

Weekly Report

RAMMB / CIRA
Cooperative Research Program Division (CoRP)
STAR/NESDIS
National Oceanic and Atmospheric Administration (NOAA)

Submitted by: Austin Boone
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Prepared by: RAMMB/CIRA contributors

Products and Applications

GREMLIN CONUS3 Dataset Published: K. Hilburn has published his *CONUS3* dataset that is used in the manuscript:

- Lee, Y., and K. Hilburn, 2023: Validating GOES Radar Estimation via Machine Learning to Inform NWP (GREMLIN) product over CONUS. *J. Appl. Meteor. Climatol.*, in review.

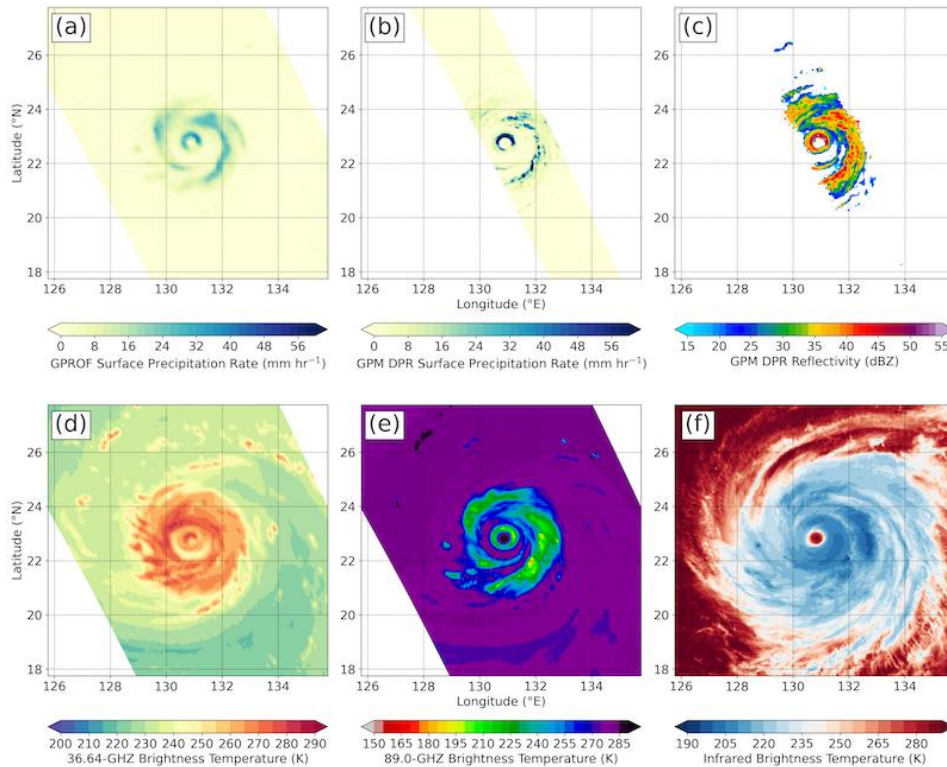
The dataset includes years 2020-2022 and is a total of 1.2 TB in size. The *CONUS3* dataset provides samples every 15-minutes (365 days/year * 24 hours/day * 4 samples/hour = 35,040 samples/year) over the whole of CONUS, resampled to the 3 km HRRR CONUS mass grid (1799 x 1059). It includes the GREMLIN inputs from GOES-16 Advanced Baseline Imager (ABI) and Geostationary Lightning Mapper (GLM) and the target output from the Multi-Radar/Multi-Sensor (MRMS) System. A detailed README and Python and Fortran read code are provided. The dataset citations with DOIs are:

- Hilburn, Kyle (2023), GREMLIN CONUS3 Dataset for 2020, Dryad, Dataset, <https://doi.org/10.5061/dryad.h9w0vt4nq>.
- Hilburn, Kyle (2023), GREMLIN CONUS3 Dataset for 2021, Dryad, Dataset, <https://doi.org/10.5061/dryad.zs7h44jf2>.
- Hilburn, Kyle (2023), GREMLIN CONUS3 Dataset for 2022, Dryad, Dataset, <https://doi.org/10.5061/dryad.2jm63xstt>.

By making this dataset publicly available, CIRA is supporting machine learning research and development to get maximum value from GOES data. (POC: K. Hilburn, CIRA, Kyle.Hilburn@colostate.edu; Y. Lee, CIRA, Yoonjin.Lee@colostate.edu; Funding: GOES-R).

