

I. MODIS Atmosphere Discipline Team: C6 Status

II. MODAWG: MODIS-VIIRS Product Continuity for Cloud Mask, Cloud-Top & Optical Properties

MODIS/VIIRS Science Team Mtg.
Silver Spring, MD

I. MODIS Atmosphere Discipline Team: C6 Status

MOD06: S. Platnick, G. Wind, N. Amarasinghe, B. Marchant, J. Riedi, G. T. Arnold, K. Meyer, M. D. King, Z. Zhang, C. Wang, R. Holz, S. A. Ackerman, P. Yang, B. Baum, et al.

MODATML2: S. Platnick, B. Ridgway

MOD08: P. Hubanks, S. Platnick, B. Ridgway

MYD02 1km re-registration: R. Wolfe, R. Bennartz, S. Platnick

QA: S. Monoharan, B. Ridgway, S. Platnick

I. MODIS Atmosphere Team C6 Status

- Main Tasks as of last Science Team Meeting
 - Completing L3 algorithm code and testing
 - Finalize Terra L1 & L2 codes (Terra B5 RVS de-trending update – in addition to other VNIR bands; MOD04 Deep Blue).
- Collection 6 reprocessing completed
 - Release in January 2014 (Aqua L2), April 2015(Aqua L3)
 - May 2015 (Terra L2/L3)
 - Collection 5 forward processing will continue to May 2016
- Updated Browse Imagery
 - L2 global browse
 - L3 w/improved image quality, user interface and new datasets
- C6 documentation page includes L2 and L3 user guides, webinars, etc.: modis-atmos.gsfc.nasa.gov/products_C006update.html

IMAGES

L1B GRANULES

L2 GLOBAL MOSAICS

L3 DAILY (D3)

L3 EIGHT-DAY (E3)

L3 MONTHLY (M3)

1. Select Collection

Version: **Collection 6** | Collection 51

2. Select Platform

Mission: **Aqua** | Terra

3. Select Date

Year: 2002 2003 2004 2005 2006 2007 2008 2009
2010 2011 2012 2013 2014 **2015**

Month: JAN FEB MAR **APR**

4. Select Map Projection

Grid: **Lat-Lon (Equal Angle)** | Hammer-Aitoff (Equal Area)

5. Select Parameter Group for Aqua APR 2015

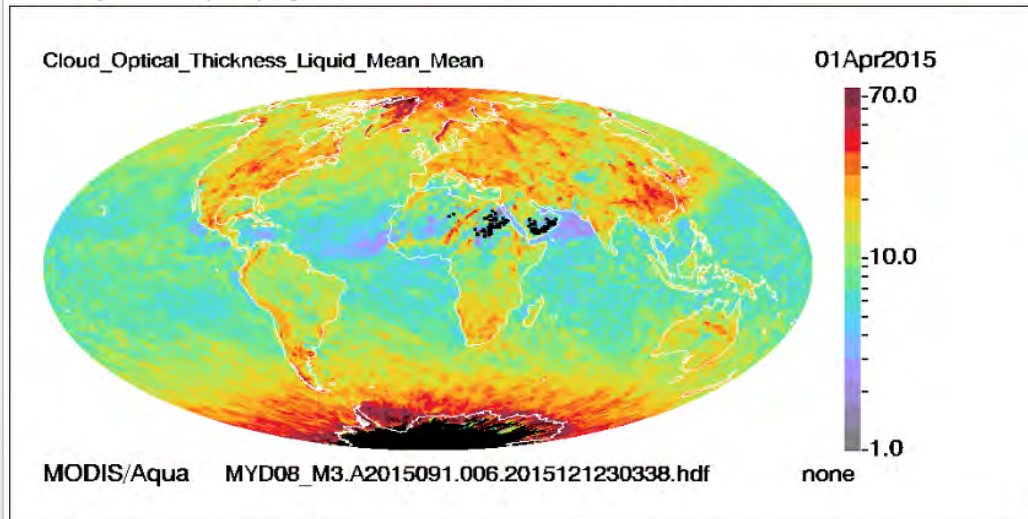
Group: Aerosol Global | Aerosol Land | Aerosol Ocean | Water Vapor
Cirrus | Cloud Top | Cloud Optical | Profiles | Angles (Solar/Sensor)

C6 L3 Browse

(S. Monoharan, B. Ridgway, et al.)

Cloud Optical Properties

Standard 2.1 μm -derived retrievals. With the exception of pixels identified as partly cloudy (PCL) by the Clear Sky Restoral (CSR) algorithm, all datasets were available in Collection 5.



Liquid	Uncertainty_Mean	Standard_Deviation
Ice	Uncertainty_Mean	Standard_Deviation
Undetermined		Standard_Deviation
Combined		Standard_Deviation
PCL_Liquid	Uncertainty_Mean	Standard_Deviation
PCL_Ice	Uncertainty_Mean	Standard_Deviation
PCL_Undetermined		Standard_Deviation
PCL_Combined		Standard_Deviation

↑ gridded means ↑ uncertainty in means ↑ sdev

Atmosphere Team C6 Webinar Series

June–Oct. 2014
(organized by
R. Kleidman)

Collection 006 Update

The documents below describe Collection 6 (C6) changes to all L2 and L3 MODIS data.

C6 Atmosphere Team Webinar Series

Organized by Richard Kleidman (NASA GSFC / SSAI) [More Info](#)



Presentation #1:
Overview of Collection 6 Atmosphere Products and Level-1B Calibration
by Steven Platnick & Jack Xiong (06/25/2014)
[View PDF](#) [View Quicktime Video](#)



Presentation #2:
Overview of Collection 6 Dark-Target Aerosol Product
by Robert Levy (07/09/2014)
[View PDF](#) [View PPT](#) [View Quicktime Video](#)



Presentation #3:
Collection 6 Deep Blue Aerosol Products
by Andrew Sayer & Christina Hsu (07/16/2014)
[View PDF](#) [View PPT](#) [View Quicktime Video](#) (Audio only, first few minutes)



Presentation #4:
MODIS Aerosols Merged Dark Target / Deep Blue Product
by Rob Levy / Andy Sayer (07/15/2014)
[View PDF](#) [View PPT](#) [View Quicktime Video](#)



Presentation #5:
MODIS Aerosol Dark Target 3 Km Product
by Leigh Munchak (07/23/2014)
[View PDF](#) [View PPT](#) [View Quicktime Video](#)



Presentation #6:
MOD035 Cloud Mask and Clear Sky Products
by Steve Ackerman (08/13/2014)
[View PDF](#) [View PPT](#) [View Quicktime Video](#)



Presentation #7:
MOD06 Cloud Top Properties Product
by Paul Menzel (08/20/2014)
[View PDF](#) [View PPT](#) [View Quicktime Video](#)



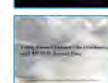
Presentation #8:
Data Archives and Acquisition
by Ed Masuoka (09/10/2014)
[View PDF](#) [View PPT](#) [View Quicktime Video](#)



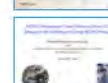
Presentation #9:
MOD06 Cloud Optical Properties Product
by Steven Platnick (09/17/2014)
[View PDF](#) [View Quicktime Video](#)



Presentation #10:
MOD08 Level-3 (L3) Products + MODIS-Atmos website + Defn. of "Day" change
by Paul Hubanks & Bill Ridgway (09/24/2014)
[View PDF](#) [View PPT](#) [View Quicktime Video](#)



Presentation #11:
Giovanni Aerosols Express
by Jim Acker (10/01/2014)
[View PDF](#) [View PPT](#) [View Quicktime Video](#)



Presentation #12:
Resources for Finding and Using MODIS Products
by Richard Kleidman (10/08/2014)
[View PDF](#) [View PPT](#) [View Quicktime Video](#)



Presentation #13:
MAIAC 1 Km Aerosol Product
by Alexei Lyapustin (10/15/2014)
[View PDF](#) [View Quicktime Video](#)



Presentation #14:
MOD07 Atmospheric Profiles Product
by Paul Menzel (10/29/2014)
[View PDF](#) [View PPT](#) [View Quicktime Video](#) (Audio only, first few minutes)

II. MODAWG: MODIS-VIIRS Product Continuity for Cloud Mask¹, Cloud-Top² & Optical Properties³

¹ Steve Ackerman, Rich Frey, Bob Holz [UW/CIMSS]

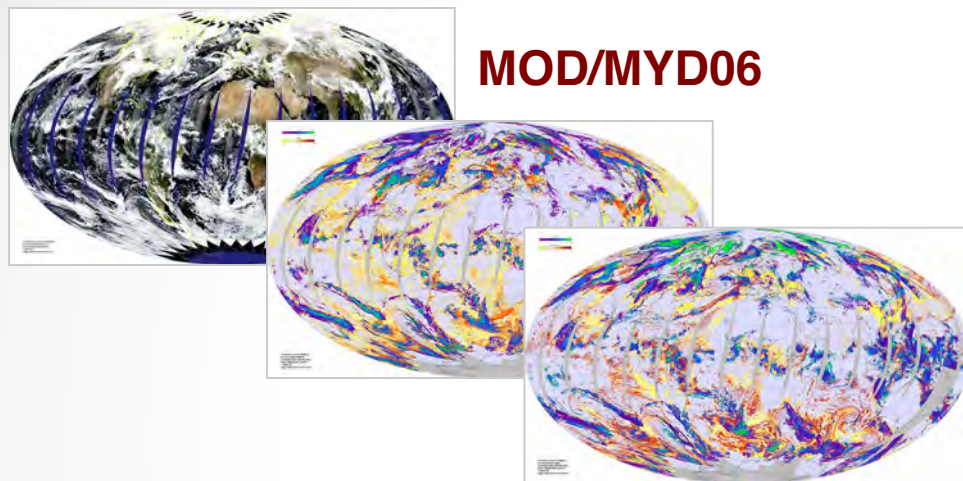
² Andy Heidinger, Yue Li, Steve Wanzong [UW/CIMSS, NOAA STAR]

³ Steve Platnick, Kerry Meyer, Gala Wind, Nandana Amarasinghe, Ben Marchant, Tom Arnold [GSFC]

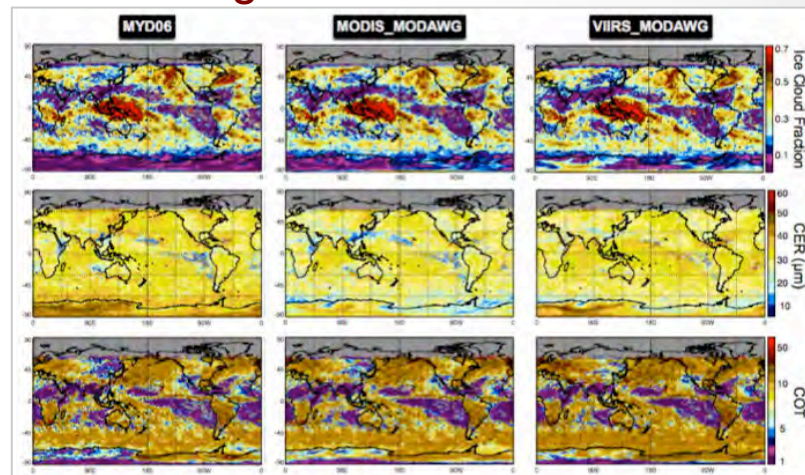
Atmosphere SIPS: Bob Holz, Steve Dutcher, Liam Gumley, et al. [UW/CIMSS]

