



Using the NASA polar orbiting fire product record to enhance and expand the Global Wildfire Information System (GWIS)

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David Roy –South Dakota State University/Michigan State
University

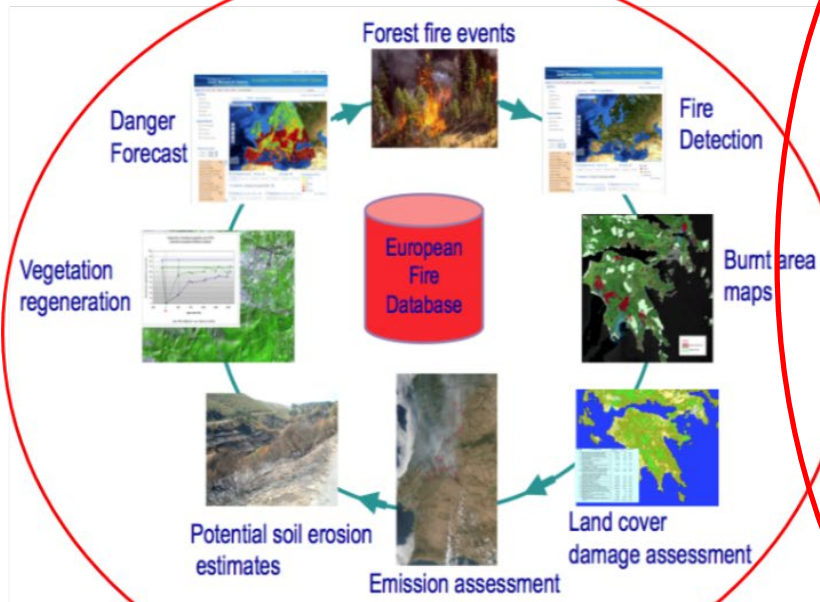


Overarching Goal of the Project

Expanding GWIS by incorporating the NASA fire products, enabling a comprehensive view and evaluation of fire regimes and fire effects in support of policy making and national resource management.

Overarching Goal of the Project

GWIS



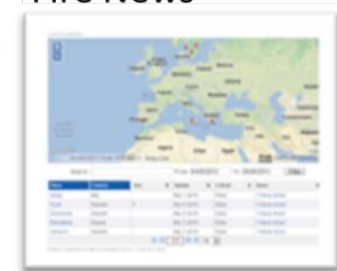
Current Situation



Fire History

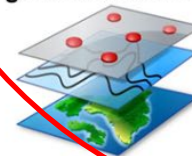


Fire News



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Downloadable
georeferenced data



Proposed activities

NASA fire products:

- MODIS C6 MOD14 active fire product
- MODIS C6 MCD64 burned area product
- Pathfinder the transition to VIIRS

Proposed activities

To deliver datasets and tools to be incorporated in GWIS for:

- visualization of Burned Area Products
- on-demand statistics
- tabular and graphical information

State/regional, national, sub-continental, continental, and global scales

Monthly, seasonal and annual time periods

Map Options

☐ COUNTRY BOUNDARIES 

Fire Danger Forecast

☒ FIRE DANGER FORECAST 


Source

Index

Oct

Rapid Damage Assessment

Select a date-range



From: 16 Oct 2017 To: 23 Oct 2017

ACTIVE FIRES

☐ MODIS ☐ VIIRS 

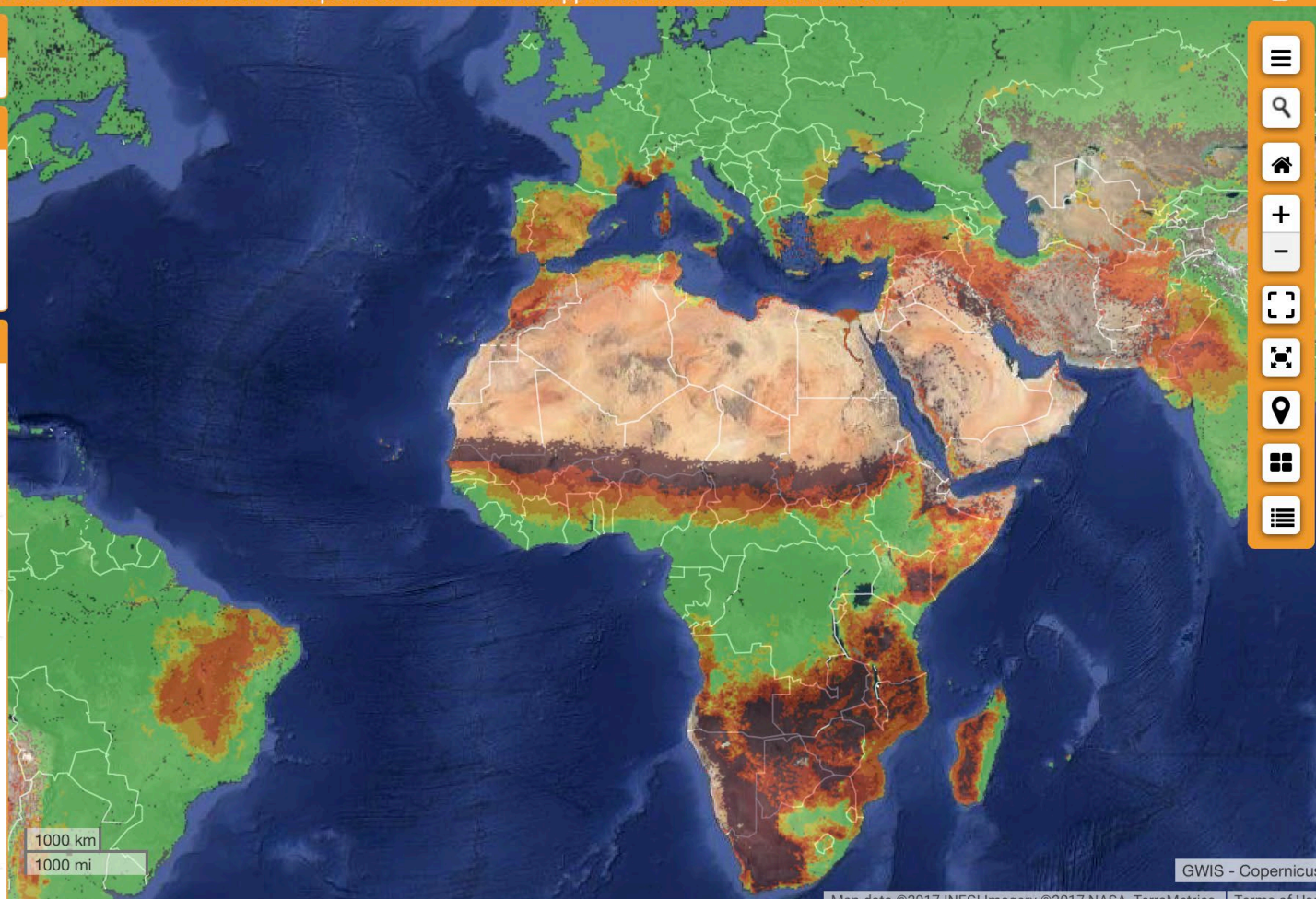
☒ BURNT AREAS (MODIS) 

FIRE EMISSIONS

- ☐ Black Carbon ☐ Methane
☐ Carbon Dioxide ☐ Carbon Monoxide
☐ Sulfur Dioxide ☐ Nitrogen Oxides
☐ Organic Carbon ☐ Particulate Matter
☐ Non-Methane Hydro-Carbon
☐ Total Carbon in Aerosols

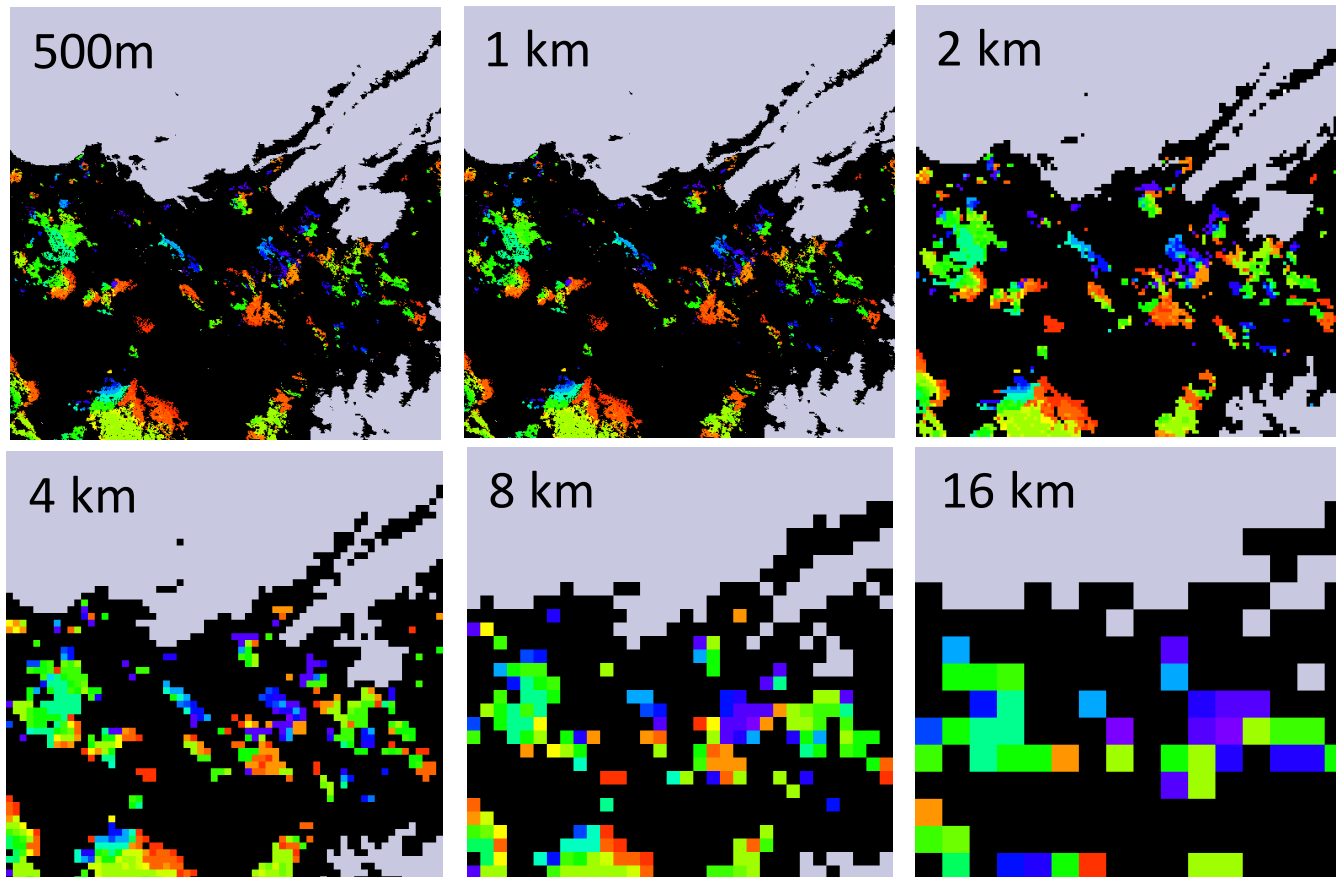
FUELS

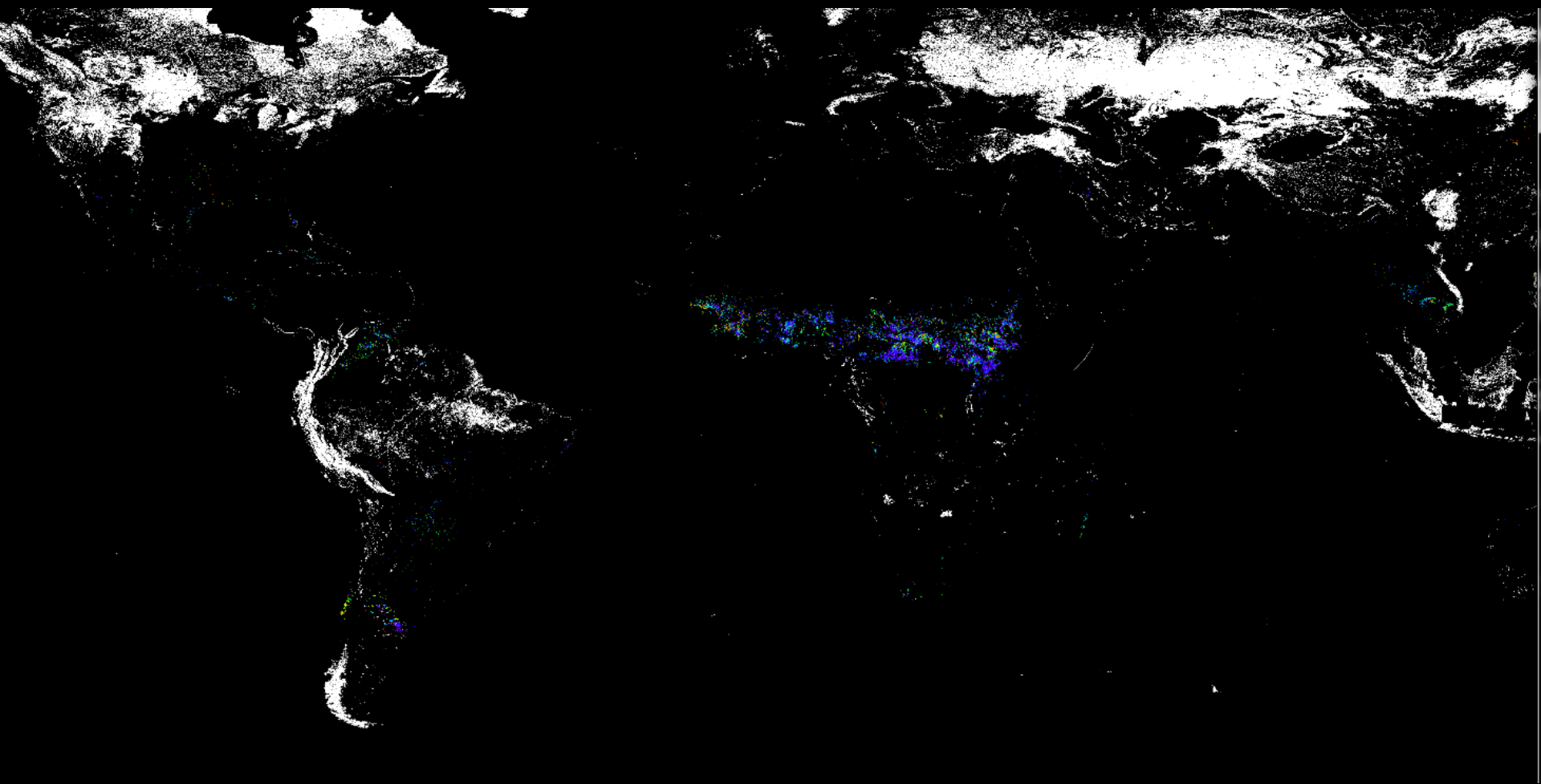
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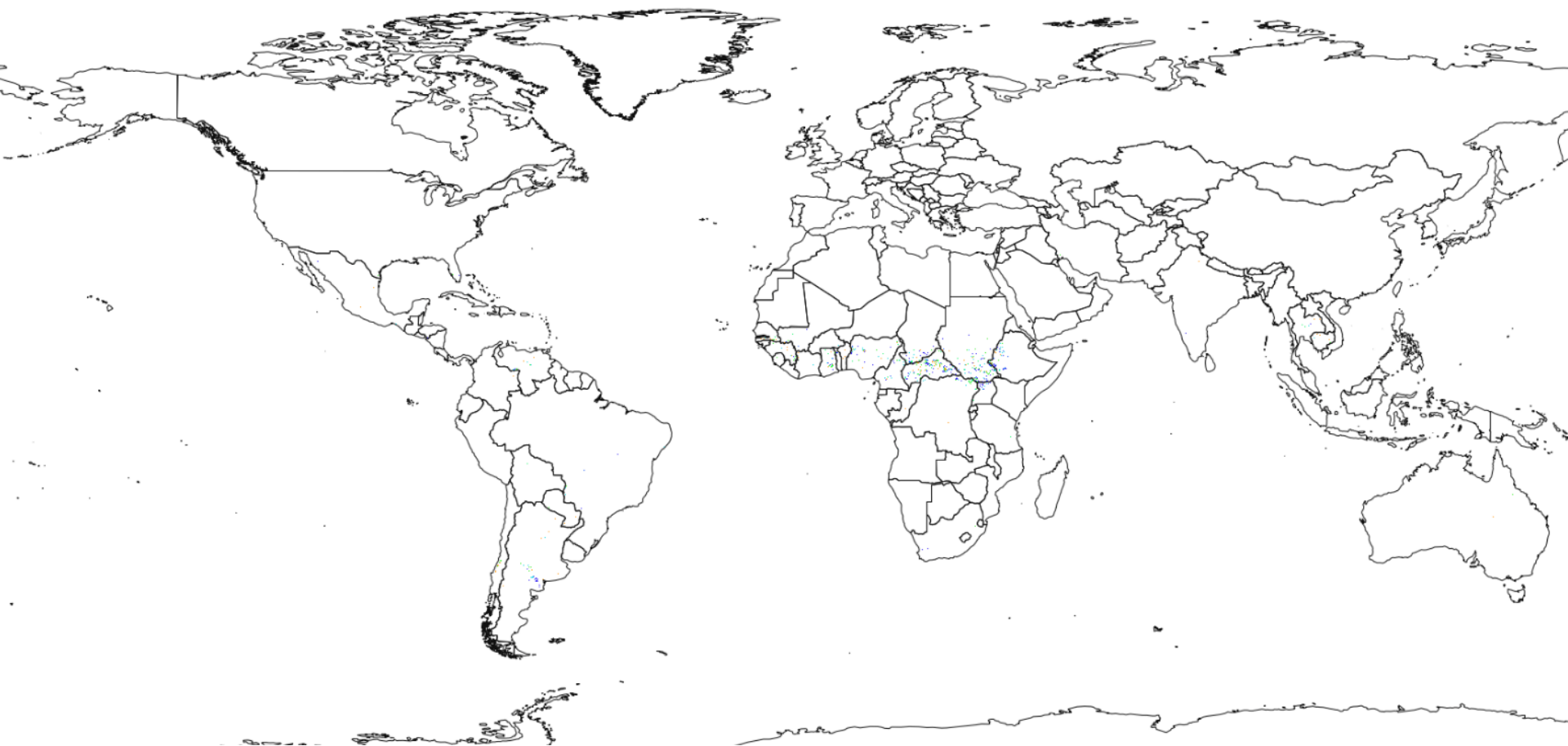
Burned Area Visualization

