

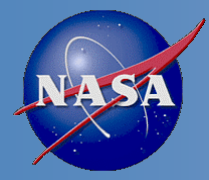
Validation of Aerosol Optical Thickness and Angström Exponent in the Suomi-NPP VIIRS Operational Aerosol Products

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Istvan Laszlo², Hongqing Liu^{2,3}, Lorraine
Remer⁴, Hai Zhang^{2,3}, Stephen Superczynski^{2,3}

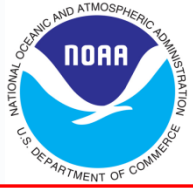
1. CICS/ESSIC, UMD 2. NOAA NESDIS STAR 3. IMSG 4. JCET, UMBC

CICS UMD Science Meeting, Nov 12-13, 2014



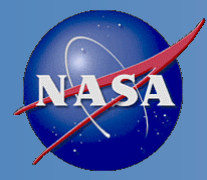


OUTLINE



- **VIIRS Aerosol Products**
- **Validation against AERONET**
- **Intercomparison to Heritage**
- **AOT & AE Maturity Status Timeline**
- **Summary**

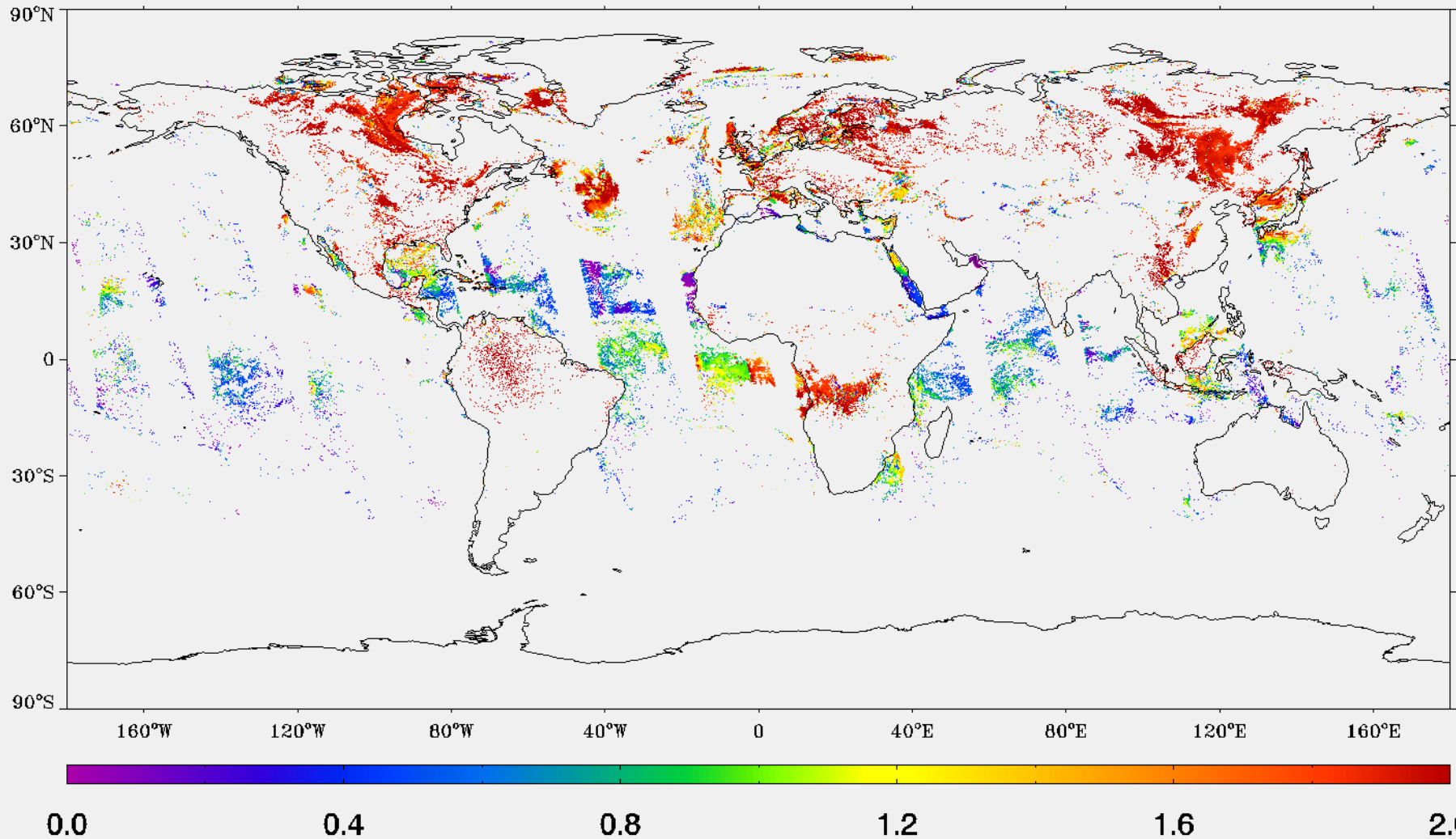


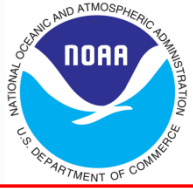
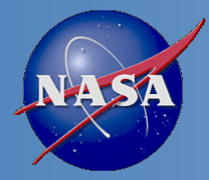


