Poster 771

GOES-R Cloud-hosted Products & Algorithm Verification Exercise

Ensuring product readiness in a new, cloud-hosted, GOES-R Ground System

Curtiss Burnett[1], Elizabeth Kline[2], Katherine Pitts[3], Jason Garris[4]

[1]Mitchell Vantage Systems (MVS) LLC, Greenbelt, MD, USA
[2]NOAA/NESDIS/GEO Program, Greenbelt, MD, USA
[3]Science and Technology Corp, Greenbelt, MD, USA
[4]Booz Allen Hamilton, McLean, VA USA

GOES-16 ABI GeoColor
Image credit: NOAA/CIRA

What is Cloud-PAVE?

Cloud-PAVE is a task to validate all ABI Level 2+ products produced in a Cloud-hosted Product Processing Zone (GeoCloud PPZ). This environment will take over ABI L2+ production and distribution of all GOES-R products in 2026.

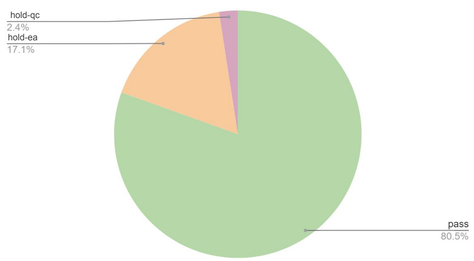
The GOES-R Product Readiness and Operations (PRO) and PRO Product & Algorithm Science Support (PRO PASS) teams are carrying out the Cloud-PAVE task by comparing files produced in the on-premises Ground System to files produced in the cloud. This is done by assessing outputs of the Glance tool from University of Wisconsin and a custom metadata comparison script.

Goals - PPZ Prototype Phase

Determine data produced in the Cloud environment meets "Beta" maturity levels. The definition of Beta is: "Data are preliminary and non-operational; undergoing testing and initial calibration and validation. Products are made available to users to gain familiarity with data formats and parameters in accordance with the GOES-R Product User Guide (PUG). Beta products have been minimally validated and may still contain significant errors. They are not optimized for operational use."

Assessment Categories	
pass	These meet the Beta criteria
hold-ea	A product comparison cannot be done due to promotion of an Enterprise Algorithm (EA) in the GEO GS
hold-qc	There are remaining artifacts in the product

Results - PPZ Prototype Phase

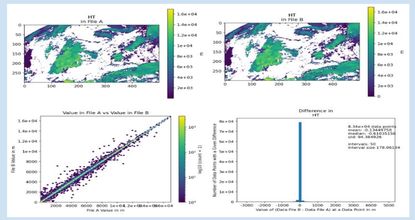


State	Count
pass	66
hold-ea	14
hold-qc	2
Total	82

The products marked "hold-ea" and "hold-qc" are currently being addressed. Any issues will be addressed during the Operationalization or Shadow Operations period and before the cutover.

Glance Comparisons

PASS - Cloud Top Height CONUS

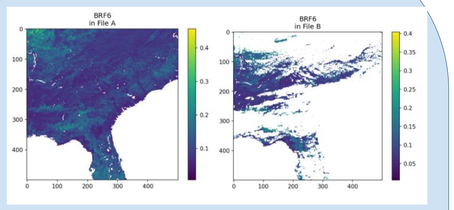


In this example, a Cloud Top Height CONUS product produced in the on-premises system (left) was compared to the version created in the cloud (right).

There are very few noticeable differences between the two images. The mean difference between the two products is -0.13 meters!

