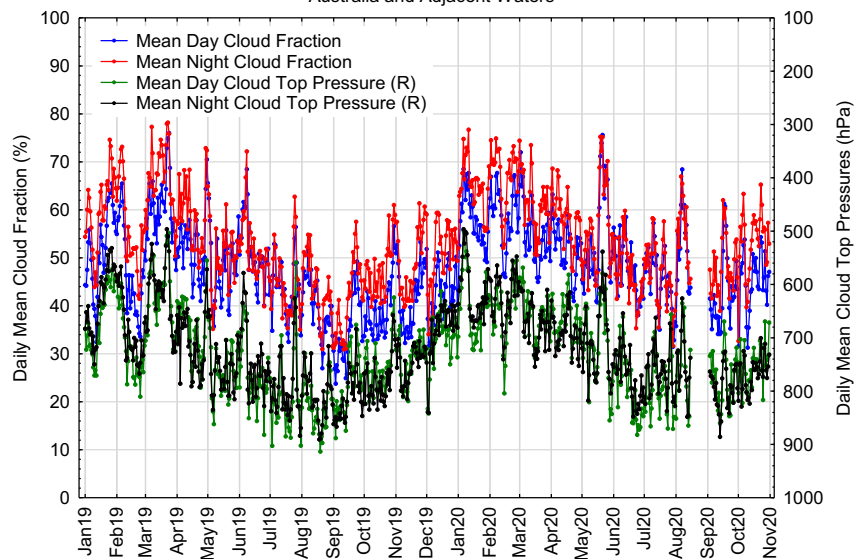




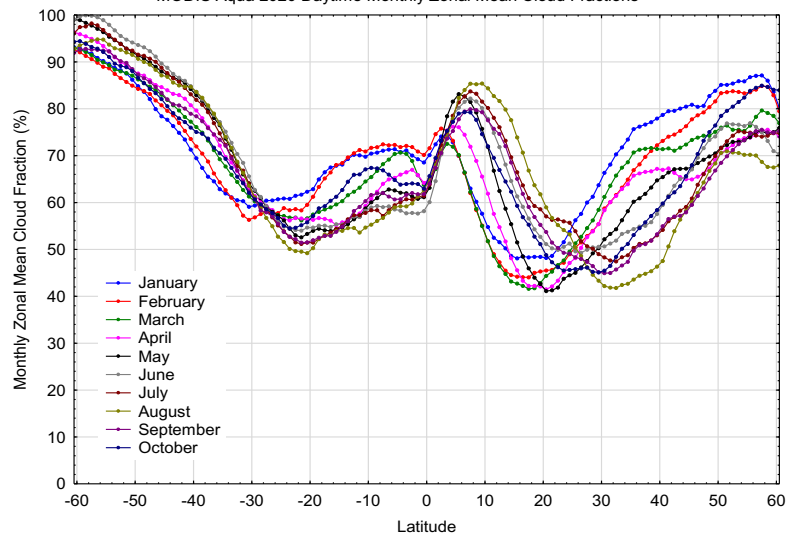
Maintenance of Cloud Products: MXD35 and MXD06CT

Steve Ackerman, Rich Frey

Aqua 2019-2020 Cloud Statistics
Australia and Adjacent Waters



MODIS Aqua 2020 Daytime Monthly Zonal Mean Cloud Fractions



Objectives

Maintenance of MXD35 and MXD06CT products

Fix for missing data in MXD06CT L2 granules:

Cause is negative RH in lowest level of some
GDAS profiles

Delivered to MODAPS; test ordered

Fix for latest update to GDAS files (1-km CTPs via
LEOCAT)

