

**Weekly Report – September 2, 2022**  
Satellite Climate Studies Branch (SCSB)/CISESS  
NOAA/NESDIS/STAR  
Acting Branch Chief: Flavio Iturbide-Sanchez

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**HIGHLIGHTS FOR NESDIS LEADERSHIP**

**Data and Information**

**Rare 12-stroke lightning captured by Raspberry Pi High-Speed Camera:** On July 12, 2012, the day when powerful thunderstorm and high winds knocked out the power on the University of Maryland Campus, Daile Zhang and her team of interns captured a 12-stroke lightning flash on campus just before the lights went out using the Raspberry Pi High-Speed Camera. The goal of this project is to use this data to validate the GOES-R Lightning Mapper (GLM) and ground lightning detection networks, like the Earth Networks Total Lightning Network (ENTLN) and the National Lightning Detection Network (NLDN). Based on this comparison, Zhang found:

- GLM only detected two frames with one frame around 3 ms (>frame rate) from the ground measurement. First GLM frame only had one lit-up pixel at least 30 km from the ground point. Last GLM frame had two closer pixels around 10-20 km from the ground point. But those pixels did not match.
- Both ENTLN and NLDN were able to pick up simultaneous strokes in the first frame. ENTLN detected all 12 strokes with one additional stroke not being caught on the frame. NLDN detected 11 out of 12 strokes with the additional one not on the frame. Good match was found both in time and space.



Click on [https://www.youtube.com/watch?v=ln\\_YJF58IWw](https://www.youtube.com/watch?v=ln_YJF58IWw) to see the video.

(Daile Zhang, CISESS, [dlzhang@umd.edu](mailto:dlzhang@umd.edu), Funding: GOES-R AWG, GOES-R PGRR, NOAA ROSES and CISESS Seed Grant.)

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**Visit to the Wallops Lightning Mapping Array (LMA) Station:** At 10:00 AM, August 25<sup>th</sup>, 2022, Dr. Guangyang Fang visited the Wallops LMA station at the Unmanned Aircraft Systems Test Site of the University of Maryland (UMD\_UAS) in California, MD to fix a GPS issue. This site is southeast of ESSIC, about 70 miles away. This site was reported to have a bad GPS connection. Since the computer still communicated with the GPS board, the issue was most likely a bad cable. After the inspection upon arriving at the site, Guangyang found that the GPS cable was cut off from the end, near the ground as seen in Figure 1.



*Figure 1. The Solar LMA and the damaged GPS coaxial cable at the UMD\_UAS site.*

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The connector to the LMA sensor was cut off and a short piece of cable after it was also cut off. It seemed that it was bitten by some animal such as a mouse. The GPS was replaced with a good spare and the station was functioning well again. Guangyang wrapped up the interface between the connector and the cable with electronic tape to make sure the same issue will not happen again. (*Guangyang Fang, CISESS, [gfang@umd.edu](mailto:gfang@umd.edu); Funding: GOES-R AWG & GOES-R PGRR*)

### **Partnerships**

**Daile Zhang Named to the Board of the African Centres for Lightning and Electromagnetics Network:** Daile Zhang was invited to serve on the Board of Directors and Executive Committee of the African Centres for Lightning and Electromagnetics Network (ACLENet). ACLENet is a not-for-profit organization with national centres in Africa registered as a non-governmental organizations (NGO) or companies limited by guarantee (i.e., non-profit organizations), dedicated to decreasing deaths, injuries and property damage from lightning in the pan-Africa area. (*Daile Zhang, CISESS, [dlzhang@umd.edu](mailto:dlzhang@umd.edu), Funding: GOES-R AWG, GOES-R PGRR, NOAA ROSES and CISESS Seed Grant.*)



### **Unique & Significant Reports**

**Quinyuan Zhang on the VIIRS Flood Inundation Maps for the 2022 Red River Flood:** CISESS Scientist Qingyuan Zhang has collaborated with NOAA's Sean Helfrich (STAR/SMCD) to explore and document the Red River flood in 2022. The Red River flows slowly northward from its source region in South Dakota/Minnesota to Canada. Daily mean temperatures in the Red River of the North throughout the winter and spring typically average 3°- 6°C cooler than those in the Red River of the South, remaining below freezing from late October to early April, then increasing to 7°- 8°C by the end of April/early May. The typical annual cycle in air temperature favors a South-to-North progression of the spring thaw, which is characterized by the melting of snow and river ice in the South during March while the downstream river channel remains frozen. These conditions favor flooding of the Red River and a backfill of the runoff into the river's tributaries. Massive flooding typically is observed during heavy snow years in which the thaw is delayed. Figure 1 reports the spatial and temporal dynamics of snow cover, river ice and flooding in the Red River from February through June in 2022 with VIIRS 5-day Flood Inundation Maps (FIM) products. The last heavy spring snow occurred during April 16 – 20. Massive flooding started to form in late April, stayed during May, and receded in early June.



