Comparison of V1 VIIRS Operational and NRT Land Products

Updated on September 24, 2018

This document provides a summary of results from comparison of NPP VIIRS land products generated by the NRT system with those generated by the operational processing at LandSIPS in AS5000. Metrics presented in this document are from assessment of global data products from processing of instrument data from a typical data day. These metrics are expected to vary slightly from day to day depending on the disparity in the input ancillary and ephemeris data used by the NRT processing.

Confidence in NPP VIIRS NRT products

- NPP VIIRS PGEs used in the V1 operational processing are ported and baselined for use in the NRT processing.
- In order to meet the NRT's latency requirement the NRT processing may use different ancillary data than the operational processing at Land SIPS and may also some times use a different production rule, resulting in minor differences in the NRT products compared to the operational products.
- This document summarizes the ability of the NRT to reproduce the V1 science quality products generated at Land SIPS using the best available inputs. This is provided as confidence metric for each dataset and is defined as percent of global retrieval in NRT that is within given accuracy of the operational V1 version of the products.

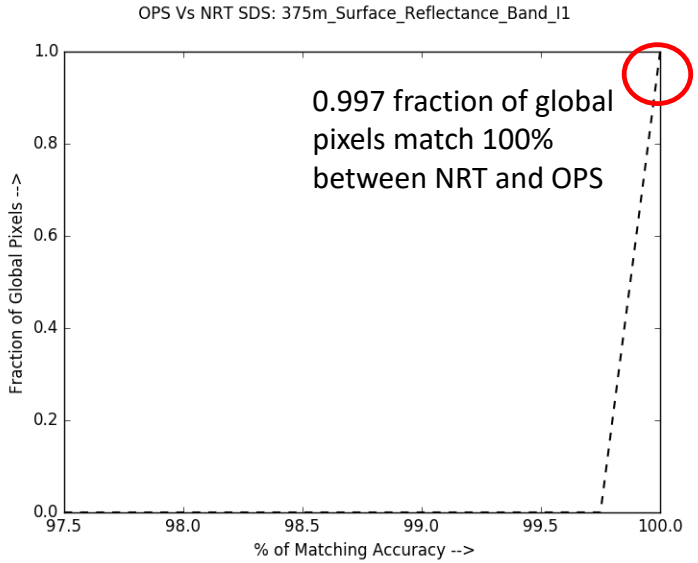
Accuracy of NRT Retrievals: Day 2018239

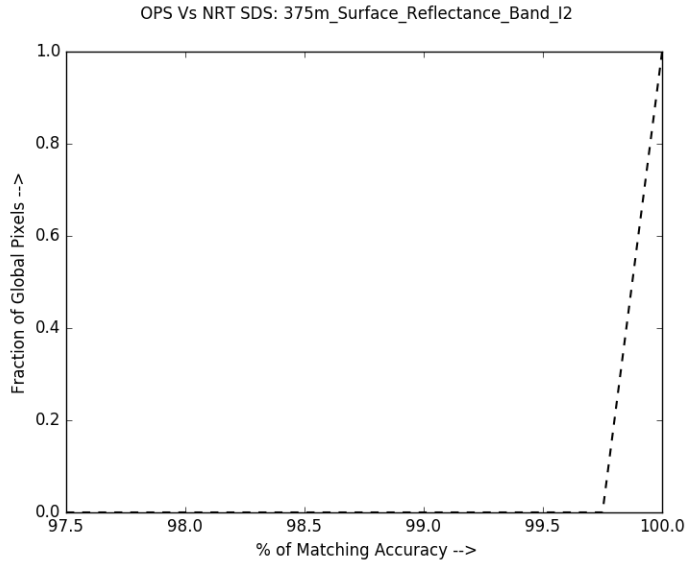
(V1 operational data used as Truth)

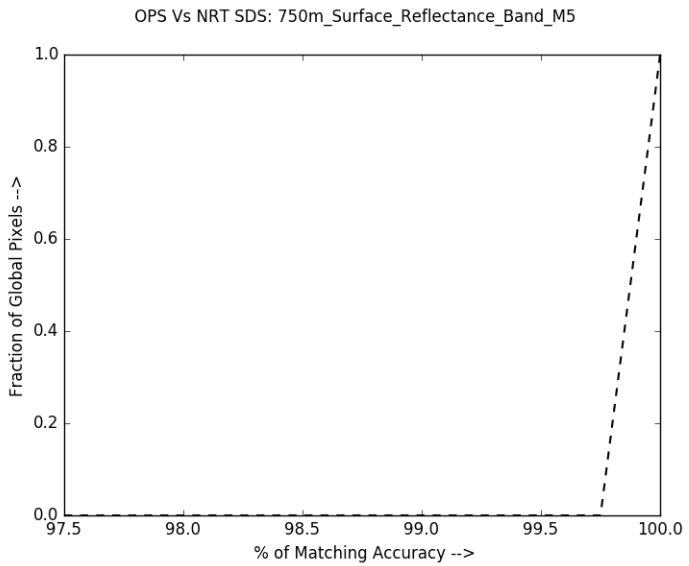
ESDT	Science Data Set	Match (%global)	Omission Error Npix(%)	Commission Error Npix (%)
VNP09	375m Surface Reflectance Band I1	99.9	NA	NA
VNP09	375m Surface Reflectance Band I2	99.9	NA	NA
VNP09	750m Surface Reflectance Band M5	99.6	NA	NA
VNP09	750m Surface Reflectance Band M7	99.7	NA	NA
VNP10	NDSI_Snow_Cover	99.99	NA	NA
VNP14	Fire Mask	100	0(0)	0(0)
VNP29	SeaIceCover_Map	99.6	0(0)	0(0)
VNP30	IST	99.9	NA	NA

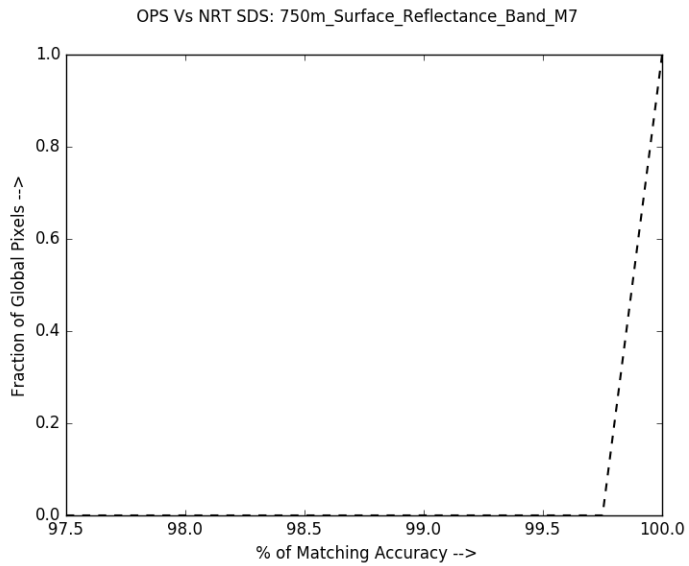
- Match - For VNP09, VNP10 it is the percentage of retrievals within 1% error margin when compared to operational V1. For other products it is the pixel to pixel exact match between NRT and V1.
- Omission and Commission Errors are computed as percentage of snow/ice/fire in the V1 operational products. All stats are based on DOY 2018239.

Plot of Confidence Metrics for VNP09 (I1, I2, M5 & M7)