Additional levels of RH and O₃

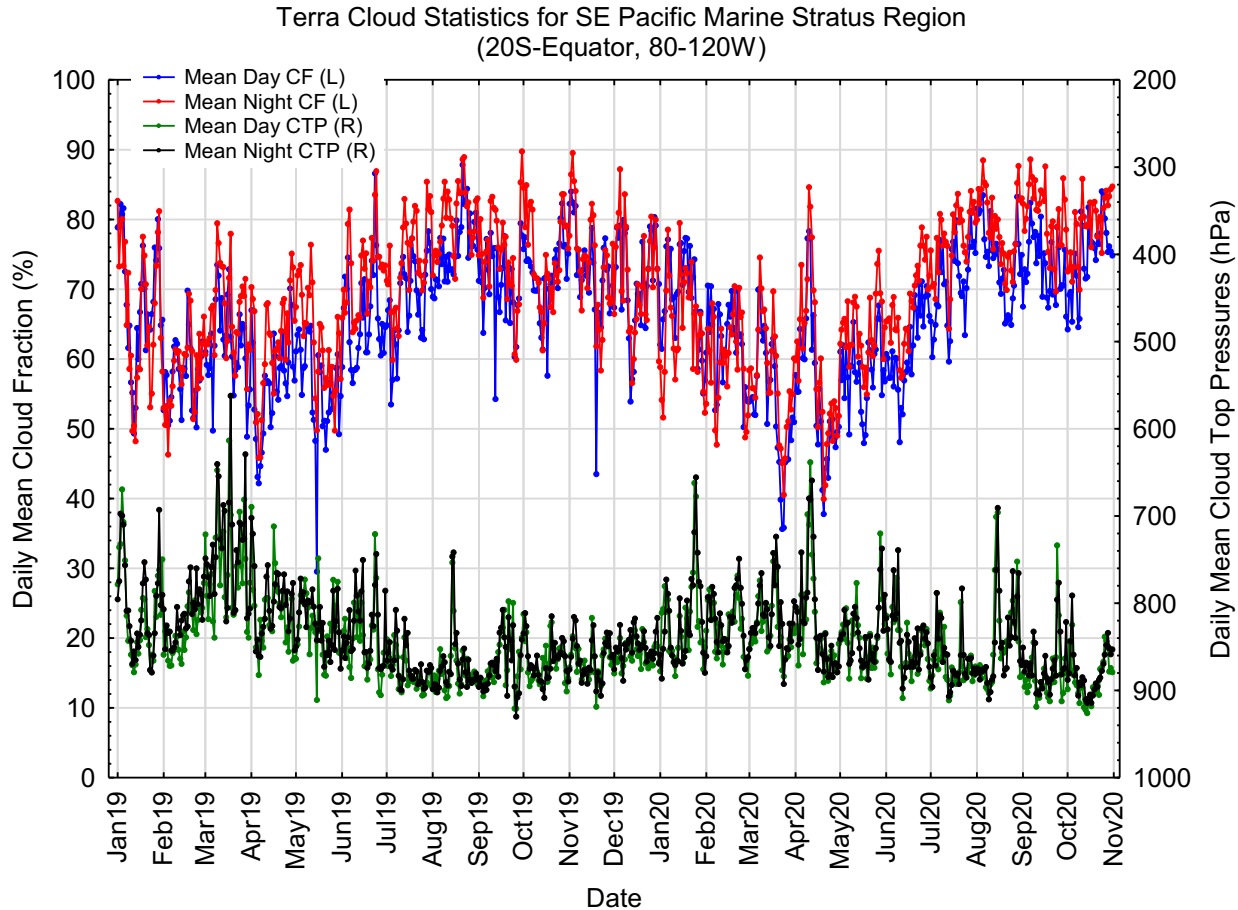
Delivered to MODAPS; test ordered

Monitoring of MXD35_L2 and MXD06CT_L2

Top: time series of area daily mean cloud
fractions (LHS) and cloud top pressures
(RHS)

