



# NATIONAL WEATHER SERVICE

## Aviation Weather Center

# Clouds, Cloud Ceiling, and Visibility (C&V) Technical Exchange Meeting

Ty Higginbotham

Boulder, Colorado (Virtual)

Wednesday, 13 July 2022, 12:20-12:40 pm (CDT)





# NATIONAL WEATHER SERVICE

## Aviation Weather Center

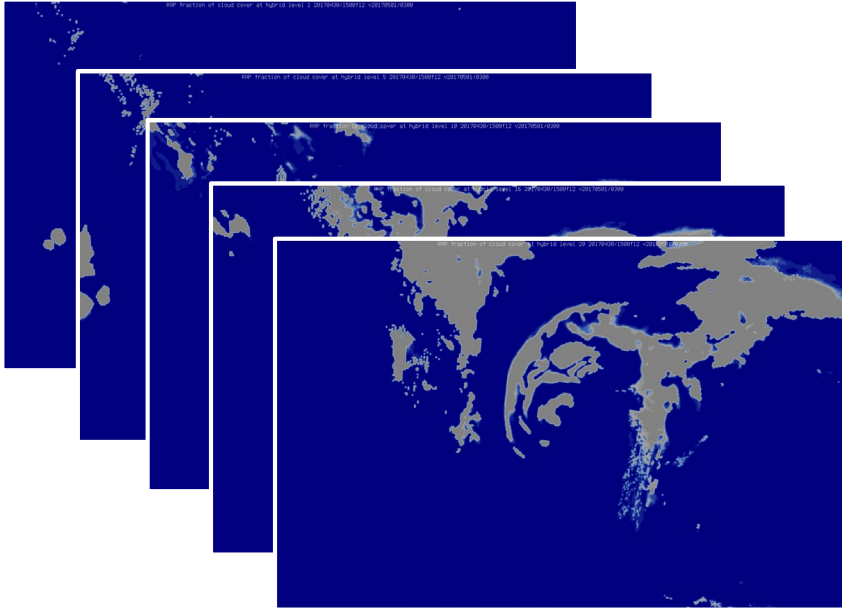
# Cloud Postprocessing and Verification Development for Gridded Aviation Forecasts

Jeremiah Pyle<sup>1</sup>, Austin Cross<sup>1</sup>, Stephanie Avey<sup>1</sup>, Rob Hepper<sup>1</sup>, Ty Higginbotham<sup>2</sup>

<sup>1</sup>NOAA Aviation Weather Center (AWC), <sup>2</sup>Cooperative Institute for Research in the Atmosphere (CIRA)

