

# TISA Status

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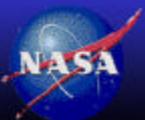


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# Outline

- Data Products
  - GEO
  - TRMM/Terra SRBAVG
  - TRMM SYN
  - Aqua SFC
- Validation
  - SRBAVG vs. surface sites
  - LW Direct Integration
  - March 2000 TRMM/Terra
- Proposed New Products
  - Subsampling
  - High resolution
  - New global domain averages



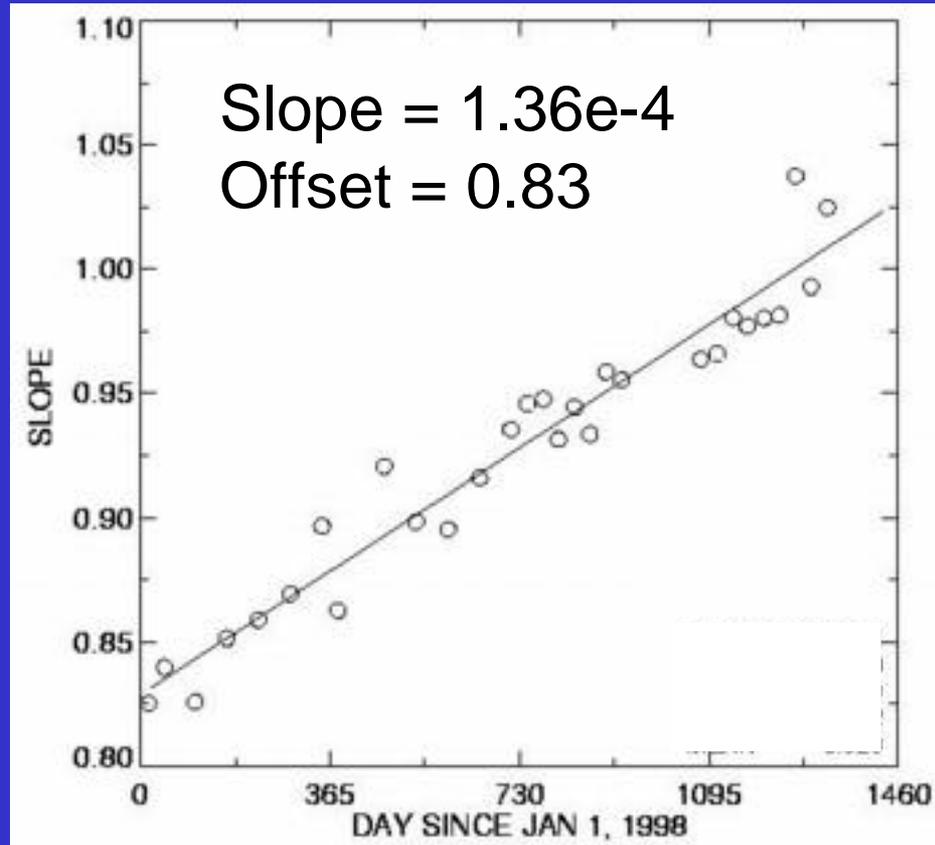
# TISA Data Product Status

## GGEO

- Terra GGEO (Val) delivered & running at ASDC
  - Running complete year
  - Testing calibration
- Improvements included
  - Surface emissivity turned on
  - High sza visible issue resolved
  - New time-dependent calibrations (from Minnis/Doelling)
- Current work
  - GMS navigation
  - Surface albedo
  - New satellites



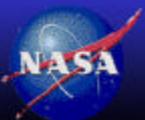
# VIRS vs GOES-8 0.65 $\mu\text{m}$ channel



# TISA Data Product Status

## SRBAVG / SFC

- TRMM SRBAVG archived
  - Results and validation shown at September meeting
  - Validation continues
- Beta Terra SRBAVG
  - First new generation global monthly mean product
- SRBAVG / ES-9 comparisons
- March 2000 Terra vs TRMM studies
- SFC
  - Terra Beta in archive
  - Aqua Beta delivered