Level-2 Cloud Optical Property Retrievals

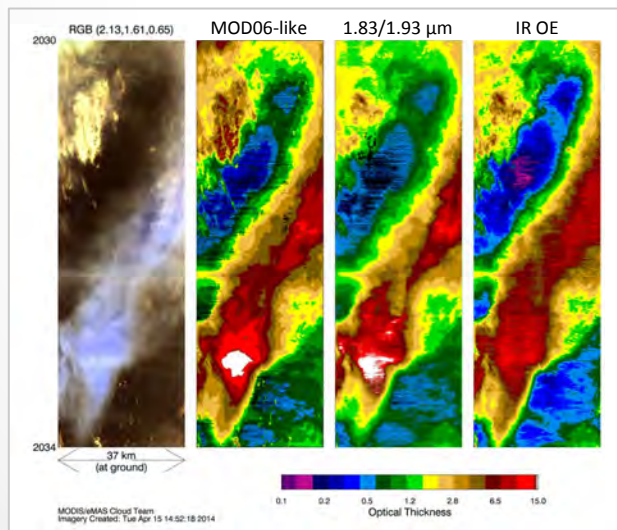
(CHIMAERA Multi-sensor Retrieval Package, see poster)



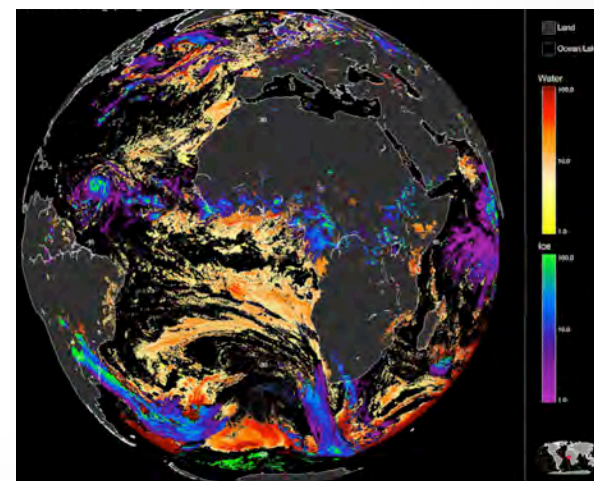
MODAWG: common VIIRS/
MODIS algorithm



eMAS



SEVIRI

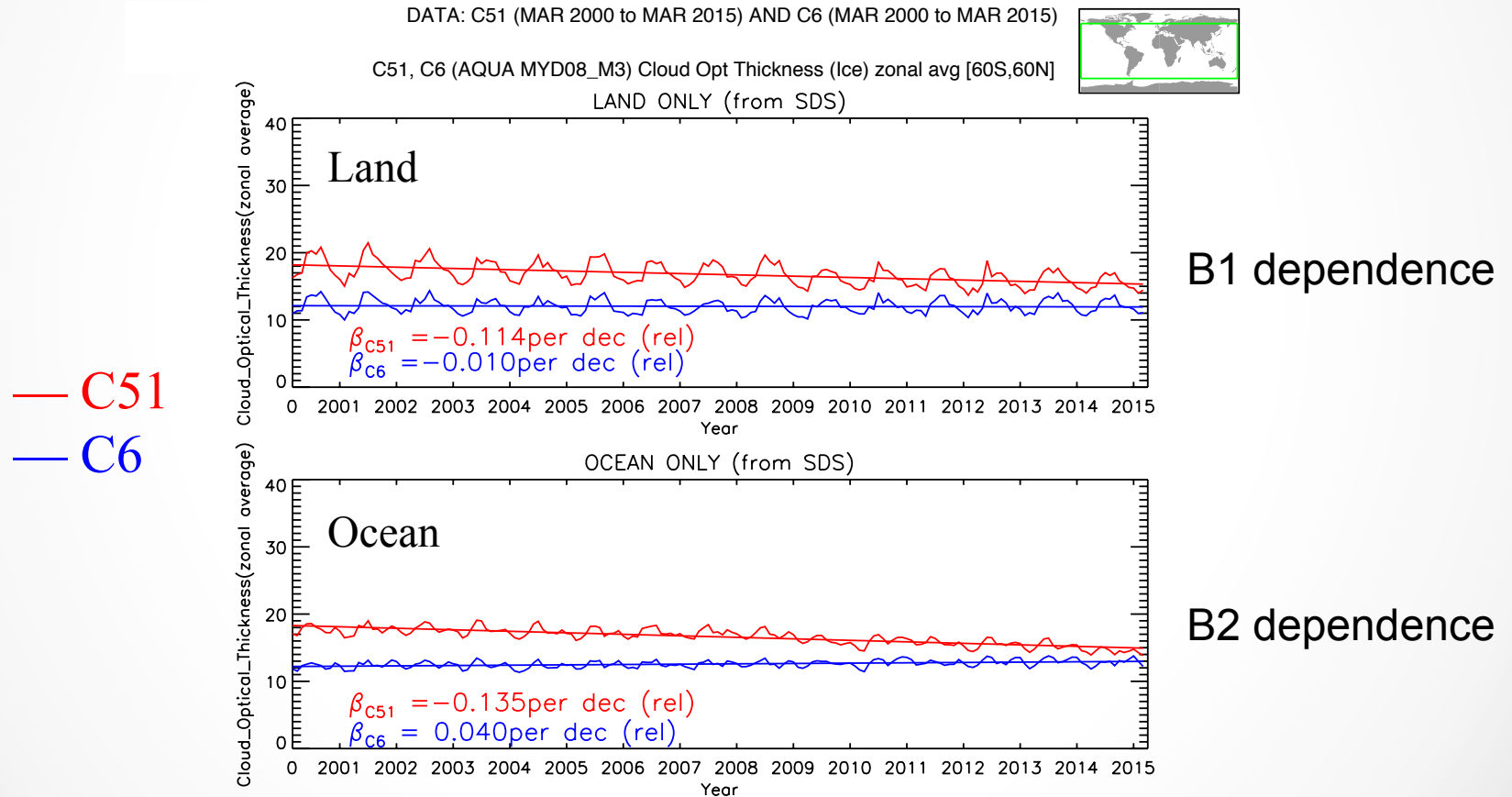


C6 Cloud Optical Property Algorithm

- L1B: Aqua VNIR “re-registration”, Terra RVS radiometric stability
- New radiative transfer and ice cloud models.
- New cloud retrieval phase algorithm (SWIR + IR).
- Additional spectral cloud effective radius retrievals included explicitly.
- Full processing and separate datasets for lower quality “partly cloudy” pixels. Failed retrieval information also provide.
- Additional/improved error sources in pixel-level uncertainty calculations. Dropped use of Confidence QA assignments!
- Surface: New gap-filled C5 land spectral surface albedo, multiple wind speed Cox-Munk ocean model.

MODIS Atmosphere Team C6 Status

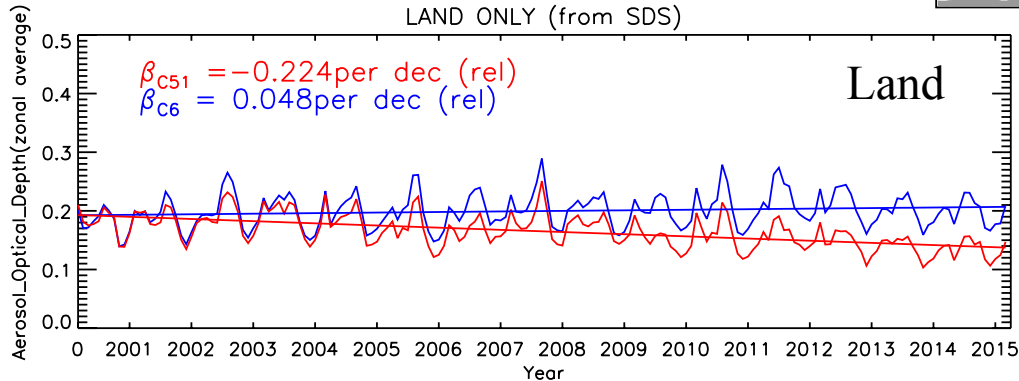
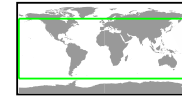
Terra C6 RVS L1B De-Trending Impact: Ice Cloud Optical Thickness



MODIS Atmosphere Team C6 Status

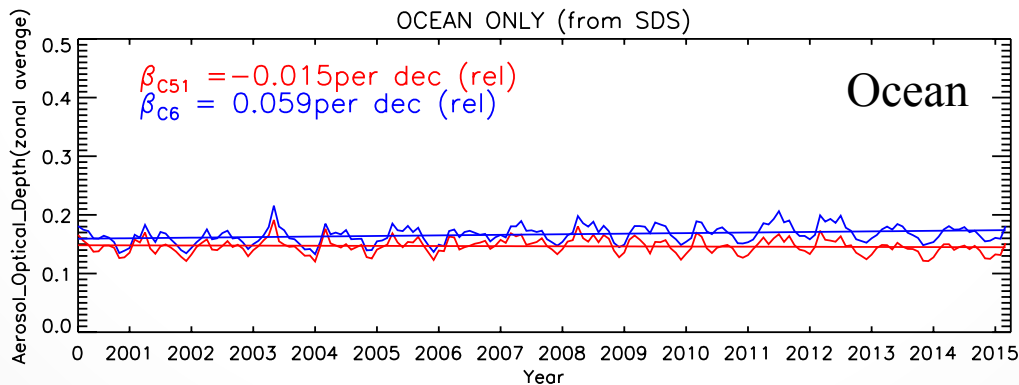
Terra C6 RVS L1B De-Trending Impact: **DT Aerosol Optical Depth**

DATA: C51 (MAR 2000 to MAR 2015) AND C6 (MAR 2000 to MAR 2015)
C51, C6 (TERRA MOD08_M3)
Aerosol_Optical_Depth_Land_Ocean_Mean_Mean zonal avg [60S,60N]
LAND ONLY (from SDS)



B3 dependence

— C51
— C6



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Terra C6 RVS L1B De-Trending Impact: %/dec, $\pm 60^\circ$ latitude

