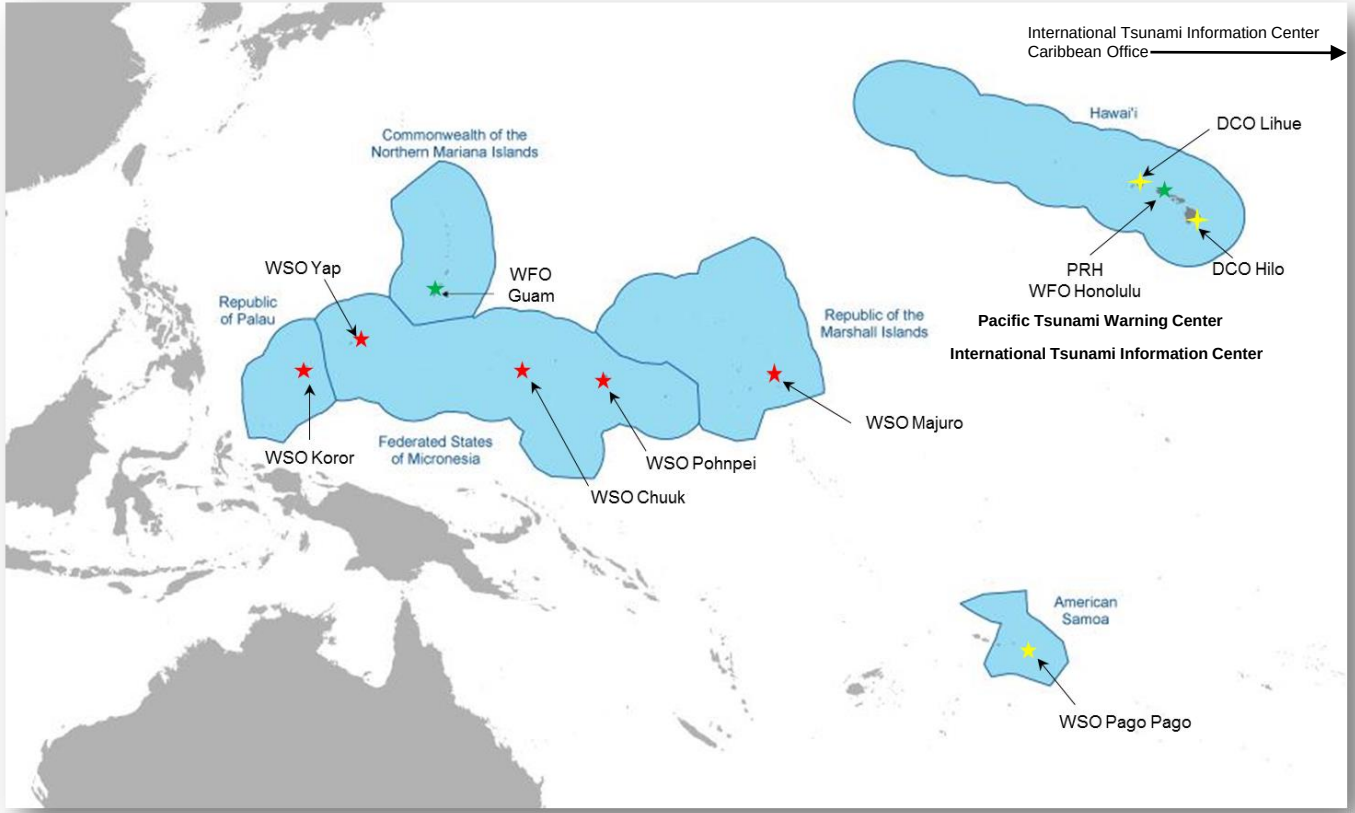
Application of Satellite Data for Tackling Extreme Precipitation Events