VIIRS Aerosol Products



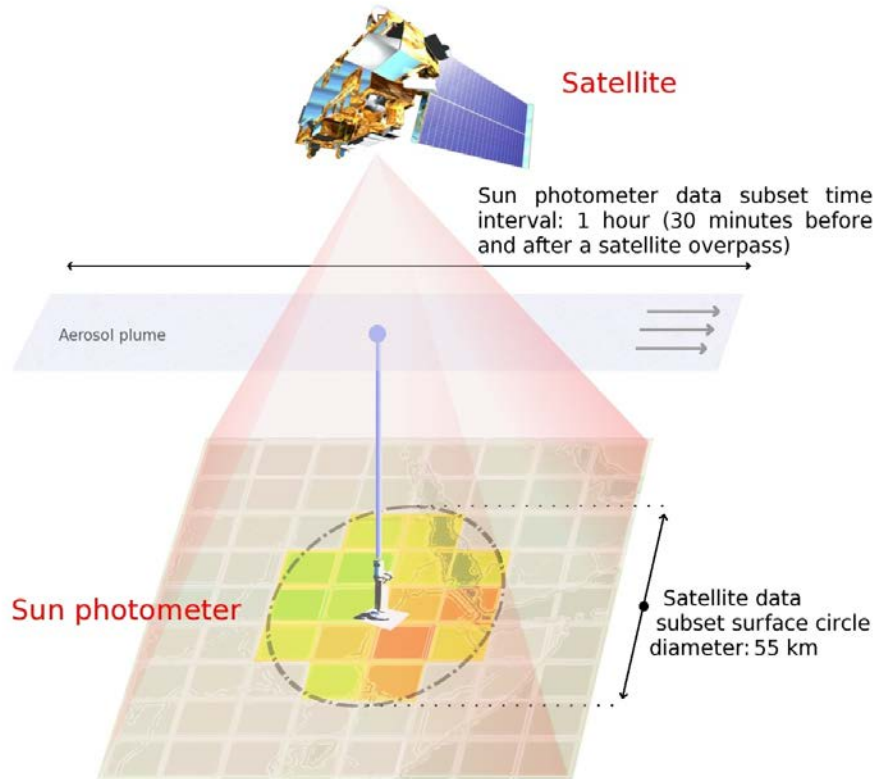
20140724 High QF Angstrom Exponent



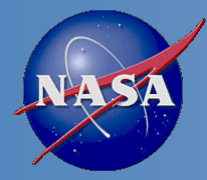


VALIDATION OF AOT AND AE COMPARISON TO AERONET





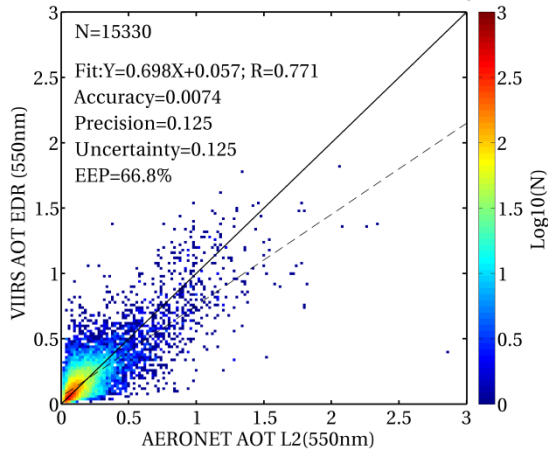
- **Matchup and Quality control criteria for MAPSS-like data:**
 - AERONET L2.0 **Direct Sun** retrievals are averaged within **± 30 minutes** of VIIRS overpass time.
 - Best quality VIIRS AOTs (QF=0 for IP; QF=3 for EDR) within a radius of **27.5 km** from the AERONET site are averaged.
 - A minimum of **five best quality VIIRS AOT** retrievals (EDR, IP) and **two AERONET observations** must be available within the spatial and temporal constraints.
 - AERONET AOT data, if observed at wavelengths other than 550 nm, are interpolated to 550 nm using a 2nd order polynomial relation between AOT and wavelengths in log-log space (340nm and 1040nm excluded due to large uncertainty).



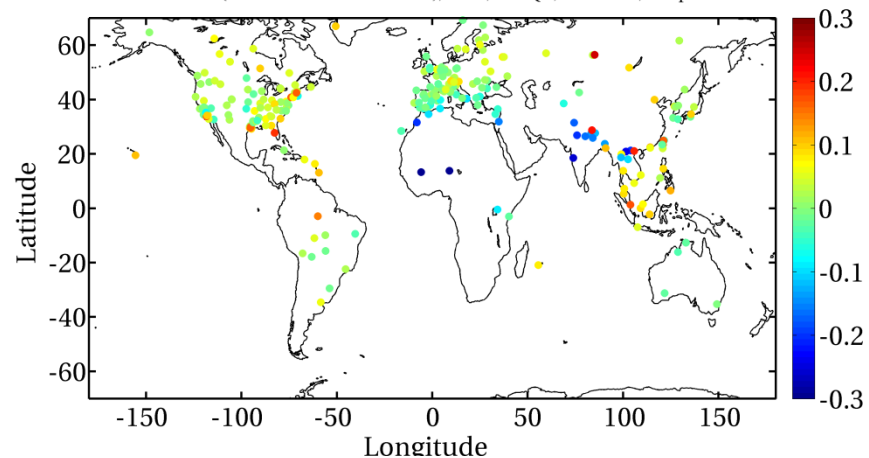
LAND AOT: VIIRS vs. AERONET



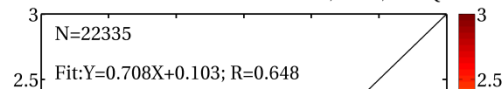
LAND AOT: VIIRS EDR vs. AERONET, M2M, best QA