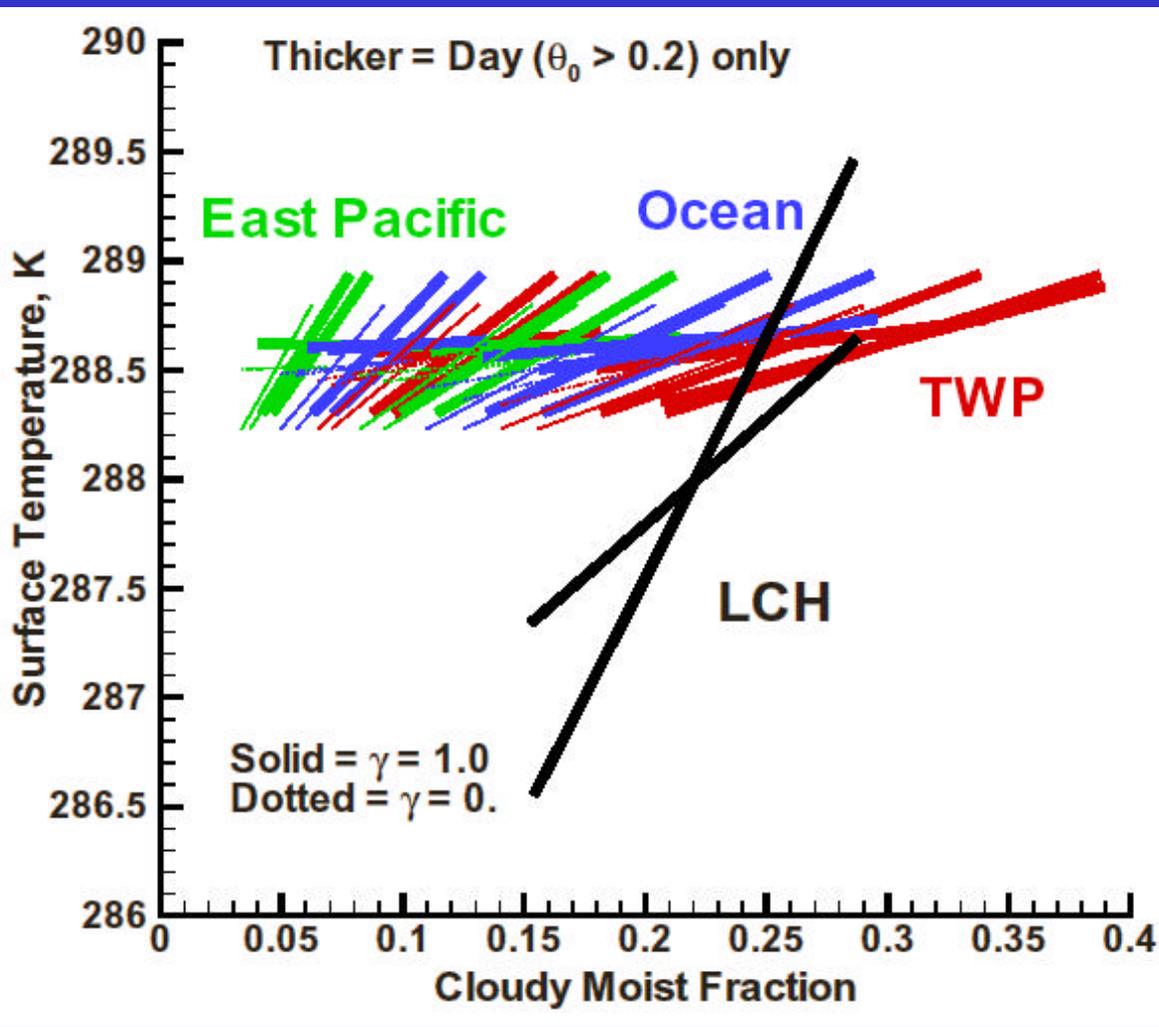


# March 2000 TRMM vs Terra

- Interpolation algorithms can be tested
  - Terra - sun-synchronous; TRMM - precessing
  - Compare TRMM measured fluxes and clous properties at Terra observation times
  - Repeat using TRMM observations/Terra interpolation
- Initial results
  - Define baseline using coincident TRMM and Terra observations
    1. LW:  $\Delta = 2.0 \text{ W/m}^2$ ;  $\sigma = 8.9 \text{ W/m}^2$
    2. SW:  $\Delta = 1.8 \text{ W/m}^2$ ;  $\sigma = 39.7 \text{ W/m}^2$
    3. Back off to SFC to look at view angle effects



# Iris Hypothesis Redux



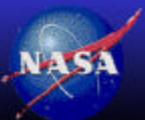
- Analysis redone using interpolated data
- Results re-confirm prior findings
- Slopes more negative than SSF analysis
  - from identification of cloudy moist region
- Some day/night differences



