Weekly Report

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

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Date of Submission: 25 July 2025
Prepared by: CIRA and STAR contributors

Products and Applications

CIRA staff provided tropical weather briefings for the NOAA Hurricane Research Division (HRD) field program: HRD hosts daily tropical weather briefings from late July to mid-October to assist with planning for their real-time hurricane field program activities. Members of the CIRA tropical cyclone research group and NESDIS/STAR (Chris Slocum, Naufal Razin, Mark DeMaria, and Alex DesRosier) provided the briefings on Tuesday-Friday, July 22-25th. These briefings provide an opportunity to highlight CIRA and NESDIS satellite products for tropical cyclone analysis and forecasting. (POC Kate Musgrave, Kate.Musgrave@colostate.edu, funding GOES, JPSS, STI)

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

Citation:

Turner, J. D., Miller, S. D., Noh, Y.-J., Chiu, J. C., Line, W. E., Kummerow, C. D., Smith, R. G. (2025). Estimation of Coupled Ocean/Atmosphere Impacts to the Satellite Detection of Nocturnal Maritime Low Clouds. Geophysical Research Letters, 52, 14, e2025GL115366. https://doi.org/10.1029/2025GL115366

Summary:

Satellite-derived cloud products often use a difference between two infrared channels to discern low clouds at night. These products can be contaminated with “false low clouds”, signals that imitate clouds under certain surface and water vapor scenarios. We present an estimation of the global extent of false low cloud signals. Our results determine regions and seasons where products like GeoColor, the Nighttime Microphysics RGB, and cloud masking algorithms may be overstating the low cloud coverage.

Detailed Summary:

When warmer water vapor overrides a cooler surface, the difference between the infrared longwave (~10-12 μm) and shortwave (~3.9 μm) brightness temperature will look similar to a nighttime low cloud. Repetitive false low clouds have been previously identified in maritime regions such as Georges Bank, the Great Lakes, the Mississippi delta, and the California coast. We continue to focus on maritime occurrences of this error in this study. We derived a radiative transfer simulation from the Schwartzschild's equation and the HITRAN database of molecular absorption. We then applied our simulation to observations of the surface temperature combined with profiles of the atmospheric temperature and moisture. This isolated the false low cloud signal from surrounding true low clouds (Figure 1). Using NWP output, we can perform this simulation globally. Our results show the potential for false low clouds in many previously unevaluated maritime regions (the Gulf Stream, the Falkland Islands, the Kuroshio Current, Hudson Bay) as well as a potential seasonal cycle for the error (Figure 2).

POC: J. D. Turner, jesse.turner@colostate.edu
Funding: JPSS Program Office, Office of Naval Research