Develop and incorporate software for rigorous multi-scale visualization

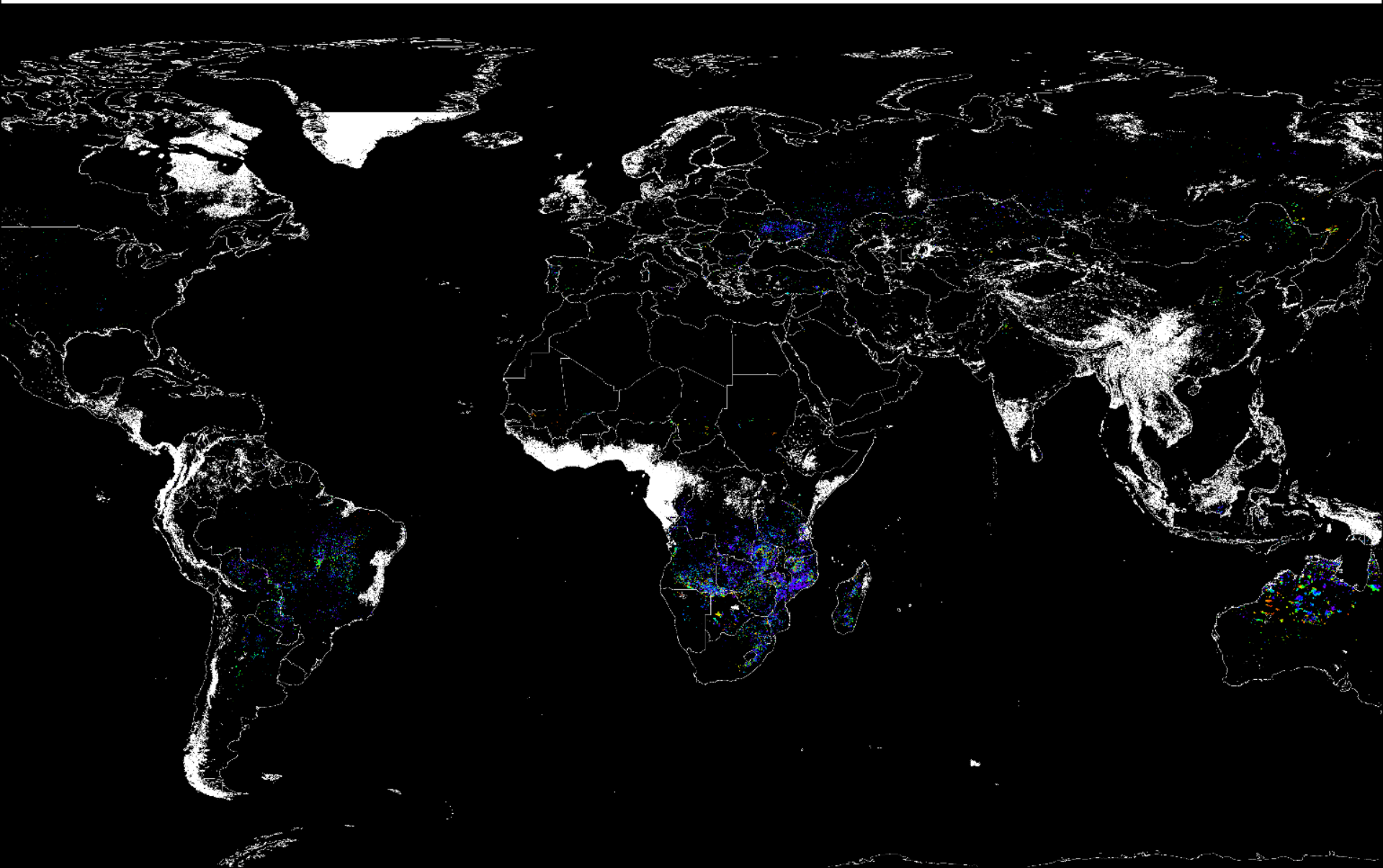




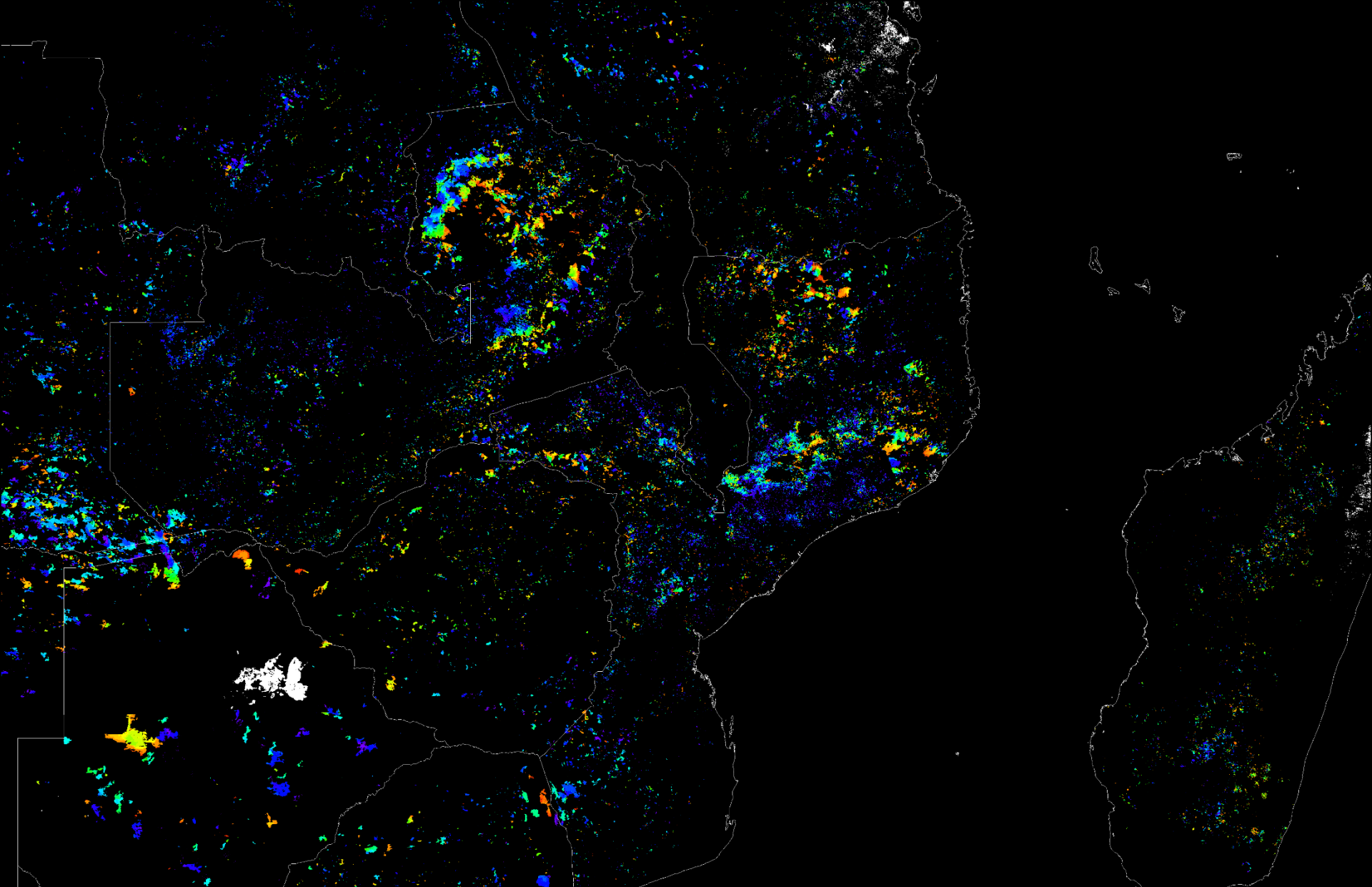
FEBRUARY 2002 (with generalization)



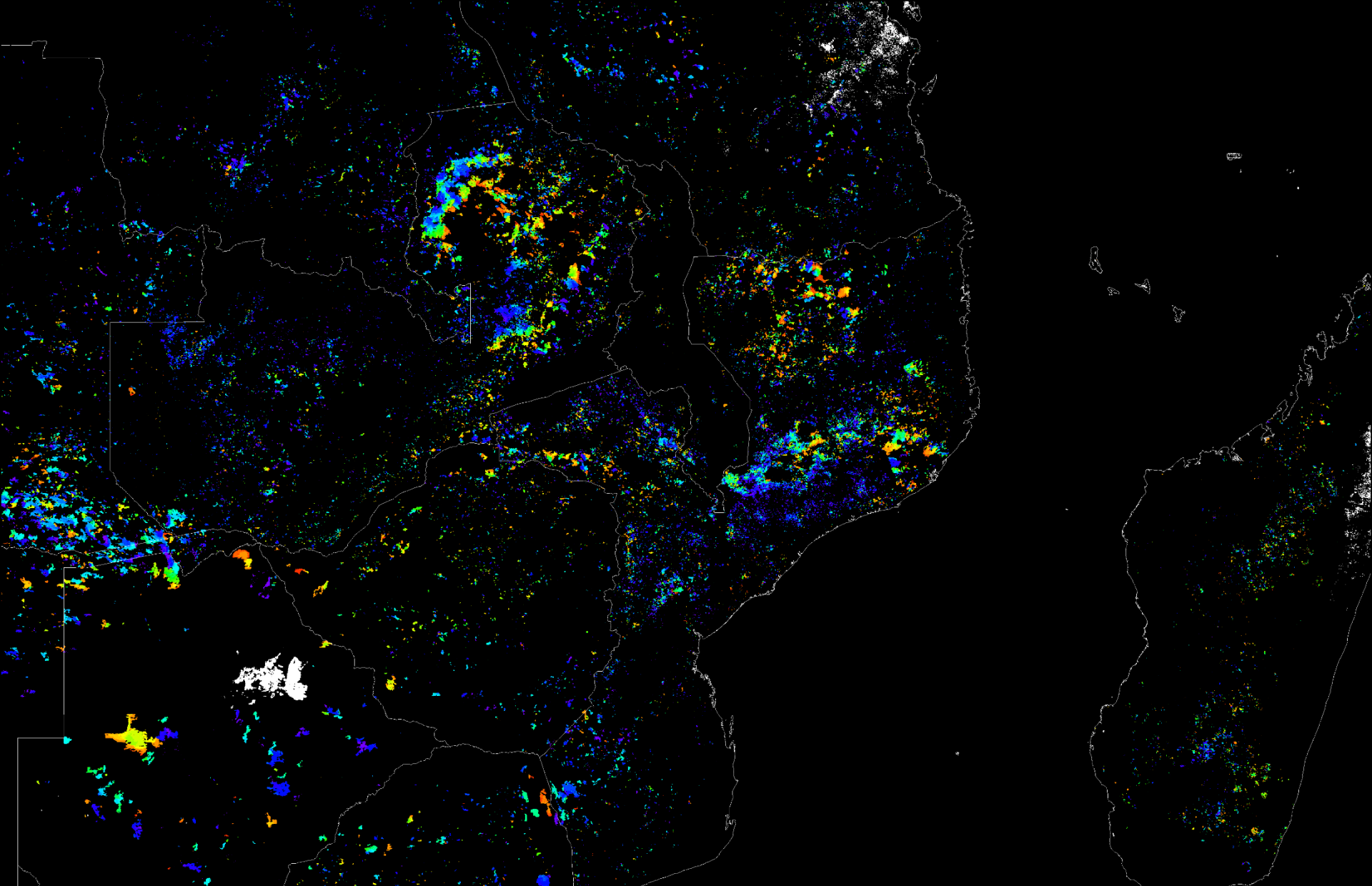
FEBRUARY 2002 (no generalization)