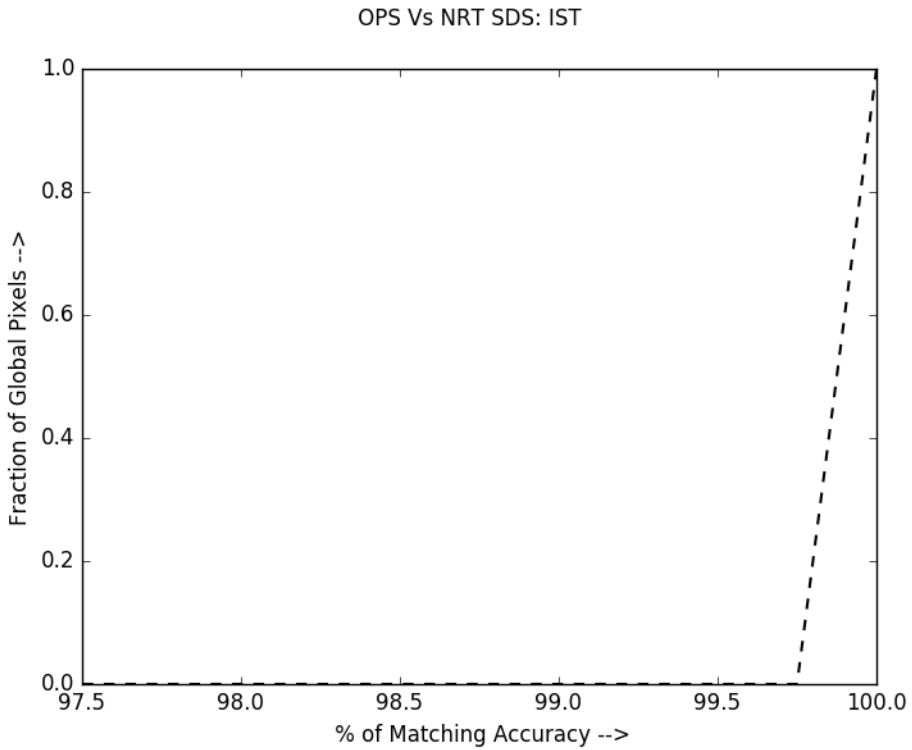


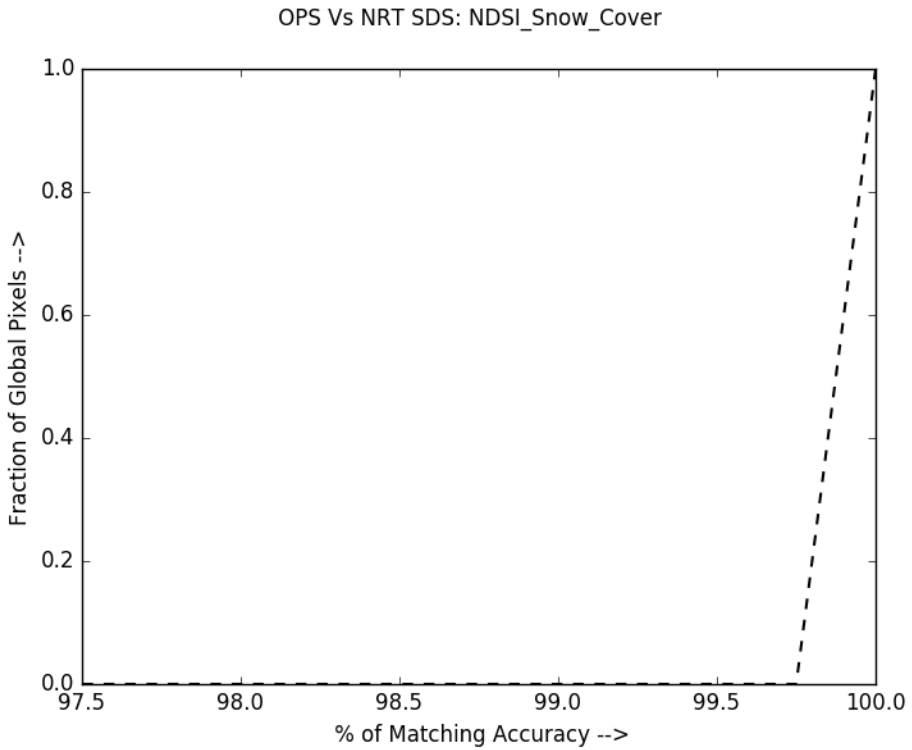






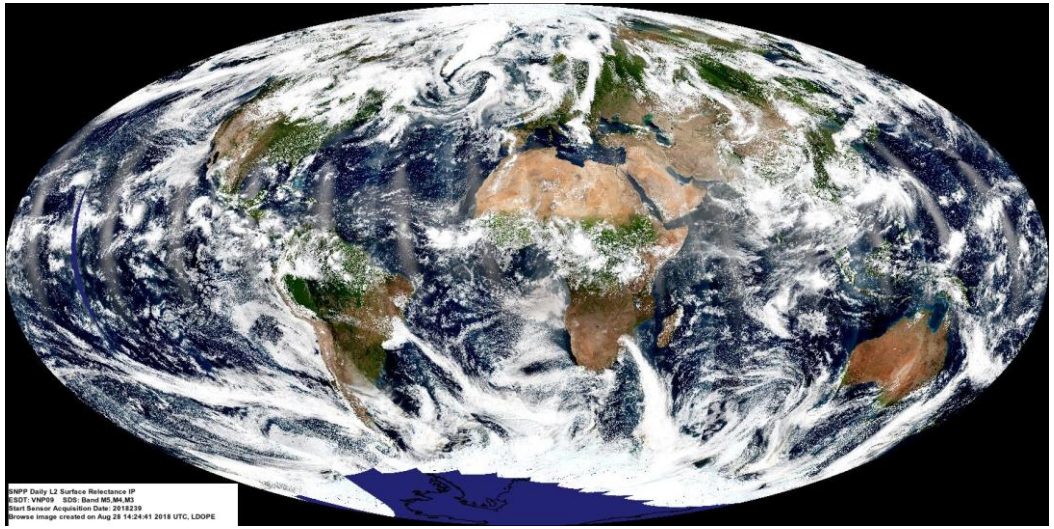
Plot of Confidence Metrics for VNP10 (NDSI_Snow_Cover) and VNP30 (IST)



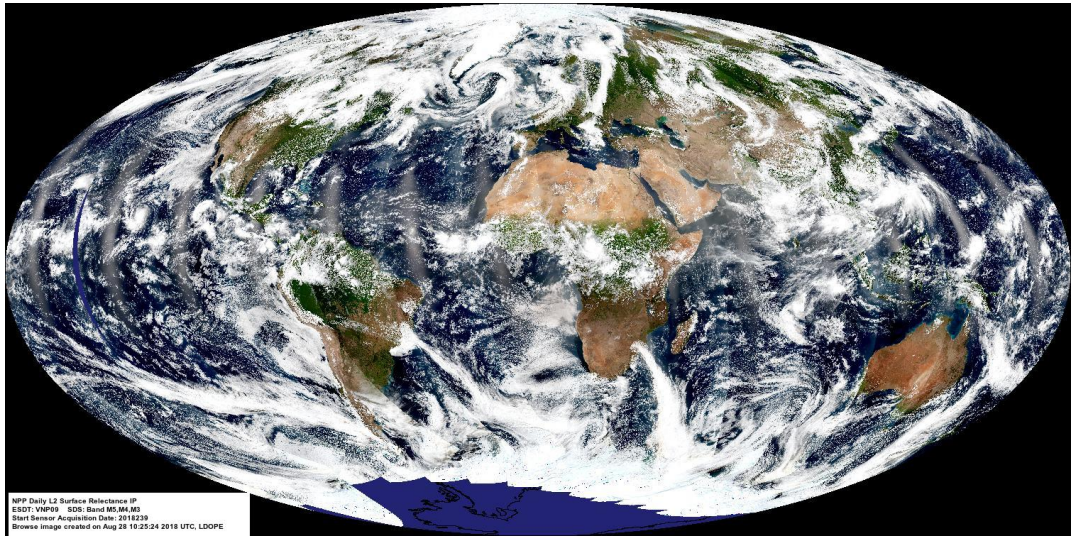


V1 Land Surface Reflectance: VNP09, RGB Composite of Bands M5, M4 and M3

NRT
DOY 2018239

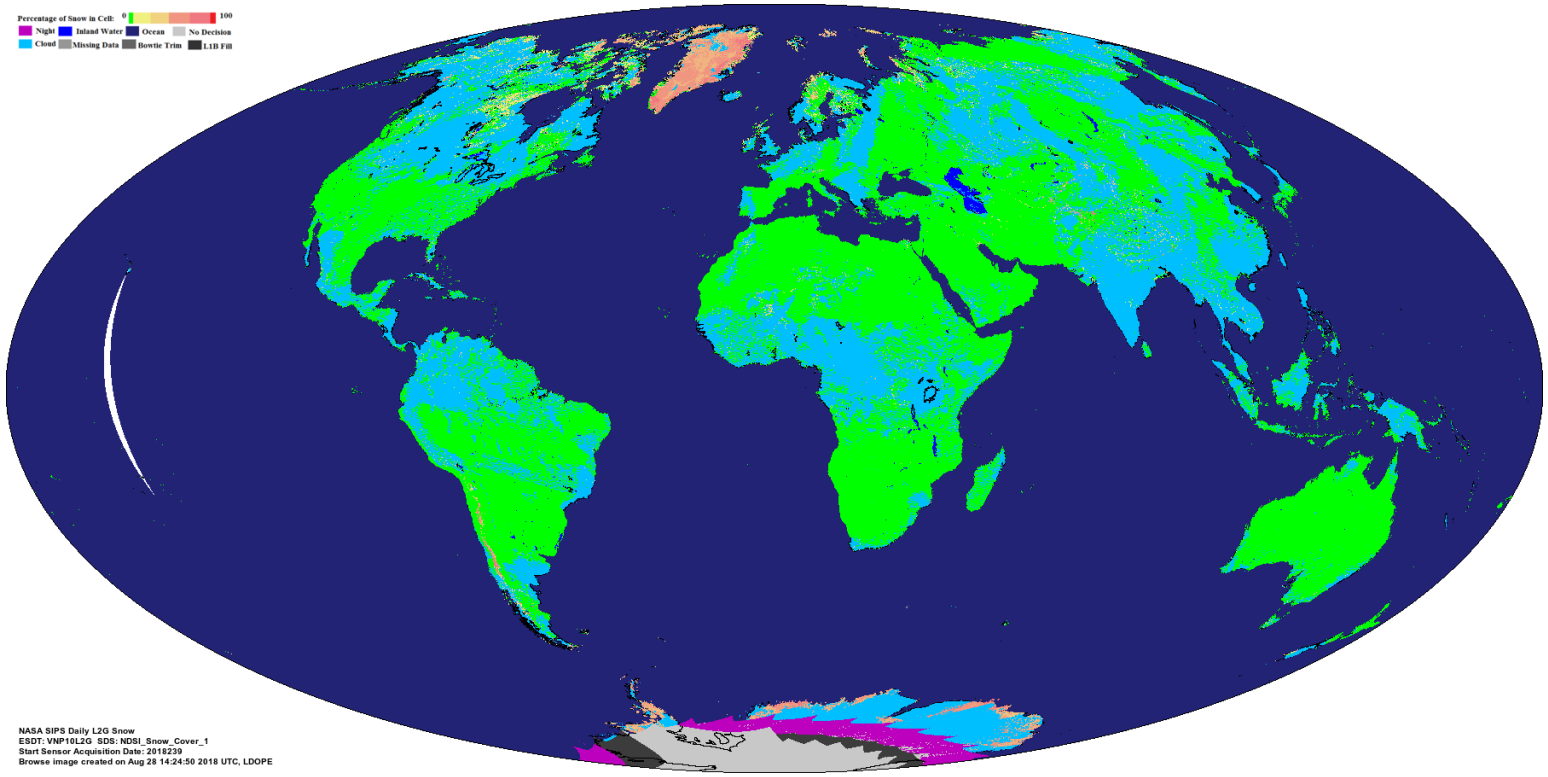


OPS



NRT V1 Snow Cover: VNP10

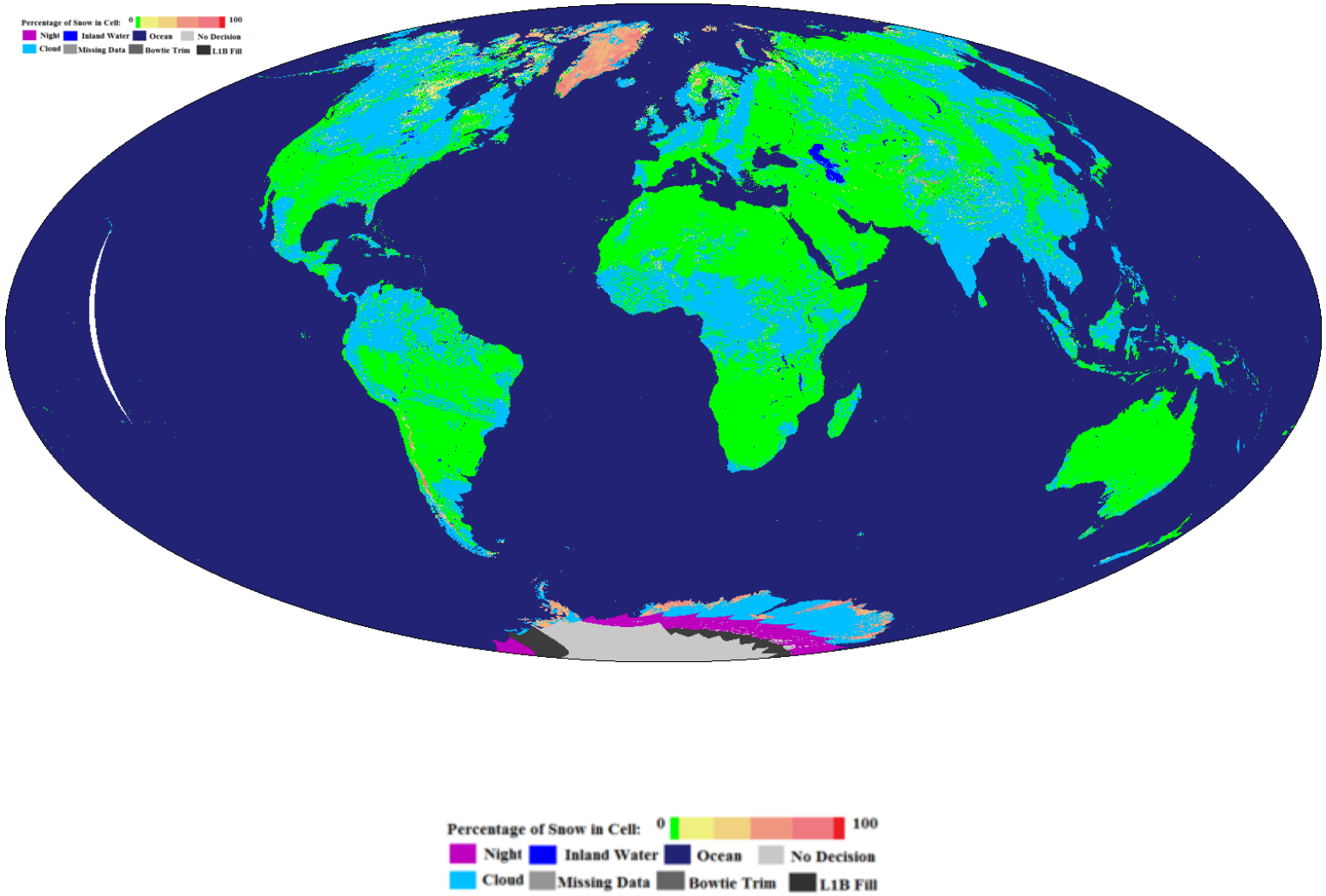
NRT
DOY 2018239



Percentage of Snow in Cell: 0 100
Night Inland Water Ocean No Decision
Cloud Missing Data Bowtie Trim L1B Fill