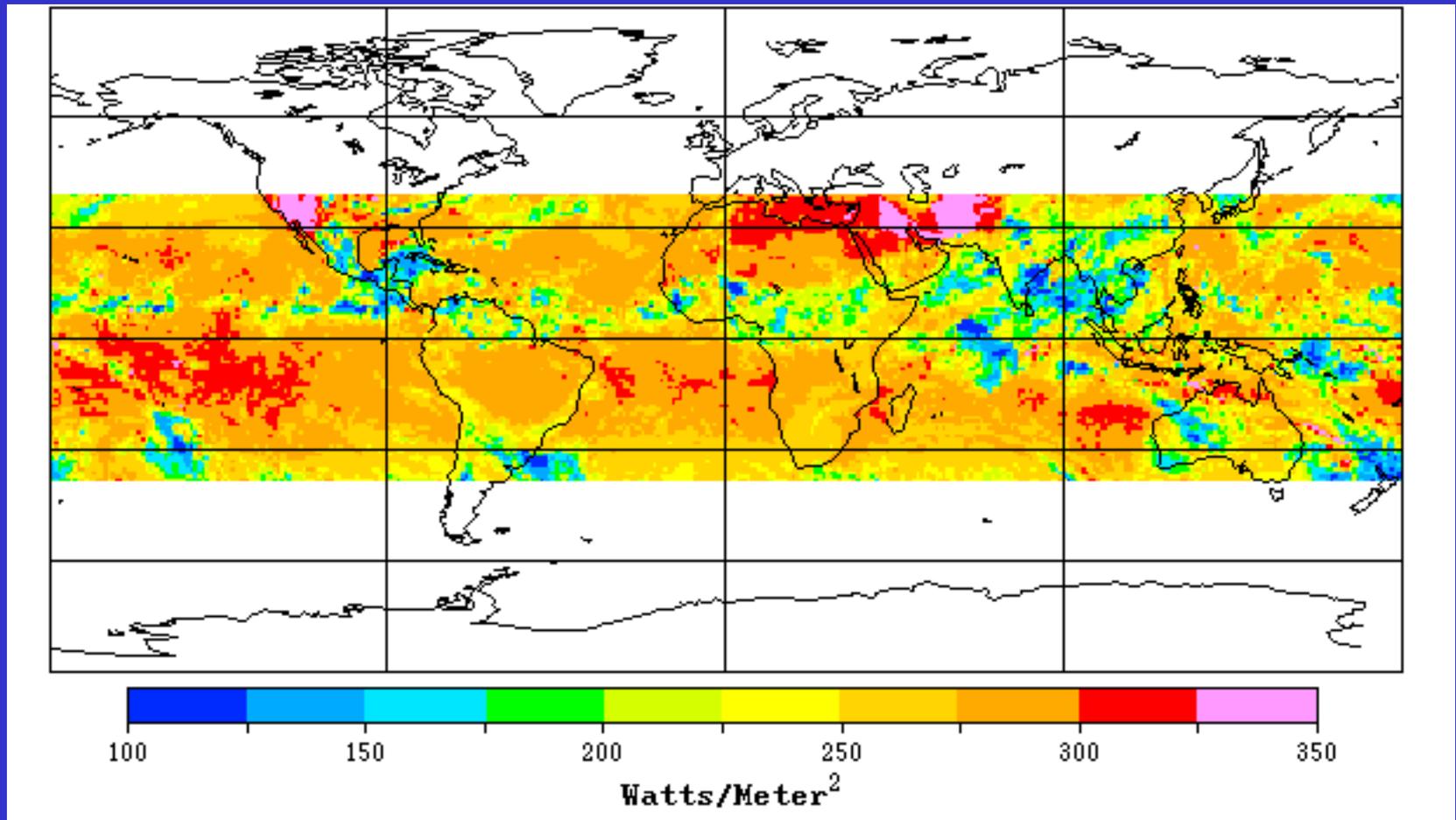
# TISA Data Product Status

## FSW / SYN / AVG

- New product in development
  - Creates 3-hourly global synoptic fields
  - TRMM Beta due by end of year
- Interpolated TOA flux/cloud product (TSI) delivered
  - Input to SARB calculations
- Developing 3-hourly integration algorithms



# 1-hourly TOA LW Flux for SYN



# SYN - Next Steps

- Run SARB code with TSI inputs
- Compare time series with surface sites
- Produce 3-hourly integrated fluxes
- Produce *AVG/ZAVG*



# Recent Validation Results

- **Direct Integration**
  - Review SW results
  - New LW results
- **Surface Flux Comparisons**
  - Instantaneous comparisons
  - Monthly means