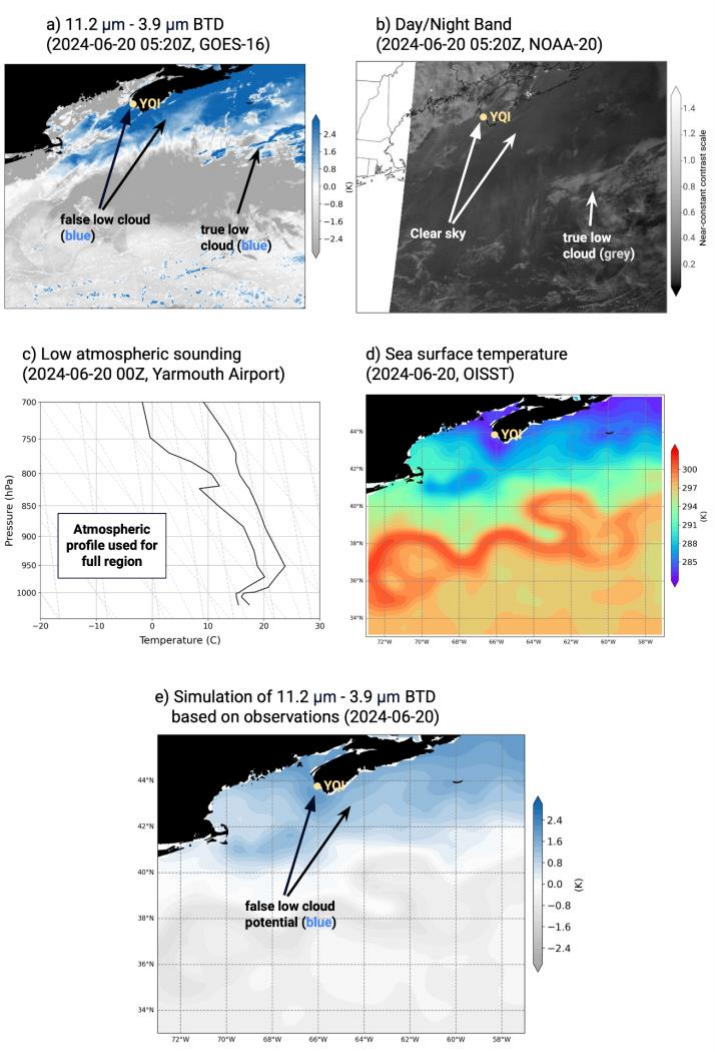

Figure 1: The estimation of clear-sky false low cloud (FLC) potential for an observed scenario. (a) Satellite imagery of the 11.2–3.9 µm brightness-temperature difference (BTD), showing both true and false low clouds in blue. Higher clouds and clear sky are negative BTD in gray. (b) Day/Night Band moonlight reflectance imagery showing the extent of the true clouds in gray. (c) Radiosonde-based atmospheric sounding from Yarmouth Airport (YQI) showing the moist inversion characteristic of FLC signals. (d) Sea-surface temperature showing relatively cold water off the coast of Nova Scotia. (e) Estimation of the clear-sky FLC effect derived from applying the measured atmospheric profile and sea-surface temperatures to the radiative transfer equation explained in Section 2.3. Simulation is most valid near the point where the sounding was measured (YQI).

