

SST Input Study on the MODIS Cloud Mask Product

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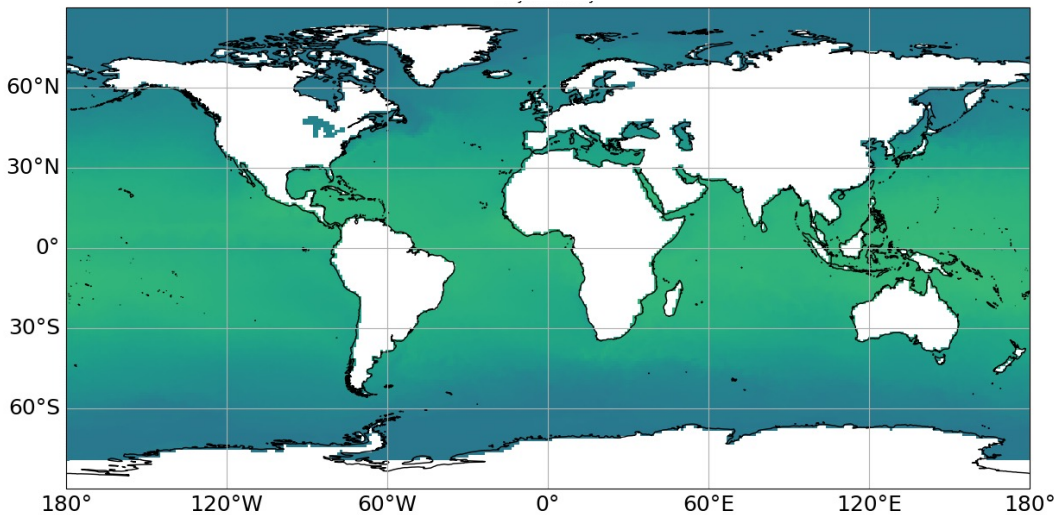
SST Input Study

- On November 27, 2022, NOAA discontinued the production of the Reynolds Sea Surface Temperature (SST) weekly data files used to generate several cloud products (i.e., MOD35, MOD06, MOD85).
- Replacement: daily mean Optimum Interpolation Sea Surface Temperature (OISST) data provided by NCEI-NOAA (<https://www.ncei.noaa.gov/data/sea-surface-temperature-optimum-interpolation/v2.1/access/avhrr/202301/>)
- An oisst_nc2bin converter package has been developed to create a pseudo-Reynolds SST data.
- Two granules are tested: Jan 15, 2021, at 14:15 UTC and 22:25 UTC
- MYD35 and MYD06 were processed with
 - Weekly mean Reynolds SST (1-degree, global, binary)
 - Month-old weekly mean Reynolds SST (1-degree, global, binary)
 - Daily mean OISST (0.25 degree, ocean only, NetCDF)
- Cloud Mask and CTP have been compared.

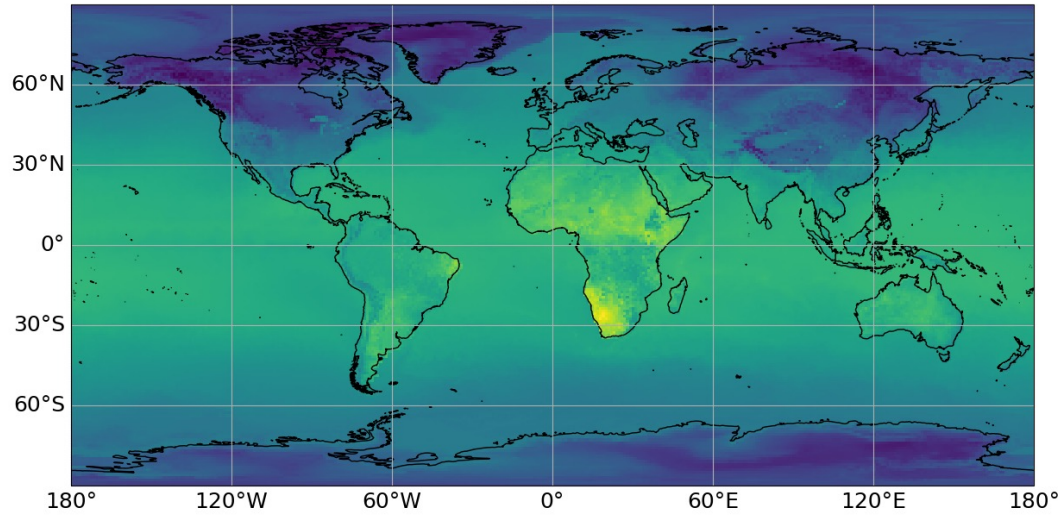
The new, pseudo-Reynolds SST file

- An `oisst_nc2bin` converter package has been developed.
- The software:
 - Resamples the OISST data from 0.25 degrees into 1-degree grid
 - Convert data format from NetCDF to binary
 - Fills up the land grid points with GDAS surface temperature data to provide SST over inland water surfaces
 - Smooths the coastline transition between GDAS and OISST