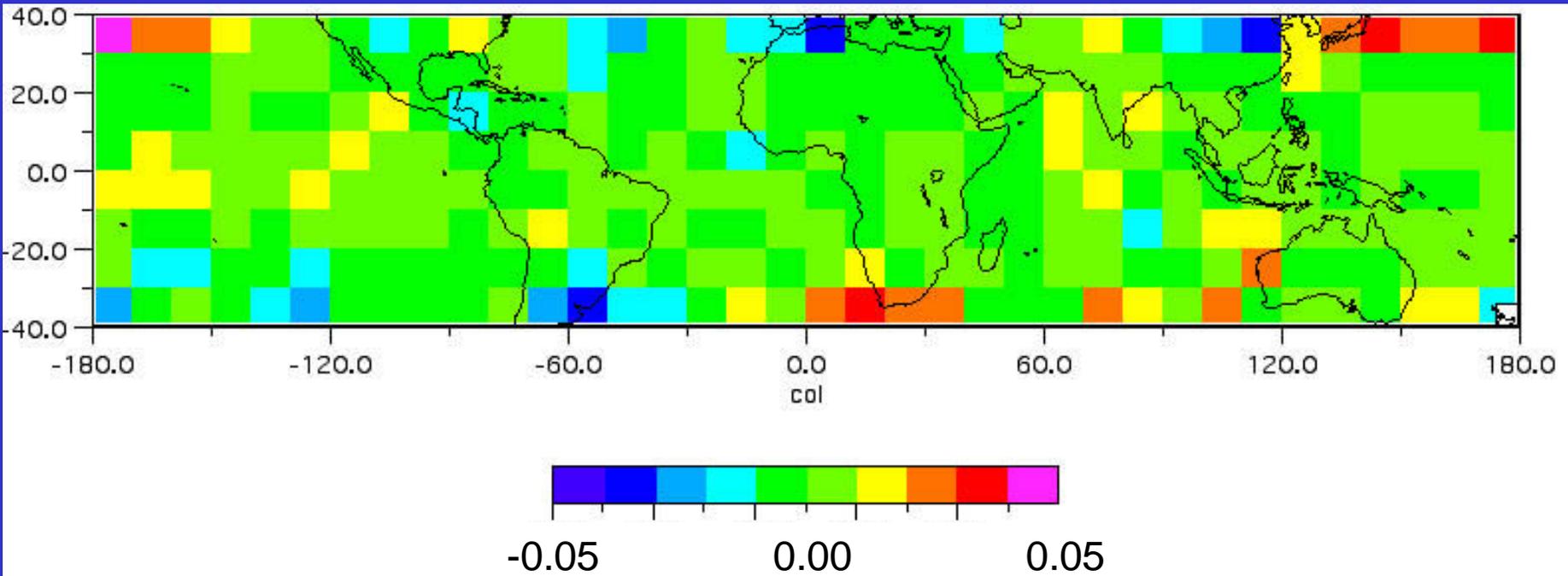


# SW Direct Integration Approach

- Comparison performed on  $10^\circ \times 10^\circ$  grid
- May/June/July SRBAVG vs 2 TRMM precession cycles
- Direct Integration
  - Use CERES SSF footprint data from 2 46-day precession cycles
  - Save mean albedo vs sza ( $5^\circ$  bins)
  - Integrate using correct solar weighting
- SRBAVG data
  - Combine  $1^\circ$  grid data on  $10^\circ$  grid from 3 months



# GEO - Direct Integration Albedo



# Summary of SW Direct Integration Results

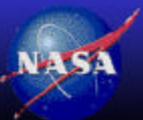
30N - 30S	nonGEO (CERES DRM)	GEO (CERES DRM)	GEO (ERBE DRM)
Mean Albedo Difference	0.001 (0.6%)	0.002 (0.6%)	-0.001 (-0.4%)
RMS Difference	0.006 (2.6%)	0.006 (2.7%)	0.011 (4.8%)