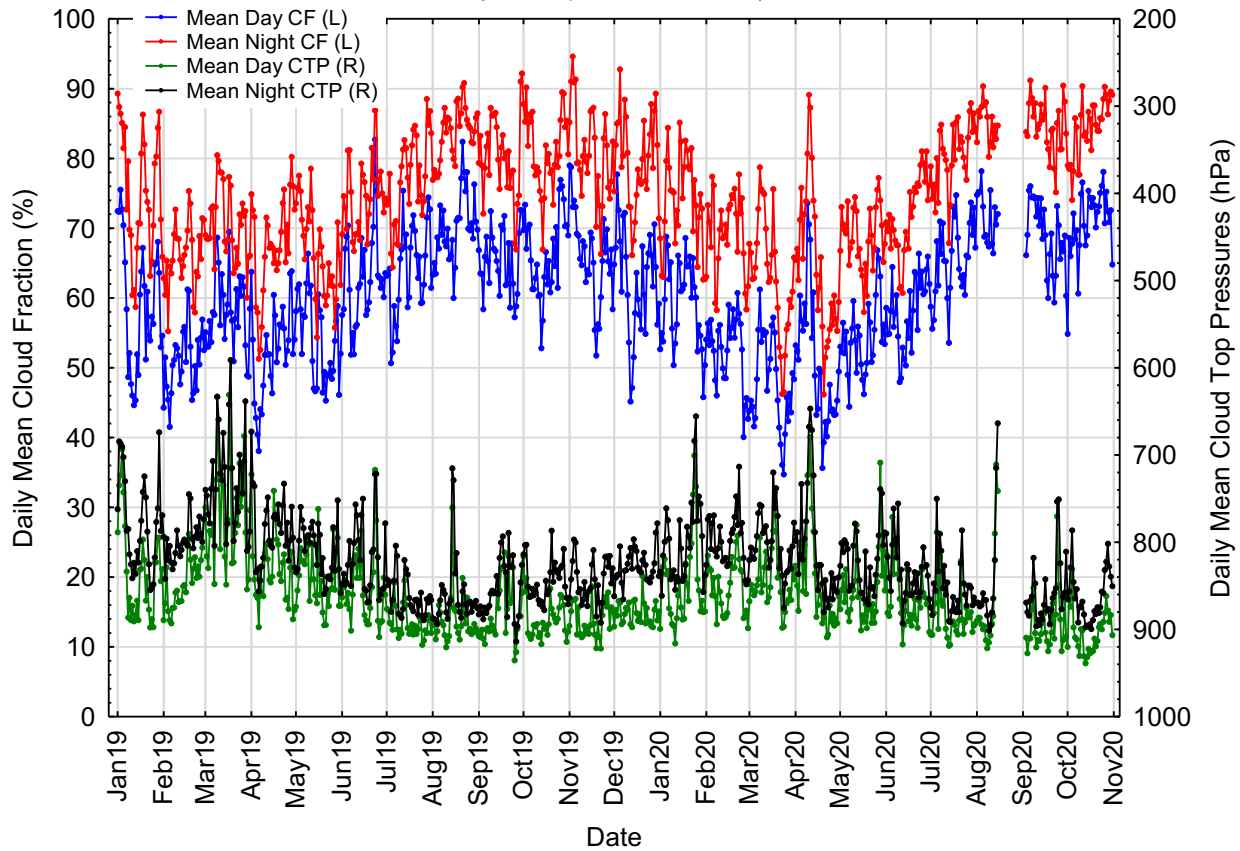
Bottom: monthly zonal mean cloud fractions
for January through October 2020
showing expected seasonal cloud
changes

Monitor Products for Changes in Inputs or Processing (any unanticipated irregularity)



Terra approximate Equator crossing time is 10:30 AM, PM

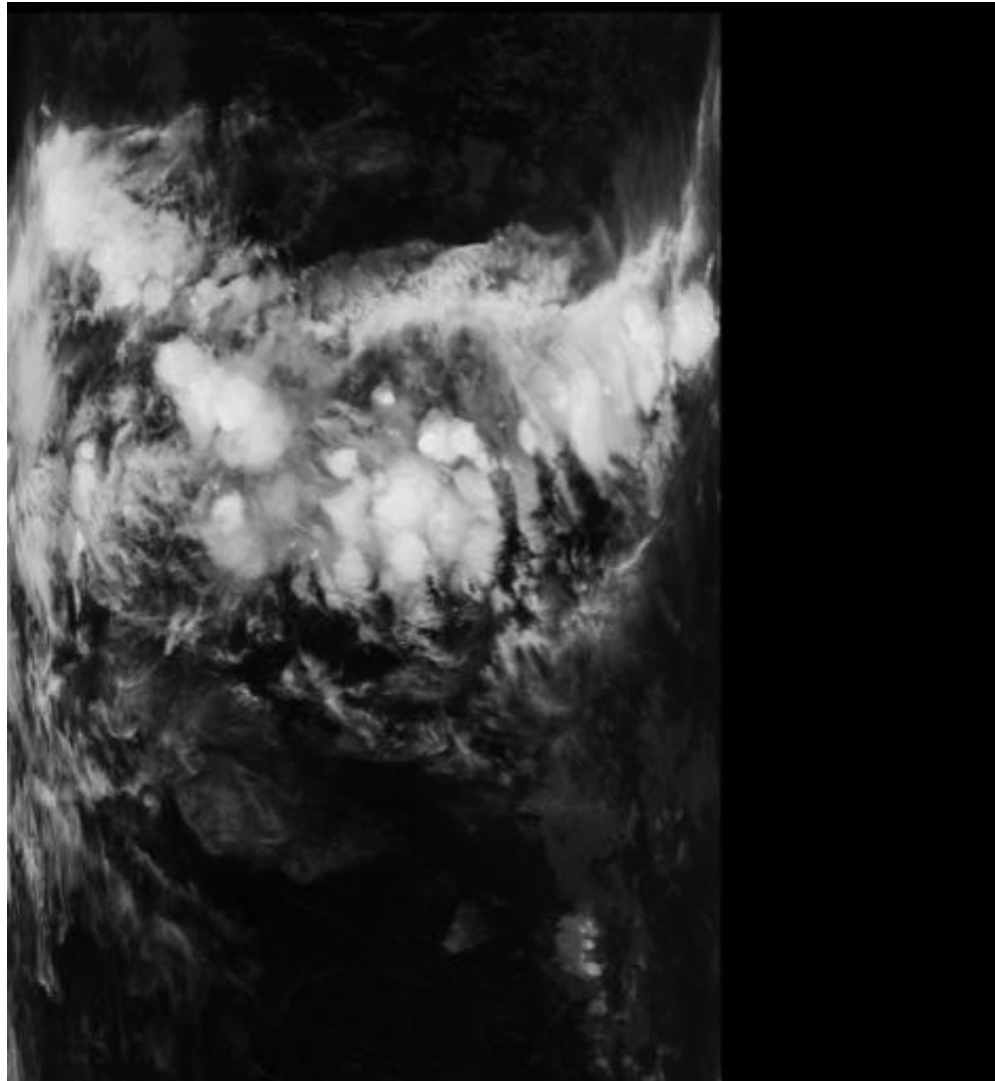
Aqua Cloud Statistics for SE Pacific Marine Stratus Region
(20S-Equator, 80-120W)