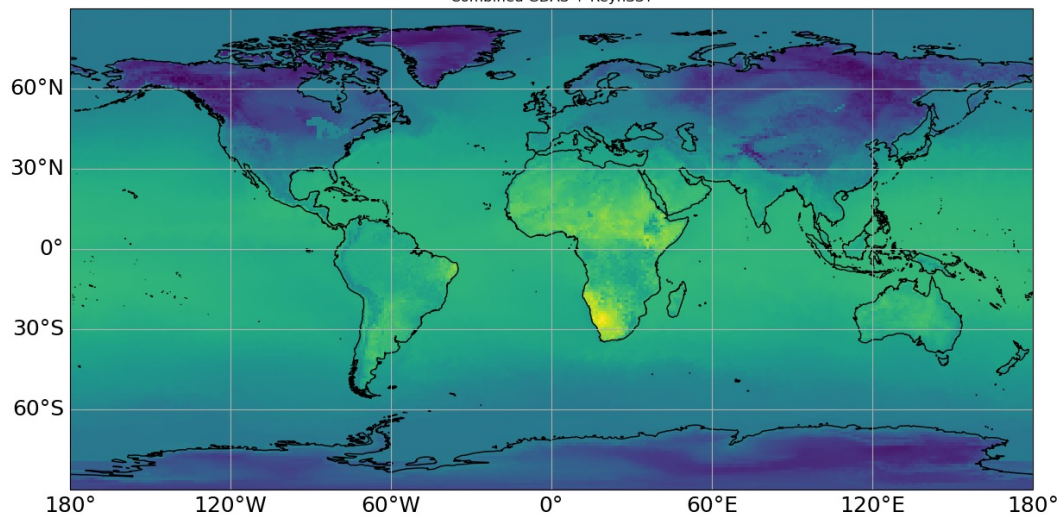
OISST Only



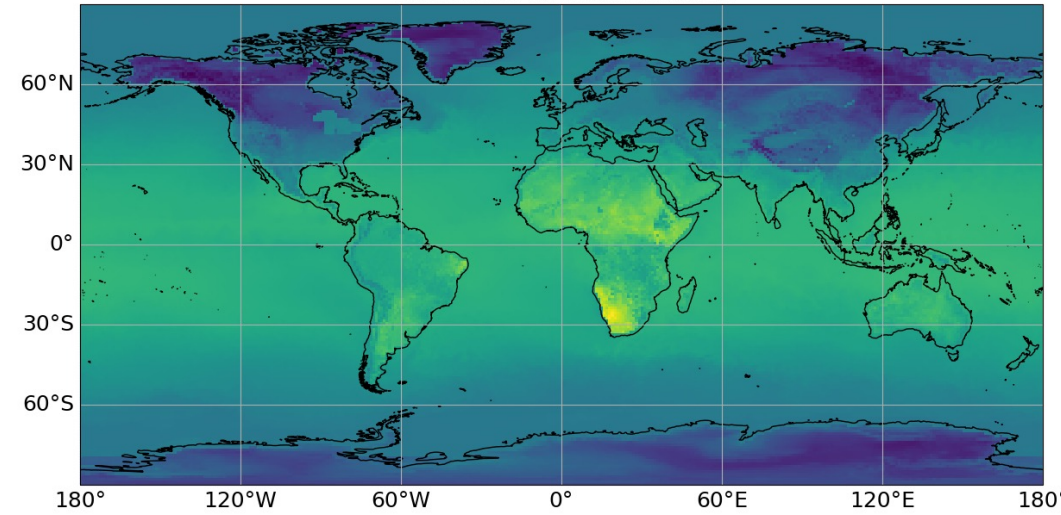
GDAS Only



Combined OISST + GDAS



Combined OISST + GDAS with coastline extend



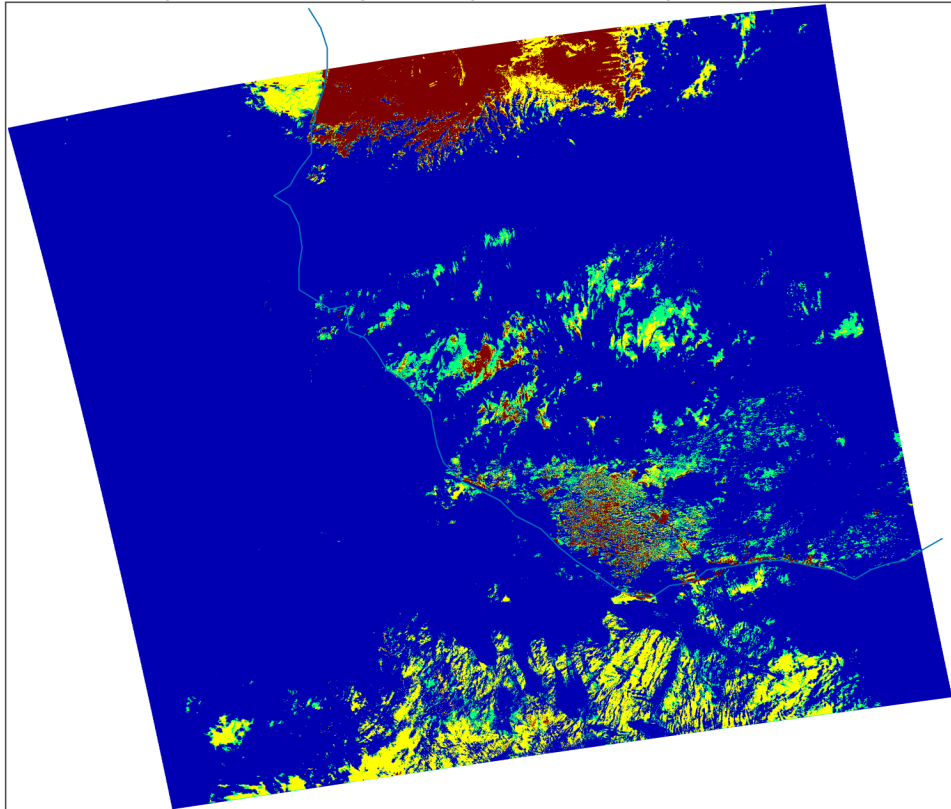
MYD35.A2021349.1415



MYD35 Cloud Mask – Dec 15, 2021, 14:15 UTC

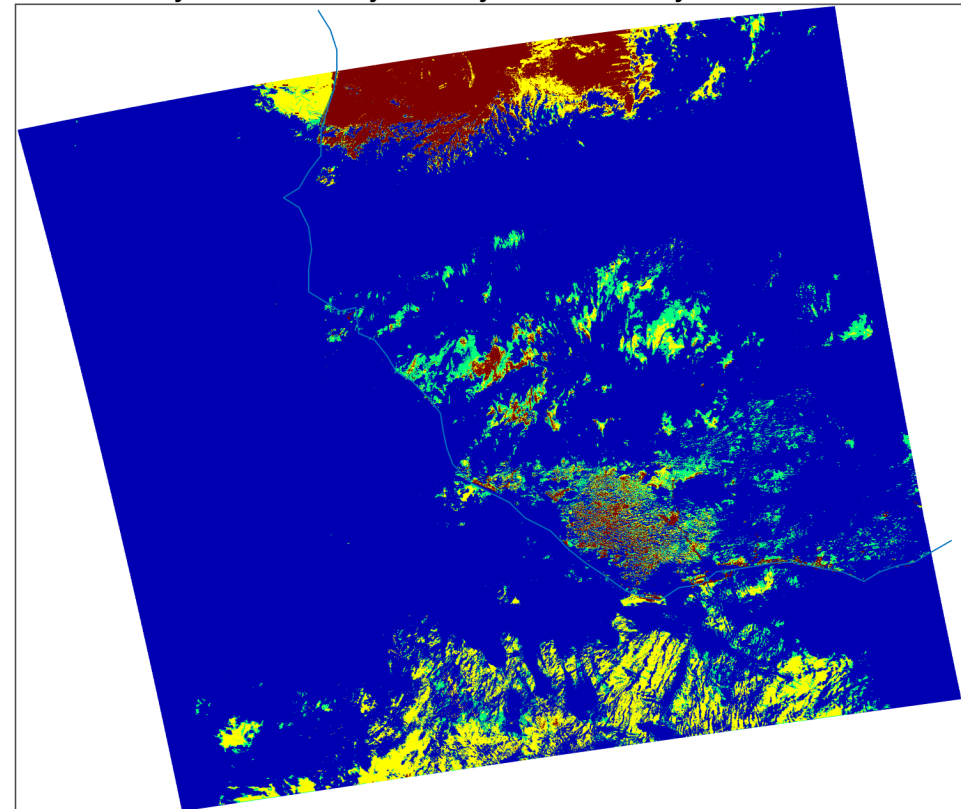
Weekly mean SST

MYD35 Cloud Mask on 2021349.1415 - Using Weekly SST
0=Cloudy - 1=Probably Cloudy - 2=Probably Clear - 3=Clear