NOAA NATIONAL WEATHER SERVICE
Pacific Region – Honolulu, Hawaii

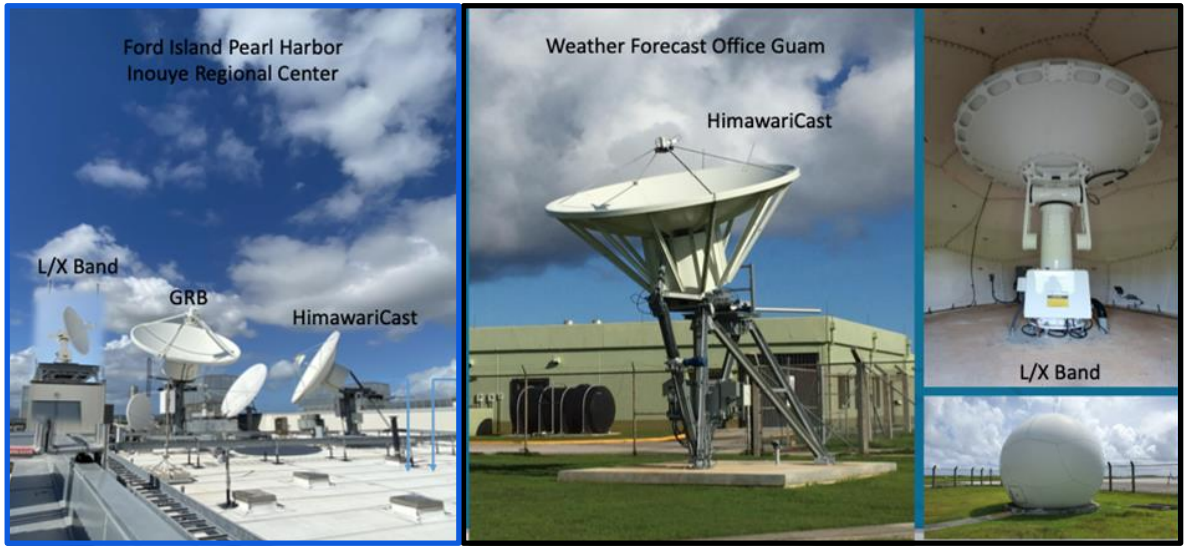
Eric Lau

National Weather Service Pacific Region



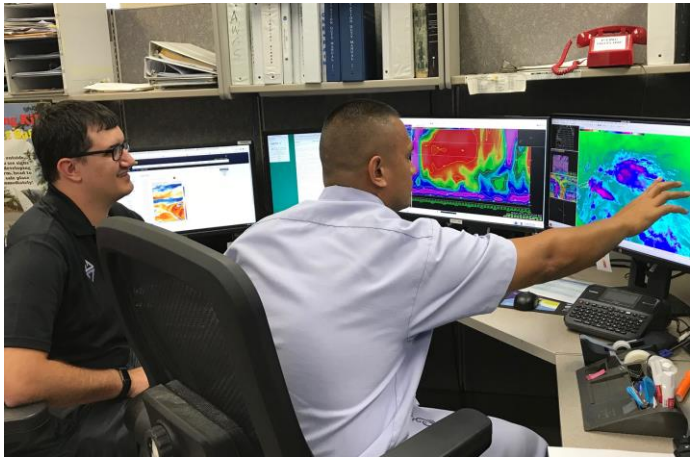
- **Largest Geographic NWS Region**
- **Covers over 30 million square miles**
- **Spans 11 time zones**
- **Only NWS offices in the southern and eastern hemispheres**
- **National and International Focus State of Hawaii, Territories of Guam and American Samoa Federated States of Micronesia, Republic of Palau, Republic of the Marshall Islands**
- **Wide range of weather hazards and tsunami**
- **Very sparse in-situ data**

Satellite Systems and Data Flow



- AWIPS configuration for satellite data visualization
- Himawari Full Res received from NCEP over terrestrial network

- Japan Meteorological Agency (JMA) HimawariCast
- GOES Re-Broadcast (GRB) GOES-W
- LX band Polar Orbiting Satellite receive stations in Honolulu and Guam.



