Status of *Terra/Aqua* MODIS aerosols over ocean on CERES SSF

Alexander Ignatov
NOAA/NESDIS

LaRC: Pat Minnis & Team, Norman Loeb, Bruce Wielicki, Walt Miller, Erika Geier, Kathleen Morris
GSFC: Lorraine Remer, Didier Tanré, Yoram Kaufman
NESDIS: Istvan Laszlo

New Editions *of* CERES SSFs available

- *Terra:* Edition 1A _ Edition 2A
- *Aqua:* _ _ Edition 1A

CERES2 STM-1 (Mar 04): Check τ_1(0.659 :m) for cross-consistency

- *Terra Ed1A* (FM1) vs. *Aqua* _ (FM4)
- M vs. A product

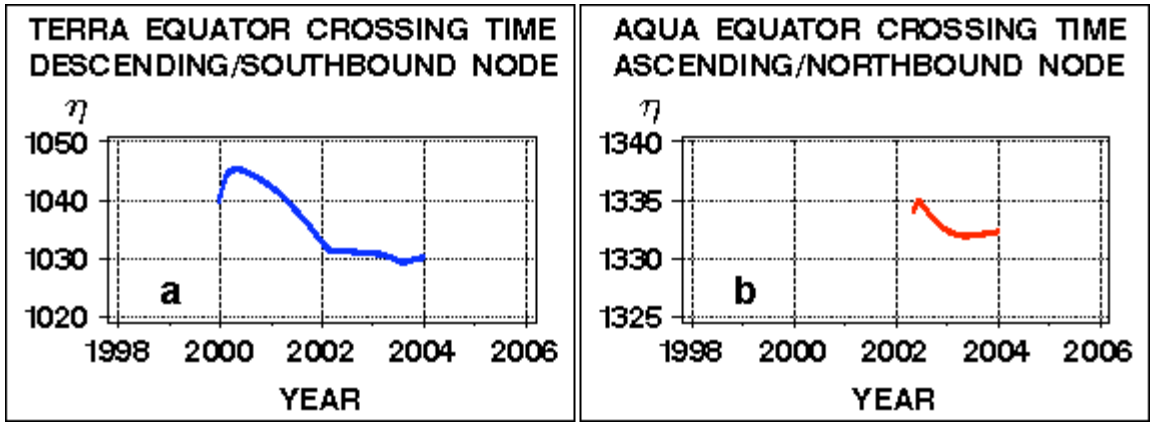
This meeting:

- Repeat analyses with *Terra Ed2A* and *Aqua* *Ed1A*
- Using 1 week of global data 13-21 Oct 2002

Terra/Aqua CERES SSF Aerosols

2 MODIS

- *Terra* (Dec 1999, 10:30 AM)
- *Aqua* (May 2002, 01:30 PM)



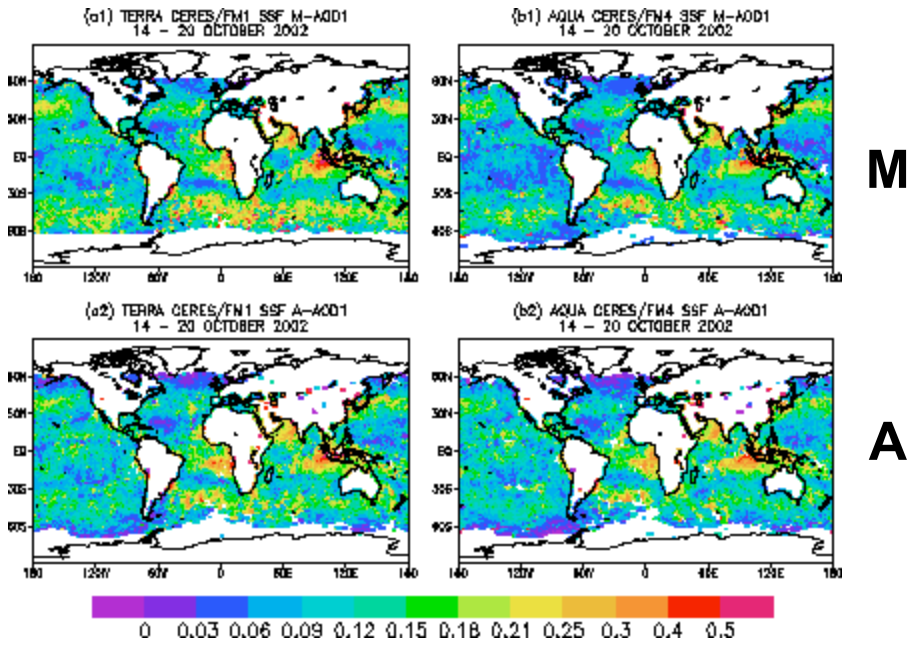
4 CERES: 2 *Terra* (FM1/2) + 2 *Aqua* (FM3/4) = 4 SSF datasets

