Weekly Report – May 02, 2025

Cooperative Institute for Satellite Earth System Studies (CISESS)

NOAA/NESDIS/STAR

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TRAINING AND EDUCATION

CISESS Highlights Some of its Research Through Fun Activities on Maryland Day

On 26 April, the University of Maryland in College Park welcomed the public to its springtime open house. Undeterred by morning rain showers, people showed up to experience what the campus, including ESSIC/CISESS, had to offer. Aside from the Climate Resilience Network's presence, a new addition to the ESSIC/CISESS display was a children's robotics team that CISESS Scientist Jifu Yin works with. These talented sixth-grade students showed the portable instrument they built as an early warning system for water quality, fielding questions from the public in a manner beyond their years.

Of note, the Dean of the university's College of Computer, Mathematical, and Natural Sciences, who was visiting the displays of different departments in the college, stopped by the ESSIC section of the Earth Sciences tent to check out the virtual reality (VR) lightning exhibit staffed by CISESS scientists and interns. Even though he was on a tight schedule, the dean spent extra time with the group, playing the VR lightning game, noting how impressive and immersive it was. Overall, CISESS succeeded in introducing some of the cool research conducted by its scientists, delighting the public along the way.

Figure: (Left) Dean Amitabh Varshney (center) surrounded by (from left to right), Joseph Patton, CISESS Intern Damian Figueroa, Guangyang Fang, and ESSIC MD Day organizer Cazzy Medley.

Photo credit: John Xun Yang. (Right) Damian instructing Dean Varshney on how to play the VR lightning game. Photo credit: Guangyang Fang.

(Jifu Yin, CISESS, jifu.yin@noaa.gov, Funding: EPIC, JSTAR GCOM; Guangyang Fang, CISESS, gfang@umd.edu, Funding: GOES-R AWG, GOES-R PGRR; Joseph Patton, CISESS, jpatton4@umd.edu, Funding: GEO-XO, GOES-R AWG, GOES-R PGRR)

SOCIAL MEDIA AND BLOG POSTS

Flash Flooding Sweeps Across Central U.S.
It was a rainy Easter weekend this year for the Southern Plains and Mississippi Valley, pummeled by storms that led to bouts of flash flooding, reported Chris Smith, CISESS Satellite Liaison to the National Weather Service Weather and Ocean Prediction Centers and contributor to the Satellite Liaison Blog. Round after round of convective activity popped up along the cold front from the morning of 19 April to 21 April as it moved across Texas into Oklahoma and central Mississippi Valley, captured by GOES-East Clear-IR Longwave Window Band imagery. The Geostationary Lightning Mapper also detected extremely high flash extent densities. During this period, 41 flash flood warnings were issued from Texas to the Middle Mississippi Valley and up to 10 inches of rain fell across northern Texas.

