GOES-R Advanced Baseline Imager (ABI) Aerosol Product Update

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	GOES-16	GOES-17
*Beta Maturity	05/24/2017	08/27/2018
Drift with Data Gap	11/30/2017 – 12/14/2017	10/24/2018 – 11/13/2018
Reach Operational Position	12/17/2017	11/14/2018
*Provisional Maturity	**07/25/2018**	**01/01/2019**
Switched M3 to M6	04/02/2019	04/02/2019
B02 Gain Value Correction	04/23/2019	04/27/2019

*Data available since Beta maturity
*Provisional maturity **data is recommended for the community to use**
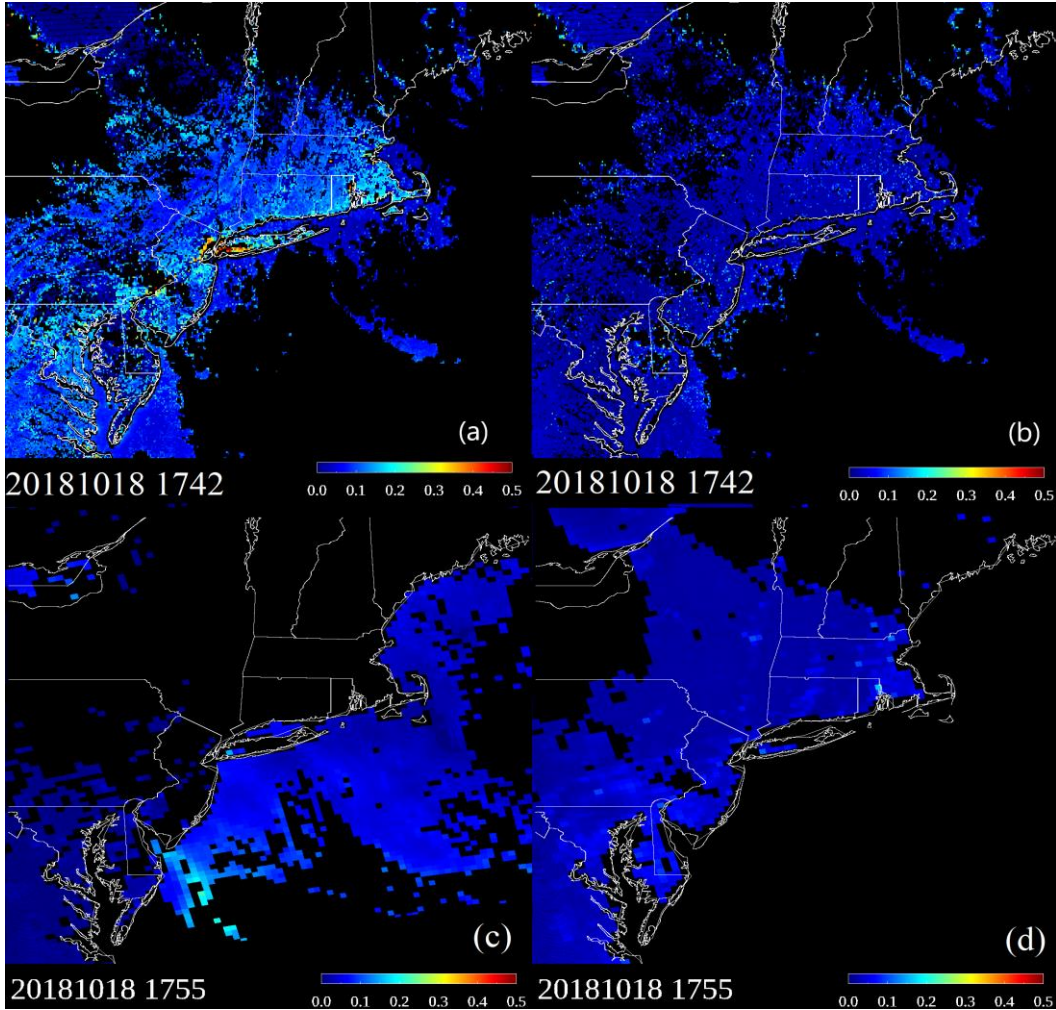**M6 is full disk every 10 minutes to be consistent with Himawari-08**

