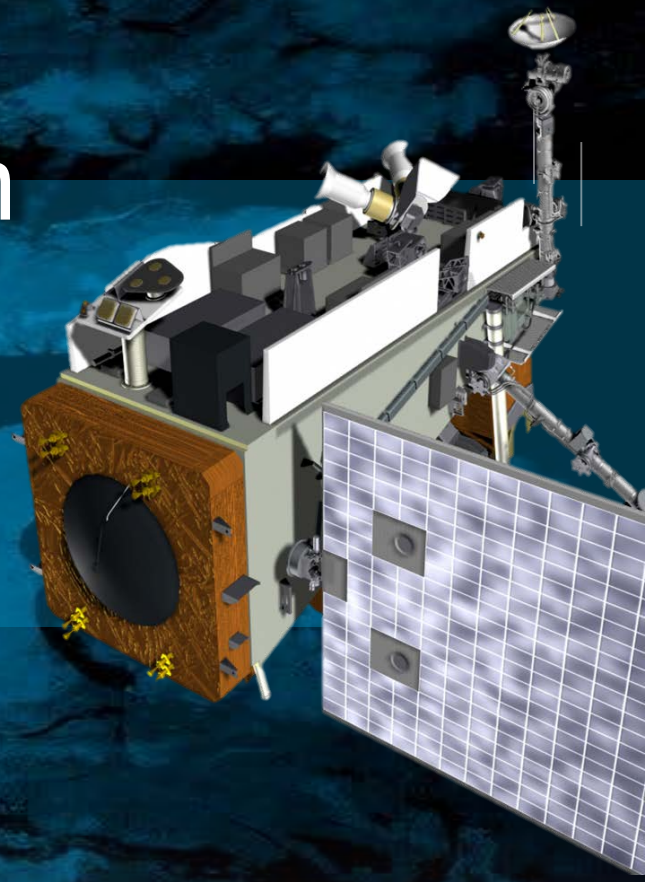
Joint Polar Satellite System (JPSS) Cloud and Precipitation Products