TC PRIMED is now on NODD: The Tropical Cyclone PRecipitation, Infrared, Microwave, and Environmental Dataset (TC PRIMED) team has made the dataset publicly available on the Amazon Web Service as part of the NOAA Open-Data Dissemination (NODD) program through the support of the NOAA Center for Artificial Intelligence. TC PRIMED is an artificial-intelligence-ready dataset that collocates disparate sources of tropical cyclone data for algorithm development and verification. The NODD initiative enables quick on-the-cloud access to TC PRIMED data, which accelerates the development time of tropical cyclone forecast products and satellite applications. The figure below shows an example of TC PRIMED data from Typhoon

Maria (2018). The various products in TC PRIMED provide a multi-variable look into the tropical cyclone structure. The dataset is available at: <https://noaa-nesdis-tcprimed-pds.s3.amazonaws.com/index.html>.



A sampling of TC PRIMED products from Typhoon Maria (2018) at 10:13 UTC on 9 July 2018 in the western Pacific, where a) GPROF surface precipitation rate, b) GPM DPR precipitation rate, c) GPM DPR reflectivity, d) 36.6 GHz brightness temperatures, e) 89 GHz brightness temperatures, and infrared brightness temperatures from Himawari-8.

(POC: Naufal Razin, CIRA, Naufal.Razin@colostate.edu, Chris Slocum, STAR, 970-491-2409, Christopher.Slocum@noaa.gov; Funding: NCAI/ONR/CSU/PDRA)

Awards and Recognition

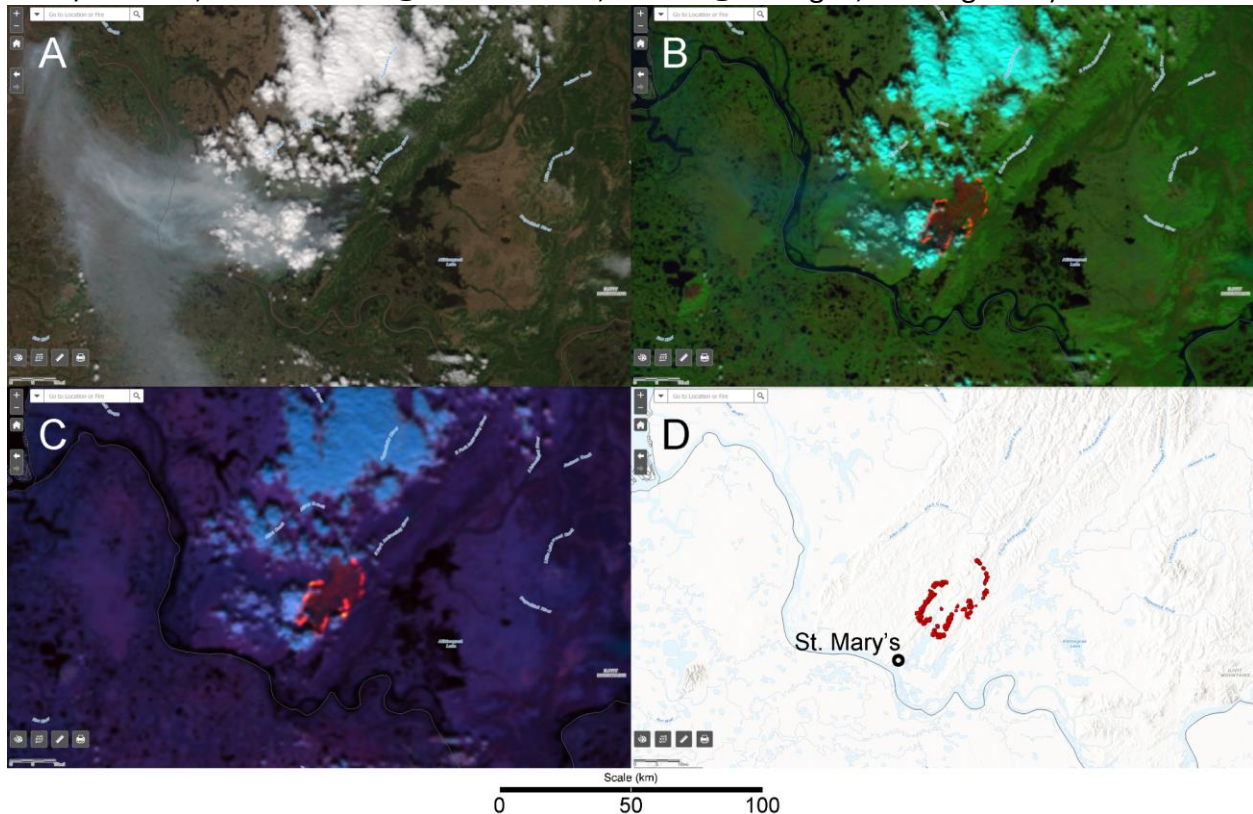
Publications (Citation: followed by a short Summary: (Why & so what), & detailed summary):

