Use of VIIRS RSBAutoCal in Calibration Monitoring and Direct Readout Support

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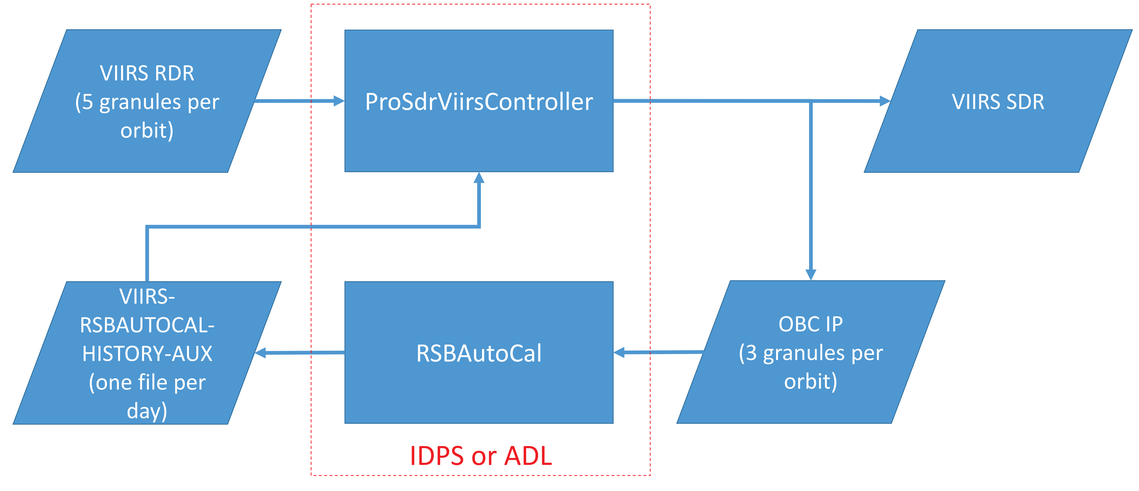
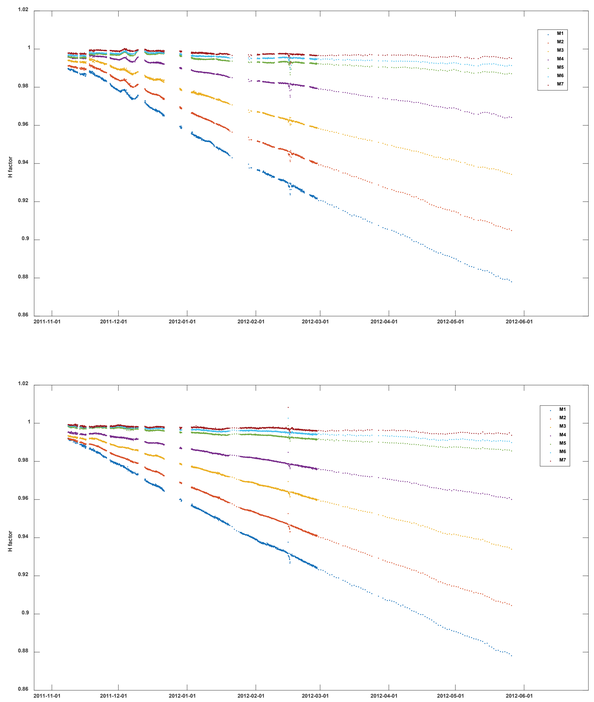
- An automated procedure, called RSBAutoCal, has been implemented in the operational IDPS (Interface Data Processing Segment) software to provide updates of the radiometric calibration coefficients for the VIIRS (Visible Infrared Imaging Radiometer Suite) reflective solar bands
- RSBAutoCal is also included in the ADL (Algorithm Development Library) software that can be executed outside of the IDPS system
- While RSBAutoCal executed in IDPS is still undergoing temporal filter optimization, ADL has enabled us to use RSBAutoCal to derive the calibration coefficients without any filtering
- The coefficients are generated from onboard solar diffuser measurements that are conducted near the South Pole once per orbit, but data from multiple orbits are aggregated before a new set of the coefficients is created and subsequently implemented in the operational IDPS processing
- RSBAutoCal executed separately without the temporal filter allows analysis of the calibration coefficients calculated for each orbit
- Calibration coefficients derived by us using RSBAutoCal for the period preceding full RSBAutoCal activation in IDPS can be provided to the Direct Readout users for consistent processing of their VIIRS data products (with the temporal filtering applied in the RSBAutoCal calculations)