Study repeated for 9-month TRMM period  
- No significant change



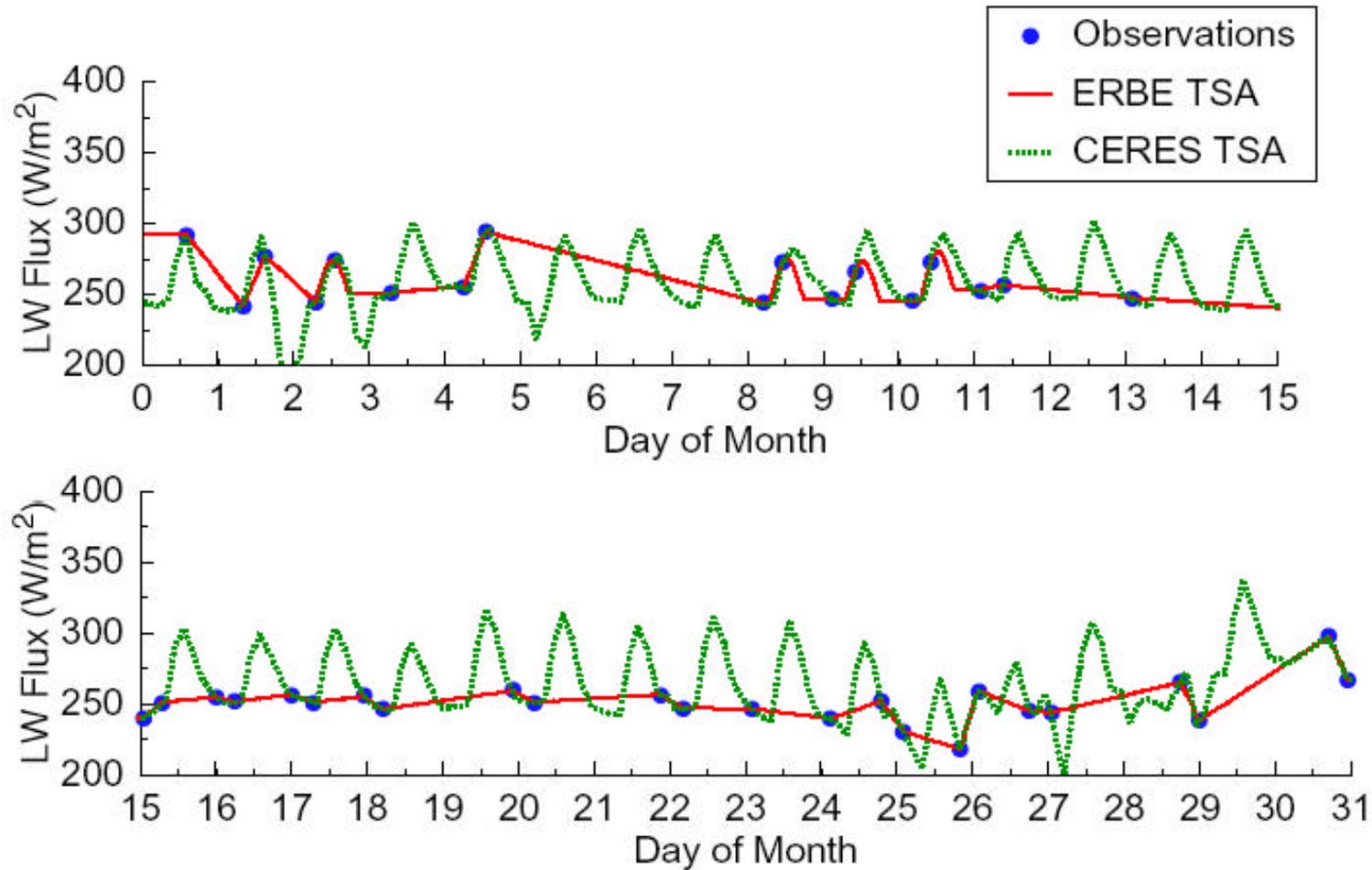
# LW Direct Integration Approach

- Comparison performed on  $5^\circ \times 5^\circ$  grid
- May/June/July SRBAVG vs 2 TRMM precession cycles
  - Need 3 months to define diurnal cycle
- Direct Integration
  - Use CERES SSF footprint data from 2 46-day precession cycles
  - Save mean TOA LW flux vs. local time (24 hours)
  - Average diurnal cycle to get 3-month mean
- SRBAVG data
  - Combine  $1^\circ$  grid data on  $5^\circ$  grid from 3 months



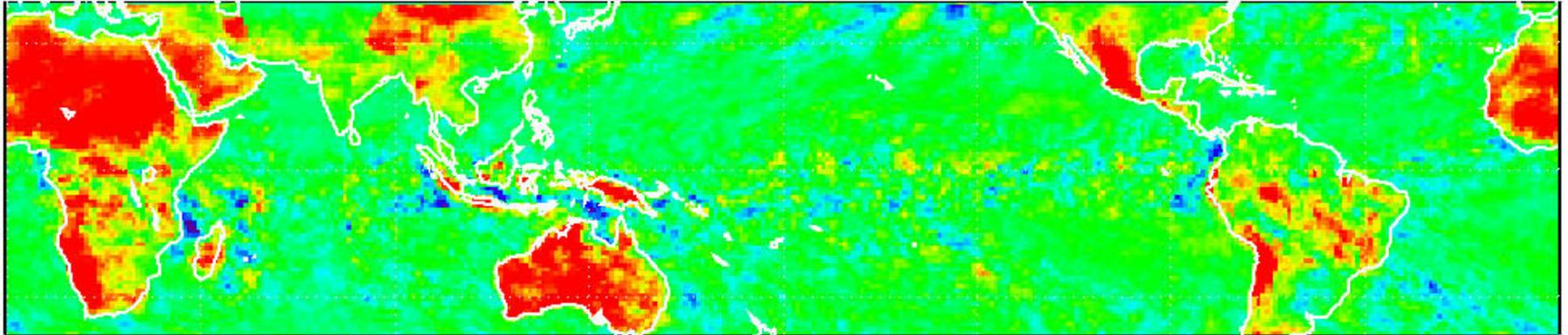
# Temporal Interpolation of TOA LW Flux

## E. Sahara 24.5N 20.5E

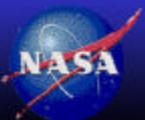
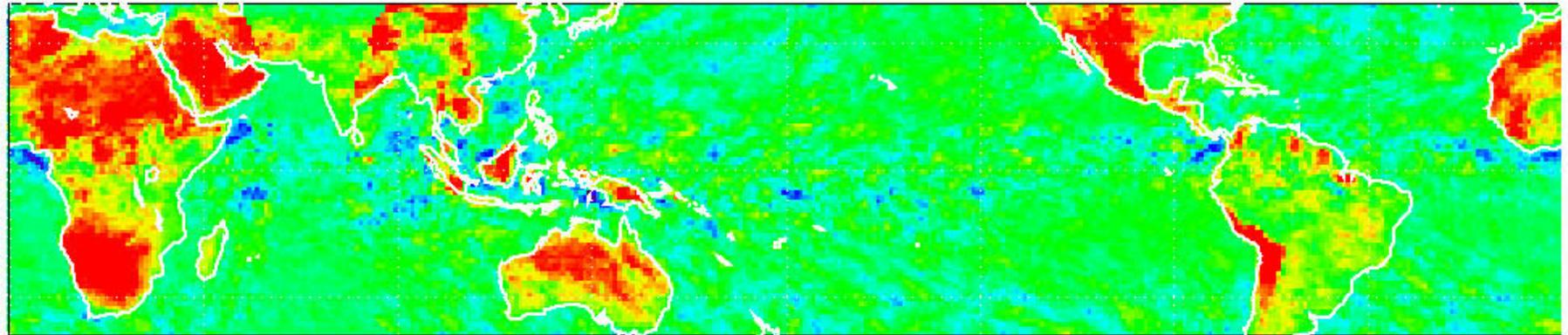