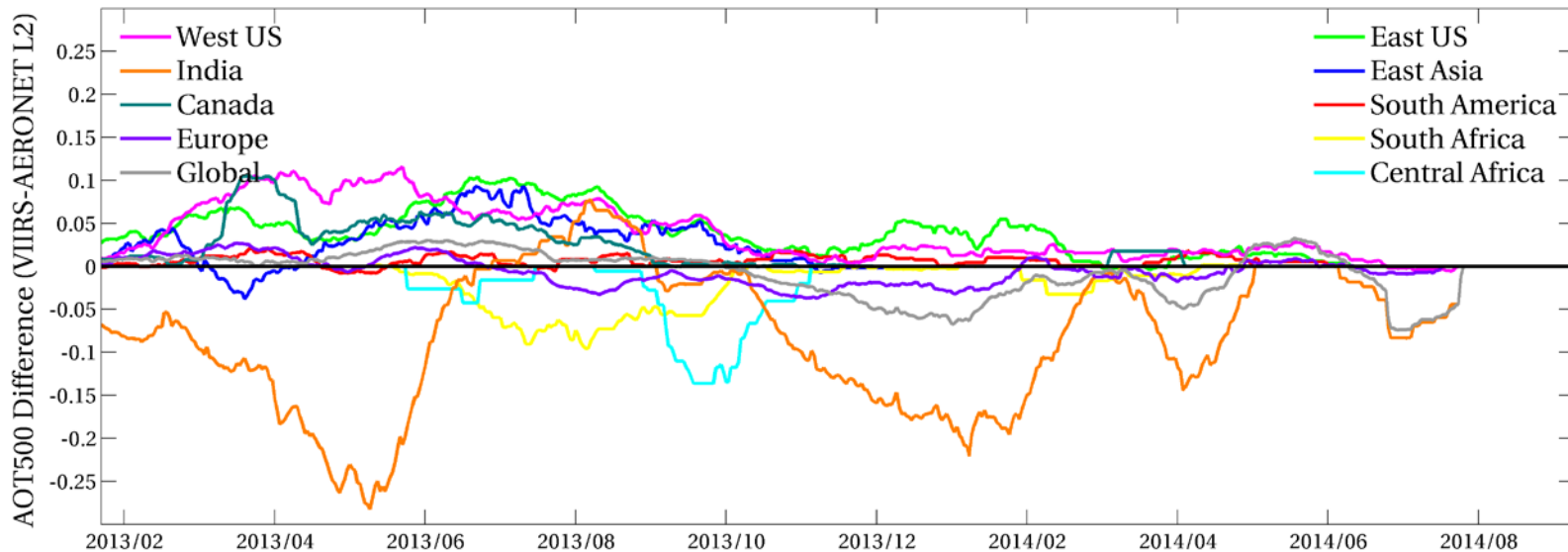
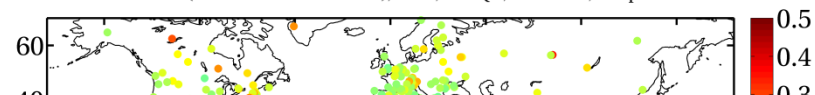
LAND AOT Diff.(VIIRS EDR - AERONET L2), M2M, best QA, Site #: 289, Sample #: 15330

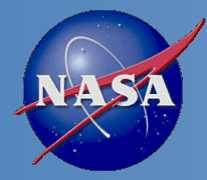


LAND AOT: VIIRS IP vs. AERONET, M2M, best QA



LAND AOT Diff.(VIIRS IP - AERONET L2), M2M, best QA, Site #: 312, Sample #: 22335