Citation: Seaman, C.J., W.E. Line, R. Ziel, J.L. Jenkins, C. Dierking and G. Hanson, 2023: Multispectral Satellite Imagery Products for Fire Weather Applications. *J. Atmos. Ocean. Tech.*, <https://doi.org/10.1175/JTECH-D-22-0107.1>.

Summary: This paper defines the Fire Temperature RGB and Day Fire RGB and highlights operational use cases of these multispectral imagery products for fire detection and monitoring.

Detailed Summary: The current generation of operational polar-orbiting weather satellites that

began with the launch of *Suomi-NPP* offers new capabilities with regard to fire detection and monitoring. In particular, false color red-green-blue composite imagery is now being used by fire managers, incident meteorologists and others in the fire management community to visualize a fire's behavior and the context in which it occurs. This paper outlines two of these red-green-blue composites that have gained widespread use throughout the U.S. National Weather Service and the Alaska Fire Service. These red-green-blue composites have been applied to the current generation of geostationary and polar-orbiting satellites to great effect and have changed how incident management teams respond to wildland fires. (POC: C. Seaman, CIRA; B. Line, CoRP/RAMMB; curtis.seaman@colostate.edu; bill.line@noaa.gov; Funding: JPSS)



Caption: a) VIIRS True Color RGB, b) Day Fire RGB, c) Fire Temperature RGB, and d) Active Fire product displayed in the Alaska Fire Service web mapping service for the East Fork Fire (9 June 2022). Note that the Fire Temperature RGB and Day Fire RGB offer similar information on the location of the fire compared to the Active Fire product, plus additional information on the presence of clouds, smoke, and land surface features that are not present in the Active Fire product alone. These VIIRS imagery products, in conjunction with the VIIRS Active Fire product, have replaced aircraft reconnaissance as the primary source of new fire detections within the Alaska Fire Service.

Media Interactions and Requests

Multiple Rounds of Severe and Tornadoic Storms Hit Central United States: Over the last two weeks, multiple rounds of severe and tornadoic storms marched across the Midwest and Southern United States. Several media and government organizations downloaded satellite videos (created by Dakota Smith) from the Satellite Library and used them in their coverage of the storms. The videos included CIRA GeoColor products. More details and urls can be found below. (POC: D. Smith, CIRA, dakota.smith@colostate.edu, S. Miller, Steven.Miller@colostate.edu) Funding: GOES-R.

Yahoo! News: 'Tornadoic storms seen on satellite imagery'. <https://news.yahoo.com/tornadoic-storms-seen-satellite-imagery-002400967.html>

Yahoo! News: 'Satellite Imagery Shows Tornadoic Storms Over Iowa and Arkansas'. <https://uk.news.yahoo.com/satellite-imagery-shows-tornadoic-storms-182705889.html>

WeatherNation: 'Satellite captured the strong storms that developed overnight...'. <https://twitter.com/WeatherNation/status/1643633341592215556>



Fox 10 - Phoenix: 'Tornadoic storms seen on satellite imagery'. <https://www.fox10phoenix.com/video/1201647>

Fox 8 - Cleveland: 'Watch Satellite shows tornadoic storms racing across Midwest'. <https://fox8.com/news/watch-satellite-imagery-shows-tornadoic-storms-racing-across-midwest/>

Click2 - Houston: 'Satellite imagery captures tornadoic storms 'racing' across Midwest'. <https://www.click2houston.com/video/weather/2023/04/05/satellite-imagery-captures->

[tornadic-storms-racing-across-midwest/](#)

Yahoo! News: 'Satellite Imagery Captures Tornadoic Storms 'Racing' across Midwest'.

<https://www.yahoo.com/lifestyle/satellite-imagery-captures-tornadic-storms-095210954.html>

NOAA Satellites: 'This #TimelapseTuesday, we're reviewing this multi-day GeoColor...'