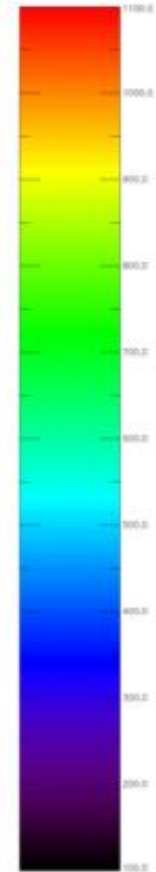
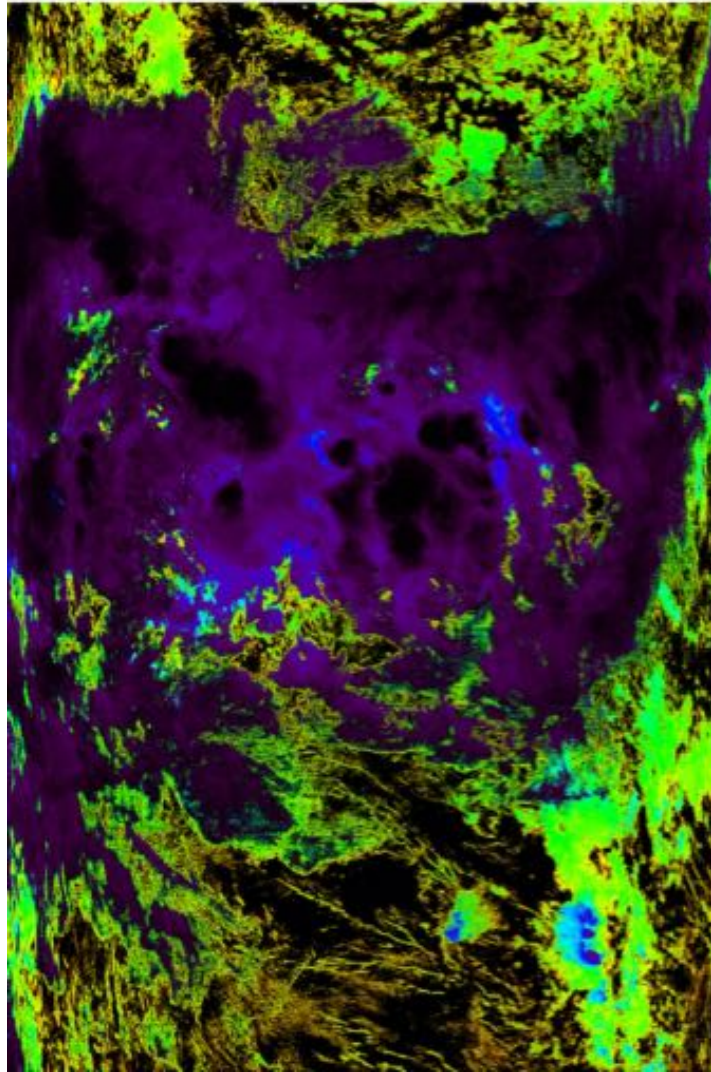
Aqua approximate Equator crossing time is 01:30 PM, AM

