# Weekly Report – Date: May 27, 2022

Satellite Climate Studies Branch (SCSB)/CISESS

NOAA/NESDIS/STAR

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## HIGHLIGHTS FOR NESDIS LEADERSHIP

### Use-Inspired Science

**Landsat flood inundation mapping**

CISESS Scientist Qingyuan Zhang has developed a Python algorithm to retrieve flood inundation map (FIM) from Landsat images. Landsat8/9 Operational Land Imager (OLI) Collection 2 Level 2 surface reflectance products (https://earthexplorer.usgs.gov/) are used to test the FIM algorithm. The Landsat FIM products are used for evaluation and validation of the VIIRS FIM products and SAR FIM products. Figure 1 expresses an example. Figure 1 (A) shows the land cover map from NLCD in 2019 for the Red River region. The Bowesmont basin in Minnesota and North Dakoda is overlapped. Figure 1 (B) depicts a true color image from Landsat on April 22, 2019. The FIM map in figure 1 (C) expresses the flood inundation extent.

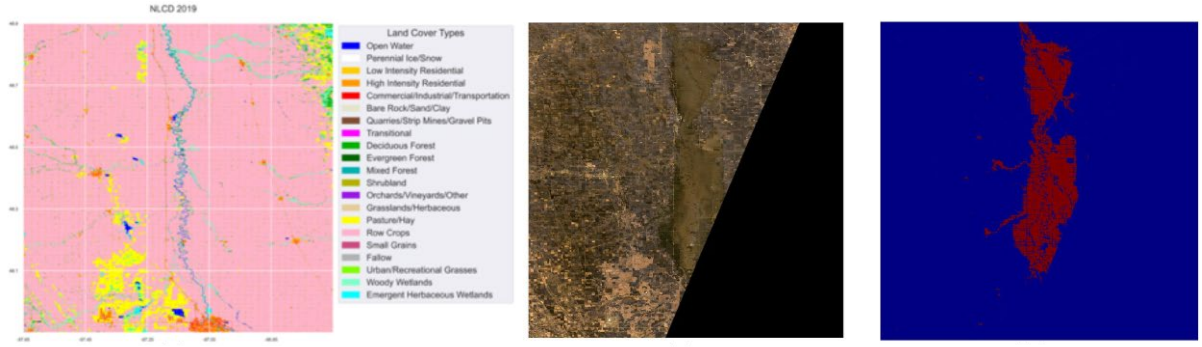


**Figure 1. (A) The NLCD map centered at (48.4°N, 97.15°W) for the Red River region in 2019; (B) the true color Landsat RGB image on April 22, 2019; and (C) the flood and inundation map (FIM) derived from the Landsat data on April 22, 2019.**

[POC: Qingyuan Zhang, CISESS, qyzhang@umd.edu , Funding: NOAA grant NA19NES4320002 (CISESS: JSTAR), and NOAA grant NA20OAR4600288 (Disaster Funding)]

## Unique & Significant Reports

### A 7-Stroke Cloud-to-ground Flash Caught on a Raspberry Pi Camera

CISESS Scientist Daile Zhang and her three student-intern-team have been monitoring lightning as part of their CISESS Seed Grant project. A storm passed over in the greater D.C. area in the afternoon of May 22, 2022. A 7-stroke cloud-to-ground (CG) flash was caught on one of the high-speed Raspberry Pi cameras in the Mid-Atlantic Raspberry Pi Camera network at Germantown. A CG flash typically has 3-5 strokes. Both Geostationary Lightning Mapper (GLM) on NOAA's GOES-16 Satellite and a ground-based lightning network – National Lightning Detection Network (NLDN) detected the flash. The work is to use the lightning videos to validate GLM and other ground-based lightning networks.

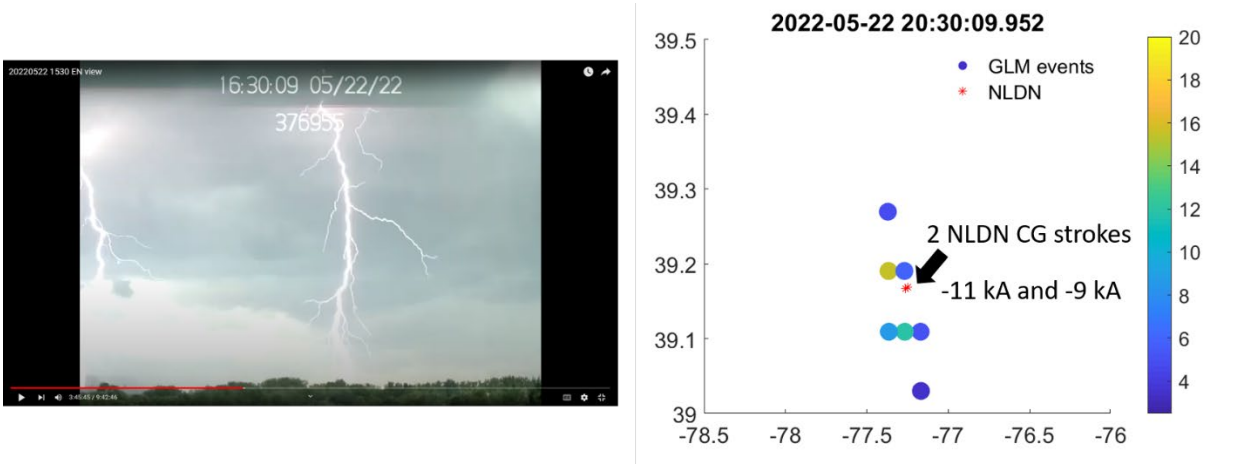


*Figure. Capture of the 1st of 7 strokes (left) and longitude/latitude locations of the GLM and NLDN detections (right). The GLM dot colors indicate low (blue) to high (yellow) cloud-top energy.*

The Raspberry Pi Camera set up was able to capture all 7 strokes, which occurred in 0.766 seconds. The full video is available at: https://www.youtube.com/watch?v=kVR6HT62GDk. This work is sponsored by the 2021-2022 NOAA CISESS Seeds Grant and a collaboration with Earth Network and University of Oklahoma.