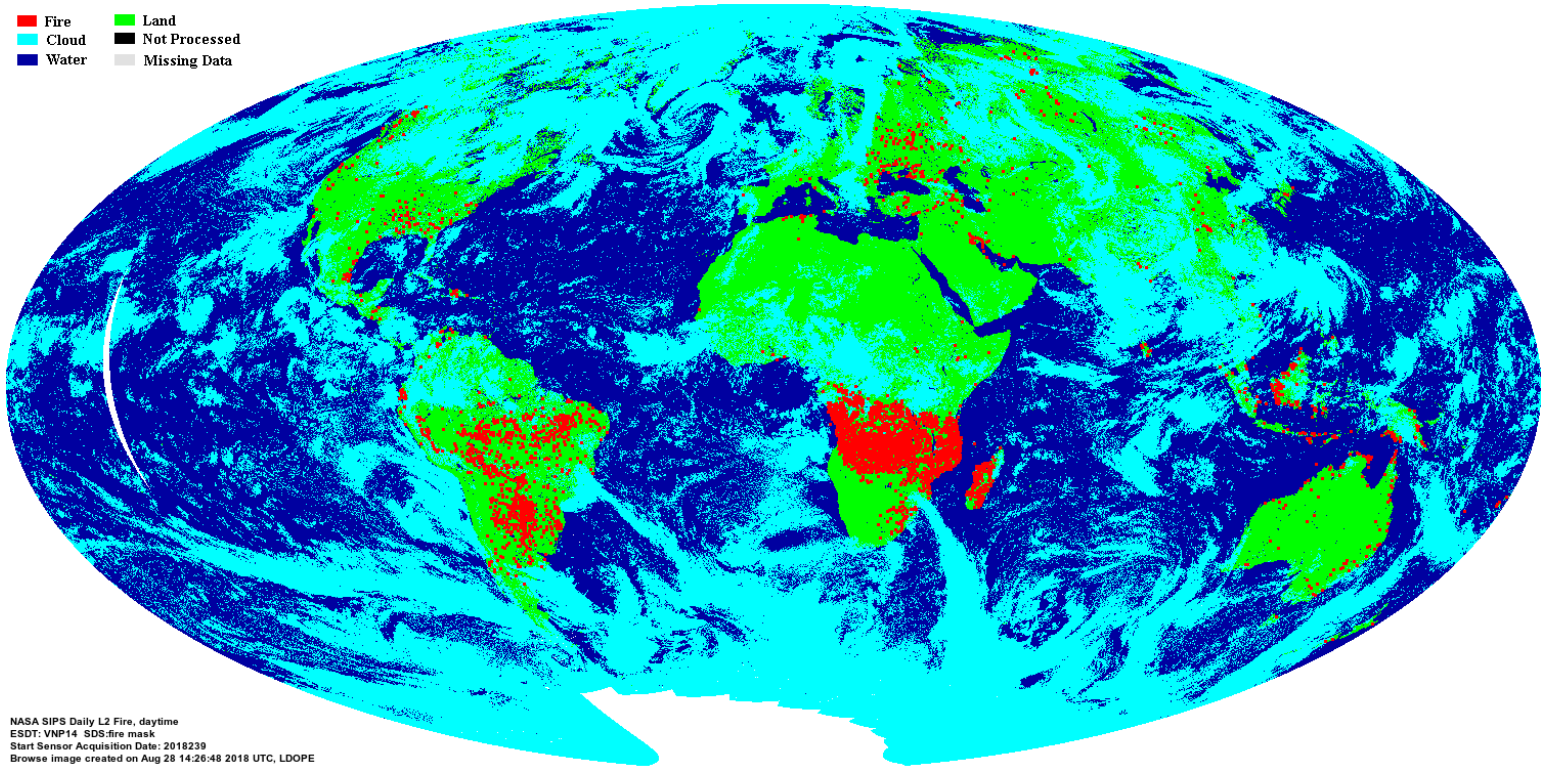
OPS V1 Snow Cover: VNP10

OPS
DOY 2018239



NRT V1 Active Fires: VNP14 (Day)

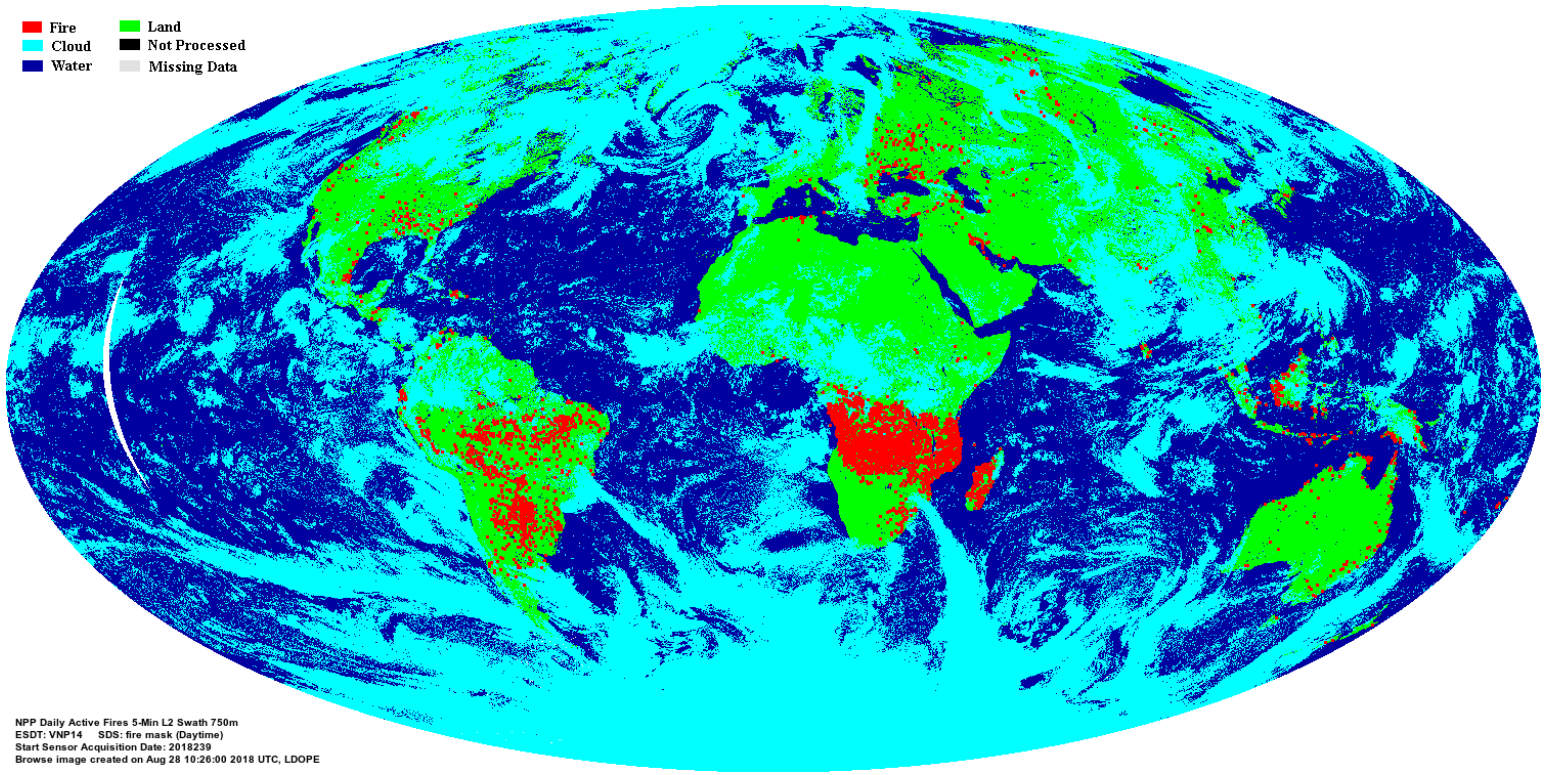
NRT
DOY 2018239



Fire
Cloud
Water
Land
Not Processed
Missing Data

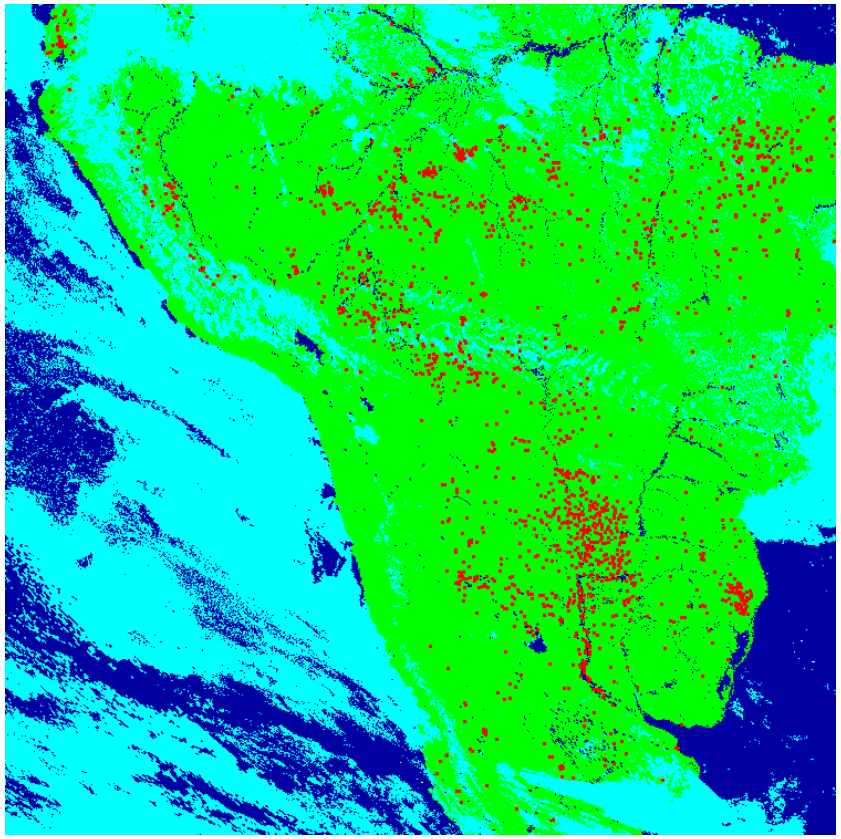
OPS V1 Active Fires: VNP14 (Day)

