Comparison of Cloud Properties from MODIS and GOES During TC4

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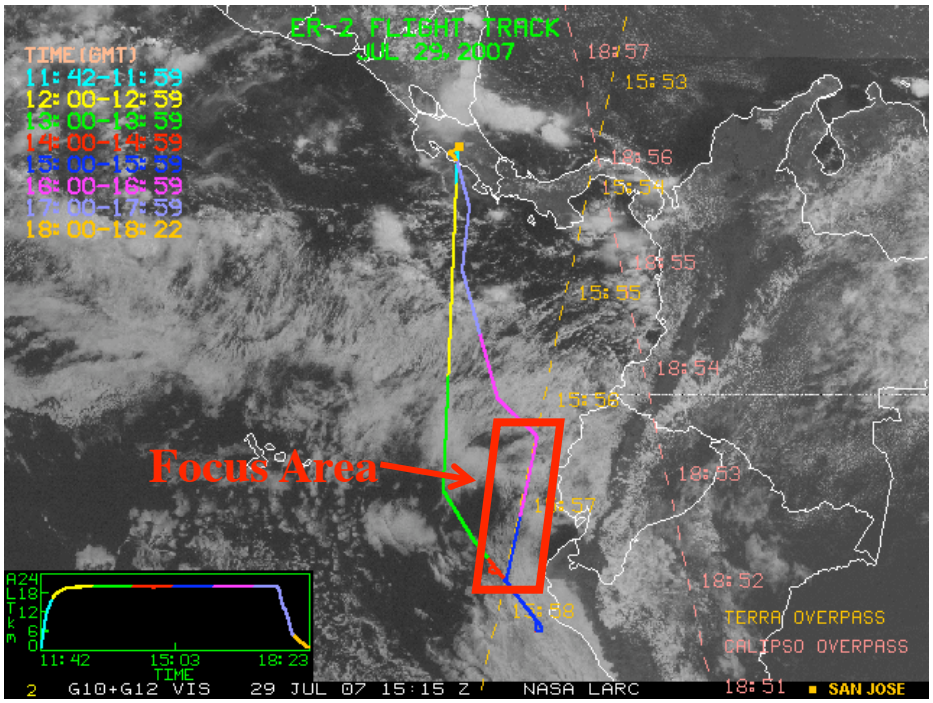
Data and Methodology

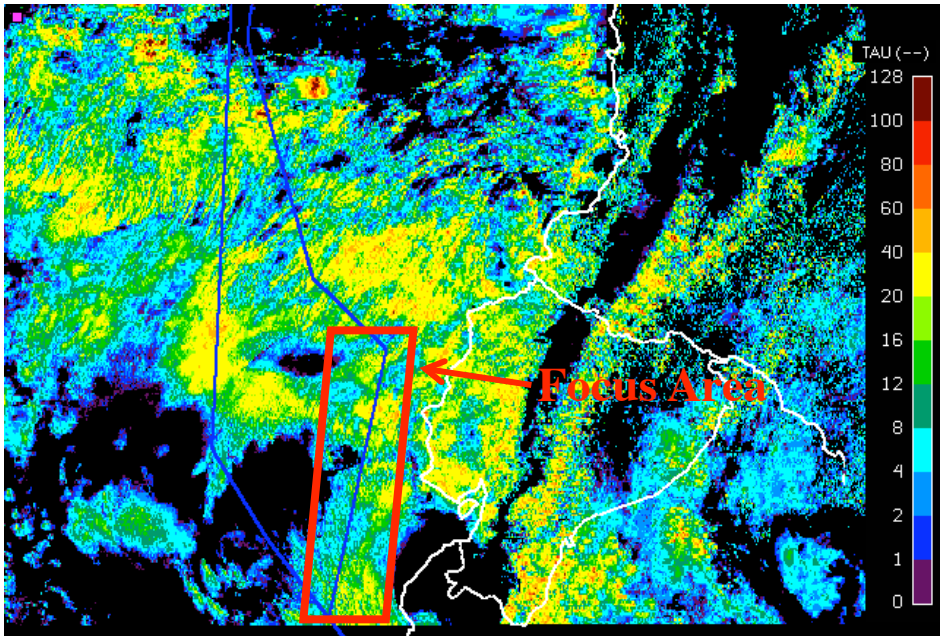
- Data
  - GOES-12 (4-km, 30 minute)
  - Terra MODIS (1-km, sub-sampled to 2 km)
- Algorithms
  - Visible Infrared Solar-Infrared Split Window Technique (VISST)
    - Day
    - 0.65, 3.9, 10.7, & 13.3 μm (GOES-12)
    - 0.65, 1.6, 3.7, 10.8, 12.0, & 13.3 μm (Terra MODIS)
    - Enhanced with CO2-slicing, New Lapse Rates, Cloud Top Adjustment
  - Solar-Infrared Infrared Split-Window Technique (SIST)
    - Night
    - 3.9, 10.7, & 13.3 μm (GOES-12)
    - 3.7, 10.8, & 12.0 μm (Terra MODIS)
- Match 4-nearest pixels (9 for StDev) to Aircraft Flight Path
- Compare Spatial and Temporal Matched GOES-12/MODIS Retrievals

ER-2 Aircraft Flight Track (July 29, 2007)

