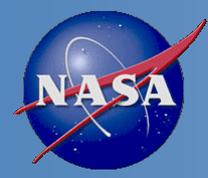


JPSS STAR Science Team Annual Meeting

# Aerosol EDR Team Report

May 16, 2014

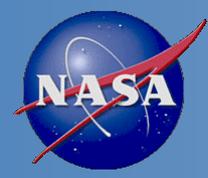




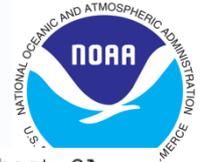
# Report on the Atmosphere Breakout



- Eight aerosol presentations
  - Two on the quality of AOT and APSP
  - One on potential improvement of AOT retrieval over land
  - Two on alternative algorithms for AOT/APSP & SM
  - Three on assimilation of VIIRS aerosol products

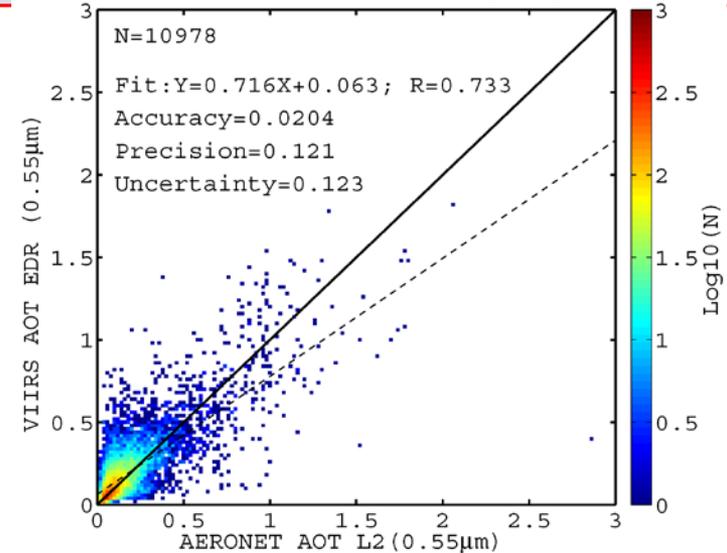


# Quality of AOT and APSP

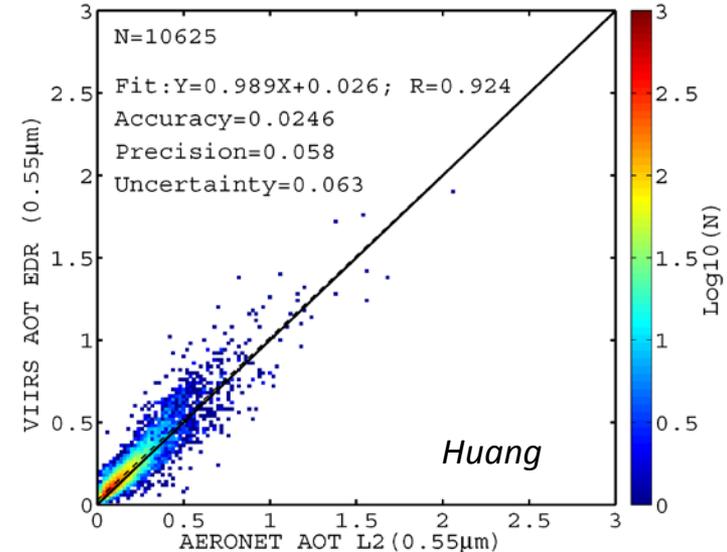


- Characterization used long-term records of independent satellite-derived and ground-observed aerosol data are used
  - MODIS Terra, MODIS Aqua, MISR, AERONET:
    - 01/23/2013-02/28/2014 (land)
    - 05/02/2012-02/28/2014(ocean)
    - **Products meet JPSS L1 requirements** (except for AOT precision at high end over land; small sample. Also, using different matchup data all requirements are met!)
  - Maritime Aerosol Network (MAN): May 2, 2012 to February 28, 2014:
    - **AOT and APSP meet JPSS L1 requirements**
- **Evaluation effort/results meet validated maturity criteria**