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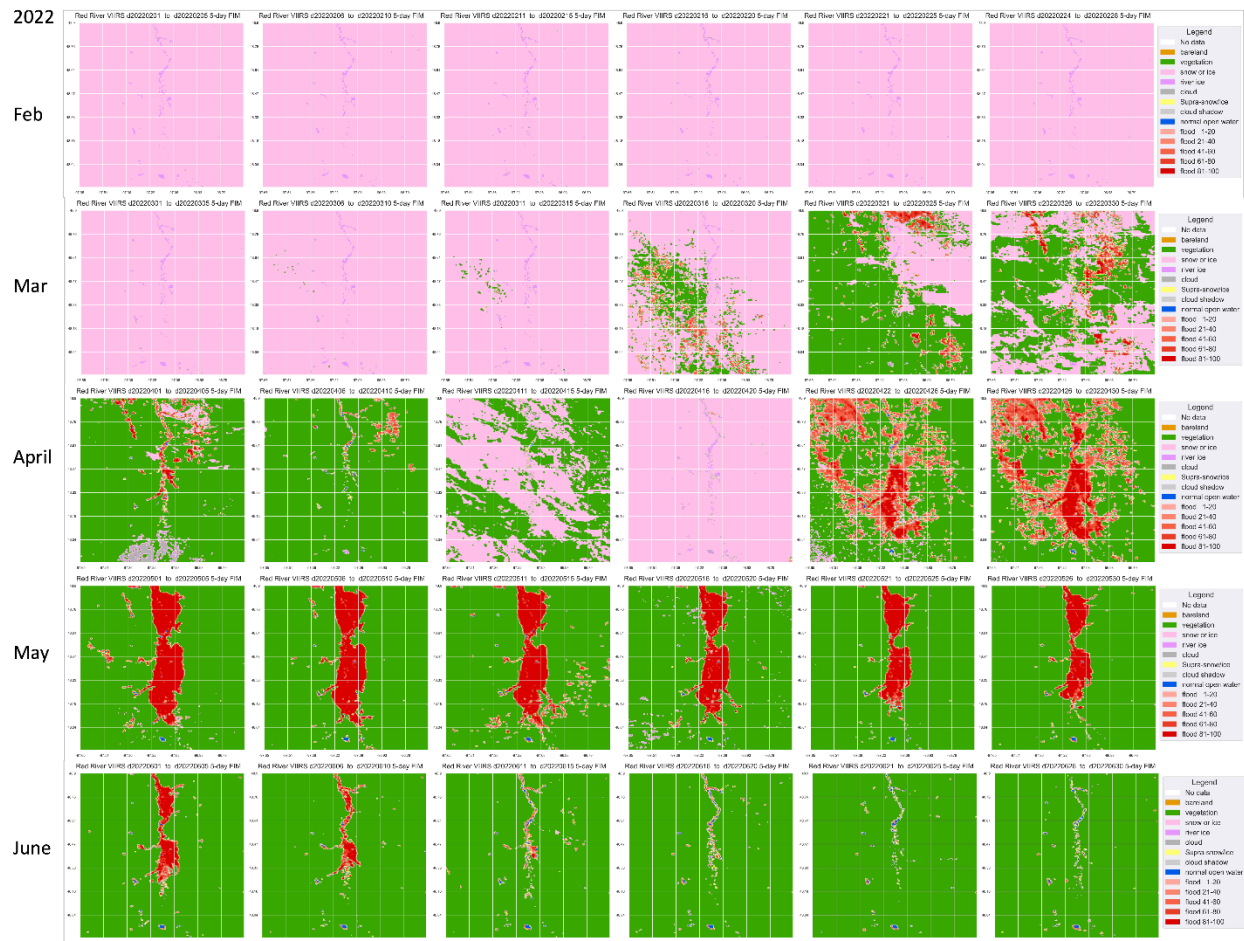