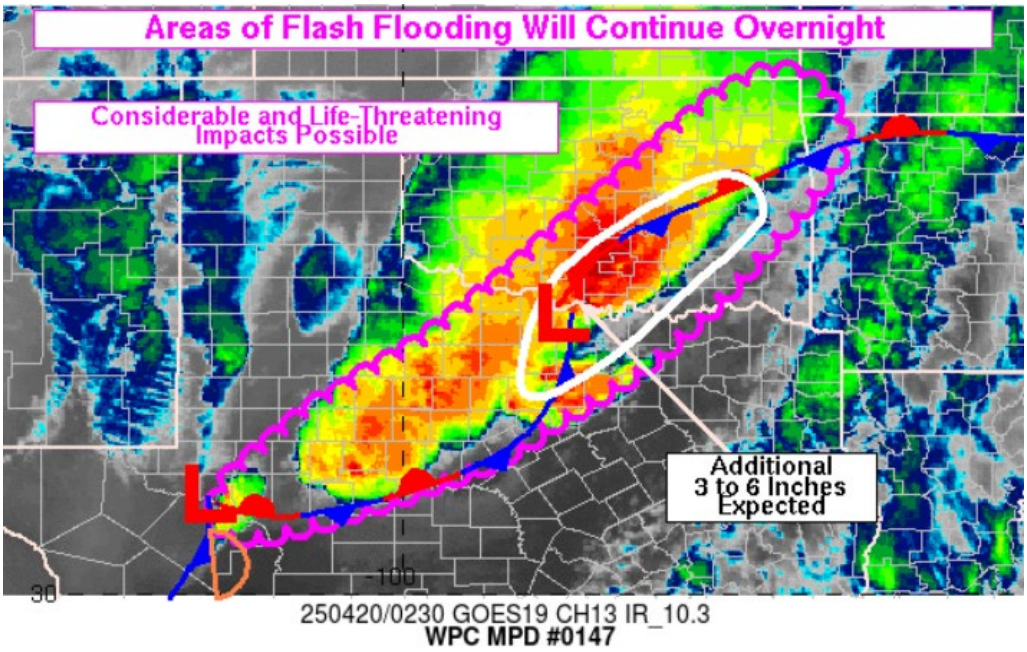

Figure: Mesoscale Precipitation Discussion (MPD) valid for 0230 UTC on 20 April, overlaid on GOES-East Clean-IR Longwave Window Band imagery. Shown are areas of northern Texas into southeastern Oklahoma.

(Christopher Smith, CISESS, csmith70@umd.edu; Funding: JPSS PGRR)

PUBLICATIONS

Assessing SNPP-VIIRS Cloud Boundaries

Citation: Liu, Qian, Xianjun Hao, Cheng-Zhi Zou, **Likun Wang**, John J. Qu, and Banghua Yan, 2025: A preliminary assessment of the VIIRS cloud top and base height environmental data record reprocessing. *Remote Sens.*, 17, 1036, https://doi.org/10.3390/rs17061036.

Summary: The Visible Infrared Imaging Radiometer Suite (VIIRS) onboard the Suomi National Polar-orbiting Partnership (SNPP) satellite has been continuously providing various global environmental data records (EDRs) of cloud properties, as well as other environmental parameters, since its launch in October 2011. Among all the cloud properties, the accuracies and performances of both cloud top and base heights (CTH and CBH, respectively) are critical for climate studies. The latest algorithms generating VIIRS CTH/CBH EDRs (Version 3.2) have never been comprehensively assessed since their implementation in the spring of 2023. CISESS Scientist Likun Wang and colleagues provide such an assessment for the period October 2018 to June 2019 in their paper published in the journal *Remote Sensing*. CTH and CBH EDRs were generated using the latest algorithms and compared with operational EDRs of the same generated from Version 2 algorithms. All cloud-boundary products were finally compared with those retrieved from CloudSat's cloud profiling radar and Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations (CALIPSO). Wang reports that reprocessed CTH and CBH EDRs agree well with CloudSat-CALIPSO retrievals, suggesting that the latest SNPP-VIIRS algorithms are an improvement over their older counterparts. This is also suggested by the ability of the newer algorithm to capture CTHs exceeding 15 km, which the older-version algorithm cannot do.