# Monthly Mean GEO-nonGEO Total-sky LW Flux Diurnal Range

February



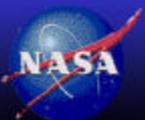
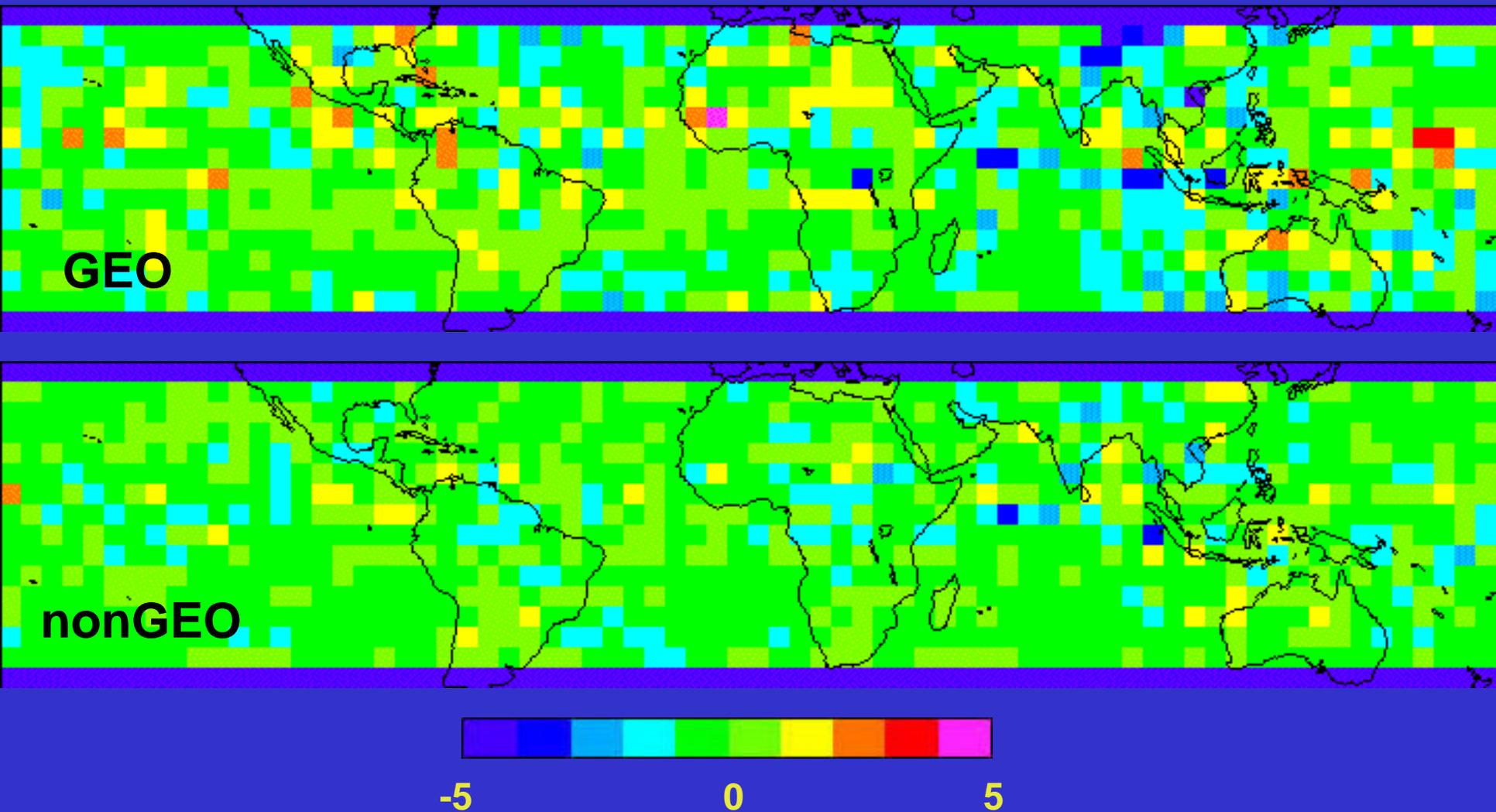
May



# Saharan Diurnal Cycle From Direct Integration May-July 1998



# GEO - Direct Integration LW Flux



# Summary of LW Direct Integration Results

<b>35N - 35S</b>	<b>nonGEO (CERES DRM)</b>	<b>GEO (CERES DRM)</b>
<b>Mean Flux Difference</b>	<b>-0.19 (0.1%)</b>	<b>-0.15 (0.10%)</b>
<b>RMS Difference</b>	<b>0.64 (0.3%)</b>	<b>1.04 (0.4%)</b>