- M-aerosol: *primary* (MODIS group; U.Wisc/GSFC/U.Lille)
- A-aerosol: *secondary* $\tau_1(0.63)$, $\tau_2(1.61/2.13\ \mu m)$ (LaRC/NESDIS)

Mapped to CERES footprints; Re-mapped to $(1E)^2$

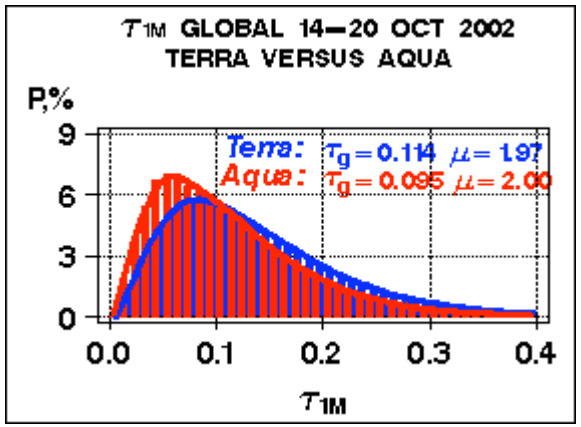
Terra Ed1A/Aqua _ τ_1@0.659 μm: 14-20 Oct 2002

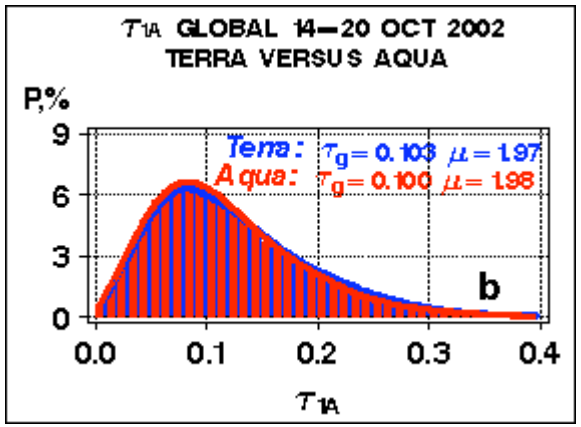
Terra **Aqua**



M

A

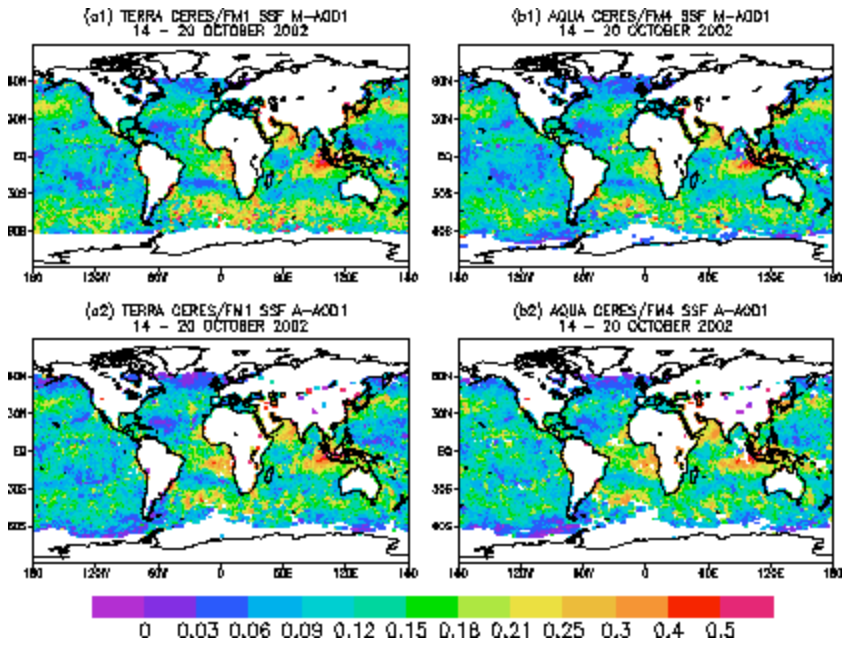