ABI AOD
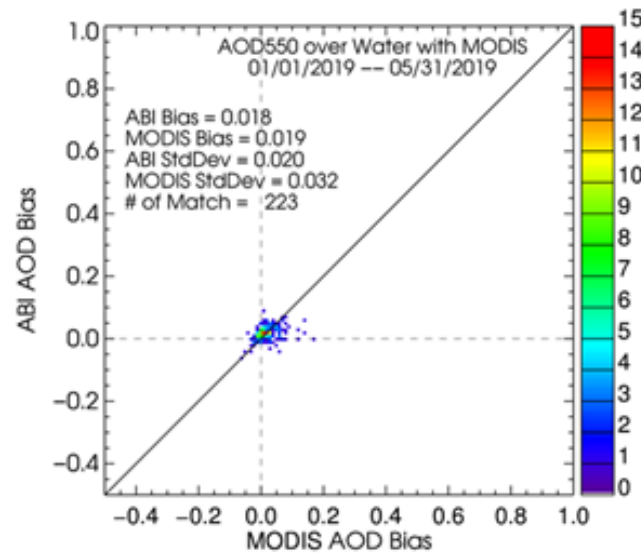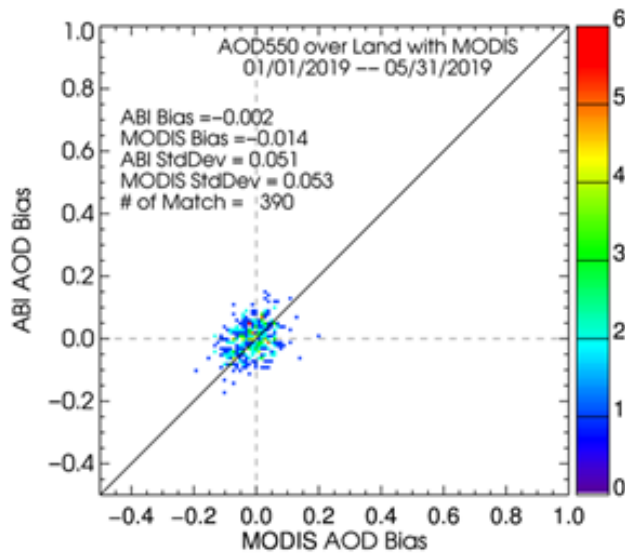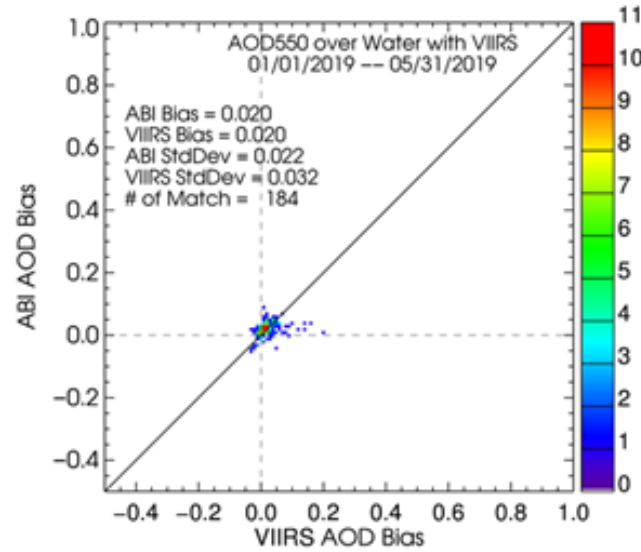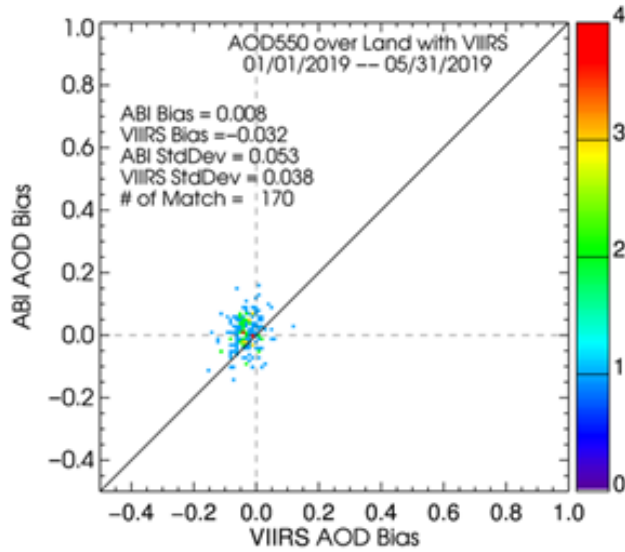