2020 NASA GPM-ACCP Transport and Logistics Workshop

Jeffrey Weinrich, Science and Technology Corporation

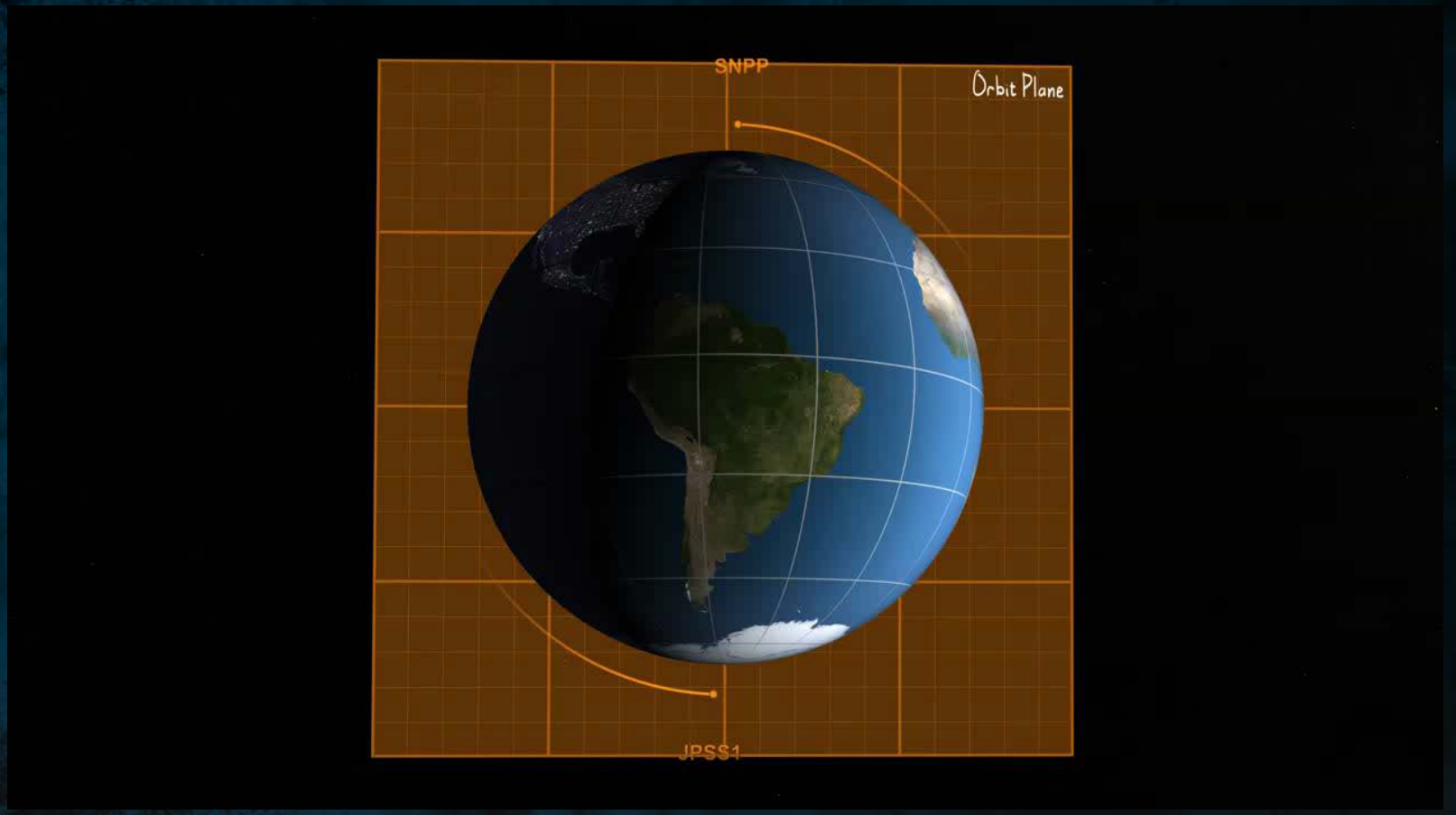
November 4, 2020

GLOBAL DATA.
LOCAL WEATHER.

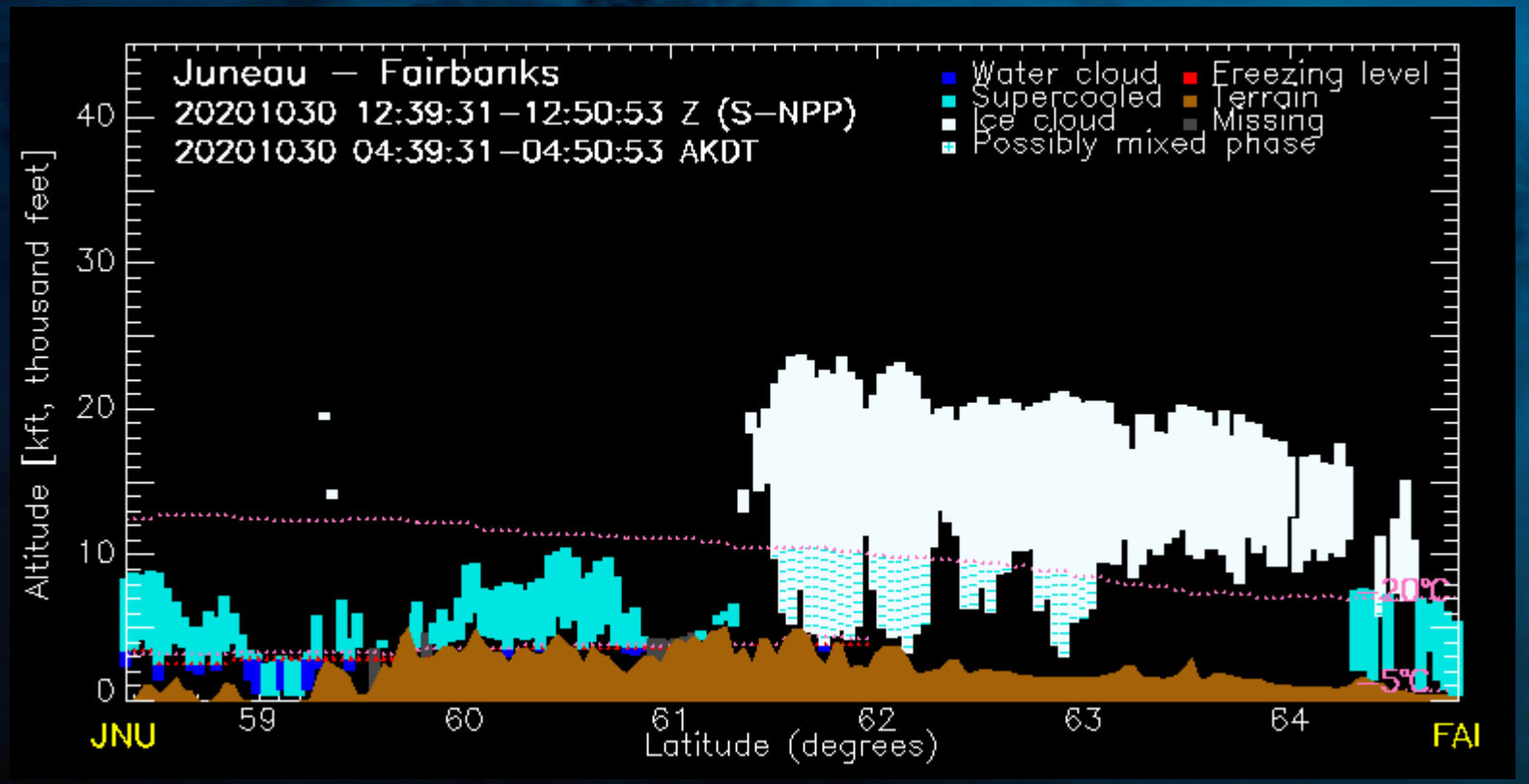
JPSS: Improving Forecast Accuracy & Timeliness

JPSS satellites:

- Two satellites circle the Earth from pole-to-pole and cross the equator 14 times daily in the afternoon orbit—providing full global coverage twice a day.
- Provide critical data to the numerical forecast models that produce 3- to 7-day mid-range forecasts.
- Provide support for zero to 3-day operational forecasting in Polar Regions (where other observational data are sparse).



