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Extending the Operational Benefit of the NOAA Integrated Calibration and Validation System

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The quality of satellite radiances is essential for direct radiance assimilation in numerical weather prediction, for retrievals of various geophysical parameters, for climate trending studies, and, ultimately, the quality of weather forecasts. It is also a measure of the success of the engineering and science efforts of our operational satellite system. However, past efforts in post launch calibration/validation took a piecemeal approach, focusing on onboard calibration, with much less attention paid to the quality of radiance data of earth observations. Many instrument related artifacts were left to the users to discover, and evaluate the impacts. The lack of on-orbit calibration standard and methodology for radiance verification also aggravated the problem. In order to meet the challenge of the increasing demand for better satellite data quality, an integrated system that incorporates prelaunch, postlaunch onboard and vicarious, and long-term monitoring, as well as forward calculation of radiance, was needed.

An Integrated Calibration and Validation System (ICVS), developed by NOAA's Center for Satellite Application and Research (STAR), first and foremost, provides real time environmental satellite health status/Instrument performance and data product quality monitoring. It also provides support and reference for NOAA environmental satellite anomaly trouble shooting, satellite long term trending monitoring, and satellite products visualization. This has resulted in satellite observations that are intercomparable and tied to international standards for weather, climate, ocean and other environmental applications.

In 2015 NOAA STAR started exploring use of advanced image processing software and techniques to provide an event-based new capability, building on the successful ICVS developed for the satellite research and operational communities, which would enable a suitable prototype of environmental products to be tested in research and operational environments. These blended and fused satellite-derived products would help forecasters by providing information and imagery for significant weather events (e.g., hurricane tracking

and monitoring; snow and ice cover detection); delivering accurate products for weather forecasts (e.g., convective and severe weather and lightning potential using thicker vs thinner clouds) and environmental monitoring (e.g., using the day-night band to detect snow from clouds); and maintaining the integrity of the climate data records from broader satellite instruments. This presentation will provide an assessment of progress and future plans.