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



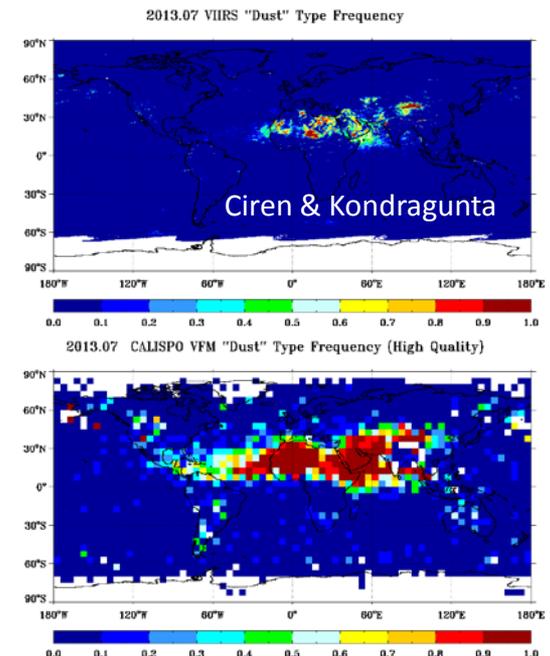
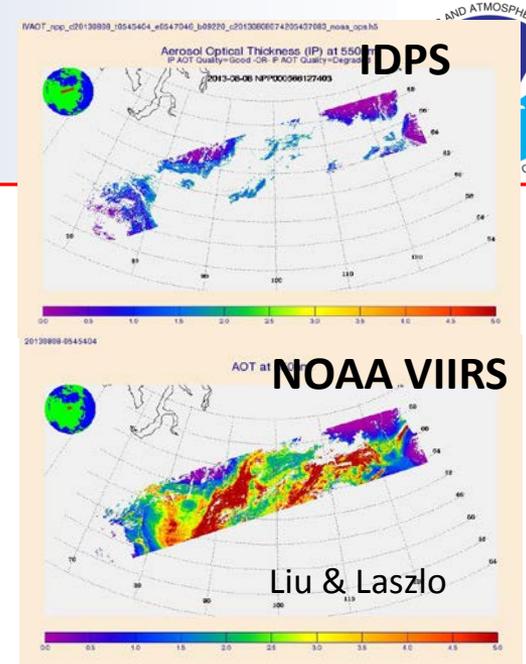
OCEAN AOT: VIIRS EDR vs. AERONET, M2M, best QA

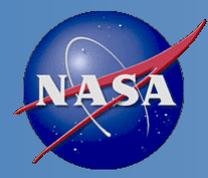




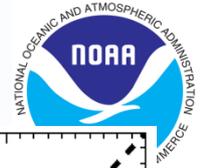
# Alternative Algorithms

- AOT & APSP
  - algorithm uses features of ABI/MODIS and current IDPS approaches
    - same algorithm for VIIRS and ABI
    - more coverage
    - better accuracy over land, comparable accuracy over ocean
    - meets L1RD requirements
    - need more tuning, testing and acceptance by users
- SM
  - based on observations from deep-blue and shortwave-IR channels
    - peer reviewed
    - dust and smoke detections meet L1RD requirements
    - additional validation on smoke detection is needed
    - additional investigation of data artifacts (false detections) is required to enhance product accuracy

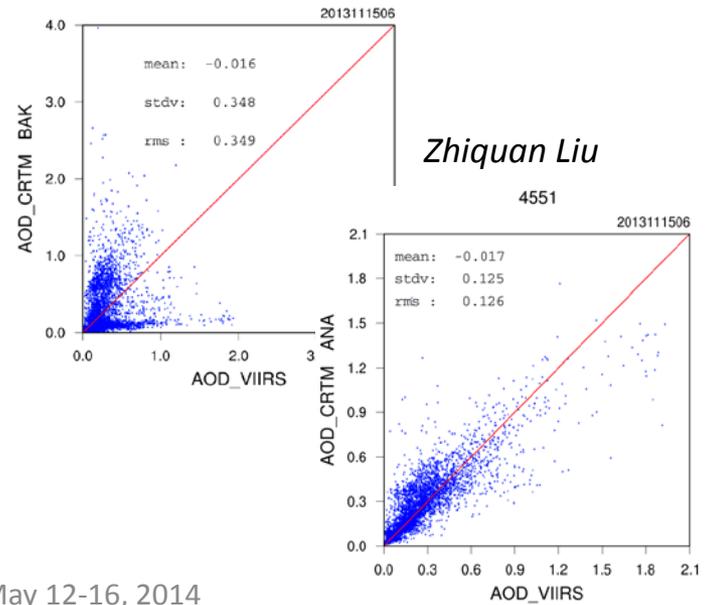
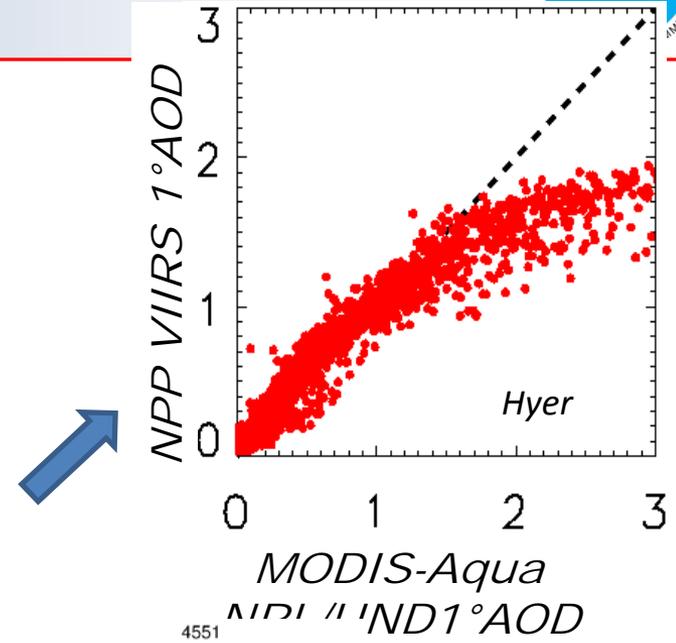