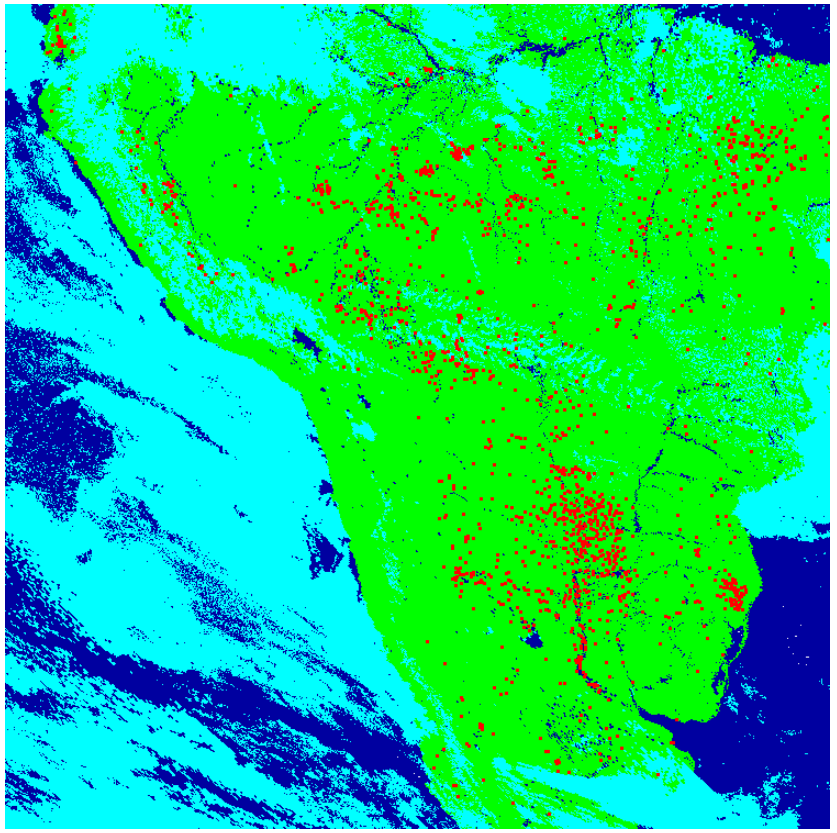
OPS
DOY 2018239



Fire
Cloud
Water
Land
Not Processed
Missing Data

Day Time Active Fire: South America





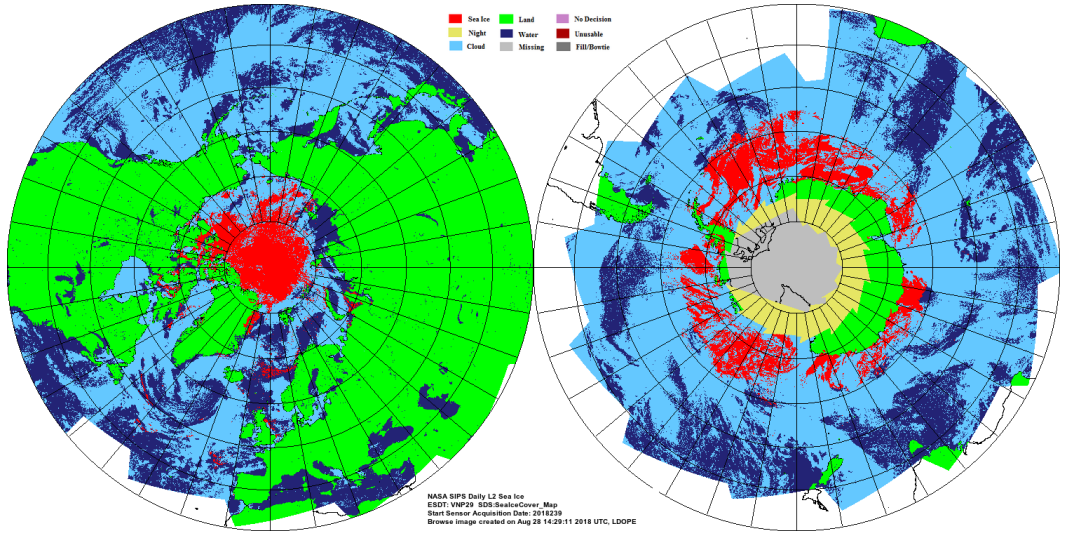
NRT
DOY 2018239

Fire
Cloud
Water
Land
Not Processed
Missing Data

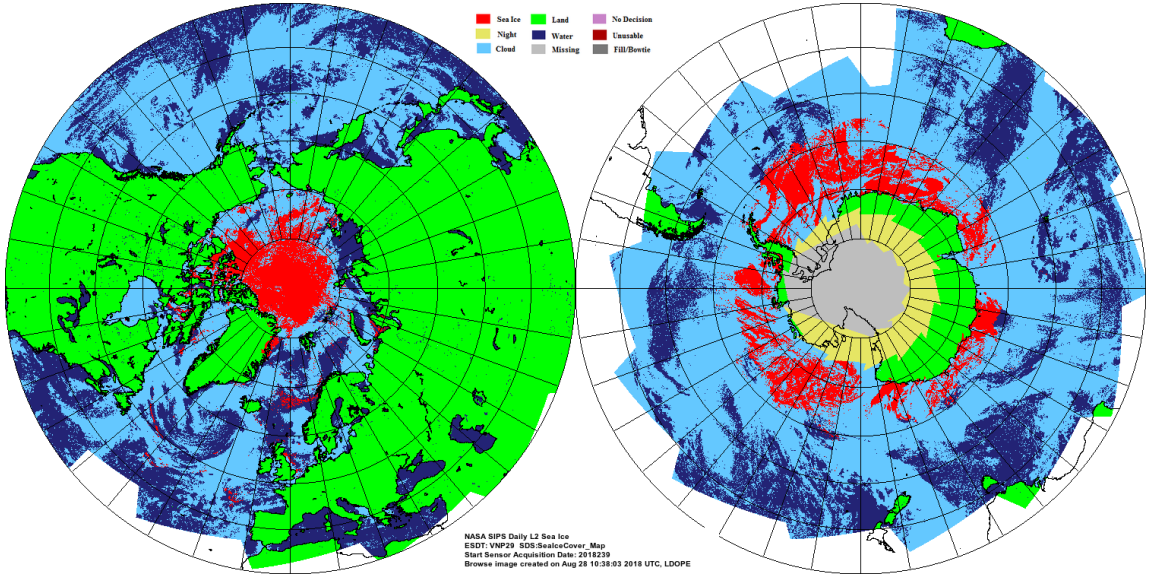
OPS

V1 Sea Ice Cover: VNP29

NRT
DOY 2018239

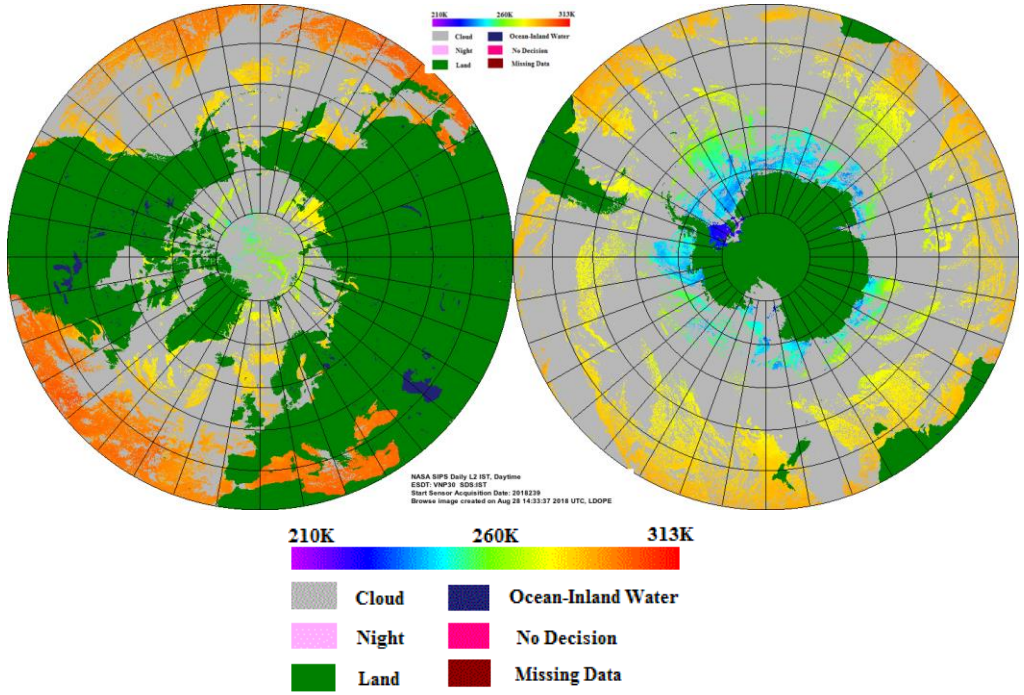


OPS

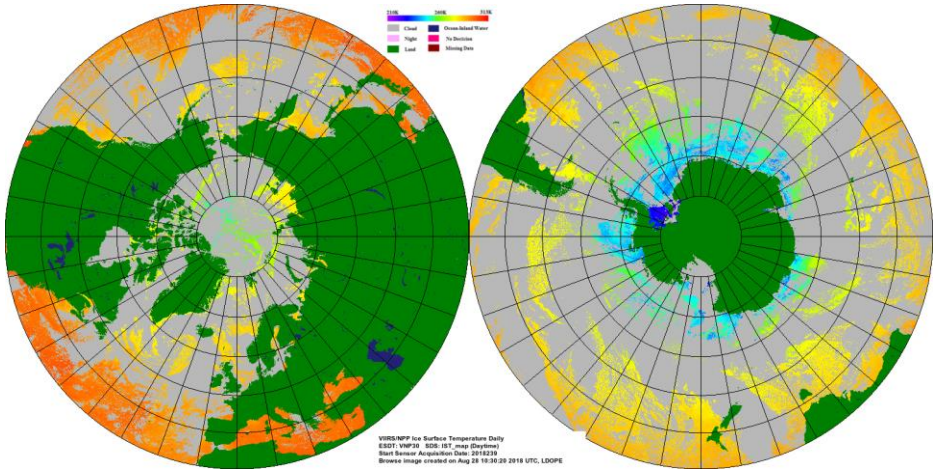


V1 Ice Surface Temperature: VNP30 (Day)