	Terra C5	AquaC5	Terra C6	Aqua C6
COT Ice/land	-11.4		-1.0	
COT Ice/ocean	-13.5		4.0	
DT AOD land	-22.4		4.8	
DT AOD ocean	-1.5		5.9	

significant reduction
in Terra trends

MODIS Atmosphere Team C6 Status

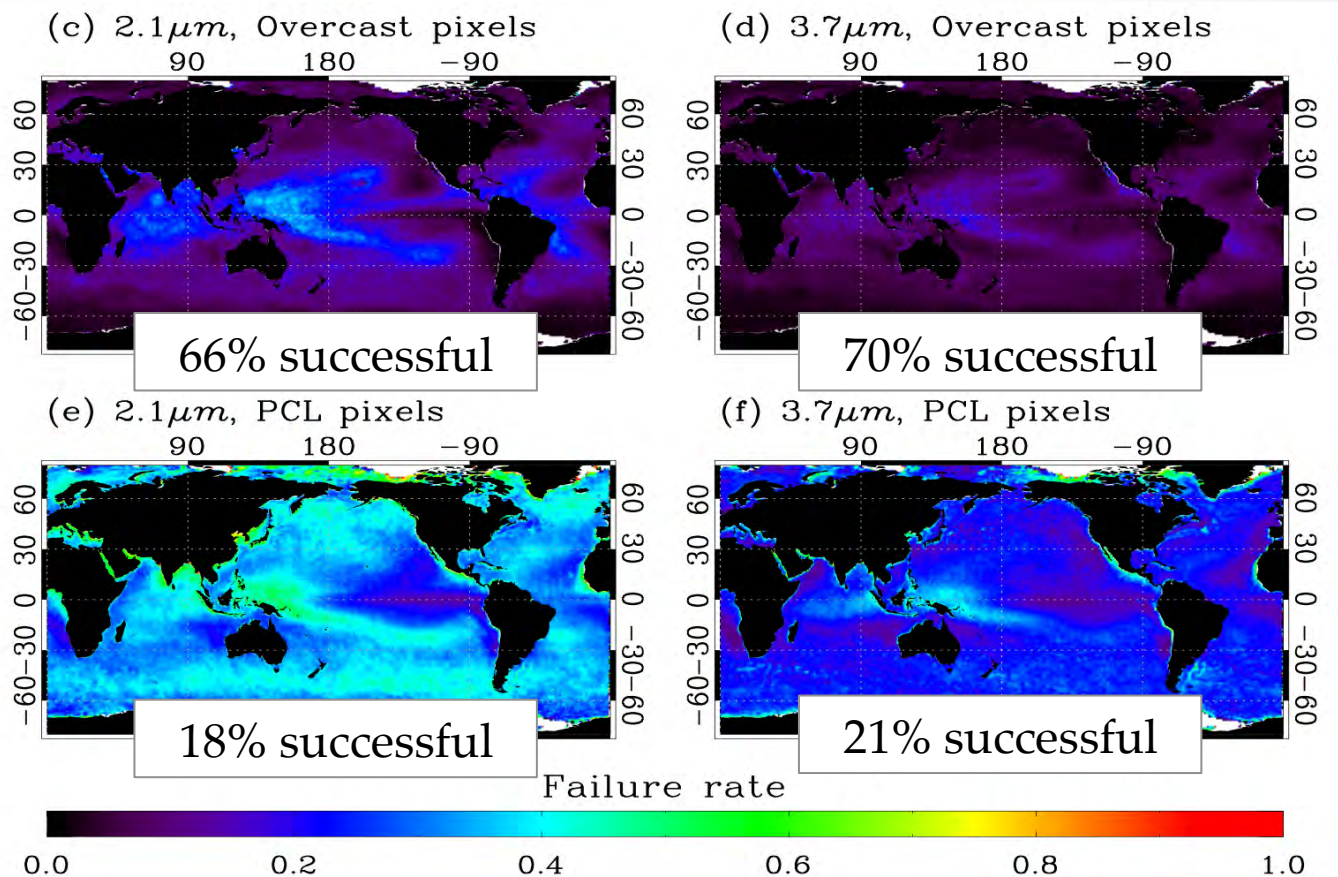
Terra C6 RVS L1B De-Trending Impact: %/dec, $\pm 60^\circ$ latitude

	Terra C5	AquaC5	Terra C6	Aqua C6
COT Ice/land	-11.4	-0.8	-1.0	-2.7
COT Ice/ocean	-13.5	-3.2	4.0	-1.2
DT AOD land	-22.4	-2.1	4.8	-1.7
DT AOD ocean	-1.5	0.3	5.9	0.7

C6 “Failed” Retrieval Statistics for Marine Boundary Layer Clouds

1 yr. (2007) Aqua MODIS analysis, see poster for further details

“Overcast”
(74% of
attempted
retrieval
population)



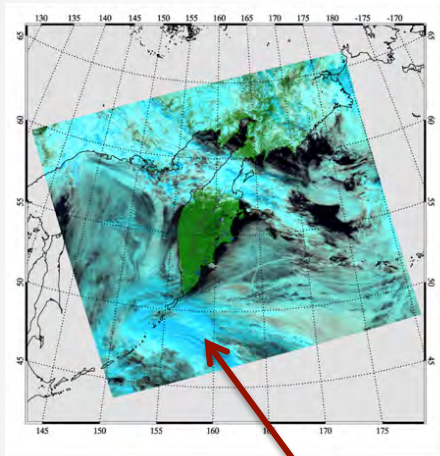
“Partly
Cloudy”
(26%)

Cho, H. M. et al. (2015), Frequency and causes of failed MODIS cloud property retrievals for liquid phase clouds over global oceans, *JGR*, doi:10.1002/2015JD023161.

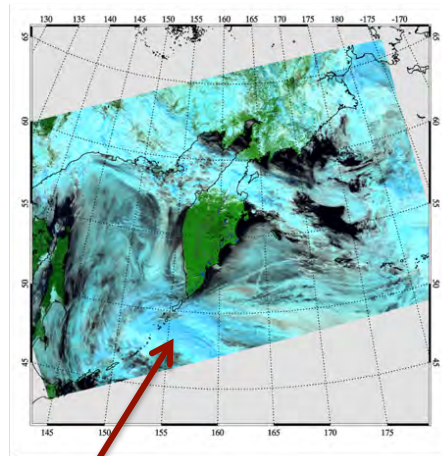
MODAWG MODIS & VIIRS L2 Comparisons

Using common IFF L1B files from Atmosphere SIPS

- 6 July 2014, Kamchatka Peninsula, near simultaneous overpass (0200 UTC) and ground track

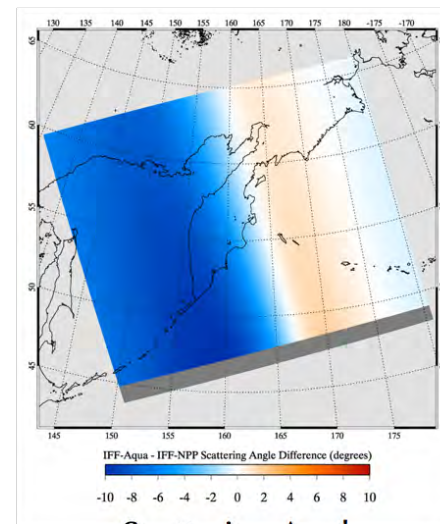


MODIS False Color
(Bands 7, 2, 1)

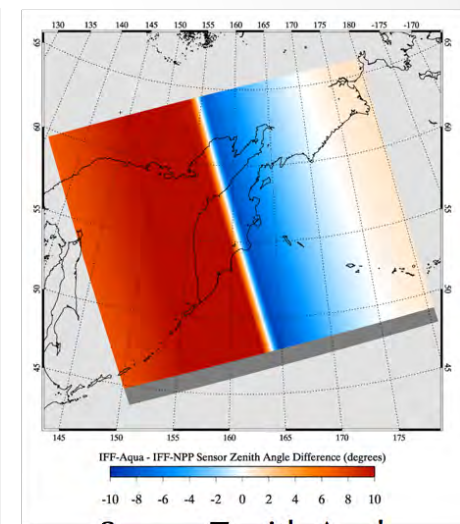


VIIRS False Color
(M11, M7, M5)

Cyan => ice phase clouds



Scattering Angle
Difference



Sensor Zenith Angle
Difference

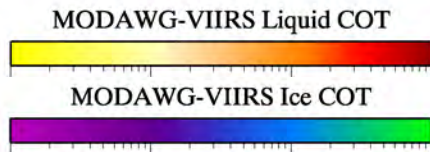
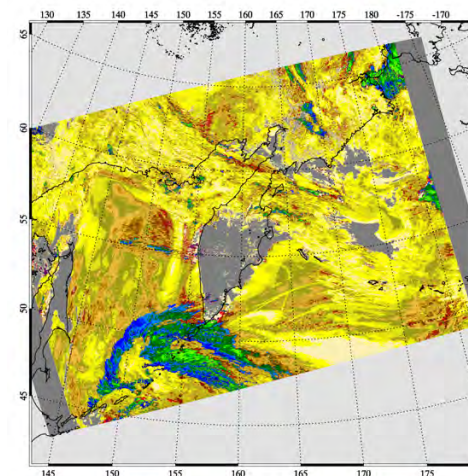
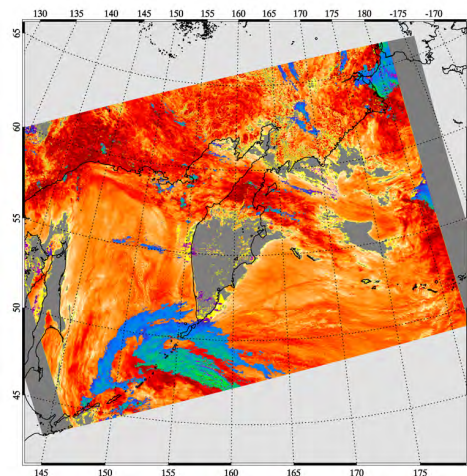
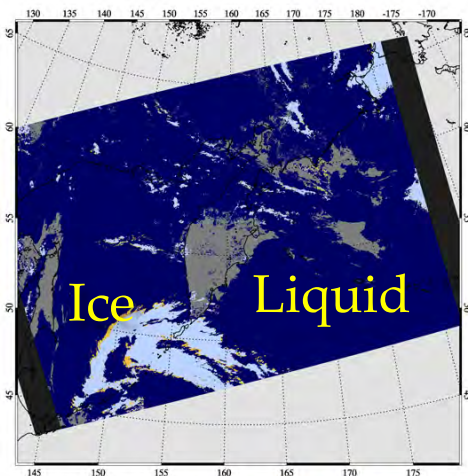
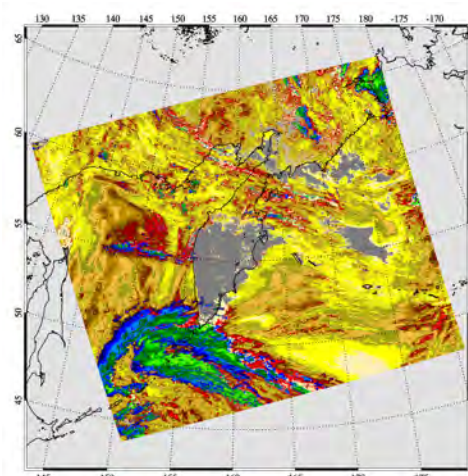
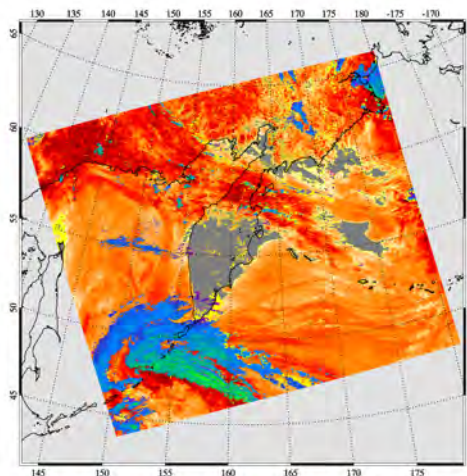
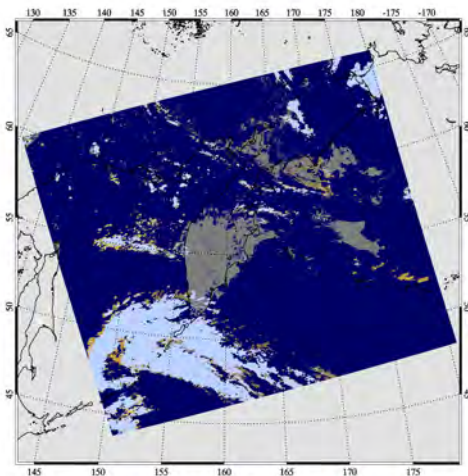
Phase