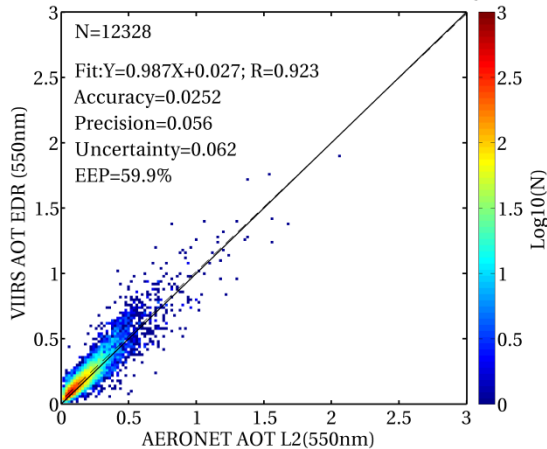




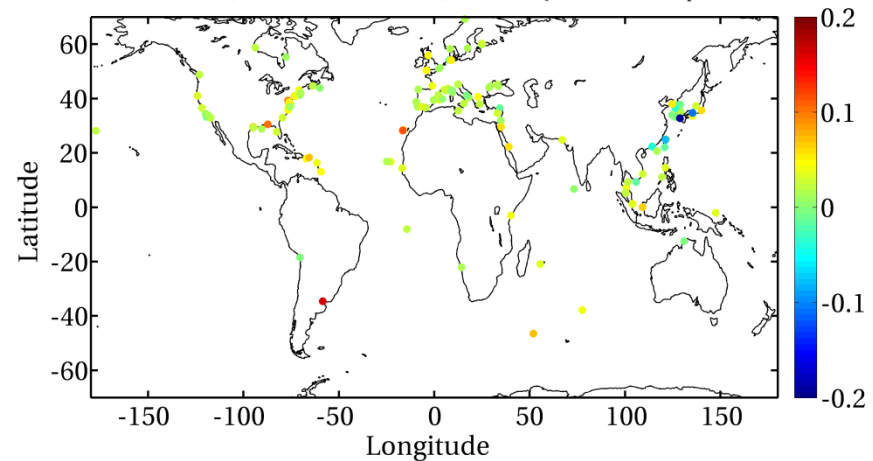
OCEAN AOT: VIIRS vs. AERONET



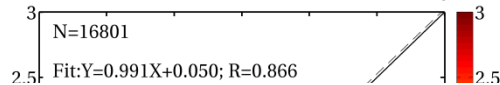
OCEAN AOT: VIIRS EDR vs. AERONET, M2M, best QA



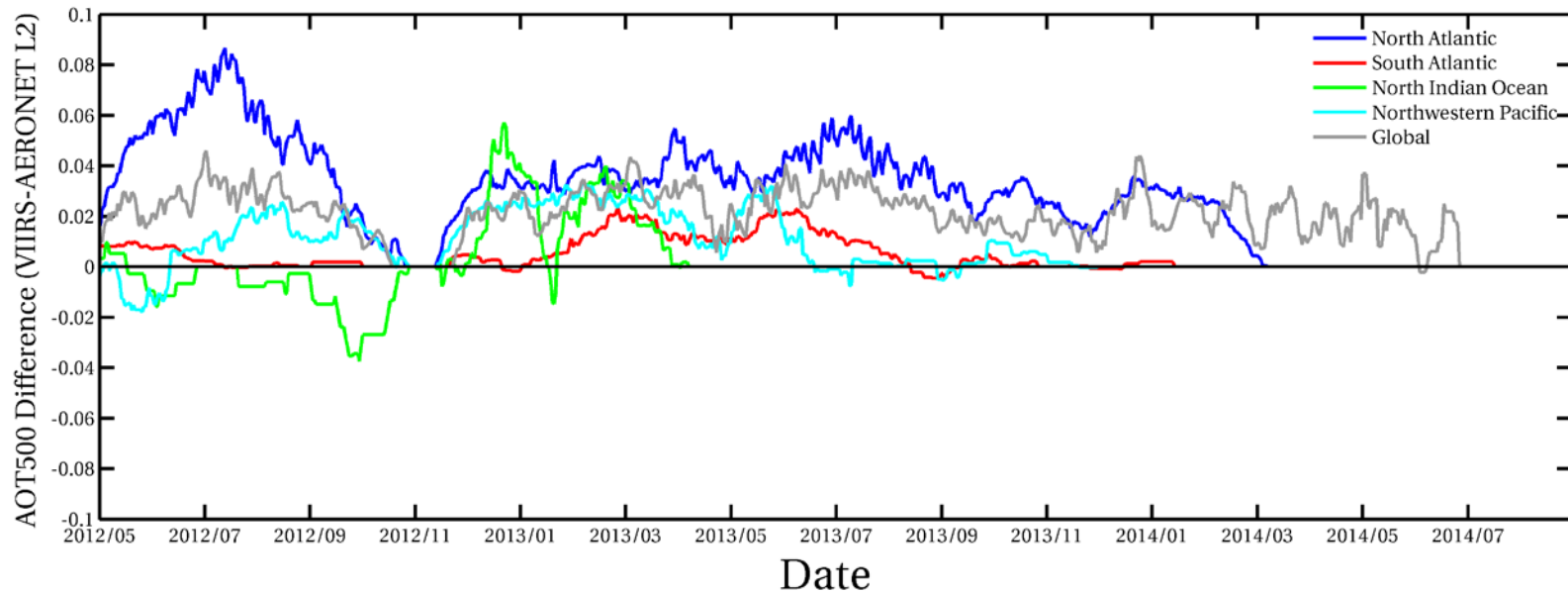
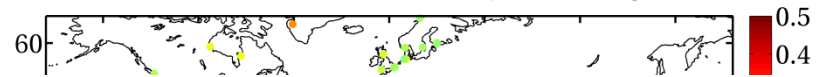
OCEAN AOT Diff. (VIIRS EDR - AERONET L2), M2M, best QA, Site #: 151, Sample #: 12328