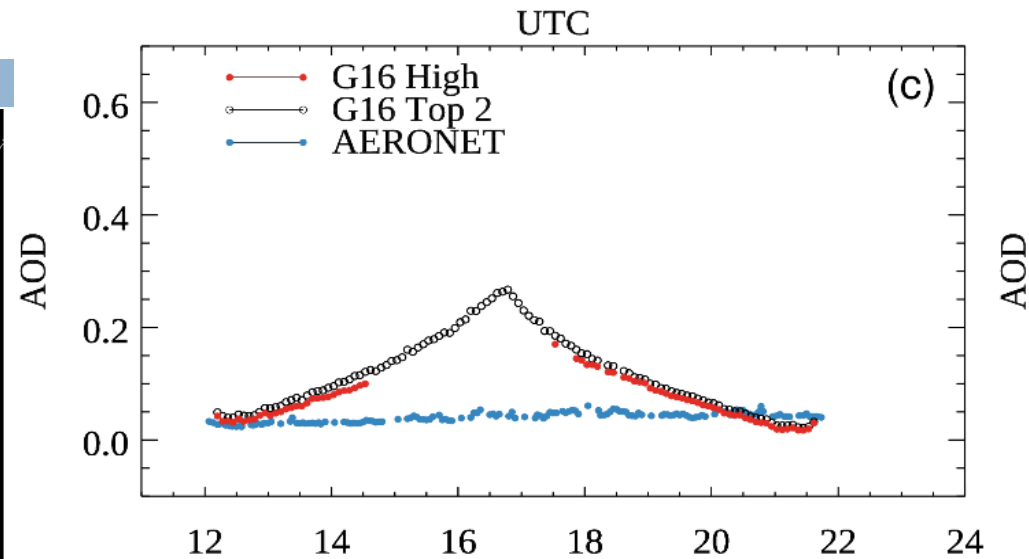ABI AOD comparisons with VIIRS and MODIS over land and water
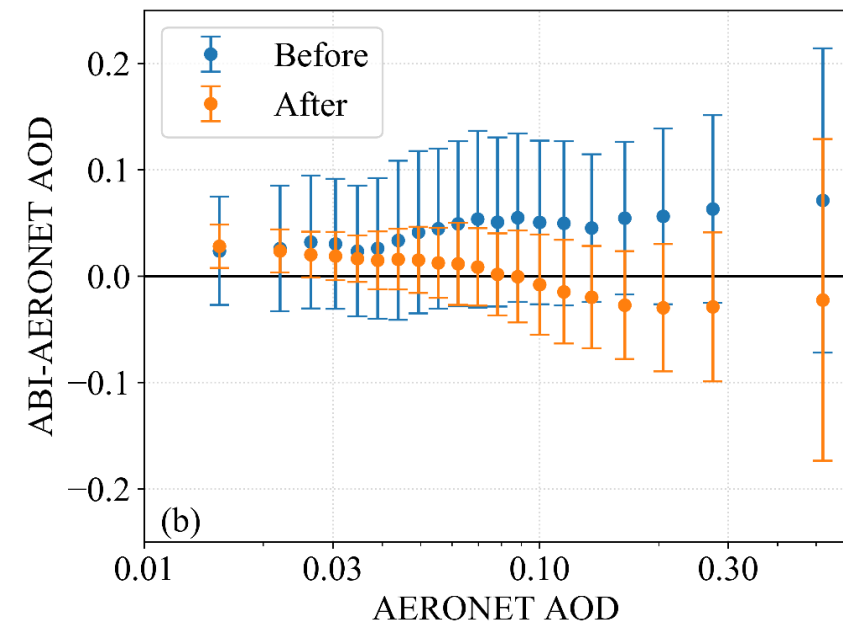
Diurnal Bias in ABI AOD