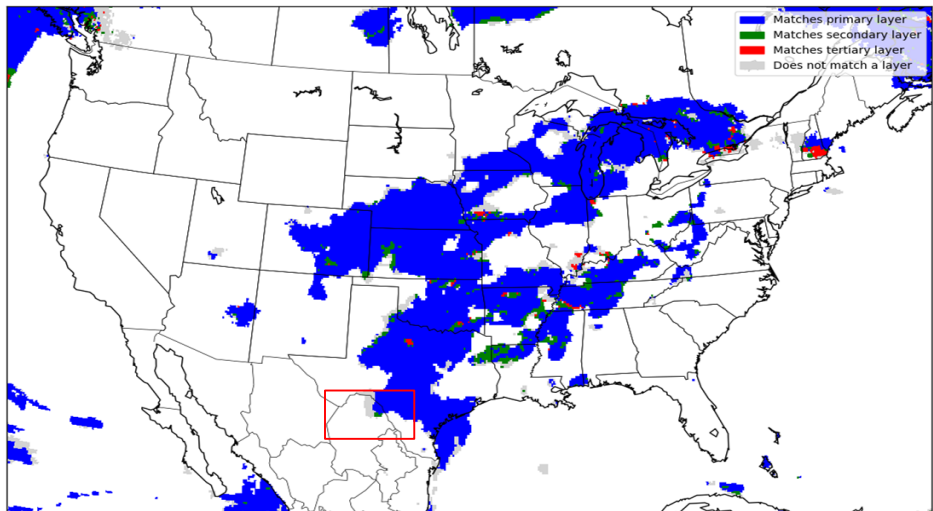


# Grid Development



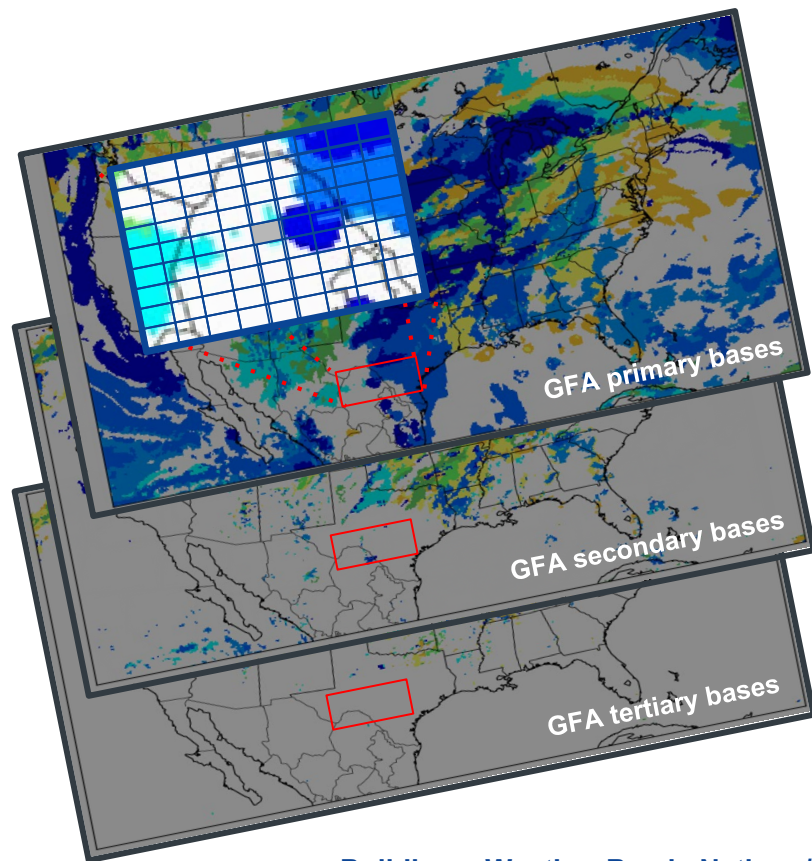
- AWC and EMC, GSD to obtain full 3D cloud information from NWP
- Developed post-processing to produce all needed elements
- RAP, HRRR, NAM, ARW, NMM, GFS (isobaric only)
- Future regional ensemble