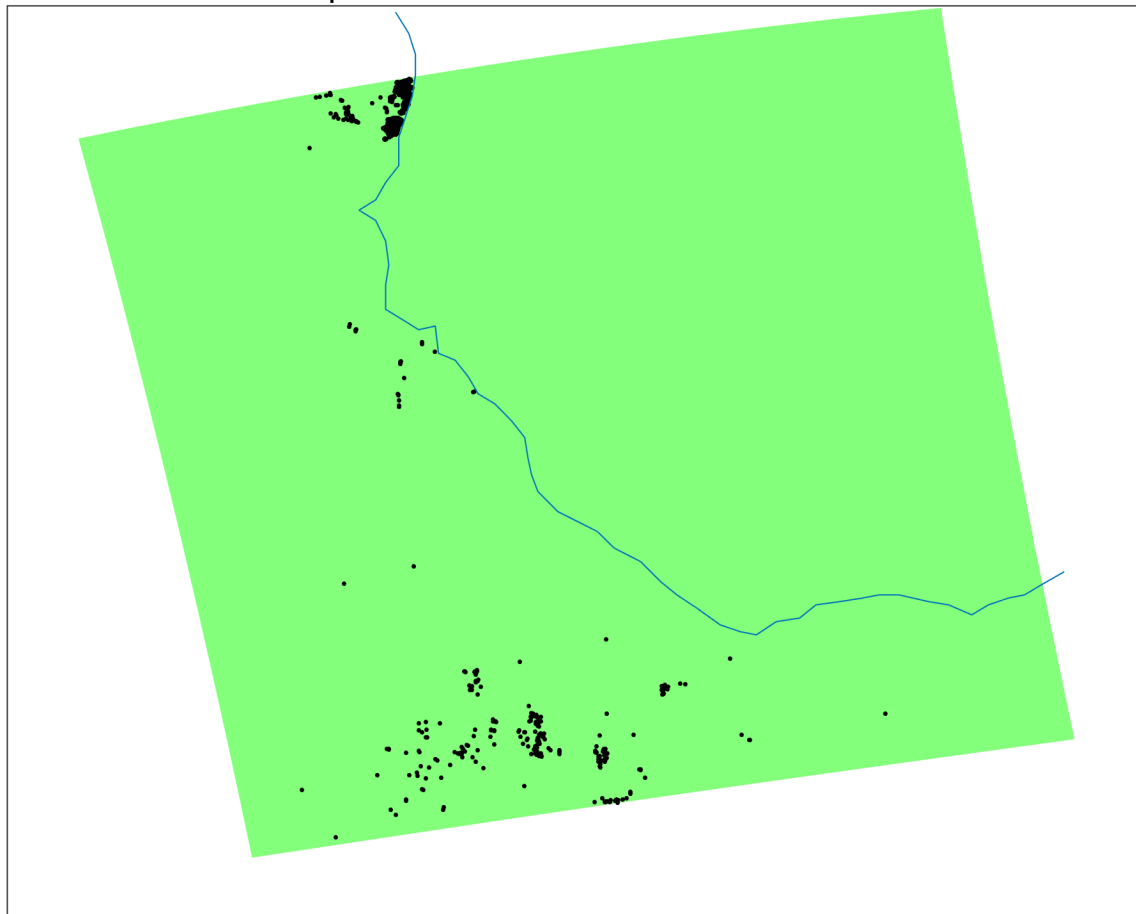
Daily mean SST Coastline Fixed

MYD35 Cloud Mask on 2021349.1415 - Using Daily SST CL
0=Cloudy - 1=Probably Cloudy - 2=Probably Clear - 3=Clear

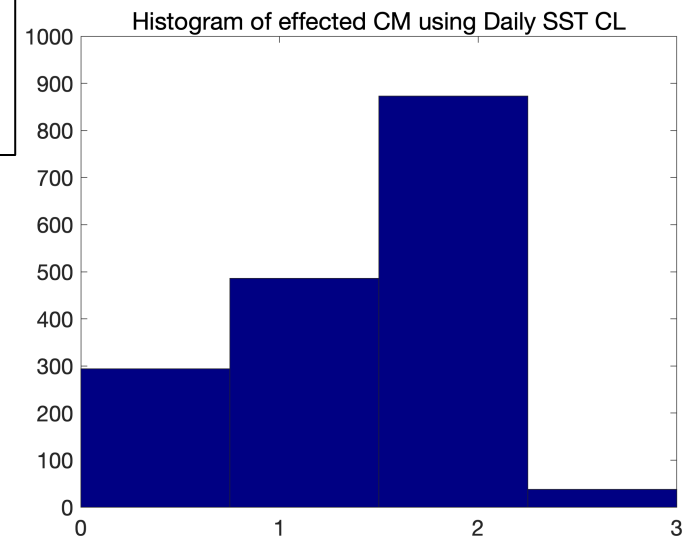
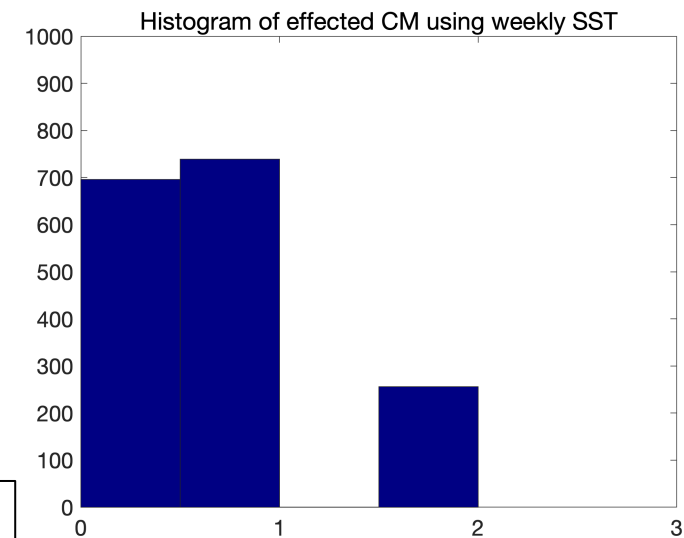


Cloud Mask Differences (weekly – daily CL)

Location of Differences of MYD35 Cloud Mask (Weekly-DailyCL) on 2021349.1415
Different pixels = 1691 out of 2748620 Percent= 0.06



