAMERICA AFRICA AUSTRALIA SOUTHAMERICA AFRICA AUSTRALIA

Leaflet | © OpenStreetMap contributors, ODbL, © CartoDB CC-BY 3.0, © NITARCTICA

Add to the map

### Vegetation Fractional Cover (PV, NPV & BS)

#### Data Description

Fractional Cover - MODIS, CSIRO Land and Water algorithm. Australia coverage. Vegetation fractional cover represents the exposed proportion of Photosynthetic Vegetation (PV), Non-Photosynthetic Vegetation (NPV) and Bare Soil (BS) within each pixel. In forested canopies the photosynthetic or non-photosynthetic portions of trees may obscure those of the grass layer and/or bare soil. The MODIS Fractional Cover product is derived from the MODIS Nadir BRDF-Adjusted Reflectance product MCD43A4). A suite of derivative are also produced, namely total vegetation cover (PV+NPV), monthly fractional cover and total vegetation cover, monthly anomaly of total cover against the time series, and three-monthly total cover difference. MODIS fractional cover has been validated for Australia. A global product is also produced with the same algorithm using the MCD43C1 (0.05 degrees spatial resolution).

#### Service Description

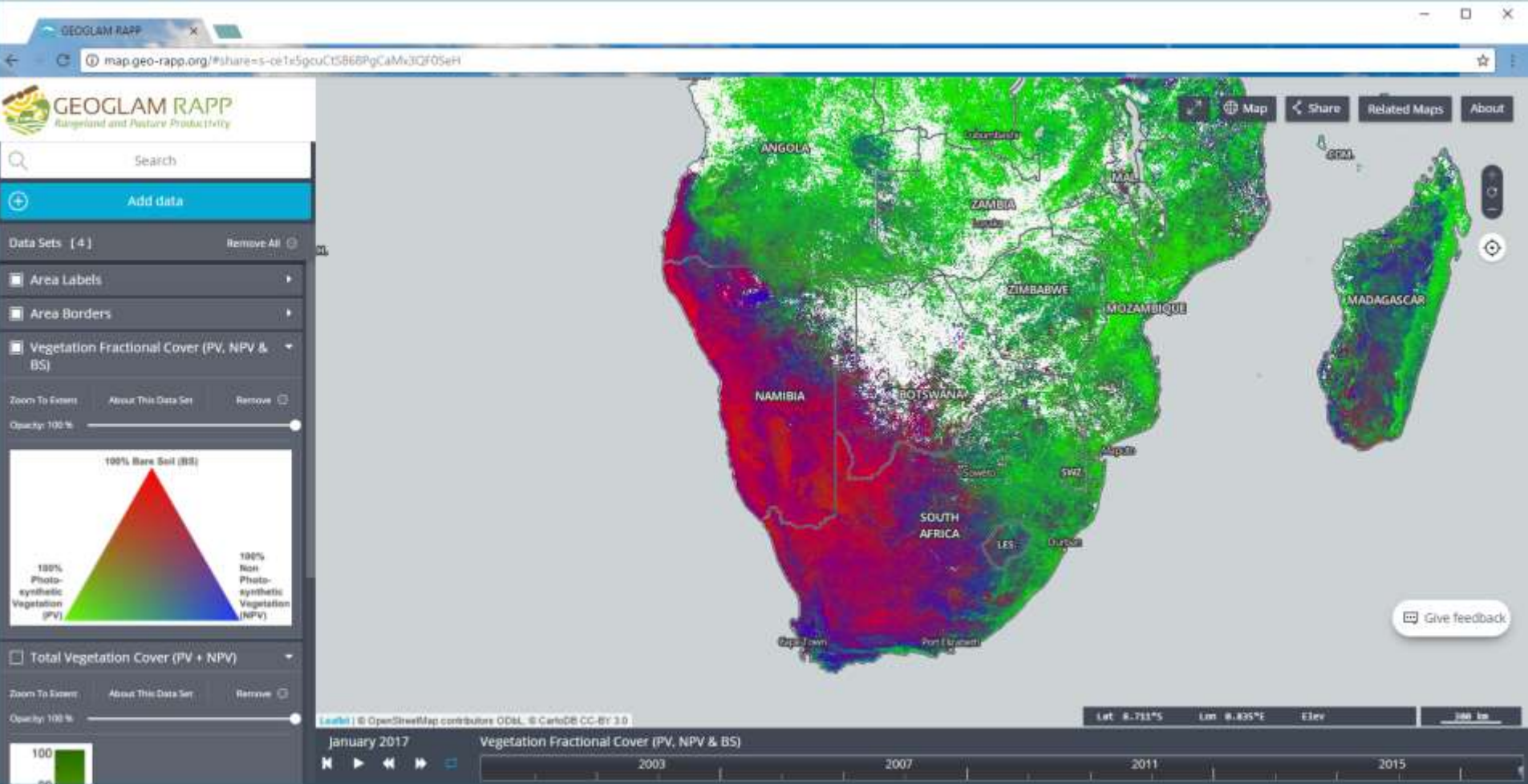
An NCI compliant implementation of WMS.