GDAS Profile Changes (coming early 2021)
Additional levels of RH, O₃

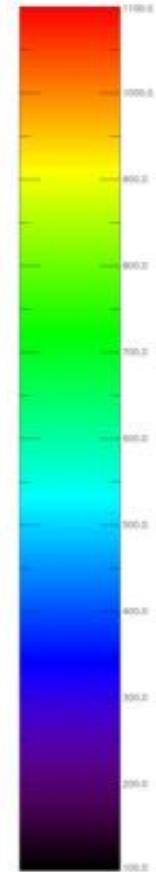
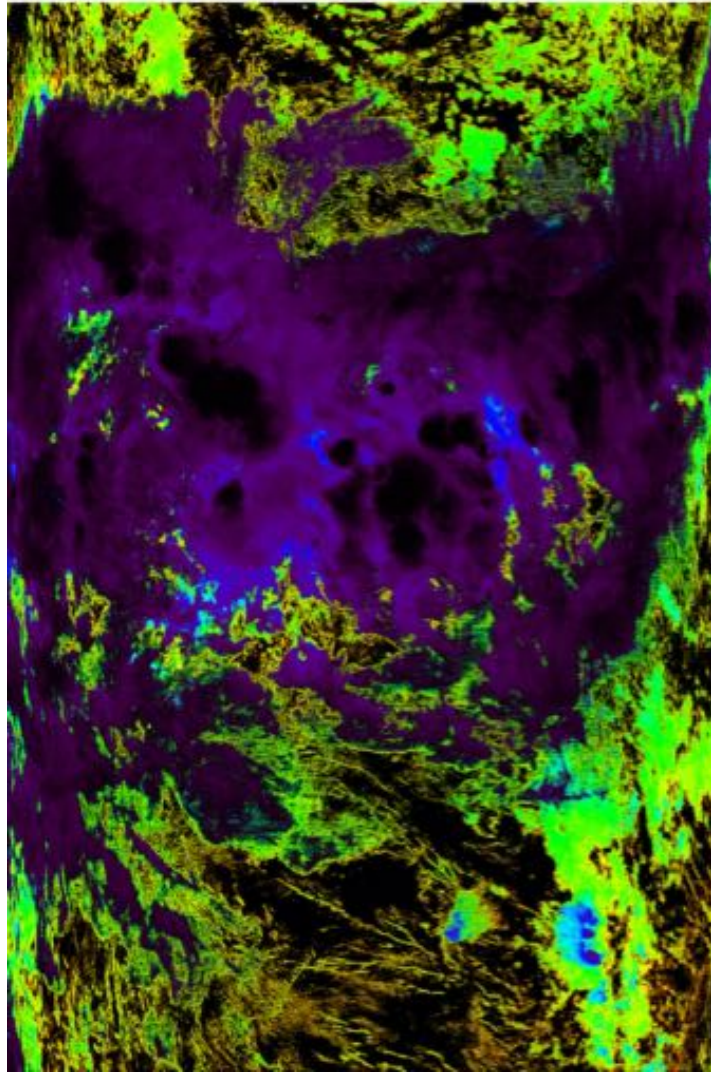
Aqua MODIS B31
2020184.1250