NRT
DOY 2018239



OPS



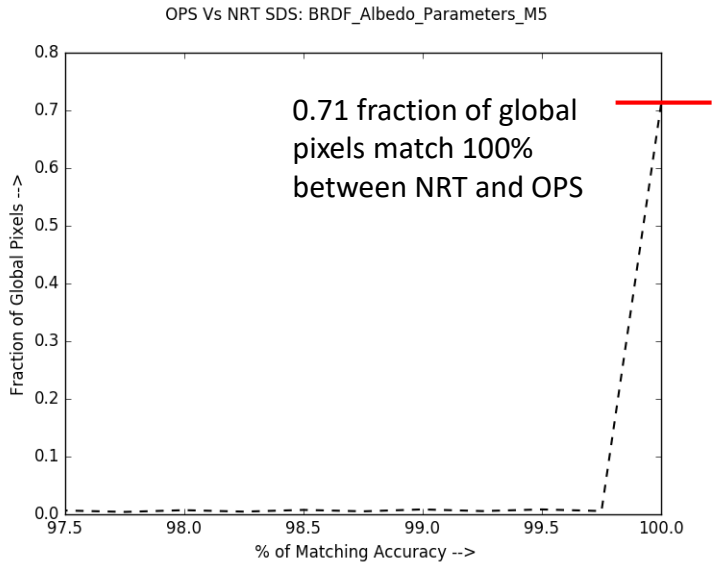
Accuracy of NRT Retrievals for VNP43 products: Day 2018252

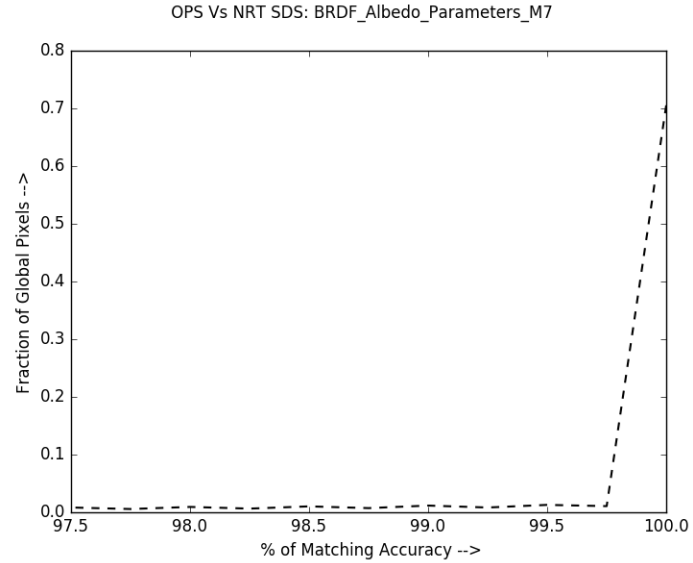
(V1 operational data used as Truth)

ESDT	Science Data Set	Match (%global)	Omission Error Npix(%)	Commission Error Npix (%)
VNP43MA1	BRDF_Albedo_Parameters_M5	71.08	NA	NA
	BRDF_Albedo_Parameters_M7	70.53	NA	NA
VNP43MA3	Albedo_WSA_Shortwave	71.52	NA	NA
	Albedo_BSA_Shortwave	71.97	NA	NA
VNP43MA4	Nadir_Reflectance_M5	70.97	NA	NA
	Nadir_Reflectance_M7	71.18	NA	NA
VNP43IA1	BRDF_Albedo_Parameters_I1	71.98	NA	NA

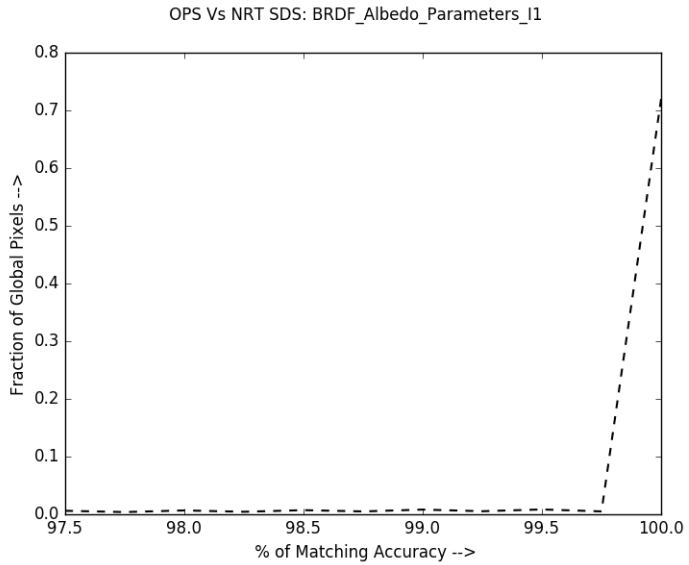
- NRT BRDF process estimates BRDF for the current data day at the leading edge of the 16-day period, operational process estimates the BRDF for the 9th day in the 16-day period. Operational BRDF processing will be lagging NRT BRDF by at least by 8-day.

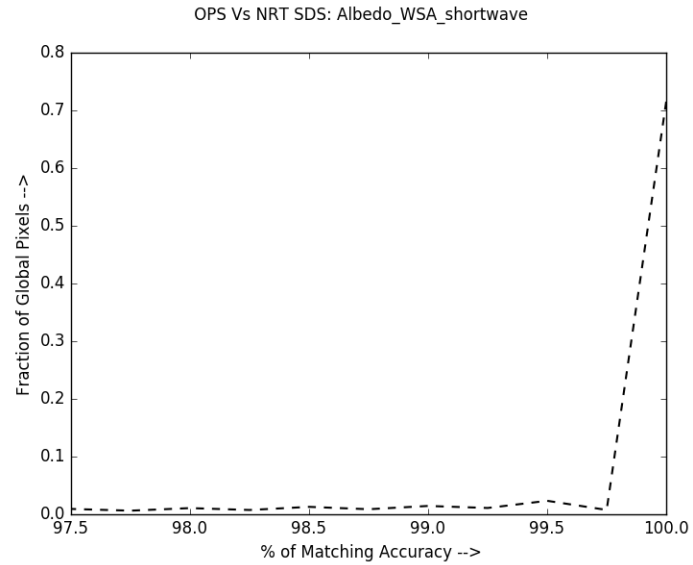
Plot of Confidence Metrics for VNP43MA1 (BRDF_Albedo_Parameters_M5, BRDF_Albedo_Parameters_M7)





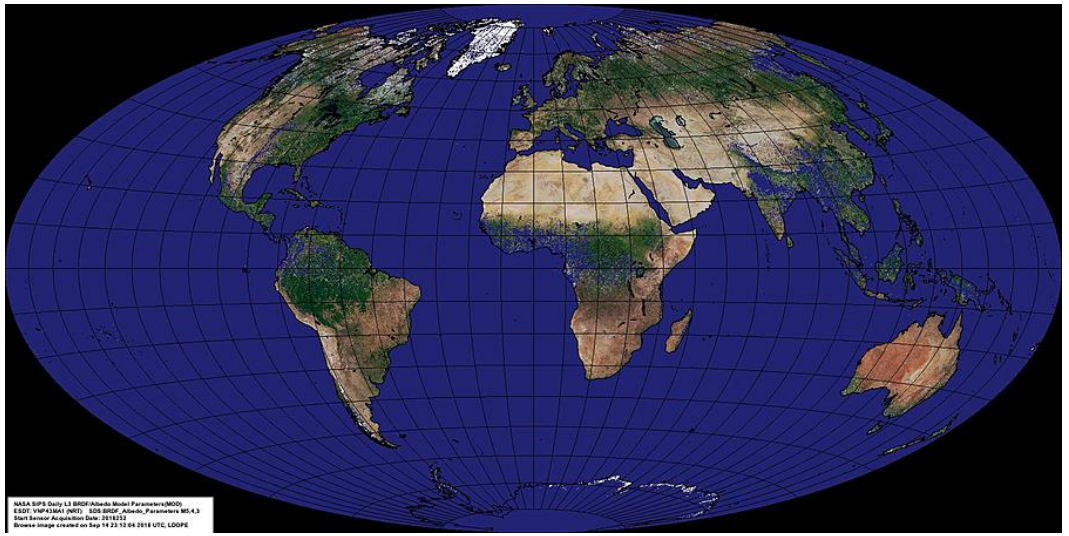
Plot of Confidence Metrics for VNP43IA1 (BRDF_Albedo_Parameters_I1), VNP43MA3 (Albedo_WSA_Shortwave)