COT

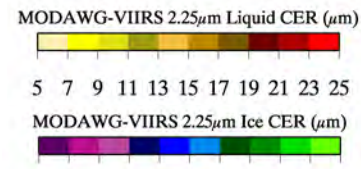
CER_{2.2} (μm)

MODAWG
MODIS
liquid & ice

MODAWG
VIIRS
liquid & ice



0.1 1.0 10.0 100.0

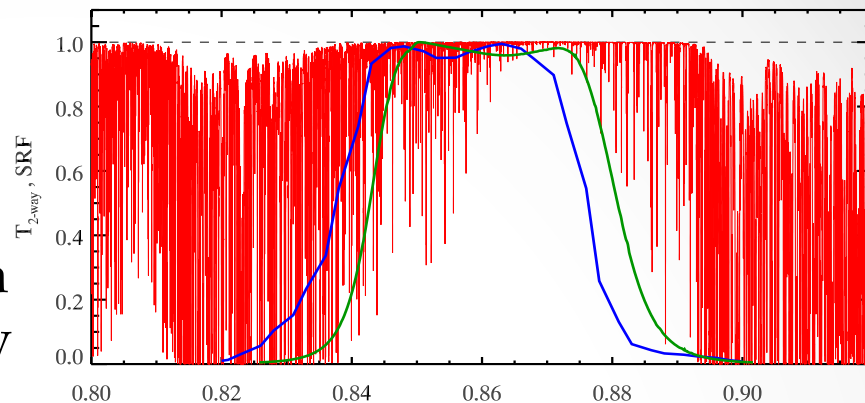


5 7 9 11 13 15 17 19 21 23 25
MODAWG-VIIRS 2.25μm Ice CER (μm)
5 10 15 20 25 30 35 40 45 50 55

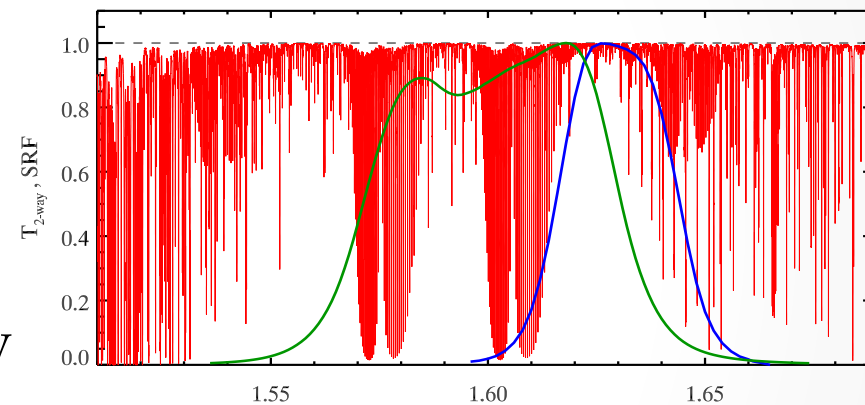
L1 Radiometric Intercomparison Challenges:

MODIS (blue) & VIIRS (green) RSRs

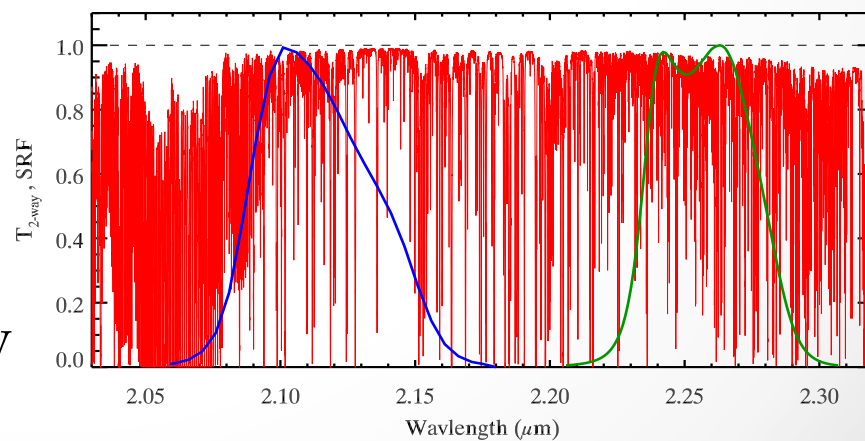
0.86 μm
window



1.6 μm
window

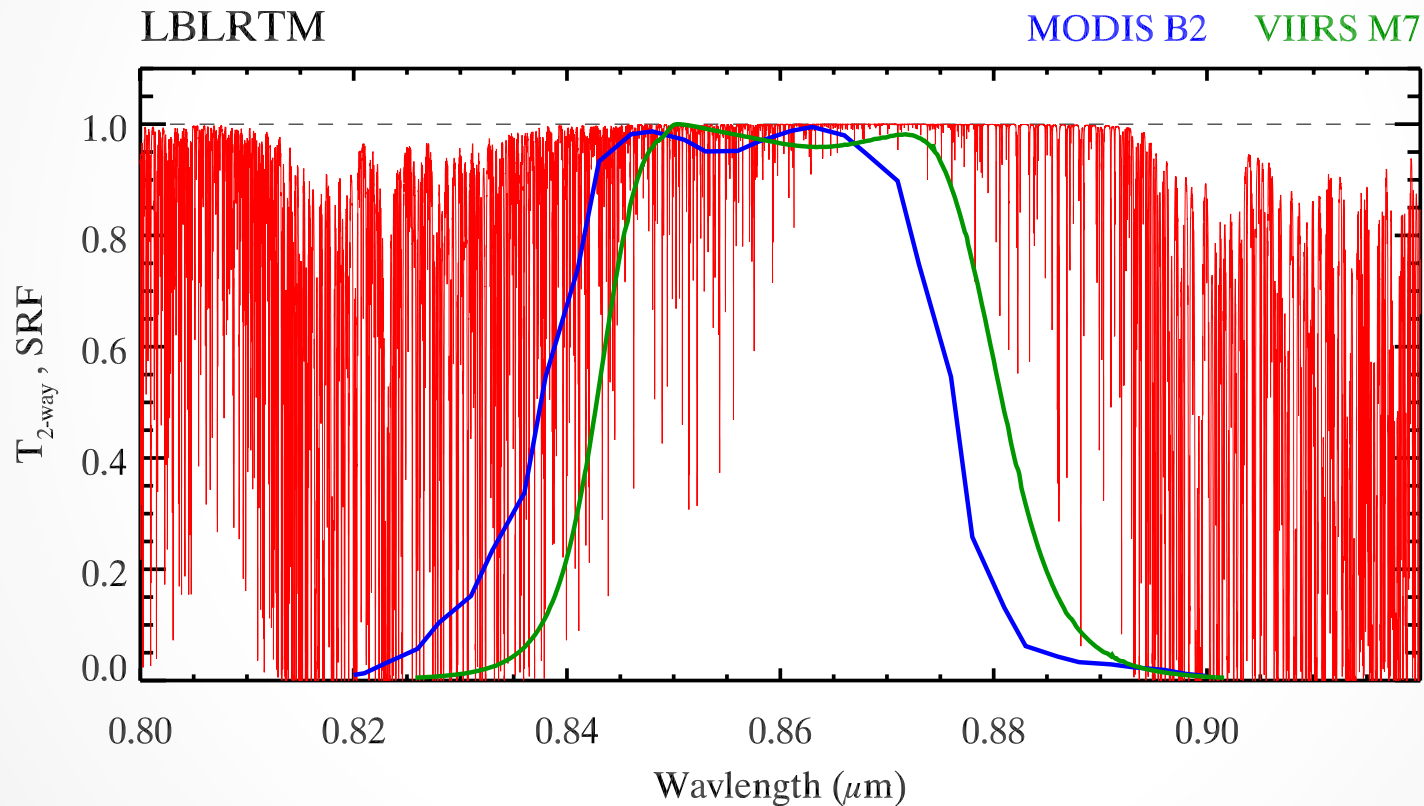


2.1 μm
window



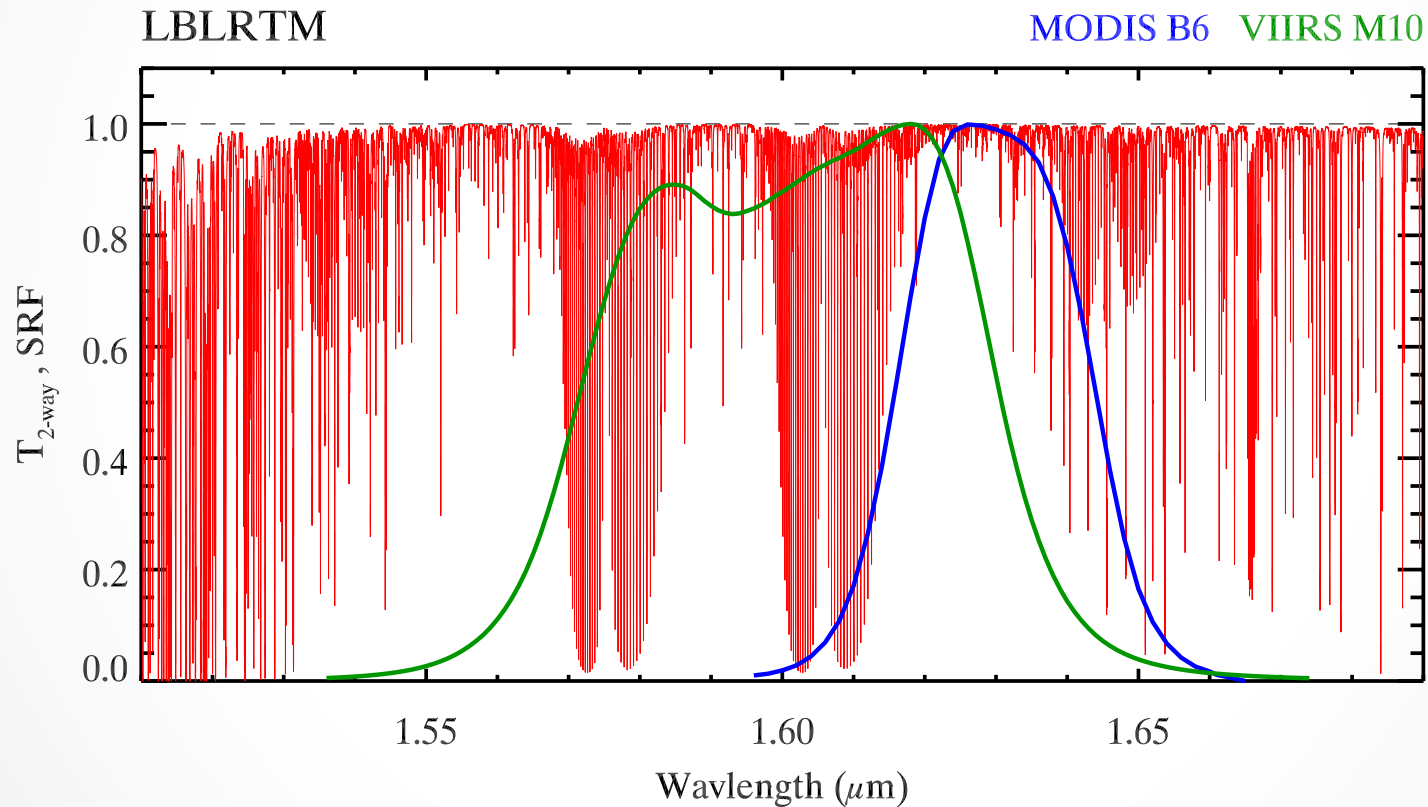
L1 Radiometric Intercomparisons

- MODIS (blue) and VIIRS (green) 0.86 μm channel bandpasses



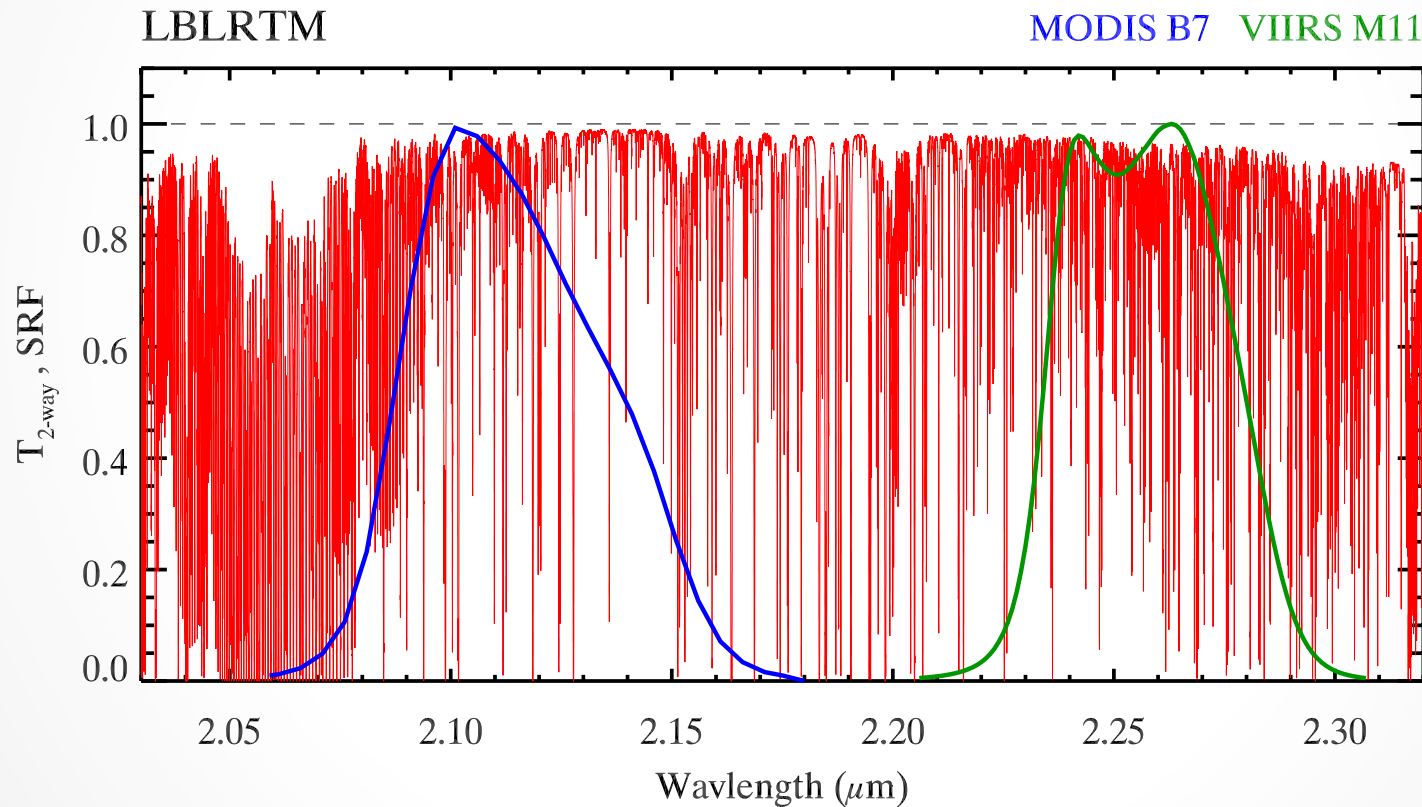
L1 Radiometric Intercomparisons

- MODIS (blue) and VIIRS (green) 1.6 μm window bandpasses



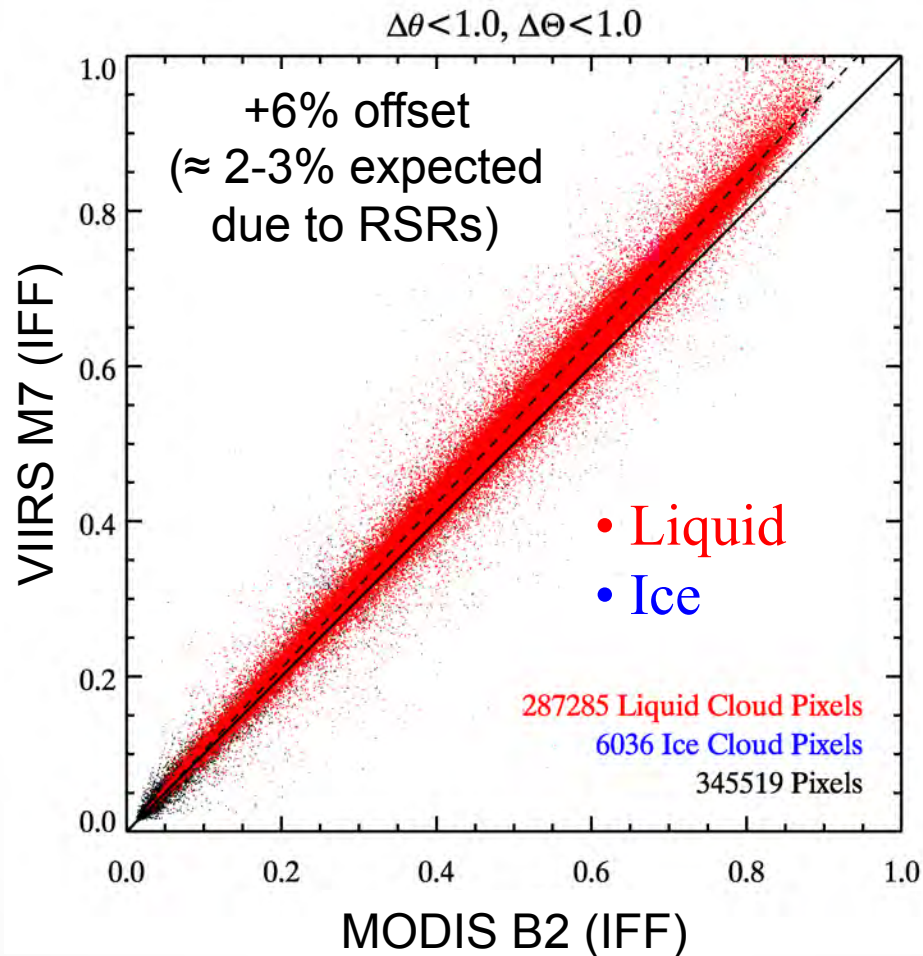
L1 Radiometric Intercomparisons