JPSS Cloud Cross Sections

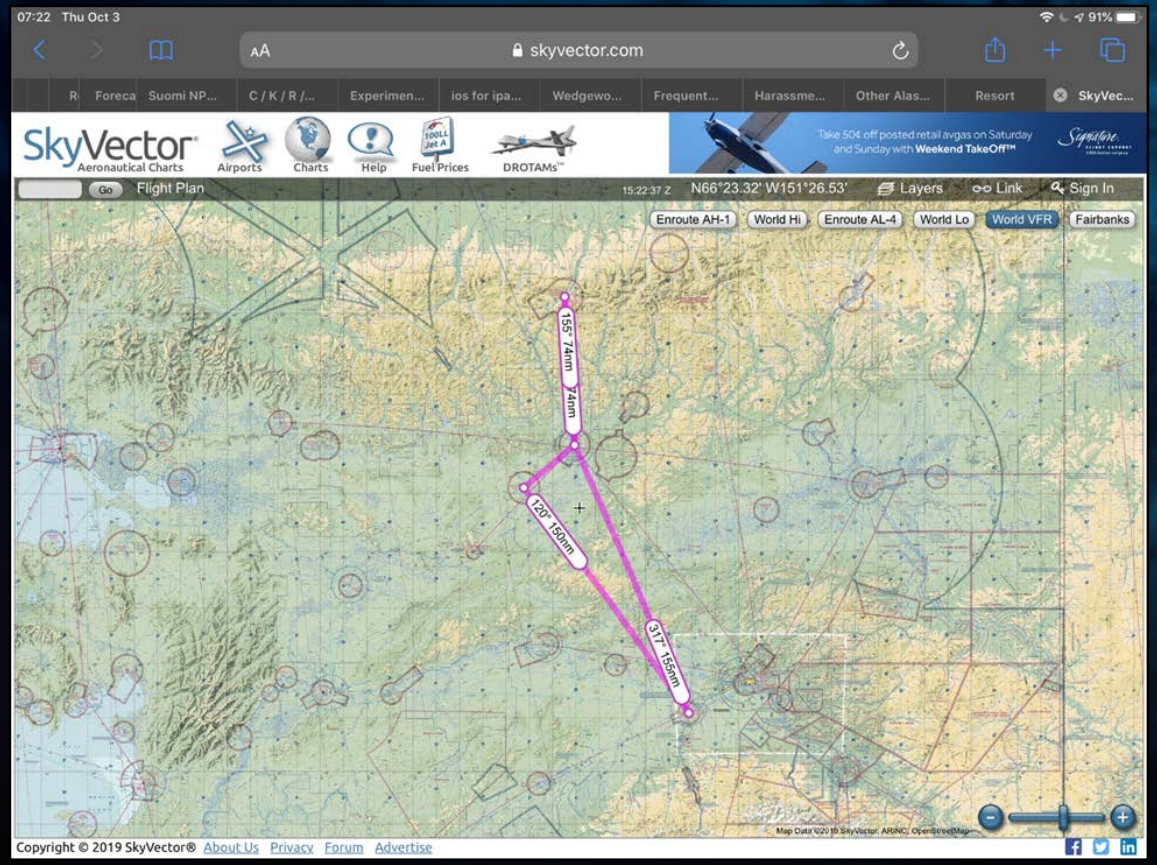


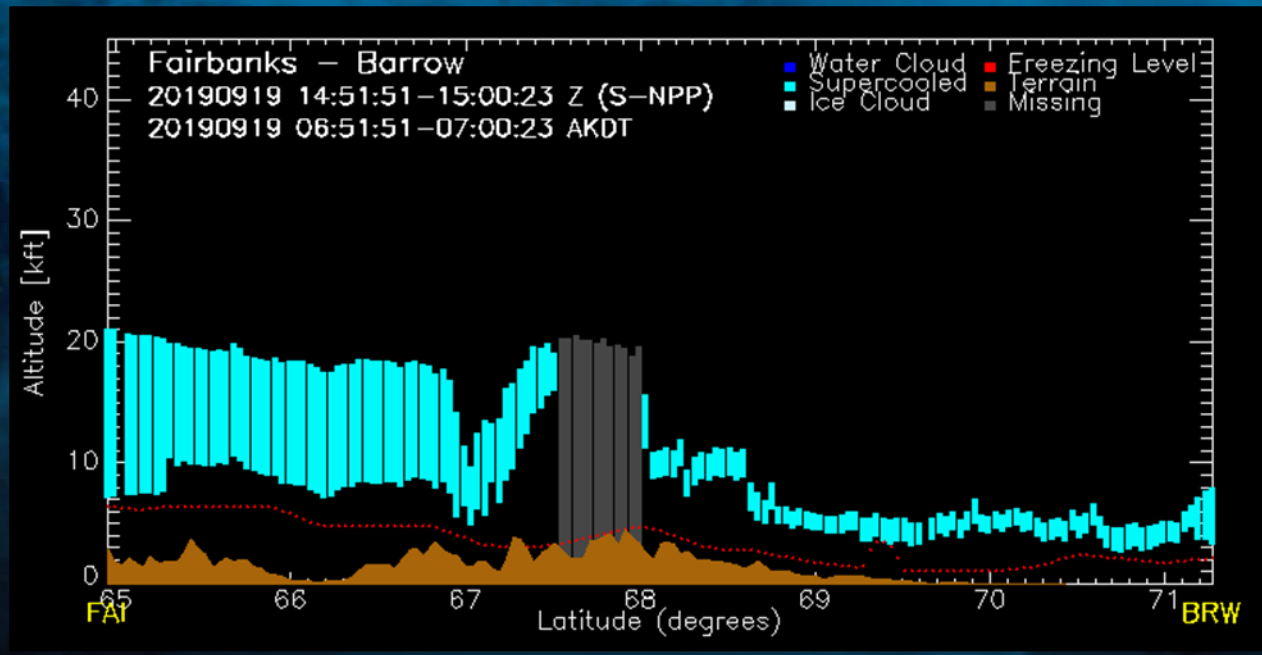
Real Life Operational Pilot Example

- **Adam White, Alaska Airmens Association, Example of real life use of JPSS Cloud Cross Section.**

"While there is some weather reporting at these airports and a weather observer at Bettles there is still a lot of distance between these locations with no data and very hostile terrain features."

"The test product was helpful to get an idea what I might encounter, especially in the PABT-PAKP-PFAL section of the trip as I was in the Brooks Range."