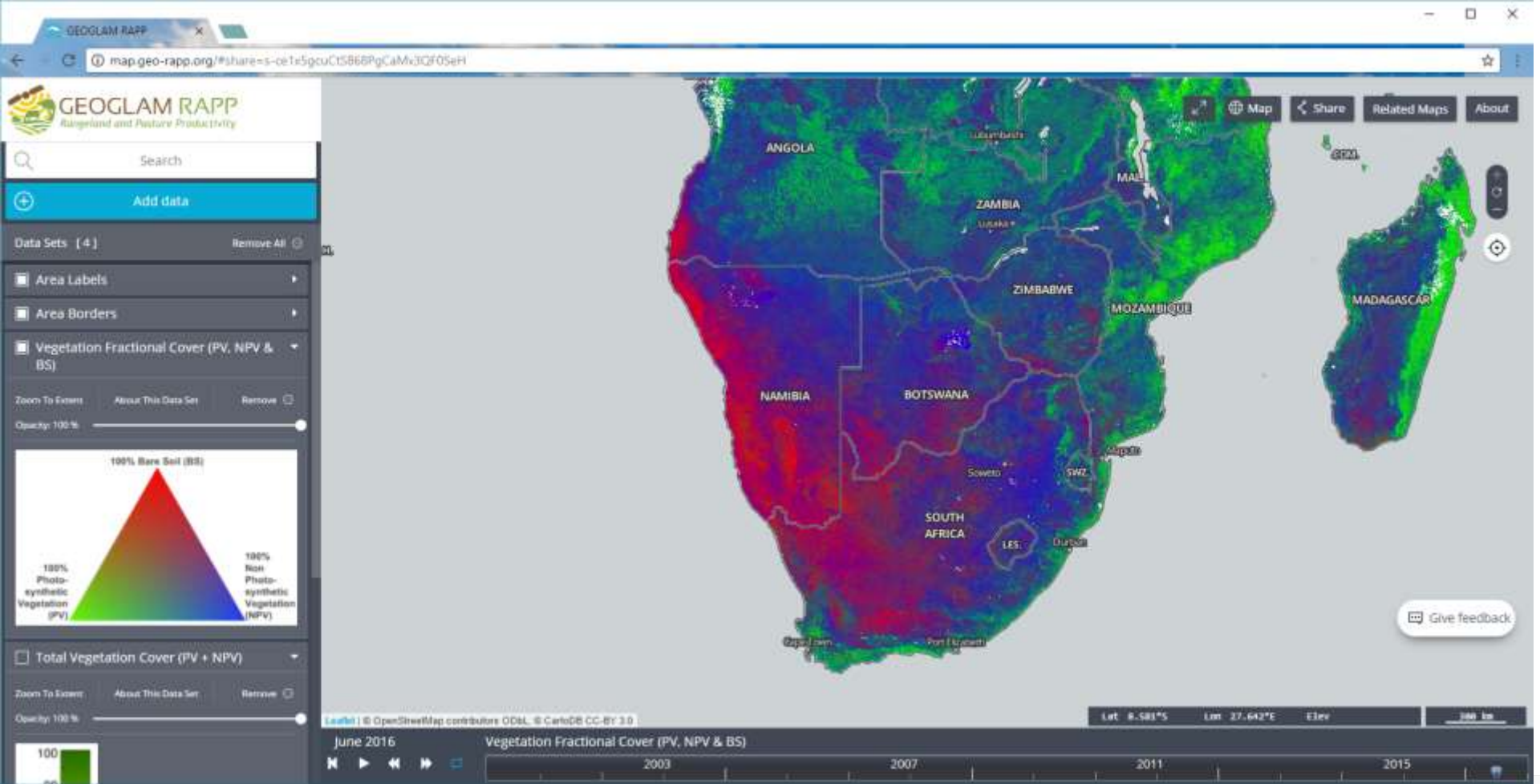
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July 2016 Total Vegetation Cover (PV + NPV)

2003 2007 2011 2015

Lat: 11.867°S Lon: 3.128°W Elev: 100 m







[map.geo-rapp.org/#share=s-c61e5gcuCtS866PgCaMa3Qf05eH](http://map.geo-rapp.org/#share=s-c61e5gcuCtS866PgCaMa3Qf05eH)

**GEOGLAM RAPP**  
 Rangeland and Pasture Productivity

Search: \_\_\_\_\_

Add data

Data Sets [ 5 ] Remove All

- Area Labels
- Area Borders
- Kruger National Park outline.kml.kml
- Vegetation Fractional Cover (PV, NPV & BS)
  - Zoom To Extent
  - About This Data Set
  - Remove
  - Opacity: 100%
- Total Vegetation Cover (PV + NPV)
  - Zoom To Extent
  - About This Data Set
  - Remove

Data Catalogue | My Data

Data added in this way is not saved or made visible to others unless you explicitly share it by using the Share panel.

User-Added Data

- Kruger National Park outline.kml.kml
- Kruger National Park outline.kml.kml

Add more data

DATA PREVIEW

Remove from the map

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Kruger National Park outline.kml.kml

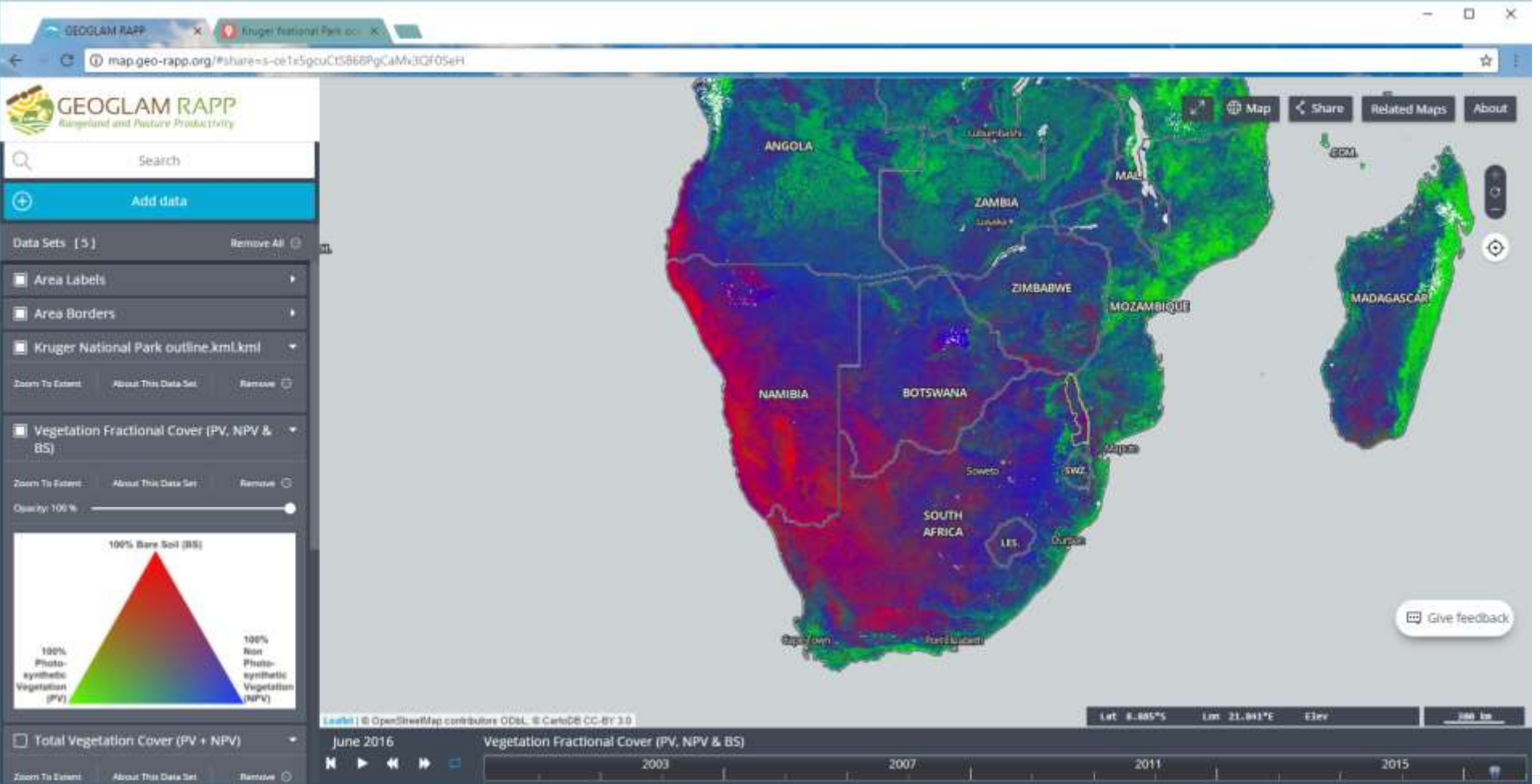
This file only exists in your browser. To share it, you must load it onto a public web server.