0=Cloudy
1=Prob. Cloudy
2=Prob. Clear
3=Clear

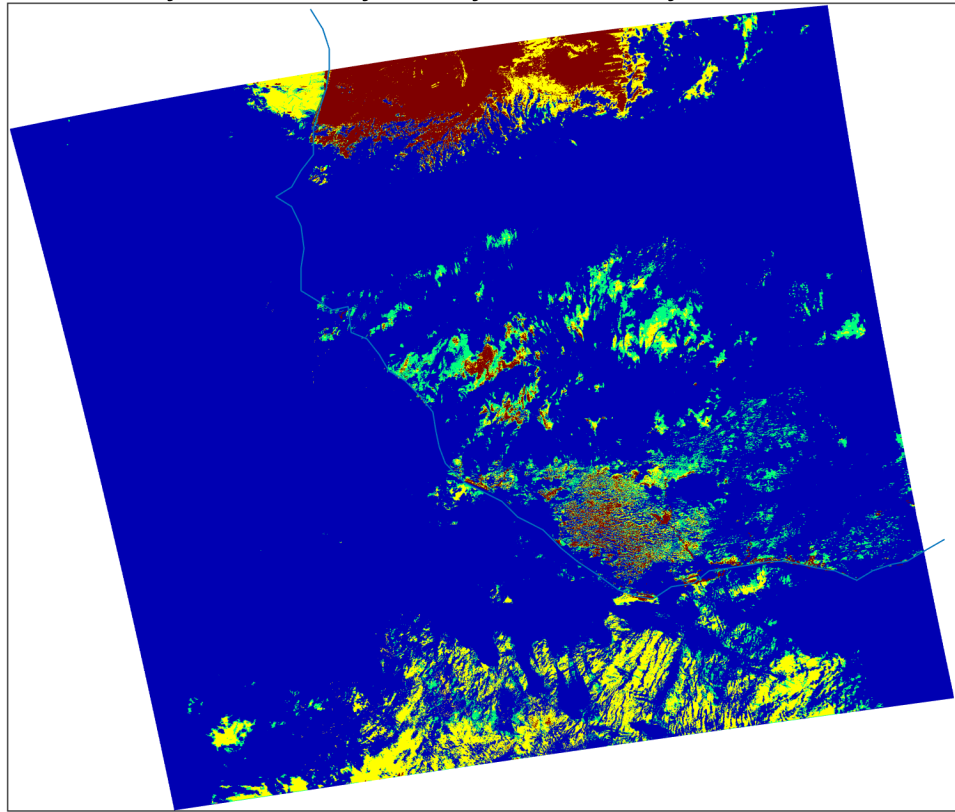


0.06% of pixels have been changed, mostly from Cloud to Probably Clear Category

MYD35 Cloud Mask – Dec 15, 2021, 14:15 UTC

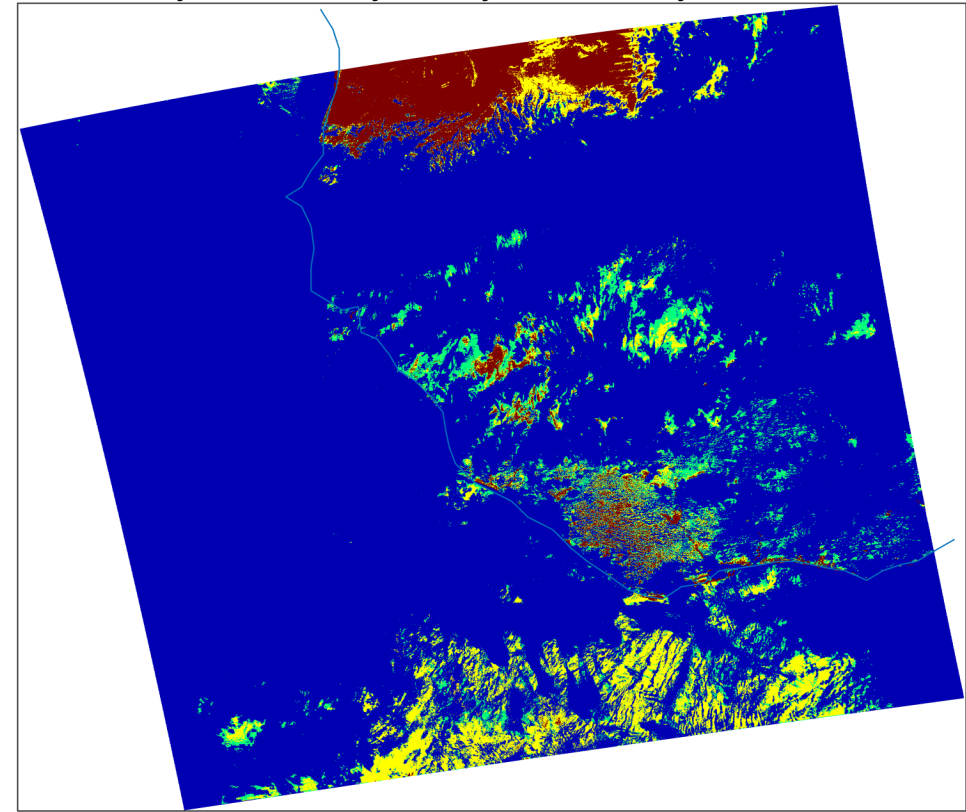
Weekly mean SST

MYD35 Cloud Mask on 2021349.1415 - Using Weekly SST
0=Cloudy - 1=Probably Cloudy - 2=Probably Clear - 3=Clear