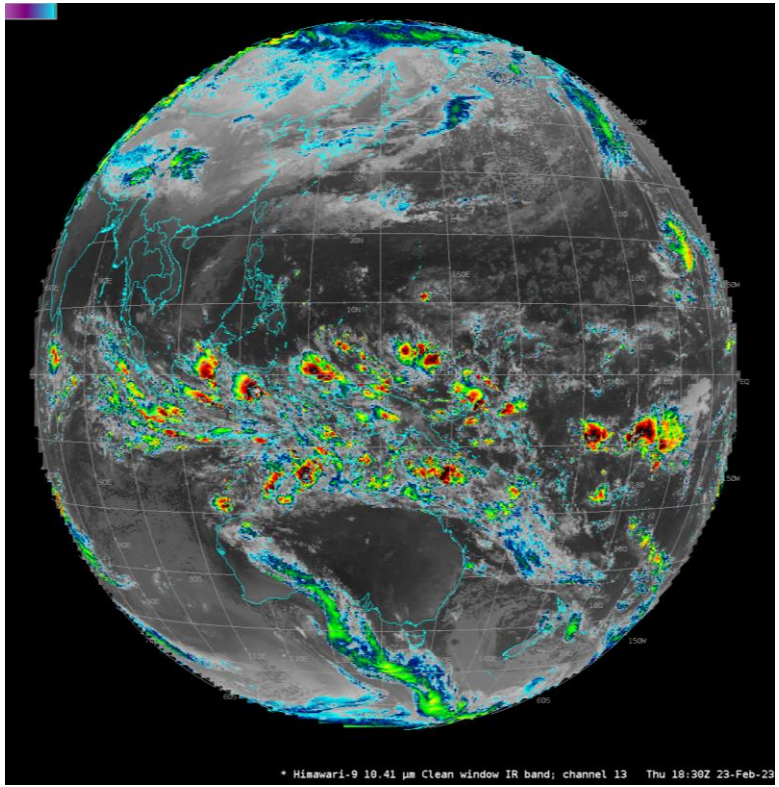
Advanced Weather Interactive Preparation System (AWIPS)

- AWIPS Satellite Broadcast Network (SBN) / NOAAPort receive station at IRC.
- Feeds ALL Pacific Region AWIPS via terrestrial networks.

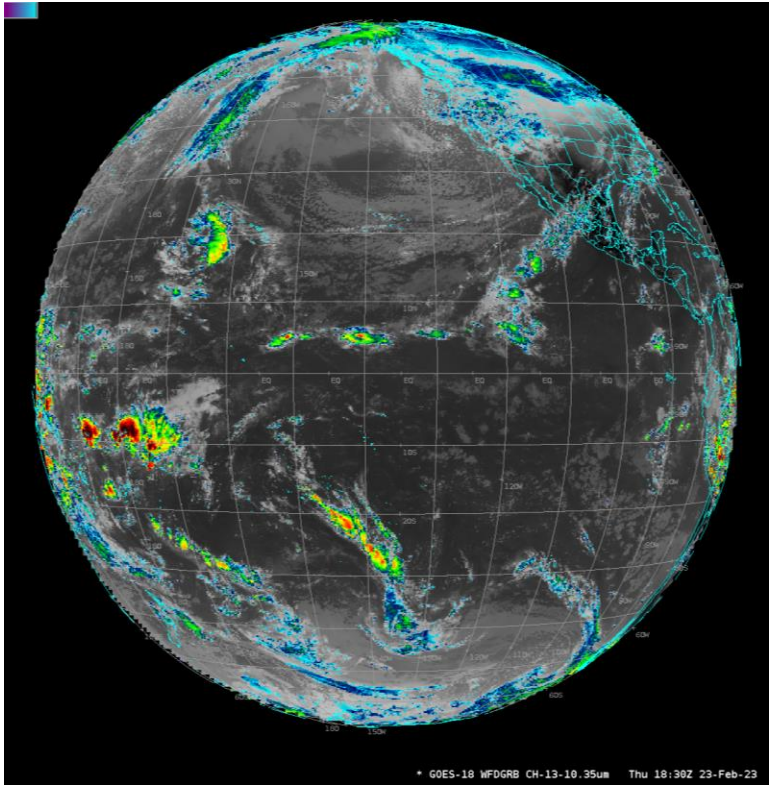
- Honolulu Forecast Office Hybrid NCEP/WFO AWIPS
- Guam Forecast Office WFO AWIPS
- Pacific Region HQ WFO AWIPS with Thin Client
- WSO Pago Pago ARD Thin Client since June 2017