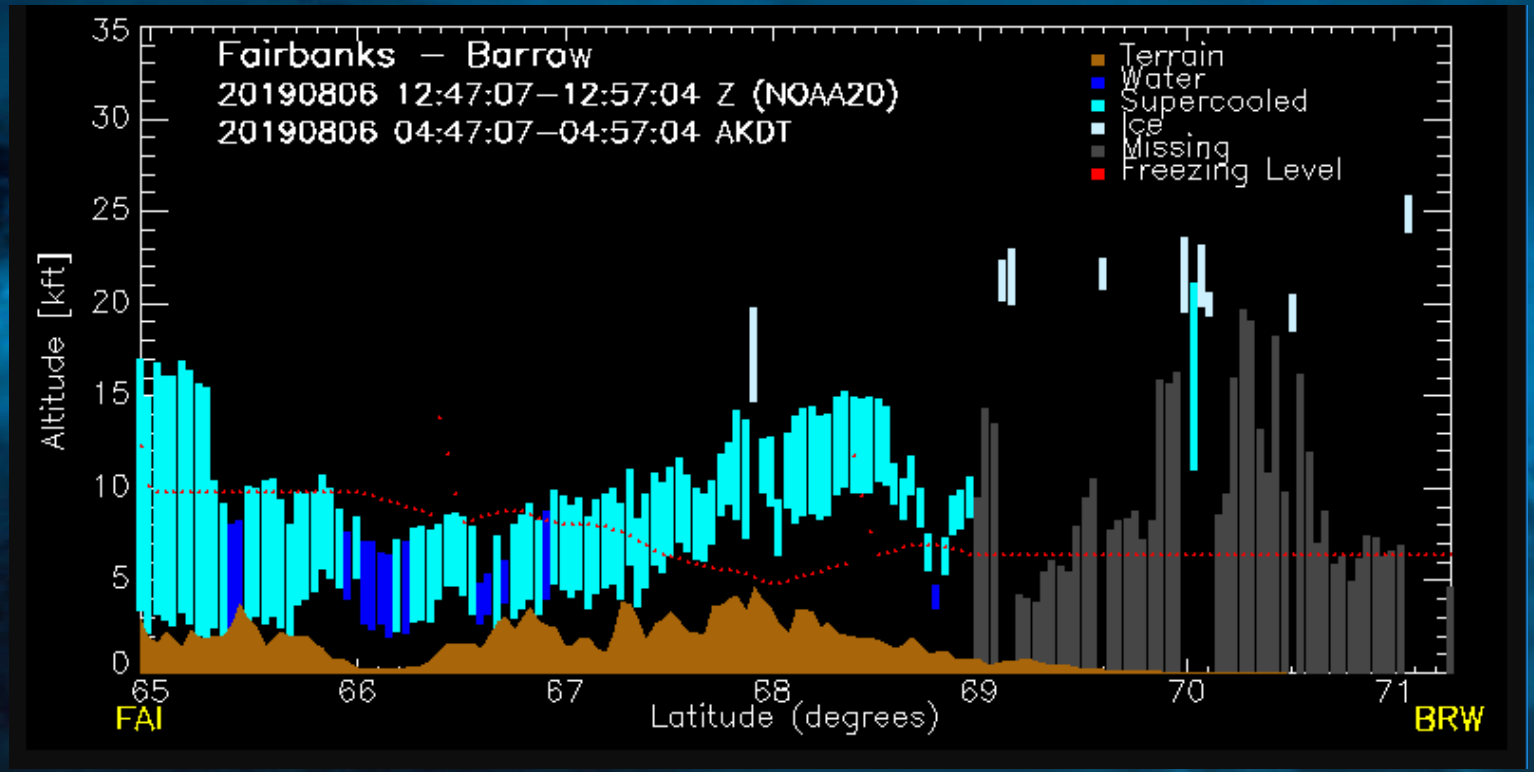




Real Life Operational Meteorologist Example

FAI UA /OV FAI320050/TM 1746/FL100/TP C208/TA M2/IC MDT RIME/RM ZAN=

FAI = Fairbanks
UA = Routine
OV Location of the PIREP
TM = 1746 Greenwich Mean Time
FL 100 = Flight Level 10,000 ft
TP C208/TA = Aircraft Type, Cessna 208 Caravan.
TA M02 = Temperature -02 Celsius
IC MOD RIME = Moderate Rime Ice
RM ZAN = Remarks, Anchorage



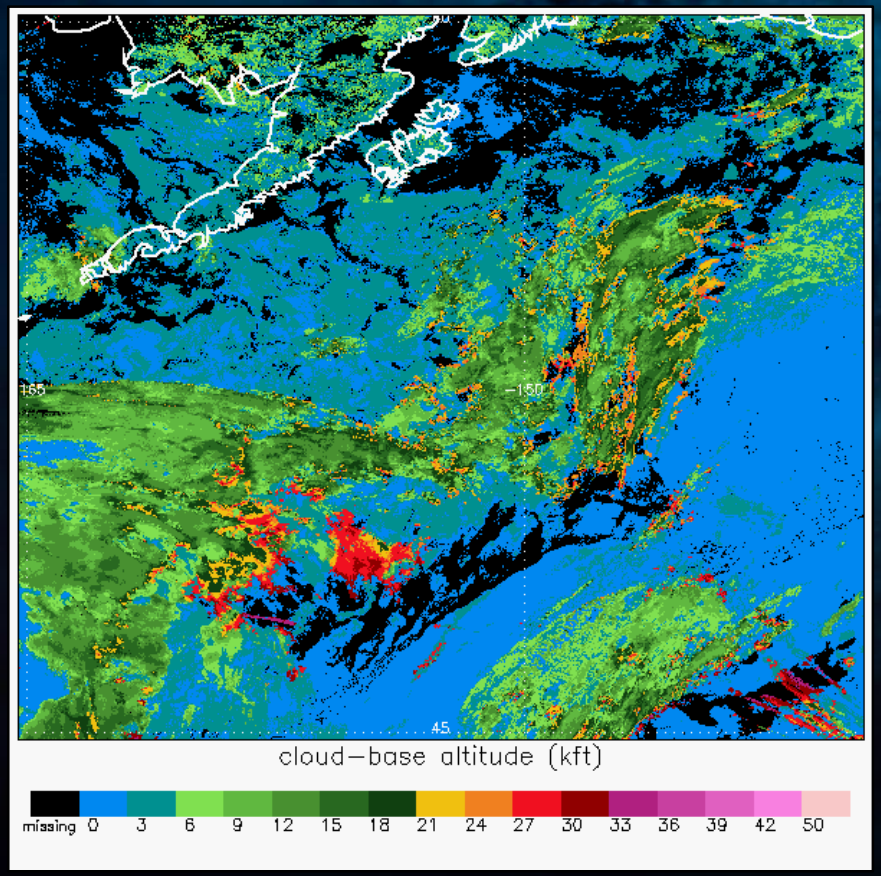
"We had an icing PIREP this morning south of FAI that matched up nicely with your cloud product." Gail Weaver, Center Weather Service Unit Anchorage"