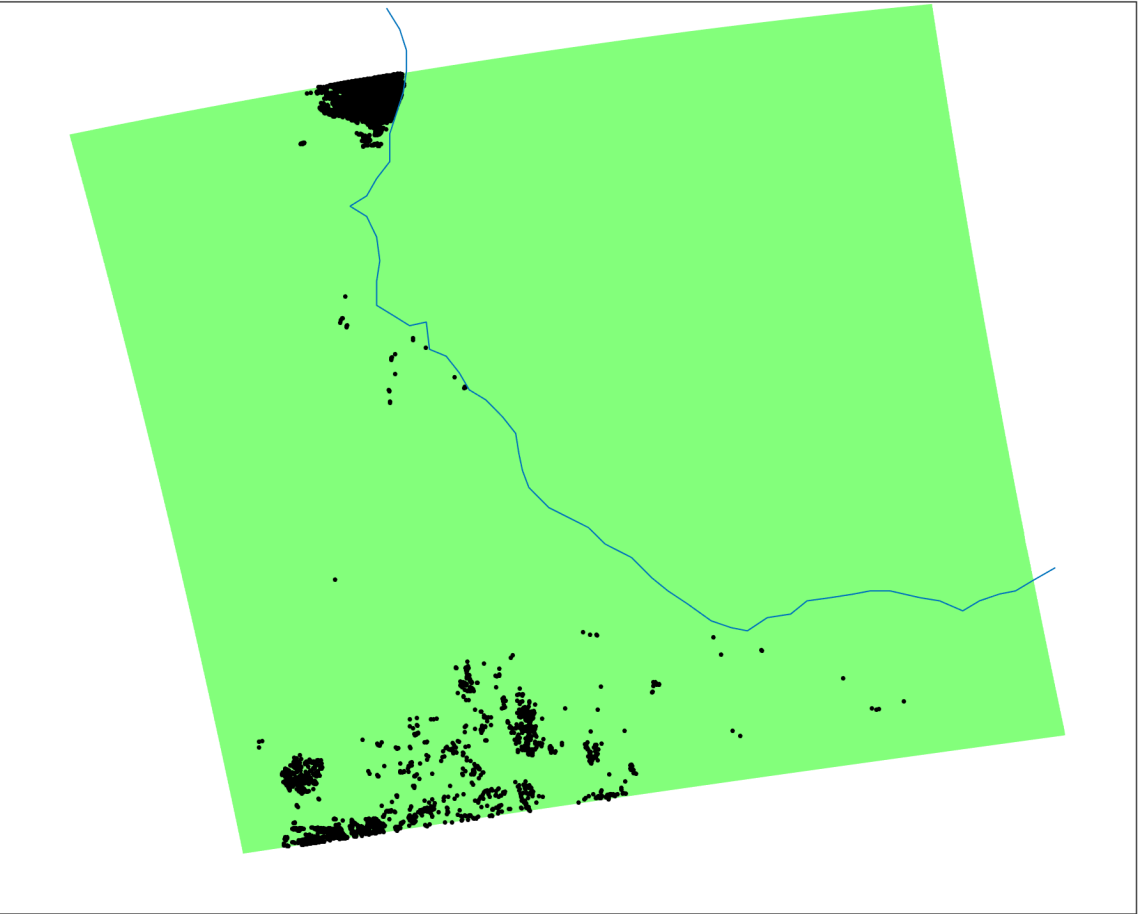
Monthly-old weekly mean SST

MYD35 Cloud Mask on 2021349.1415 - Using monthold weekly SST
0=Cloudy - 1=Probably Cloudy - 2=Probably Clear - 3=Clear

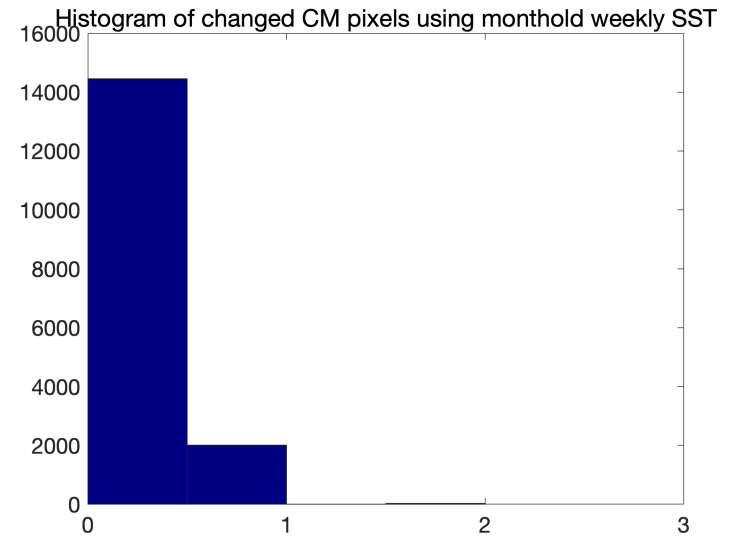
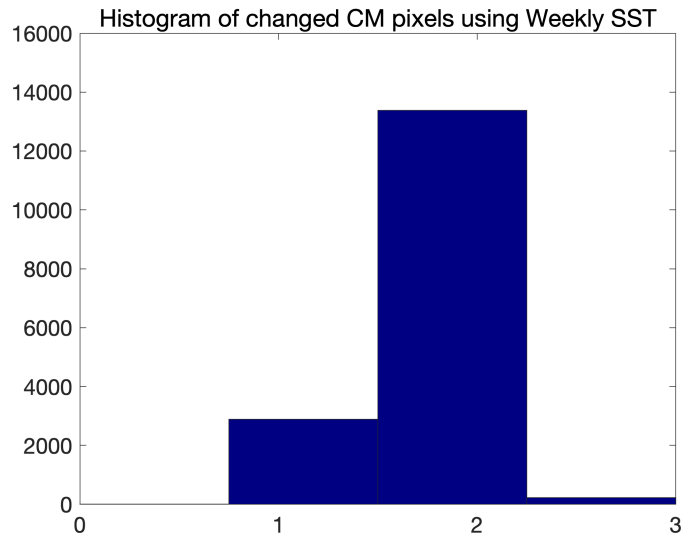


Cloud Mask Differences (weekly – month old)

Location of Differences of MYD35 CCloud Mask (Weekly-Month Old Weekly) on 2021349.1415
Different pixels = 16497 out of 2748620 Percent= 0.60



0=Cloudy
1=Prob. Cloudy
2=Prob. Clear
3=Clear



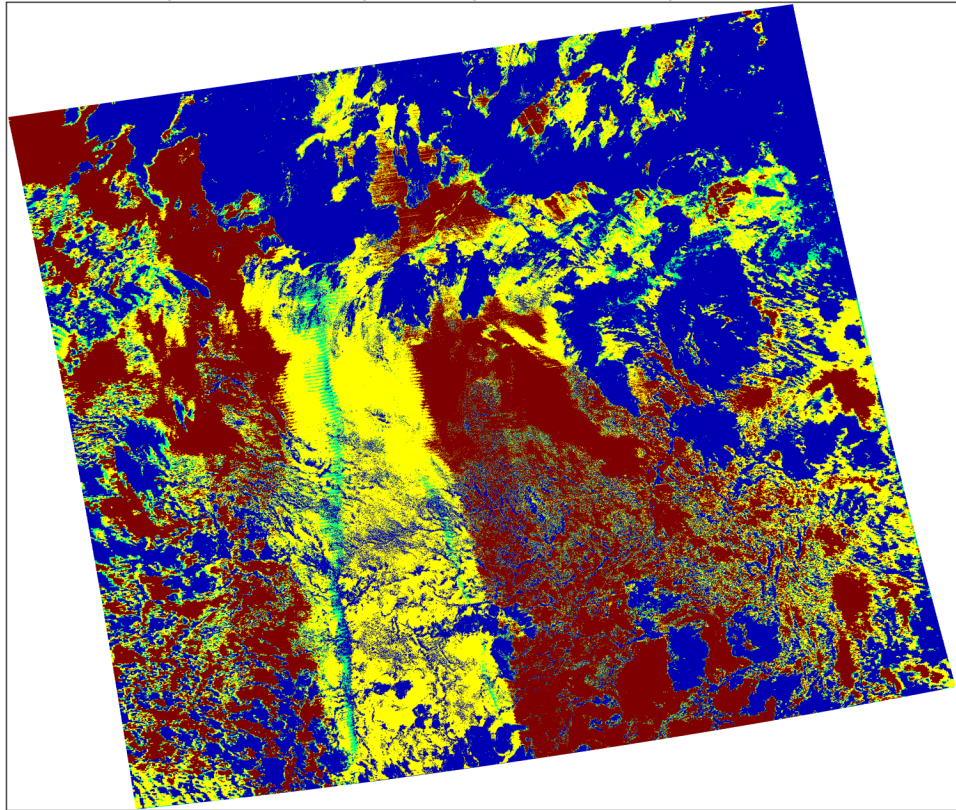
0.6 % of pixels have been changed, mostly from Probably Clear to Cloudy Category