Next Generation Geostationary Satellites

Himawari-9



GOES-18



Forecasters have access to All 16 channels

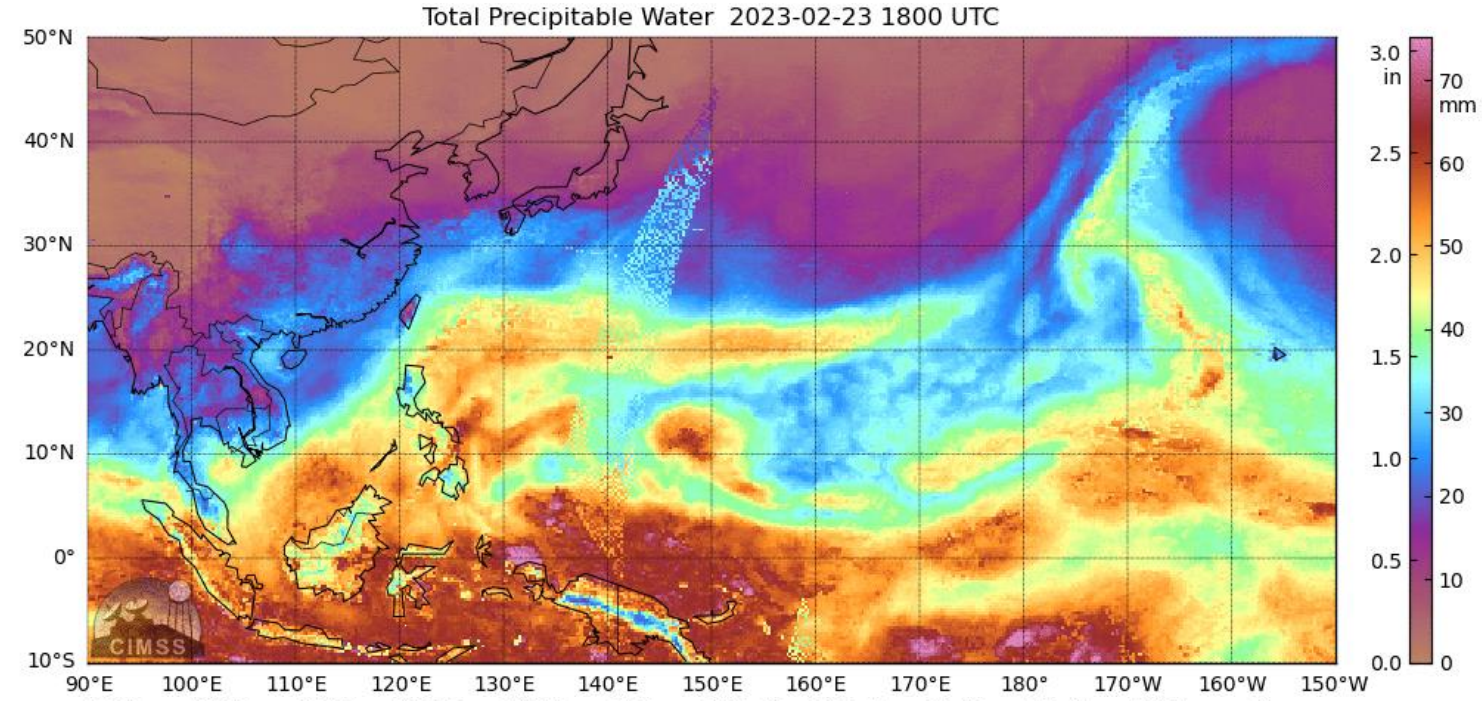
Full temporal and spatial resolution

Geostationary Lightning Mapper (GLM)

GOES-18 Level-2 Products

Himawari-9 Level 2 will start soon!

