Products and Applications

Accelerate the Exploitation of Satellite Observations to Improve Flood and Inundation Monitoring and Forecasts: CISESS Scientist Qingyuan Zhang (STAR/CoRP/SCSB) has developed a Matlab software package to produce daily VIIRS water fraction products with NOAA20-VIIRS and S-NPP-VIIRS images. Zhang and the Florida Institute of Technology (FIT) validation team have discussed the framework for validation and evaluation of the VIIRS daily water fraction products and determined that Geotiff format is workable to easily compare Landsat/Sentinel products and VIIRS products. Zhang has produced the daily VIIRS water fraction products for the Cedar Rapids flood event in Iowa from 9/23/2016 to 10/7/2016. Figure 1 shows the event study area. Two formats are available: ASCII and Geotiff. The VIIRS products for the Cedar Rapids flood event in 2016 have been delivered to the FIT team. Figure 2 exhibits temporal and spatial evolution of flood extent during this event with VIIRS products on 9/26, 9/27, 9/29, 10/5, and 10/7 in 2016.
Figure 2 (cont.) VIIRS daily water fraction (%) of the Cedar Rapids flood event in Iowa on 9/27/2016 (top left), 9/29/2016 (top right), 10/5/2016 (bottom left) and 10/7/2016 (bottom right).

(POC: Qingyuan Zhang, qyzhang@umd.edu, Funding: FY19 Disaster Supplemental)

Microwave Surface and Precipitation Products (MSPPS) Retirement: The MSPPS, the cornerstone of hydrologic products from the AMSU and MHS sensors since 1998, was approved for NESDIS retirement in February 2021. The Microwave Integrated Retrieval System (MiRS) is now providing similar products at higher spatial resolution and accuracy, which makes MSPPS obsolete. Additionally, MiRS generates products from a larger array of satellites and sensors than MSPPS. The retirement has been in the works for several years. It is important to note the contributions of several members of the original MSPPS, including R. Ferraro, H. Meng, C-Z. Zou, L. Zhao, C. Kongoli, I. Guch and A. Irving, as well as former NESDIS scientists, N. Grody and F. Weng.
Publications

**Radiometric Calibration of NOAA-20 VIIRS**: CISESS Scientists Wenhui Wang, Sirish Uprety and Xi Shao (STAR/SMCD/SCDAB) have a new article in the November 2020 issue of *IEEE Transactions on Geoscience and Remote Sensing* documenting two years of radiometric calibration of the NOAA-20/JPSS Visible/Infrared Imager Radiometer Suite (VIIRS). VIIRS has 14 reflective solar bands (RSBs) covering a spectral range of 0.41–2.3 μm (see Figure). The primary source of RSB calibration is the solar diffuser (SD), and the time-dependent SD degradation is monitored by the SD stability monitor (SDSM). The initial instability of the SD degradation (H-factor) was resolved by updating SDSM sun screen transmittance function combining yaw maneuver data and on-orbit SDSM data sets. After the H-factor improvements, the VIIRS RSB calibration coefficients (F-factors) are updated and applied to the operational Sensor Data Record (SDR) product generation. To validate the SD F-factors, the lunar F-factors are calculated by using a lunar irradiance model and comparing the trend differences between them. Over the two years of operation, decreasing trends have been calculated with the SD F-factors, whereas constant lunar F-factors were observed in bands M1–M4. With these discrepancies, the operational F-factors remained unchanged since April 2018 because the deep convective cloud (DCC) and cross-calibration comparison results did not show any further degradations in these bands. All the possible radiometric calibration sources, such as SD and lunar F-factors, DCC

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*POC: Ralph Ferraro, Ralph.R.Ferraro@noaa.gov, Funding: PSDI and PDRA*
trends, and cross-calibration results, are monitored, compared, and applied by the NOAA VIIRS SDR science team for the best quality of the VIIRS SDR product.

Figure: NOAA-20 VIIRS relative spectral response function plot.


(POC: Wenhui Wang, wenhui.wang@noaa.gov, Funding: JSTAR)