Weekly Report

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

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Products and Applications

Using Satellites to Improve Flood Monitoring and Forecasts: CISESS Scientist Qingyuan Zhang has utilized the Matlab software he developed to produce daily VIIRS water fraction products with ~~JPSS~~NOAA-20-VIIRS and NPP-VIIRS images. Zhang has produced the daily VIIRS water fraction products for the Missouri River flood event along the western Iowa border from 3/16/2019 to 4/19/2019. Figure 1 shows the event study area. Figure 2 displays "WaterDetection" and water fraction maps of the study area for this flood event on 3/20/2019. Two formats of the water fraction products are available: ASIIC and Geotiff. The VIIRS products for the Missouri River flood event in 2019 have been delivered to the Florida Institute of Technology (FIT) team.

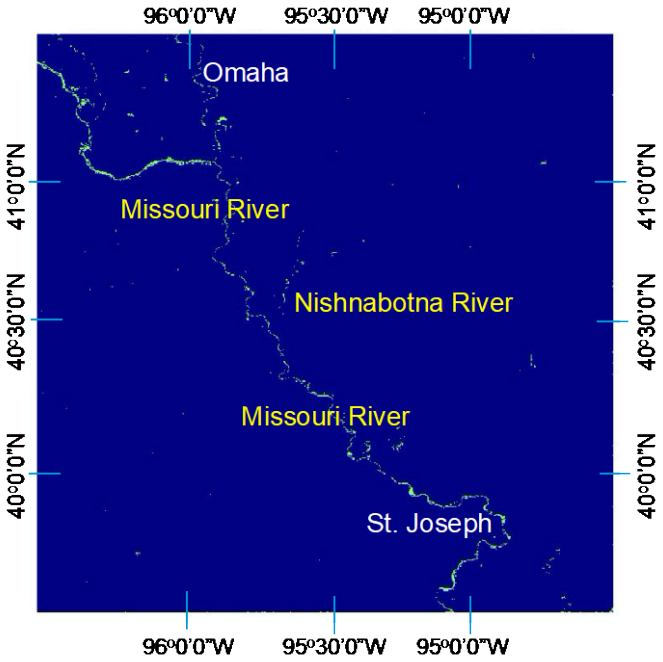
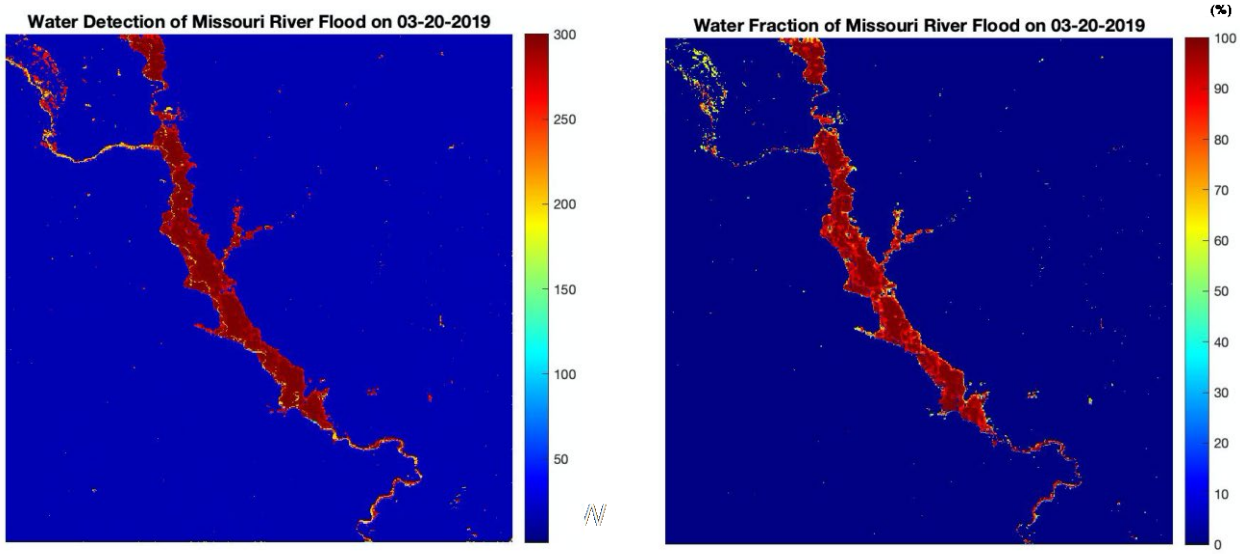