MYD35.A2021349.2225

MYD35 Cloud Mask – Dec 15, 2021, 22:25 UTC

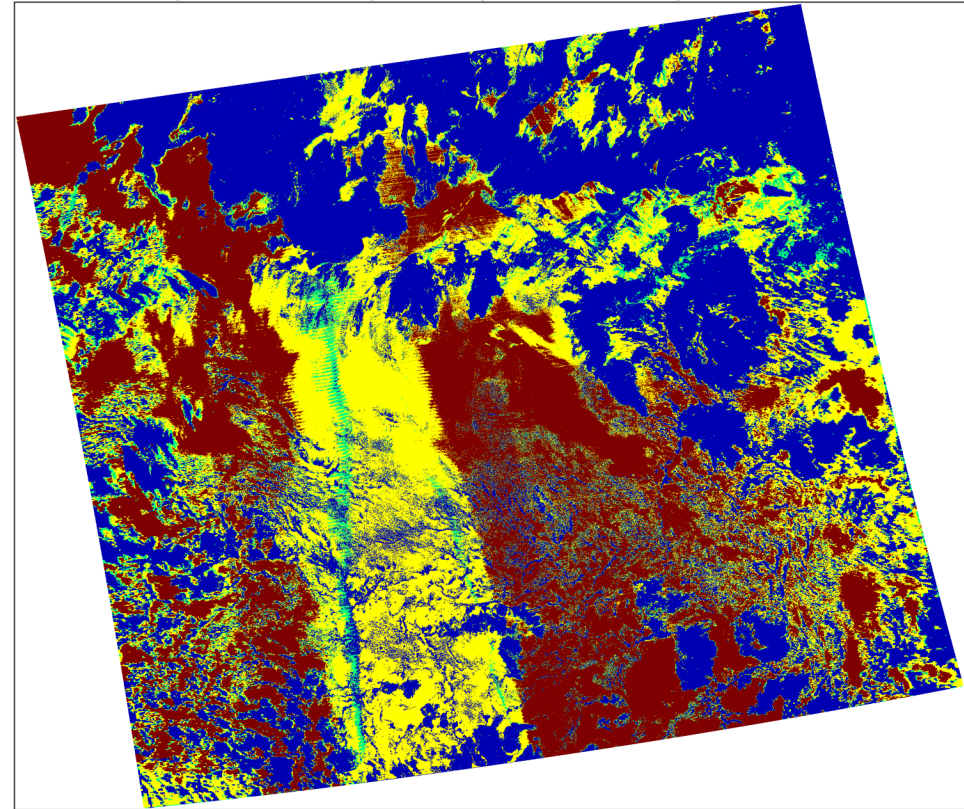
Weekly mean SST

MYD35 Cloud Mask on 2021349.2225 - Using Weekly SST
0=Cloudy - 1=Probably Cloudy - 2=Probably Clear - 3=Clear



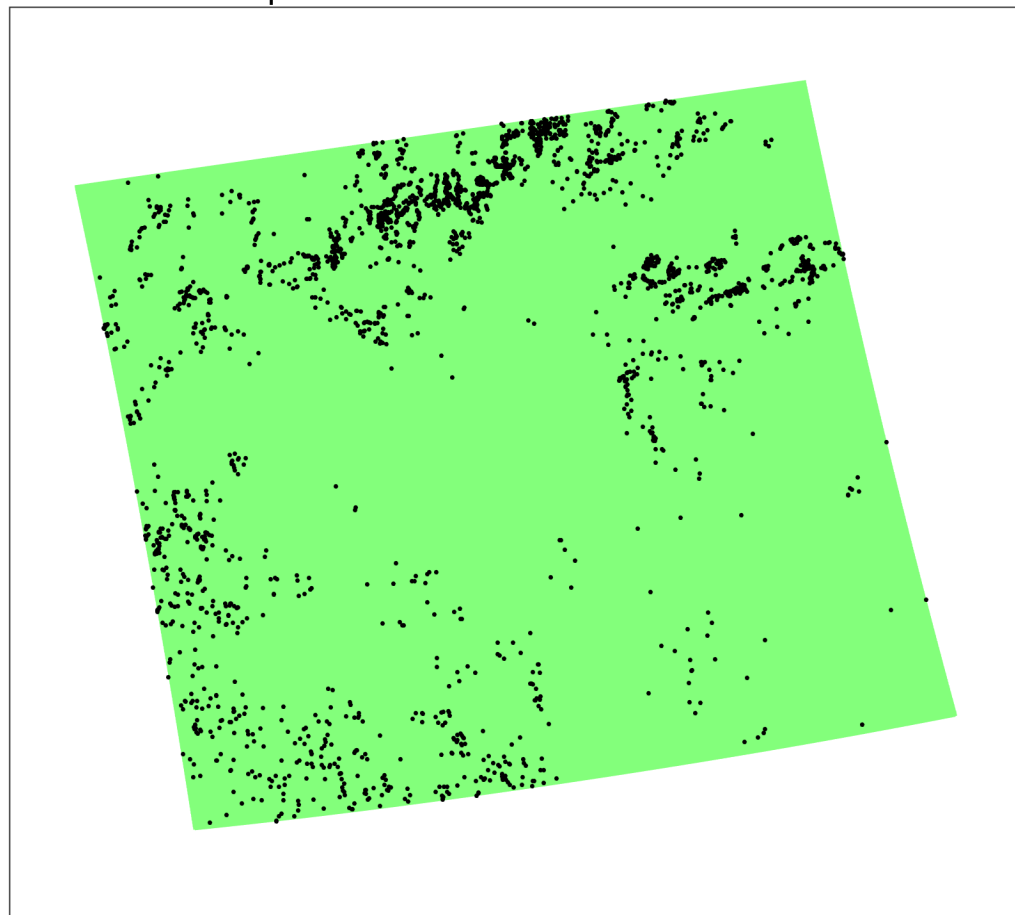
Daily mean SST coastline fixed

MYD35 Cloud Mask on 2021349.2225 - Using Daily SST CL
0=Cloudy - 1=Probably Cloudy - 2=Probably Clear - 3=Clear

