

NASA MODIS and VIIRS Burned Area Products Update

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MODIS Burned Area Products

MODIS Collection 6

MCD64A1	500-m Monthly
MCD64A1-based GIS Products (SCF)	Shapefiles + 500-m GeoTIFF
MCD64CMQ (SCF)	0.25° Monthly
MCD64CDQ (SCF)	0.25° Daily

MODIS C6 BA Product Status

- C6 MCD64A1 operational production began in late 2016
- Public release February 2017
- General increase in burned area (~26%) compared to C5.1
- Gave update at last meeting in Windsor
- MCD64CMQ 0.25° monthly CMG product released July 2018



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The Collection 6 MODIS burned area mapping algorithm and product

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ABSTRACT

The two Moderate Resolution Imaging Spectroradiometer (MODIS) instruments on-board NASA's Terra and Aqua satellites have provided nearly two decades of global fire data. Here, we describe refinements made to the 500-m global burned area mapping algorithm that were implemented in late 2016 as part of the MODIS Collection 6 (C6) land-product reprocessing. The updated algorithm improves upon the heritage Collection 5.1 (C5.1) MCD64A1 and MCD45A1 algorithms by offering significantly better detection of small burns, a modest reduction in burn-date temporal uncertainty, and a large reduction in the extent of unmapped areas. Comparison of the C6 and C5.1 MCD64A1 products for fifteen years (2002–2016) on a regional basis shows that the C6 product detects considerably more burned area globally (26%) and in almost every region considered. The sole exception was in Boreal North America, where the mean annual area burned was 6% lower for C6, primarily as a result of a large increase in the number of small lakes mapped (and subsequently masked) at high latitudes in the upstream C6 input data. With respect to temporal reporting accuracy, 44% of the C6 MCD64A1 burned grid cells were detected on the same day as an active fire, and 68% within 2 days, which represents a substantial reduction in temporal uncertainty compared to the C5.1 MCD64A1 and MCD45A1 products. In addition, an areal accuracy assessment of the C6 burned area product undertaken using high resolution burned area reference maps derived from 108 Landsat image pairs is reported.

MODIS Collection 6/VIIRS Validation

- Landsat-8 imagery
- CEOS burned area validation protocol
 - Image-pair interpretation
 - Cloud free + within a set time period (~2 months)
 - Widely tested and used in peer reviewed literature
- CEOS Stage-2 (done) and Stage-3 (writing up)

