

**This document is a first cut DRAFT to help show the discrepancy  
between 1km and 5km cloud top retrievals  
since new GDAS files were put in operations:**

The issue seems to be isolated in the (Level-2) 1-km Cloud Top Properties algorithm, where the 1-km cloud heights are calculated to be too low. This propagates into the (Level-2) 1km Cloud Optical Properties algorithm. Note that in Level-3, only the Cloud Optical Property SDS's are impacted since 1km Cloud Top Properties is not generally propagated (however there is a joint histogram of 1km CTP in L3).

Findings thus far:

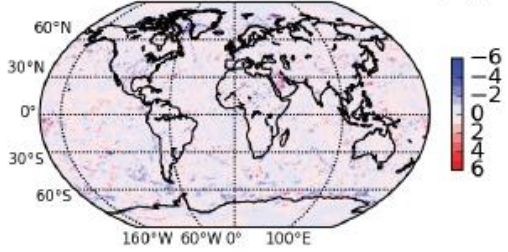
- 1) unlike the 5-km algorithm, the 1-km (via leocat) grabs whatever profile data is available. It's possible with a code change in the 1km Cloud Top Properties algorithm code, this can be mitigated.
- 2) The above noted code change would help, but there are still fewer band 35/34 and 34/33 retrievals -- and when we get them, they produce lower cloud heights. It is believed this is due to the fact that the new profiles are wetter in the mid-levels (profiles are smoother and fill in some dryer levels in the old profiles). This leads to smaller calculated clear sky radiances and smaller cloud signals. Averaging in the 5-km alg. mitigates these impacts to a certain degree, which is why it's barely noticeable in the 5km Cloud Top Properties data.
- 3) Due to noise issues, we restrict how often we allow band 34 to be used for Aqua. Many times, the clear - cloud signal for this band falls outside our allowable thresholds.
- 4) There is also the issue of CSRBs - they actually do have a noticeable impact on cloud heights, when we get them.

This information was provided by Rich Frey (UW-MODIS Cloud Top Properties Algorithm Team)

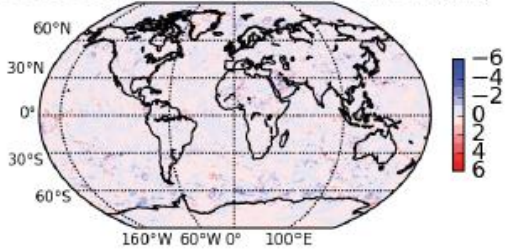
The following images were provided by Gala Wind  
 (MODIS Atmosphere, Cloud Optical Properties)

New-Old GDAS Differences in various physical properties:

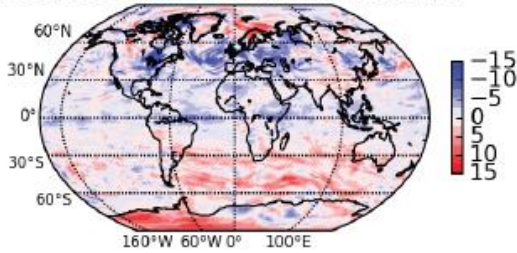
2016.103.00z New-Old GDAS wind speed delta (m/s)



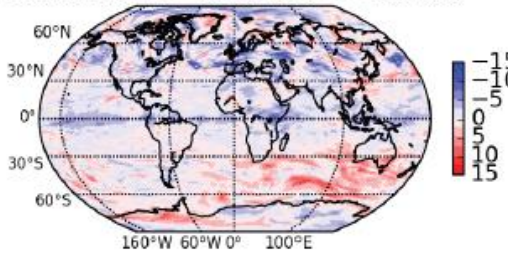
2016.103.18z New-Old GDAS wind speed delta (m/s)



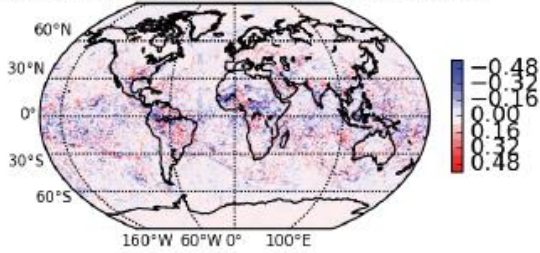
2016.103.00z New-Old GDAS col. O3 delta (DU)