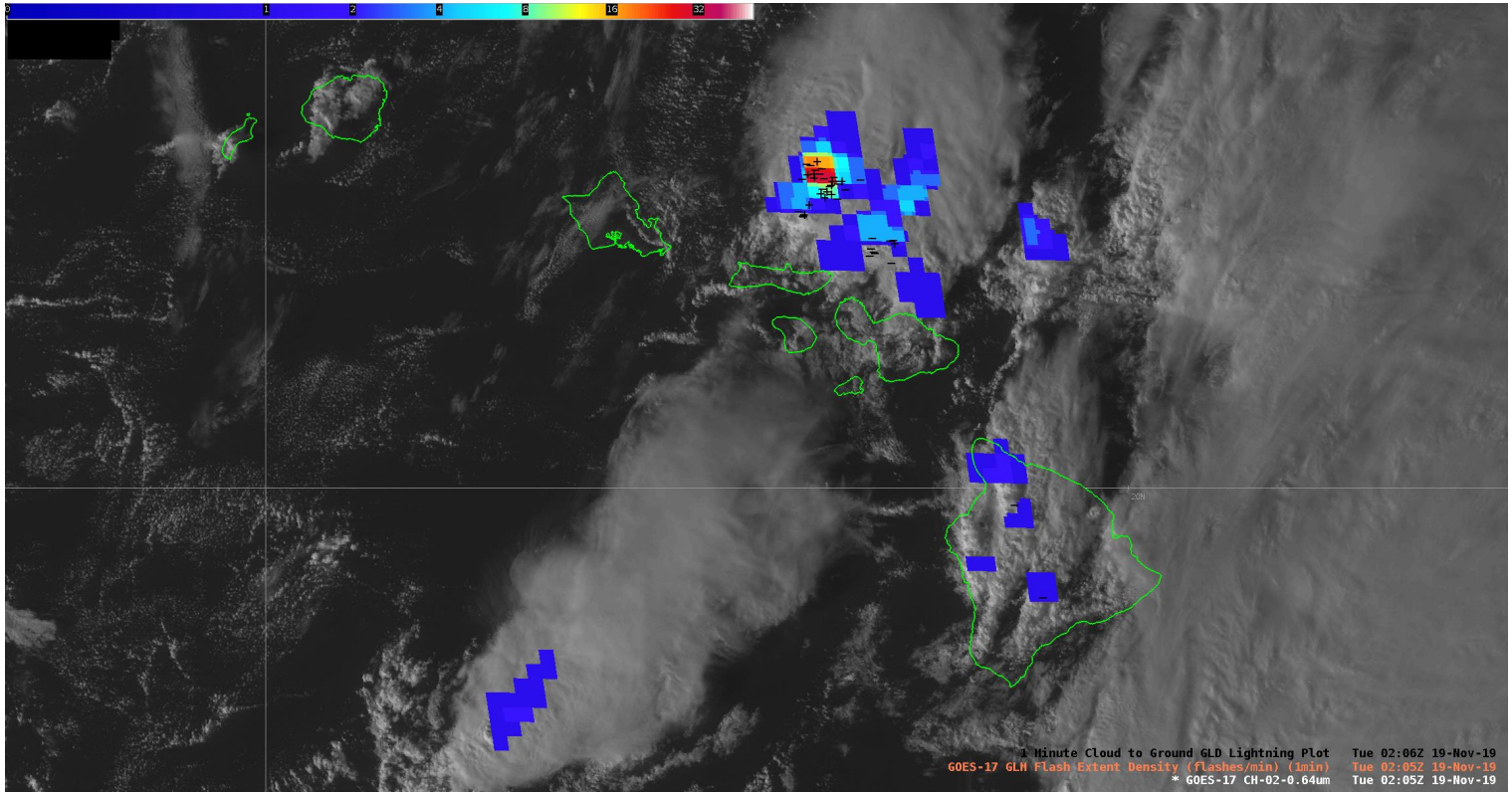
Morphed Integrated Microwave Imagery at CIMSS (MIMIC-TPW2)