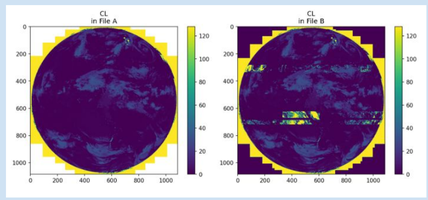
Small differences are likely caused by differences in NWP interpolation times

PASS - Bidirectional Reflectance Factor



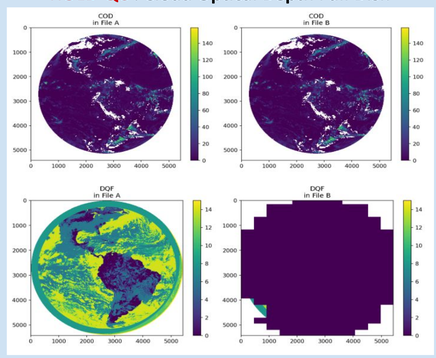
This product was marked pass even though the data have extremely different coverages. This is because the on-premises algorithm (left) had the benefit of a multi-day spin up period, and the cloud version (right) did not.

HOLD-EA : Cloud Cover Layers - Cloud Layer



The Cloud Layer variable from the Cloud Cover Layers algorithm was marked as a hold-ea because of software baseline differences. It was unfair to mark it as a hold-qc since the environments were running significantly different versions of the algorithm. On-premises (left), cloud (right)

HOLD-QC : Cloud Optical Depth Full Disk

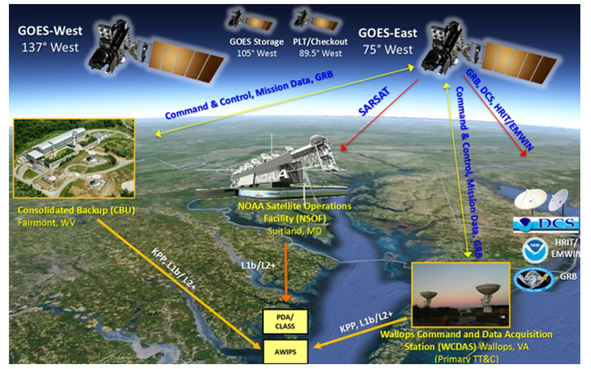


In this case, the Cloud Optical Depth data compares well between the on-premises (left) and cloud systems (right). Unfortunately, there seems to be issues packing the DQF data into the end product in the cloud version. This is more likely to be an implementation issue rather than a science algorithm issue. This was reported back to the implementation team and will be addressed during the operationalization period.

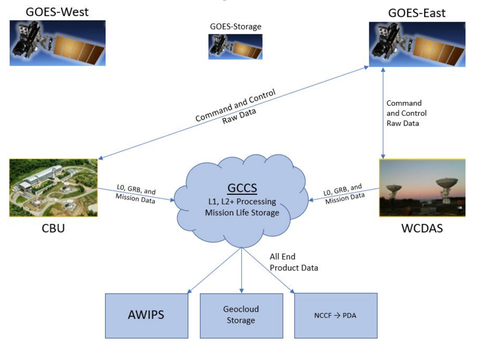
Other PRO Posters at this session:

- **Poster 769 - Kashaud Bowman - "The Satellite Book Club Seminar Series: Celebrating 200 Sessions and a Look Ahead"**
- **Poster 770 - Emily Maddox - "GOES-R Satellite Data Integration into NWS Operations through TOWR-S Technical Outreach"**

Current Ground System Architecture

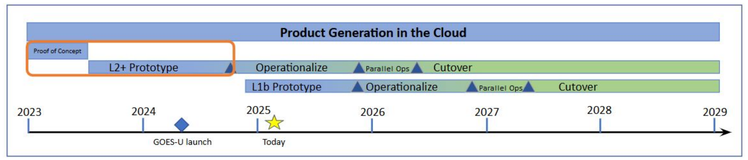


Future Ground System Architecture



The GEO Cloud Compute Subsystem (GCCS) will be located within the NESDIS Cloud System (NCS) and will handle all GEO L0, L1, and L2 processing that is currently done in the Satellite Operations Zone (SOZ) and Product Processing Zone (PPZ)

Transition to Operations Timeline



Scope of this presentation is contained within the orange box. The L1b prototype has started, but has not been validated. Cutover to operational cloud processing is expected in 2026 for L2+, and in 2027 for L1b. At that point the on-premises systems will be retired.