(a) ABI AOD (original), (b) ABI AOD (after bias correction)
(c) MODIS DT AOD, (d) MODIS DB AOD

Figures from Zhang et al., AMT, in review

Diurnal profile of AOD shows high bias compared to AERONET (top figure). Bias correction is applied to remove the time-dependent bias. Figures on the left and right show improvements in ABI AOD vs. AERONET after bias correction
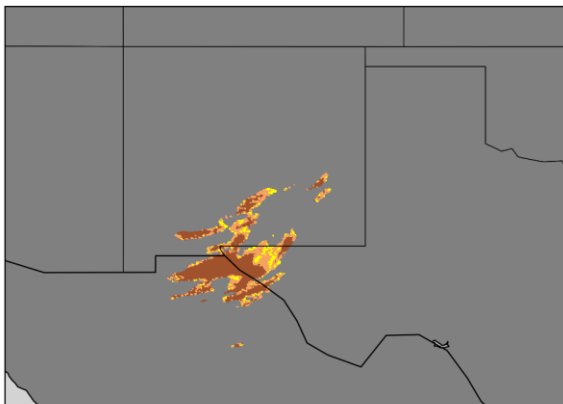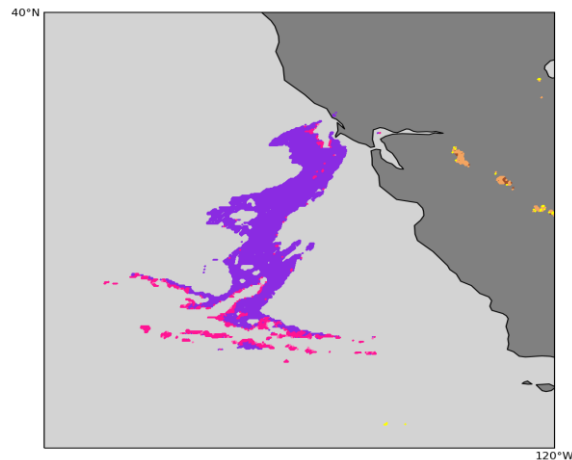
ABI Aerosol Detection Product

