Weekly Report

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

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Prepared by: Debra Baker
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Products and Applications

Accelerate the Exploitation of Satellite Observations to Improve Flood and Inundation Monitoring and Forecasts: CISESS Scientists **Qingyuan Zhang** and **Frank Monaldo** have been working on merging optical and SAR flood and inundation mapping (FIM) products. Optical FIM products include VIIRS flood products, GOES ABI and Himawari AHI flood products. SAR FIM products include Sentinel-1 A/B. Zhang has worked out approaches to rearrange newly released input files to make VIIRS FIM algorithm work on in-house CISESS machines so that retrospective flood cases can be used by the project team. Zhang has also developed a MATLAB software to merge VIIRS FIM products from different swaths and/or different days. Monaldo has updated an important aspect of the SAR Ocean Products System (SAROPS) that SAR imagery from whatever source is converted to a common format. Figure 1 shows "normal water" map of a 2° by 2° study area for the Cedar Rapids flood event in Iowa in 2016. Figure 2 displays "WaterDetection" and water fraction maps of the study area for this flood event on 9/27/2016. VIIRS FIM products work well with cloud-free observations.

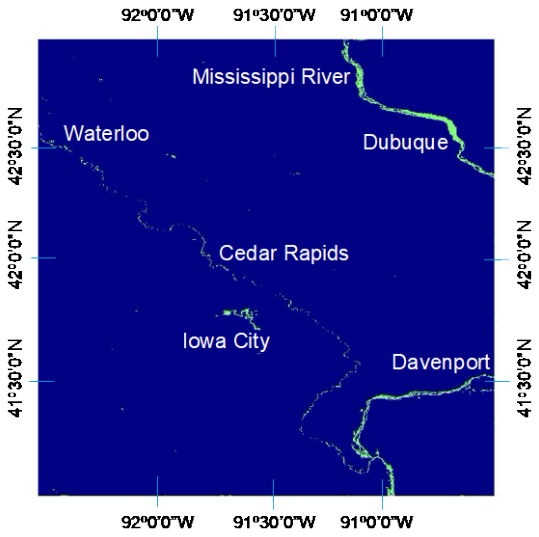


Figure 1. Normal water map of a 2° by 2° study area of the Cedar Rapids flood event in Iowa in 2006.

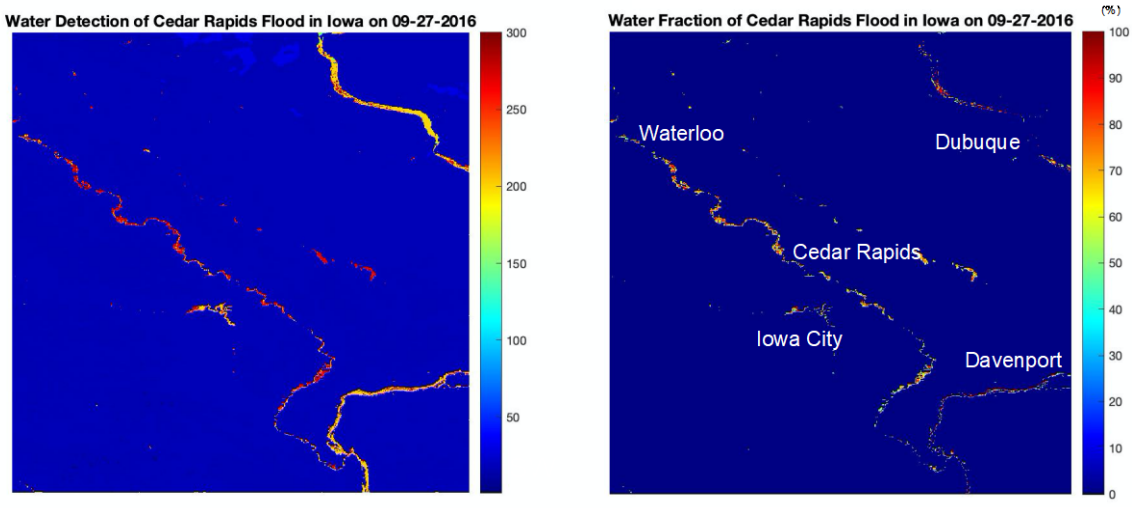
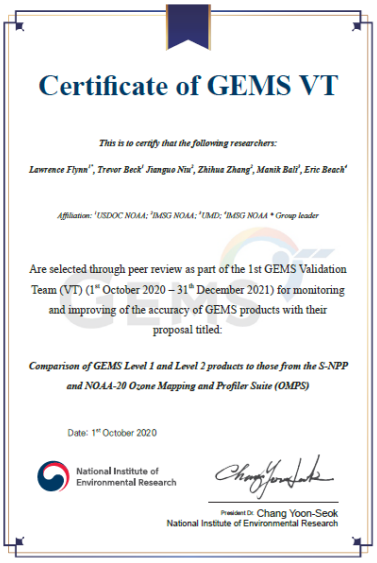