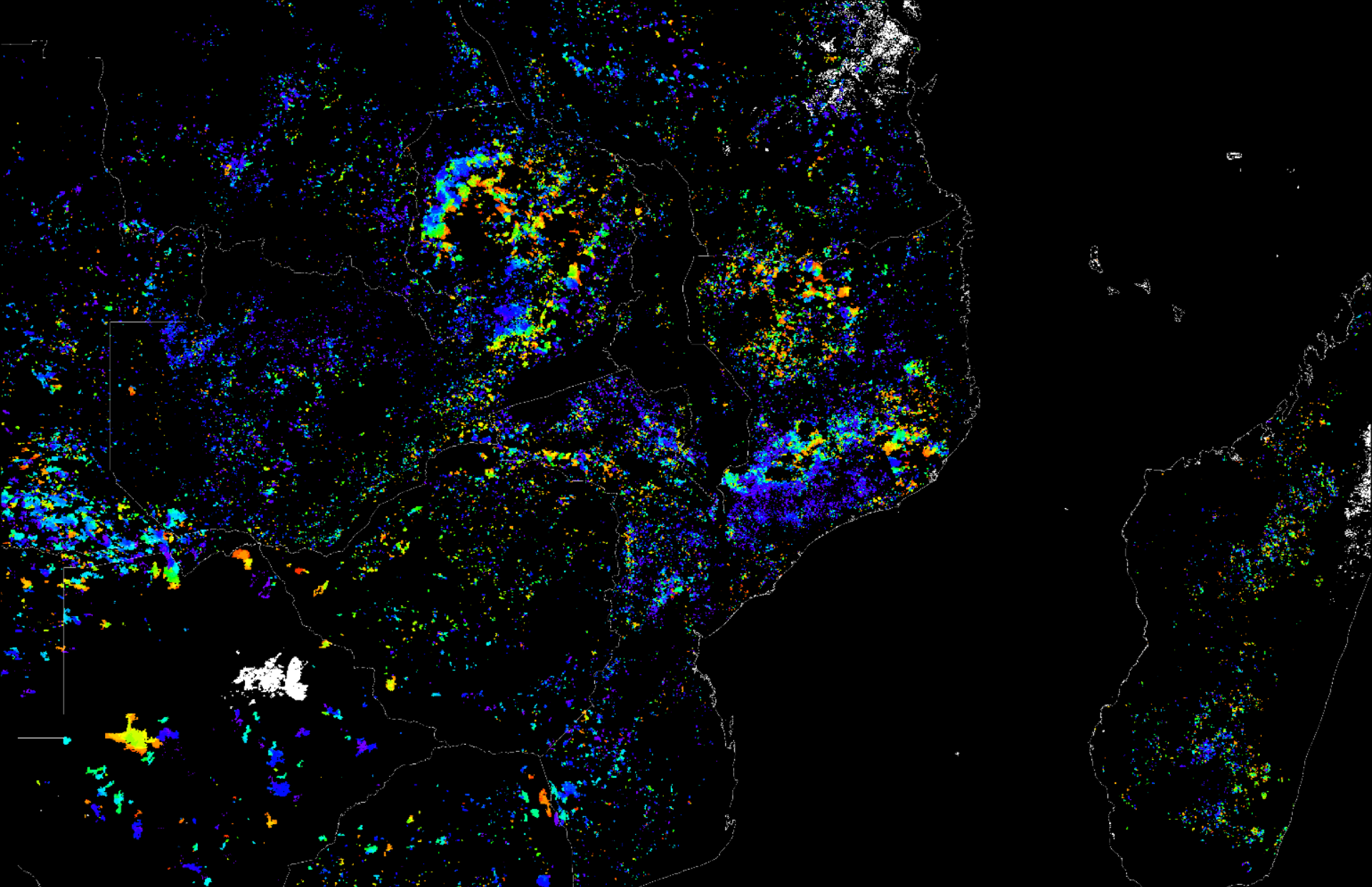
Global 8km composite – September 2001



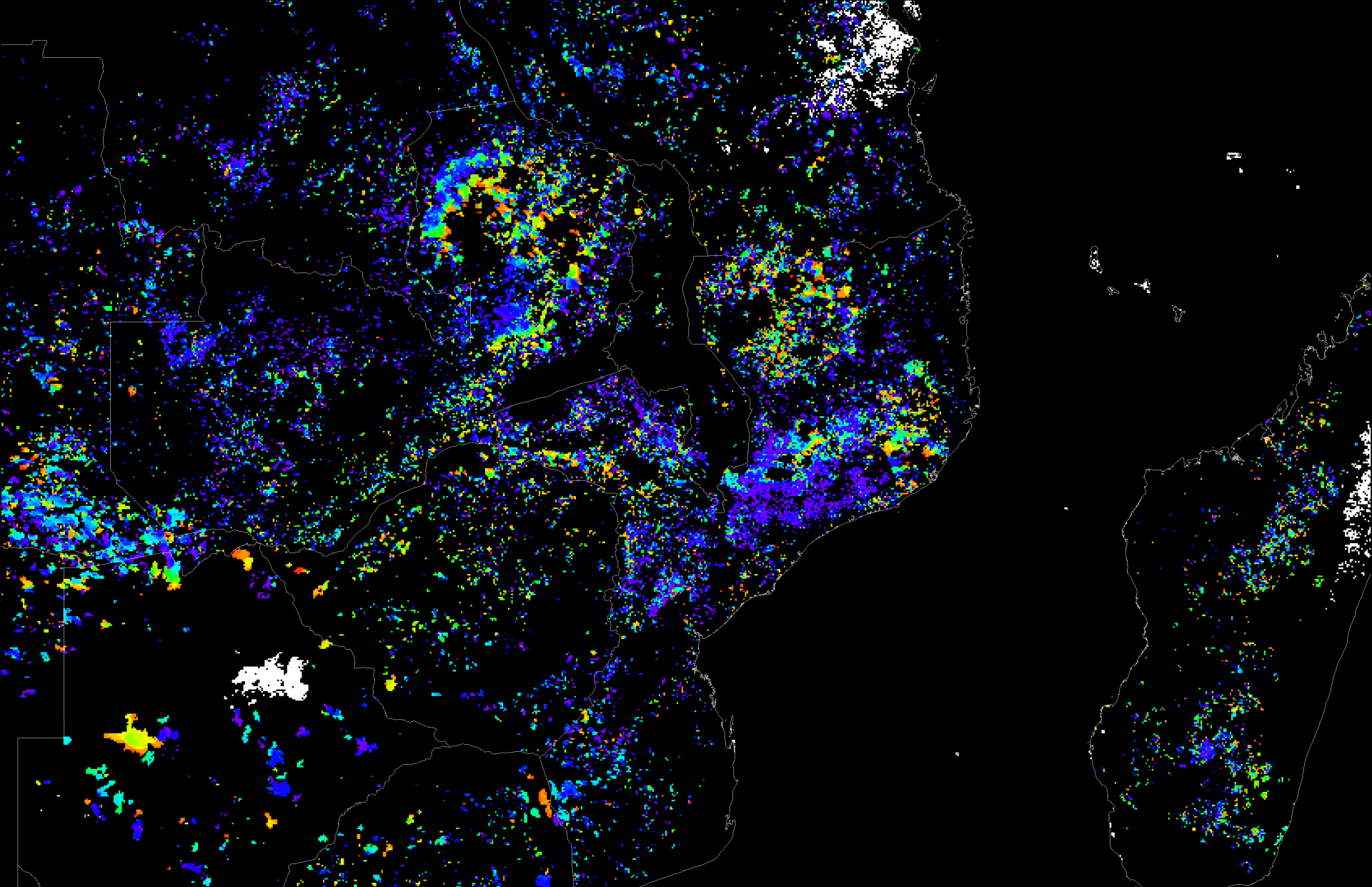
Detail Africa - 500m



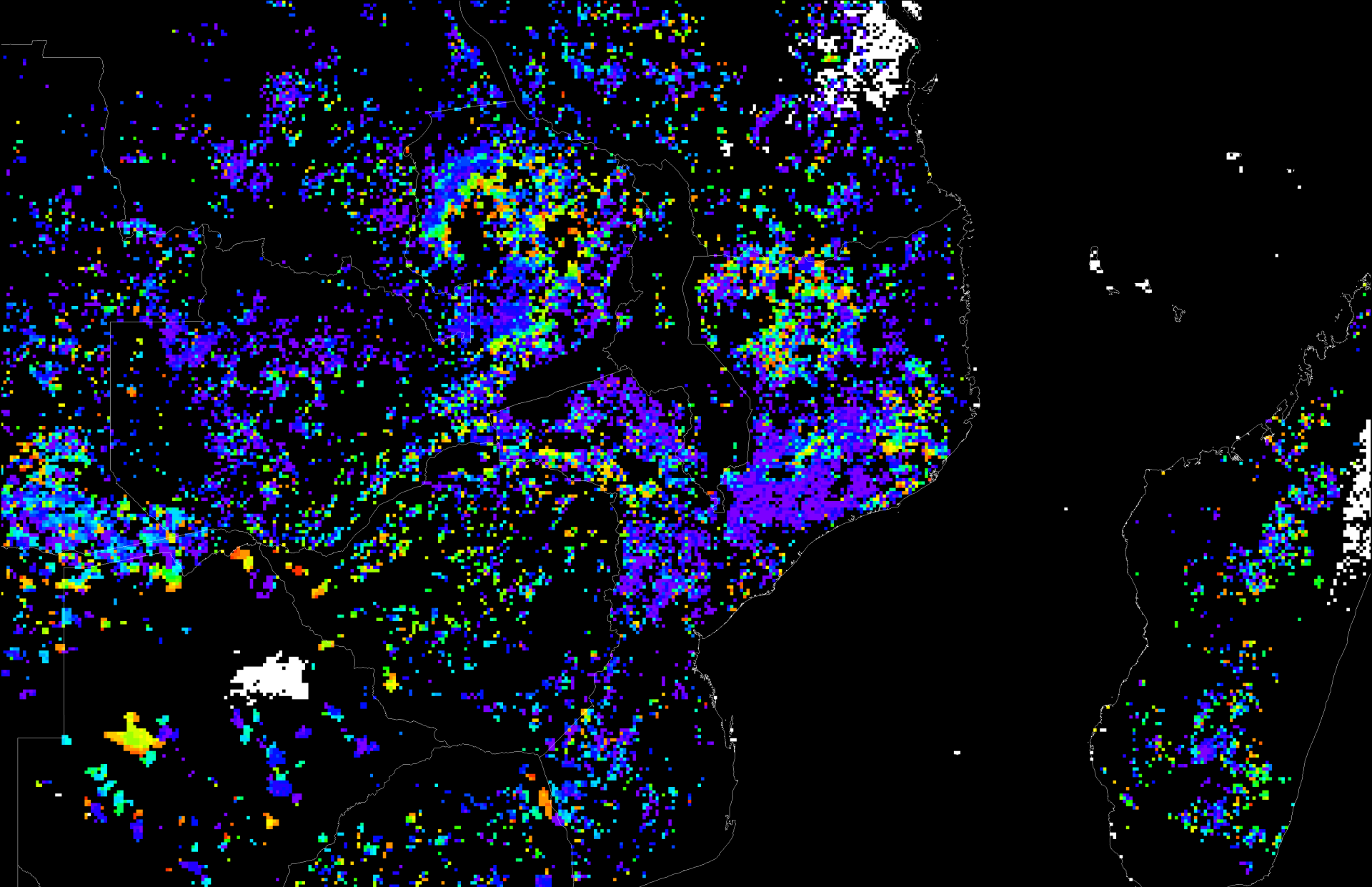
Detail - 1Km



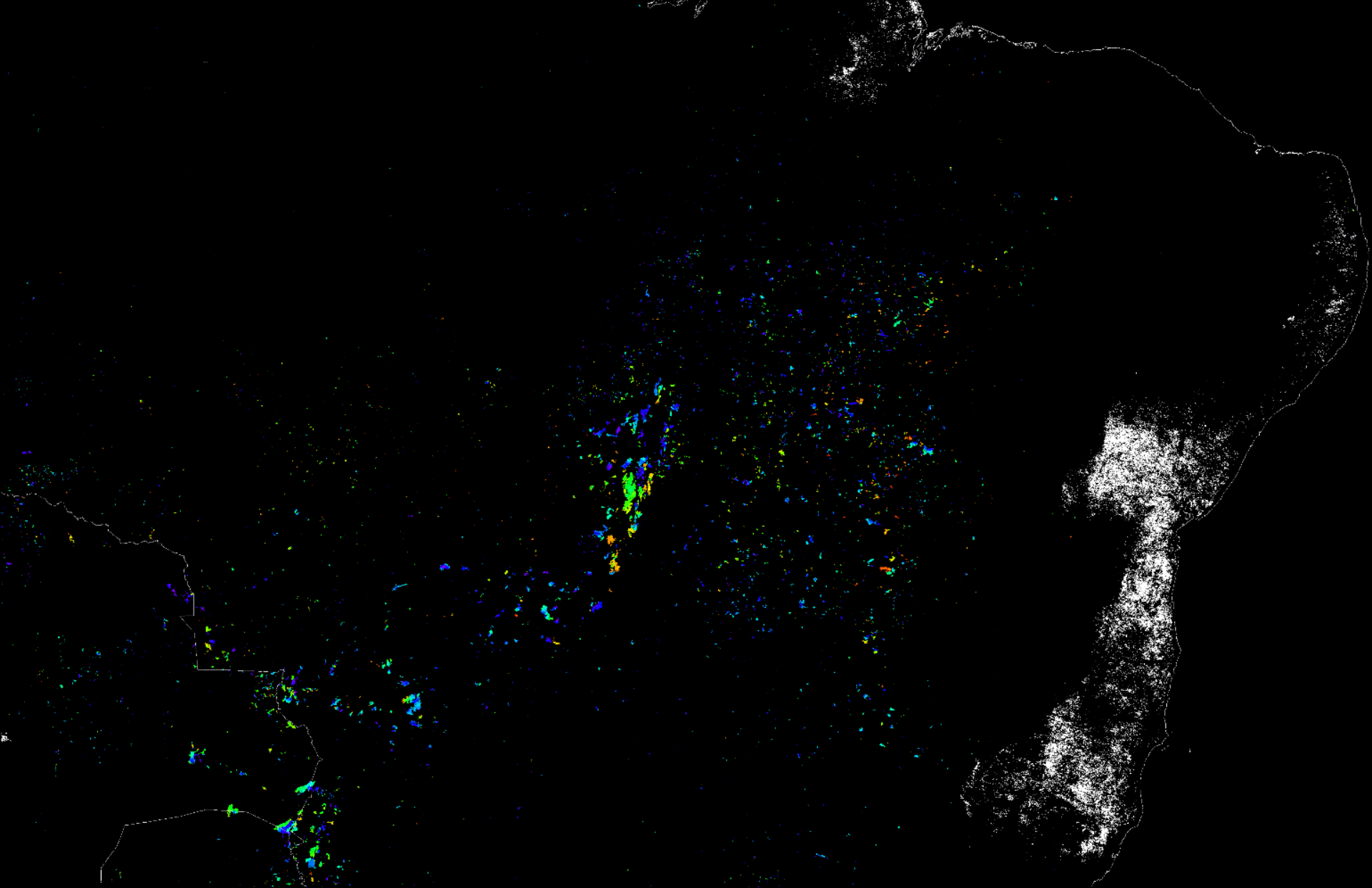
Detail - 2km



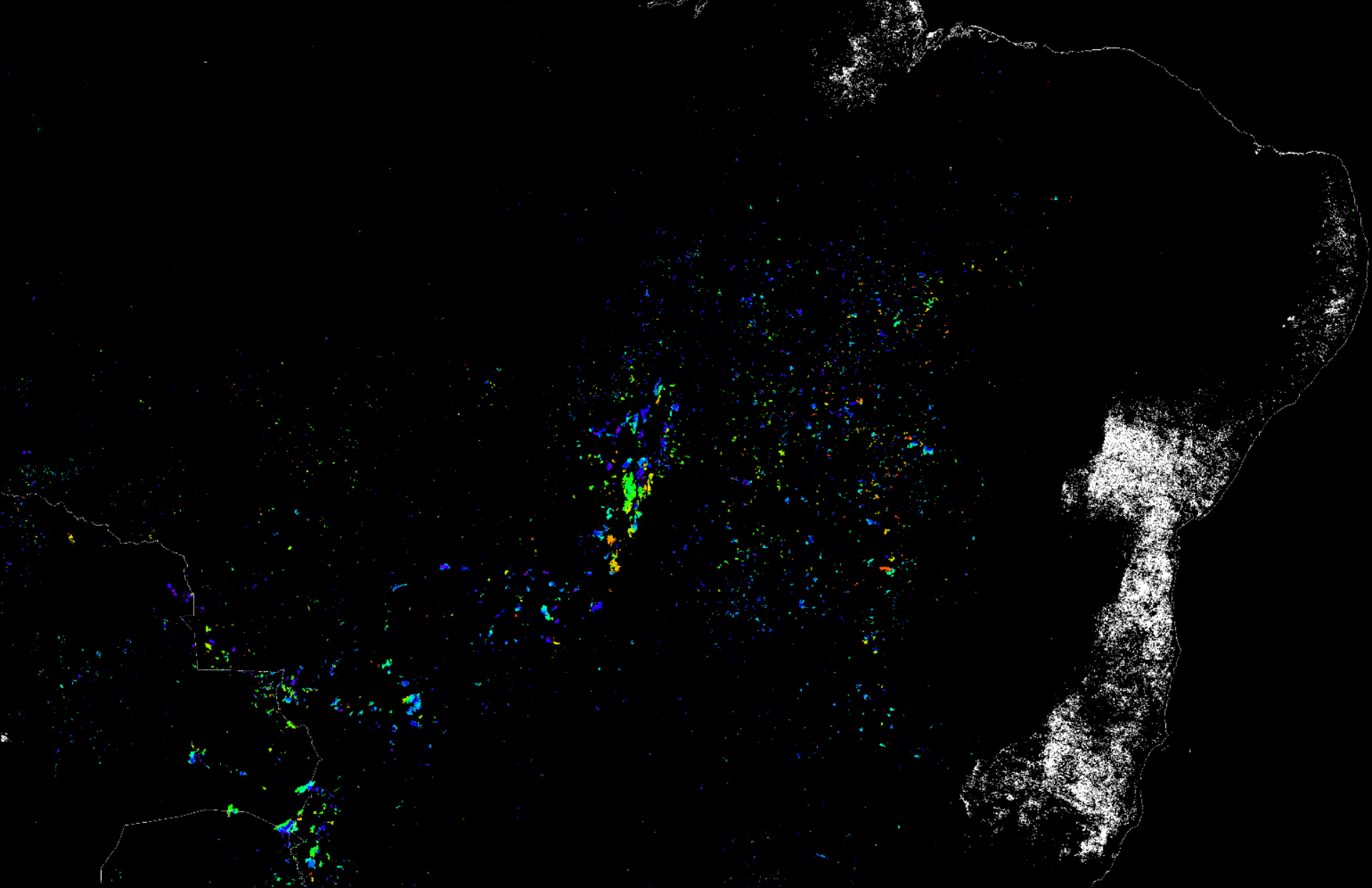
Detail - 4km



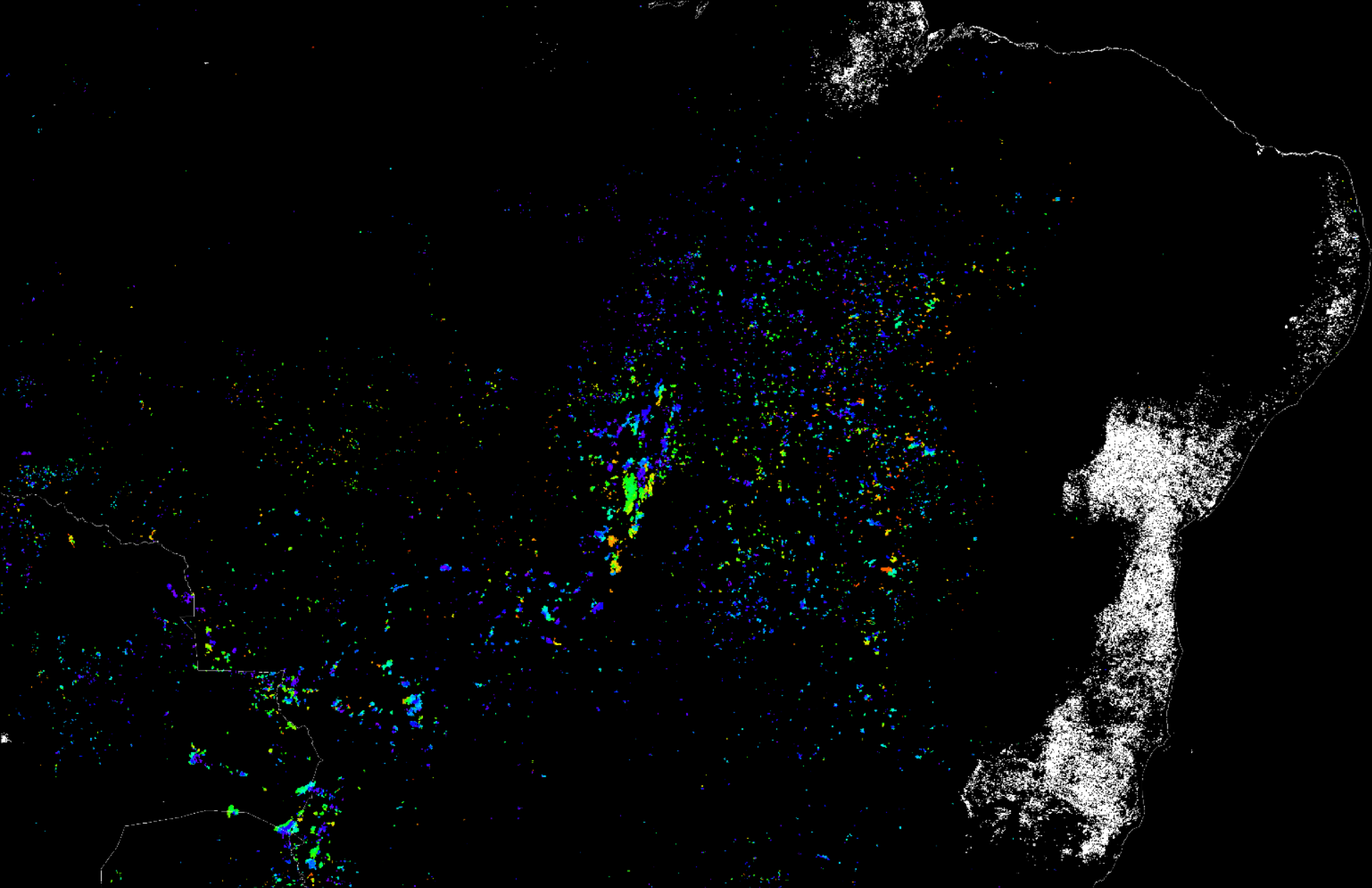
Detail - 8km