Figure 1. Normal water map of a 2º by 2º study area of the Missouri River flood event in 2019



WaterDetection Water Fraction

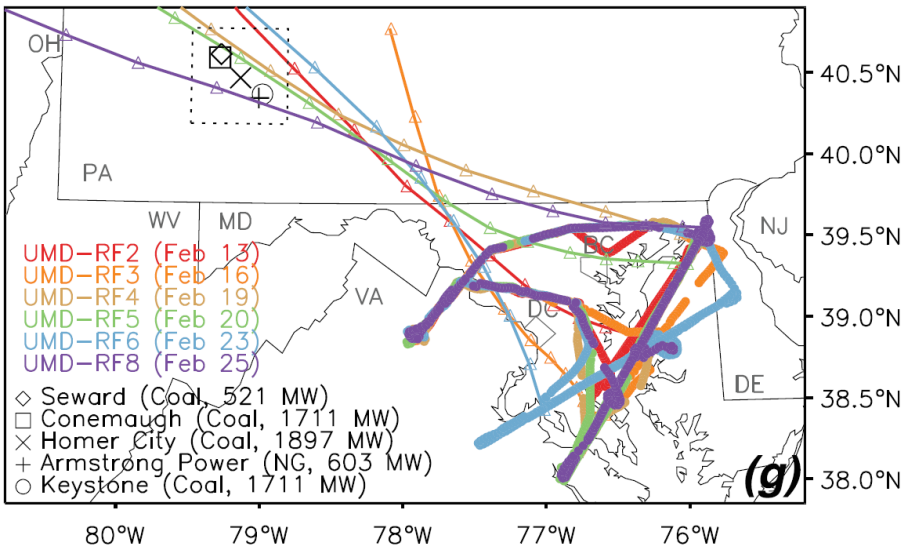
Figure 2. VIIRS Retrievals of "WaterDetection" and water fraction of the Missouri River flood event on 3/20/2019

(POC: Qingyuan Zhang, qyzhang@umd.edu, Funding: Disaster Supplemental)

Training and Education

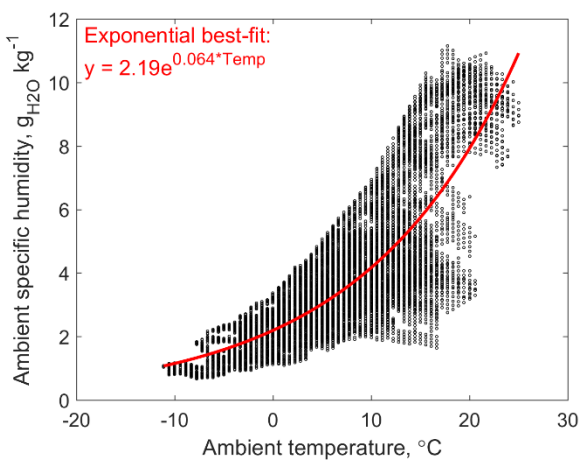
CISESS Graduate Student Publications: CISESS Scientists Xinrong Ren of the Air Resources Laboratory and Russell Dickerson of the Department of Atmospheric and Oceanic Sciences have been jointly advising graduate students Sarah Benish, Dolly Hall, and Doyeon Ayn. All three have recent articles about their research:

- **Doyeon Ayn** reports the results of flight data and HYSPLITT model analyses on emissions of sulfur dioxide and carbon dioxide in the Baltimore MD-Washington DC area. **Ahn, D. Y.**, Hansford, J. R., Howe, S. T., **Ren, X. R., Salawitch, R. J**., Zeng, N., … and **R. R. Dickerson**, 2020: Fluxes of atmospheric greenhouse-gases in Maryland (FLAGG-MD): Emissions of carbon dioxide in the Baltimore, MD-Washington, D.C. area. Journal of Geophysical Research: Atmospheres, **125**, e2019JD032004, https://doi.org/10.1029/2019JD032004.