Complete

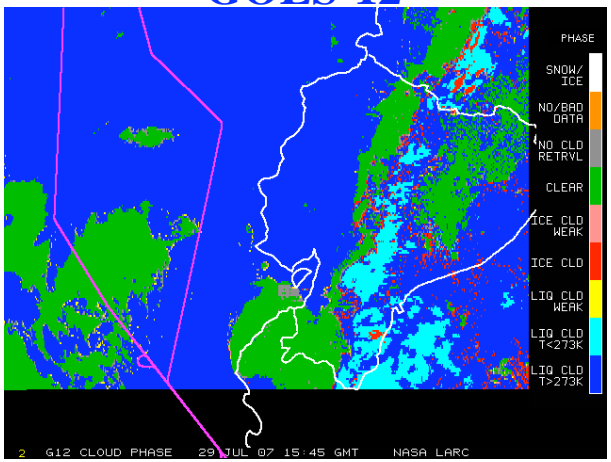


G-12 1545 UTC Optical Depth Retrieval

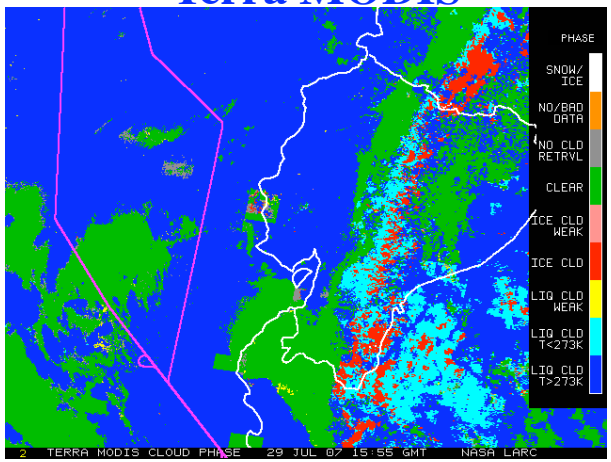


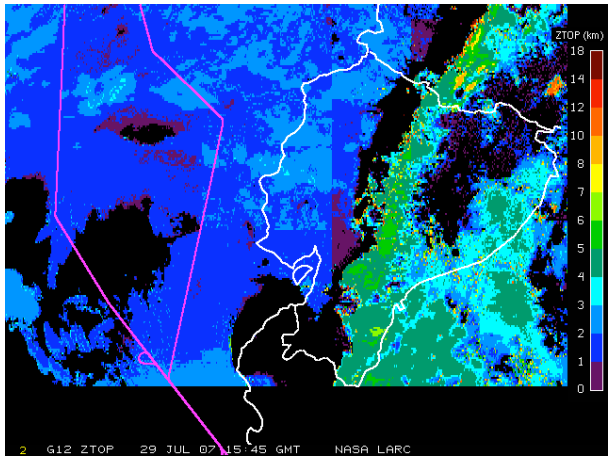
Comparison of GOES-12 and Terra MODIS VISST Derived Cloud Properties (July 29, 2007)