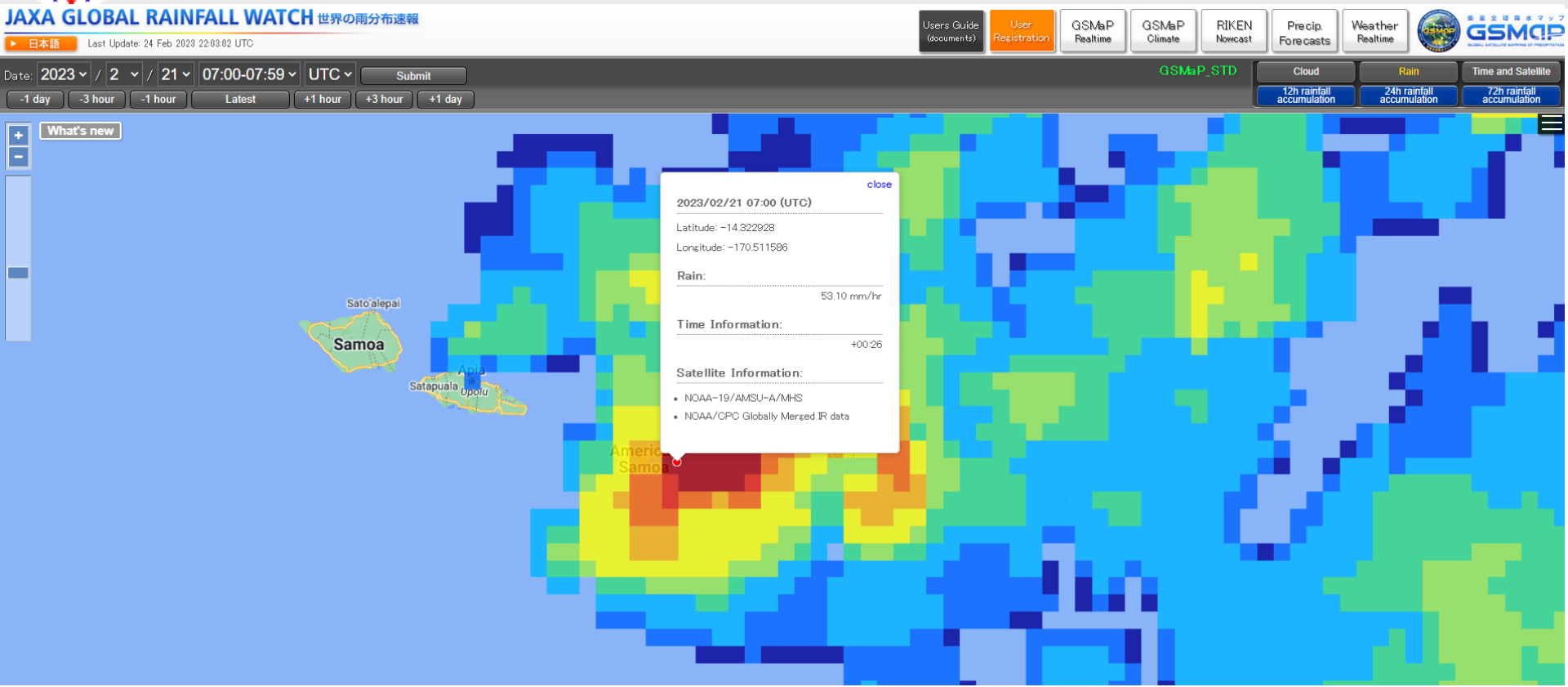
- Microwave retrievals from various polar orbiting satellites (NOAA, METOP, JPSS)
- Special algorithms morph data into the Global Forecast Systems (GFS) model background
- Forecasters use this to find anomalous areas of moisture.
- Zoom into specific regions.
- Available online and in AWIPS

University of Wisconsin Madison – Space Science Engineering Center
Cooperative Institute for Meteorological Satellite Studies

Hawaii case: November 2019 and Geostationary Lightning Mapper (GLM)

