Weekly Report

CIRA
STAR/NESDIS
National Oceanic and Atmospheric Administration (NOAA)

Submitted by: Maranda Hutson
Date of Submission: 02 May 2025
Prepared by: CIRA and STAR contributors

Products and Applications

Experimental AI Super-resolution RGBs available on SLIDER at 0.5 km resolution: We have developed a convolutional neural network (CNN) for GOES-R series imagers that sharpens the fifteen 1 km and 2 km resolution channels to a 0.5km resolution. This approach is based on our previously published work (https://doi.org/10.1175/AIES-D-23-0065.1) which we found to perform much better than simple interpolation techniques. The result is a uniform 0.5 km spatial resolution for all sixteen channels. We are currently exploring applications of the sharpened imagery and the feasibility of generating these channels at 0.5 km resolution in near-real time. Experimental versions of the Day Cloud Phase Distinction and Fire Temperature RGB products are now being generated with the sharpened channels for the GOES-19 CONUS sector. Examples here: Day Cloud Phase Distinction Example, Fire Temperature Example We are actively using the SLIDER interface to continue identifying areas of improvement in the super-resolution algorithm and identifying ideal applications of the sharpened imagery for end users. (POC: Chuck White, CIRA; charles.white@colostate.edu) Funding: GOES-R

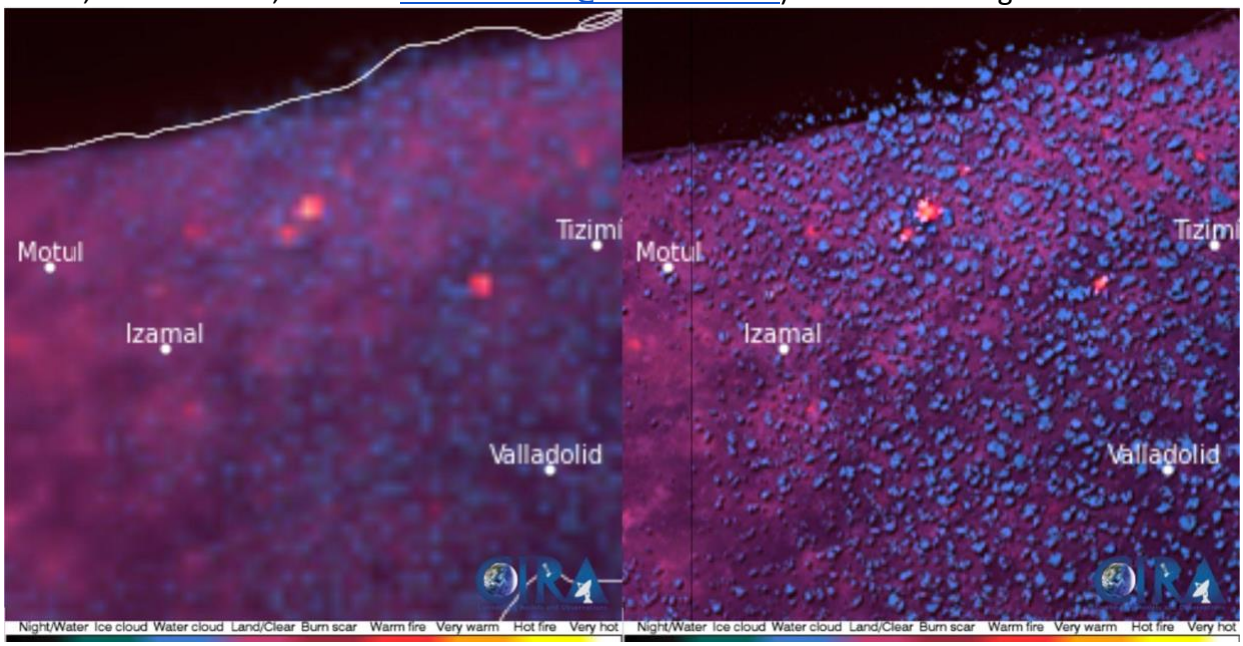

Figure: The standard resolution Fire Temperature RGB (left) and the sharpened RGB using the generated 0.5 km channels for GOES-19 ABI (right) over the Yucatan peninsula on April 30th,

2025 at 17:46 UTC (https://rammb-slider2.cira.colostate.edu/ for GOES-19 CONUS).