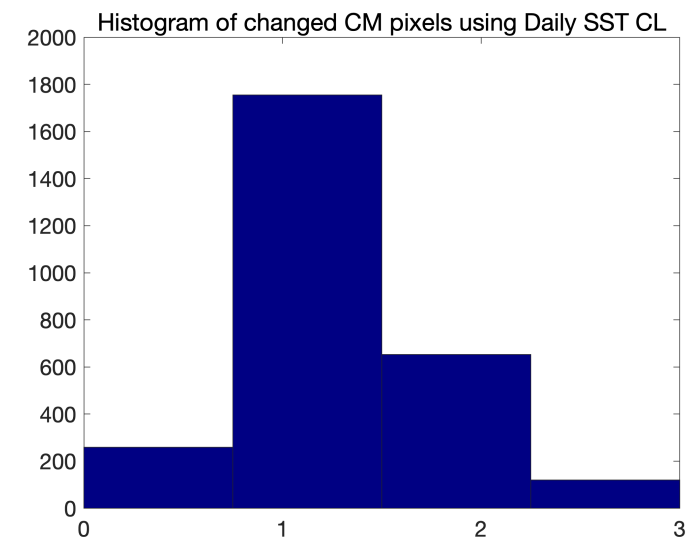
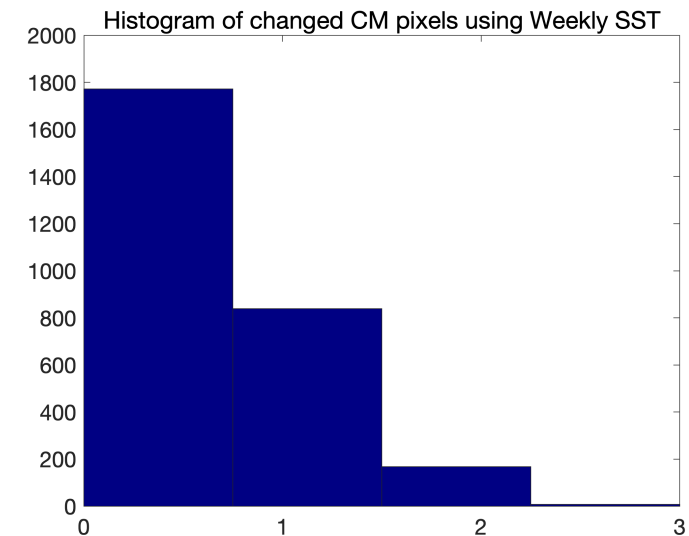


Cloud Mask Differences (weekly – daily CL)

Location of Differences of MYD35 CCloud Mask (Weekly-DailyCL) on 2021349.2225
Different pixels = 2787 out of 2748620 Percent= 0.10



0=Cloudy
1=Prob. Cloudy
2=Prob. Clear
3=Clear

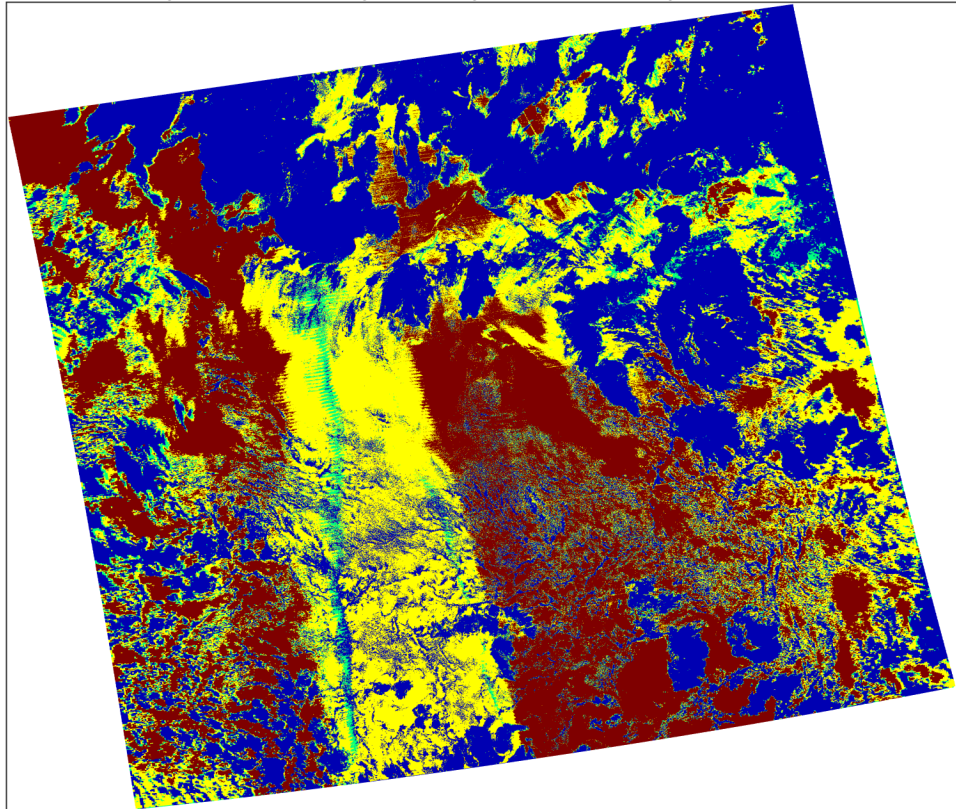


0.1 % of pixels have been changed, mostly from Cloudy to Probably Cloudy Category

MYD35 Cloud Mask – Dec 15, 2021, 22:25 UTC

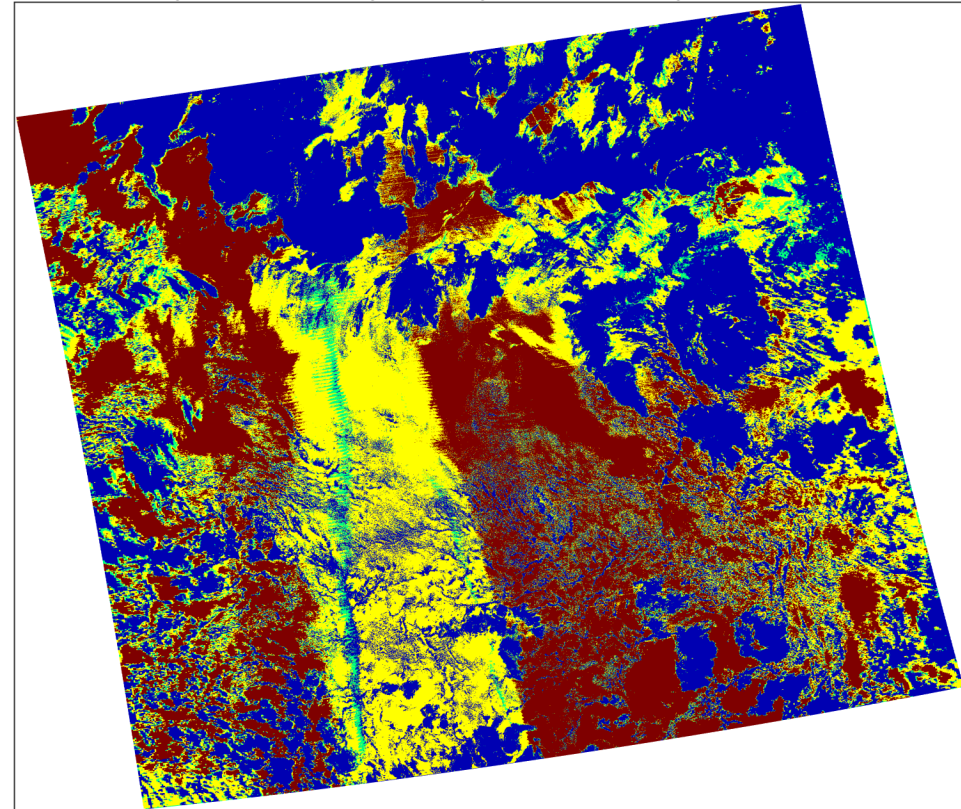
Weekly mean SST

MYD35 Cloud Mask on 2021349.2225 - Using Weekly SST
0=Cloudy - 1=Probably Cloudy - 2=Probably Clear - 3=Clear