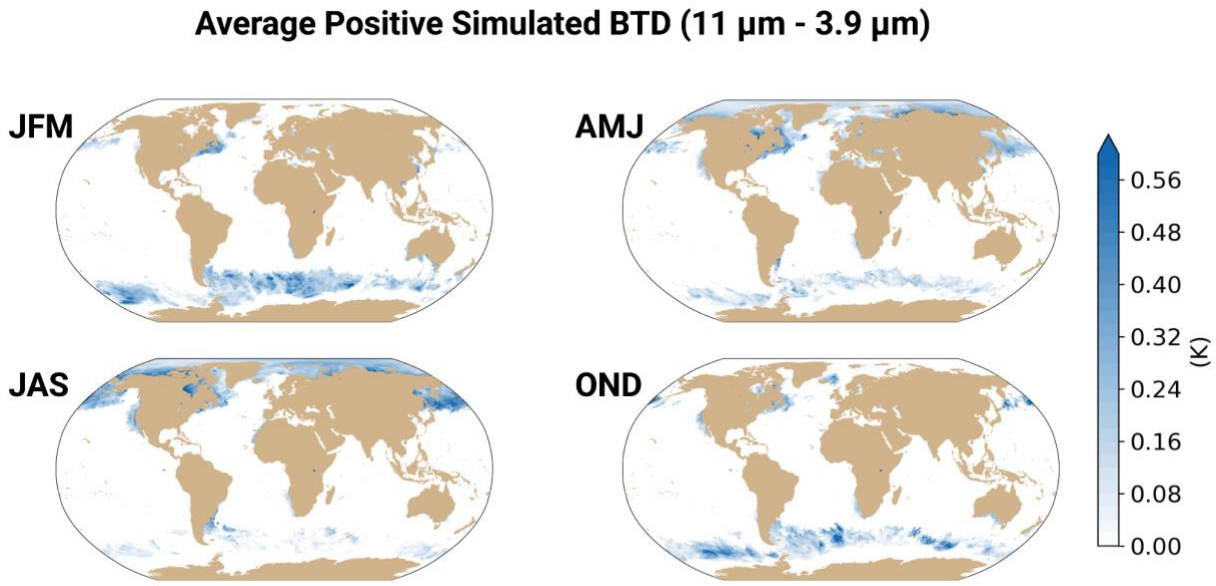

Figure 2: Seasonal composite imagery (December 2023–November 2024) of simulated IR brightness-temperature difference, highlighting regions of higher false low cloud potential in blue. These composites are generated using daily Global Forecast System model input from 06:00 UTC.

Awards and Recognition

Media Interactions and Request

Blog Posts and Social Media

Travel, Workshops, Conferences, and Meeting Reports

Training and Education activities

ACCAP VAWS Seminar on the upcoming Metop-SG Satellites and METImage: On 23 July 2025, Curtis Seaman (CIRA) gave a virtual seminar for the Alaska Center for Climate Assessment and Preparedness (ACCAP) Virtual Alaska Weather Symposium (VAWS) titled, “Introduction to Metop-SG and METImage”. This talk previewed the capabilities of the new European polar-orbiting constellation of satellites, Metop-SG, with a focus on the new meteorological imager, METImage, and how it compares to VIIRS on the JPSS satellites. The first Metop-SG satellite, Metop-SG-A1, which will have the first METImage on-orbit, is currently scheduled to launch in August 2025. Metop-SG will complement JPSS, providing valuable observations in the mid-

morning orbit into the 2040s. The talk had over 50 registrants, including several forecasters from throughout the National Weather Service Alaska Region. A recording of the seminar, as well as the slides presented, are available at the following URL: https://uaf-accap.org/event/vaws-metop-sg-constellation/ (POC: Curtis Seaman, CIRA, curtis.seaman@colostate.edu, funding: OCS)

LEO Science Seminar: On 21 July 2025, J. Torres presented on *'JPSS: Recent Visits to Weather Forecast Offices (WFOs), Training Resources, and Data Access Updates' at the LEO Science Seminar*. The presentation discussed the recent in-person and virtual visits to WFOs that were conducted within the past year and a half (2024 to present day). The visits included interactions with NWS forecasters, the collection of forecaster feedback on the usage of JPSS data in operations, and discussions about the challenges that forecasters encounter within their respective County Warning Areas (CWAs). Updates were also provided covering the latest JPSS training materials and near-real-time data that forecasters can access online and in AWIPS-II. There are plans to present on this topic again (that will also include forecaster feedback on GOES data) at the Satellite Book Club (SBC) Seminar Series on Thursday, 7 August 2025. (POC: J. Torres, E. Sanders, D. Bikos, CIRA, and B. Line, NOAA, jorel.torres@colostate.edu, Funding: JPSS)

Updated JPSS Quick Guide! The *Blended Total Precipitable Water (TPW)* Quick Guide was updated to reflect product changes that were implemented into AWIPS, earlier this year. The republished guide is now accessible for forecasters to access online via CIRA/VISIT webpage: https://rammb2.cira.colostate.edu/guides/blended-tpw/.

(POC: J. Torres, E. Sanders, D. Bikos, B. Connell, S. Kusselson, and J. Forsythe, CIRA, jorel.torres@colostate.edu, Funding: JPSS)

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

Other

Taiga Tsukada reviewed a manuscript for the Journal of Geophysical Research: Machine Learning and Computation. (POC: T. Tsukada, taiga.tsukada@colostate.edu)

Stephanie Ortland reviewed a manuscript for Advances in Atmospheric Science. (POC: S. Ortland, stephanie.ortland@colostate.edu)

Alex DesRosiers reviewed a manuscript for Monthly Weather Review. (POC: A. DesRosiers, adesros@rams.colostate.edu)