Terra vs. Aqua: ***M-AODs: differ more significantly***
A-AODs: compare better

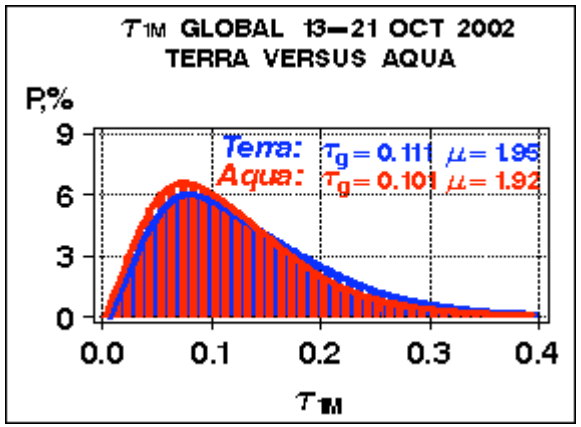
Terra Ed2A/Aqua Ed1A τ_1@0.659 μm: 13-21 Oct 2002

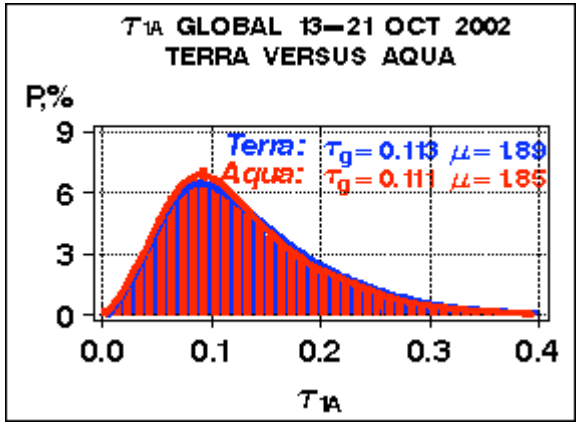
Terra ***Aqua***



M

A



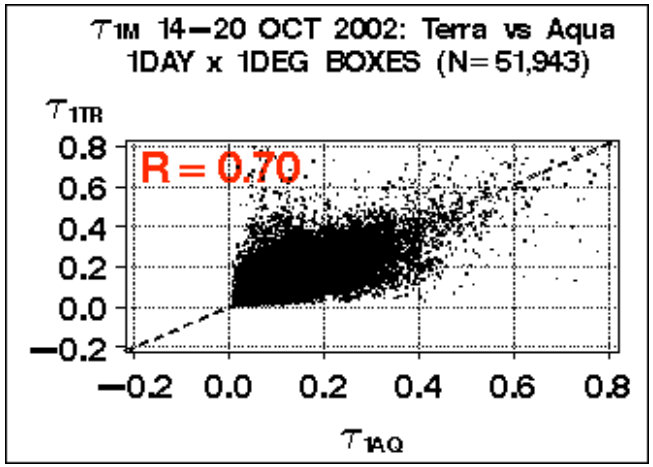


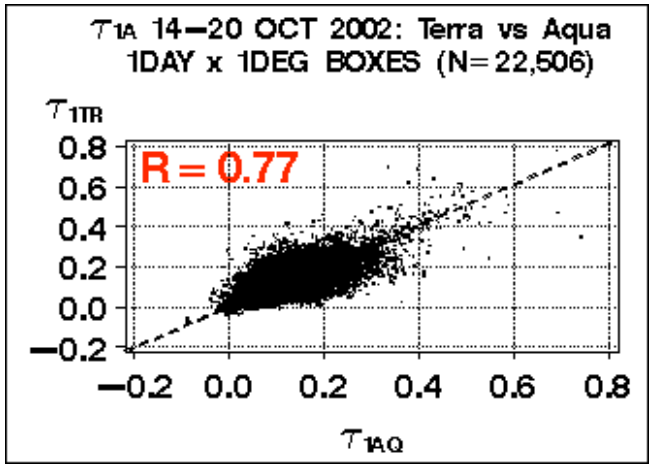
Terra vs. Aqua: ***M-AODs: differ more significantly***
A-AODs: compare better