GOES-16 ABI
Aerosol Detection
19:11 UTC, 10 Apr 2019

Smoke Confidence: Low Med High
Dust Confidence: Low Med High

GOES-17 ABI
Aerosol Detection
20:00 UTC, 27 Oct 2019

Smoke Confidence: Low Med High
Dust Confidence: Low Med High

Dust Detection

- In IR region, dust decreases the brightness temperature difference between 11 and 12 μm, compared to clear sky. In visible region, dust reduces the contrast between two neighboring wavelengths, such as 0.47 μm/0.64 μm.
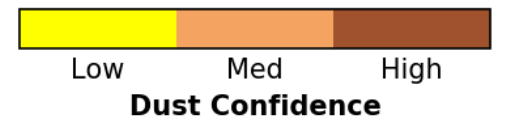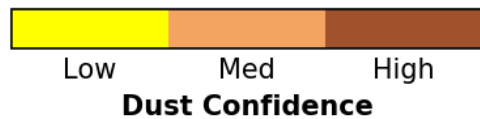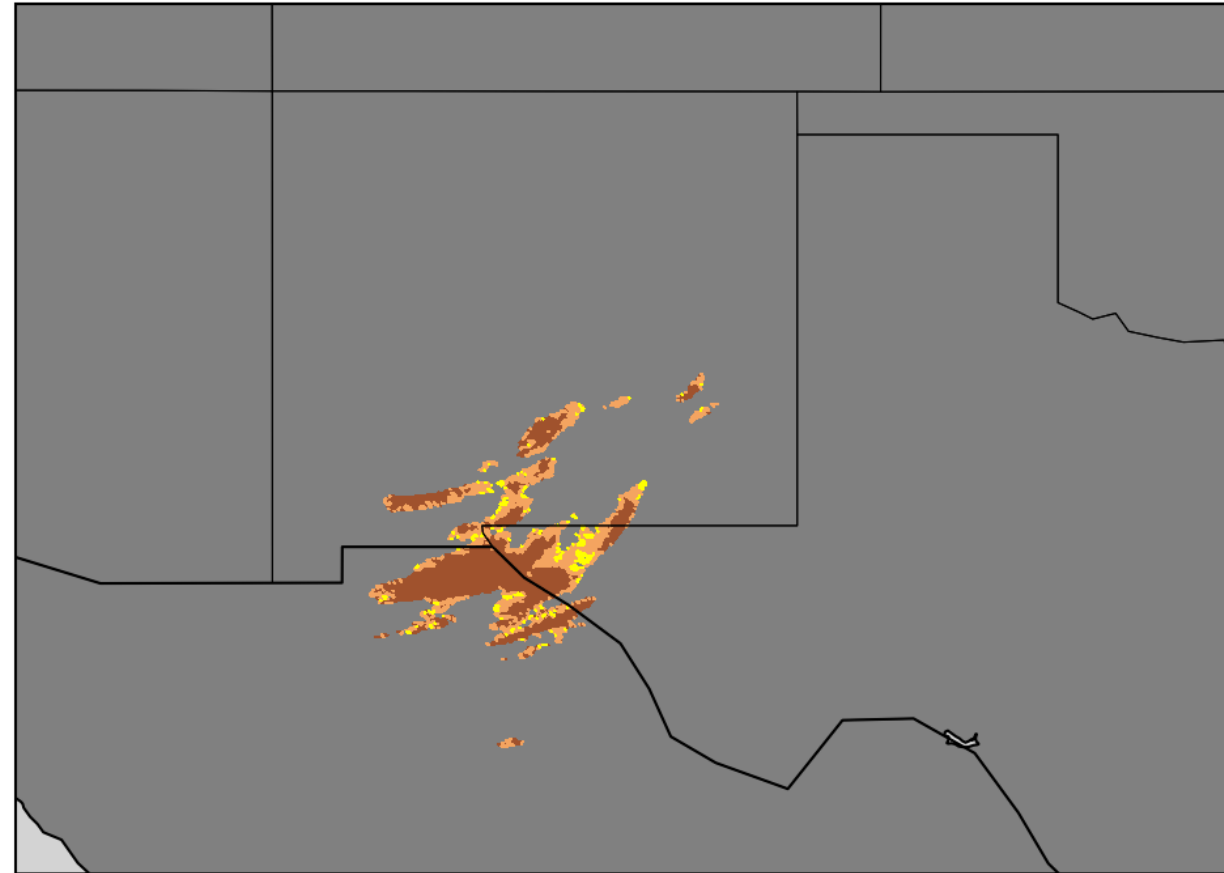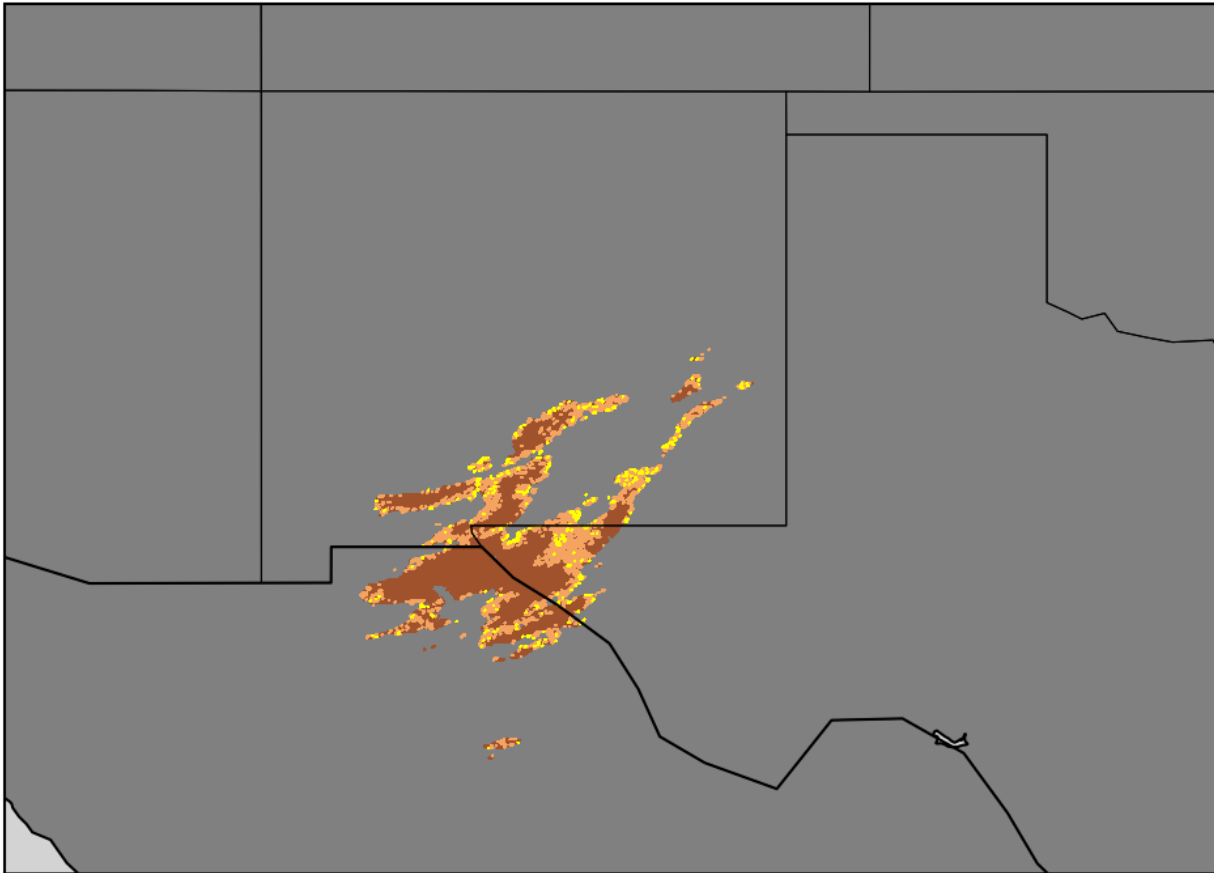
Smoke Detection

