VIIRS Aerosol EDR
Validation Stage 1
May 2014
DISCREPANCY REPORTS

Closed Critical DRs

ADR Title	Aerosol retrieval anomaly following Mx6.3/6.4 transition		
ADR4962	Submit Date: 2012-10-19	PCR32735	Status: Closed
ADR Description	Following the recent Mx6.3/6.4 transition, VIIRS Aerosol EDR and IP values are showing up even for confidently cloudy areas (as determined by the VCM) where there should not be aerosol retrievals. The VCM input appears to be correct. However, the AOT IP Cloud Confidence Flag reports 'Confidently Clear' where the VCM says "Confidently Cloudy". As a result, aerosol retrievals are performed for much of the cloudy areas leading to increased AOT values.		
Note	Fix was implemented in Mx6.5 on 2012-11-27.		

ADR Title	Update spectral reflectance ratios for land inversion		
ADR4989	Submit Date: 2012-11-27	474-CCR-12-0788	Status: Closed
ADR Description	The pre-launch spectral reflectance ratios used in the land inversion were generated using MODIS /AERONET match-up data. These spectral reflectance ratios have been regenerated using VIIRS / AERONET match-up data. Reprocessing VIIRS data using the updated coefficients shows improvement versus AERONET in-situ measurements of AOT. The operational processing coefficients should be updated to use these new values.		
Note	New PCT of spectral reflectance ratios went into operation on 2013-01-22.		

Other closed DRs (1)

ADR Title	Aerosol inversion failure for a single pixel should not cause a granule failure		
ADR4889	Submit Date: 2012-09-04	PCR32259	Status: Closed
ADR Description	There are numerous reasons for an individual pixel inversion to fail in the main pixel loop of the VIIRS Aerosol algorithm. Error trapping has been implemented to avoid segmentation faults; however, the logic in the main pixel loop is incorrect and returns PRO_FAIL from the main program under certain error conditions. If an individual pixel inversion fails, that pixels should have all output values set to fill, the overall quality set to not produced and then processing should continue with the next pixel.		
Note	The fix is in Mx7.1 build with TTO 2013-07-10.		

ADR Title	Inconsistent Low Sun Quality Flags between aerosol IP and EDR products		
ADR4975	Submit Date: 2012-10-31	PCR33470	Status: Closed
ADR Description	When the two aerosol EDR low sun quality flags are compared against the aerosol IP day/night quality flag, there are data patches where the quality flags are not set correctly or consistently to the aerosol IP day/night flag. Investigation indicated that such inconsistency is due to the aerosol EDR low sun quality flags are set within the land/ocean aerosol retrieval determination loop. Therefore, for any EDR pixels that are not going to have aerosol retrievals because they are not land or ocean dominated, the corresponding aerosol EDR low sun quality flags will stay as the initial default values that may not be consistent to the aerosol IP day/night quality flag.		
Note	The fix is in Mx7.1 build with TTO 2013-07-10.		

Other closed DRs (2)

ADR Title	AOT IP does not contain proper fill at night in maneuver		
ADR5016	Submit Date: 2012-12-13	PCR32613 (rejected)	Status: Closed
ADR Description	AOT IP has incorrect fill in maneuver at night, but ok in day. RTN PCR Wording: In VIIRS Maneuver PROXY Dataset 4, Granule NPP001212109974, the Aerosol Optical Thickness IP (AOT IP) does not properly contain ELINT fill. This is a night granule and the product seems to contain proper ELINT fill in day granules. This was found in build 7.F.		
Note	Discussion Item on PCR32613 – Jeff Tate on 2013-04-25: PCR032613 - DR5016-Aerosol Optical Thickness IP (AOT IP) does not contain proper fill at night in maneuver. I worked with David James and ran 2 different maneuver night granules. Each run produced the correct ELINT fill values in the AOT IP product. This PCR may have been indirectly fixed by PCR034041. David agrees that we should reject this PCR.		
PCR	**Aerosol Optical Thickness IP Slant and Vertical are VDNE in the night scans only in Mode=BOTH granules**		
PCR34041	Submit Date: 2013-03-12	PCR34041	Status: Closed
Description	In Build Mx7.D (I1.5.07.D) with PCR026400, an Ellipsoid intersect problem was repaired. This appears to have broken AOT IP Slant and Vertical. Now in granules with Mode=Both (Day and Night sensor scans), the night scans are FILL. But, these scans should not be FILL, as it is shown in granules with Mode=Night, there is non-FILL in night scans. One notable element in "/vobs/PRO/EDR/VIIRS/aerosol/src/ProEdrViirsAerosol.cpp" that sets VDNE_FILL is that the code comment states "check for VDNE fill in the GEO", but then the logic immediately following checks "if (scanMode == NIGHT)". This occurs in 2 separate locations in the module.		
Note	The fix is in Mx7.1 build with TTO 2013-07-10.		