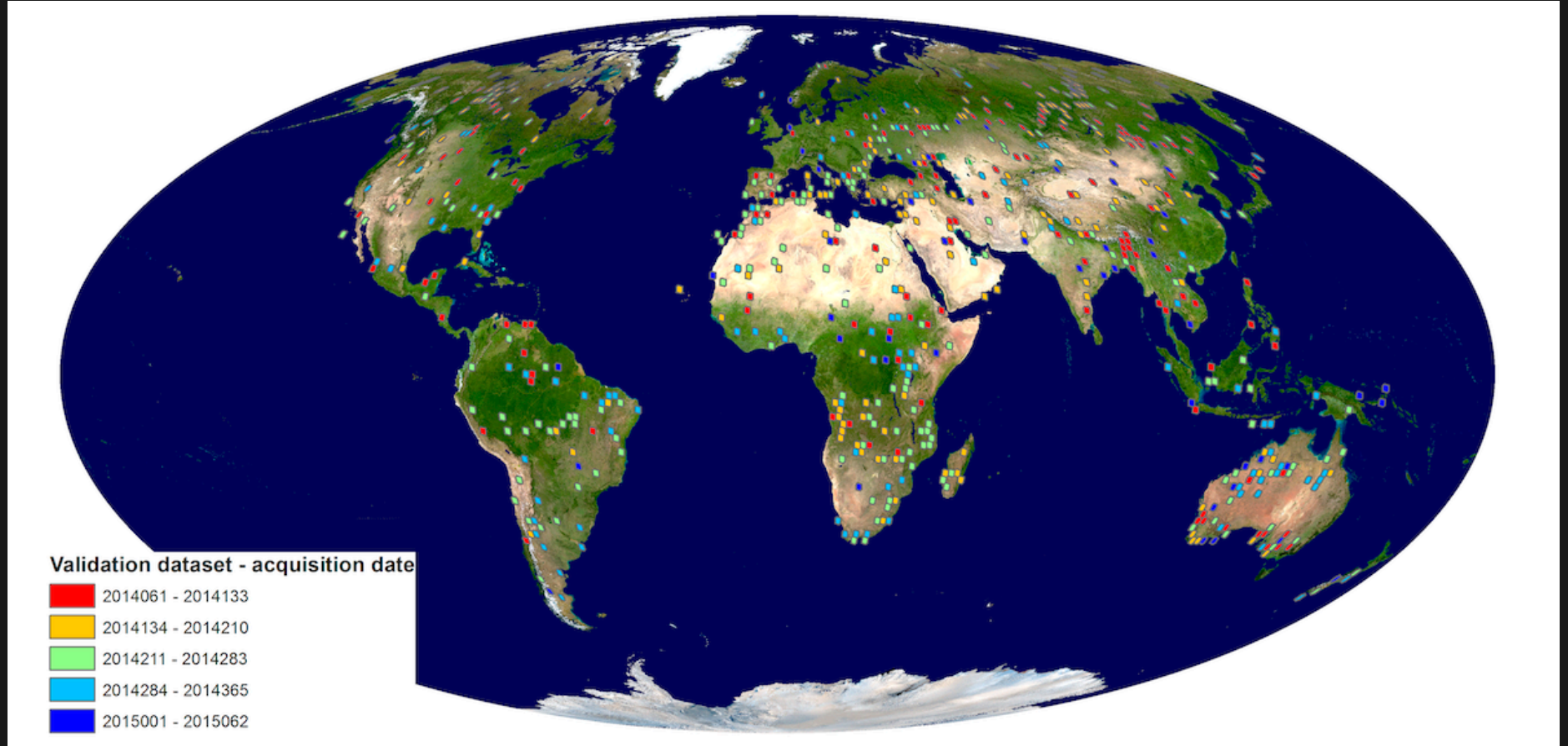
CEOS Validation Hierarchy

Stage 1: Product accuracy estimated using small number of measurements obtained from selected locations and time periods.

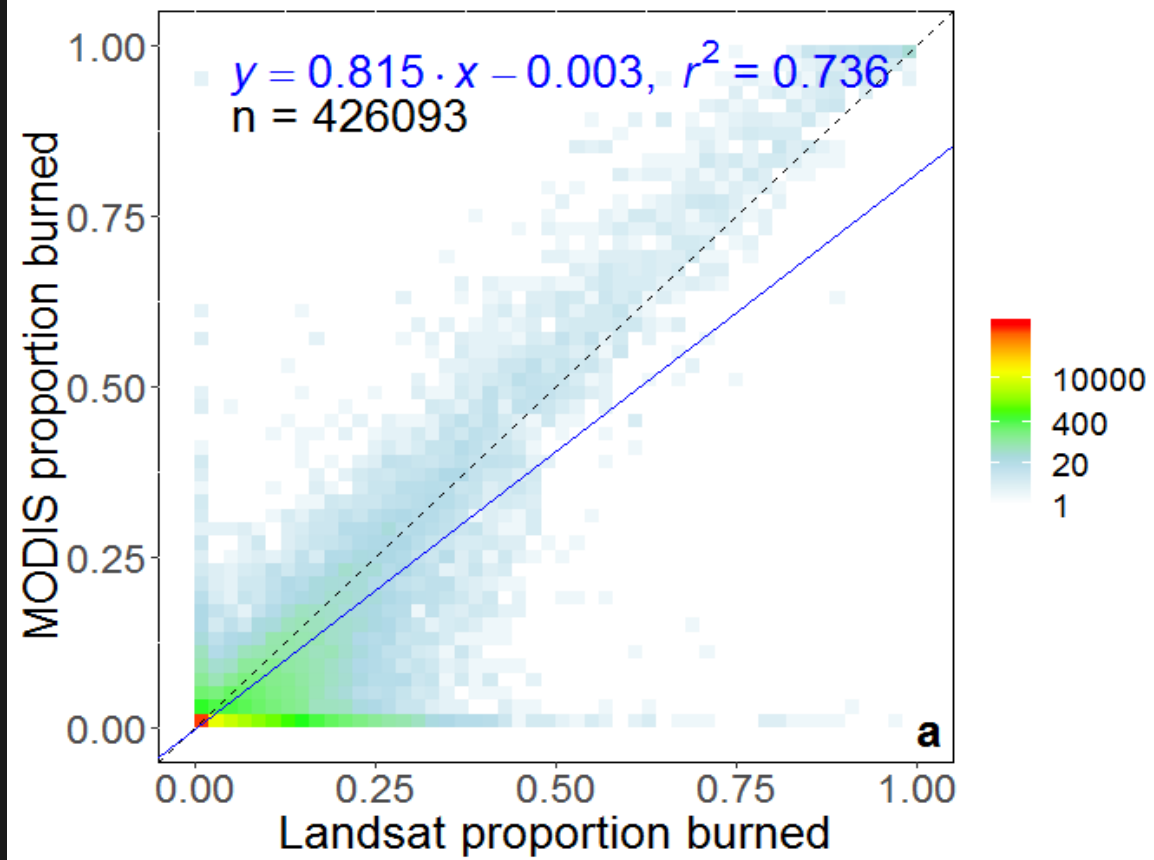
Stage 2: Product accuracy assessed over widely distributed set of locations and time periods, representative of full range of conditions present in product.