# Synthesis of GLMP with GFA cloud grids

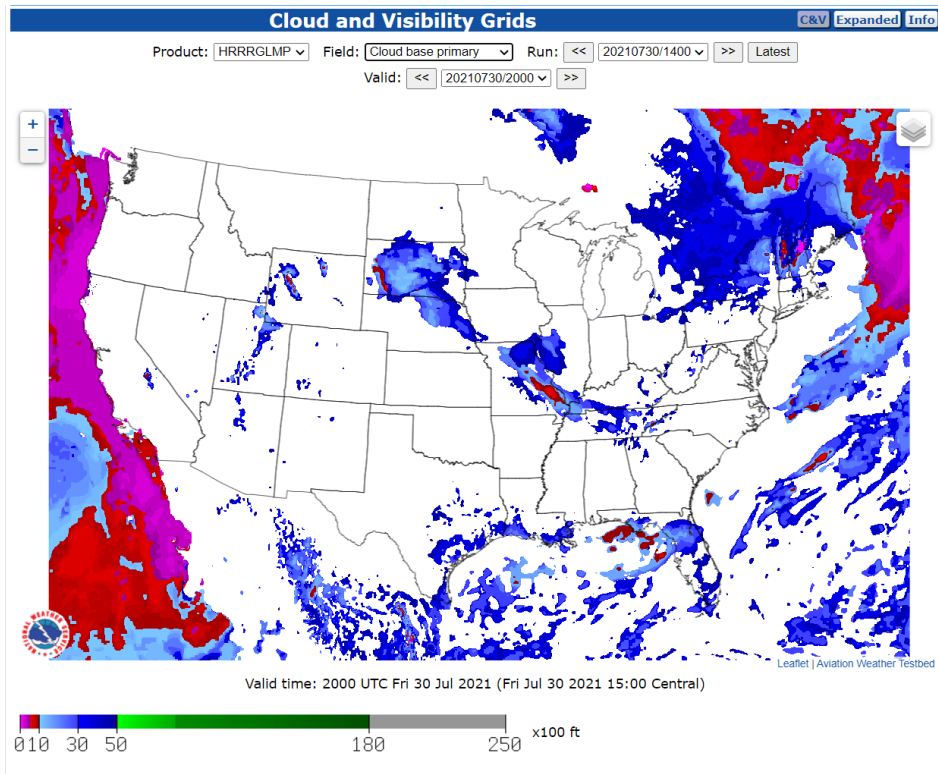


For grids with GLMP ceilings and no GFA layer matches

- Examine neighbors using a kernel (20x20 in current prototype)
- Find nearest GFA layer (looking at all primary, secondary, tertiary layer base heights)
- Preserve thickness of this GFA matched layer
- Primary top = GLMP ceiling + thickness of neighbor layer match



# Blended GLMP/GFA low clouds (base $\leq$ 5 kft)

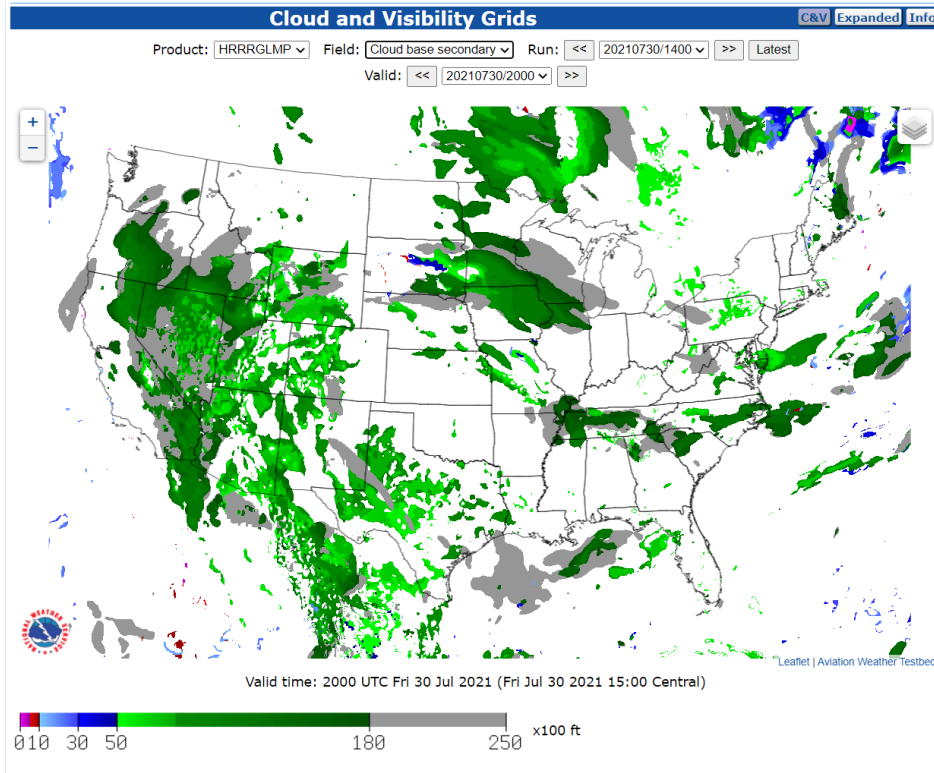


- Prototype blend primary cloud layer limited to layers with bases  $\leq$  5 kft
- Secondary and tertiary layers contain higher clouds  $>$  5 kft
- Forecasters would edit primary cloud layer only, leave higher level secondary and tertiary layers go into the forecast straight from model

<https://testbed.aviationweather.gov/cigvis?model=hrrrglmp&field=cbp>



# GFA higher clouds (base > 5 kft)



- Prototype blend primary cloud layer limited to layers with bases  $\leq 5$  kft
- Secondary and tertiary layers contain higher clouds  $> 5$  kft
- Forecasters would edit primary cloud layer only, leave higher level secondary and tertiary layers go into the forecast straight from model

<https://testbed.aviationweather.gov/cigvis?model=hrrrglmp&field=cbs>



# NATIONAL WEATHER SERVICE

## Aviation Weather Center

# Satellite Cloud Cover Layer Fraction Product at AWC with CIRA

Ty Higginbotham<sup>1</sup>, Yoo-Jeong Noh<sup>1</sup>, John Haynes<sup>1</sup>, Deb Molenaar<sup>1</sup>,  
Amanda Terborg<sup>1</sup>, Jeremiah Pyle<sup>2</sup>, Austin Cross<sup>2</sup>, Rob Hepper<sup>2</sup>,  
Lee Byerle<sup>3</sup>