Improved statistical-dynamical tropical cyclone forecast models for the National Hurricane Center (NHC): The CIRA tropical cyclone group performed research to improve several statistical-dynamical forecast models used by NHC. Accomplishments include using updated GOES imagery and GFS model databases to retrain several statistical tropical cyclone intensity forecast models, and retraining consensus models for track and intensity forecasts that use optimal combinations of forecasts from several modeling systems. Based on CIRA's evaluations from several years of retrospective forecasts, NHC is in the process of implementing these improved models for use in their operations during the 2025 hurricane season. (POCs: Mark DeMaria, CIRA Mark.DeMaria@colostate.edu, Kate Musgrave, CIRA, Kate.Musgrave@colostate.edu, Jon Martinez, CIRA, Jon.Martinez@colostate.edu, Alan Brammer, CIRA, Alan.Brammer@colostate.edu). Funding: NWS/STI, GOES-R.

Publications (Citation: followed by a short **Summary:** (Why & so what)**, & detailed summary):**

Awards and Recognition

Media Interactions and Request

Blog Posts and Social Media

Travel, Workshops, Conferences, and Meeting Reports

Training and Education activities

NWS Juneau Spring Training: John Forsythe of CIRA presented a virtual talk at the spring training seminar for the National Weather Service (NWS) Juneau, Alaska Weather Forecast Office (WFO) titled "Experimental Layer Precipitable Water Transport and Percentile Products". WFO Juneau's area of responsibility is over 150,000 square miles, including the Panhandle and the eastern Gulf of Alaska. Juneau is responsible for monitoring and forecasting a wide variety of hazards, including for ships at sea, commercial and civil aviation including complex mountainous terrain, and inland flood and landslide threats. CIRA developed and transitioned to NOAA operations in 2024 a satellite-derived product called Advected Layer Precipitable Water (ALPW), which allows forecasters to see the flow of moisture at different layers globally, including the data sparse oceans. This lets forecasters see the "plumbing" of the atmosphere - how much and where pipelines of water vapor are flowing. Two new experimental products are being evaluated by CIRA's NWS partners, including the Juneau WFO. These are Layer Vapor Transport and a Percentile Ranking of ALPW. Both provide forecasters a measure of the extremity of a flood event, in advance of when the rain starts falling. Forecasters provided

positive comments and feedback on both products, which CIRA produces hourly around the clock. An example of the Layer Vapor Transport for the lowest layer of the atmosphere for an atmospheric river approaching SE Alaska is shown in the Figure below. (POC: J. Forsythe, CIRA, John.Forsythe@colostate.edu) Funding: JPSS PGRR and NOAA CPO.

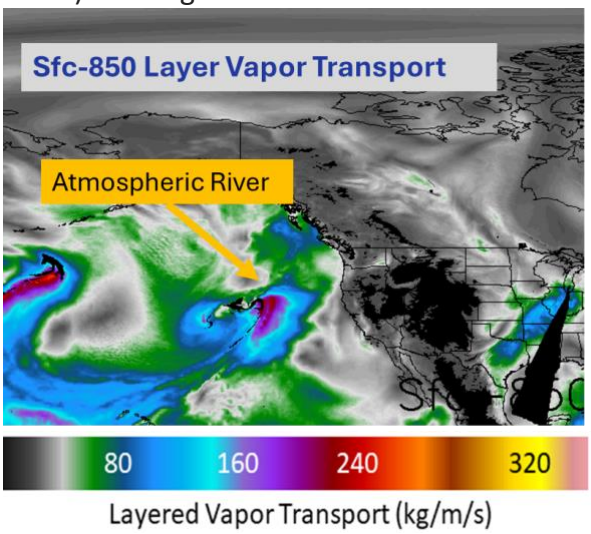

Figure: Experimental lower atmosphere CIRA Layer Vapor Transport product for 20 UTC 9 April 2025, showing an atmospheric river approaching southeast Alaska.

Future Meetings and Events (dates, meeting/event, location, staff involved)

Other