Stage 3: Product accuracy assessed, and uncertainties in product established via independent measurements made in a statistically robust way that represents global conditions, and is characterized by selection of reference data via a probability sampling, i.e., design-based validation.

Stage 4: Results for Stage 3 systematically updated when new product versions are released, or when time coverage of existing products expands.



700 Landsat-8 image pairs to validate one year of MCD64A1



VIIRS Burned Area Product Status

- Adapt MCD64 production code to use VIIRS data
 - 750-m versus 375-m bands
- Retain 500-m grid for MODIS compatibility

VIIRS Burned Area Products

VIIRS “Collection 1”

VNP64A1	500-m Monthly
VNP64A1-based GIS Products (SCF)	Shapefiles + 500-m GeoTIFF
VNP64CMQ (SCF)	0.25° Monthly
VNP64CDQ (SCF)	0.25° Daily

March 2017 release significantly behind schedule due to delays in availability of upstream VIIRS input products.

VIIRS burned area input expected timeline:

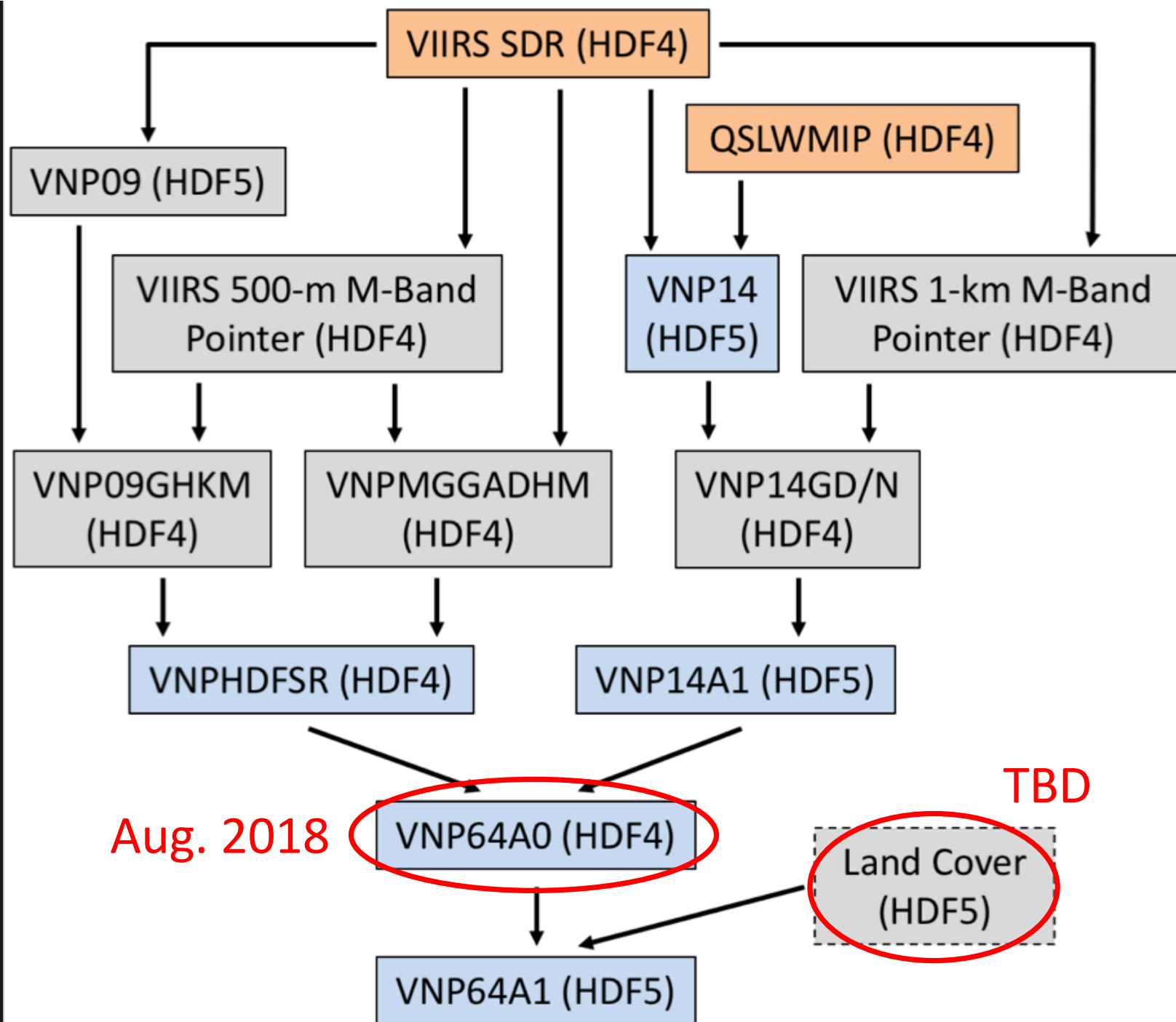


VIIRS burned area input expected timeline:

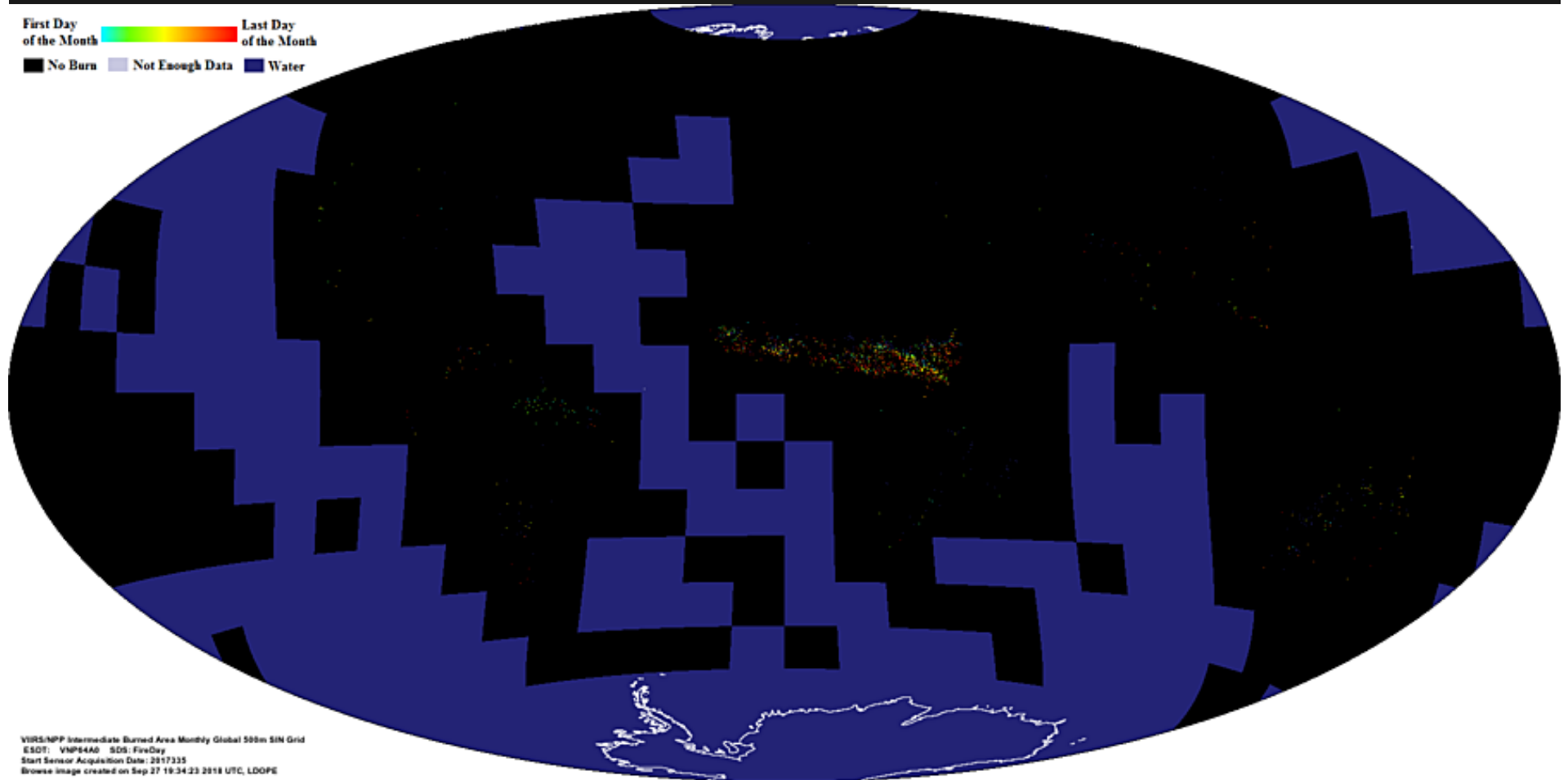


VIIRS burned area input actual timeline:





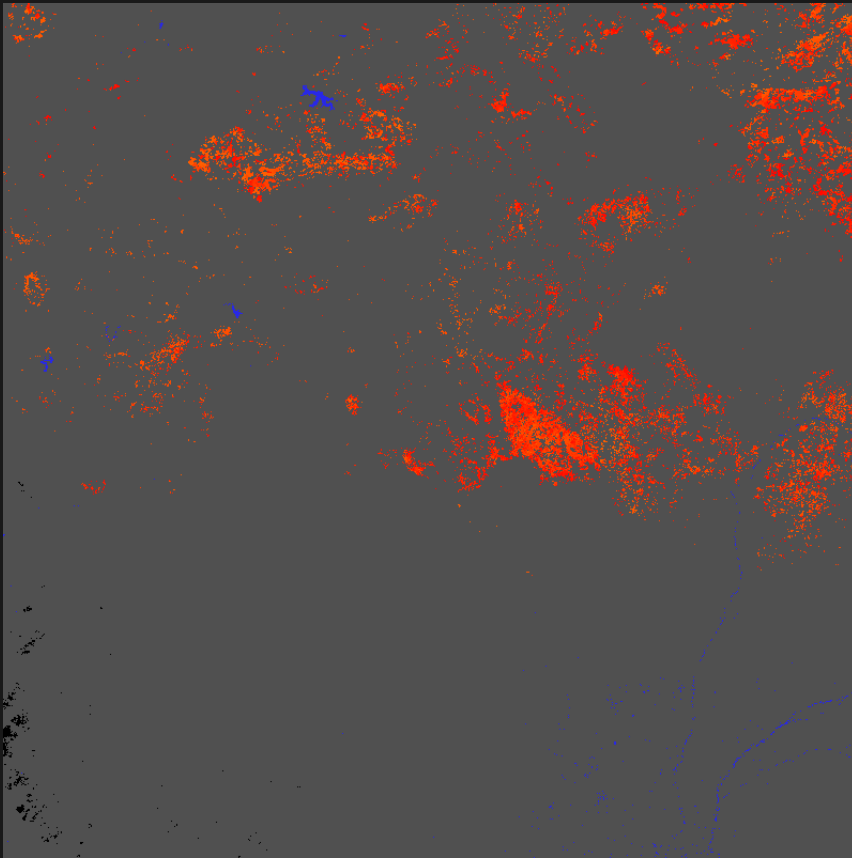
VNP64A0 Intermediate Product



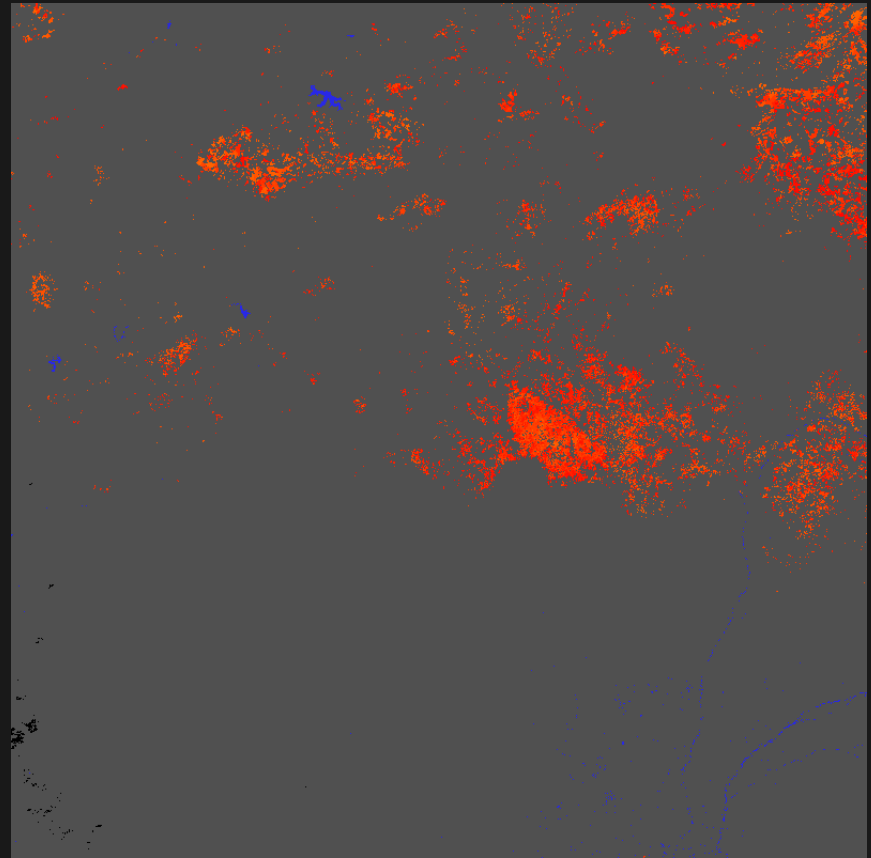
First Land SIPS test run 27 Sep. 2018

h19v08 (Africa)