Figure 2. VIIRS Retrievals of "WaterDetection" and water fraction of the Cedar Rapids flood event in Iowa on 9/27/2006.

(POC: Qingyuan Zhang, gyzhang@umd.edu, Funding: NOAA Disaster Supplemental: Improving Forecasting of Hurricanes, Floods, and Wildfires) Hurricanes, Floods, and Wildfires)

GEMS Validation Team: GEMS (Geostationary Environment Monitoring Spectrometer) is a Korean geostationary satellite that aims to take observations of the earth in ultraviolet (UV) wavelengths. The GEMS Satellite is unique because it will be the first geostationary satellite taking measurements of the Earth in the UV. CISESS Scientist **Manik Bali** has been selected for the validation team. As a member of the GEMS validation team, he will support NOAA and its international partners in improving the accuracy of GEMS products by comparing UV measurements with J1 and SNPP crossovers. For more information on GEMS, see http://gems1.yonsei.ac.kr/sub01/sub01.php


Certificate of GEMS VT

This is to certify that the following researchers:

Lawrence Flynn[1*], Trevor Beck[1], Jianguo Niu[2], Zhihua Zhang[2], Manik Bali[3], Eric Beach[1]

Affiliation: [1]USDOC NOAA; [2]IMSG NOAA; [3]UMD; [*]IMSG NOAA * Group leader

Are selected through peer review as part of the 1st GEMS Validation Team (VT) (1st October 2020 – 31st December 2021) for monitoring and improving of the accuracy of GEMS products with their proposal titled:

Comparison of GEMS Level 1 and Level 2 products to those from the S-NPP and NOAA-20 Ozone Mapping and Profiler Suite (OMPS)

Date: 1st October 2020

National Institute of Environmental Research

President Dr. Chang Yoon-Seok
National Institute of Environmental Research

(POC: Manik Bali, manik.bali@noaa.gov, Funding: JPSS PGRR)

Publications

Adding GPM GMI Data to the Snowfall Rate Product: CISESS Scientist **Cezar Kongoli, Huan Meng, CISESS Scientist Jun Dong and Ralph Ferraro** published a new article in the October-2 2020 issue of *Remote Sensing*. The published article explores the capability of dual polarization high frequency measurements by Global Precipitation Mission (GPM) Global Microwave Imager (GMI) for snowfall detection over land. In this new investigation, the authors found that the

vertical and horizontal polarization differences at GMI 166 GHz and 89 GHz, not available in AMSU and ATMS, contain unique information relative to single channel measurements at these frequencies. In addition, they found that these indices are important predictors in snowfall detection algorithms, filling a research gap with implications for the improved utilization of remote sensing data from this type of satellite instruments. The GMI snowfall detection is a major component of the GMI snowfall rate (SFR) algorithm. Effort is ongoing to further develop GMI SFR so it can be transitioned to operation.