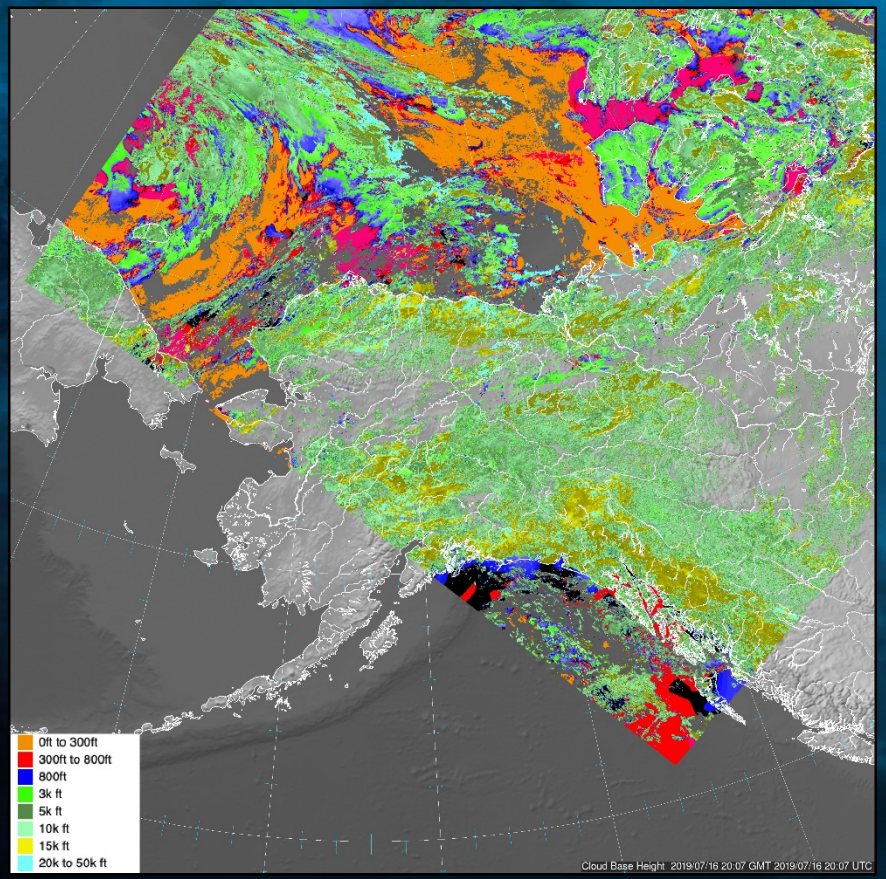
JPSS Aviation Users

Federal Aviation Administration	International	National Weather Service	Pilots/Others
FAA Headquarters	*German Weather Service*	*Alaska Aviation Weather Unit*	*Alaska Airmen's Association*
FAA Command Center	*Iceland Weather Service*	*NWS Anchorage*	*Aircraft Owners and Pilots Association*
FAA Air Traffic Control Center – Anchorage, Kansas City, Houston	*Environment Canada*	*NWS Juneau*	*National Transportation Safety Board (NTSB)*
FAA Flight Service		*NWS Phoenix*	*Southwest Airlines*
		Aviation Weather Center	*National Center for Atmospheric Research (NCAR)*

Cloud Base Altitude

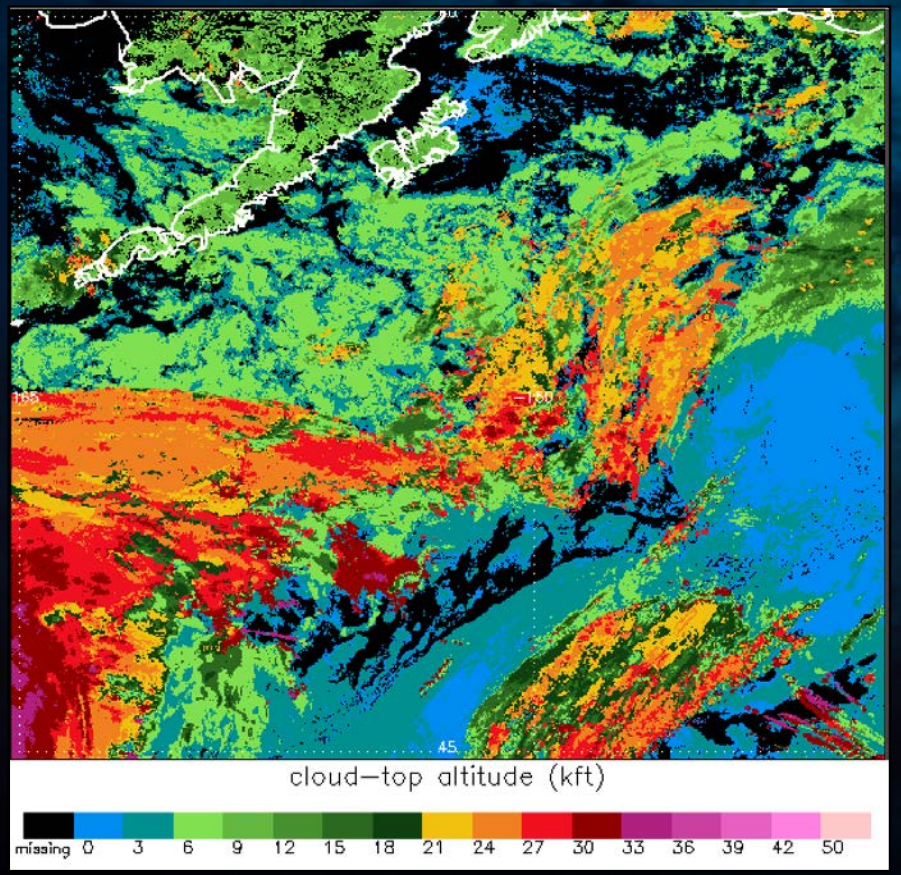
- Identifies the Highest Lower level
- Used to create vertical cross sections
- Display of product updated based on feedback
- Pilots are better able to distinguish where the bottom cloud layer is located