τ_1: *Terra* vs. *Aqua*

Correlation: Improved in new data; Higher in A

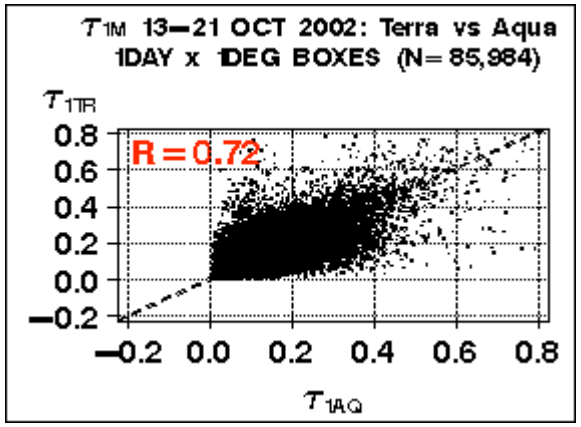
M: *Terra* Ed1 vs. *Aqua* _

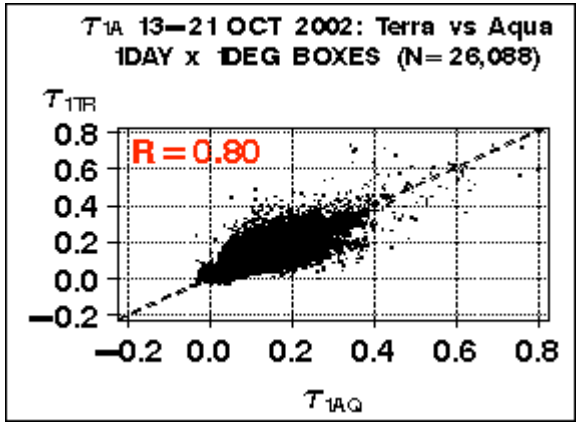




A: *Terra* Ed1 vs. *Aqua* _

M: *Terra* Ed2 vs. *Aqua Ed1*



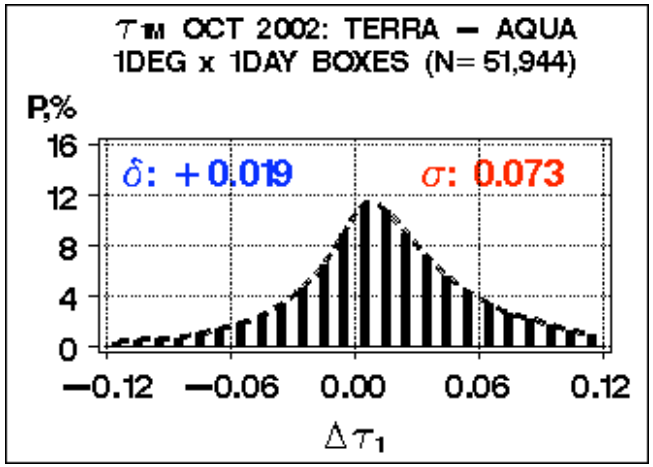


A: *Terra Ed2* vs. *Aqua Ed1*

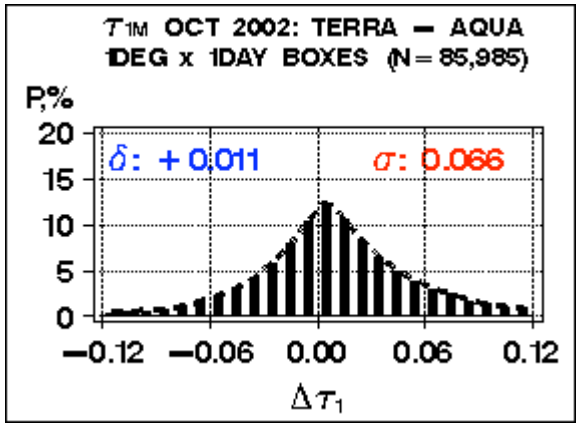
τ_1: Terra vs. Aqua

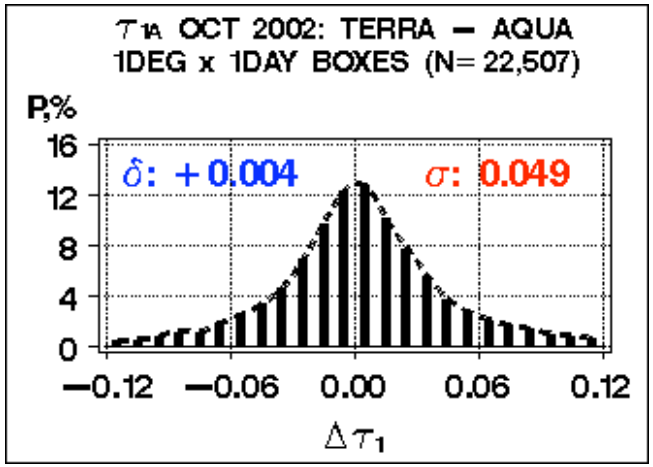
Bias/Noise: Improved in new data; Smaller in A