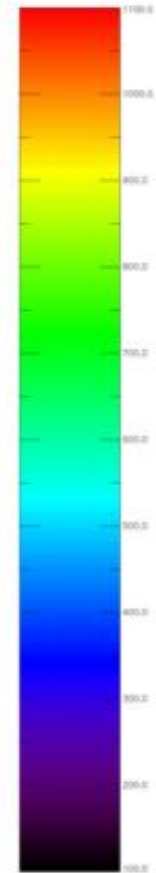
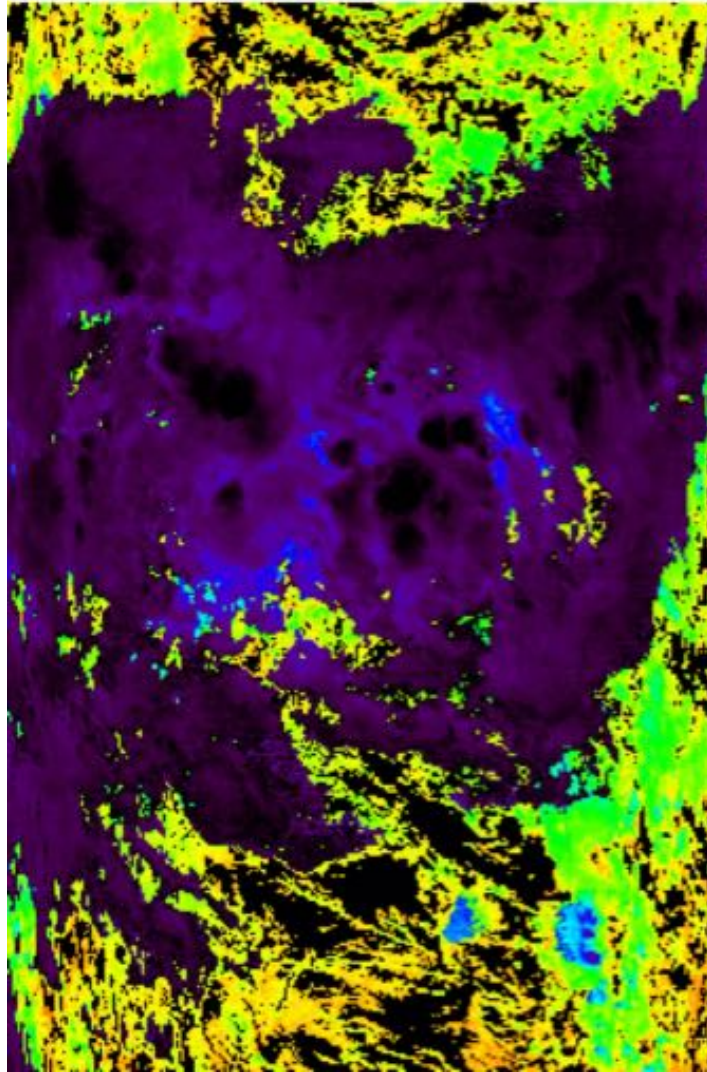
Aqua MODIS MOD06
1-km cloud top pressure
MODAPS baseline
2020184.1250



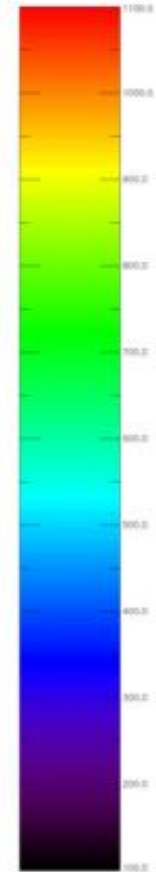
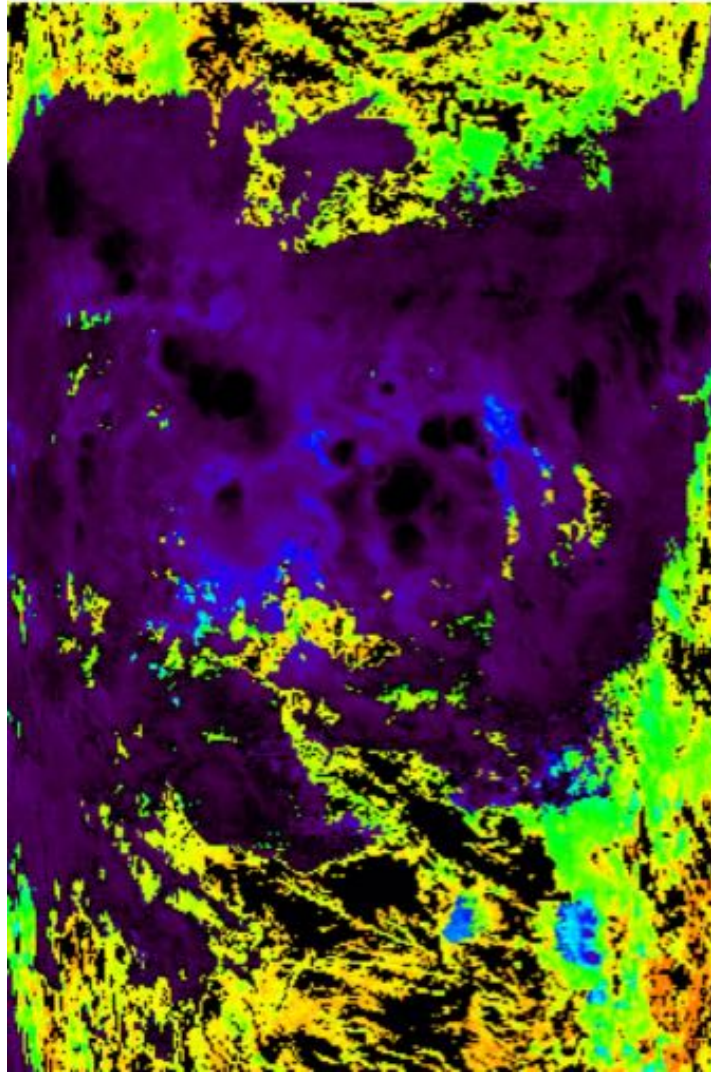
Aqua MODIS MOD06
1-km cloud top pressure
Local new GDAS
2020184.1250