# SRBAVG vs. Surface Flux Comparisons

## Instantaneous



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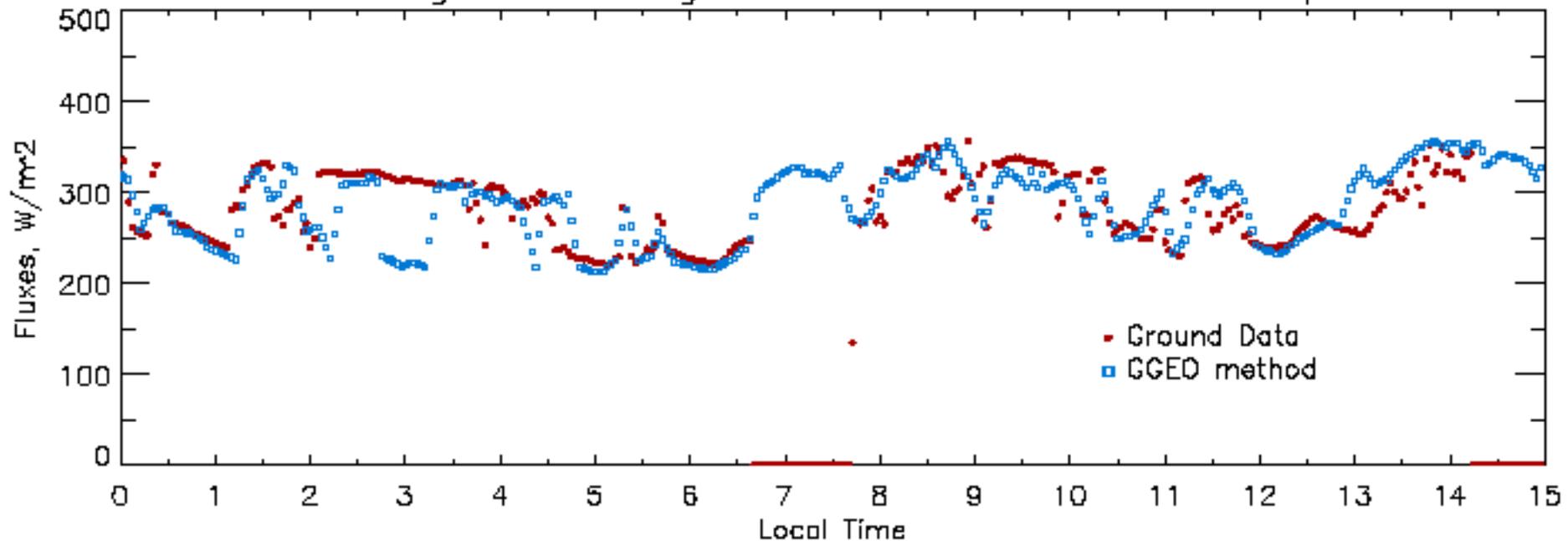


# Comparison with Surface-Based Measurements

ARM SGP CF

February 1998

Downwelling LW Flux Region Number: 19163 Data Date: 02/1998

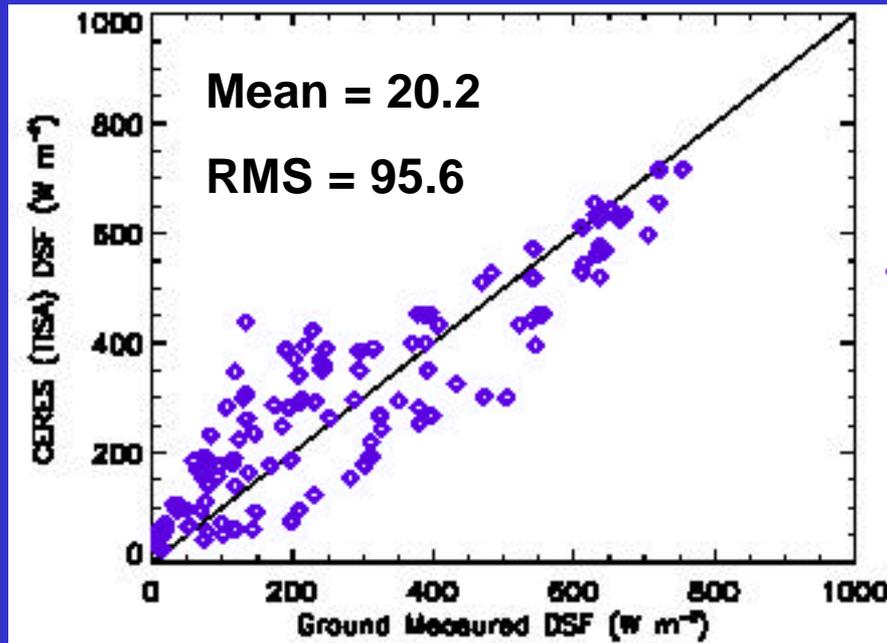


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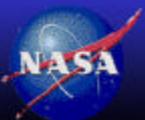
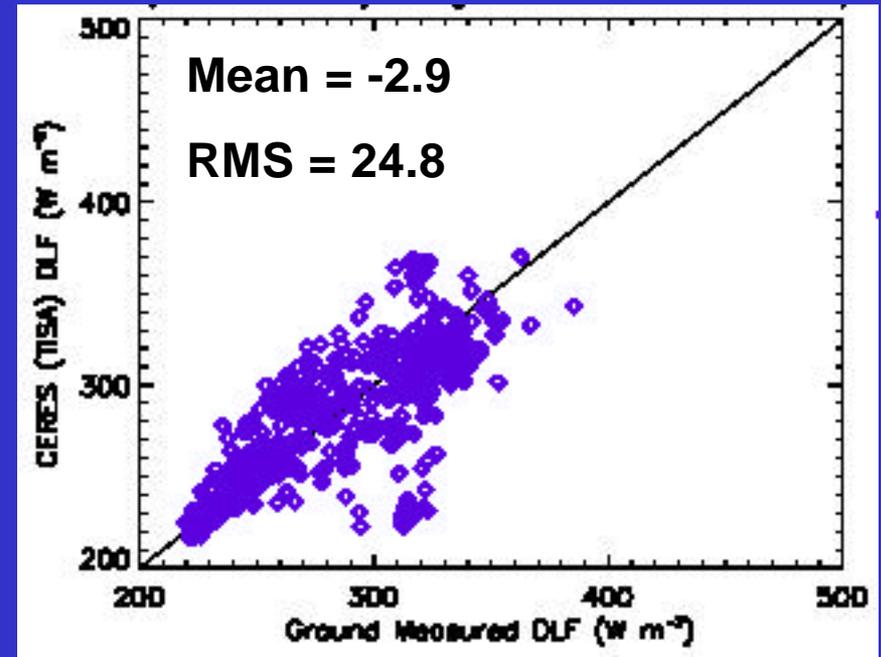