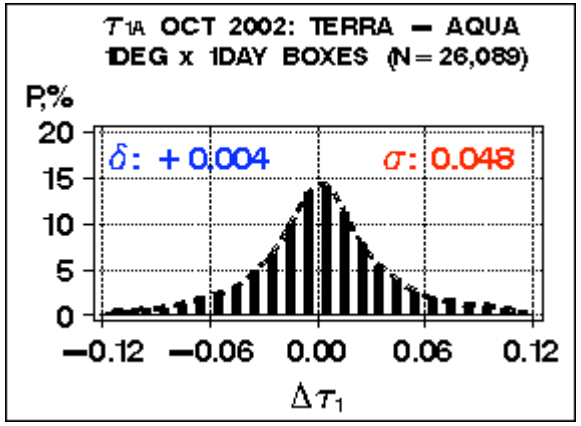
M: *Terra* Ed1 vs. *Aqua* _



M: *Terra* Ed2 vs. *Aqua Ed1*







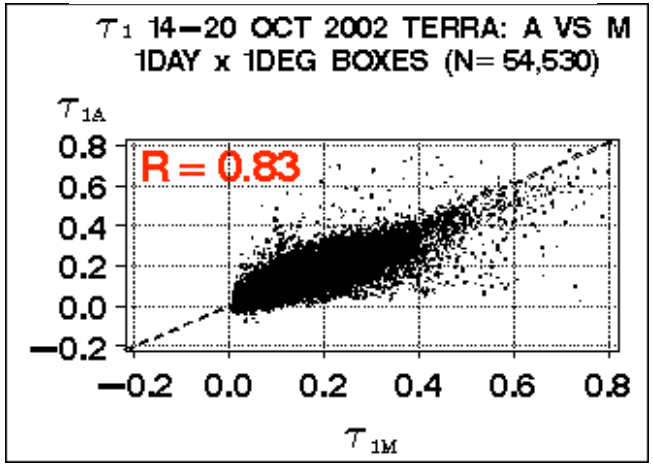
A: *Terra* Ed1 vs. *Aqua* _

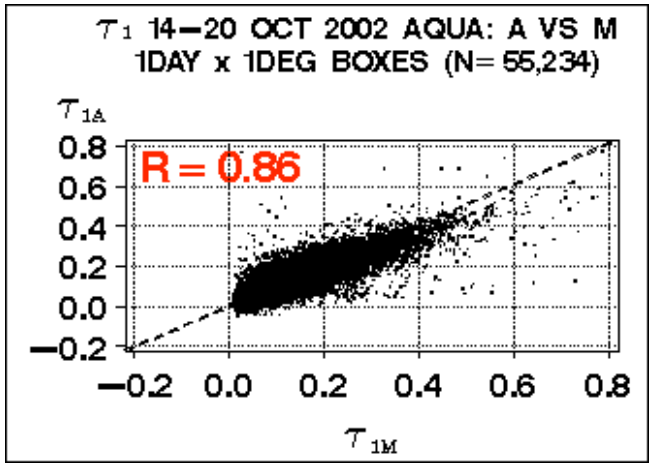
A: *Terra Ed2* vs. *Aqua Ed1*

τ_1: A vs. M

Correlation: Improved in new data; more cross-platform consistency