(Daile Zhang, CISESS, dlzhang@umd.edu, GOES-R AWG, GOES-R PGRR, NOAA-NASA ROSES).

## TRAINING AND EDUCATION

### Student Develops Hurricane Visualization Code

CISESS Undergraduate Research Assistant Sophia Hu just finished up 12 months of work with CISESS Scientist Christopher Grassotti and NOAA Scientist Shuyan Liu. She worked on five different projects,

one of which was Hurricane visualization and data post-processing. She developed Python code that shows not only the hurricanes path but also details of the hurricanes lifecycle.

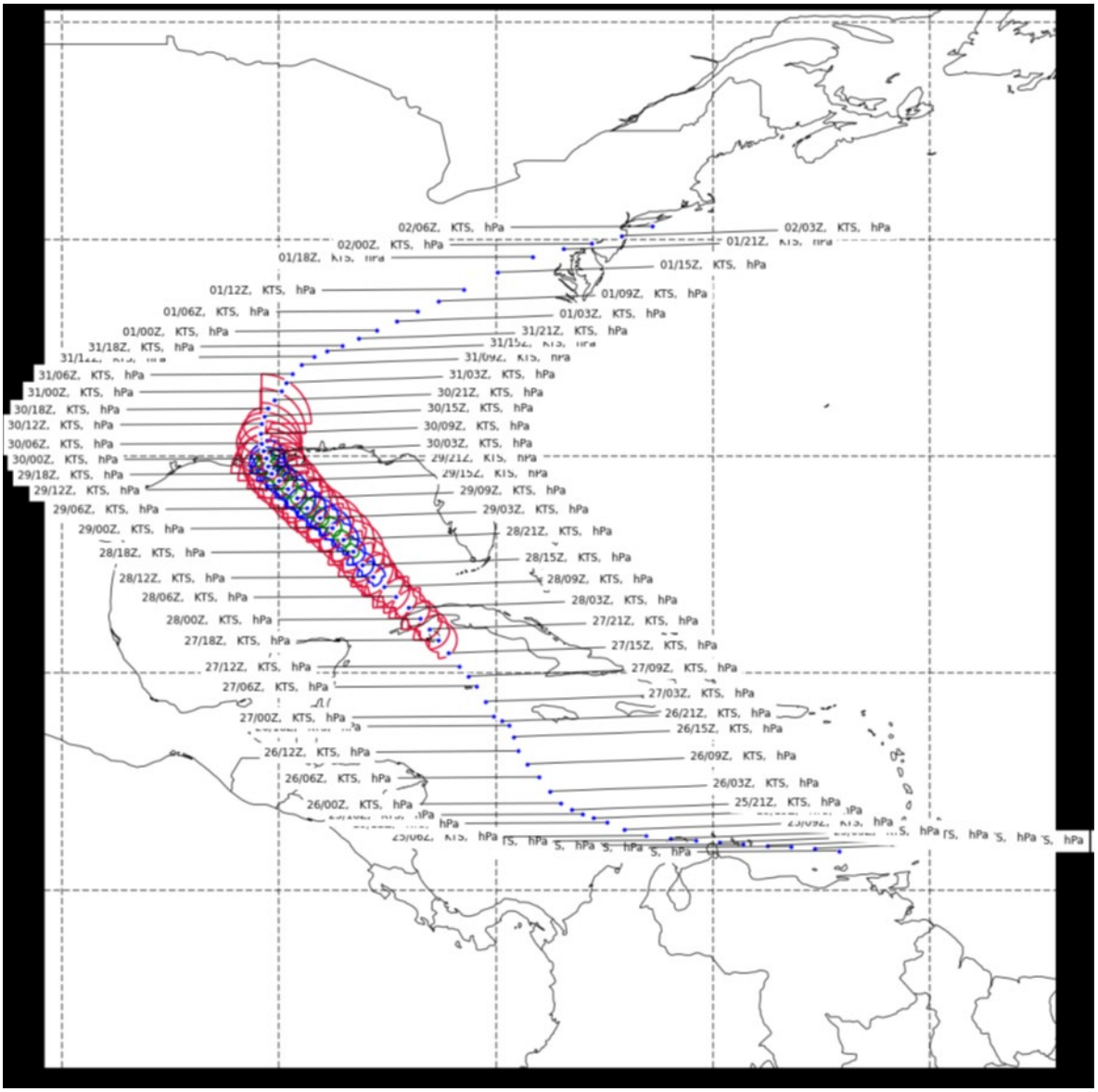


*Figure. The green, blue, and red circles denote the locations of the 64-, 50-, and 34-knot (kt, where 1 kt = 0.514 m s-1) wind radii, respectively. The annotations to theside of the blue dots denote the date (day and UTC hour), maximum 10-m wind speed in kts, and minimum SLP (hPa) at the given time.*

(POC: Christopher Grassotti, CISESS, christopher.grassotti@noaa.gov , his intern was funded through CISESS Task I).