Figure: The Red River snow cover, river ice and flooding monitored with VIIRS 5-day Flood Inundation Maps (FIM) time series products from February through June in 2022. (POC: Qingyuan Zhang, [qyzhang@umd.edu](mailto:qyzhang@umd.edu), Funding: JSTAR & DRSA)

## TRAVEL AND MEETING REPORTS

**Fangfang Yu Presents at the 2022 SPIE Meeting:** CISESS Scientist Fangfang Yu from the STAR GOES-R cal/val support team attended the Earth Observing Systems XXVII Conference of the SPIE Optics + Photonics Meeting on 21–25 August 2022 in San Diego, CA. On 24 August 2022, she delivered an oral presentation, “On-orbit radiometric calibration performances of GOES-16/17 ABI IR channels”, co-authored with Xiangqian Wu (NOAA sponsor, STAR/SMCD/SCDAB), Hyeilm Yoo (CISESS) and Haifeng Qian (CISESS). This talk summarized the overall calibration and validation performances of the Advanced Baseline Imager (ABI) radiometric on-board the

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current in-orbit GOES-R satellites, including the major impacts of the calibration events on the ABI Infrared (IR) radiances. She also co-authored another presentation “Operational calibration of GOES ABI visible and near infrared channels,” given by Xiangqian Wu. These two papers comprised the session on GOES-R ABI Calibration at the conference.

**G16/17/18 IR Accuracy**

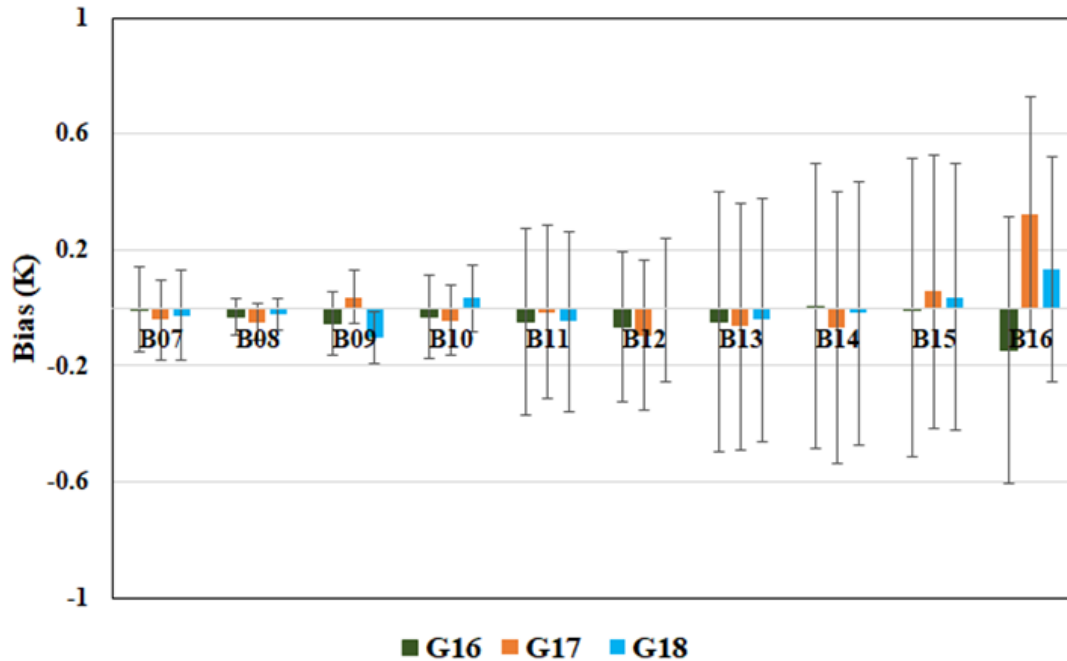


Figure: The IR radiance at stable detector temperatures from the three ABI instruments on-board GOES-16/17/18 satellites are all well calibrated, when compared to the reference hyperspectral measurements. (Fangfang Yu, CISESS & STAR/SMCD/SCDAB, [fangfang.yu@noaa.gov](mailto:fangfang.yu@noaa.gov), Funding: GOES-R PGRR & STAR).