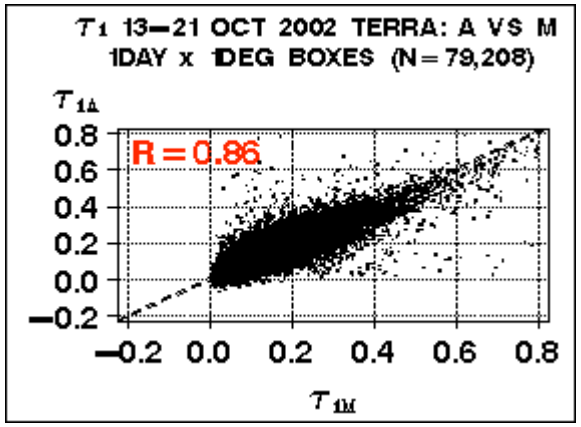
Terra Ed1: **A vs. M**

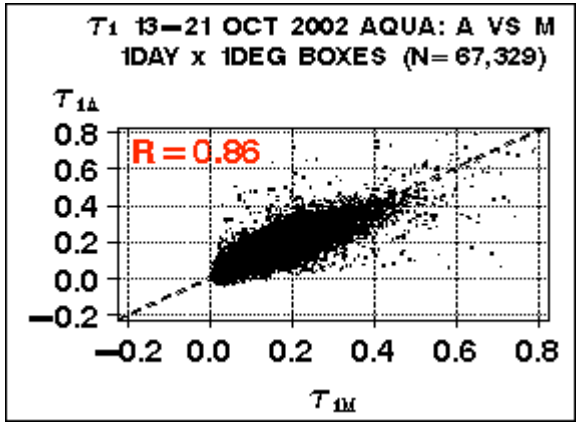




Aqua _: **A vs. M**

Terra Ed2A: **A vs. M**





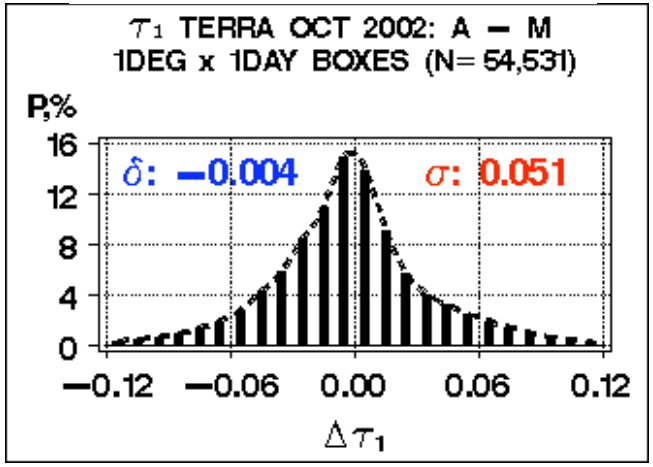
Aqua Ed1A: **A vs. M**

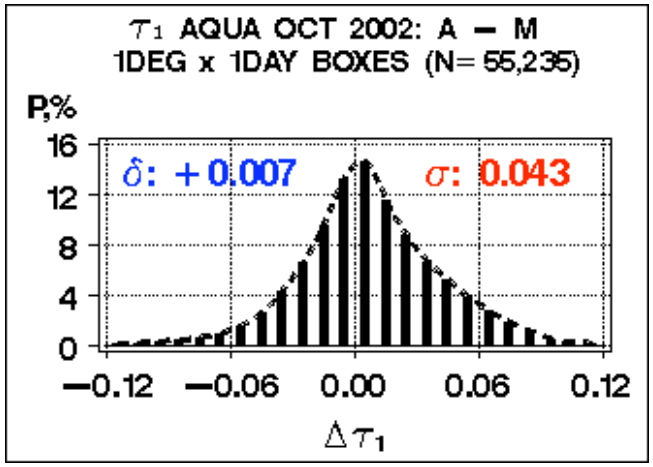
τ_1: A vs. M

Systematic bias in $_{1A}$ > $_{1M}$; RMS smaller

(Istvan Laszlo's talk)