Other closed DRs (3)

ADR Title	Aerosol inversion over ocean should not use band M6 when saturation rollover is possible		
ADR7113	Submit Date: 2013-03-26	PCR34607	Status: Closed
ADR Description	VIIRS band M6 experiences rollover saturation at radiance levels consistent with bright Saharan dust plumes. The VIIRS Aerosol algorithm must be modified to check the VIIRS M6 SDR pixel level "Out of Range" quality flag and not use band M6 in the ocean inversion when the flag is set. Because the MODIS algorithm does not use the 746 nm band in its ocean inversion and pre-launch testing with MODIS data demonstrated good performance for the VIIRS without band M6, the quality of the retrieval will not be degraded when this condition occurs.		
Note	The fix is in Mx8.0 build with TTO 2013-11-14.		

ADR Title	Calculation of residual for band M7 is not skipped in over-ocean aerosol retrieval		
ADR7115	Submit Date: 2012-10-31	PCR33470	Status: Closed
ADR Description	In the calculation of residual over ocean the contribution of band M7 is meant to be ignored since the observed and calculated M7 reflectances are the same. However, in the current routine ProEdrViirsAerosol.cpp the caluclation is not skipped because the incorrect variable bandIdx is used to check if the current band is M7.		
Note	The fix is in Mx8.0 build with TTO 2013-11-14.		

Other closed DRs (4)

ADR Title	Coding error in VIIRS Aerosol algorithm land residual calculation		
ADR7297	Submit Date: 2013-07-23	PCR35724	Status: Closed
ADR Description	There is a coding error in function ChsMdlLand that causes the incorrect surface reflectance in band M5 to be used in the first three iterations of the residual calculation. This can result in a significant error in AOT when an incorrect aerosol model is selected as a result of the error in the residual calculation.		
Note	The fix is in Mx8.1/Mx8.2 build with TTO 2014-02-20.		

ADR Title	VIIRS Suspended Matter EDR not compliant with EDRPR		
ADR7049	Submit Date: 2013-02-14	PCR33804	Status: Open (Should be closed)
ADR Description	Suspended Matter EDR is currently implemented to be fill when the VCM is not Confidently clear or Probably Clear. The EDRPR says: NPP.EDR.9.2 SM product shall be produced only for pixels under Confidently Clear as determined by the VCM. Fill values shall be used otherwise. The (under development) new Level 2 spec also says the same thing. The decision needs to be made now whether the EDRPR is changed (and upcoming Block 2 Level 2 spec as well as Level 3 SRS) or the implementation is changed. The current functionality is non-compliant with the EDRPR and fails current and Block 1.5 IDPS/PRO requirements.		
Note	Aerosol Cal/Val Team recommended to retrieve SM from both Confidently Clear and Probably Clear pixels; that is, the documentation should be changed not the code. The fix is planned for IDPS_NPP_Maint_1.5.8. PCR033804 rejected. DR7427 open to update the EDRPR document (DR Open, no PCR assigned), no code changes required.		

DRs currently being implemented

DR Titles		Status
ADR4724	Angstrom Exponent and Suspended Matter Quality Flag (IP) error at bowtie deletion pixels	Implemented in Mx8.5 (under PCR039026-30)
ADR7595	APSP (Angstrom Exponent) Quality Flag Fix	Implemented in Mx8.5 (under PCR039026-30)
ADR7596	SM quality flags QF2 and QF3 are not set when SM type quality is high	Implemented in Mx8.5 (under PCR039026-30)
ADR7597	Inconsistent cloud contamination flags in AOT IP and SM	Implemented in Mx8.5 (under PCR039026-30)
ADR7598	Undetermined SM type over ocean is incorrectly labeled as smoke	Implemented in Mx8.5 (under PCR039026-30)
ADR7367	Minor Aerosol code error in ProEdrViirsAerosol::CalcCorrRefl	Under PCR035916

Open DRs

DR Titles		Status	Comment
ADR4991	Update spectral reflectance ratios for land inversion to be a function of SWIR NDVI	Open	more demonstrations of its impact are needed
ADR4988	Extend reporting range of AOT EDR	Open	
ADR4836	Inconsistency in VIIRS IP AOT and EDR AOT Quality Flag (QF) Definitions	Open	AERB makes a decision on how to make it consistent for all products, not only for aerosol
ADR4706	Update Aerosol LUT for RSR changes	Open	will be implemented with ADR00004988

Implementation of the above DRs is not critical to meeting the L1RD threshold requirements. They are, however, expected to

- improve accuracy and precision of regional and seasonal AOT (ADR4991)
- improve usefulness of aerosol data for air quality, and make it more consistent with heritage MODIS practice (ADR4988)

Assessment of Data Quality Threshold Tables

- The current aerosol Data Quality monitoring reports summaries of
  - AOT, APSP, SM and SM typing product quality,
  - AOT, APSP, SM detection and SM typing exclusion,
- The current DQTTs are adequate, no update is necessary for Provisional Maturity.
- DQTTs will be re-evaluated using several months of Validated Stage 1 aerosol data
  - Updates to DQTT will be implemented if needed before at the time of Validated 2 Maturity.