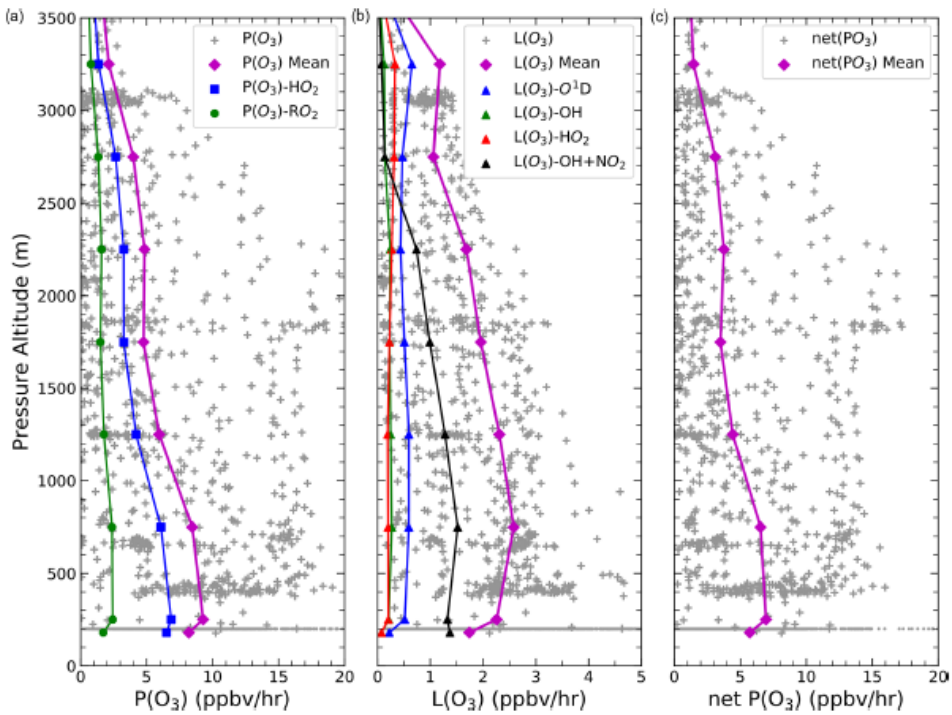
This figure shows HYSPLIT back trajectories of SO_2 from the six flights to the locations of five major power plants in Pennsylvania. The names of power plants, fuel, and their nameplate capacity are shown at the left-bottom corner (source: USEIA, 2016)

- **Dolly Hall** did research on the impact of vehicle emissions of nitrogen oxides (NOx) and carbon monoxide on ambient temperatures and specific humidity. **Dolly L. Hall**, Daniel C. Anderson, Cory R. Martin, **Xinrong Ren, Ross J. Salawitch**, Hao He, **Timothy P. Canty**, Jennifer C. Hains, **Russell R. Dickerson**, 2020: Using near-road observations of CO, NOy, and CO_2 to investigate emissions from vehicles: Evidence for an impact of ambient temperature and specific humidity, *Atmos. Environ.*, **232**, 117558, https://doi.org/10.1016/j.atmosenv.2020.117558.



This figure shows the correlation between observed ambient temperature and specific humidity observations collected at the I-95 Near-Road site in Howard County, MD. The red line represents an exponential best-fit to the one-minute measurements.

- **Sarah Benish** has the most recent article, published last month, in which she used aircraft observations over the North China Plain to analyze the interaction of NOx, volatile organic chemicals (VOCs) and ozone. **Benish, Sarah E.**, Hao He, **Xinrong Ren**, Sandra J. Roberts, **Ross J. Salawitch**, **Zhanqing Li**, Fei Wang, Yuying Wang, Fang Zhang, Min Shao, Sihua Lu, and **Russell R. Dickerson**, 2020: Measurement report: Aircraft observations of ozone, nitrogen oxides, and volatile organic compounds over Hebei Province, China. *Atmos. Chem. Phys.*, **20**, 14523–14545, https://doi.org/10.5194/acp-20-14523-2020.



This figure showns the ozone (a) production rate; (b) loss rate; and (c) net production during the Air chemistry Research in Asia (ARIAs) campaign.

Although Xinrong Ren left CISESS last summer to become a federal ARL scientists, he will continue his work with students.

(POC: Russ Dickerson, rrd@umd.edu, Funding: ARL)