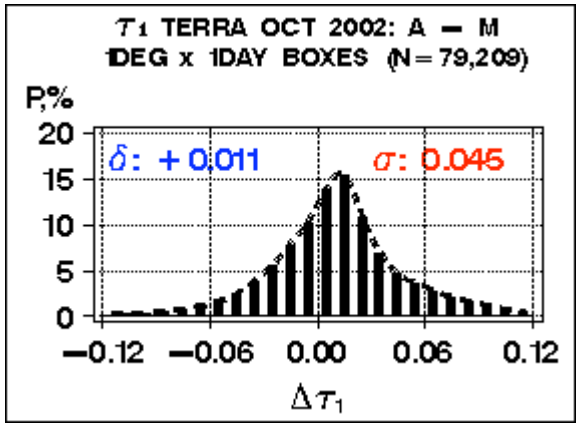
***Terra Ed1:* A vs. M**

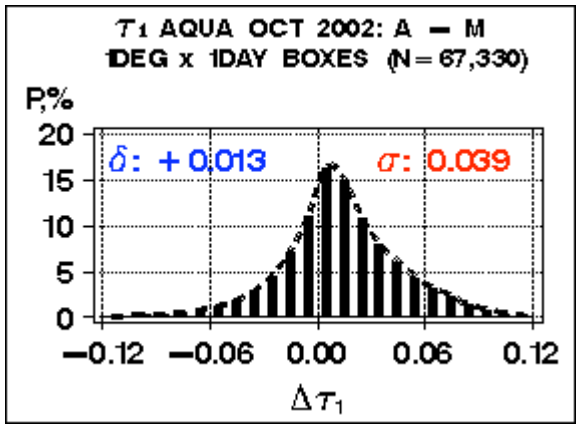




***Aqua _:* A vs. M**

***Terra Ed2A:* A vs. M**



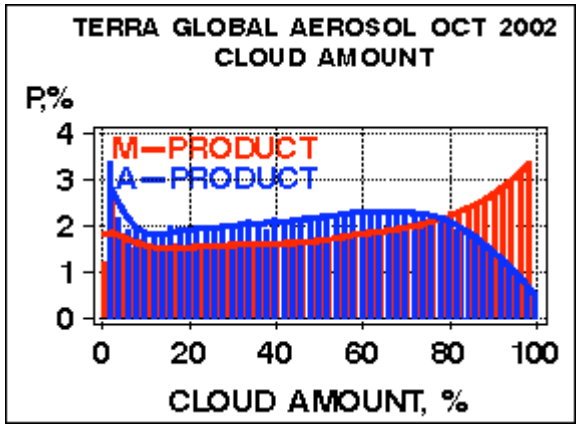


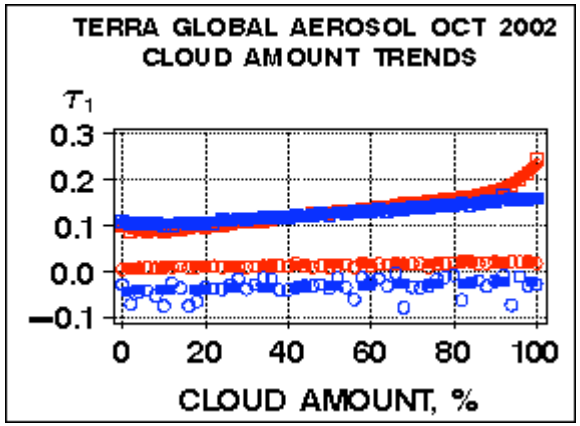
***Aqua Ed1A:* A vs. M**

MODIS Cloud/Aerosol Correlation

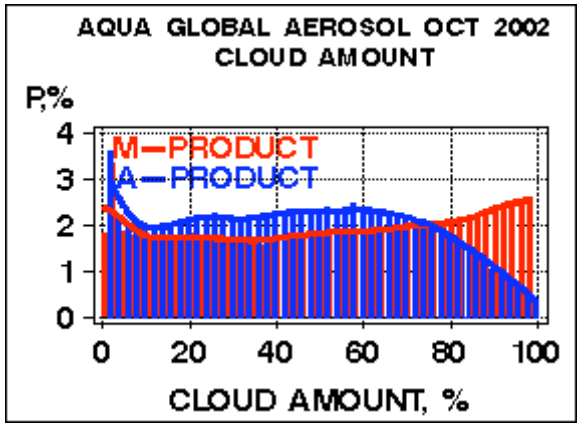
M- and A-histograms & trends differ cross-platform & cross-product