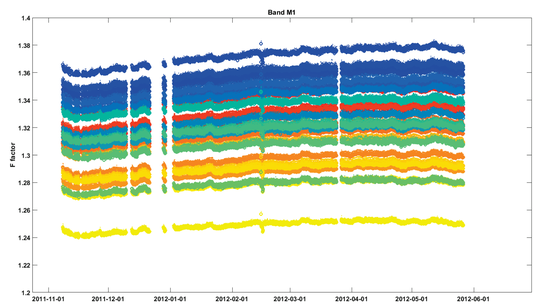


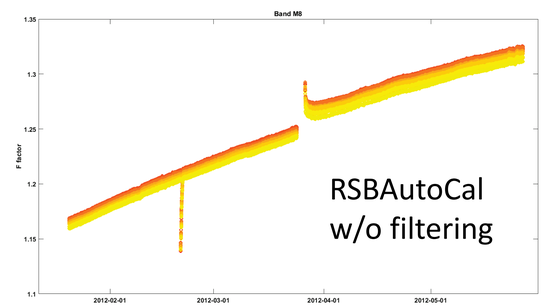
Flowchart of the VIIRS Solar Calibration Processing

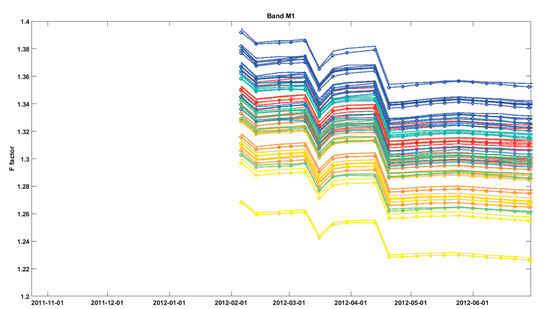


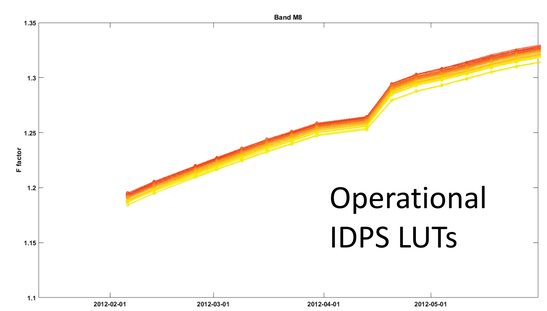
Degradation of the VIIRS Solar Diffuser reflectance (H factor) as measured by the Solar Diffuser Stability Monitor (SDSM) and analyzed with the previous (top graph) and current (bottom graph) sets of processing parameters in RSBAutoCal (including solar vector correction)

- We have compared time series of the RSBAutoCal coefficients with those generated offline and applied in the operational VIIRS SDR (Sensor Data Record) production
- Radiometric calibration scaling coefficients (F factors) calculated with RSBAutoCal in ADL (top graphs) extend to the beginning of the Suomi NPP mission before the operational lookup tables (LUTs) were created for the SDR production in IDPS (bottom graphs)
- RSBAutoCal F factors show that VIIRS performance was more stable than what was reflected in the operational LUTs at that time

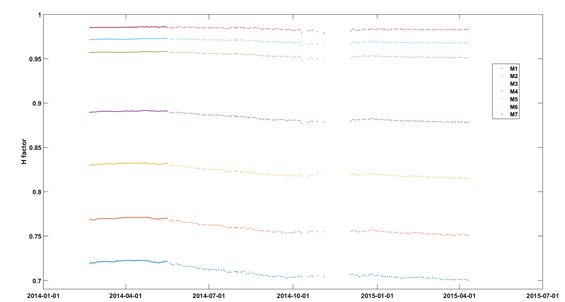


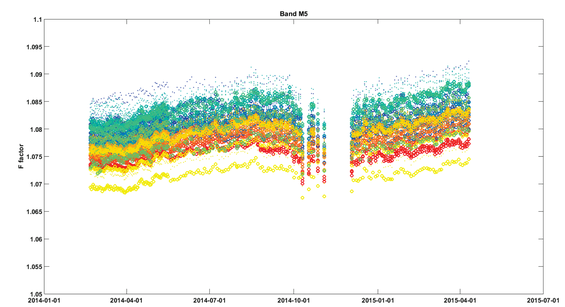


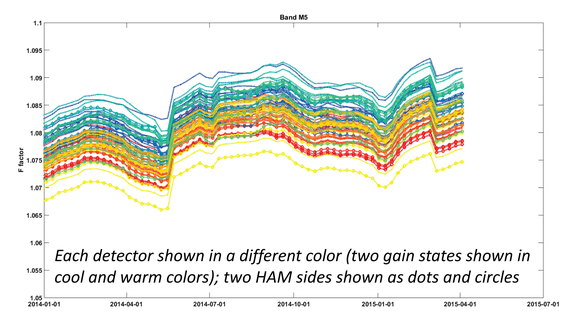




SDSM anomalies in 2014







Each detector shown in a different color (two gain states shown in cool and warm colors); two HAM sides shown as dots and circles