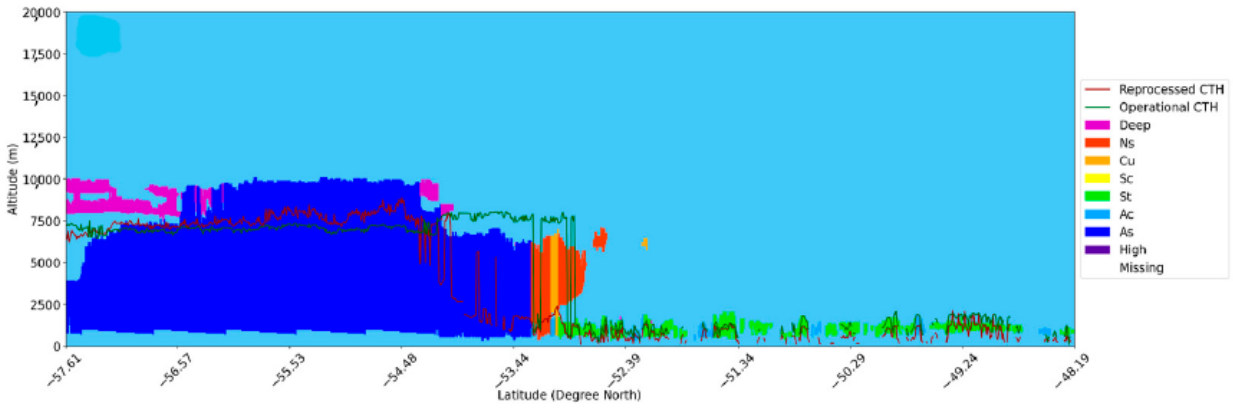

Figure: Comparison of cloud-top heights (CTHs). Green and red solid lines are operational and reprocessed CTHs, respectively. Color-coded cloud types from CloudSat-CALIPSO are shown in the background.

(Likun Wang, CISESS, likun.wang@noaa.gov; Funding: JPSS PGRR, JSTAR)

Other

CISESS Seed Project: Enhancing Water Quality Predictions in NOAA's NextGen Framework
Water quality is an important indicator of the health of water sources critical to human health and the environment. Stream water temperature is an important aspect to consider when assessing water quality because it affects aquatic ecosystem dynamics. CISESS Scientist Nigus Melaku has developed an advanced stream water temperature model with the goal of improving predictions of water quality dynamics across U.S. river basins. In another of CISESS's Seed Projects, Melaku plans to develop an interface integrating this model into NOAA's Next Generation Water Resources Modeling Framework. Down the line, this will offer better guidance for water resource managers.

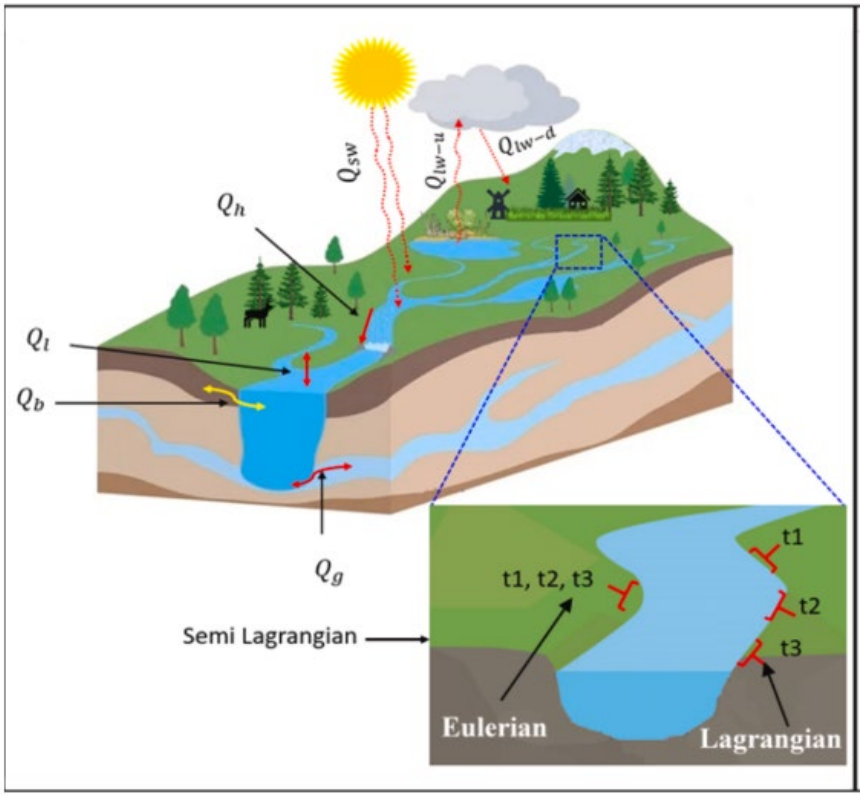

Figure: Conceptual framework of the stream water temperature model.

(Nigus Melaku, CISESS, nmelaku@umd.edu, Funding: JSTAR)

(Maureen Cribb, CISESS, mcribb@umd.edu, Funding: CISESS Task I)