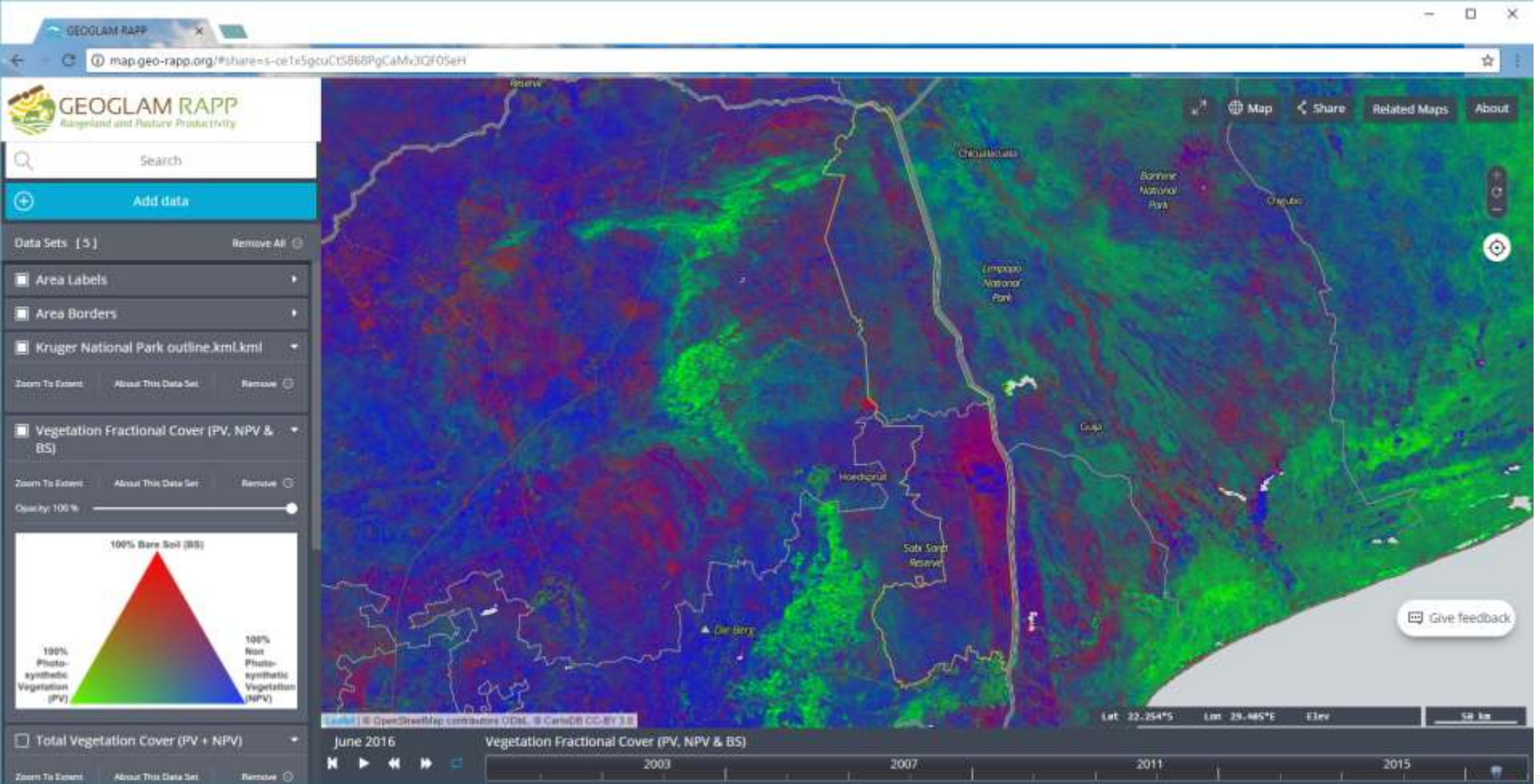
Leaflet | © OpenStreetMap contributors, ODNL, © CartoDB, CC-BY 3.0

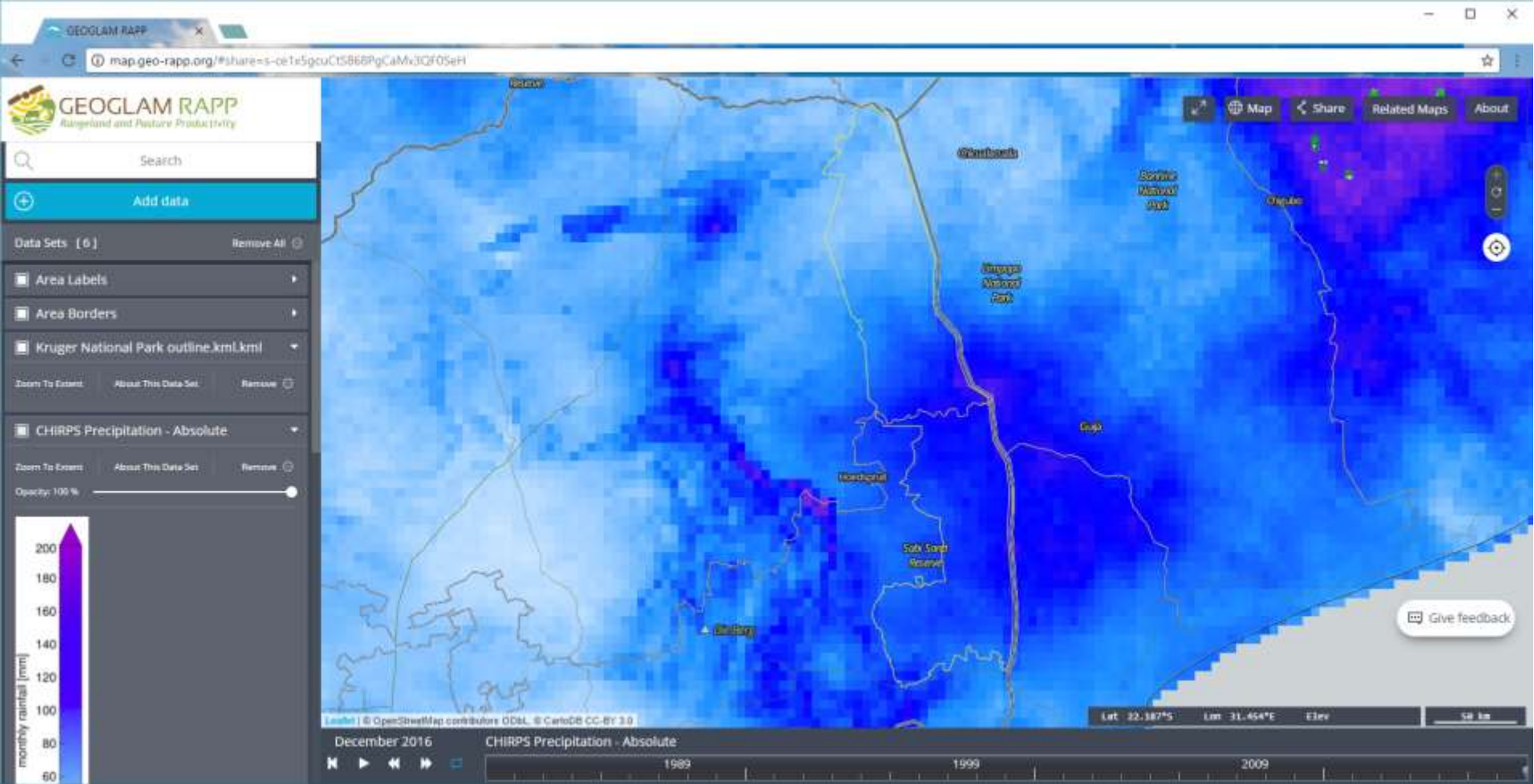
June 2016 | Vegetation Fractional Cover (PV, NPV & BS)