- MODIS (blue) and VIIRS (green) 2.2 μm window bandpasses

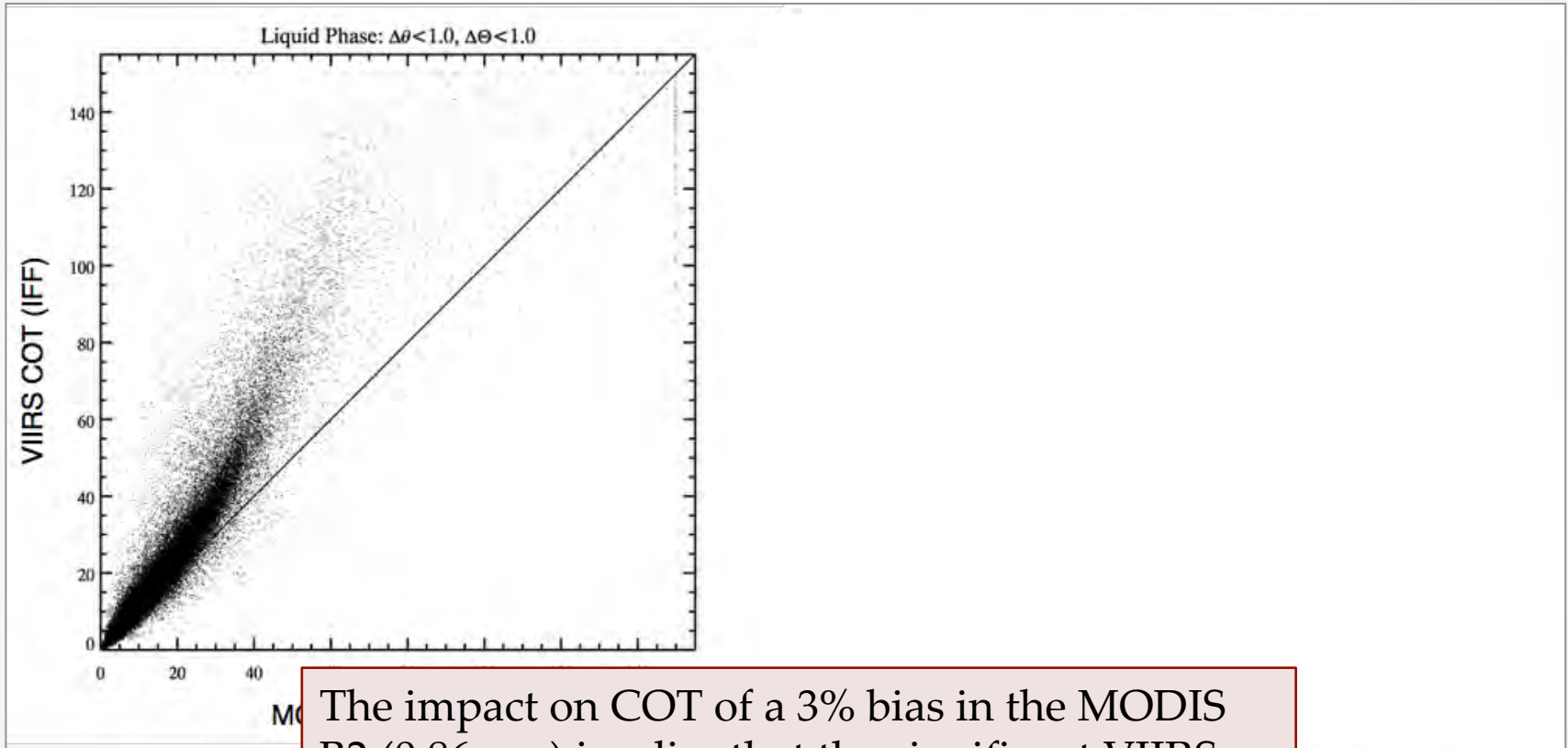


L1 Radiometric Intercomparisons

0.86 μm reflectance scatterplot for similar solar/view geometry ($\leq 1^\circ$)

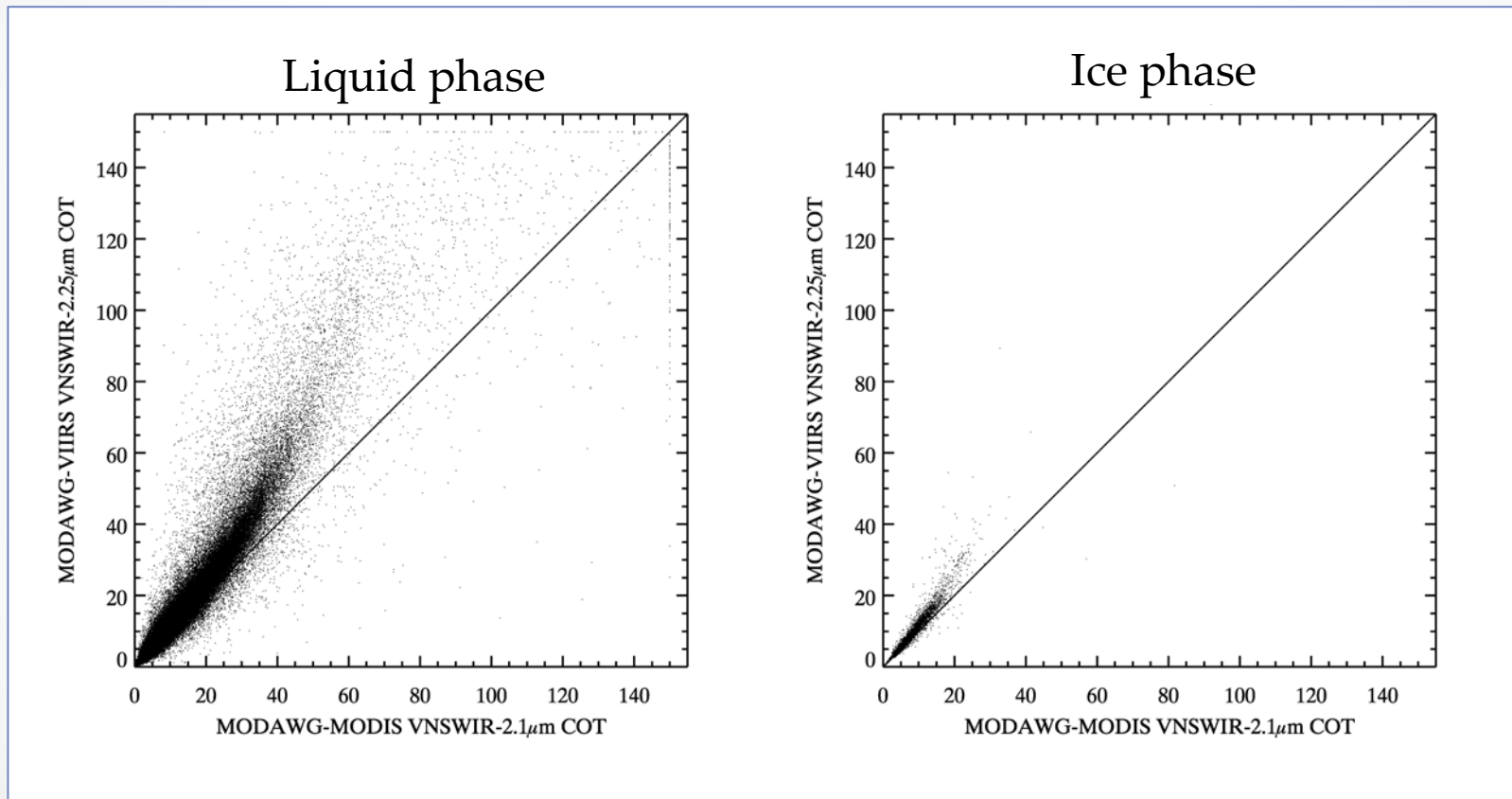


MODAWG Cloud Optical Thickness (COT) Intercomparisons for liquid water clouds

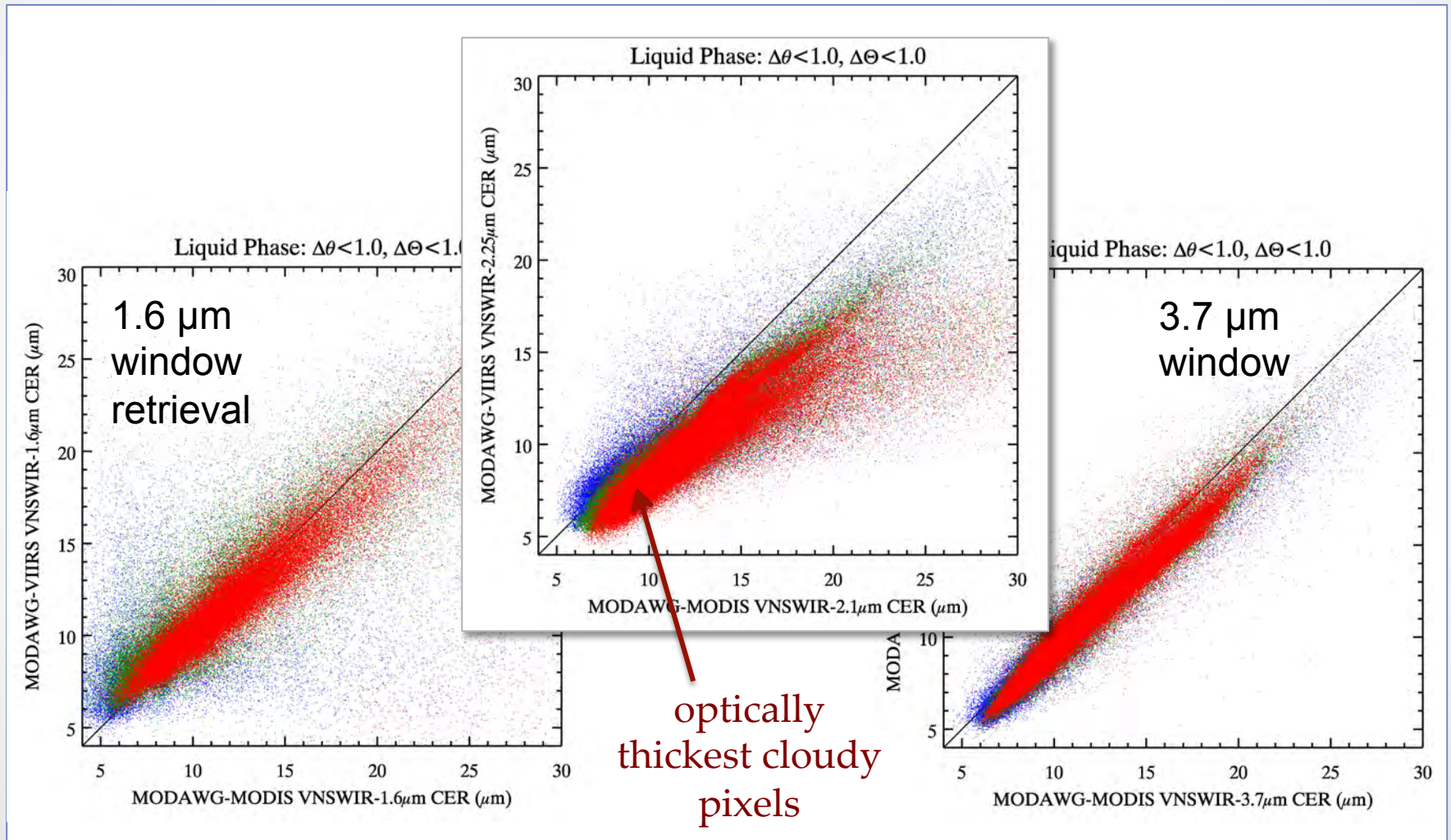


The impact on COT of a 3% bias in the MODIS B2 (0.86 μm) implies that the significant VIIRS COT bias at large values in the left panel is explained by a radiometric bias.