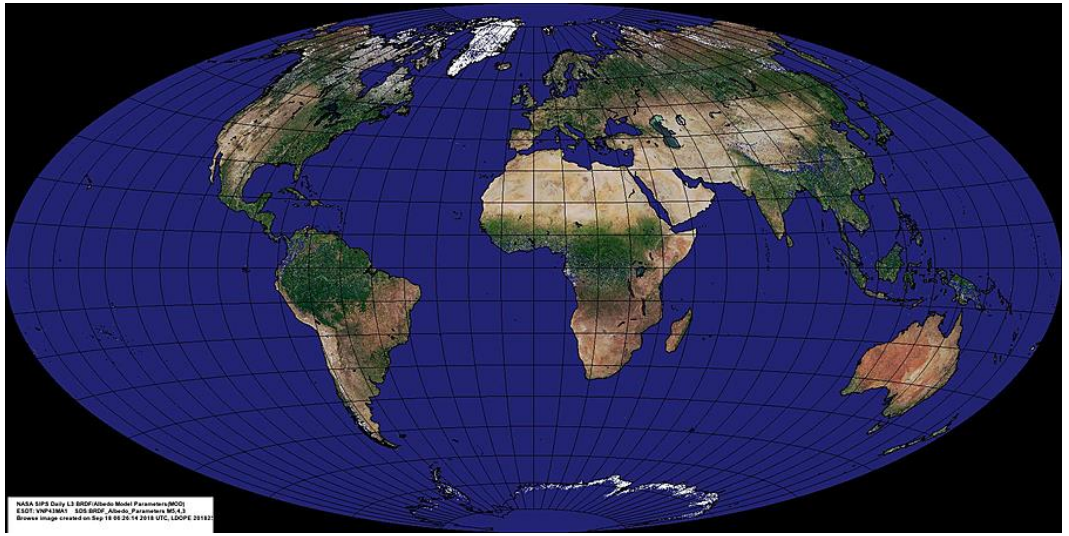


V1 BRDF Albedo: VNP43MA1 - BRDF_Albedo_Parameters_M5,4,3

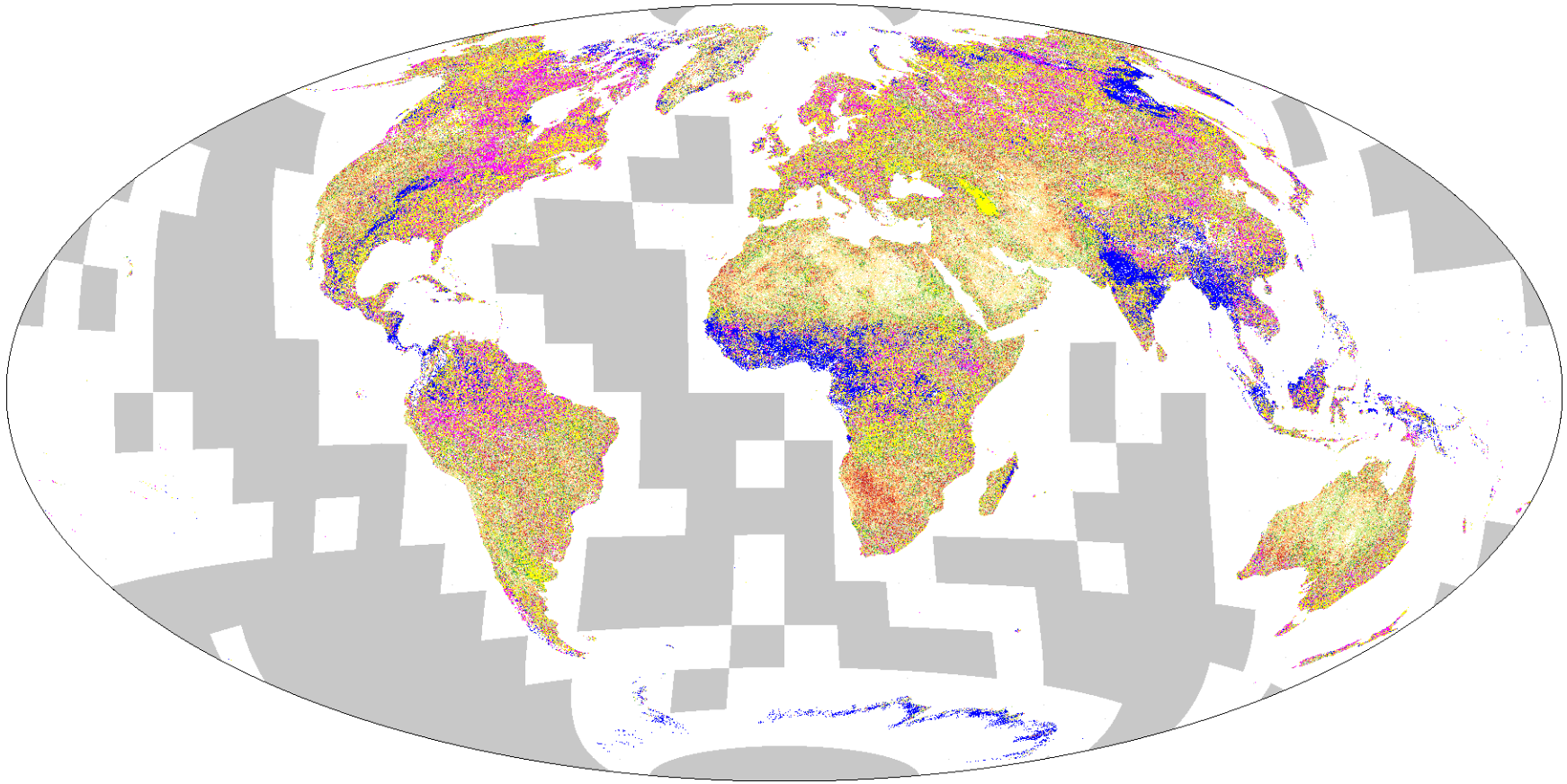
NRT
DOY 2018252

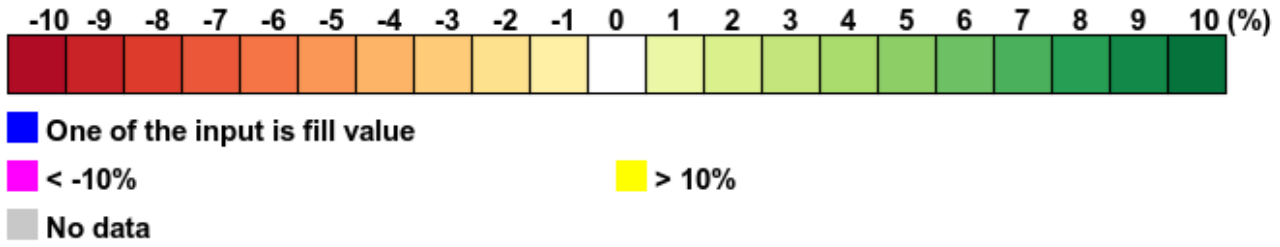


OPS



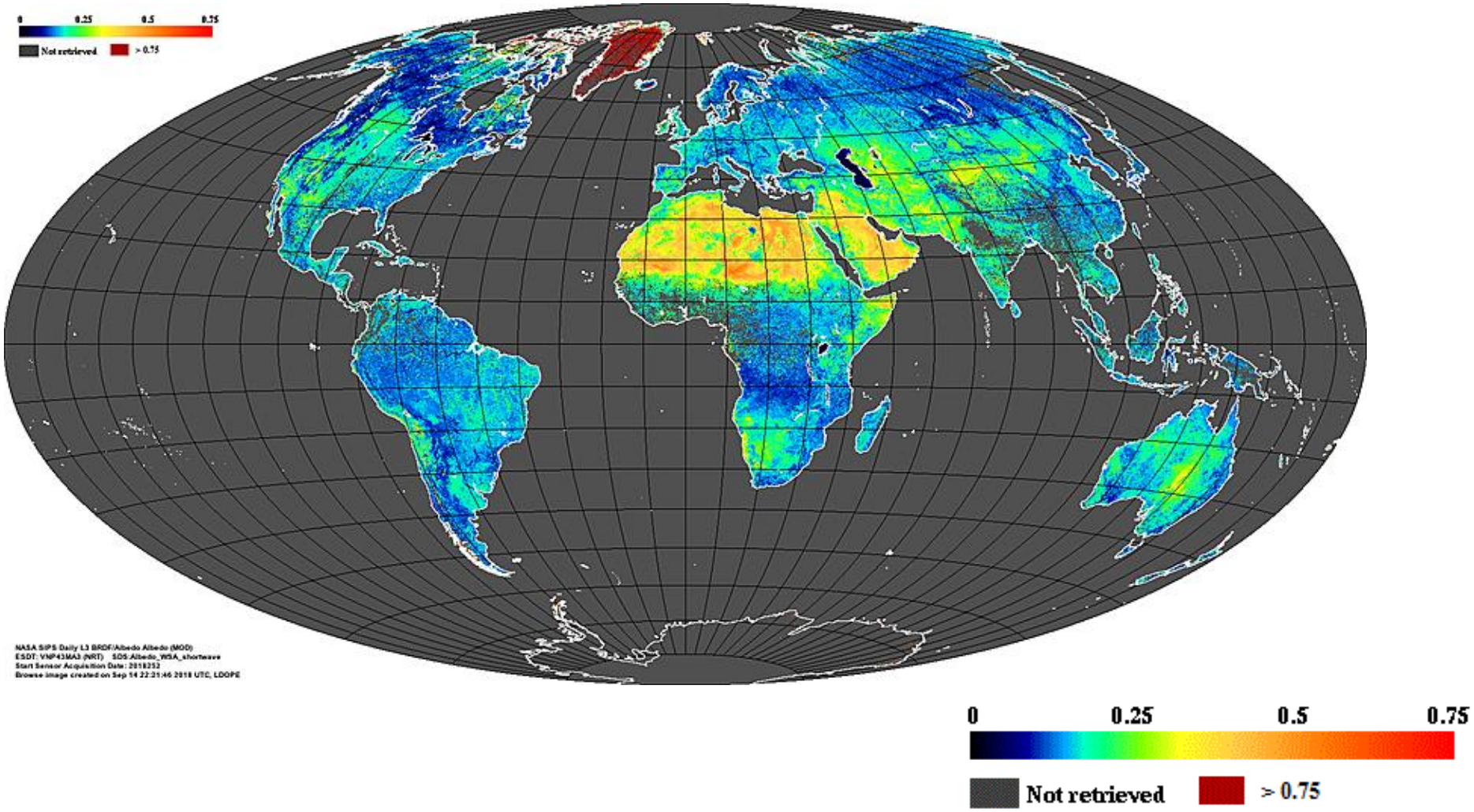
Relative Difference between NRT and OPS
VNP43MA1 - BRDF_Albedo_Parameters_M5





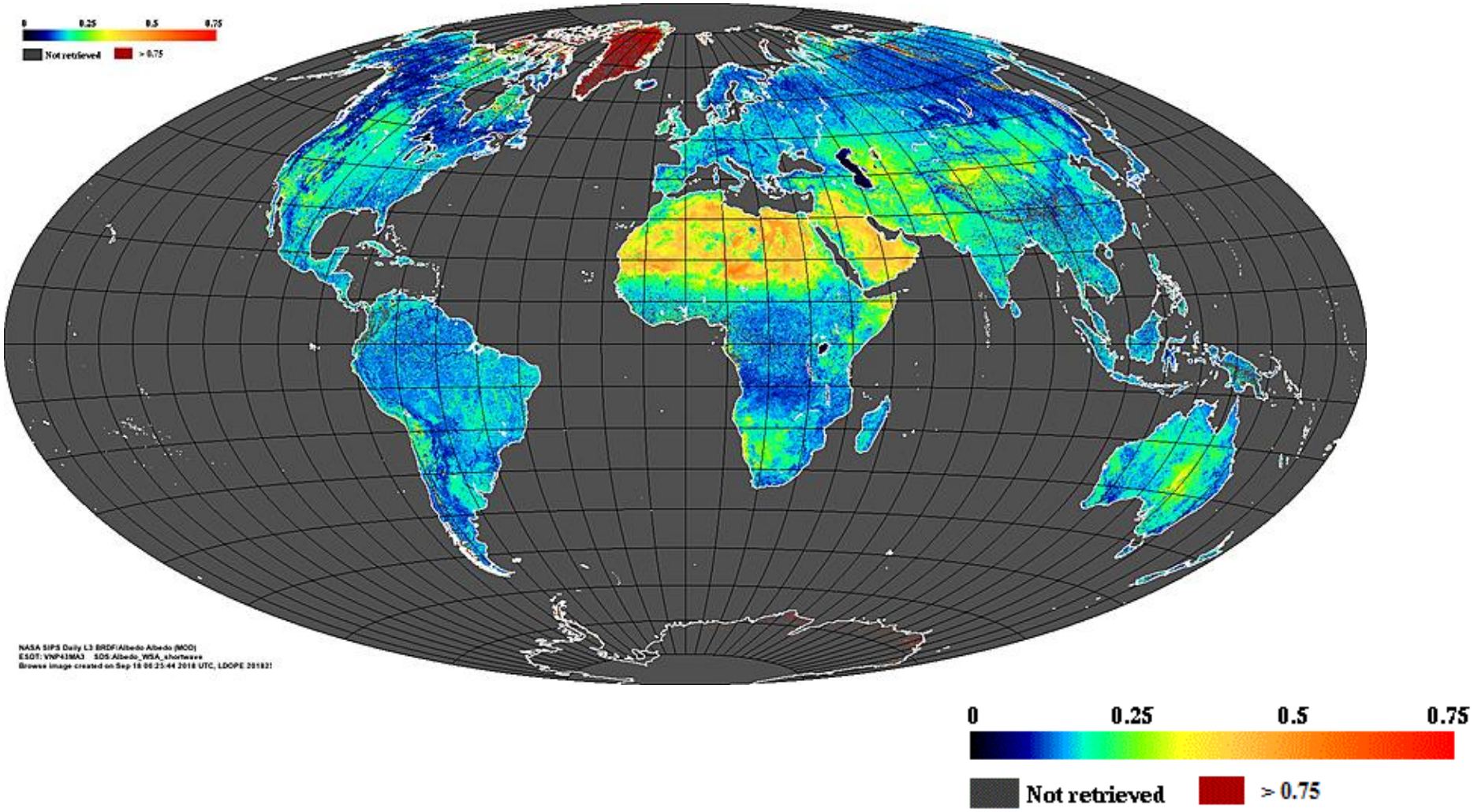
NRT V1 BRDF Albedo: VNP43MA3 - Albedo_WSA_shortwave