2003 2007 2011 2015

Lat: 25.248°S Lon: 34.542°E E1ev 100 km







**GEOGLAM RAPP**  
Rangeland and Pasture Productivity

map.geo-rapp.org/#share=s-cet1s5gcuCt5866PgCaMx3GF05eH

Search

Add data

Data Sets [ 6 ] Remove All

- Area Labels
- Area Borders
- Kruger National Park outline.kml.kml
- CHIRPS Precipitation - Absolute

Zoom To Extent About This Data Set Remove

Opacity: 100%

monthly rainfall [mm]

200  
180  
160  
140  
120  
100  
80  
60

Data Catalogue My Data Done

Search

Query Data

Vegetation Dynamics

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- Total Cover
  - Total Vegetation Cover (PV + NPV)
  - Total Vegetation Cover Anomaly

Climate

- Rainfall
  - CHIRPS Precipitation - Absolute**
  - Anomalies
- Soil Moisture

Land Use & Land Cover

Livestock

DATA PREVIEW

Remove from the map

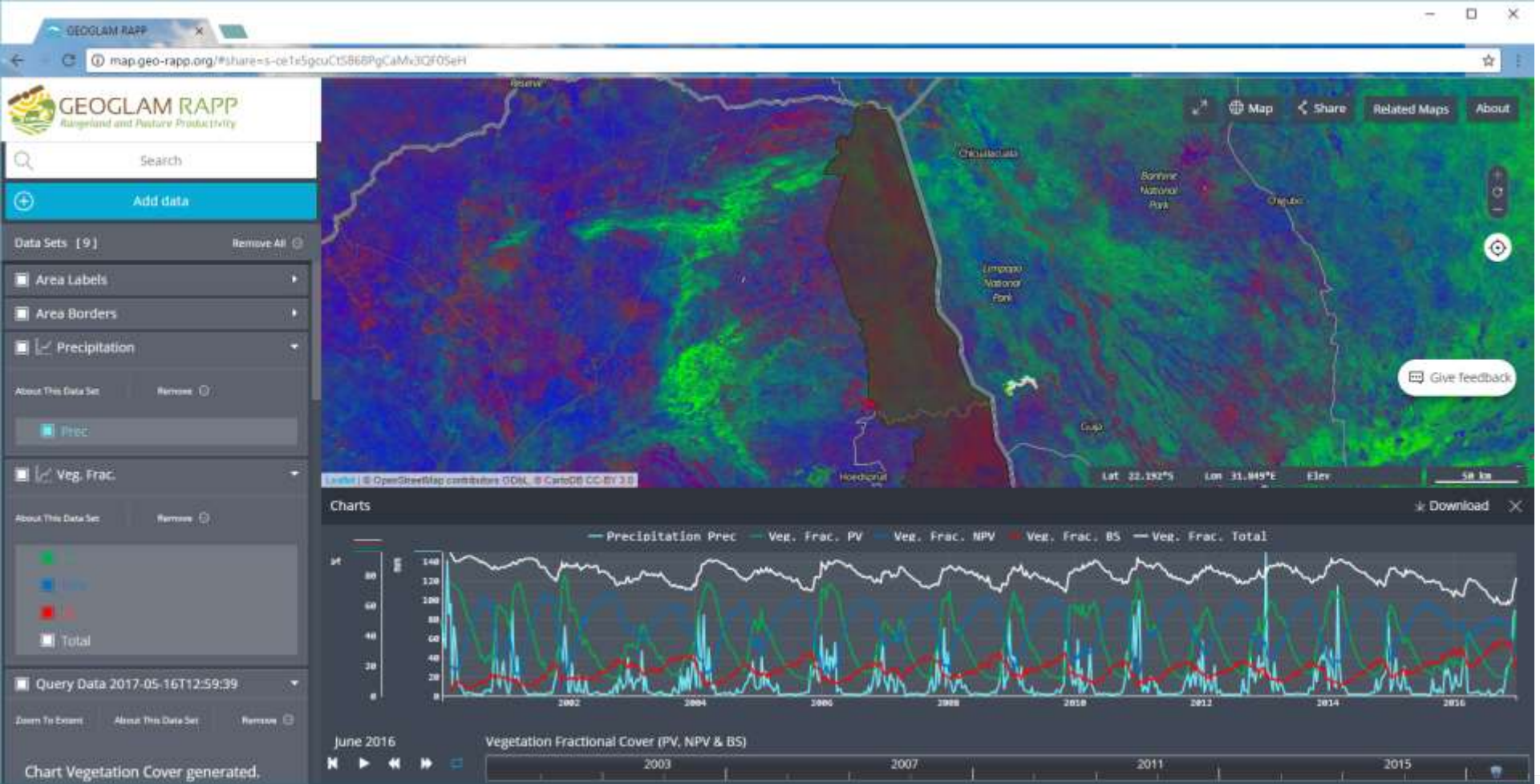
CHIRPS Precipitation - Absolute

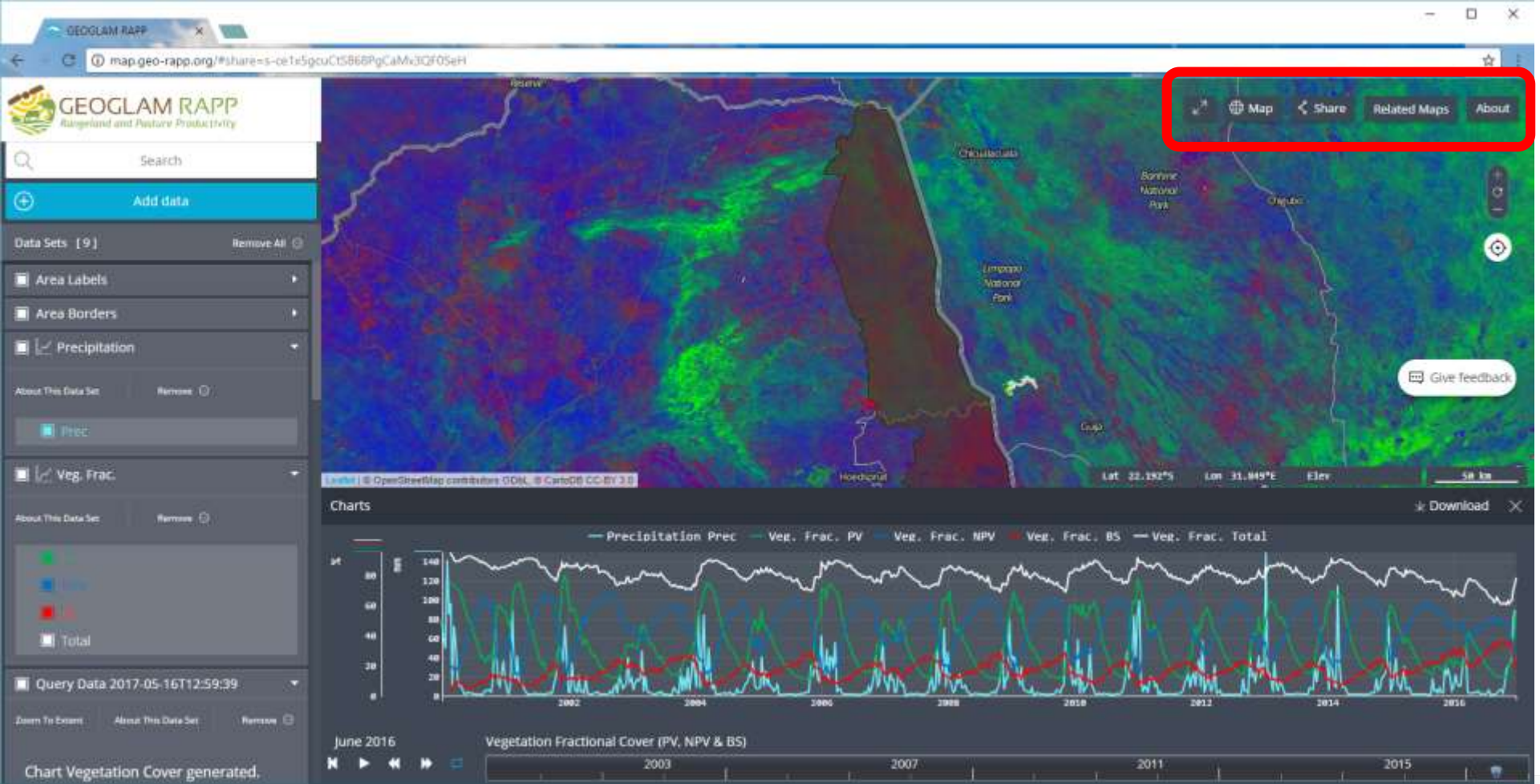
Data Description

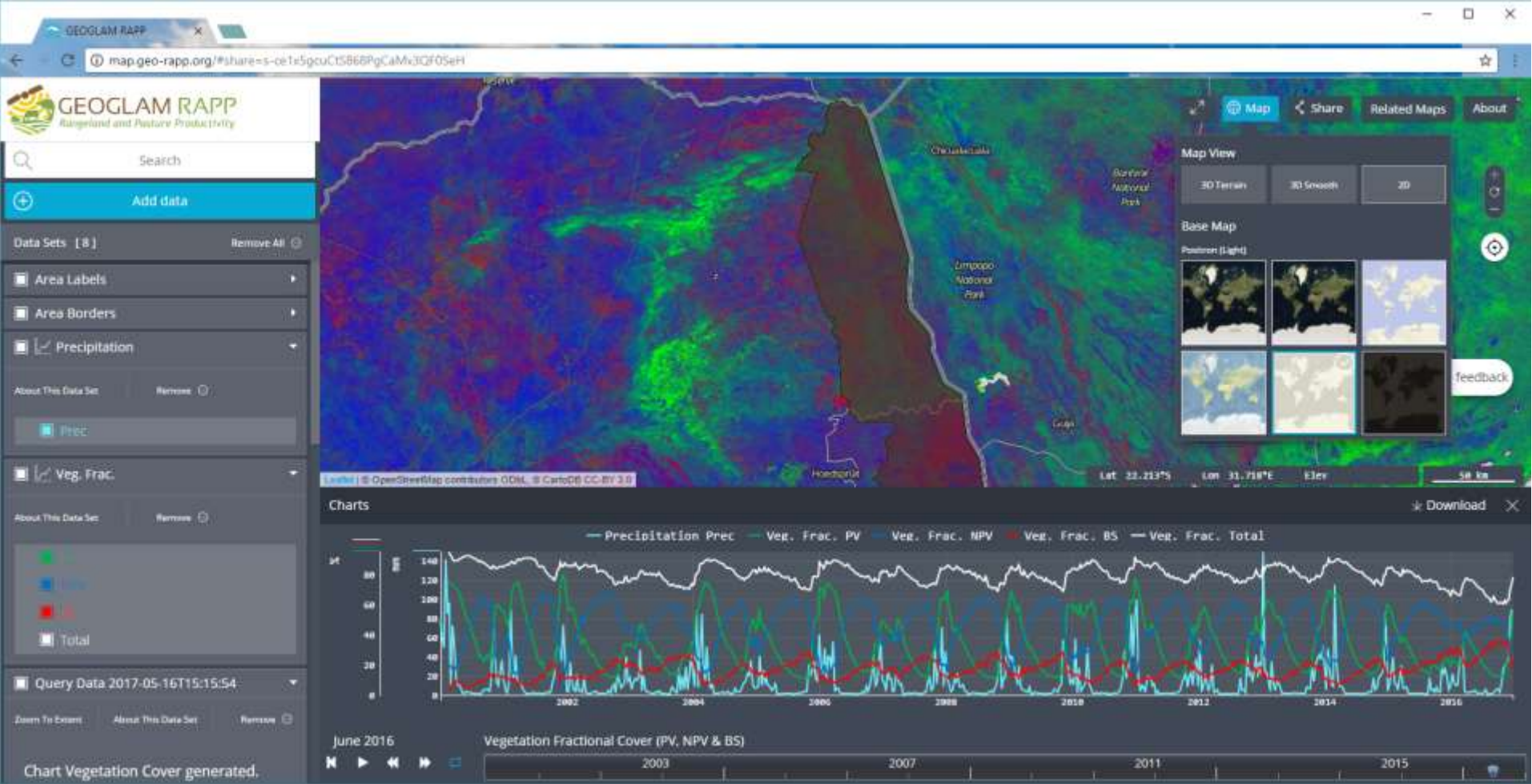
The CHIRPS dataset was obtained from <http://chg.geog.ucsb.edu/data/chirps/> What is CHIRPS? Latest Preliminary CHIRPS v2.0 Africa Pentad Climate Hazards Group InfraRed Precipitation with Station data (CHIRPS) is a 30+ year quasi-global rainfall dataset. Spanning 50°S-50°N (and all longitudes), starting in 1981 to near-present, CHIRPS incorporates 0.05° resolution satellite imagery with in-situ station data to create gridded rainfall time series for trend analysis and seasonal drought monitoring. As of February 12th, 2015, version 2.0 of CHIRPS is complete and available to the public. For detailed information on CHIRPS, please refer to our paper in Scientific Data. History and Intent Since 1999, U.S. Geological Survey (USGS) and CHG scientists, supported by funding from the U.S. Agency for International Development (USAID), the National Aeronautics and Space Administration (NASA), and the National Oceanic and Atmospheric Administration (NOAA), have been developing techniques for producing rainfall maps, especially where surface data is sparse. Estimating rainfall variations in space and time is an important aspect of drought early warning and environmental monitoring. An evolving dryer-than-normal season must be placed in historical context so that the severity of rainfall deficits