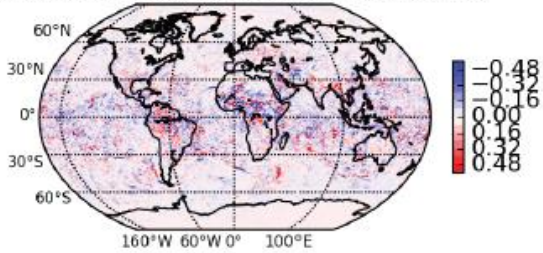
2016.103.18z New-Old GDAS col. O3 delta (DU)



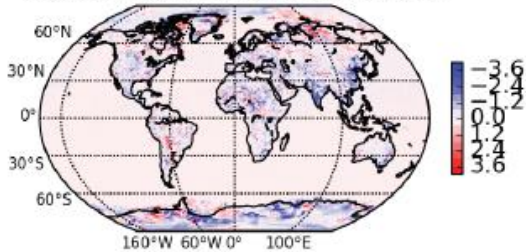
2016.103.00z New-Old GDAS col. PW delta (g/cm2)



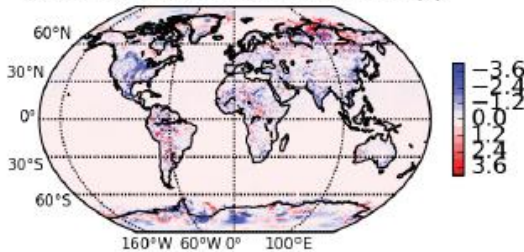
2016.103.18z New-Old GDAS col. PW delta (g/cm2)



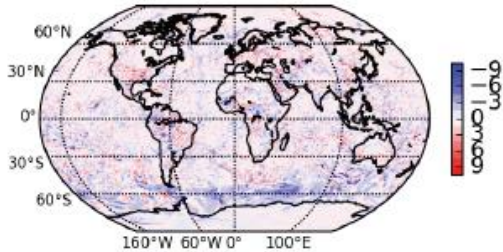
2016.103.00z New-Old GDAS Tsfc delta (K)



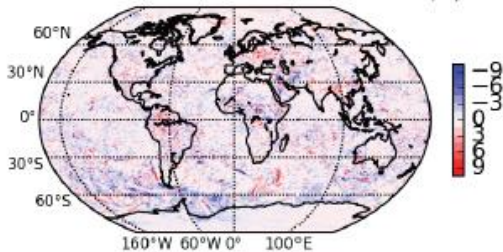
2016.103.18z New-Old GDAS Tsfc delta (K)



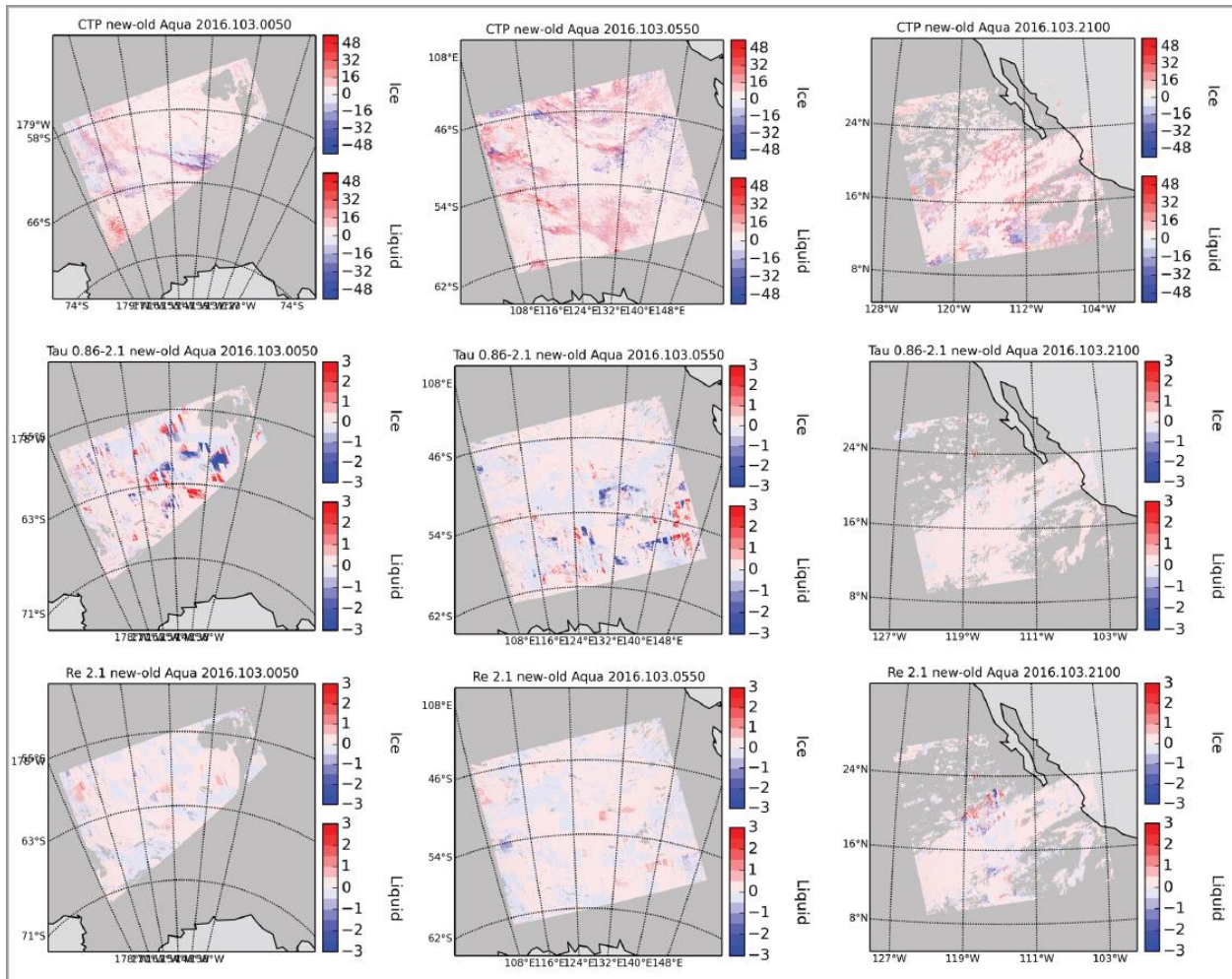
2016.103.00z New-Old GDAS col. RH delta (%)