<https://twitter.com/NOAASatellites/status/1643274068005904384>

NOAA Satellites Public Affairs: 'Early this morning, NOAA GOES16 tracked the path...'

<https://twitter.com/NOAASatellitePA/status/1643705751444004864>

NOAA Satellites Public Affairs: 'UPDATE: NOAA's GOES16 is closely tracking multiple...'

<https://twitter.com/NOAASatellitePA/status/1641909528764510209>

Blog Posts and Social Media

New Satellite Liaison Blog Post: Bill Line published a blog post titled "NOAA-21 VIIRS Imagery Reaches Provisional Maturity". The post discussed the current status of NOAA-21 VIIRS Imagery, and shared many single-band and multispectral imagery examples of NOAA-21 alongside NOAA-20 and S-NPP. See Figure below. The link to the post can be found [here](#). (POC: B. Line, CoRP/RAMMB, bill.line@noaa.gov) Funding: PDRA

20230402 J02 VIIRS NCC

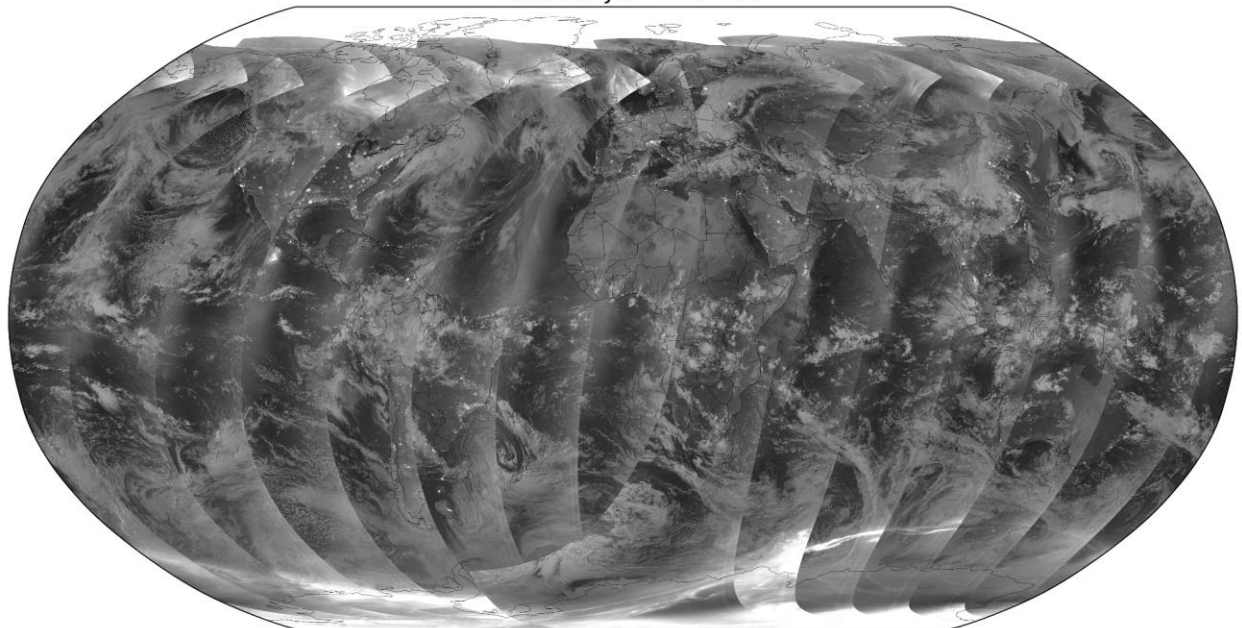


Figure: 02 April 2023 NOAA-21 VIIRS Near Constant Contrast Product nighttime global composite.

Travel, Workshops, Conferences, and Meeting Reports

Training and Education activities

Satellite Book Club Seminar: Bill Line (CoRP/RAMMB) presented “GOES-18 Barcode Artifact” for this week’s Satellite Book Club (SBC) Seminar Series. The presentation shared background information on the GOES-18 Barcode Artifact along with many examples of how it appears in products that are leveraged by operational users. The SBC convenes weekly to provide an opportunity for scientists throughout the NOAA satellite domain to share a topic of interest, followed by an open discussion. There were over 70 entities in attendance. A recording for the webinar can be found [here](#). (POC: B. Line, CoRP/RAMMB, bill.line@noaa.gov) Funding: PDRA