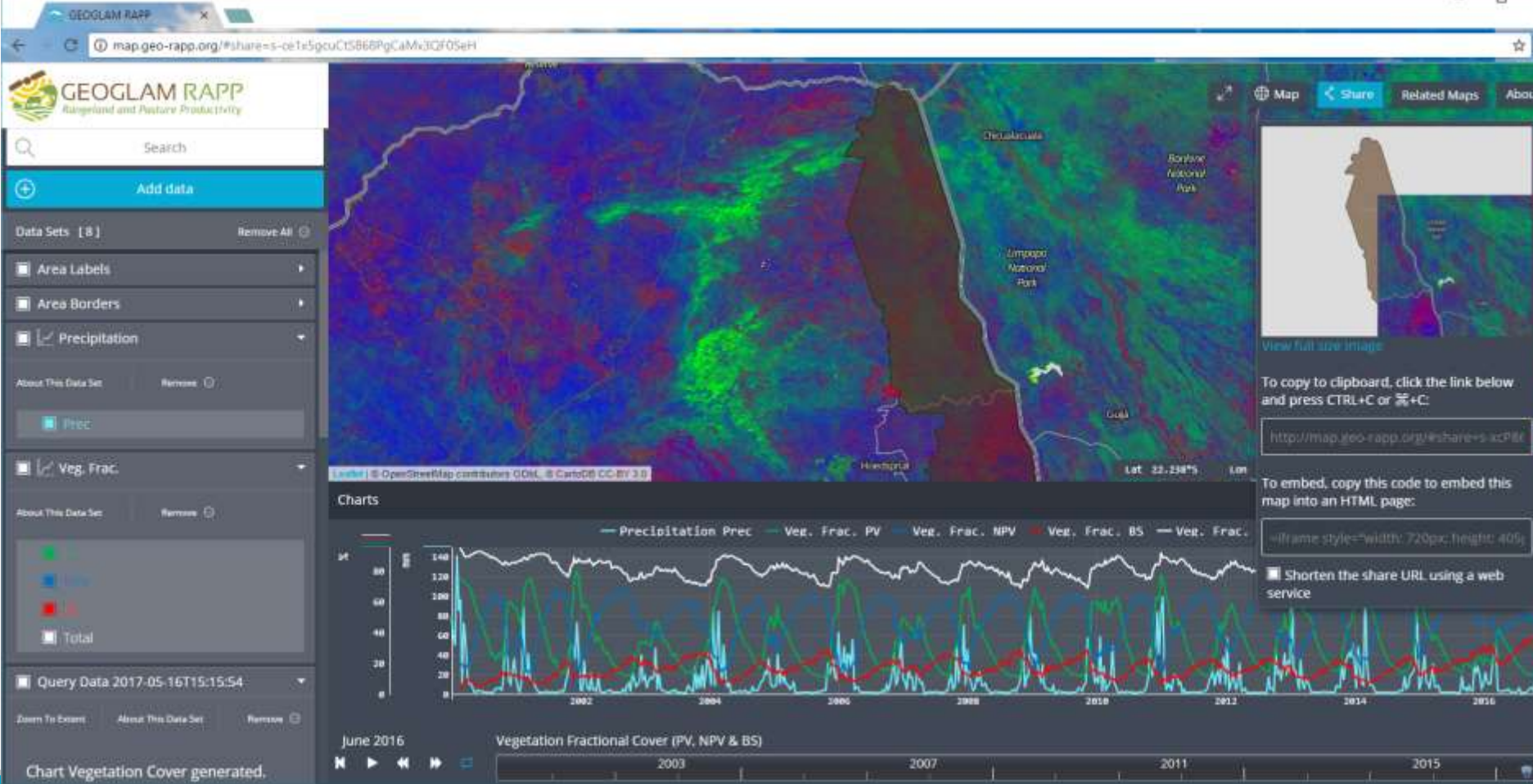
June 2016 Vegetation Fractional Cover (PV, NPV & BS)