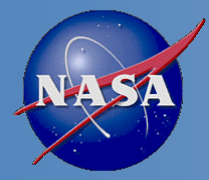


OCEAN AOT: VIIRS IP vs. AERONET, M2M, best QA



OCEAN AOT Diff. (VIIRS IP - AERONET L2), M2M, best QA, Site #: 170, Sample #: 16801

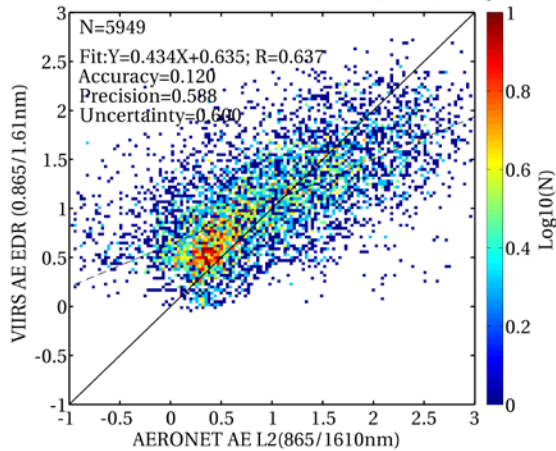




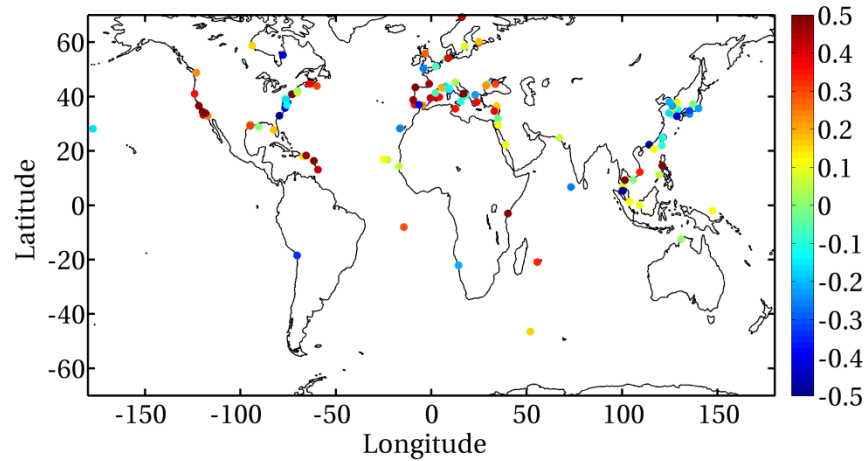
OCEAN AE: VIIRS vs. AERONET



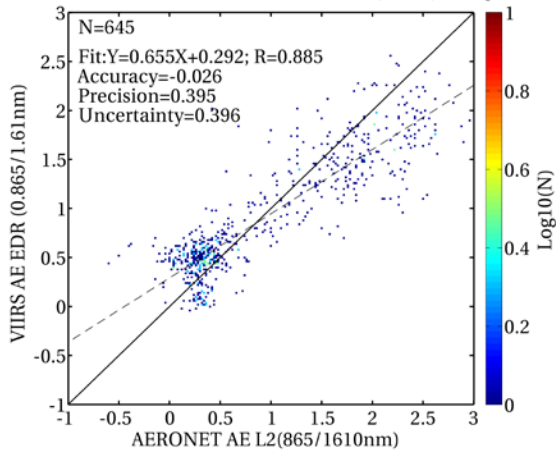
OCEAN AE: VIIRS EDR vs. AERONET L2, M2M, best QA



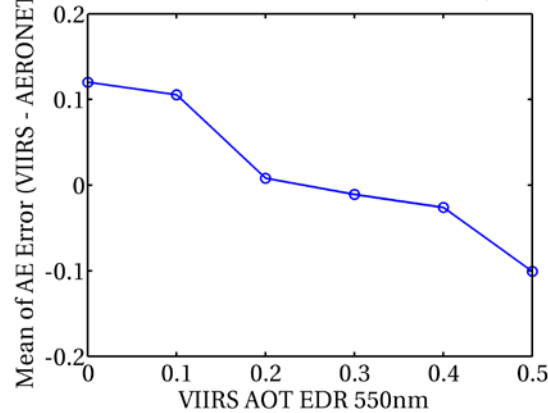
OCEAN AE Diff. (VIIRS EDR - AERONET L2), M2M, best QA, Site #: 145, Sample #: 5949



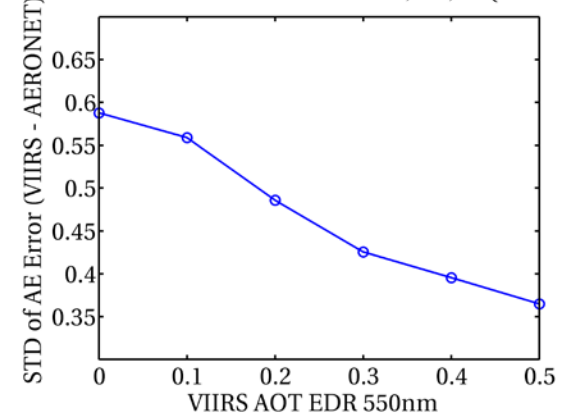
OCEAN AE: VIIRS EDR vs. AERONET L2, M2M, best QA