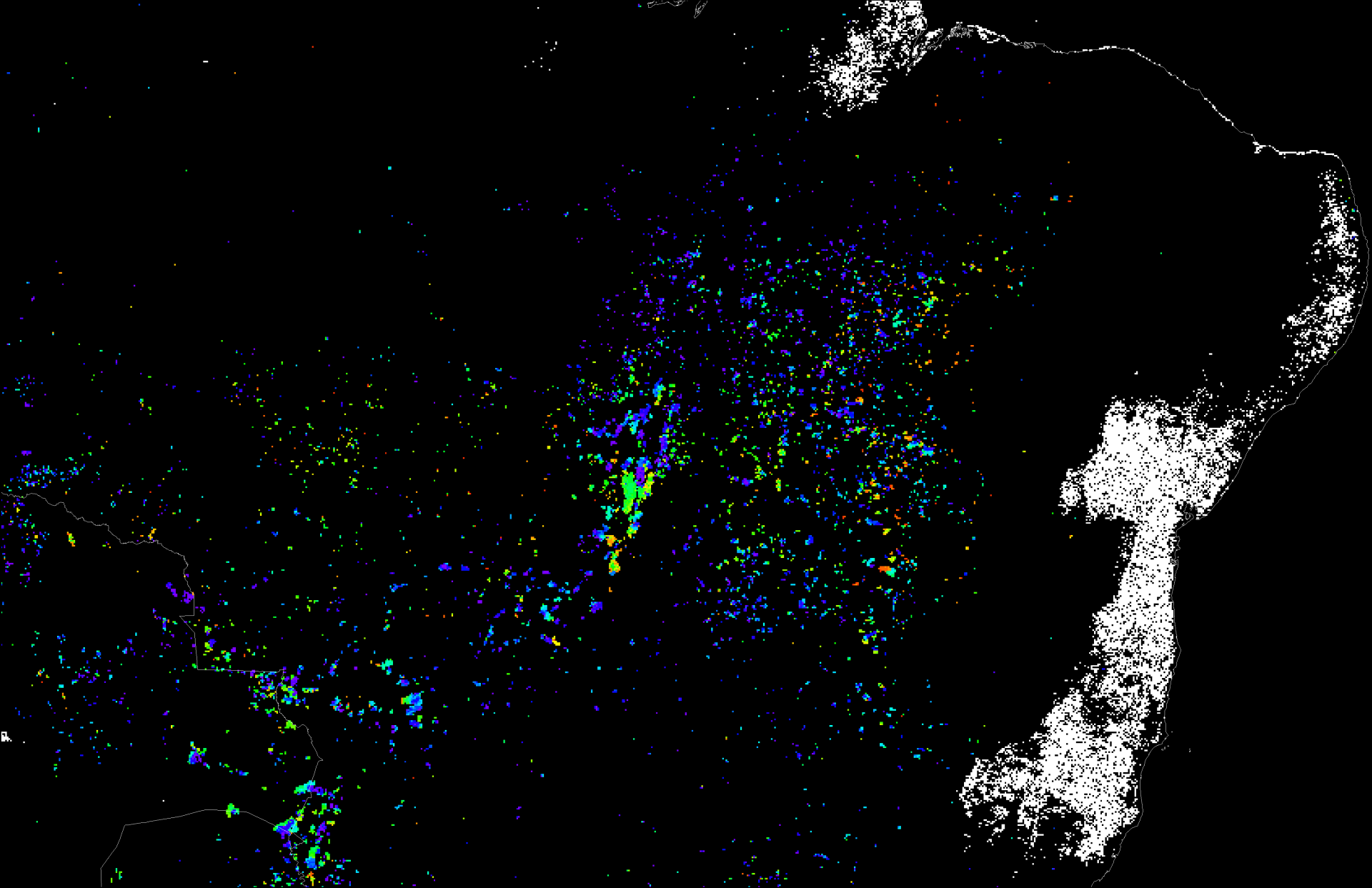
Detail Brazil - 500m



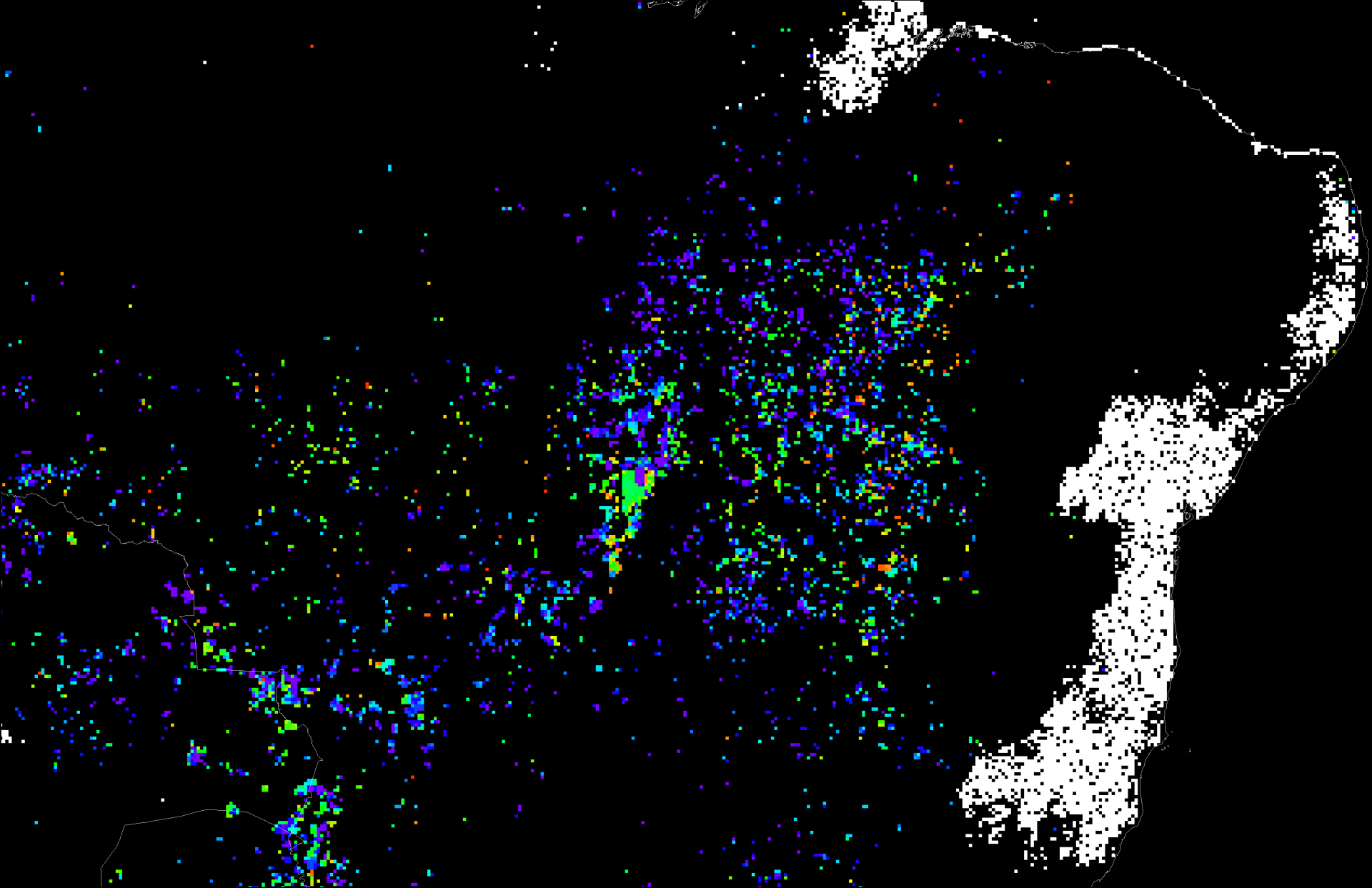
Detail - 1Km



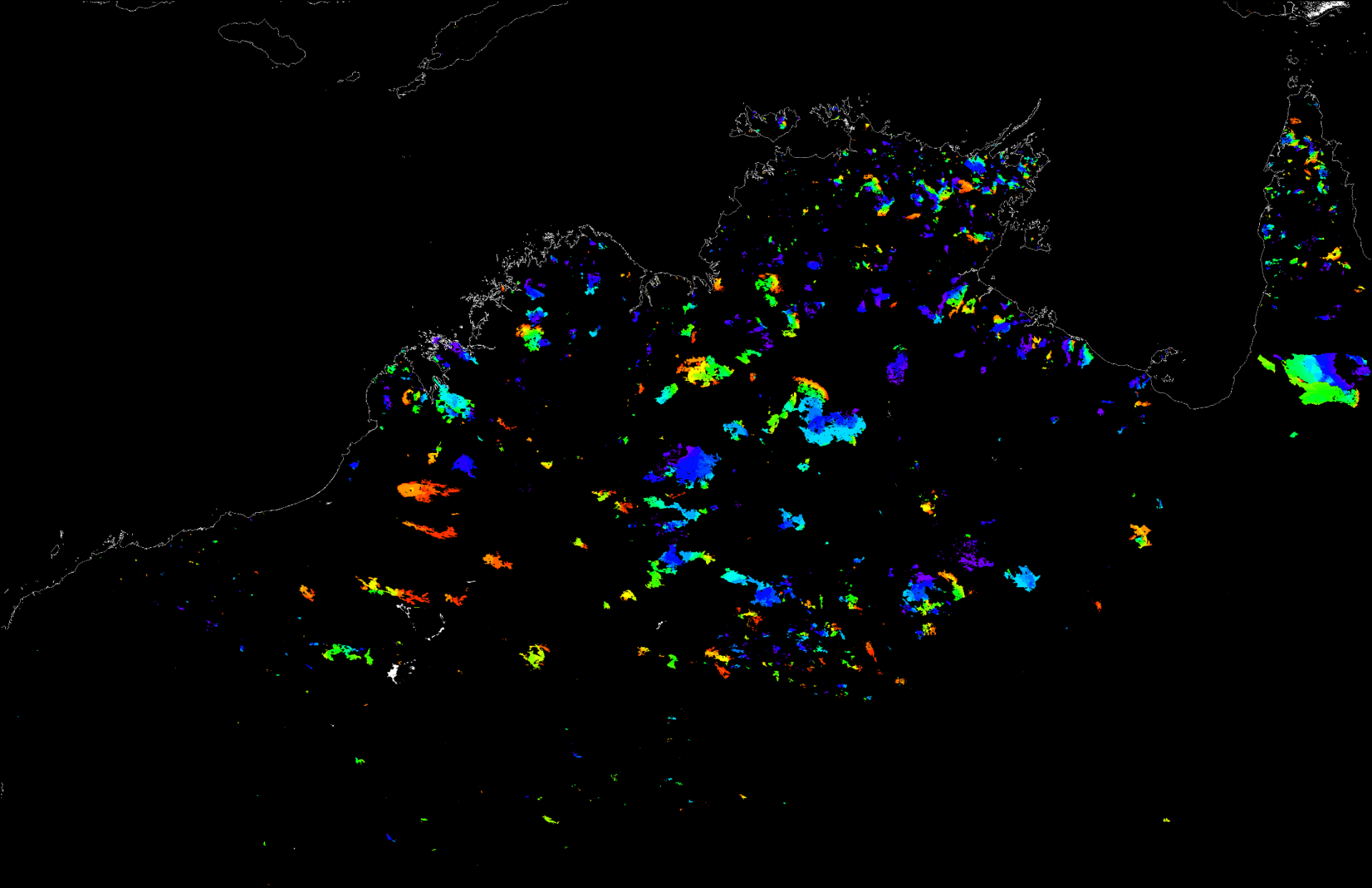
Detail - 2km



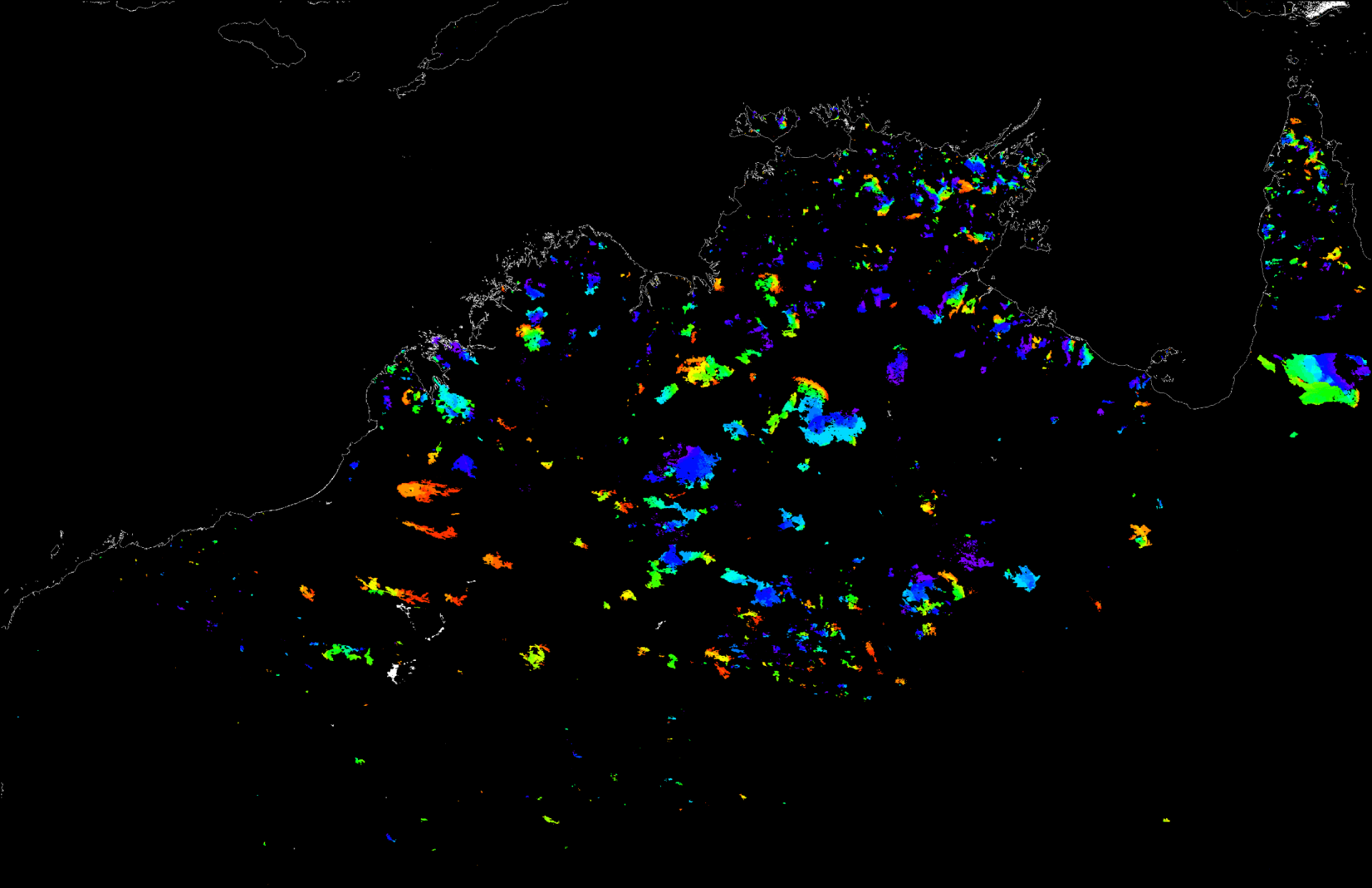
Detail - 4km



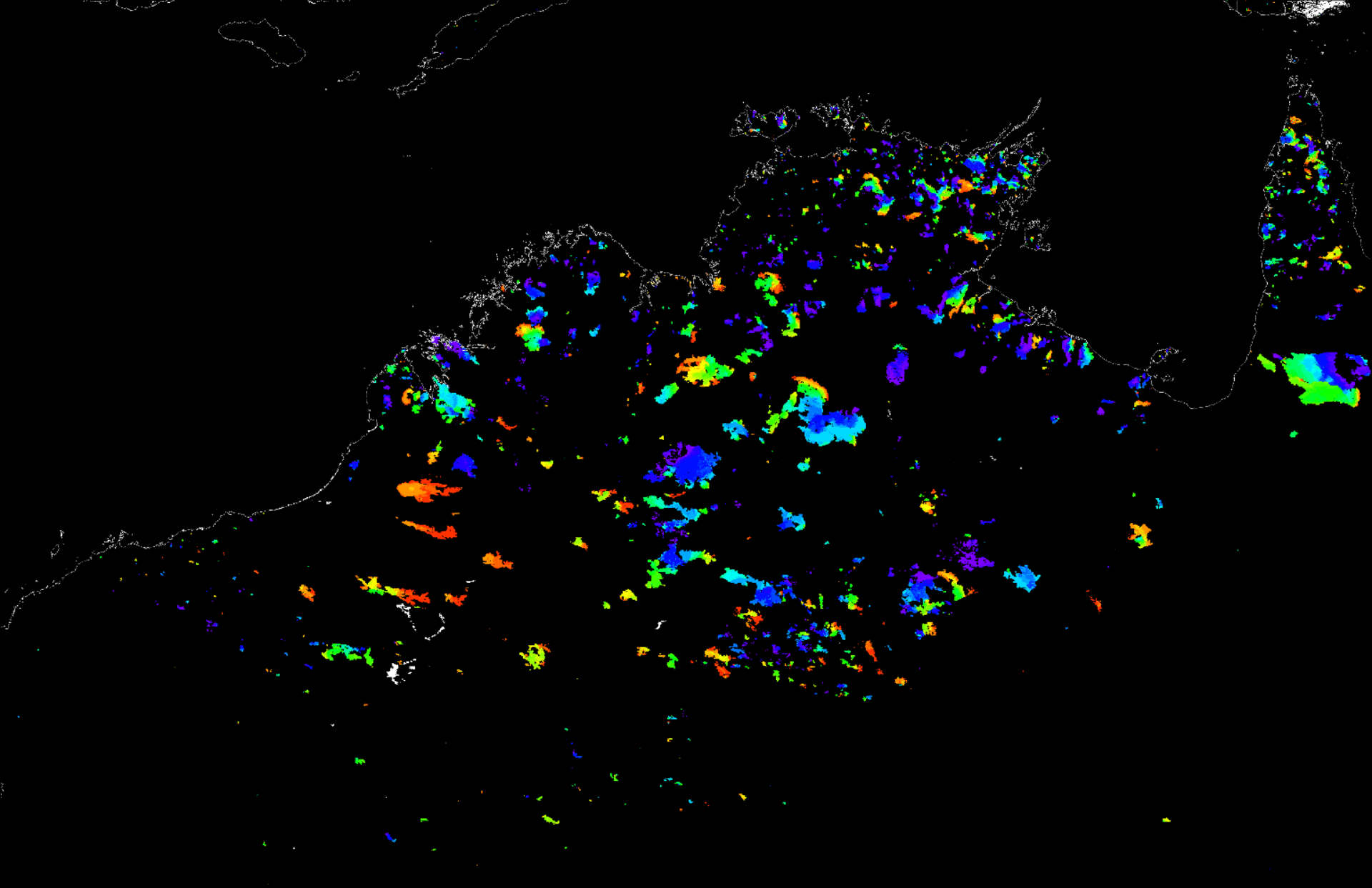
Detail - 8km



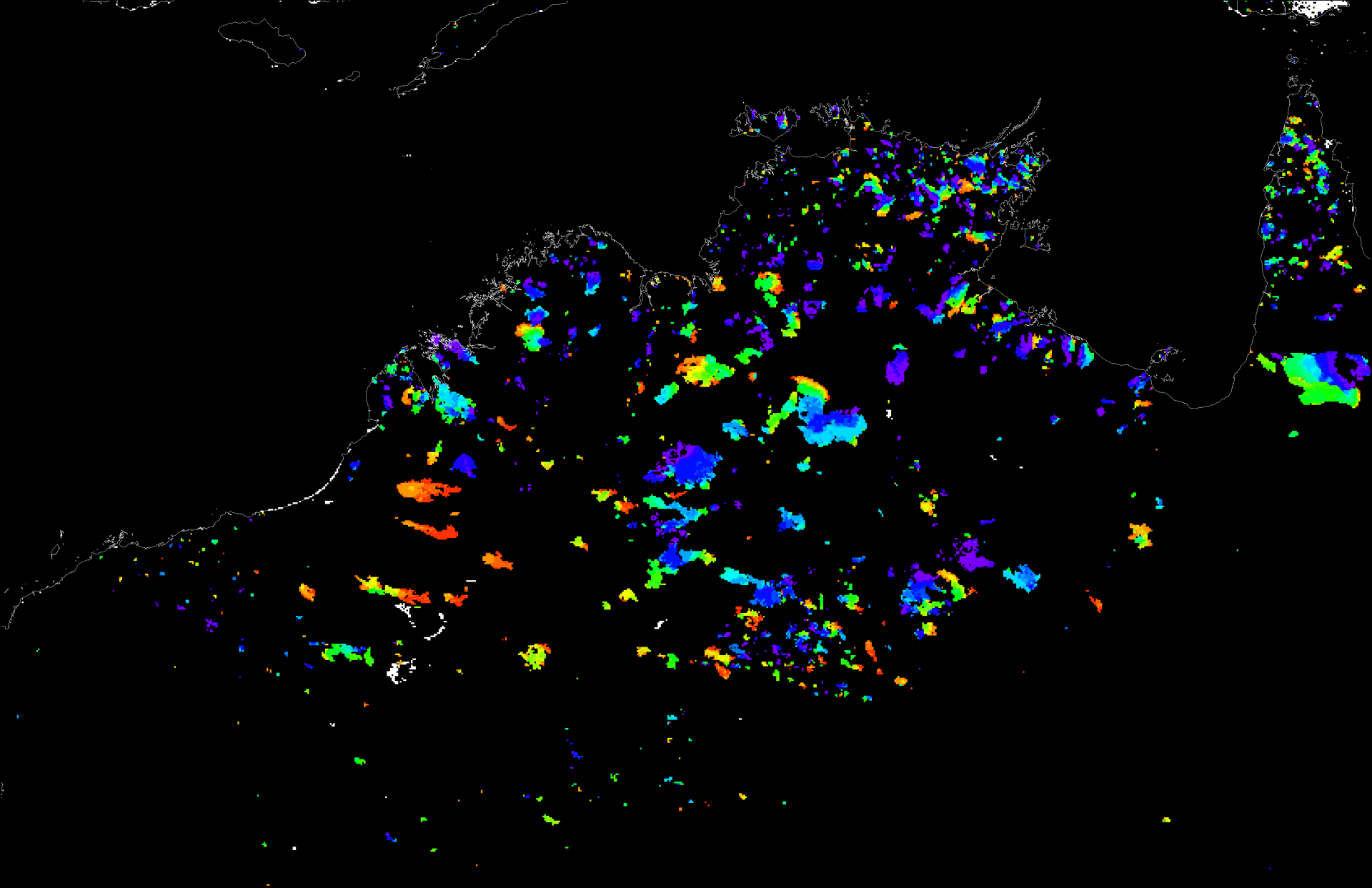
Detail Australia - 500m



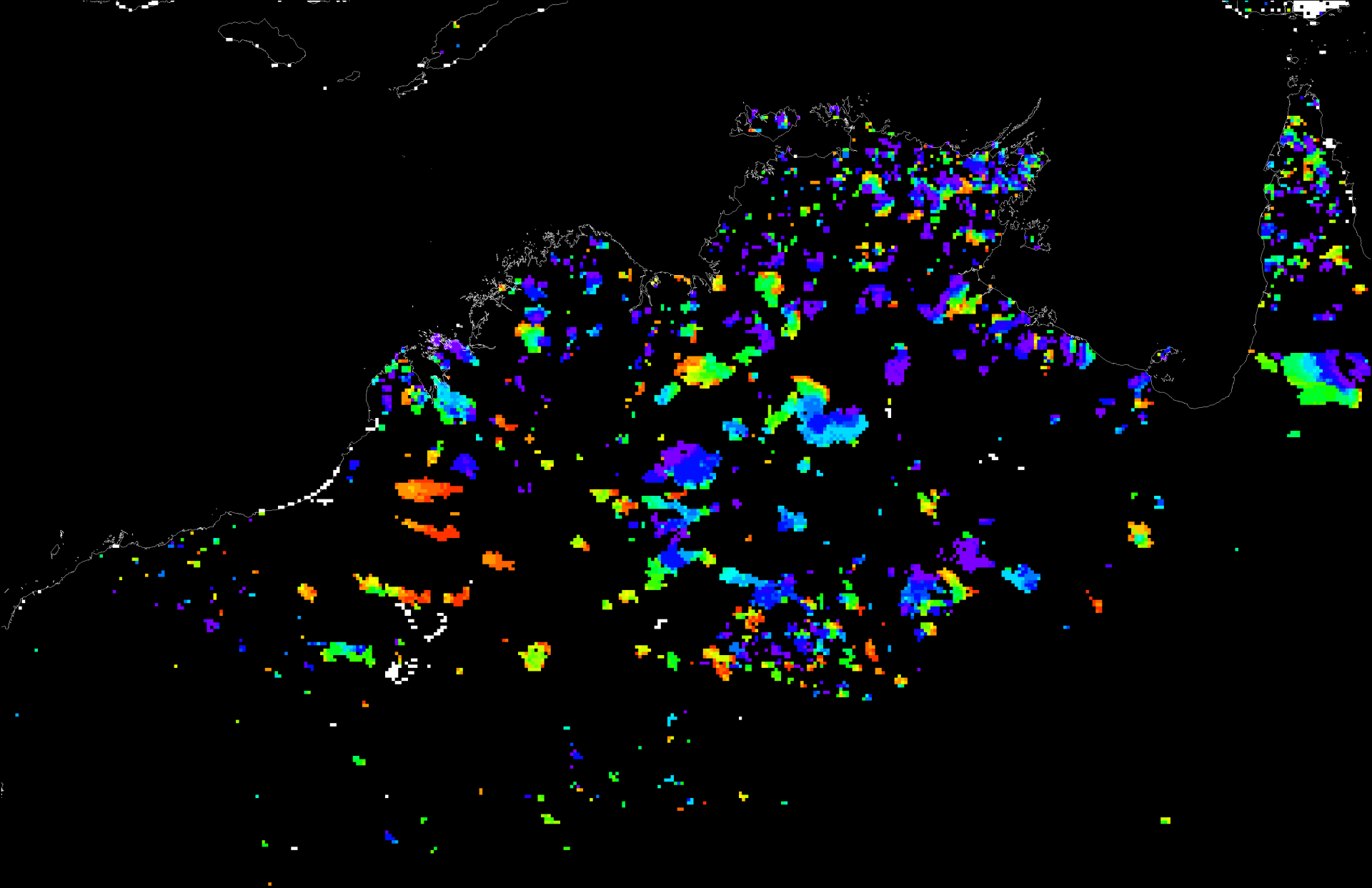
Detail - 1Km



Detail - 2km



Detail - 4km



Detail - 8km

Burned Area Visualization

Status:

- Prototype code developed
- 1 year dataset delivered to JRC to test incorporation in the GWIS
- Whole 2000+ MCD64 archive preprocessed and ready for delivery

Summary Fire Metrics

Summary fire information for non-science users, in support of national fire assessment and national fire operations.