2003 2007 2011 2015



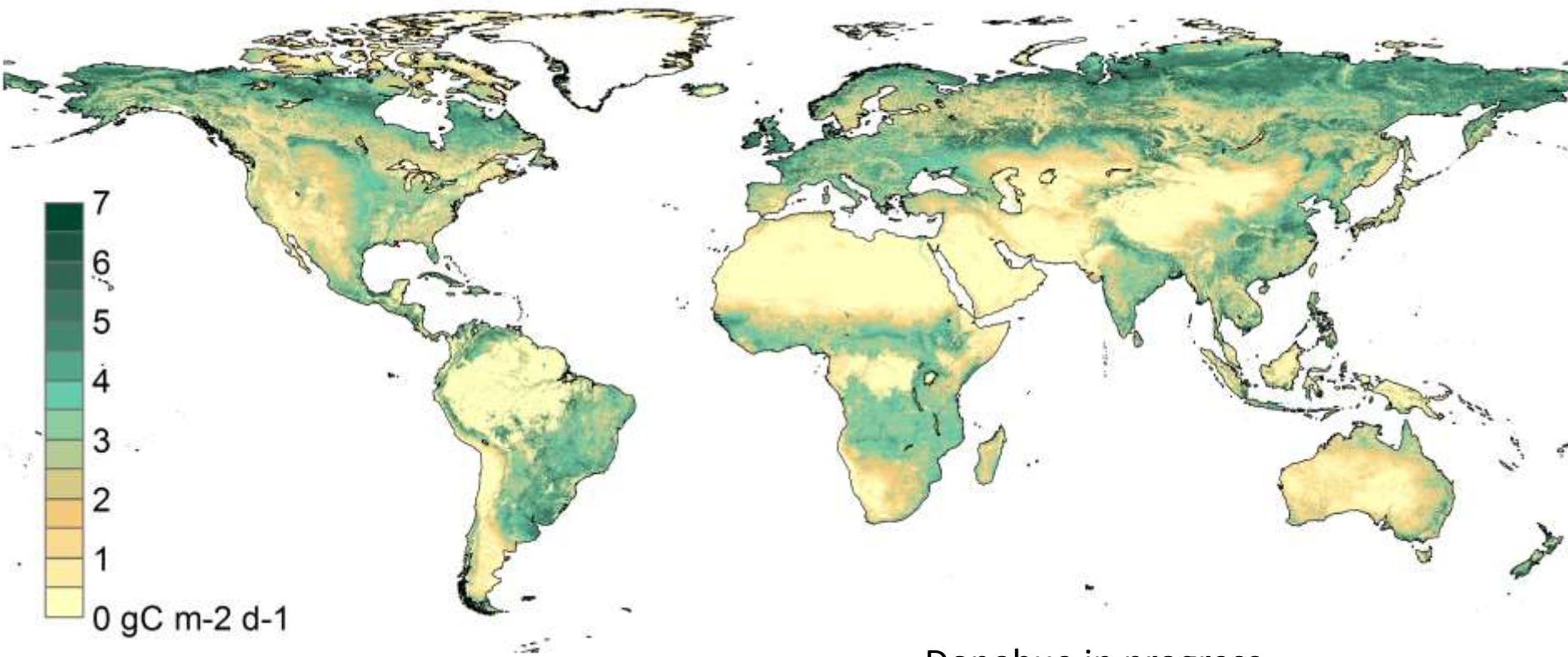






# Summary

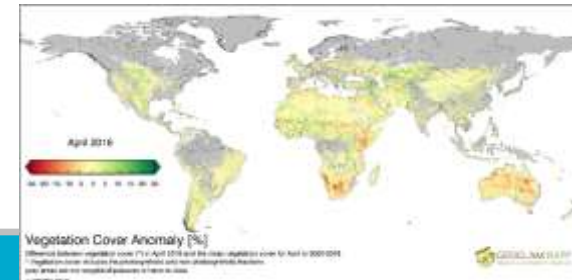
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  - Landsat/Sentinel data for selected locations
- Anomalies (Veg Cover) at 500 m
- Global soil moisture from SMOS product
- Global monthly grass / tree NPP dynamic layer
- RAPP sites
- Automatic updates of new layers (MODIS, Rainfall)
- Several bugs and other minor issues
- Need your input!!