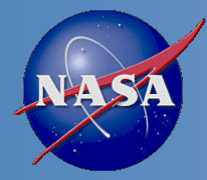


OCEAN AE: VIIRS EDR vs. AERONET L2, M2M, best QA



OCEAN AE: VIIRS EDR vs. AERONET L2, M2M, best QA

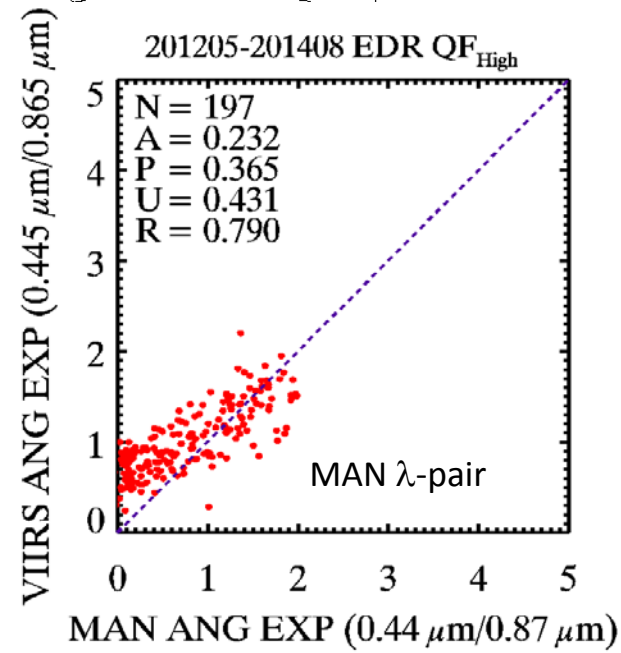
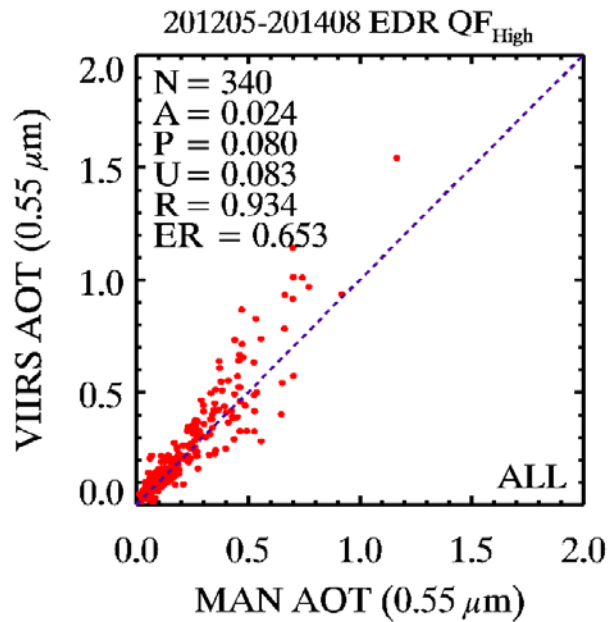
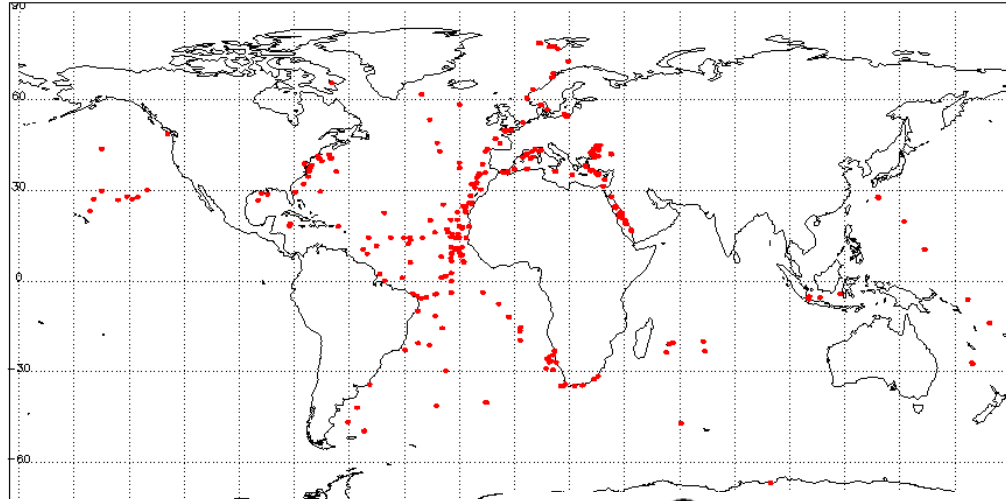


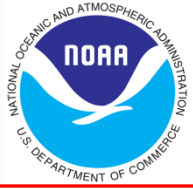
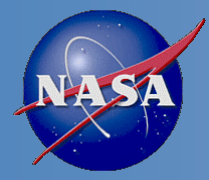


VIIRS OCEAN AOT & AE EDR vs. Maritime Aerosol Network (MAN)