MCD64A1 2017 335

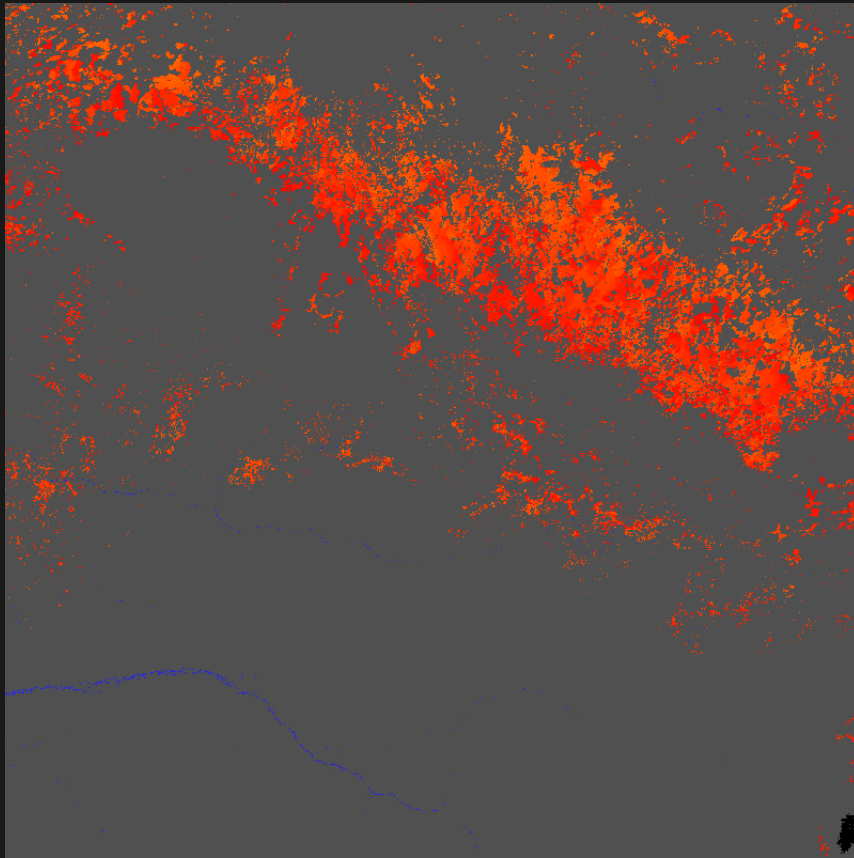


VNP64A1 2017 335