- Weak spectral dependence of reflection from clouds and strong wavelength dependent reflection from smoke allows us to use spectral contrast between two visible wavelengths to separate smoke from clouds; and further separate thick smoke from thin smoke .

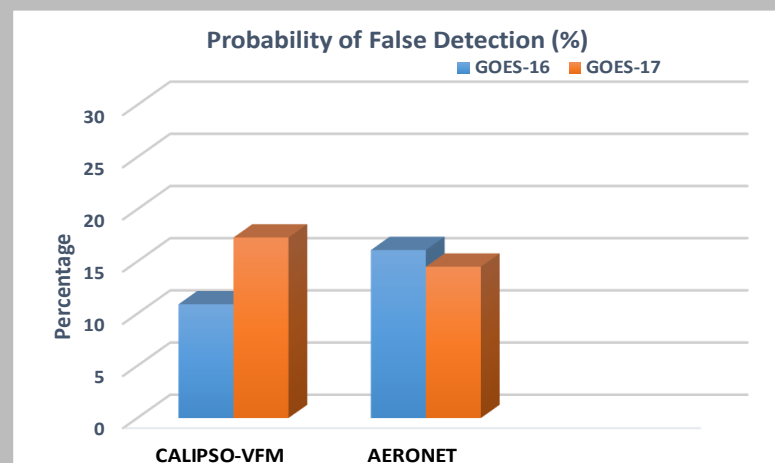| Satellite Platform	Time period	Satellite location	Observing Mode	Maturity
GOES-16 (East)	05/24/2017- 11/13/2018	89.5⁰ west before 12/11/2017 75.2⁰ west after 12/11/2017	Mode 3: FD/CONUS: 15 min Meso: 5 min After 04/02/2019	Beta
	11/13/2018- present	75.2⁰ west	Mode 6: FD/CONUS: 10 min Meso: 5 min	Provisional
GOES-17 (West)	08/27/2018- 11/13/2018	89.5⁰ west	Mode 3 (15 min)	Beta
	11/13/2018- present	137.2⁰ west	After 04/02/2019 Mode 6 (10 min)	Provisional