MAN - VIIRS EDR Match-up Location 201205-201408 LEV20 Num=340

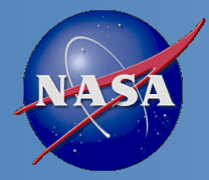




VALIDATION OF AOT AND AE

PERFORMANCE INTERCOMPARISON TO HERITAGE

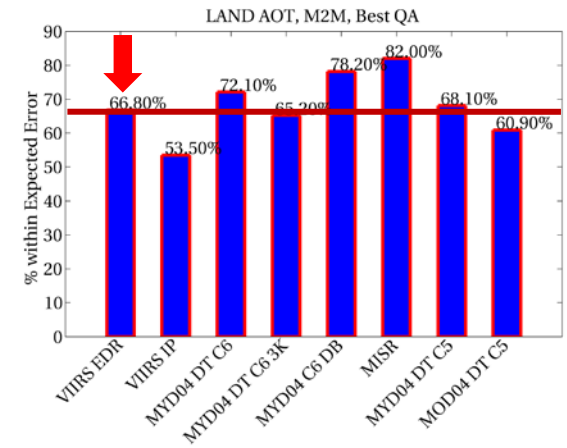
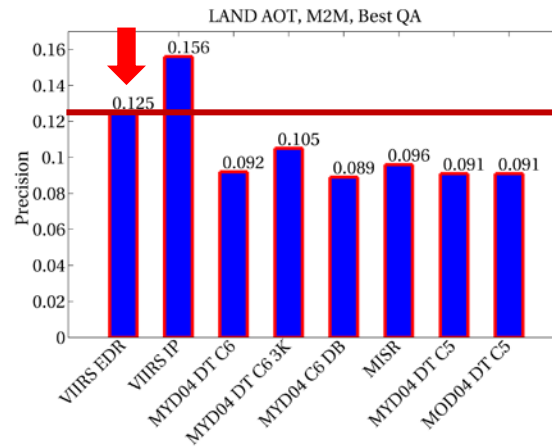
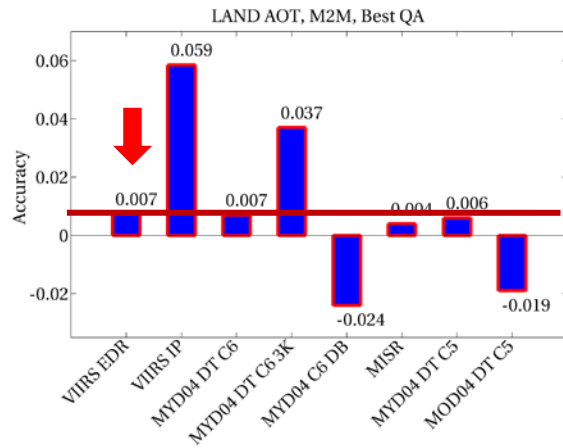




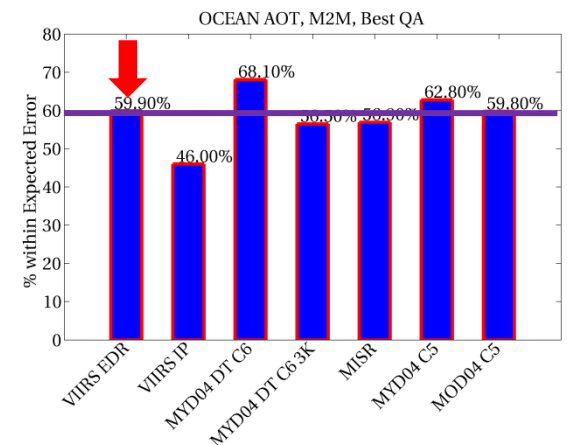
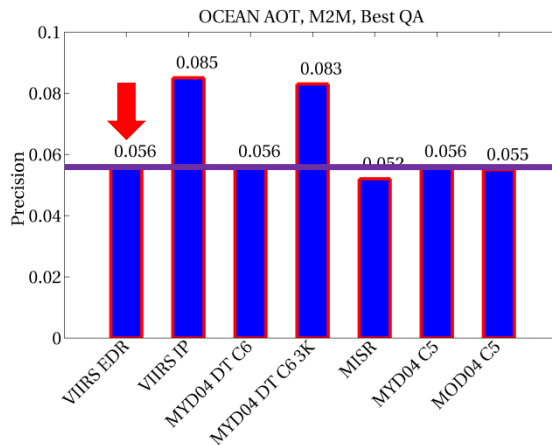
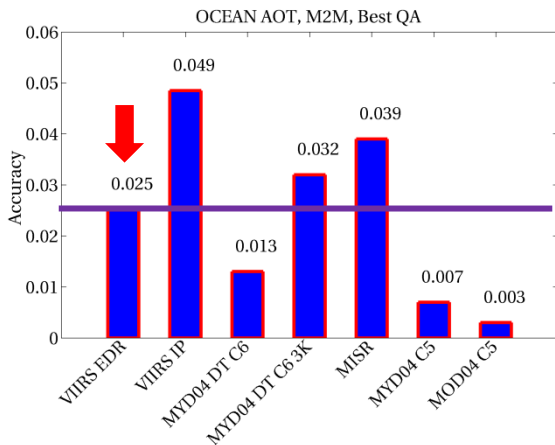
AOT: Multi-sensors vs. AERONET

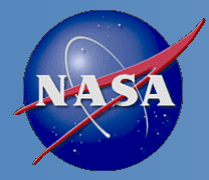


LAND AOT:



