

Title: Recent Improvements in S-NPP VIIRS DNB calibration

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### **Abstract**

The Visible Infrared Imaging Radiometer Suite (VIIRS) onboard Suomi-NPP is equipped with a Day/Night Band (DNB), a major advancement in nighttime imaging capability as compared to the heritage Operational Linescan System (OLS) onboard Defense Meteorological Satellite Program (DMSP). DNB data quality has been largely improved through a number of major calibration updates since early launch. One of the most recent improvements is in the DNB offset, computed using the pitch maneuver based deep space view that is free of airglow. DNB High Gain Stage (HGS) operational radiometric calibration involves estimation of dark offsets using the nighttime measurements over Pacific Ocean during new moon. However, the DNB detectors were found to be highly sensitive, enough to detect faint emission from airglow even during the new moon nights. Thus, the on orbit calculated dark offset is overestimated by an amount equivalent to that of airglow. This causes direct impact in calibrated data such that the radiance values are underestimated in the absolute scale. The impact is prominent at low light radiance. This study focuses on analyzing the airglow using DNB measurements. In addition, the impact on operational calibrated radiance product and how the absolute accuracy can be improved especially at low light radiance are also explored. Similarly, recent improvement in DNB straylight characterization algorithm will also be presented.