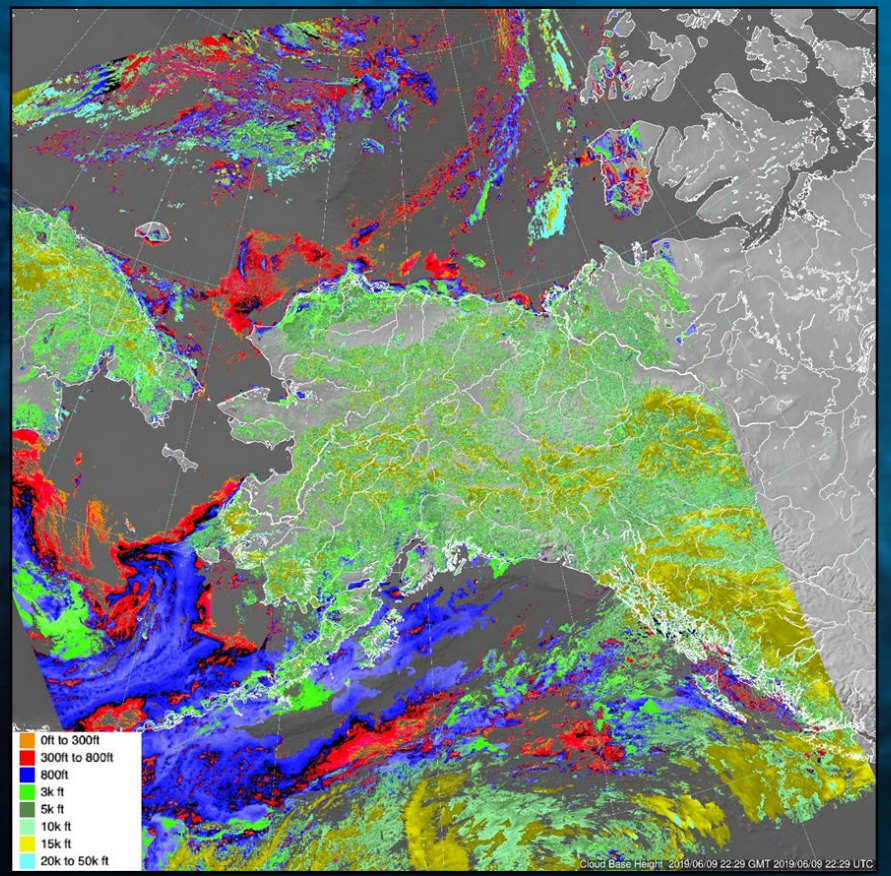




Cloud Top Altitude

- Used to as a tool for cloud top rising
- High Frequency between satellites overpasses in high latitudes
- Used in conjunction with Numerical Weather Prediction
- Display of product updated based on feedback
- Pilots are better able to distinguish where top layer is





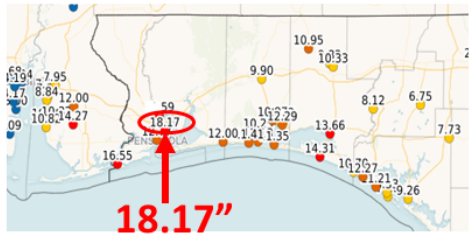
S. Kusselson, CSU/CIRA

Ensemble Tropical Rainfall Prediction (eTRaP)

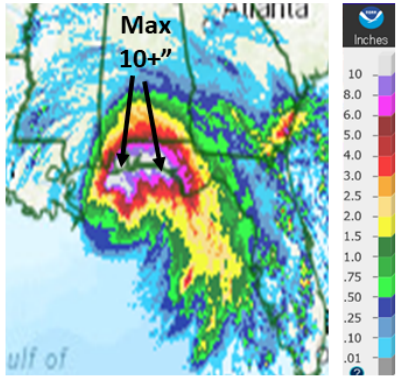
- Uses individual LEO MW rain estimates (MiRS, GAASP, GPM) and GEO (H-E/SCaMPR) along with NHC best track to predict 6, 12, 18 and 24 QPE. Weights assigned based on product accuracy and latency. Used extensively by NCEP/WPC.