GOES-12 **Terra MODIS**

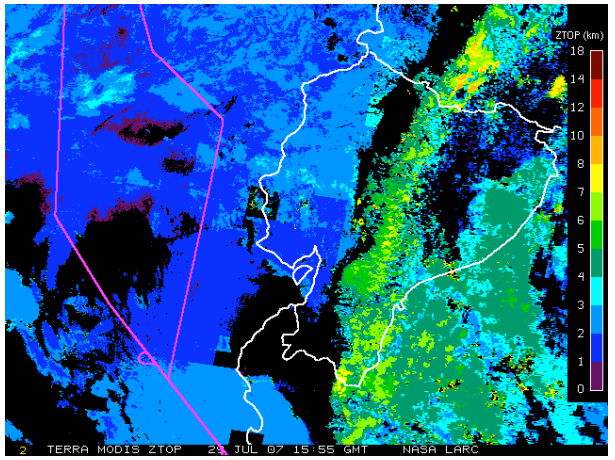


Cloud Mask



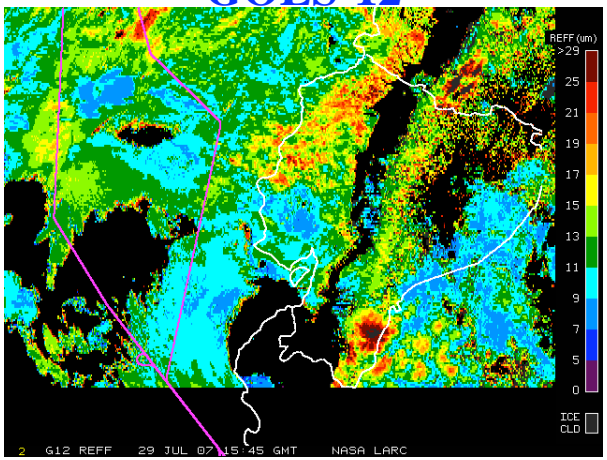


Cloud Top Height

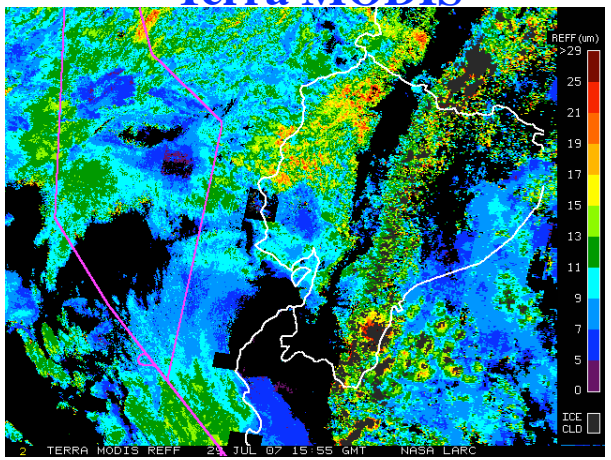


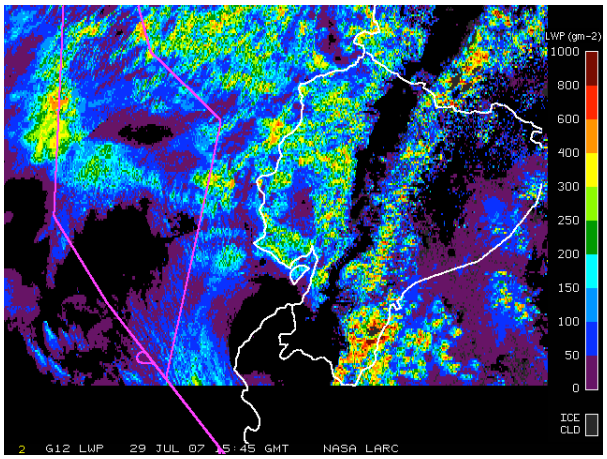
Comparison of GOES-12 and Terra MODIS VISST Derived Cloud Properties (July 29, 2007)