2016.103.18z New-Old GDAS col. RH delta (%)

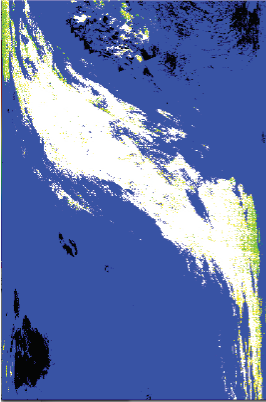


# MODIS Retrieval Differences using new-old GDAS

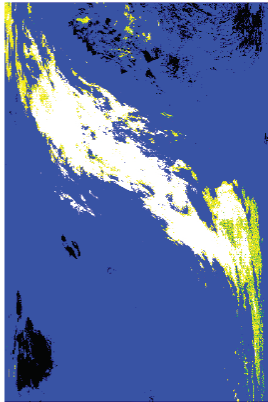


CTM (old vs new GDAS) Image Differences:

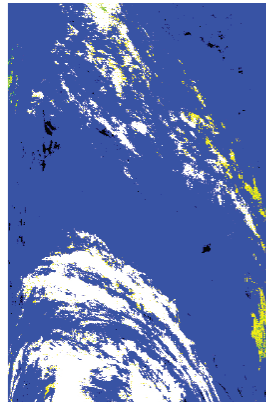
2016 103 00:50 CTM old



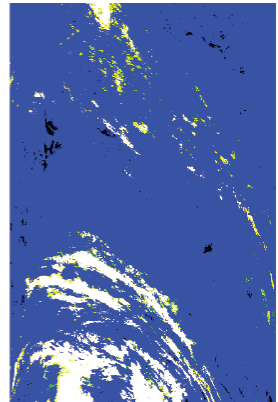
2016 103 00:50 CTM new



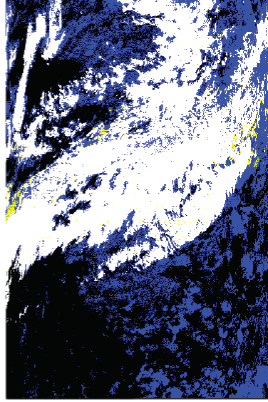
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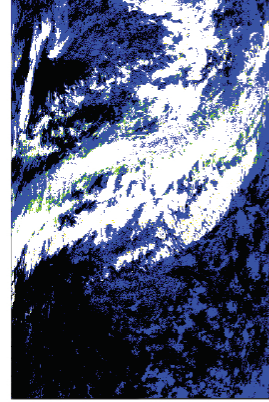
2016 103 05:50 CTM new



2016 103 21:00 CTM old



2016 103 21:00 CTM new



Additional Figures: MODIS Retrieval Differences using new-old GDAS at top, actual images at bottom.