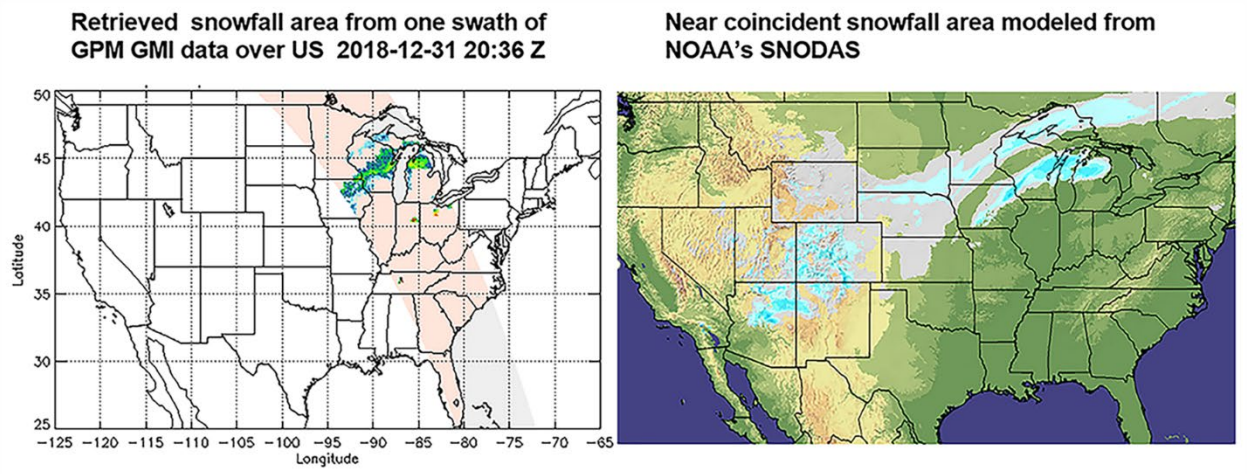


Figure: Comparison of GMI snowfall area compared to in-situ snow observations.

Cezar Kongoli, Huan Meng, Jun Dong and **Ralph Ferraro**, 2020: Ground-based Assessment of Snowfall Detection over Land Using Polarimetric High Frequency Microwave Measurements. *Remote Sens.* 2020, **12**(20), 3441; https://doi.org/10.3390/rs12203441.

(POC: Cezar Kongoli; cezar.kongoli@noaa.gov; Funding: JSTAR, PSDI JSTAR)

Workshops, Conferences, and Meetings

NWS User Forum for EUMETSAT Polar System – Second Generation (EPS-SG): With the EUMETSAT EPS-SG program preparing to launch its first polar-orbiting-couple in 2023 and 2024, the NWS Office of Observations and STAR science teams held a series of meetings to discuss the content and format of future NOAA-supported EPS-SG products. A week-long event (October 8th through October 16th) provided an opportunity to NESDIS scientists to exchange communication with representatives from NWS offices, and discuss users' needs and preferences for accessing the satellite products in operational environment. CISESS Scientist **Veljko Petkovic** and Ralph Ferraro, the leads of EPS-SG Microwave Imager (MWI) algorithm team, presented the capabilities, expected algorithm performance and objectives relevant for a successful implementation of ten Microwave Imager products. Users have expressed high interest in MWI Imagery, total precipitable water, cloud liquid water, precipitation rate/type, sea surface winds, snow cover/depth, snow water equivalent, sea ice, and snowfall rate products over various spatial and temporal scales, highlighting the benefits from sensors' ability

to fill the existing gaps and complement JPSS and GOES observations. Members of Ocean Prediction Center, National Hurricane Center, Aviation Weather Center, Storm Prediction Center, and NWS Alaska and Pacific region offices provided a valuable input on prioritization and potential improvements of EPS-SG MWI products. The outcome of this unique meeting will be communicated with our European partners and serve as a guidance in the preparation process for successful delivery of day-1 products by STAR.

(POC: Veljko Petokvic, Veljko.Petkovic@noaa.gov ; Funding: OSAAP/EPS-SG)

(Left) EUMETSAT-Second Generation satellite B platform, which will have a 835-km-altitude sun-synchronous 9:30 am orbit; life expectancy 2024 through 2045; (Right) EPS-GS Microwave Imager (MWI) to be on board of all three B platforms providing imagery at 26-channels (19 GHz – 183 GHz) over a ~1650 km wide swath.