GOES-12 **Terra MODIS**

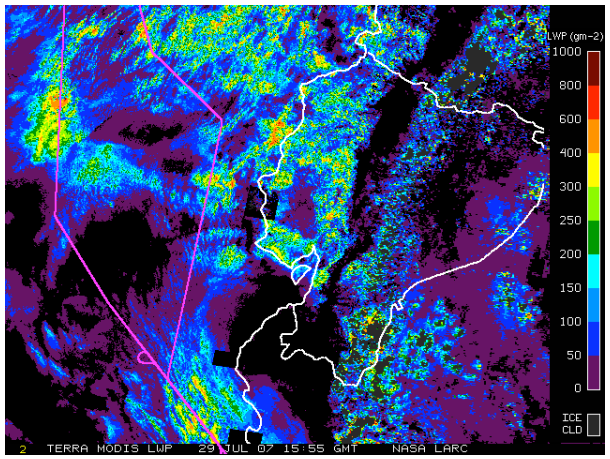


Effective Droplet Radius

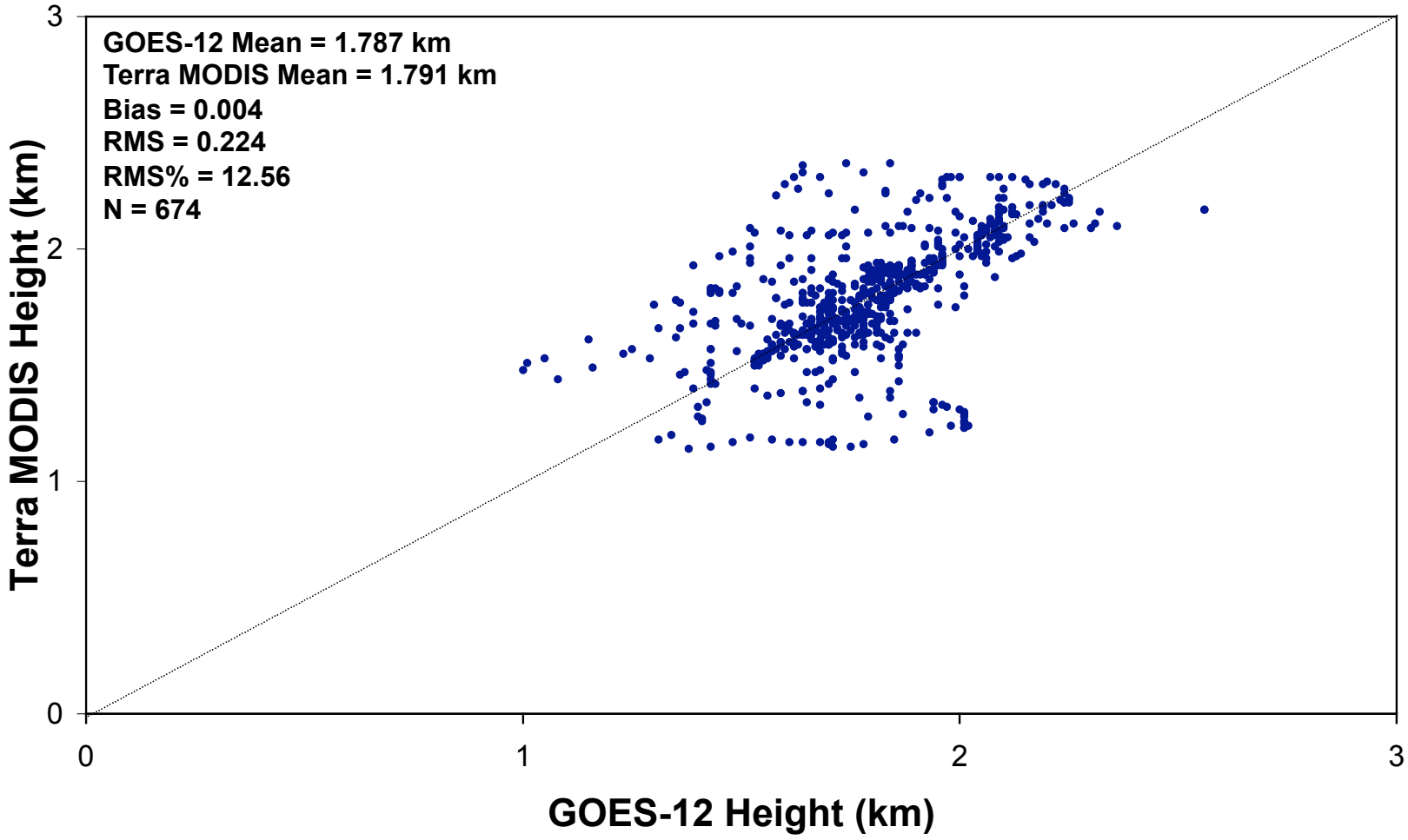




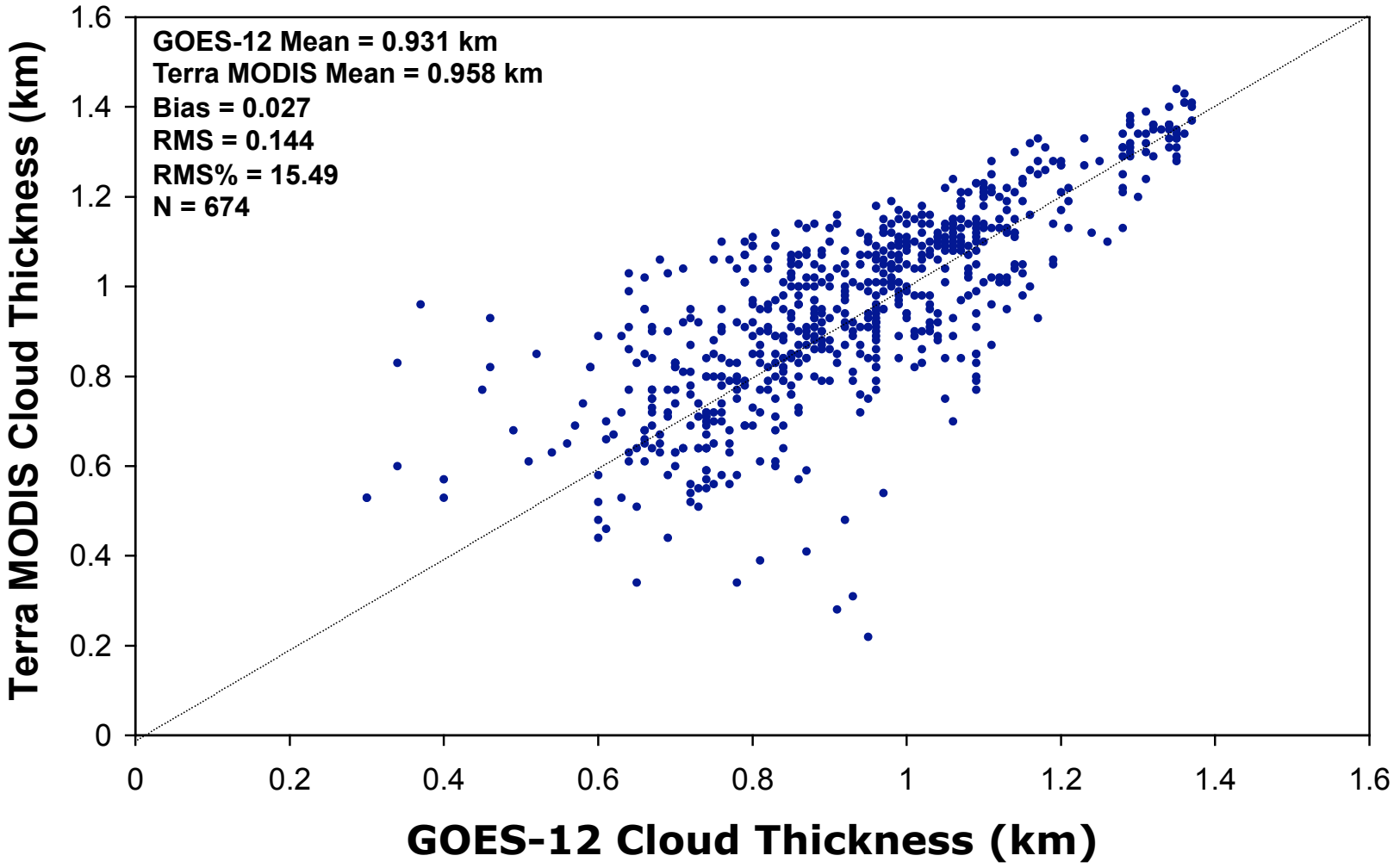
LWP