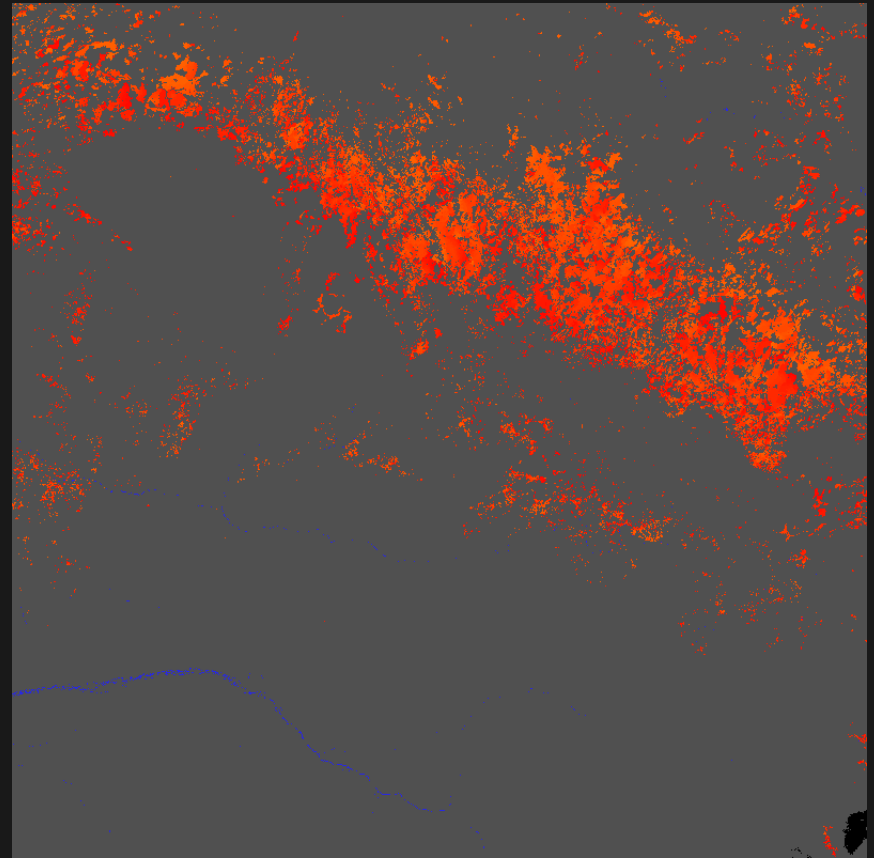


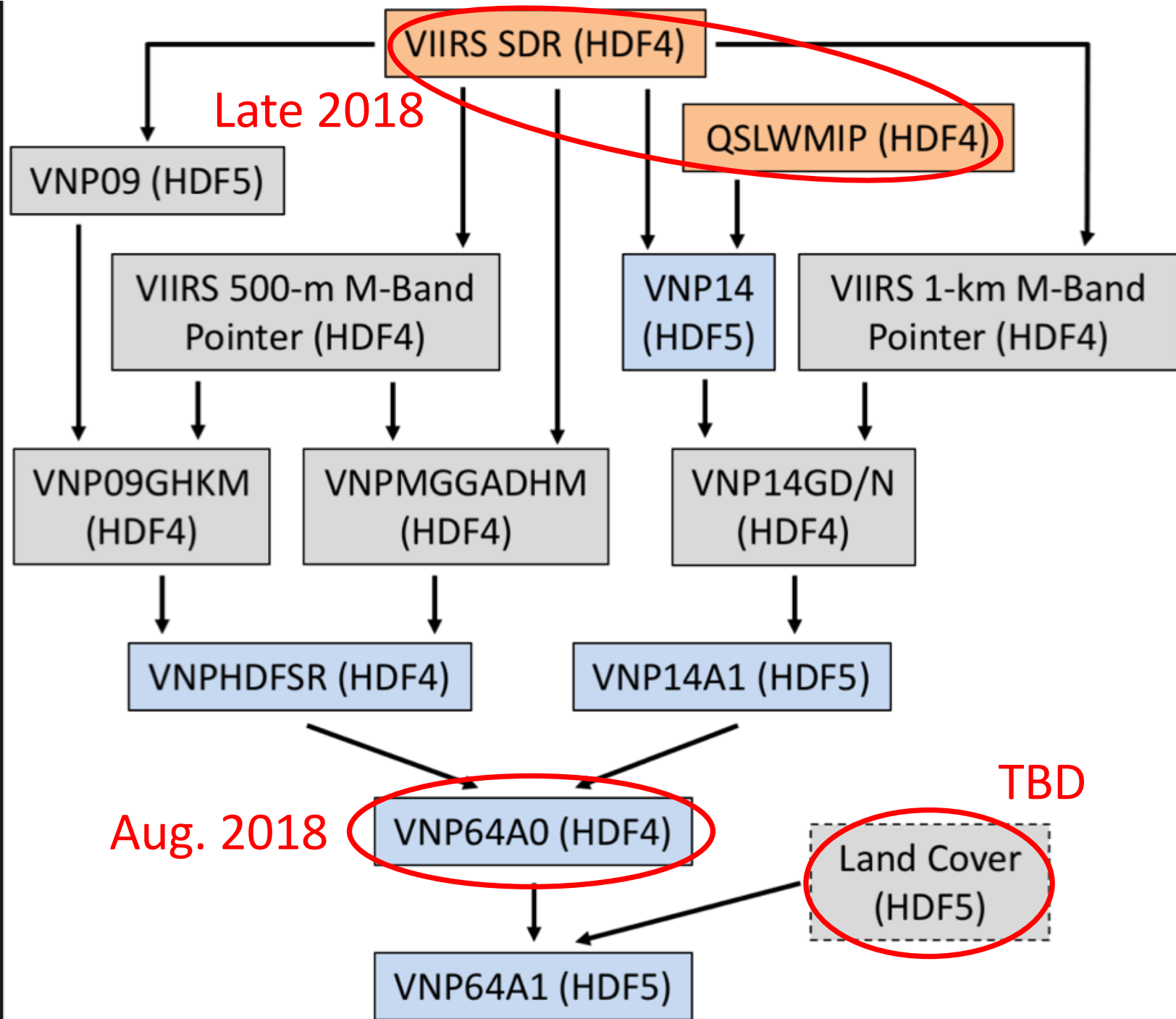
h20v08 (Africa)