# Aerosol Assimilation

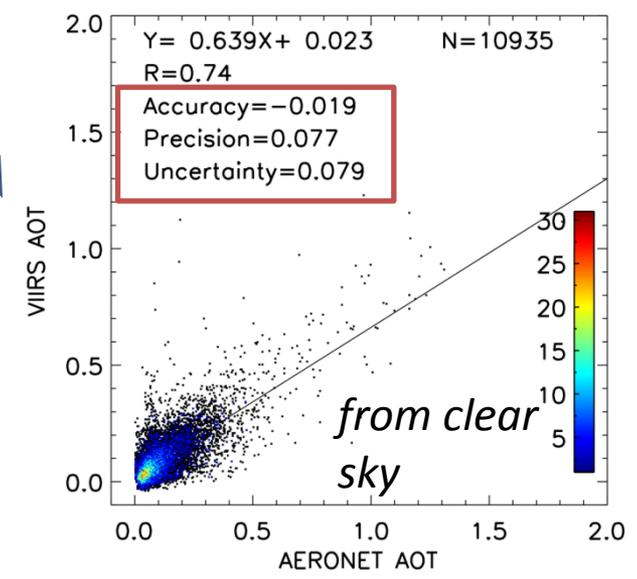
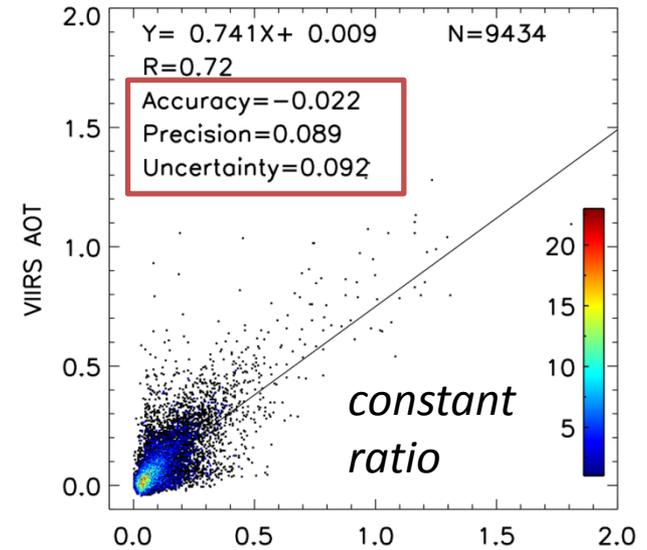


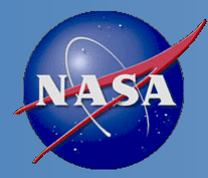
- VIIRS has about twice the coverage of MODIS (good)
- VIIRS is higher in low-AOT areas and has elevated AOT where MODIS does not. (not so good - outliers are very bad for assimilation)
- Current AOT range of [0-2] is not sufficient; results in a truncation effect on averaged data
- Events with elevated AOT may not be properly captured
- NCEP aerosol forecasts are routinely evaluated with aerosol data from different sources; aerosol analysis using VIIRS AOT is a priority in Phase 3 (post FY15) of their planned system enhancement
- Assimilation of VIIRS AOT improved aerosol analysis and subsequent forecasts over East-Asia



Addressing issues identified by cal/val team and/or raised by users

- extending the AOT reporting range to [-0.05,5.00]
- more aggressive filtering for detecting possible cloud contamination, snow/ice contamination:
  - spatial homogeneity
  - new spectral test and thresholds (e.g. NDSI and its variants)
- develop regional and seasonal land surface reflectance relationships to reduce overall high AOT bias over land
- implement some version of the deep blue algorithm





# Concerns/questions



- **At least one group of users needs MODIS-like output files**
  - cal/val team can design “conversion software, but would it be part of IDPS (new format instead of current one), or would it be run outside of IDPS. If latter, who would do it?
    - required content (aggregated “aerosol” reflectances) suggests it should be part of the retrieval, that is IDPS
- **Path forward is not clear:**
  - algorithms are going to IDPS or NDE?
  - what is the maturity level assessment, i.e. validation plan?
    - if an algorithm goes to NDE,
    - if an alternative algorithm replaces the current IDPS algorithm (repeat maturity assessment starting with beta?)
- **Breakout was by discipline**
  - no VCM presentation (input to aerosol)
  - land product breakout was parallel; would have liked to get feedback on AOT from surface reflectance team (AOT is input to them)
- **Would/should NCEP aerosol forecast replace NAAPS in the future?**