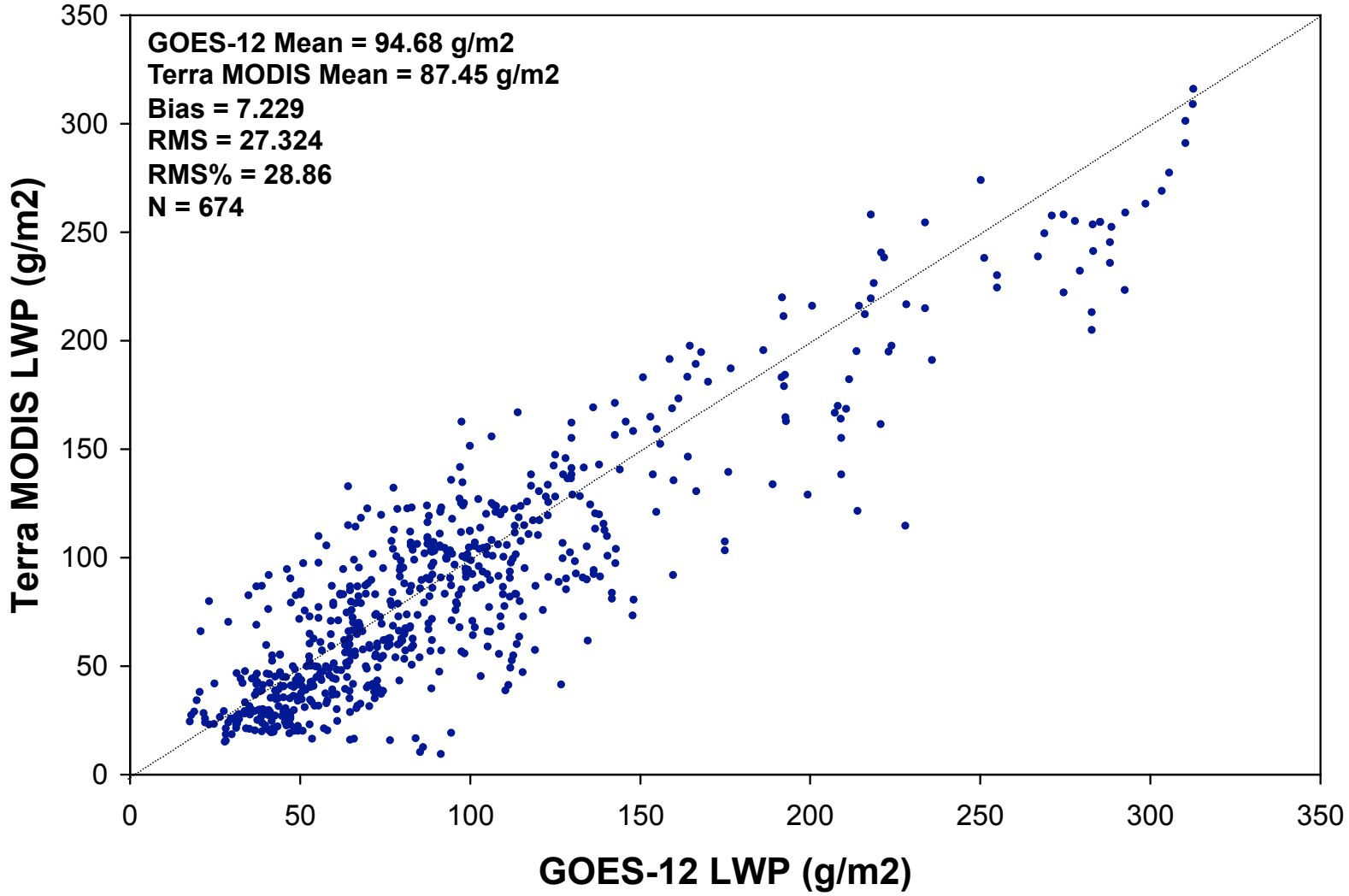
Cloud Top Height Comparison (July 29, 2007)



Cloud Thickness Comparison (July 29, 2007)

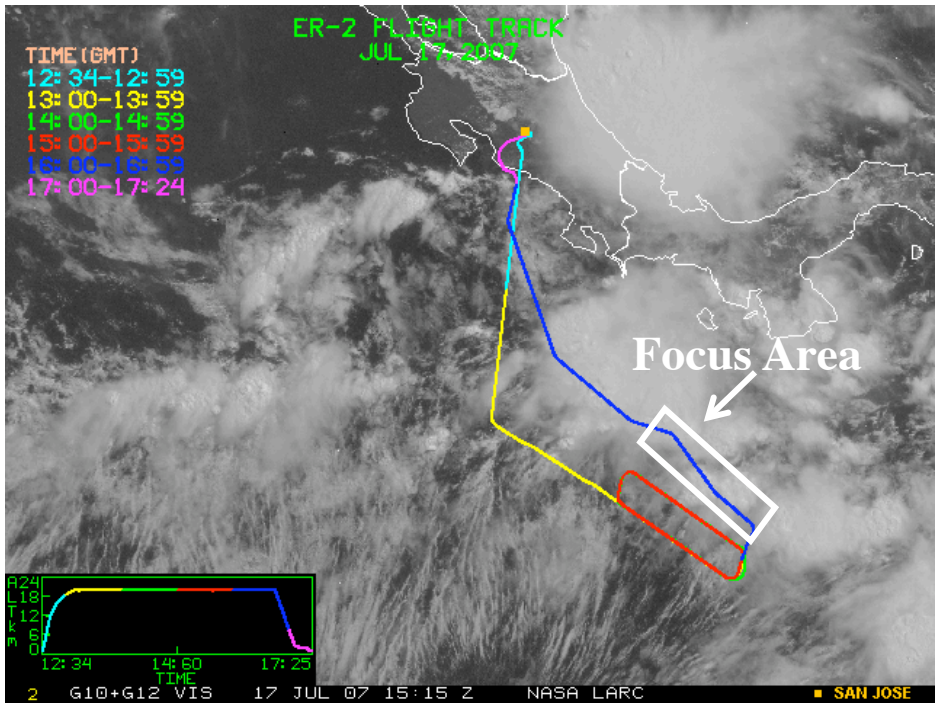


LWP Comparison (July 29, 2007)