NOAA/NESDIS Operational Ensemble Tropical Rainfall Potential (eTRaP) Comparison with Observed Rainfall for Sally

CoCoRaHS 24h Precipitation Ending
12 UTC 16 September 2020

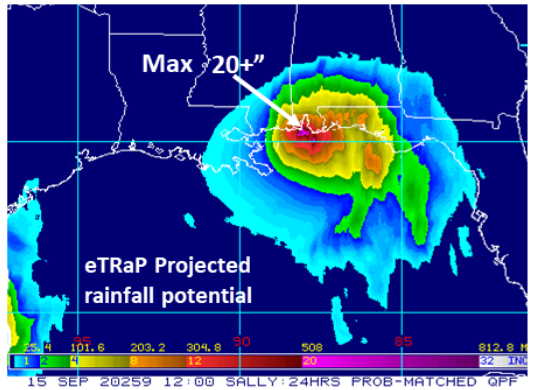


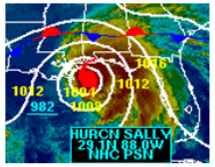
24h Observed Precipitation Ending
12 UTC 16 September 2020



NOAA OFFICE OF SATELLITE AND PRODUCT OPERATIONS

NOAA/NESDIS eTRaP
12 UTC 15 Sep to 12 UTC 16 Sep 2020





12 UTC 15 Sep 2020

eTRaP uses polar orbiting microwave rain rates from NOAA, Metop, GPM and SSMIS satellites. Infrared rain rates from GOES. And includes R-Clipper climatology along with the official Hurricane Center track forecast.

Prepared by Sheldon Kusselson

Primary NESDIS Operational Product Systems

- Microwave Integrated Retrieval System (MiRS)
  - http://www.ospo.noaa.gov/Products/atmosphere/mirs/index.html
  - Runs on POES legacy (AMSU/MHS), JPSS (ATMS), DMSP (SSMIS), GPM (GMI)
- Microwave Snowfall Rate (SFR)
  - http://www.ospo.noaa.gov/Products/atmosphere/mirs/index.html
  - Runs on POES legacy (AMSU/MHS), JPSS (ATMS), DMSP (SSMIS), GPM (GMI)
- NOAA Operational GCOM-W1 AMSR2 Products System (NOGAPS)
  - http://www.ospo.noaa.gov/Products/atmosphere/gpds/
- Enterprise GEO precipitation (SCaMPR)
  - https://www.star.nesdis.noaa.gov/smcd/emb/ff/SCaMPR.php
  - Runs on GOES-16, GOES-17, Himawari-8 and -9
- Blended TPW/RR
  - http://www.ospo.noaa.gov/Products/atmosphere/brr/
  - Uses all available TPW and RR estimates
- Ensemble Tropical Rainfall Potential (eTRaP)
  - https://www.ssd.noaa.gov/PS/TROP/etrap.html
  - Uses all available TPW and RR estimates

- Note – NOAA/NWS/Climate Prediction Center runs CMORPH2, which combines many of the L2 passive MW precipitation estimates and advects with GEO cloud motion

Data Access and Resources

- Stored Mission Data (SMD) access
  - Product Distribution and Access (PDA): Designed for near real-time users. Access is managed/controlled by NESDIS/Office of Satellite Products and Operations;
  - Comprehensive Large Array-data Stewardship System (CLASS): Designed non real-time users. https://www.avl.class.noaa.gov
  - Global Telecommunications System (GTS): currently includes CrIS SDR and ATMS TDR
  - GEONEcast-Americas: Currently includes VIIRS DNB, I band Imagery, Blended TPW, Active Fires, MiRS, NUCAPS

- High Rate Data (HRD) / Direct Broadcast access
  - Available to users with antennas. Software available: http://cimss.ssec.wisc.edu/cspp/

- Algorithm maturity information and documentation: https://www.star.nesdis.noaa.gov/jpss/AlgorithmMaturity.php

- JPSS data products over Alaska: http://hippy.gina.alaska.edu/distro/aviation/

- Polar Slider: https://rammb-slider.cira.colostate.edu

Acknowledgements

Gail Weaver (NWS), Emily Berndt (NASA/SPoRT), Kris White (NWS, and NASA/SPoRT), Jack Dostalek (CIRA), Brad Zavodskey (NASA/SPoRT) and Nadia Smith (STC)

Andy Heidinger, YJ, and the Cloud Team

Carl Dierking (GINA), Carrie Haisley (CWSU), Ralph Ferraro,Tom George (AOPA), Arron Layns (JPSS), Becca Mazur (Arctic Test Bed), Andrew McClure (FAA), Jeff Osiensky (AAWU), Bonnie Reed (JPSS/STC), Jorel Torres, Adam White, CIRA and all the users for their help!

THANK YOU!

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