OCEAN AOT:

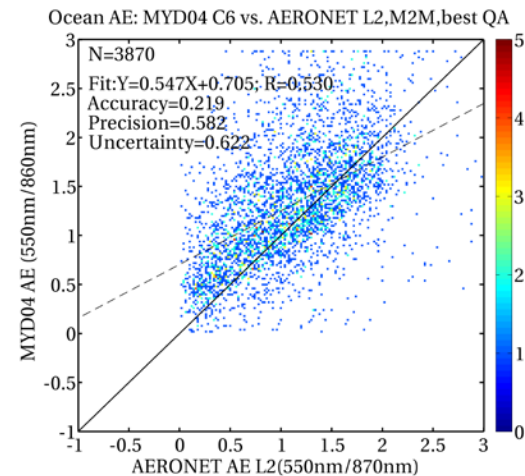
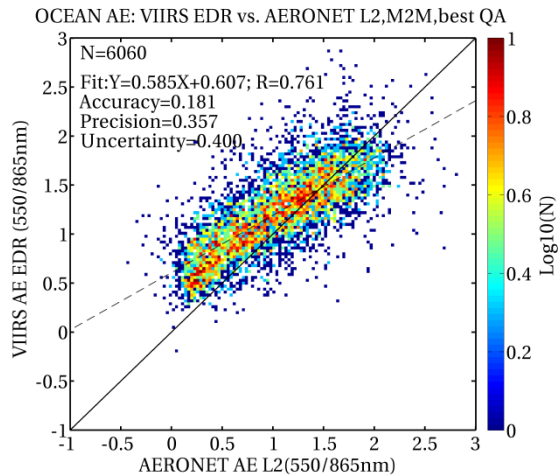
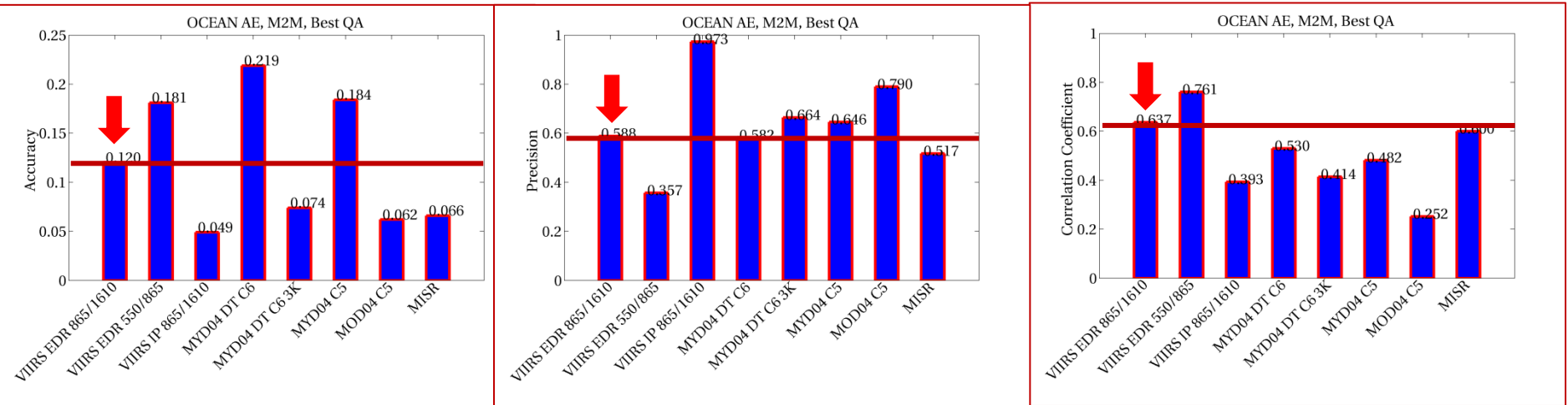


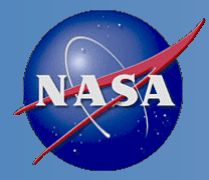


Ocean AE: Multi-sensors vs. AERONET



OCEAN AE:





VIIRS AOT & AE Maturity Timeline



LAND AOT:



OCEAN AOT & APSP:

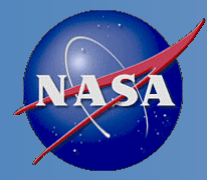


Red period: Product is not available to public, or product should not be used.

Blue period: Product is available to public, but it should be used with caution, known problems, frequent changes.
(Beta)

Green period: Product is available to public; meets the threshold performance attributes identified in the JPSS Level 1 Requirements Supplement
(Validated)
AOT: Validated stage 2
APSP: Validated stage 1





SUMMARY



- Validation showed that S-NPP VIIRS Aerosol Products provide daily global aerosol observations with competitive performance to heritage sensors
- S-NPP VIIRS AOT EDR reaches Validated Stage II
(since 01/23/2013 over land and since 05/02/2012 over ocean, excluding 10/15/2012-11/27/2012)
and the AE EDR over ocean reached Validated Stage I
(since 05/02/2012, excluding the anomaly period of 10/15/2012-11/27/2012)
- Validated products can be used for quantitative studies and applications in scientific publications
- Data use is encouraged and feedbacks are always welcome