Aqua MODIS MOD06
5-km cloud top pressure
MODAPS baseline
2020184.1250



Aqua MODIS MOD06
5-km cloud top pressure
Local new GDAS
2020184.1250





MODIS-VIIRS Cloud Mask (MVCM)

Status and Updates:

- Aqua MODIS and SNPP VIIRS available at the Goddard DAAC; NOAA-20 VIIRS soon
- Additional algorithm development in progress

Known Issues:

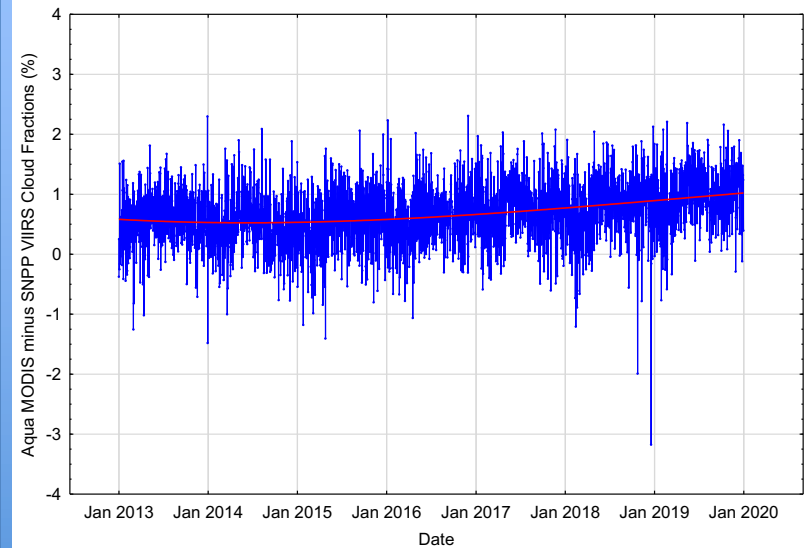
- Cloud detection threshold updates needed (polar)
- VNIR calibration offsets between Aqua MODIS AND SNPP VIIRS

Recent Publications:

The Continuity MODIS-VIIRS Cloud Mask

R. Frey, S. Ackerman, R. Holz, S. Dutcher, Z. Griffith
[Remote Sensing](#), 13 October 2020

Comparison of MVCM Aqua MODIS and MVCM SNPP VIIRS Daily Mean **Daytime** Cloud Fractions
All Surfaces 60S-60N



Plot above shows Aqua MODIS daytime cloud fractions increasing by $\sim 0.5\%$ relative to SNPP VIIRS from 2013 through 2019.

Goal: achieve consistency in cloud detection by use of a uniform set of spectral bands between MODIS and VIIRS

As much as possible, realize comparable quality between MOD35 and MVCM and consistency between the various implementations of MVCM

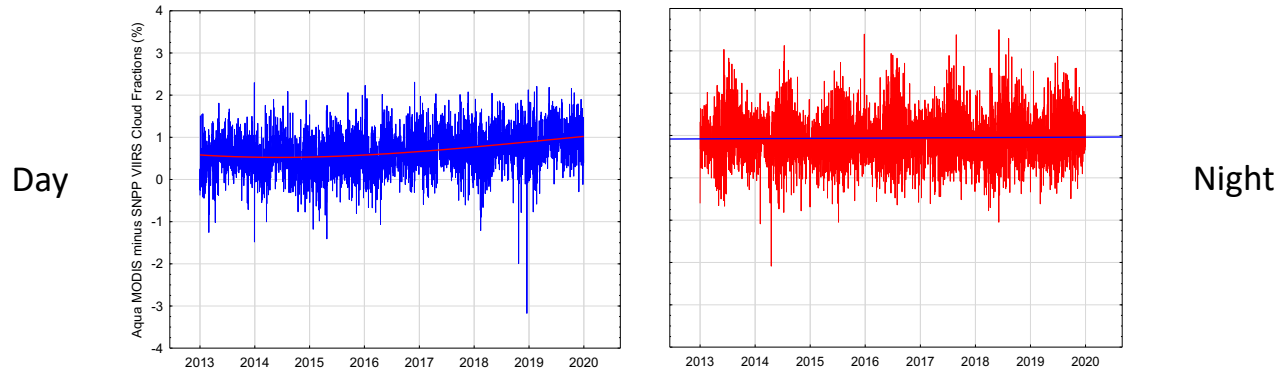
Hit Rate Comparisons Between CALIOP, MYD35, and MVCM