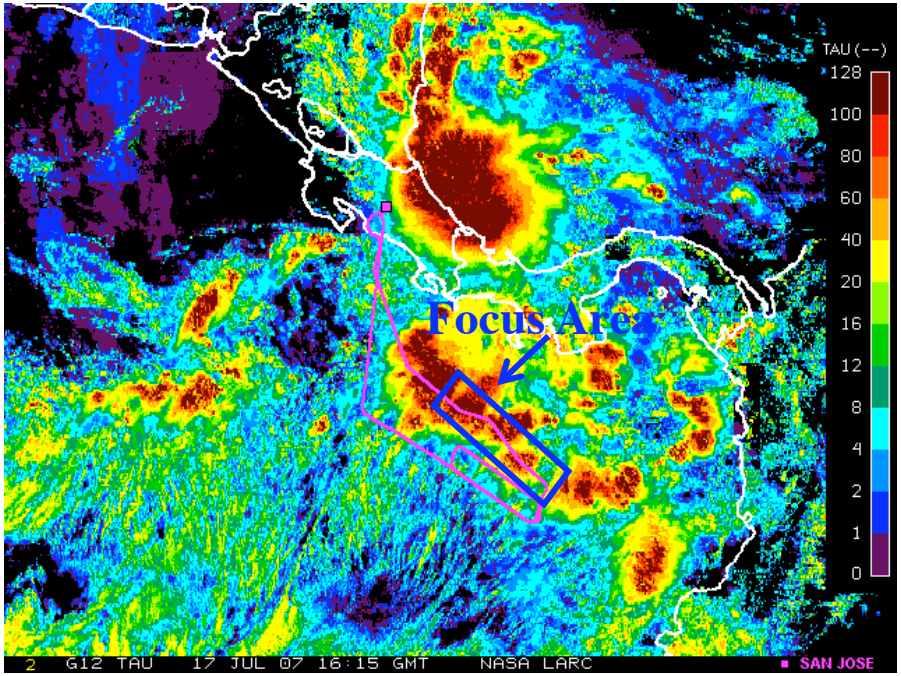


ER-2 Aircraft Flight Track (July 17, 2007)