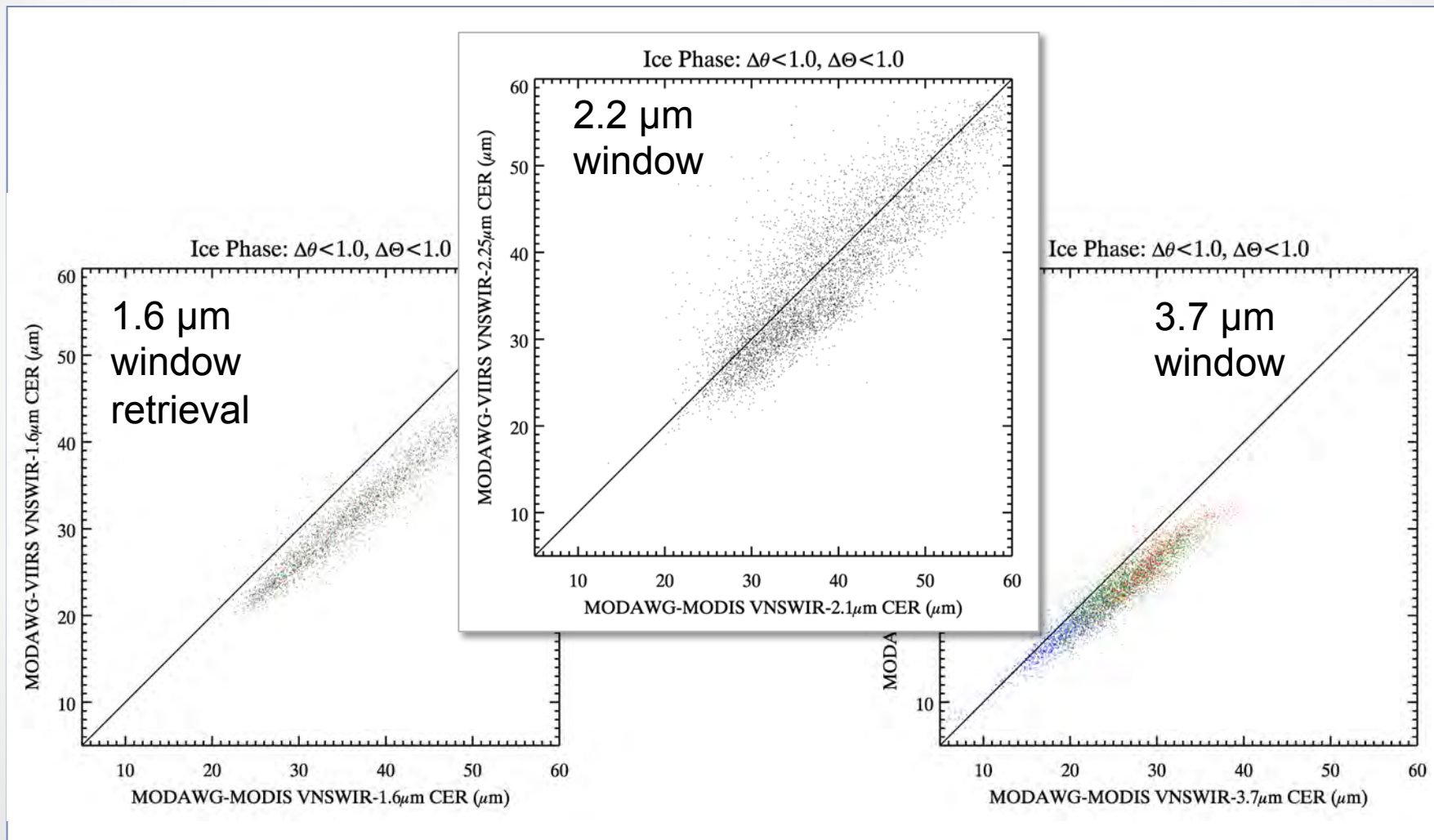
MODAWG COT Intercomparisons: solar/view angle match $<1^\circ$



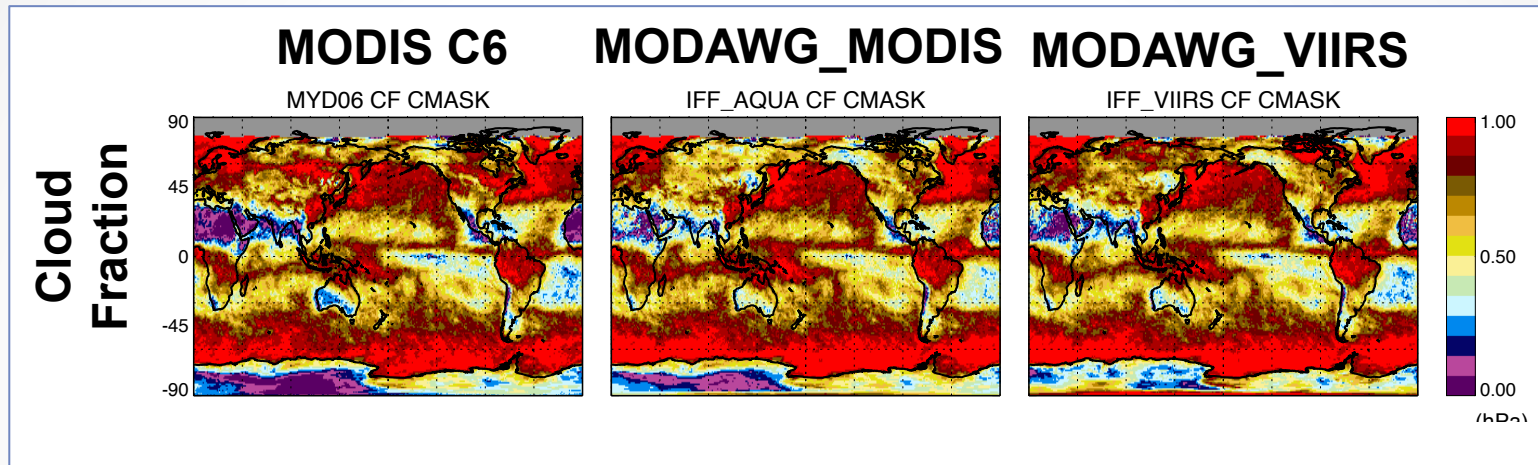
MODAWG CER Intercomparisons: Liquid clouds, solar/view angle match $<1^\circ$



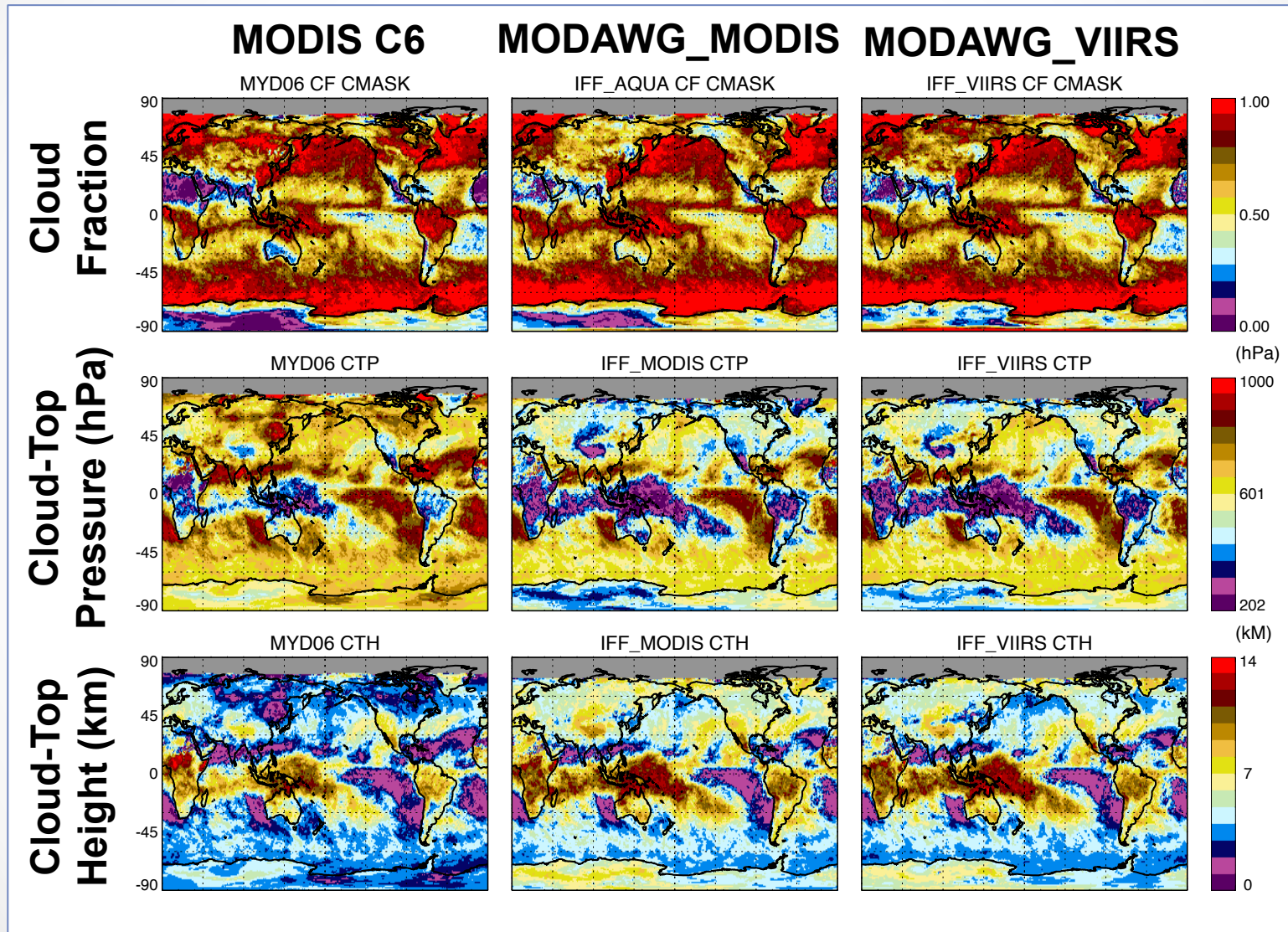
MODAWG CER Intercomparisons: Ice clouds, solar/view angle match $<1^\circ$