<sup>1</sup>Cooperative Institute for Research in the Atmosphere (CIRA), <sup>2</sup>NOAA Aviation Weather Center (AWC),  
<sup>3</sup>KBR GOES-R Program NWS Central Processing (CP)



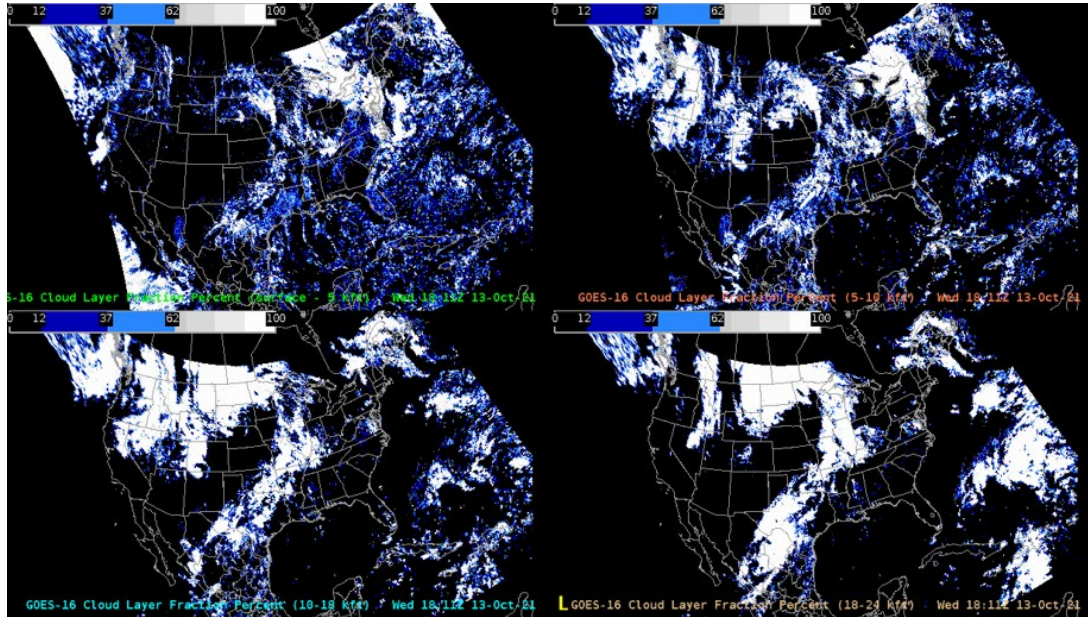
# CIRA and AWC Collaboration

- NESDIS reached out to AWC about the CCL enterprise algorithm on the GOES-R ground system.
  - Intermediate product for Cloud Base Height (CBH)
- Provide as a stand-alone product.
- Needed a valid user request from operational NOAA user.





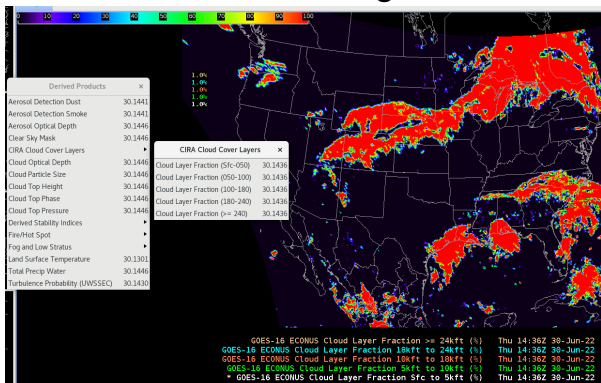
# CIRA/AWC Cloud Cover Layer Fraction (CCLF) Experimental Product



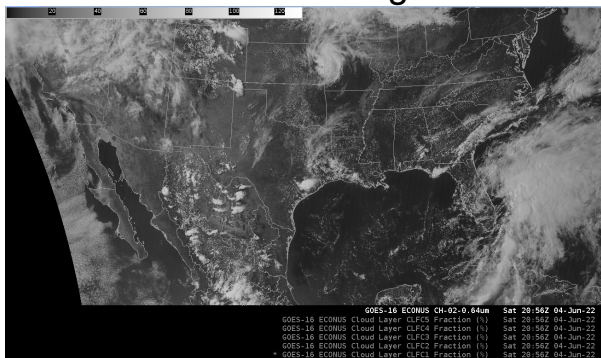
- Based on the CLR, FEW, SCT, BKN, and OVC percentage categories for DAS grids.
- Provided in AWC AWIPS Cloud