GOES-17 ABI
Aerosol Detection
19:00 UTC, 10 Apr 2019

GOES-16 ABI
Aerosol Detection
19:00 UTC, 10 Apr 2019

Low Med High
Smoke Confidence

Low Med High
Dust Confidence

Low Med High
Smoke Confidence

Low Med High
Dust Confidence

Smoke

Probability of Correct Detection (%)
GOES-16 GOES-17

Probability of False Detection (%)
GOES-16 GOES-17

Dust

Probability of Correct Detection (%)
GOES-16 GOES-17

Probability of False Detection (%)
GOES-16 GOES-17
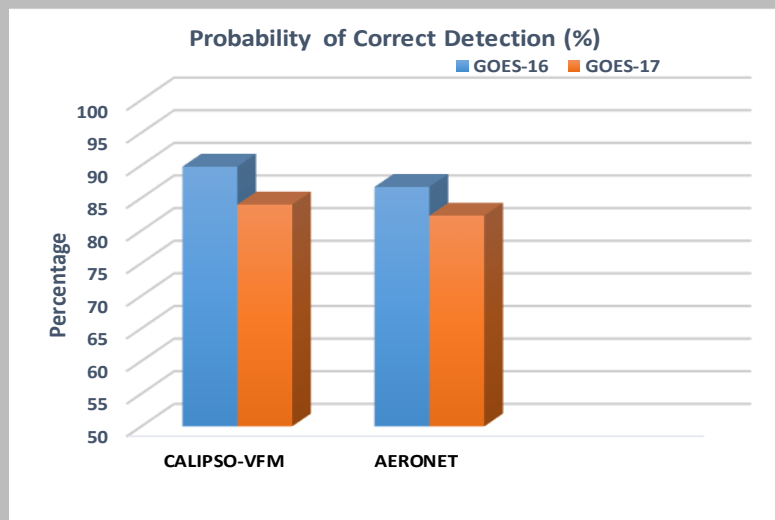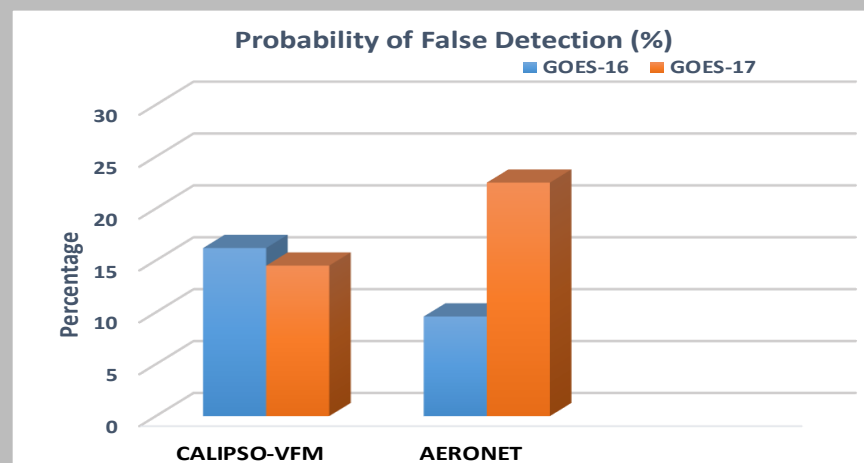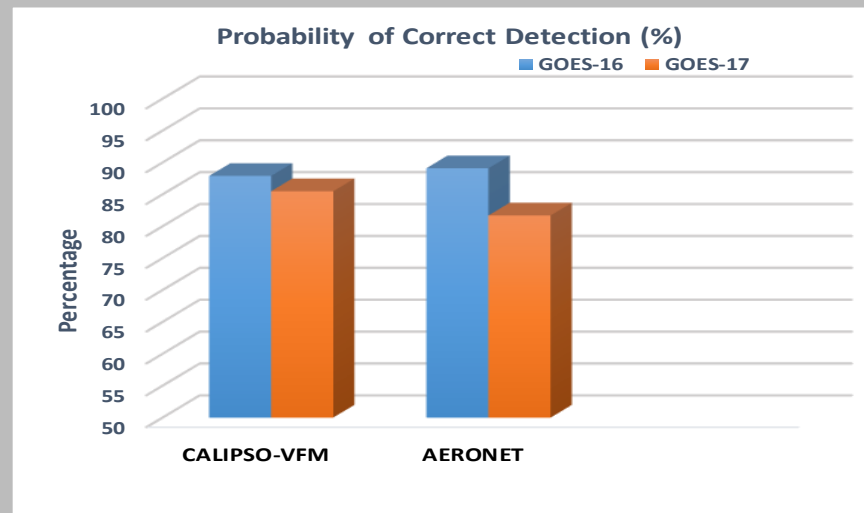
- Both dust and smoke detection for GOES-16 and GOES-17 meet performance requirements (80% POCD)
- POFD high for dust in GOES-17 compared to AERONET.
- POFD for smoke high for GOES-17 compared to GOES-16.
- Note that dataset for GOES-17 only includes the time period when FPM temp is normal.

- https://www.star.nesdis.noaa.gov/smcd/spb/aq/AerosolWatch/
  - Near real time imagery (GeoColor, AOD, ADP, Fire hot spots, Fire Radiative Power, dust RGB, surface PM2.5). Ten minute refresh
  - Latency 20 minutes from data capture

- www.class.noaa.gov
  - Full archive

- ftp://ftp.star.nesdis.noaa.gov/pub/smcd/hzhang/GOES-16/NRT/
  - Ten day rotation
  - Full Disk, CONUS every 10 minutes