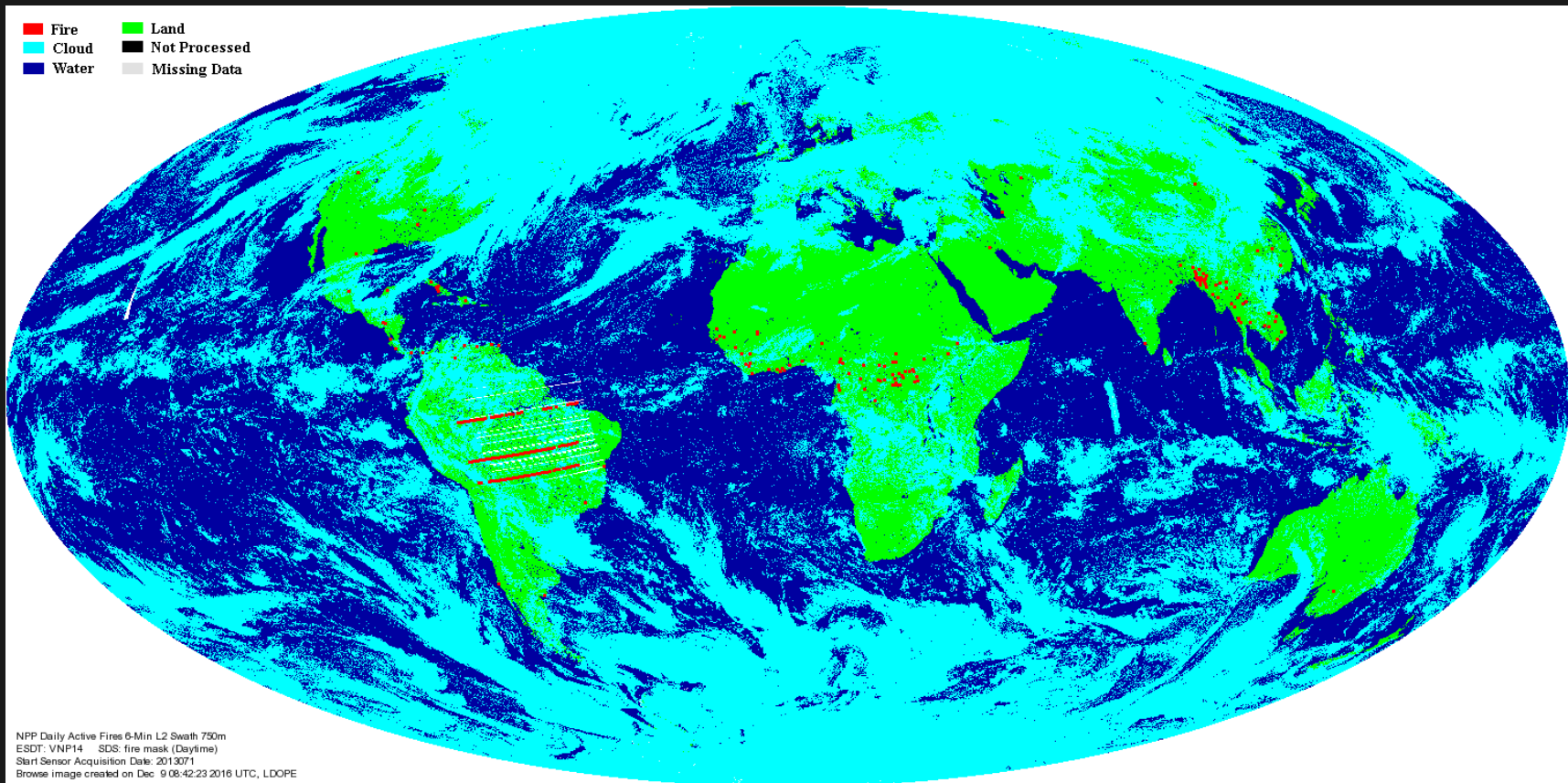
MCD64A1 2017 335



VNP64A1 2017 335







750-m VIIRS VNP14 active fire product
12 March 2013

Arcs of false fire pixels caused by spurious M13 scans.

VIIRS Burned Area Issues

- VIIRS to MODIS transition
 - Aqua: ≥ 2021
 - Terra: 2022 (2025 w/ relaxed equatorial crossing time)
- Lack of morning VIIRS overpass
 - Use SLSTR active fire observations?

Thanks