Designed for easy access by analysts (EFFIS model):

- overview of current season
- overview of historical fire regimes
- comparison between current season and historical data (detection of anomalies)

Summary Fire Metrics

“Country dashboard” with easy access to fire information at the national and subnational level. Directly supports the task of analysts compiling a national fire assessment.

Involvement of GOFC Fire Regional Network to identify the relevant metrics

Preliminary list of metrics

Total area burnt and number of active fire detections (computed monthly and yearly)

- total area burned (ha and km²) with uncertainty estimates
- total number of active fire detections (counts)
- temporal ranking of the above and the year/month that the ranked values occurred on
- counts of the number of months or years where there was no fire (burned area = 0 km², or number of active fires detected = 0)

Preliminary list of metrics

Fire seasonality metrics (computed yearly):

- start of the fire season and end of the fire season, peak month of burning
- temporal ranking of the above and the year/month that the ranked values occurred on

Preliminary list of metrics

Fire size metrics (computed yearly):

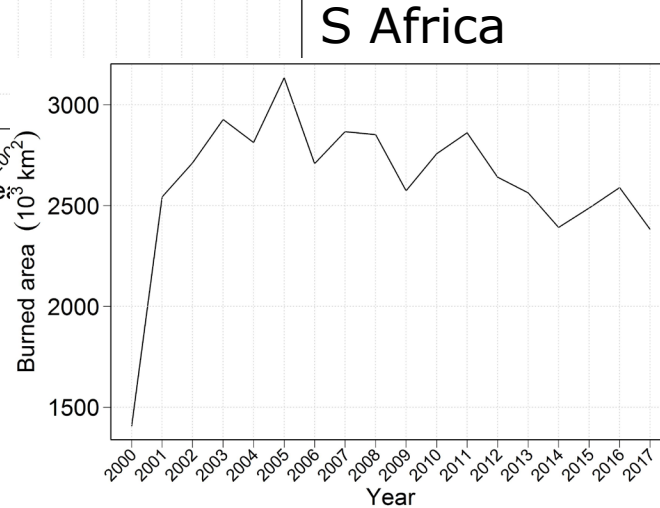
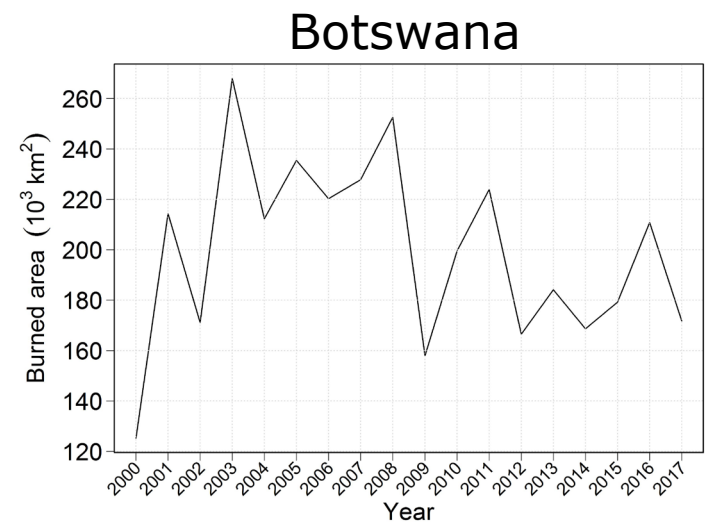
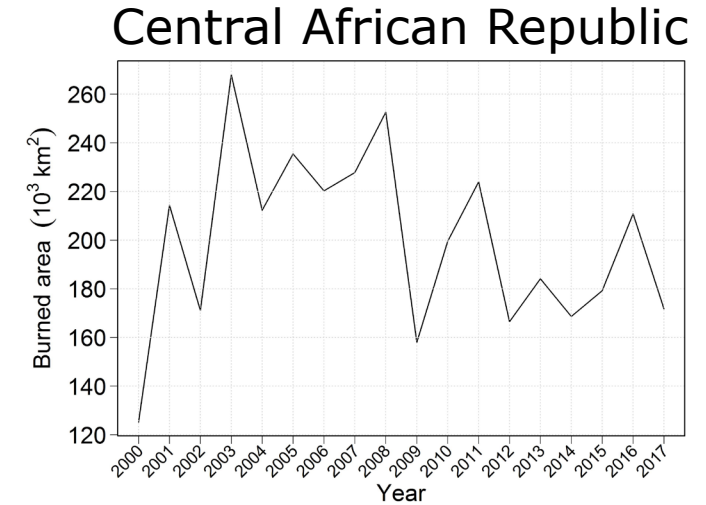
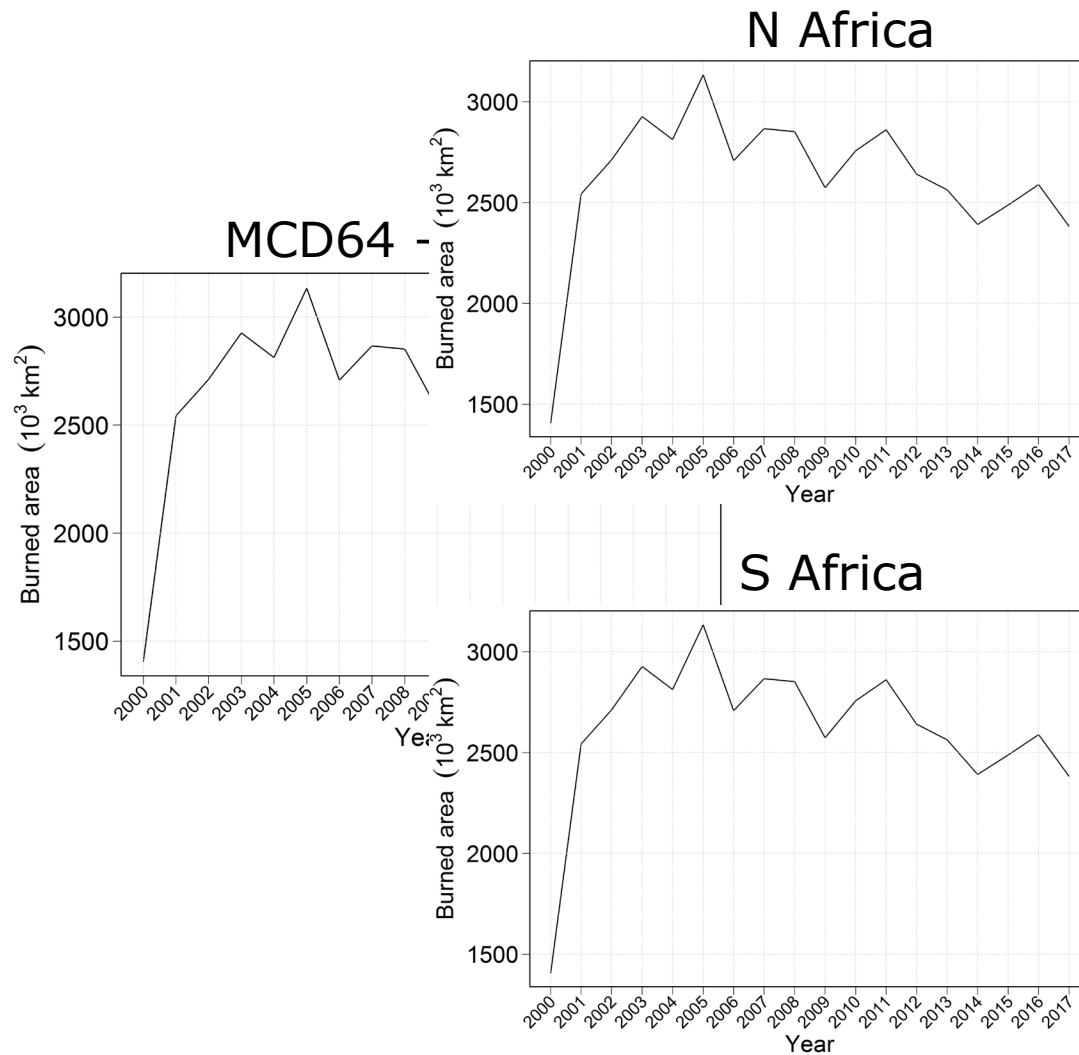
- mean, median and maximum fire size
- number and minimum size of the fires responsible for 25%, 50%, 75% of the total annual burned area

Spatial Reporting Units

Metrics computed at these scales:

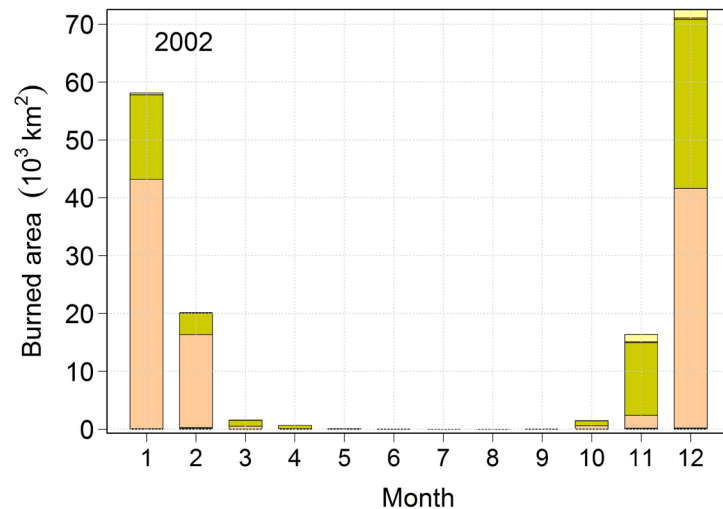
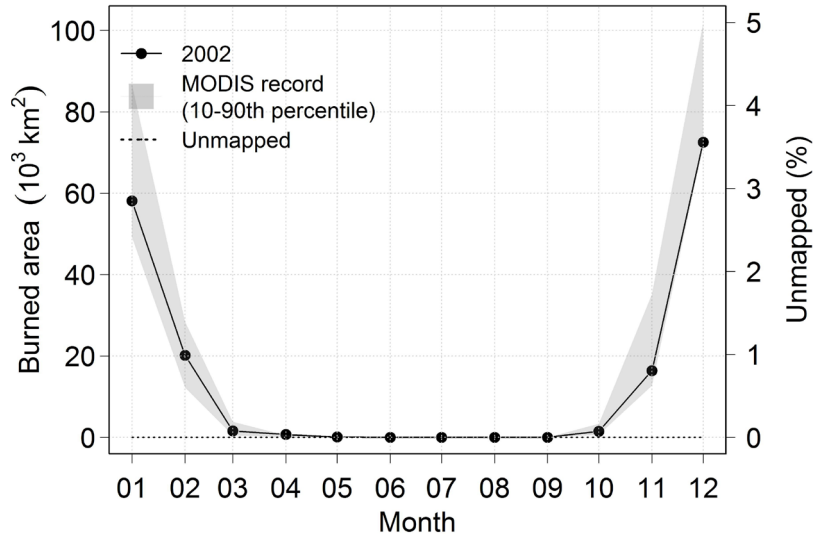
- sub-national, (GAUL Level 1 boundaries)
- national, (GAUL Level 0)
- sub-continental
- continental
- global

On-demand plots and charts

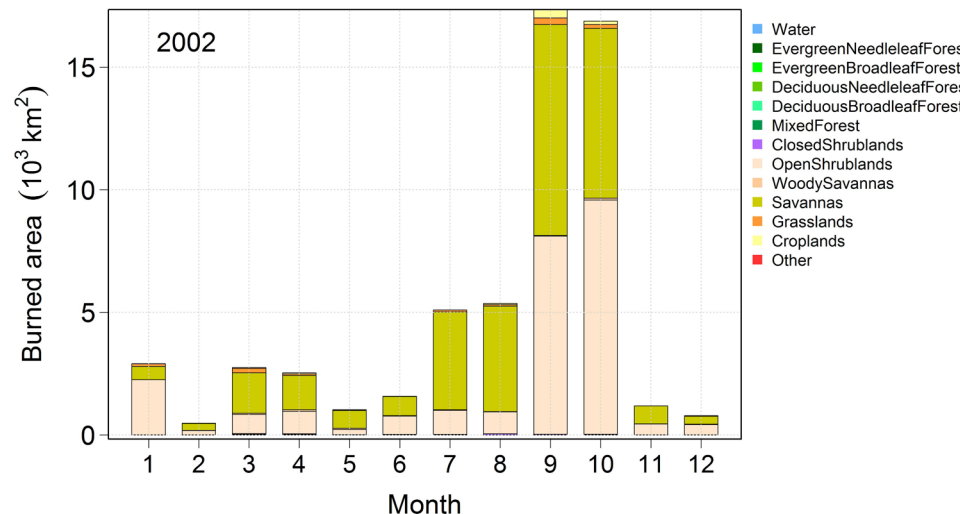
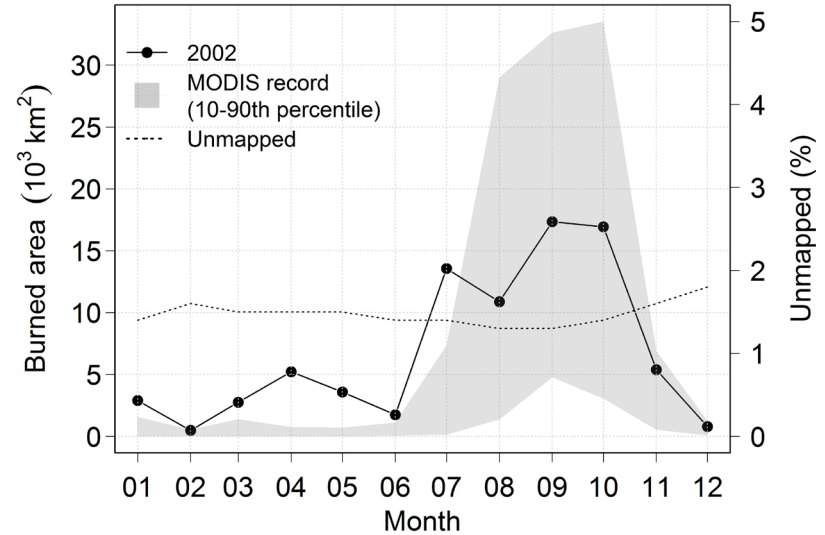


