

Weekly Report

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

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Products and Applications

GREMLIN CONUS1 Dataset Published: K. Hilburn has published his *CONUS1* dataset:

- Hilburn, Kyle (2023), GREMLIN CONUS1 Manually Selected Storms Dataset, Dryad, Dataset, <https://doi.org/10.5061/dryad.m905qfv60>.

This is a “toy” dataset that is small enough to be able to train a convolutional neural network on a laptop computer to do image translation from GOES-R ABI and GLM images to MRMS radar reflectivity. This dataset is ideal for class projects, and Kyle has previously shared the dataset with Dr. Libby Barnes “Machine Learning for the Atmospheric Sciences” course at CSU. Currently the NSF AI2ES institute is using the *CONUS1* dataset to explore techniques for improving spatial sharpness of convolutional neural network predictions. 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, Funding: GOES-R).

Daily NCC Global Composites: A daily-updating NOAA-21 VIIRS Day Night Band (DNB) Near Constant Contrast (NCC) Global Imagery Composite at night is now available on the VIIRS Imagery team website homepage, [here](#). (POC: B. Line, CoRP/RAMMB, bill.line@noaa.gov) Funding: PDRA

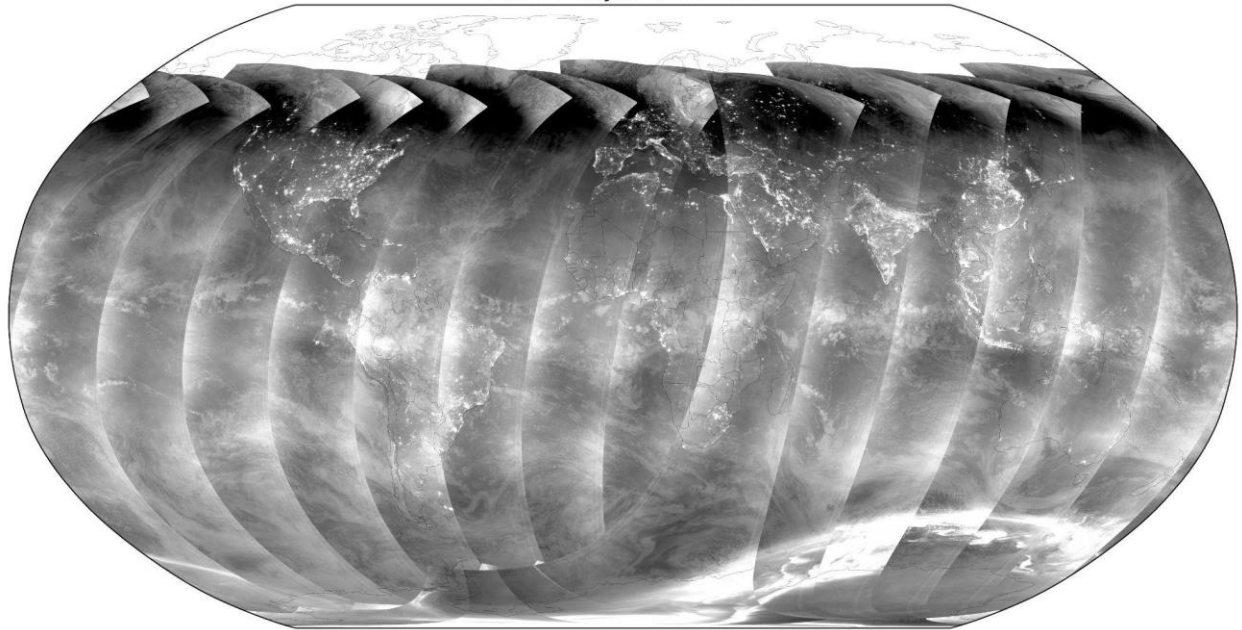


Figure: 25 April 2023 NOAA-21 VIIRS NCC Global Composite at night.

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

Barotropic instability during Hurricane Maria (2017):

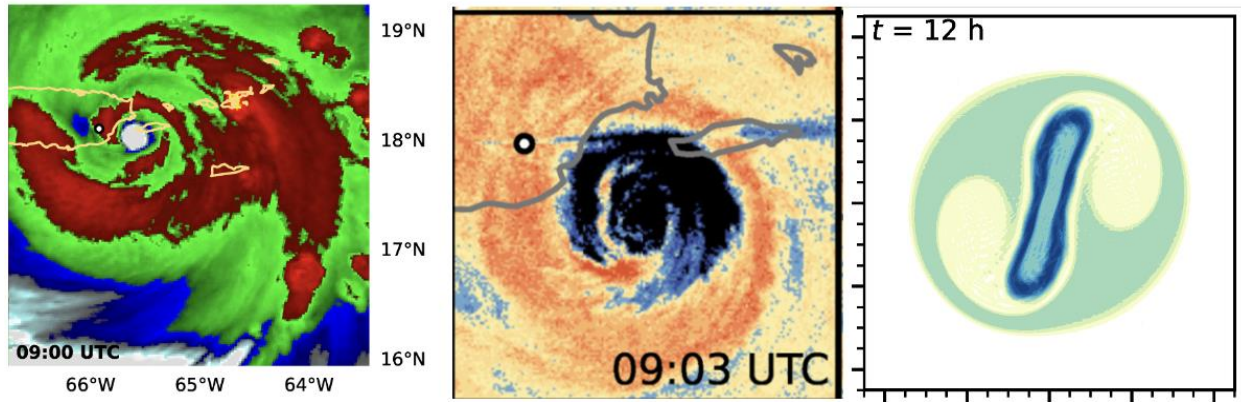
Citation:

Slocum, C. J., R. K. Taft, J. P. Kossin, and W. H. Schubert, 2023: Barotropic Instability during Eyewall Replacement, *Meteor.*, **2**, 191–221. <https://doi.org/10.3390/meteorology2020013>.