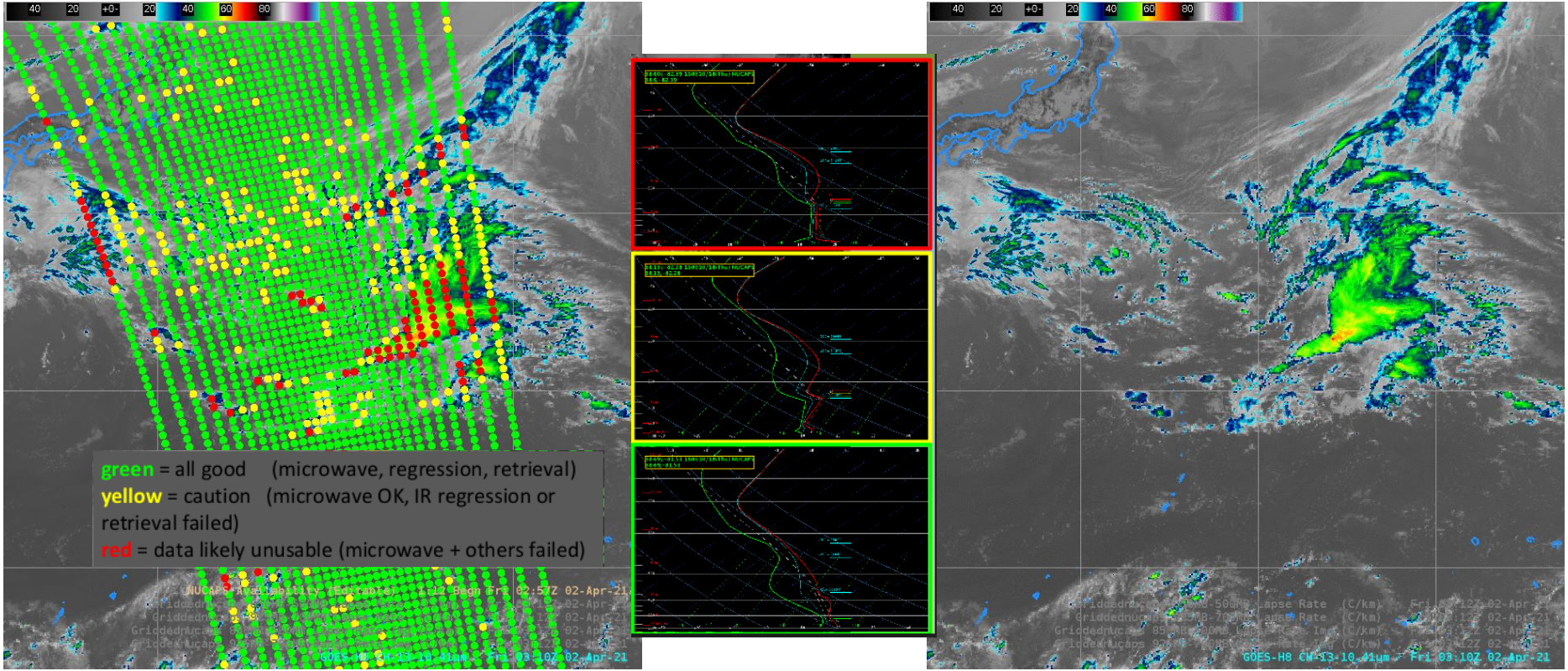


Heavy Rain over American Samoa case: February 21, 2023

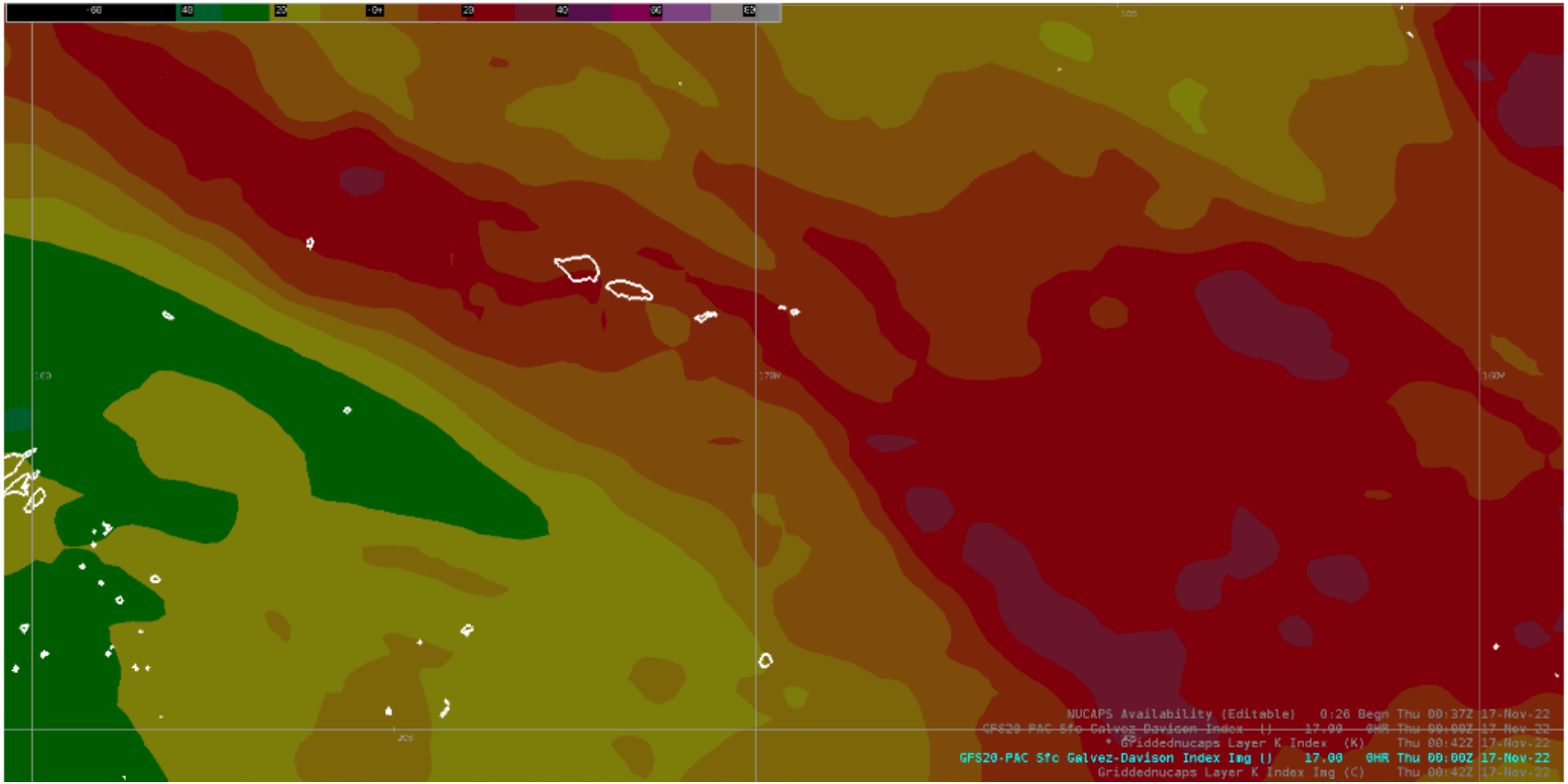


NOAA Unique Combined Atmospheric Processing System (NUCAPS)

Infrared and Microwave Sounders



American Samoa case: November 17, 2022



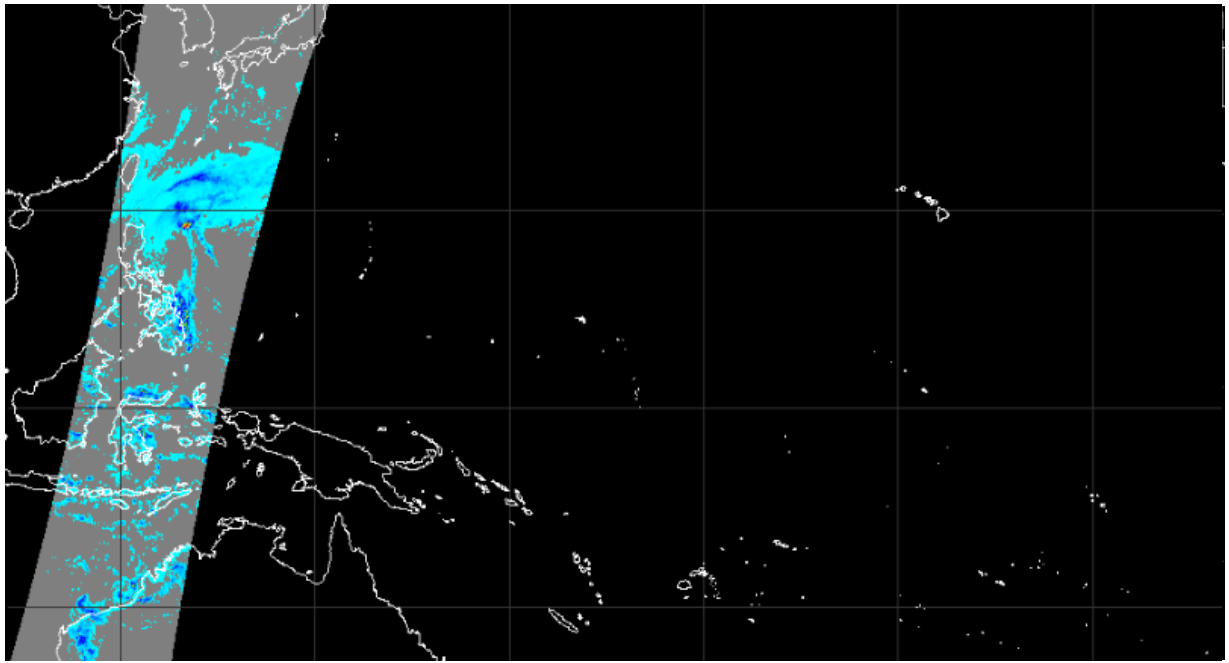
Gridded NUCAPS estimate of K-Index (0042 UTC on 17 November 2022)

NUCAPS Sounding Availability points

Gálvez-Davison Index (GDI) from the 20-km GFS

Tool to forecast tropical convection, particularly in trade wind regimes.

Passive Microwave GPM Constellation: Rain Rates
(from most microwave sensors)



Available online and in AWIPS

Various satellite tools to assists meteorologists to assess and forecast extreme precipitation.

MIMIC-TPW

NUCAPS

Geostationary Satellite Derived Products (Stability)

Microwave Rain Rates

Aloha and Thank you

Questions or Comments

Please contact me anytime!

Eric Lau

NOAA National Weather Service Pacific Region

Chief, Environmental Scientific & Services Division

eric.lau@noaa.gov