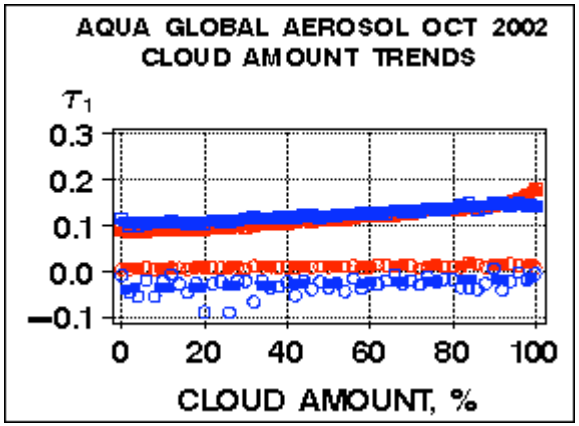
Terra Ed1A





Aqua _

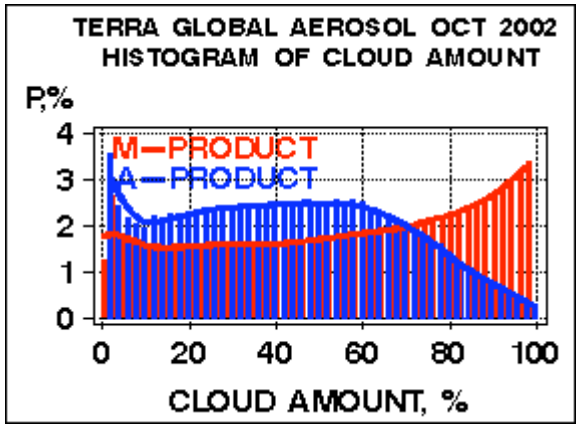


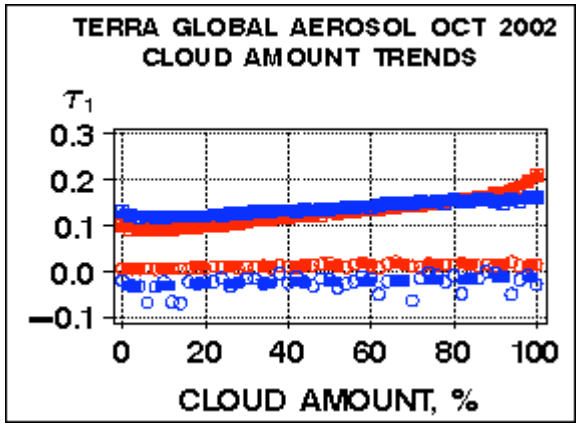


MODIS Cloud/Aerosol Correlation

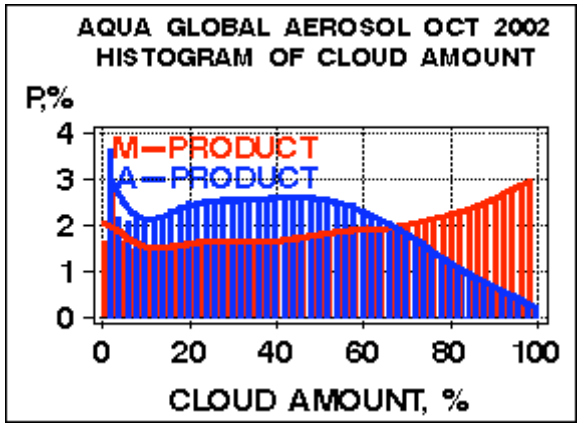
M- and A-histograms & trends differ cross-platform & cross-product

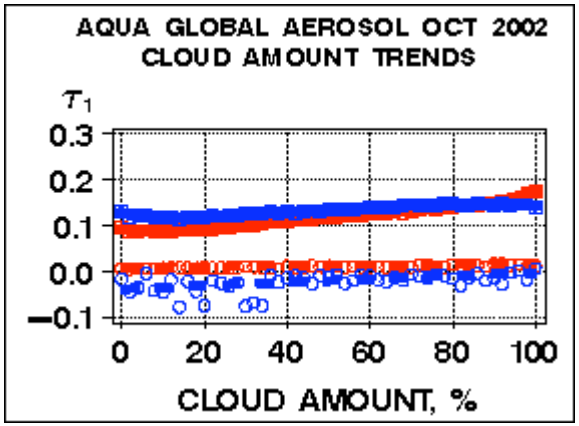
Terra Ed2A





Aqua Ed1A





Conclusion

- Cross-platform/product comparisons improved in new data
- Cross-platform: A compare better (bias/noise/correlation/trends)
- $\_{A1}$ higher than $\_{M1}$ by 0.011-0.013 *(see Laszlo's talk)*
- Ambient cloud: Key parameter in both aerosols
- Correlations $\_{A}(A_T)/\_{M}(A_T)$ *Terra/Aqua* differ: Residual cloud?

Near-future plans (ocean)

- Explore spectral information in the M product
- Extend analyses over time (climate)

AVHRR-like aerosol algorithm over ocean delivered for SEVIRI

- *Steve DeWitte (RMI/Belgium)*
- Helen Brindly (Impreial/UK)
- Pat Minnis/Sunny Sun-Mack (NASA/LaRC)
- Marianne K_nig (EUMETSAT)

Aerosol Products on SSF documented

- JAS, CLAMS Special issue: *Two MODIS Aerosol products over ocean on CERES SSF datasets*
- 13th AMS Conf on Satellite Meteorol and Ocean, 20-23 Sep 2004, Norfolk, VA *(Poster)*
- 4th Int'l SPIE Symp Remote Sensing, 8-12 Nov 2004, Nonolulu, HI: *(Oral)*