Summary:

Hurricane Maria's (2017) devastated the island of Puerto Rico. While the geostationary satellite observations miss key aspects of the vortex evolution, the San Juan Next Generation Weather Radar (NEXRAD) captures an important feature about the eyewall replacement process. This work uses the non-divergent barotropic model to understand the linear and non-linear evolution of Maria-like vortices. From the analysis provided by both approaches, the simple dynamics highlight one possible pathway to Hurricane Maria's eyewall replacement process and insight into how this evolution may have resulted in the destruction of the San Juan NEXRAD. With increasing synthetic aperture radar tropical cyclone overpasses, a broader understanding of eyewall structure and evolution might be possible using these simple arguments.

(POC: Chris Slocum, STAR, Christopher.Slocum@noaa.gov; Funding: PDRA)



Caption: GOES-16 (left) and San Juan NEXRAD (center) prior to the landfall of Hurricane Maria (2017) on Puerto Rico. Radar shows an elliptical inner eye that can be explained through barotropic instability as simulated (right).

Awards and Recognition

AMS Reviewer Service Recognition: C. Slocum recognized for peer review service by the American Meteorological Society for 2022. (POC: Chris Slocum, STAR, Christopher.Slocum@noaa.gov; Funding: PDRA)

Media Interactions and Requests

Blog Posts and Social Media

New Satellite Liaison Blog Post: Bill Line published a blog post titled “26 April 2023 Central Texas Thunderstorms”. The post highlights how various NWS offices leveraged satellite imagery in operations for a central Texas severe thunderstorm event, including corresponding imagery and imagery annotation. See Figure below. The link to the post can be found [here](#). (POC: B. Line, CoRP/RAMMB, bill.line@noaa.gov) Funding: PDRA

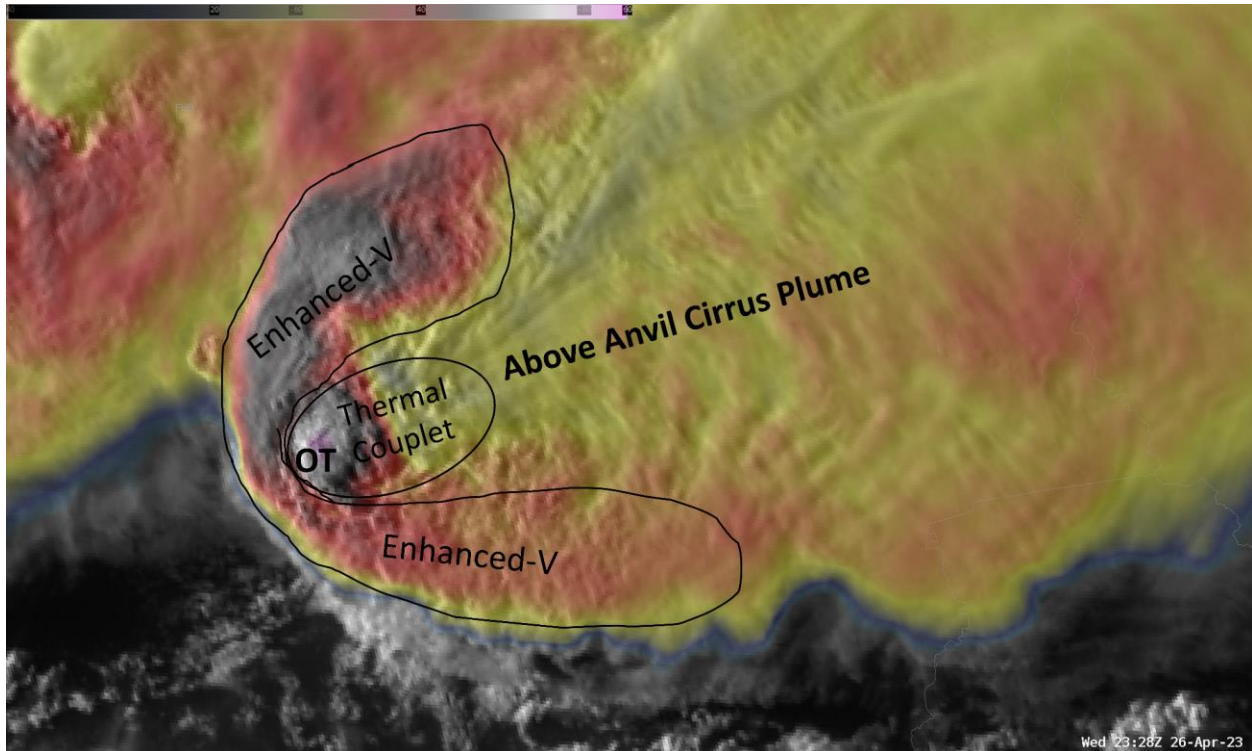


Figure: 2328 UTC 26 April 2023 GOES-East VIS/IR Sandwich Imagery, captured from AWIPS, with relevant storm top features annotated.

Travel, Workshops, Conferences, and Meeting Reports

Training and Education activities

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

Other

Manuscript Reviewed: C. Slocum reviewed a manuscript submitted to Tropical Cyclone Research and Review. (POC: Chris Slocum, STAR, Christopher.Slocum@noaa.gov; Funding: PDRA)