MYD35 and MVCM vs. CALIOP Cloud Detection								
Scene Type	JJA 2018 Hit Rates (%)				DJF 2017-2018 Hit Rates (%)			
	MYD35	MVCM Aqua MODIS	MVCM SNPP VIIRS	MVCM NOAA20 VIIRS	MYD35	MVCM Aqua MODIS	MVCM SNPP VIIRS	MVCM NOAA20 VIIRS (JF)
Global	88.2	87.5	86.8	86.8	88.1	86.6	86.3	86.5
60S-60N	90.7	90.5	90.1	90.3	90.1	89.7	89.6	89.5
Global Day	91.1	90.5	89.3	89.2	90.6	89.9	89.4	89.0
Global Night	85.6	84.7	84.5	84.6	85.9	83.7	83.6	84.3
60S-60N Day	91.0	90.6	90.2	90.3	90.8	90.2	90.3	90.0
60S-60N Night	90.3	90.5	90.0	90.3	89.4	89.2	88.9	88.9
60S-60N Water Day	91.4	90.6	90.4	90.6	92.3	91.0	91.5	91.3
60S-60N Water Night	90.1	90.1	89.6	89.7	90.7	90.6	90.3	89.5
60S-60N Land Day	90.1	90.4	89.7	89.4	86.6	87.8	86.8	86.3
60S-60N Land Night	90.9	91.7	90.8	91.9	86.0	85.3	85.6	87.6
60S-60N Desert Day	91.0	91.3	90.4	91.0	85.7	86.7	85.5	84.5
60S-60N Desert Nt	90.6	91.0	90.4	91.9	83.5	84.1	85.0	86.3
Polar Day	91.2	90.3	87.3	86.8	90.2	89.4	87.4	86.3
Polar Night	76.9	73.5	73.9	73.7	79.7	74.2	74.6	76.5

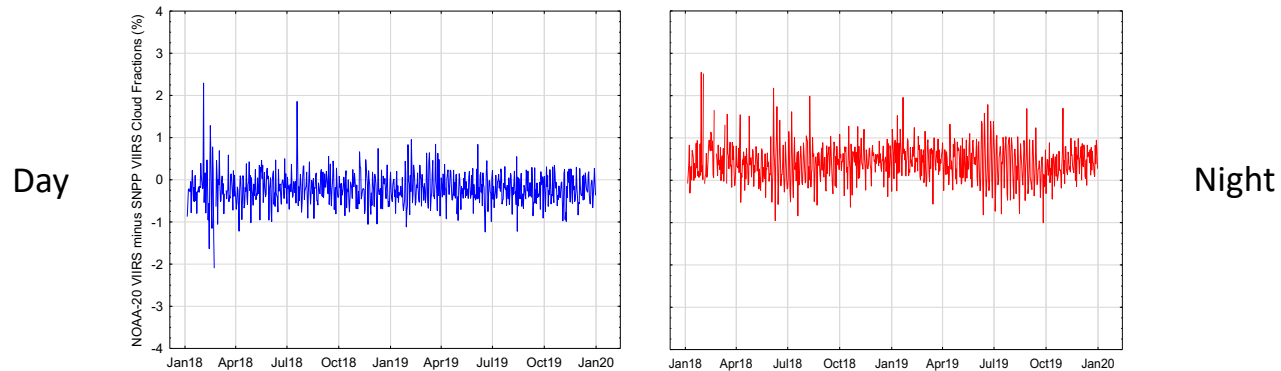
Green means statistically insignificant differences

Blue means statistically significant differences

Time Series of Daily Mean MVCM Cloud Fraction Differences (%) 60S-60N, 2013 - 2019



MVCM Aqua MODIS CF minus MVCM SNPP VIIRS CF



MVCM NOAA-20 VIIRS CF minus MVCM SNPP VIIRS CF