NRT
DOY 2018252



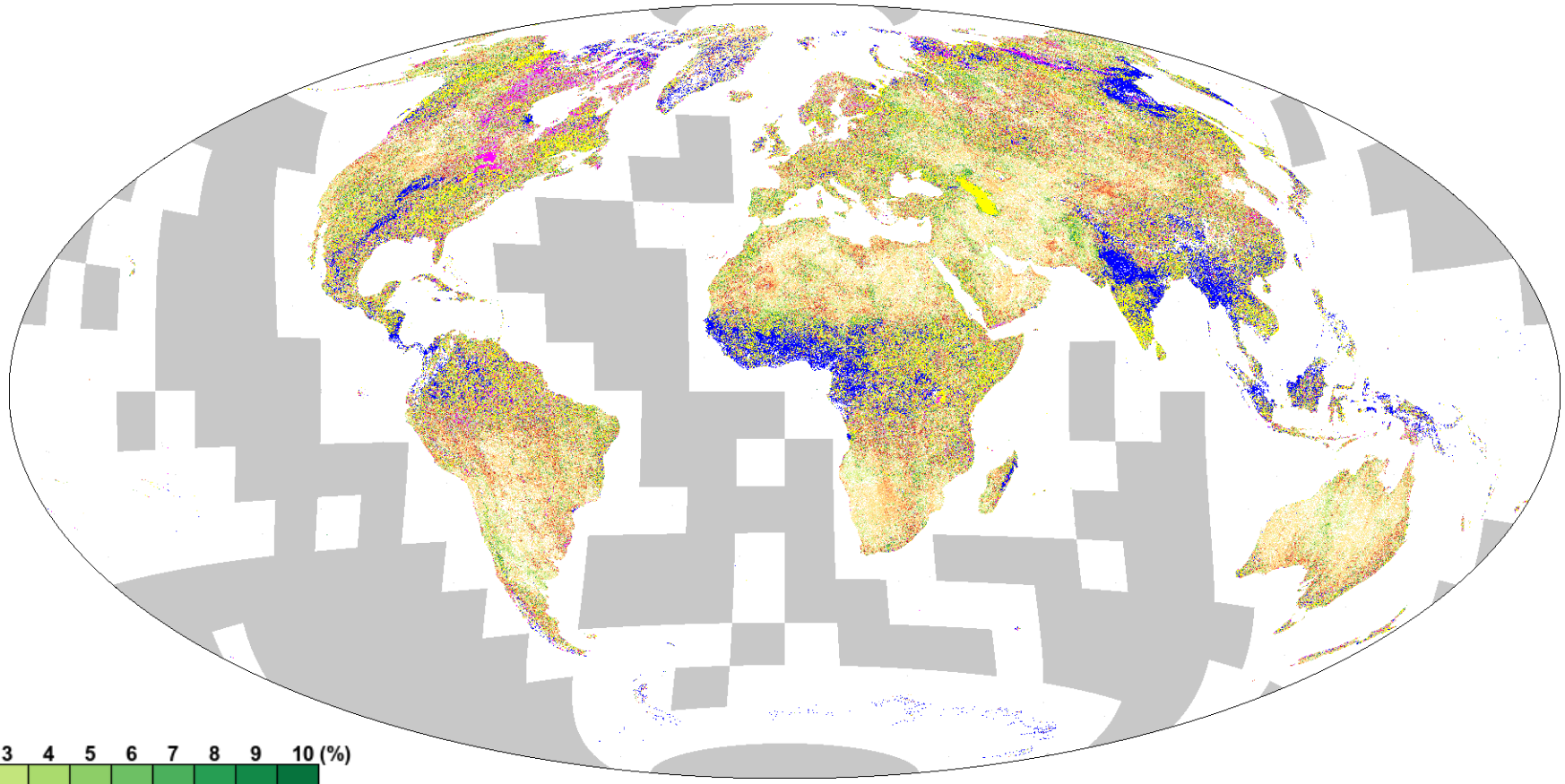
OPS V1 BRDF Albedo: VNP43MA3 - Albedo_WSA_shortwave

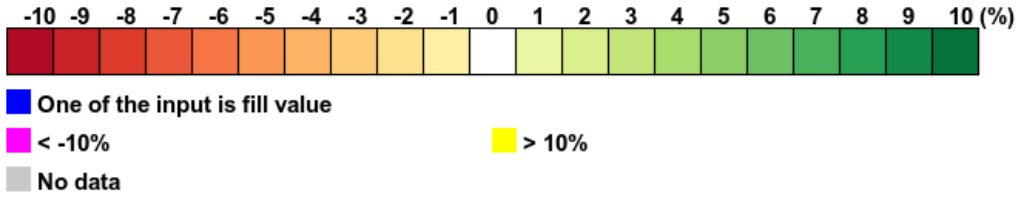
OPS
DOY 2018252



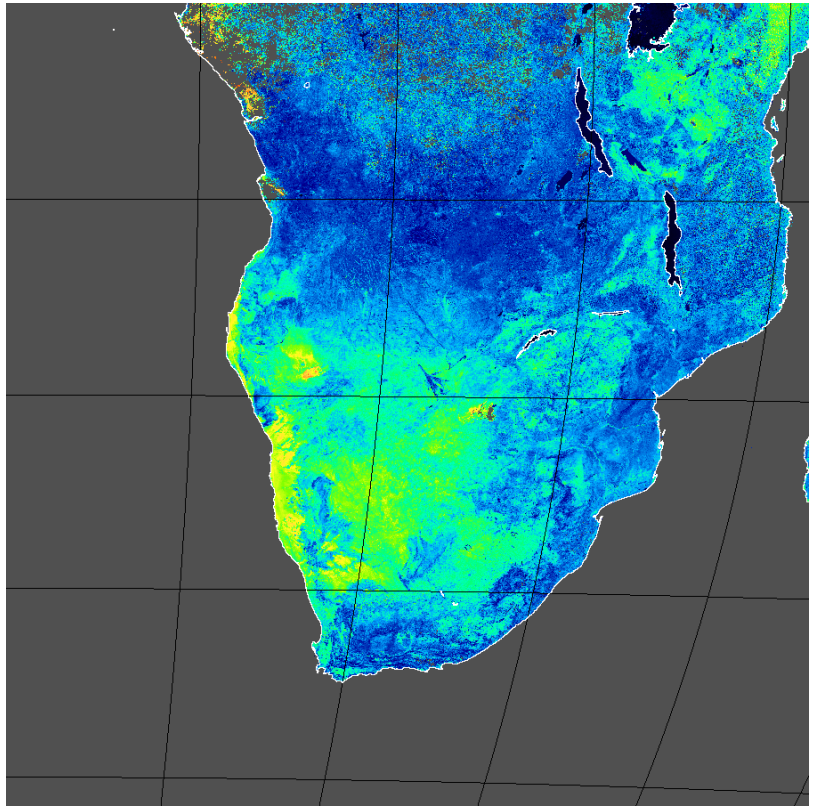
Relative Difference between NRT and OPS
VNP43MA3 - Albedo_WSA_shortwave