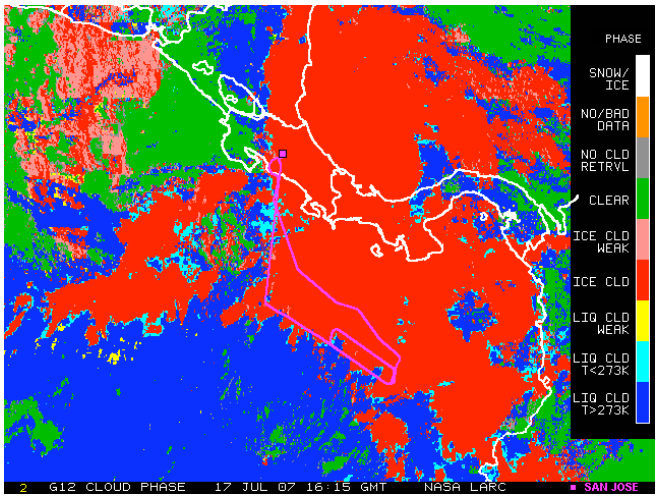
Complete



G-12 1615 UTC Optical Depth Retrieval

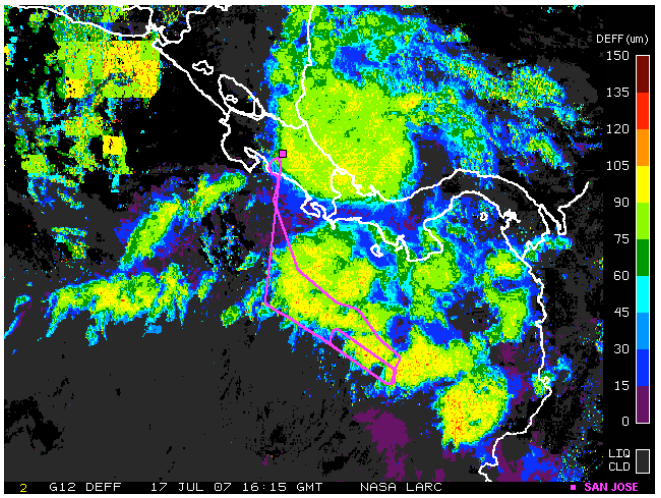


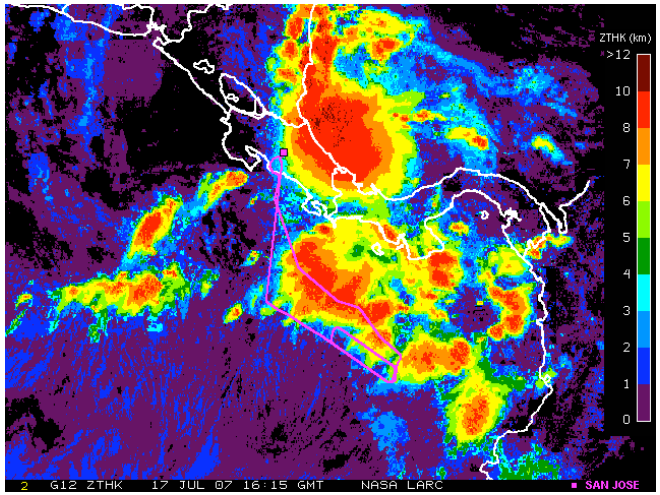
GOES-12 VISST Derived Cloud Properties (July 17, 2007)