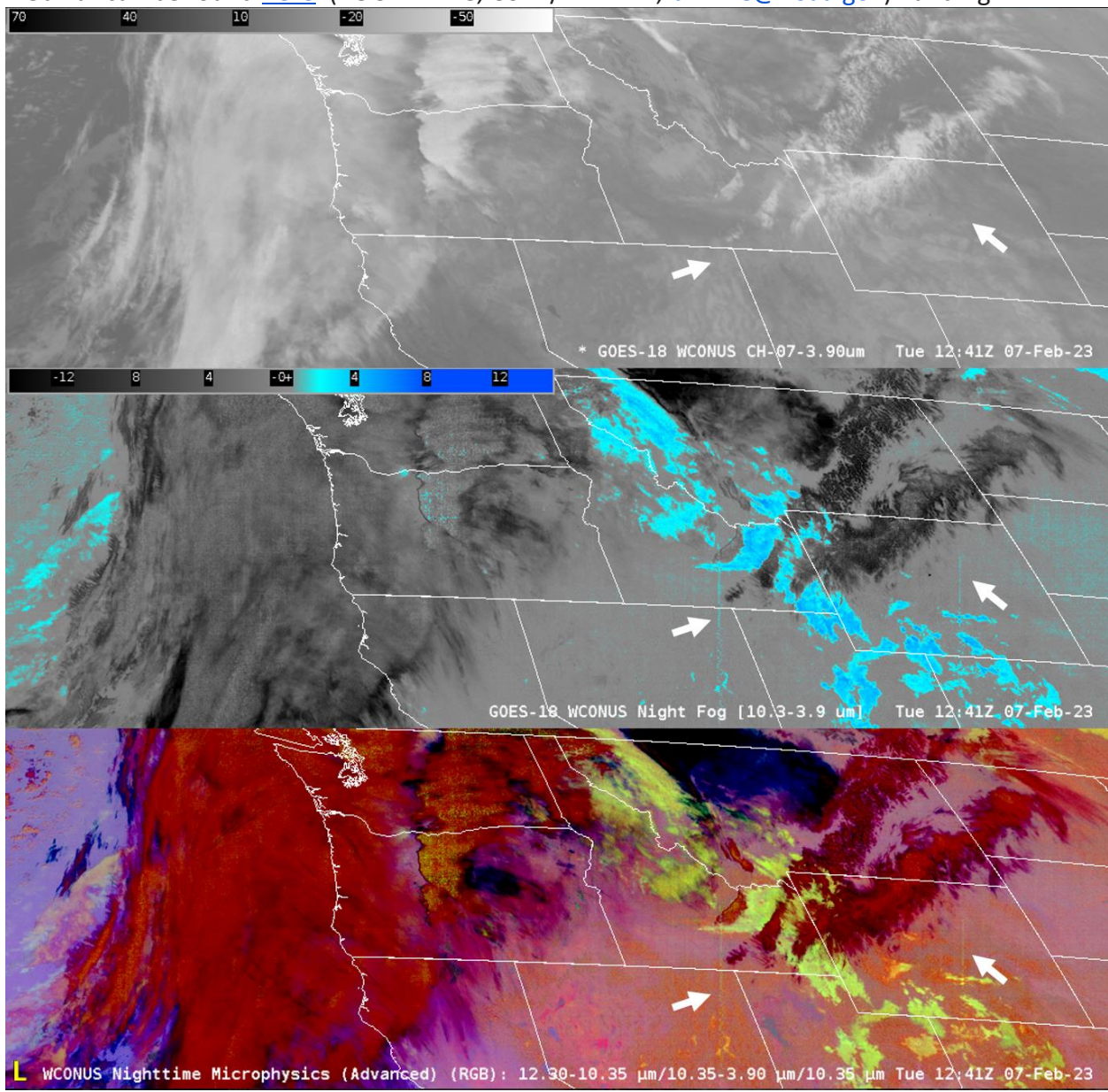


Figure: 1241 UTC 07 Feb 2023 GOES-18 Ch07 (top), Ch13 - Ch07 “Fog Difference” (middle), and

Nighttime Microphysics RGB (bottom), with visible influence of Barcode Artifact noted by arrows.

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

Other

Manuscript Reviewed: C. Slocum reviewed a manuscript submitted to the Journal of Climate.
(POC: Chris Slocum, STAR, Christopher.Slocum@noaa.gov; Funding: PDRA)