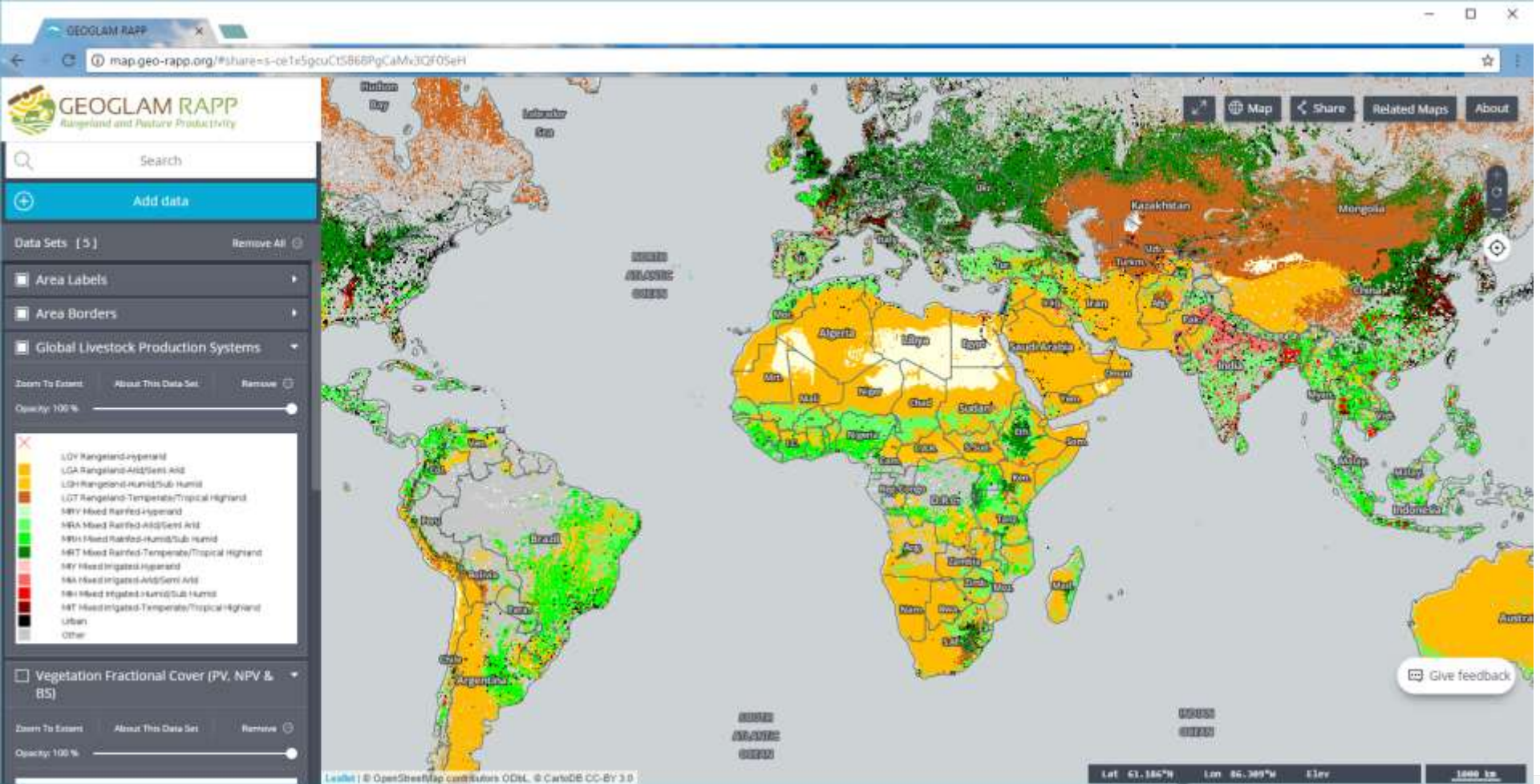


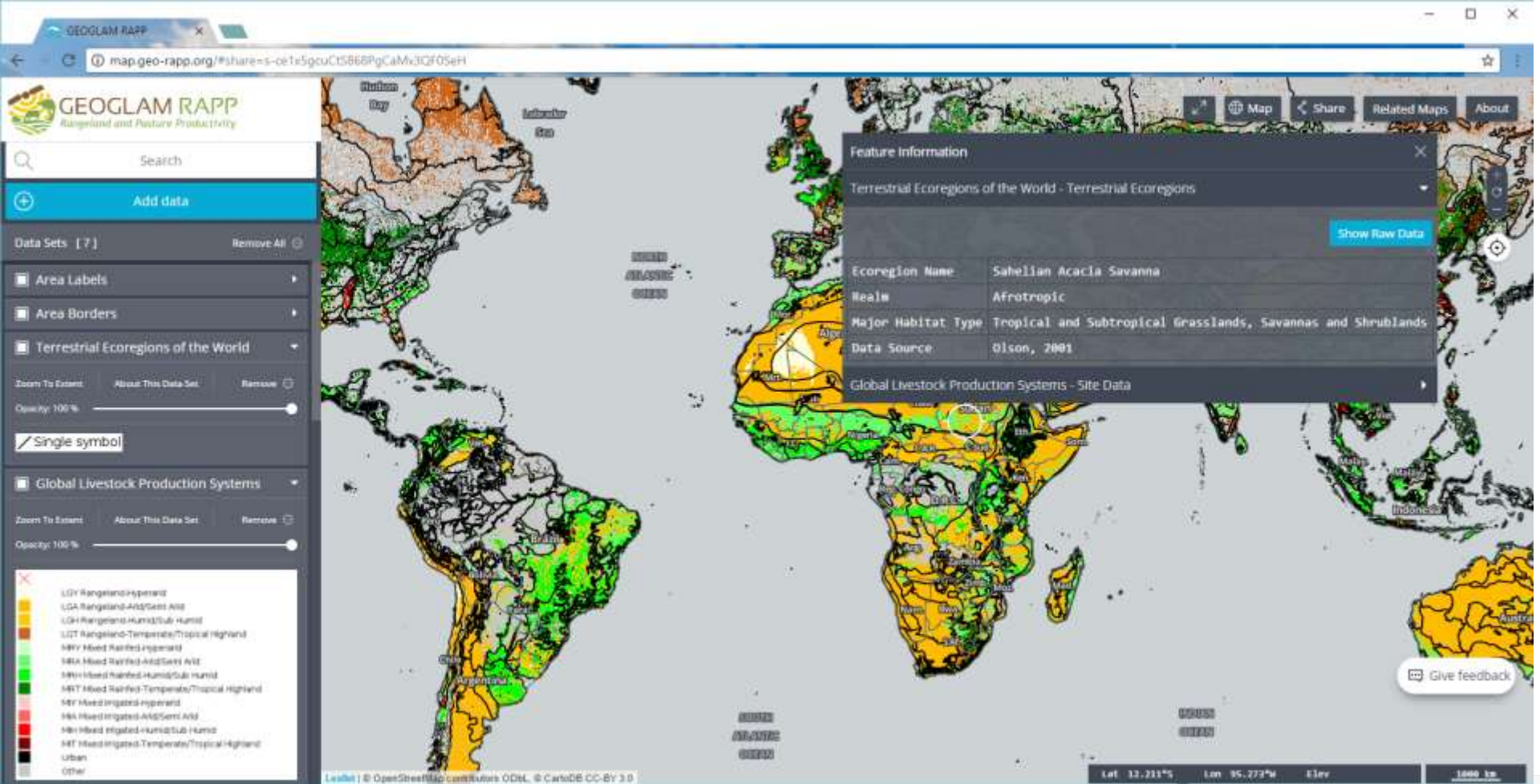
Donohue in progress  
Global grass GPP (mean 2001-2016)

# Summary

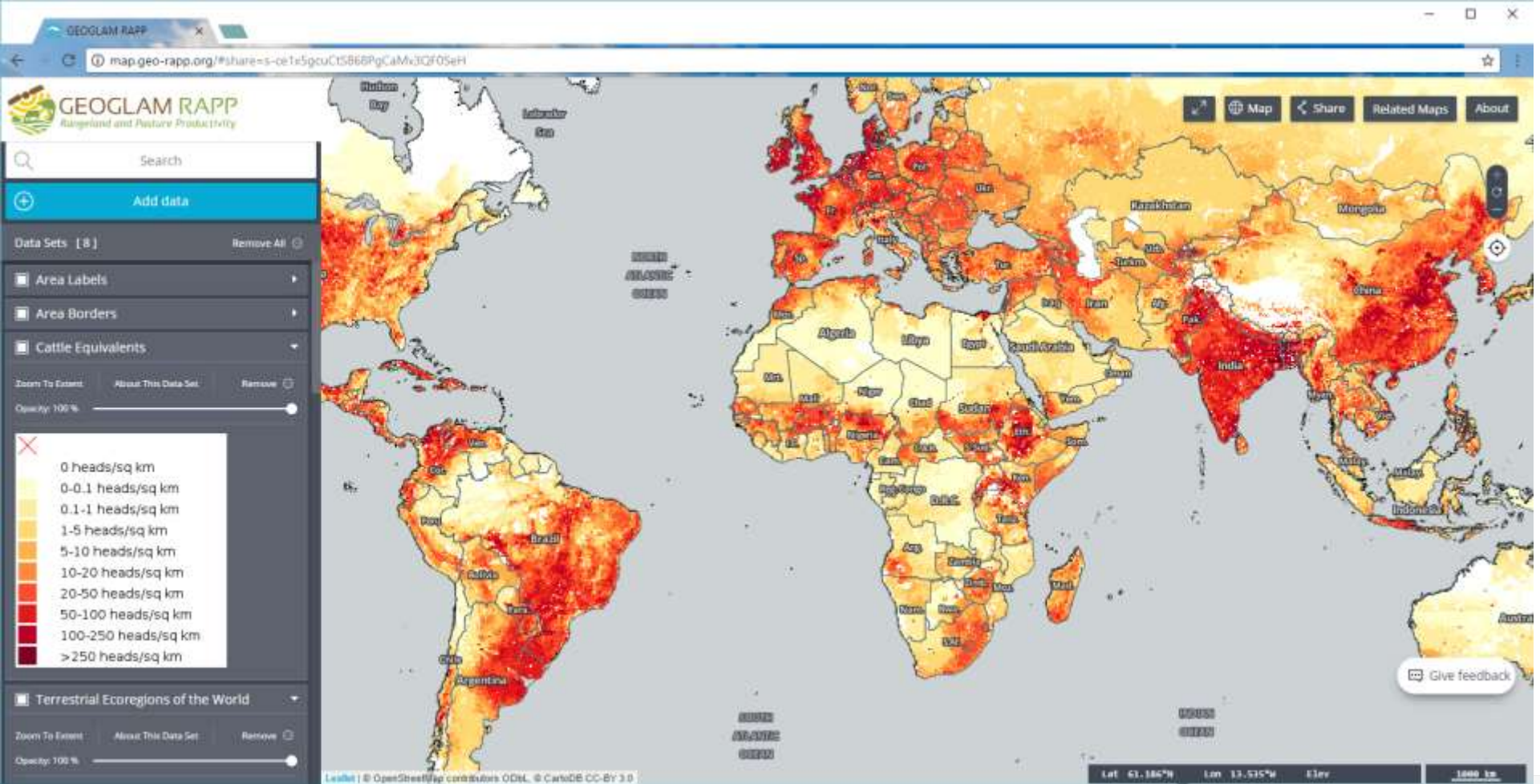
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- “Rangeland” is a land **use** class (not land **cover**)
  - “open country used for grazing animals”
- No agreed mask as such available (unlike crops)
- Areas without livestock?
- Using mask for reporting anomaly











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  - **Country-specific layers**
  - Landsat data for selected locations
- Working on an Australian customisation
- Using Australian layers for land use/land cover, livestock densities, etc.
- Other countries possible
- We need your input!

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- Open Data Cube
- Copernicus services/applications
- Can be done for selected regions (global still not possible)
- Need to be prioritised
- We need your input!

# Thank you