On-demand plots and charts

Central African Republic

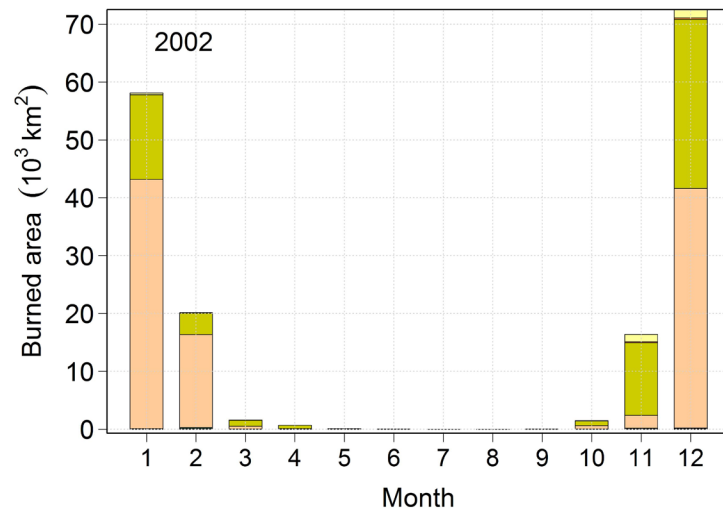
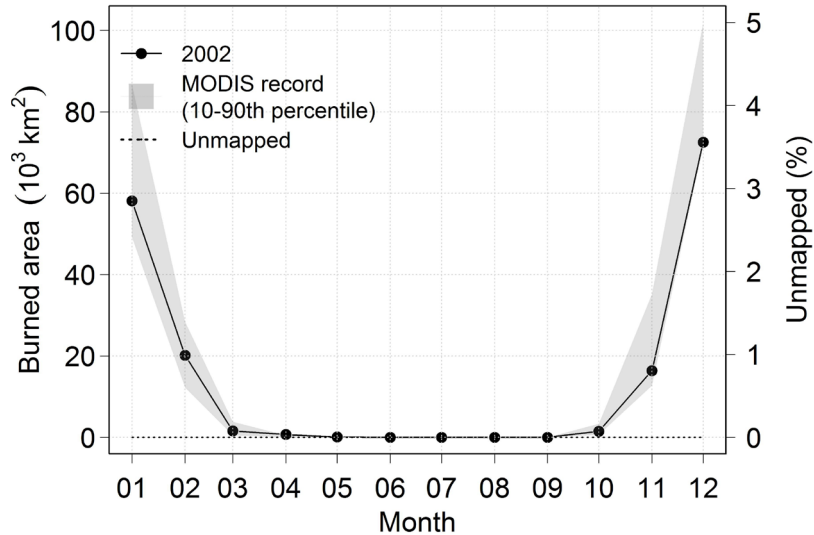


Botswana

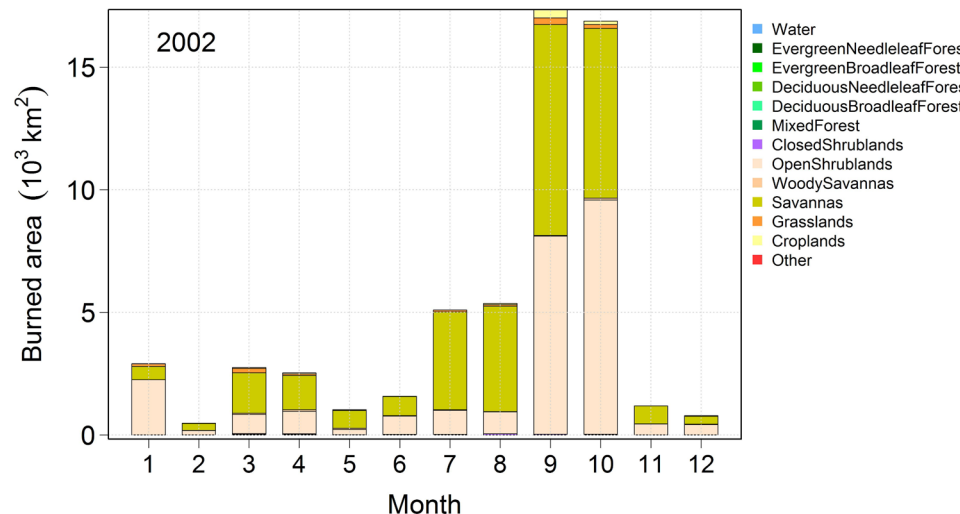
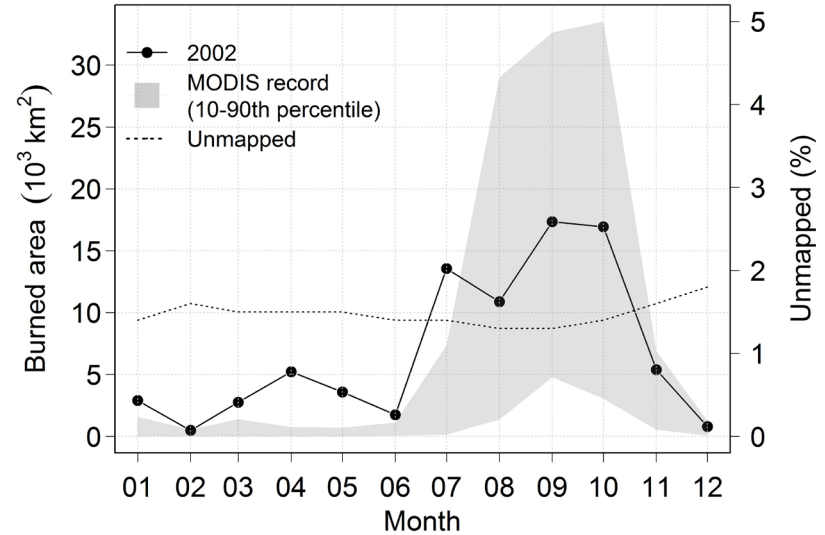


On-demand plots and charts

Central African Republic

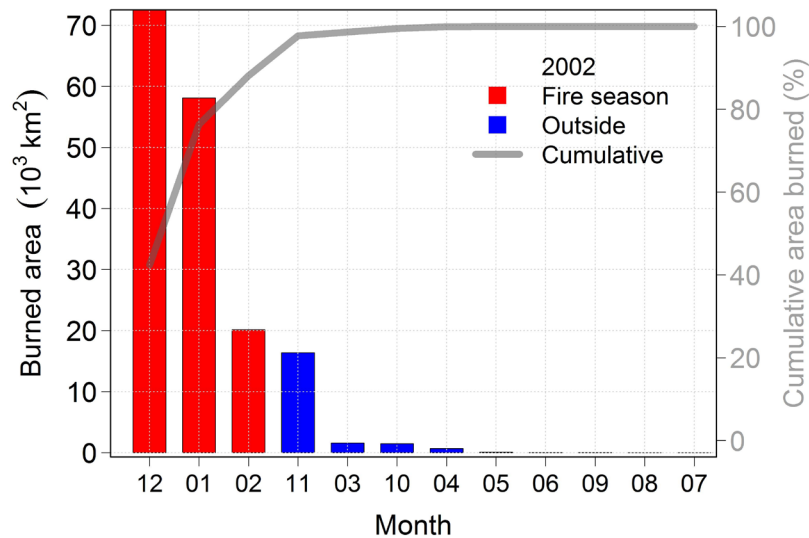


Botswana

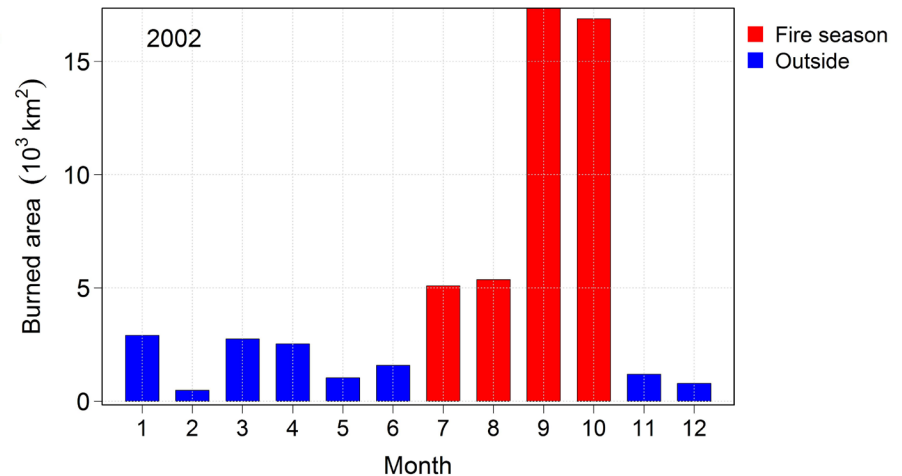
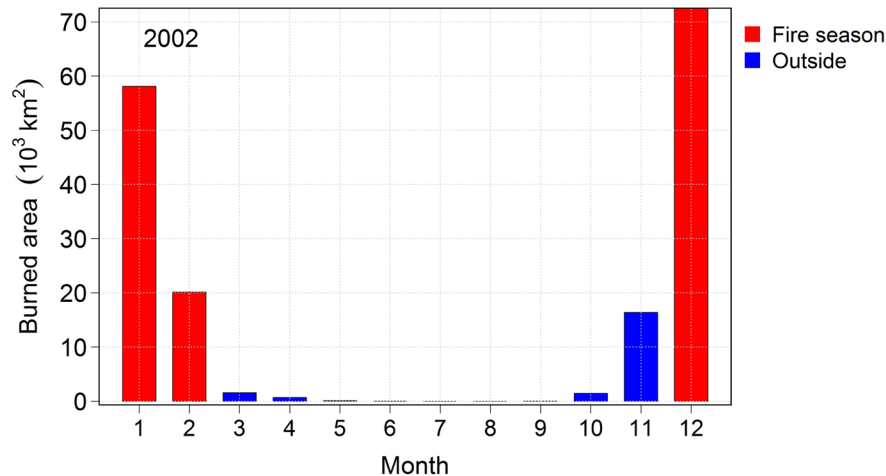
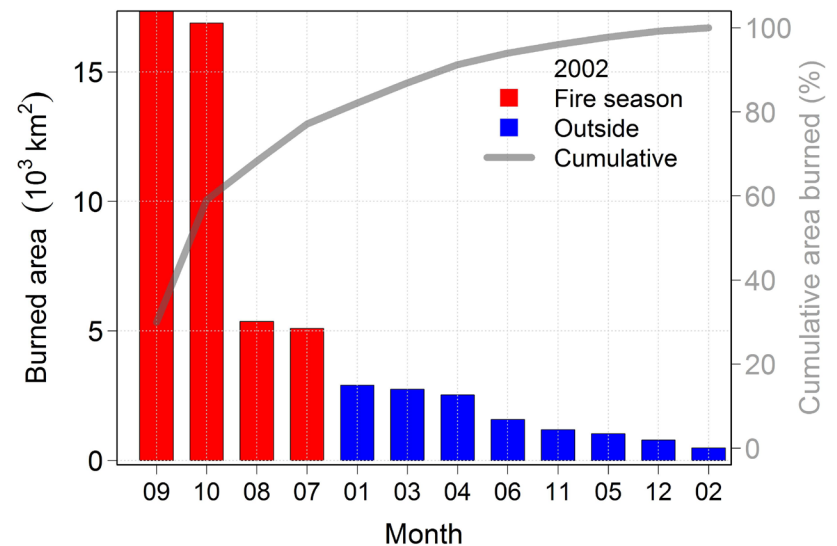