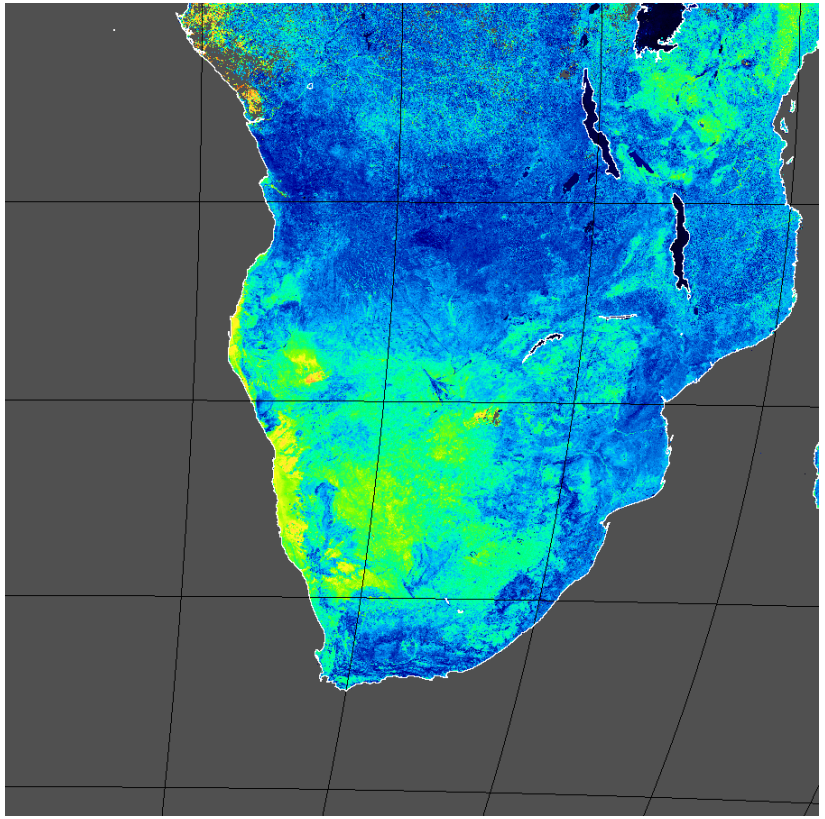
DIFFERENCE
DOY 2018252

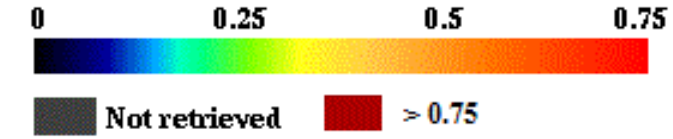




Albedo_WSA_shortwave: South Africa





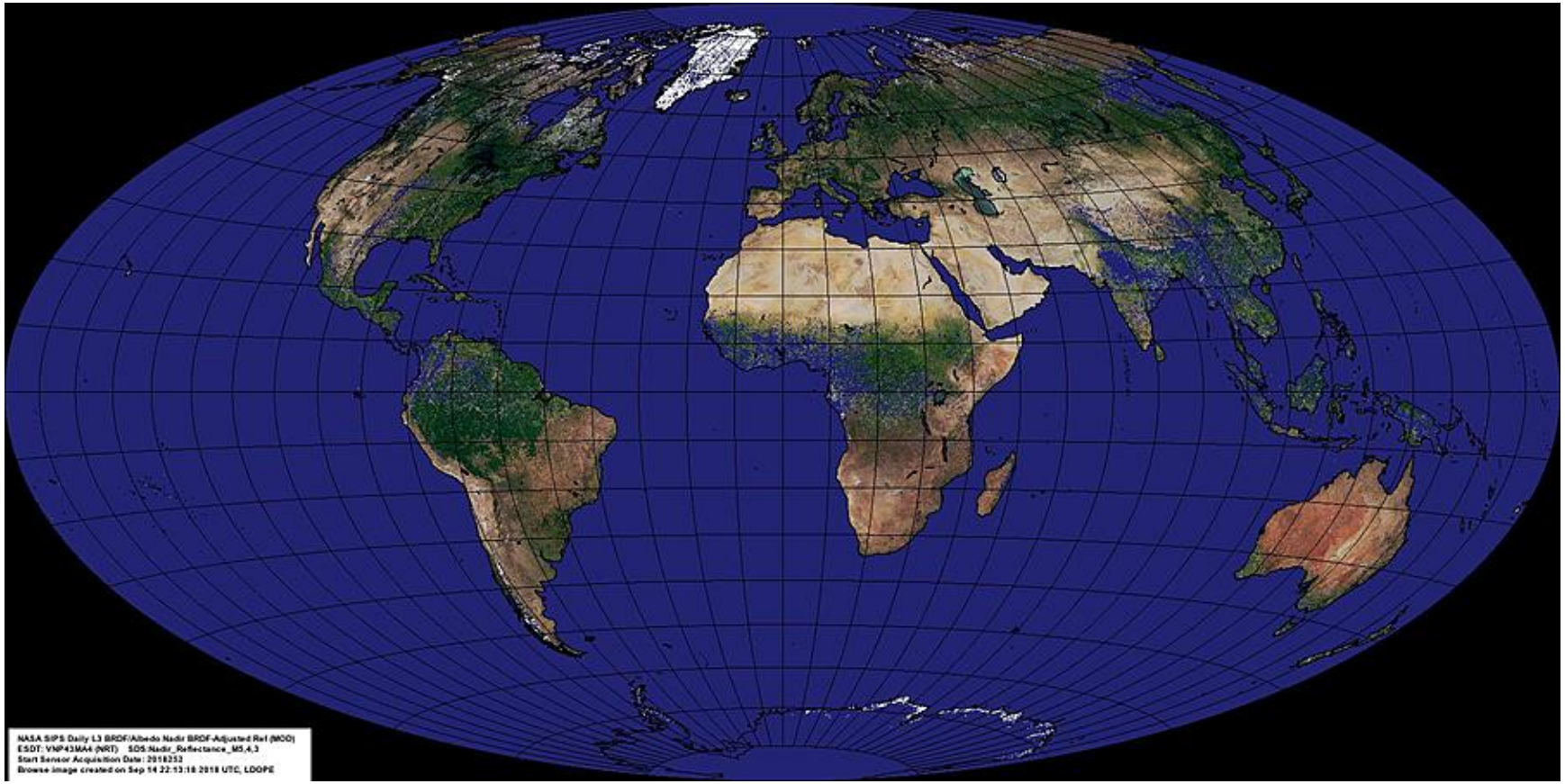


NRT
DOY 2018252

OPS

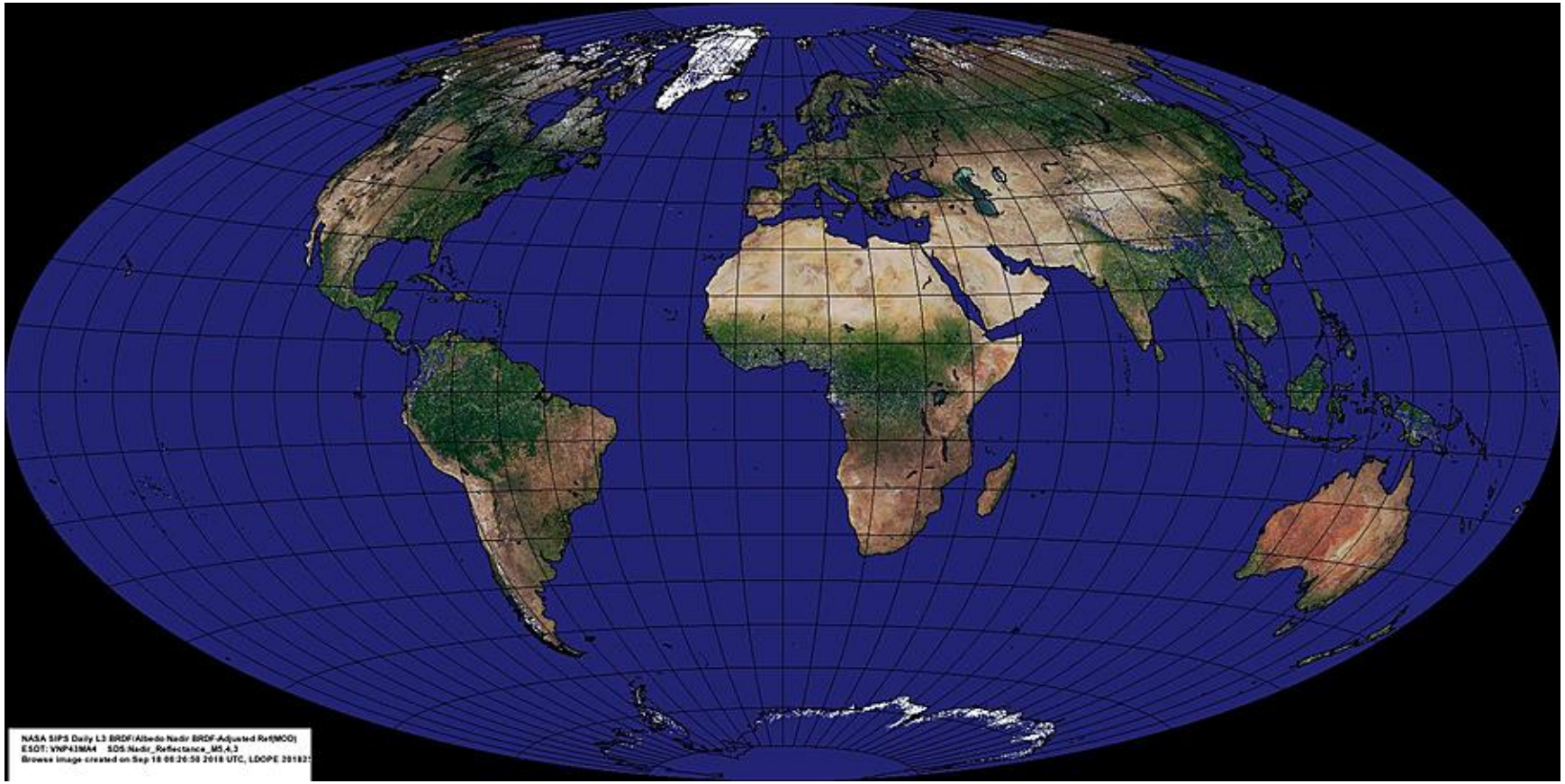
NRT V1 BRDF Albedo: VNP43MA4 - Nadir_Reflectance_M5,4,3

NRT
DOY 2018252



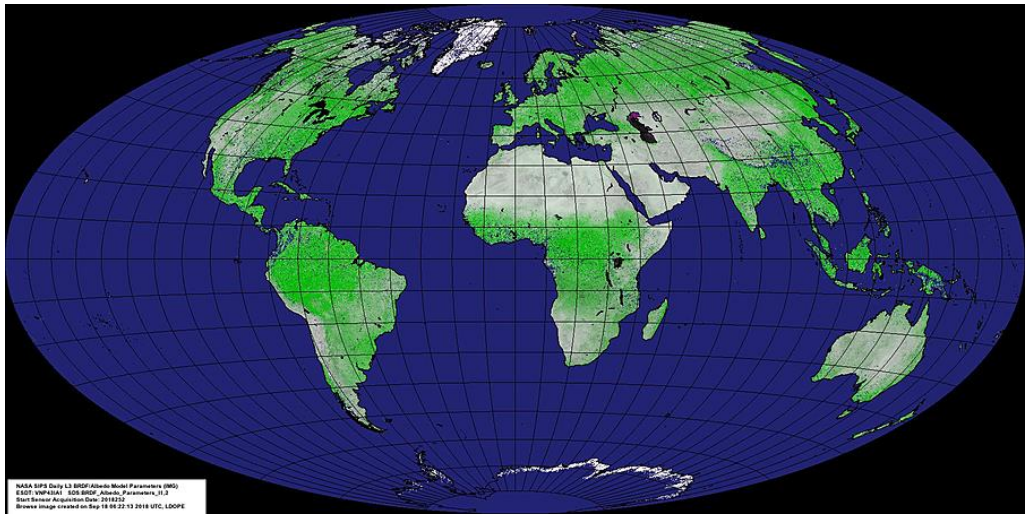
OPS V1 BRDF Albedo: VNP43MA4 - Nadir_Reflectance_M5,4,3

OPS
DOY 2018252

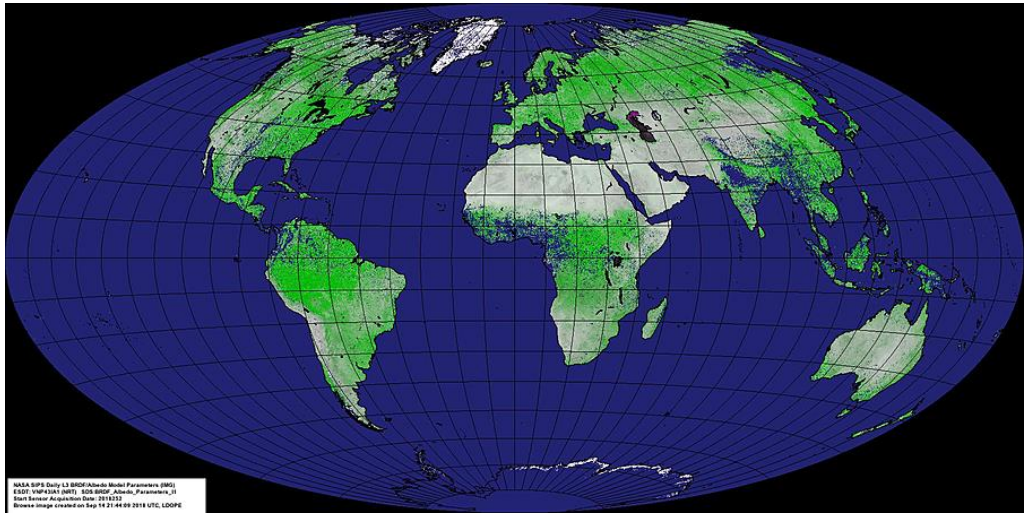


V1 BRDF Albedo: VNP43IA1 - BRDF_Albedo_Parameters_I1,2

NRT
DOY 2018252



OPS



Summary

- Overall the V1 land products from NRT processing match to the operational V1 products with some expected minor differences from use of different ancillaries.
- In general, NRT processing will produce the same set of granules/tiles with nearly same geolocation accuracy as the operational processing except for the data period that may be impacted by maneuvers. In these cases users are advised to use the operational products generated at Land SIPS using the best available geolocation information and after bad data are removed through the QA performed by LDOPE.