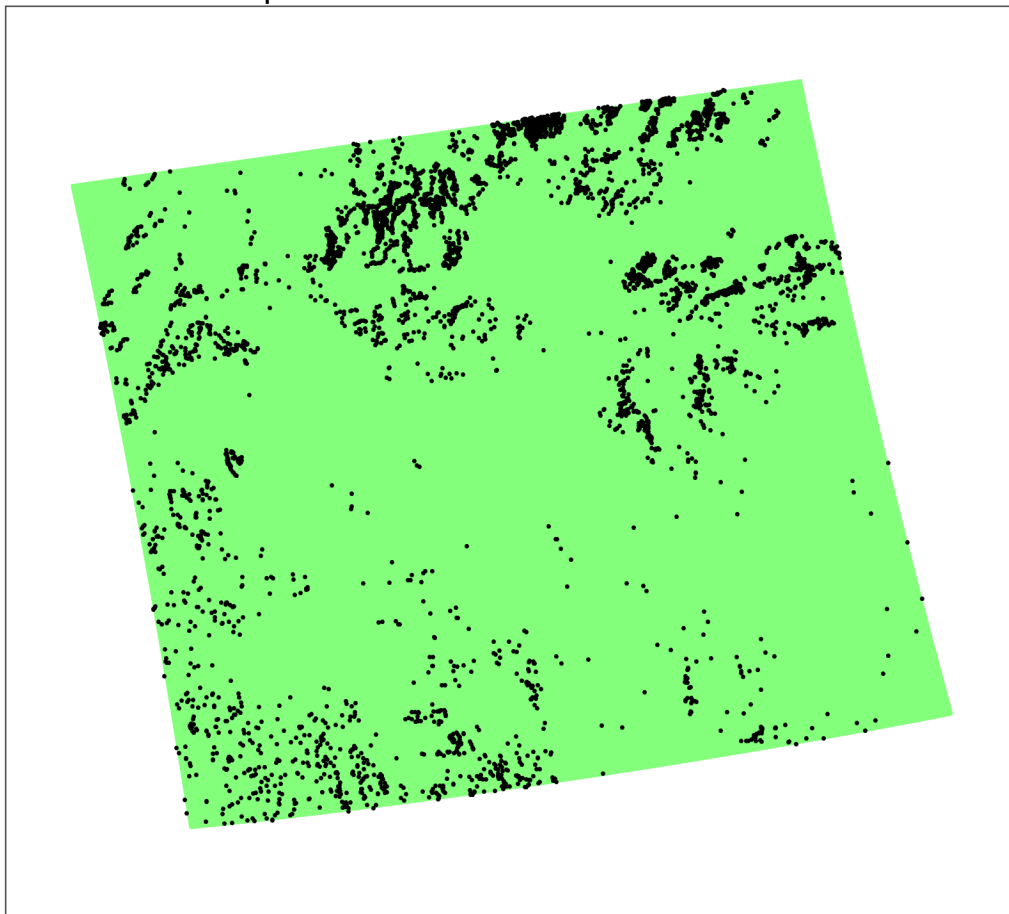
Month-old weekly mean SST

MYD35 Cloud Mask on 2021349.2225 - Using monthold weekly SST
0=Cloudy - 1=Probably Cloudy - 2=Probably Clear - 3=Clear

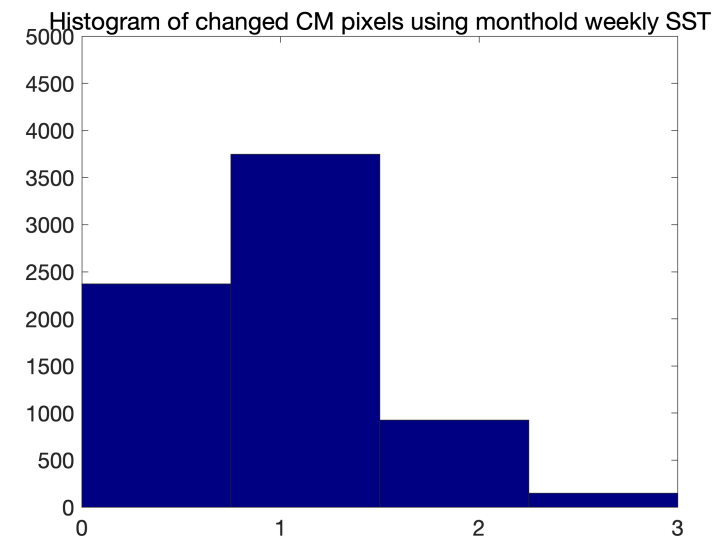
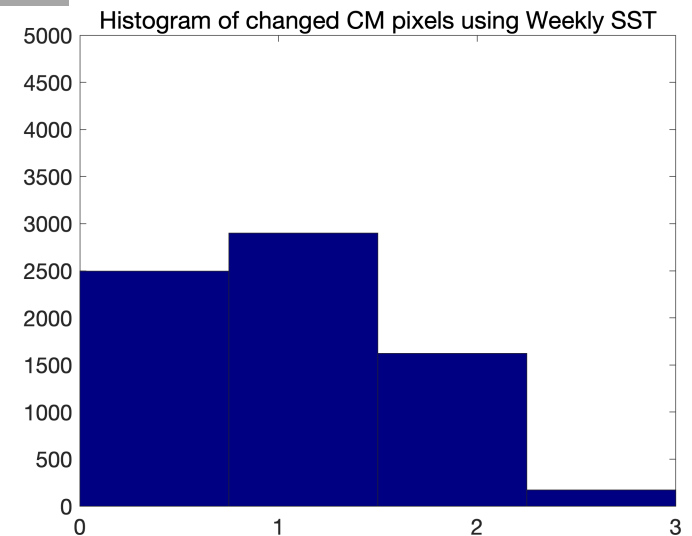


Cloud Mask Differences (weekly – month-old weekly)

Location of Differences of MYD35 CCloud Mask (Weekly-Month Old Weekly) on 2021349.222
Different pixels = 7192 out of 2748620 Percent= 0.26



0=Cloudy
1=Prob. Cloudy
2=Prob. Clear
3=Clear



0.26 % of pixels have been changed, mostly from Cloudy to Probably Cloudy Category

Next

- Do the same study but using GDAS SST only
- Compare SSTs (Reynolds, OISST (preliminary vs final), GDAS)
- Run diagnosis for a global day