← Cloud Phase

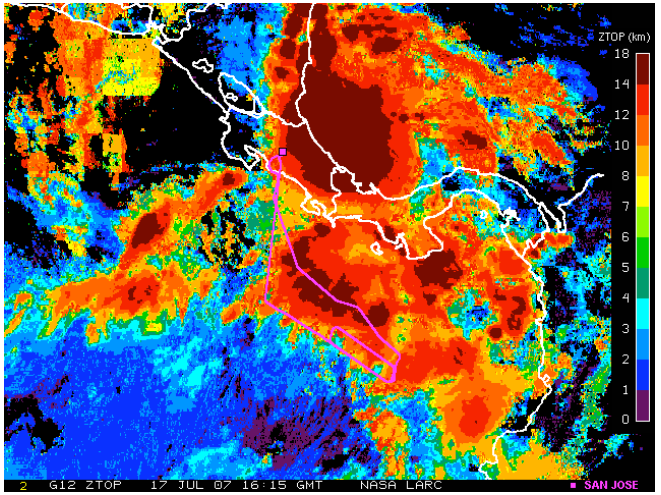
Effective Ice Diameter →



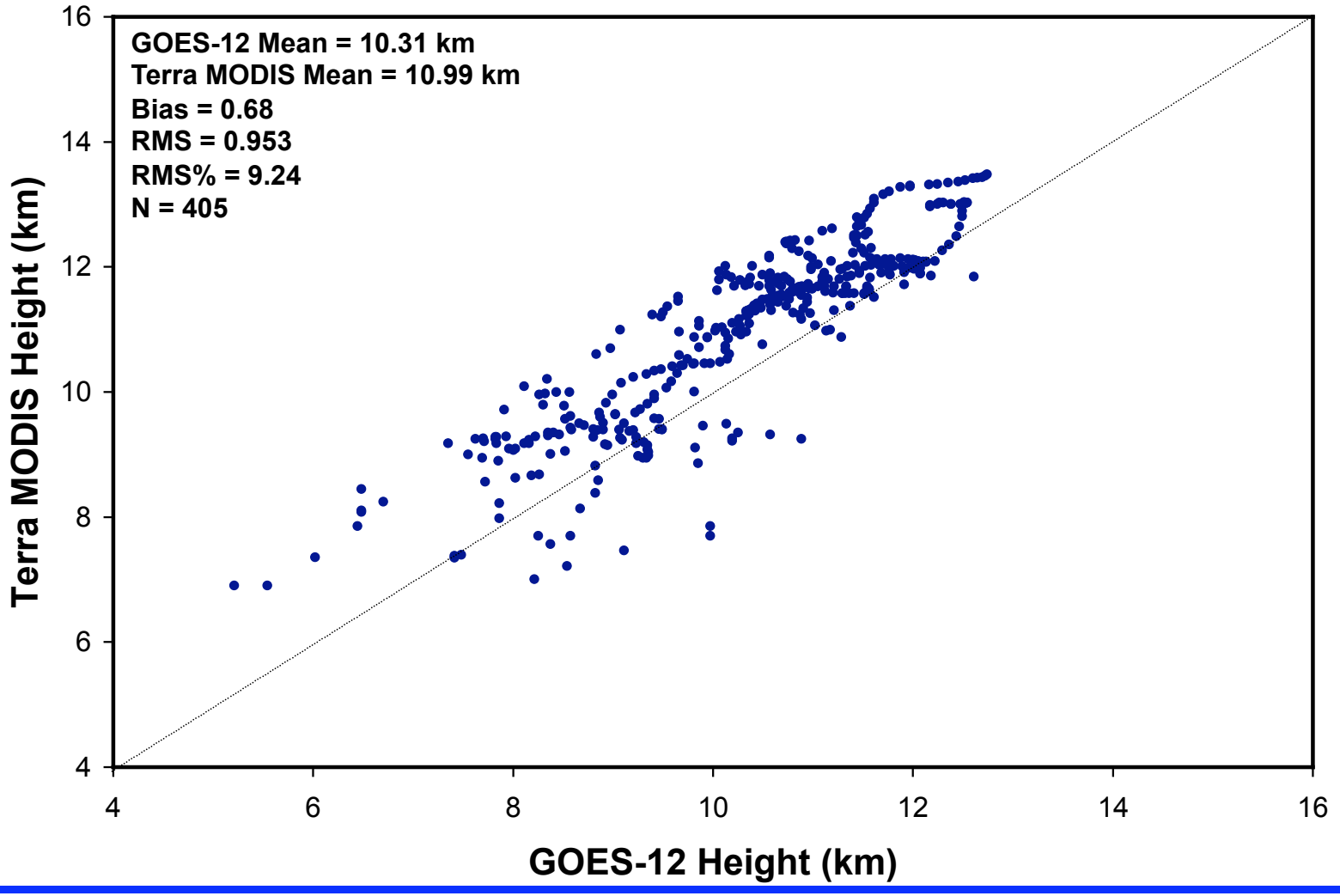


← Cloud Thickness

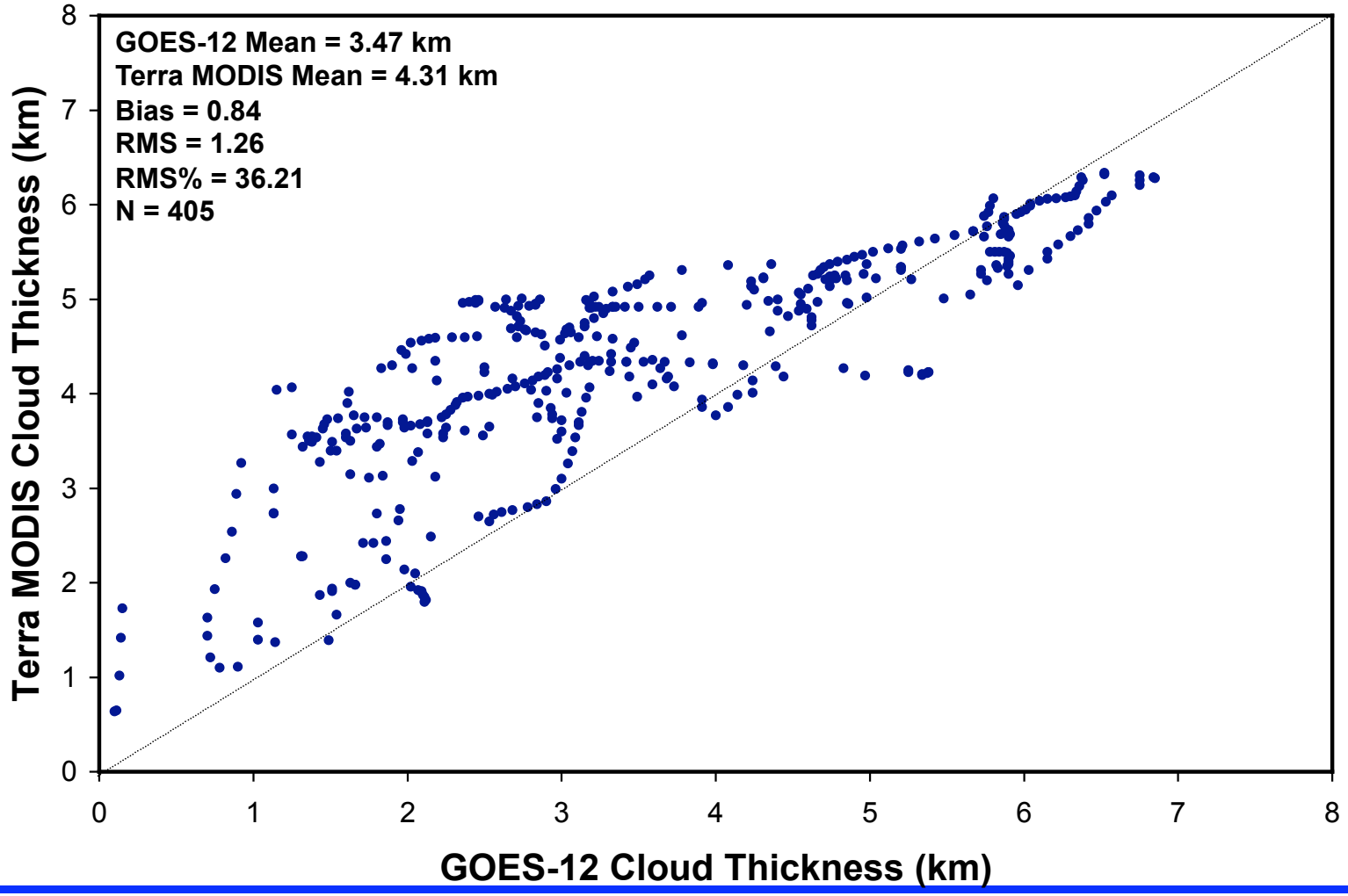
Cloud Top Height →



Cloud Top Height Comparison (July 17, 2007)



Cloud Thickness Comparison (July 17, 2007)



Summary/Future Work

- GOES-12 and Terra MODIS Data Have Been Processed With New Algorithms
  - Multi-Layer Cloud/CO2-Slicing Corrections
  - Improved Cloud Tops
  - New Cloud Mask
- Low Cloud Property Comparisons Show Good General Agreement
  - Some Differences Due to Resolution, Time Offset, and Sub-Pixel Level Effects
- High Cloud Top Retrievals are Improved but Additional Comparisons are Needed
  - Additional MODIS Channels Allow Better Detection of Thin Cirrus and Cloud Top
- Continue Evaluation of MODIS and GOES Retrievals
- Validate Retrievals with Insitu Measurements
- Update WWW Page to Provide Access to New Results