# CIRA/AWC Cloud Cover Layers in AWIPS

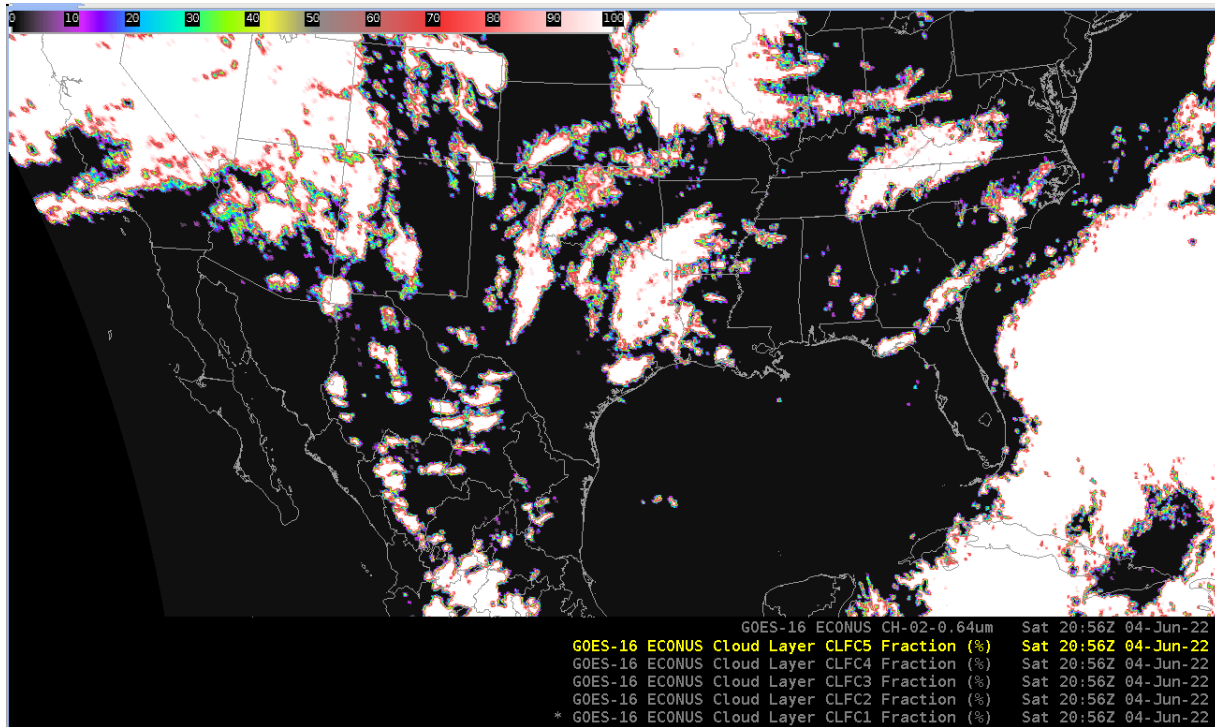
## CCL Menu Configuration



## CCL Vis Image



## CCL Layer 5fc (500-60000ft)



# CIRA/AWC Cloud Cover Layers

## AWC Feedback From Forecaster

- Product can be used as an overlay on AWIPS and AWC website over satellite imagery.
  - Looking at simple visible imagery channels doesn't show much cloud layer wise. Could be looking at high level cirrus or low level overcast skies.
  - Having the CCLF product can give forecasters that final decision to issue a SIGMET or AIRMET.

## Where are we currently with the data?

- Data is currently AWC configured on the AWIPS Cloud. *Experimental*.
  - CIRA CCL product is queued in our LDM feed at the moment. Once change control approves, AWC will move into putting it out on AWC Cloud and operational AWIPS for forecasters to use.



# Thank you! Questions?

If you have any questions regarding this CIRA/AWC collaboration or how the product is being used at AWC please contact me via email:

**[ty.higginbotham@noaa.gov](mailto:ty.higginbotham@noaa.gov)**