On-demand plots and charts

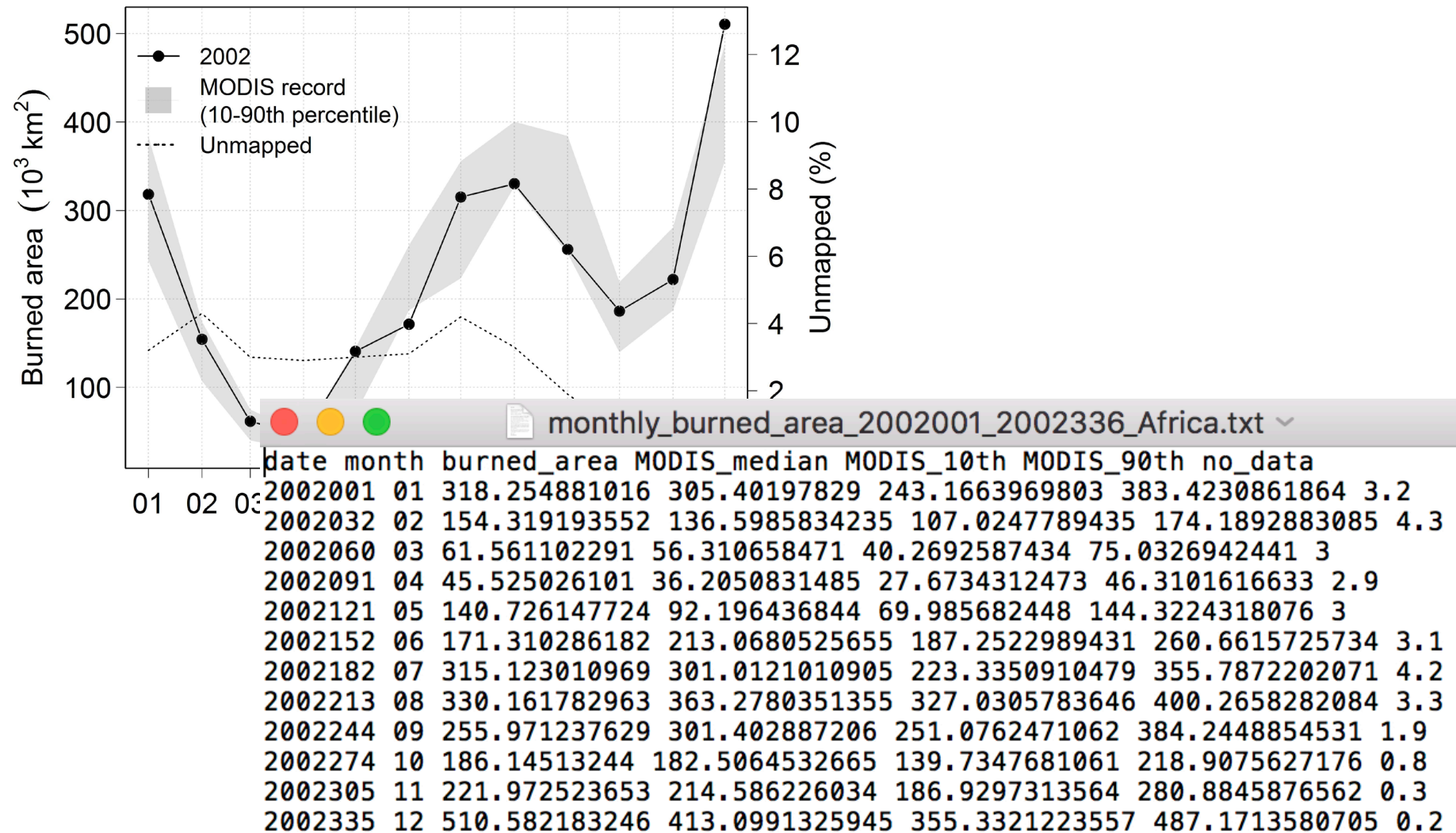
Central African Republic



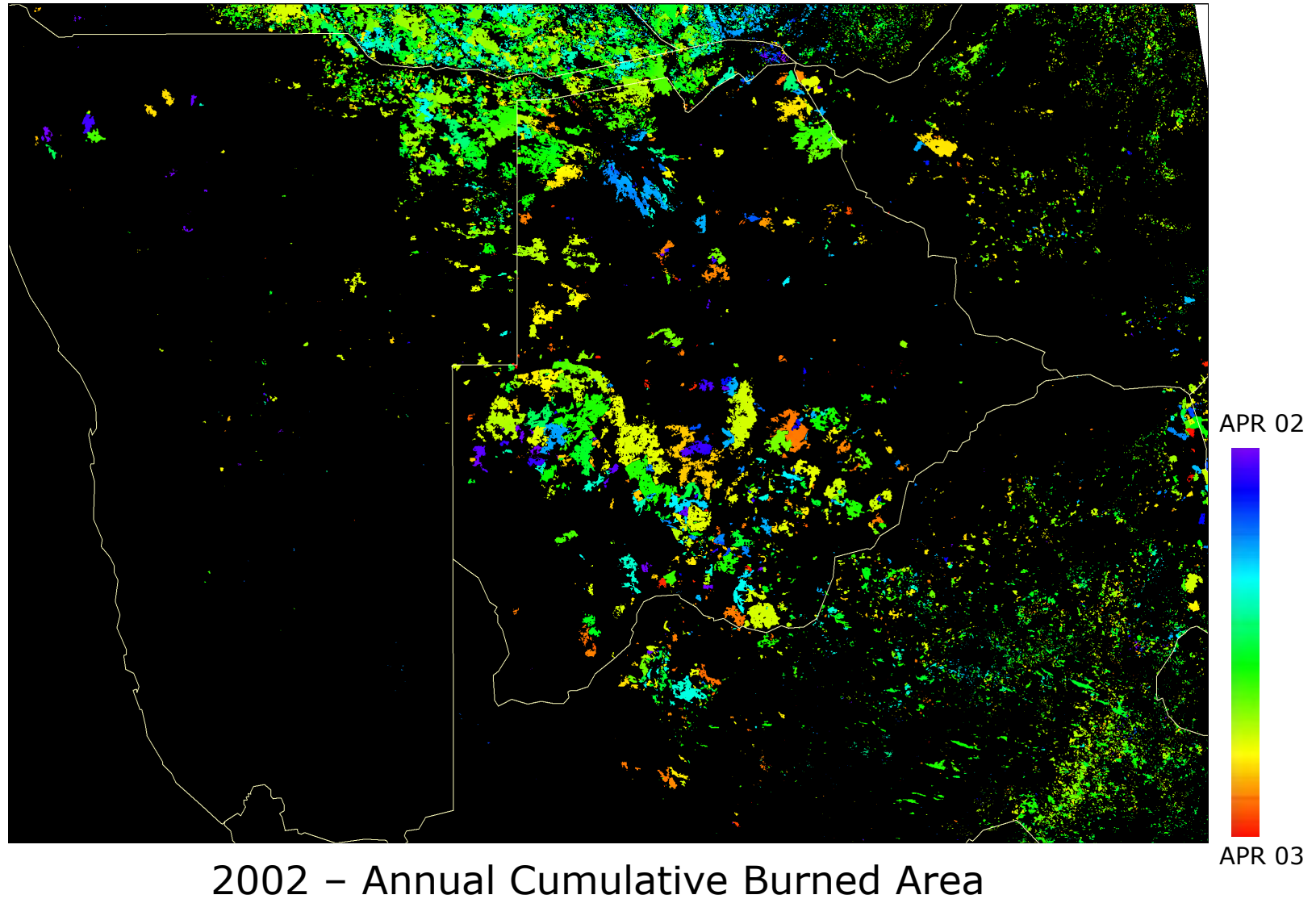
Botswana



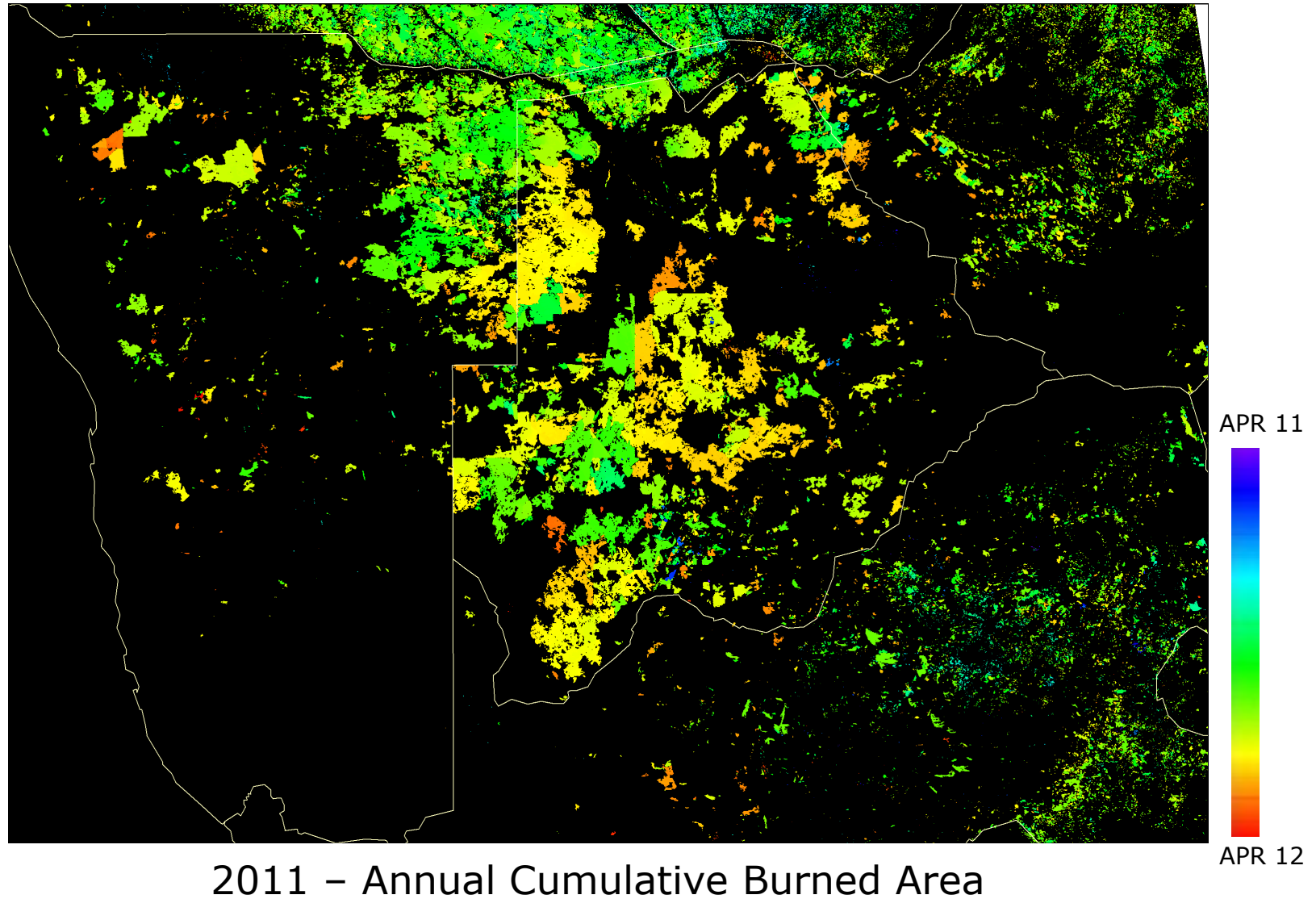
ASCII datasets



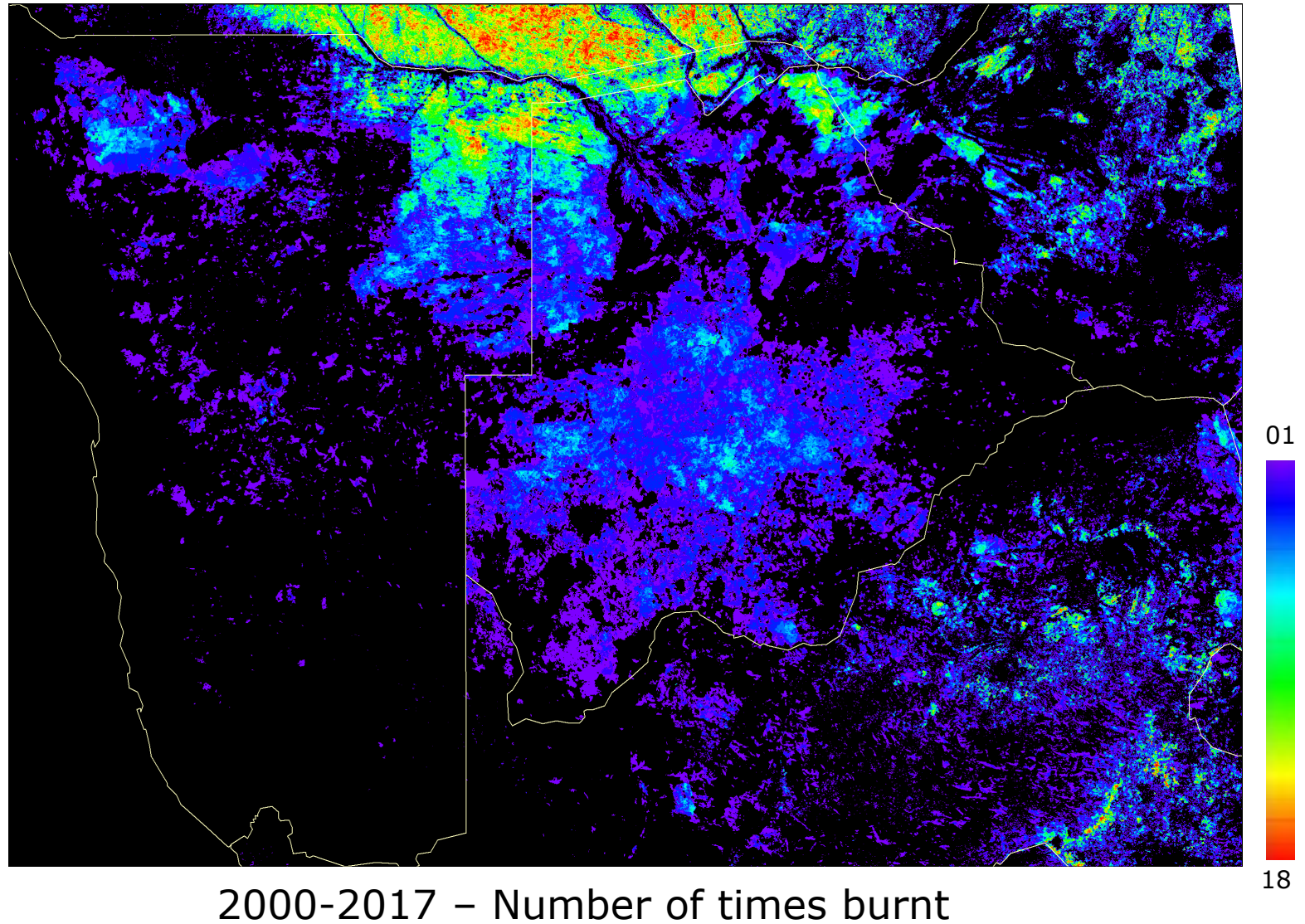
Summary Raster Datasets



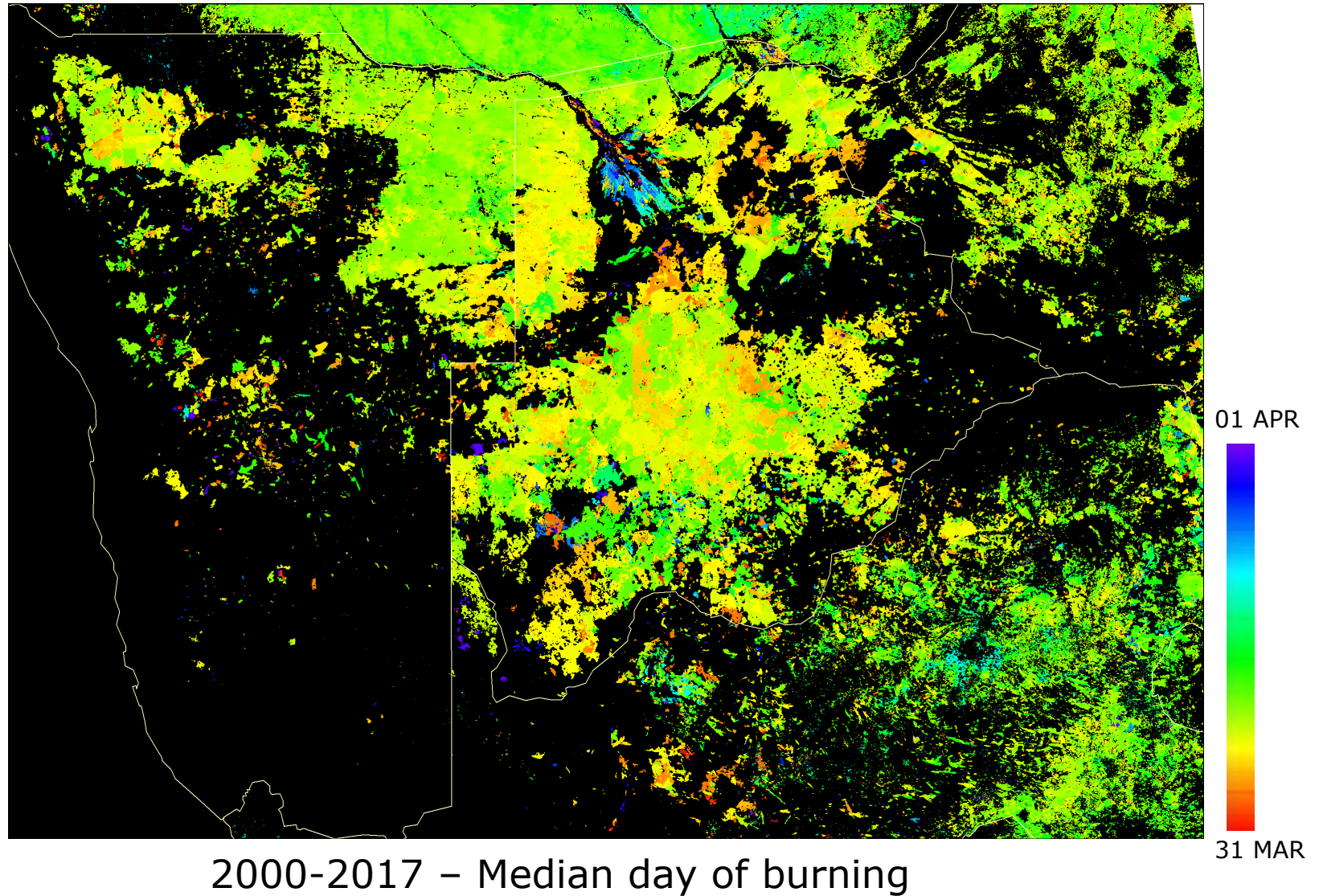
Summary Raster Datasets



Summary Raster Datasets



Summary Raster Datasets



Summary Datasets - Status

- Participation in SafNet meeting April 2018
- Prototype code developed
- Presentation and discussion at the 2019m Wildfire conference in Brazil.
- Collaboration with FAO to provide input datasets to FAOSTAT for the computation of fire emissions with IPCC Tier 1/ Tier 2 methodology

Data Quality Issues

Providing information for policy support requires:

- Documented, transparent and reproducible methods
- Statistically rigorous protocols for the assessment of uncertainties and propagation of the uncertainties into the summary metrics
- Tools designed to help analysts, not to replace them