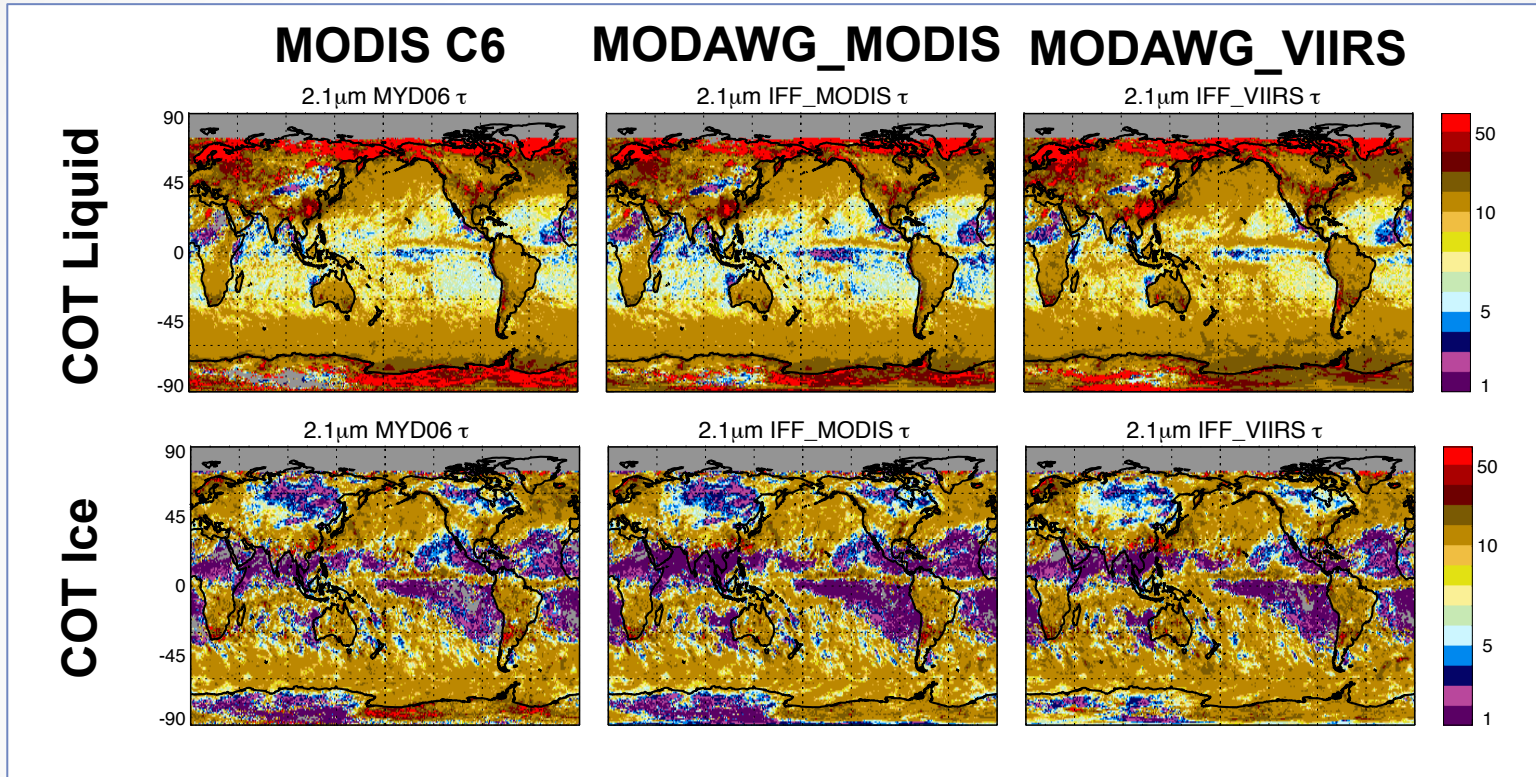
MODAWG Global Gridded Mask & CTP: Day Only



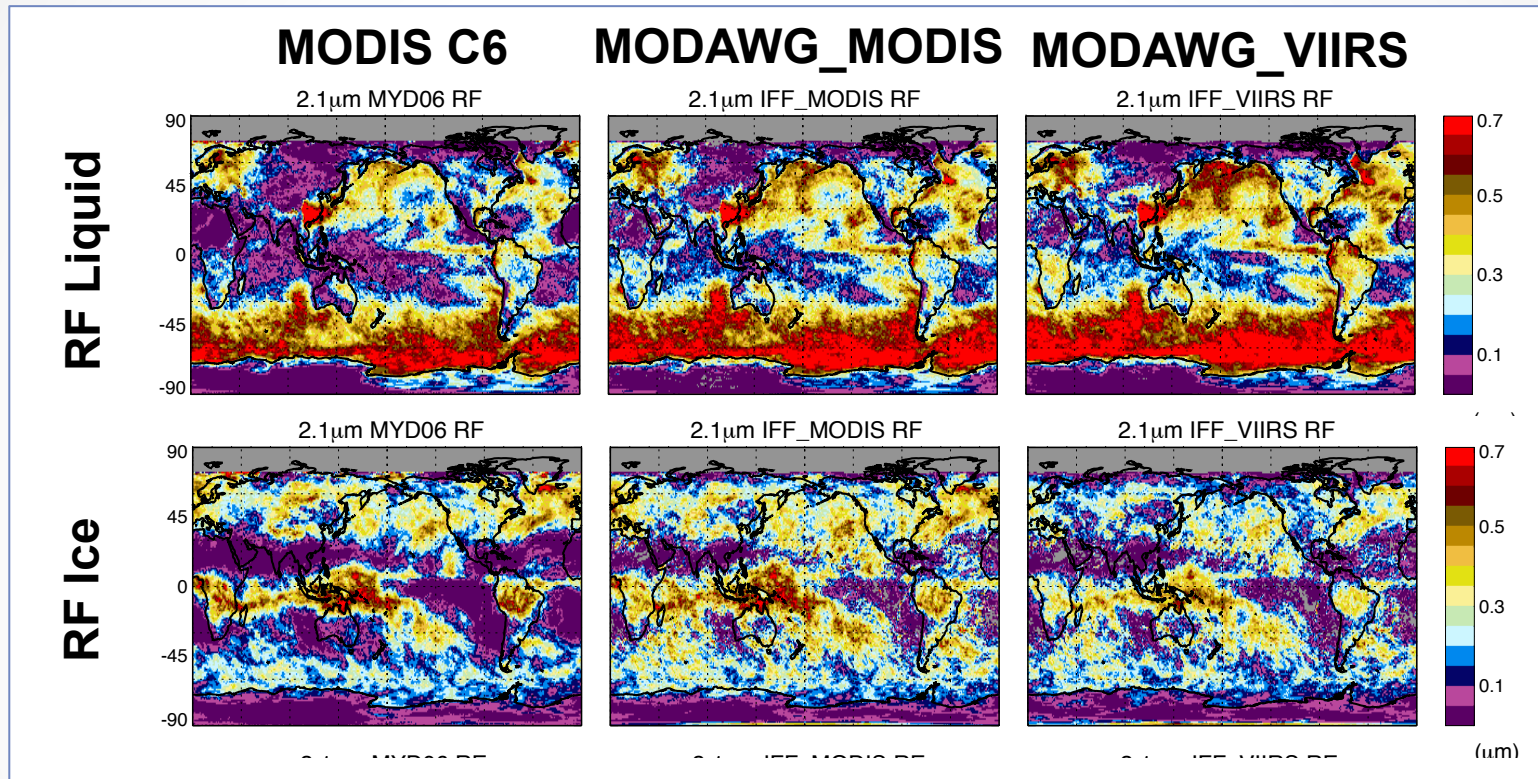
MODAWG Global Gridded Mask & CTP: Day Only



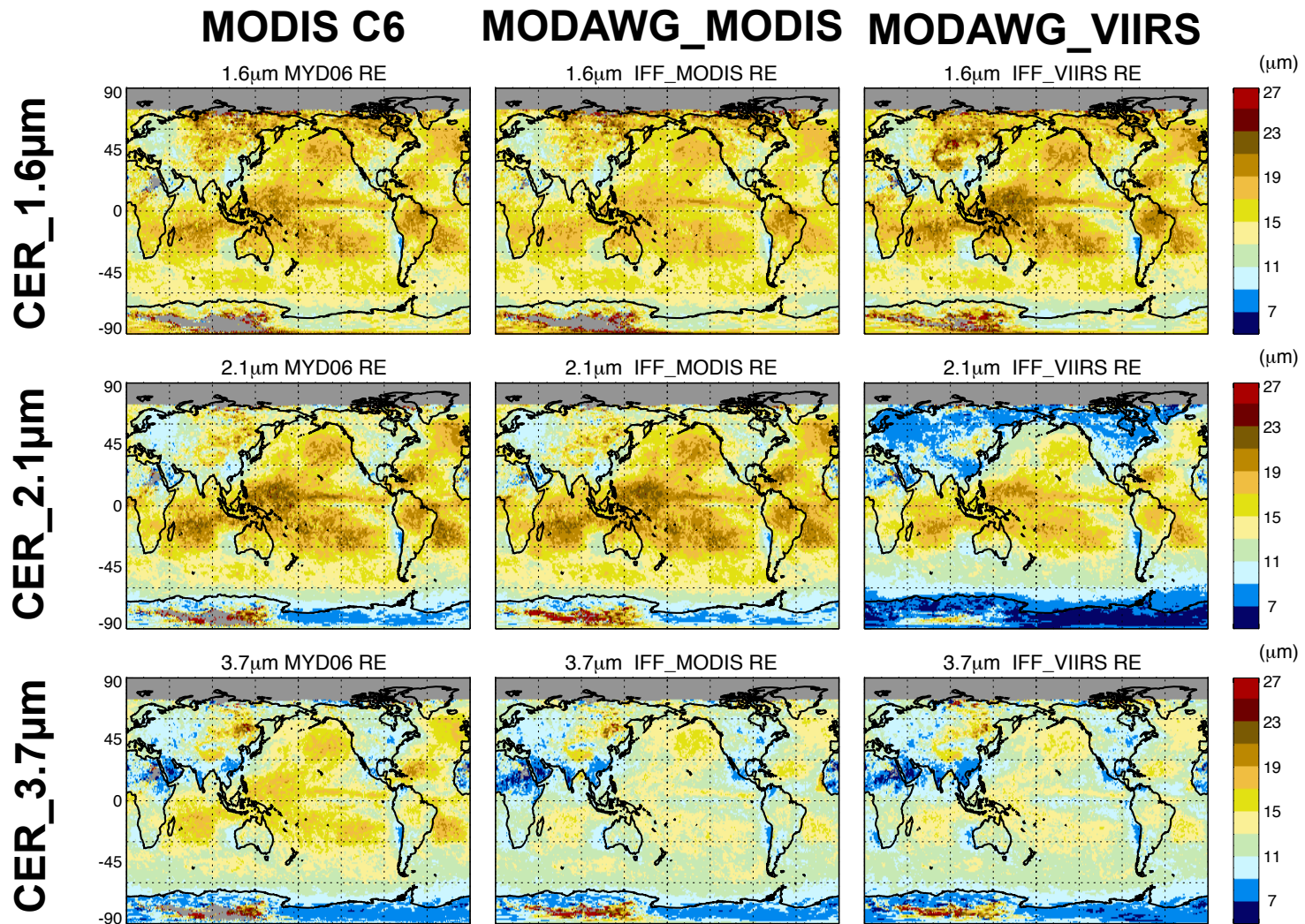
MODAWG Global Gridded COT



MODAWG Global Gridded COT



MODAWG Global Gridded CER: Liquid Clouds



MODAWG Global Gridded CER: Ice Clouds