# Comparison of SRBAVG Total-sky Downwelling Flux with Surface Observations ARM SGP Central Facility February 1998

**SW**



**LW**

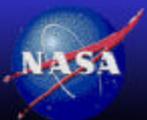


# CERES-Surface Downwelling Fluxes

## ARM SGP CART Site All TRMM Months

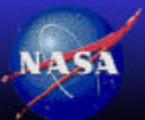
### Mean and ( $\sigma$ ) in %

	Interpolated fluxes	Matched observations
SW Model A Clear	2.1 (9.0)	2.9 (6.0)
SW Model B Clear	-0.5 (9.0)	-1.8 (4.3)
SW Model B All-sky	-0.1 (20.5)	2.7 (13.9)
LW Model A Clear	2.0 (7.7)	-0.9 (6.9)
LW Model B Clear	-1.8 (3.5)	-1.7 (5.8)
LW Model B All-sky	1.5 (6.4)	-1.0 (5.8)

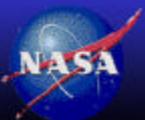
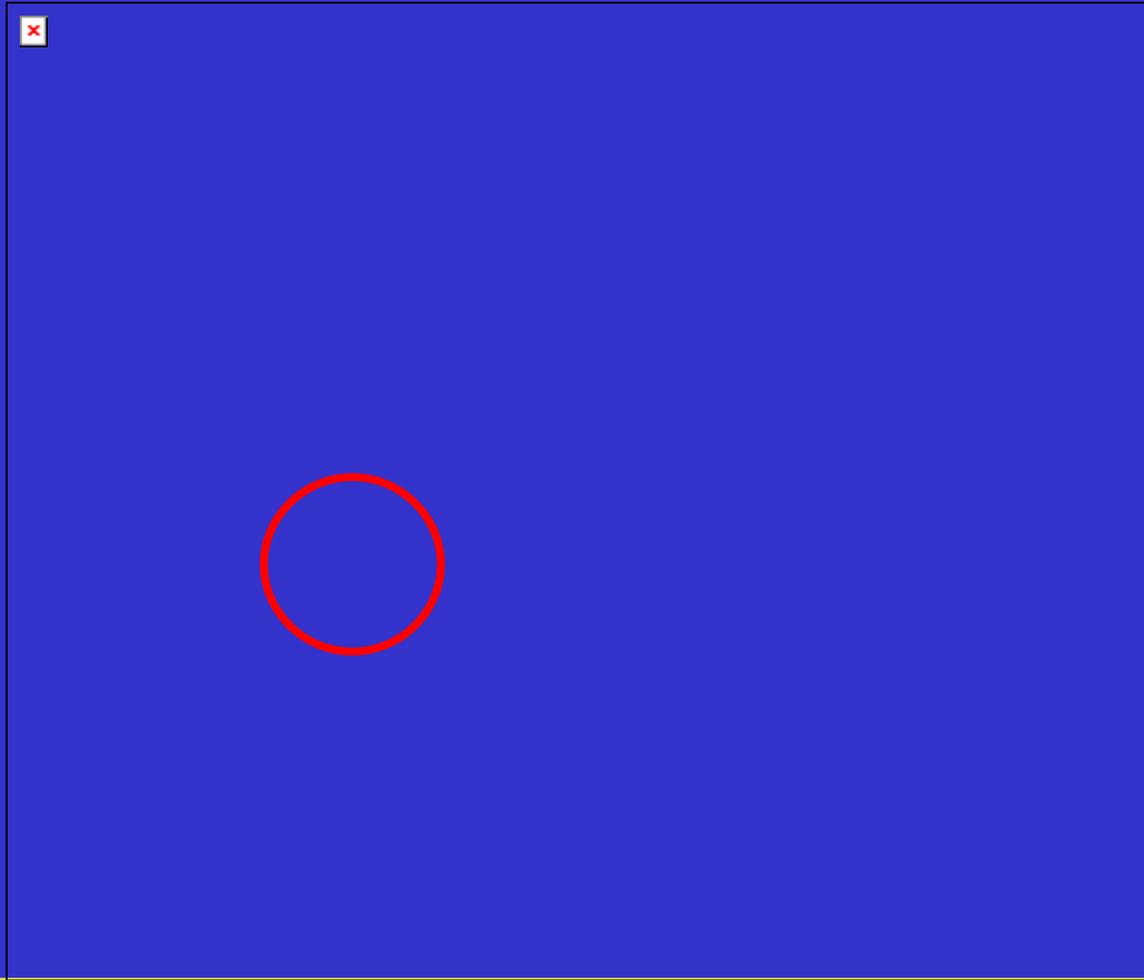


# SRBAVG vs. Surface Flux Comparisons

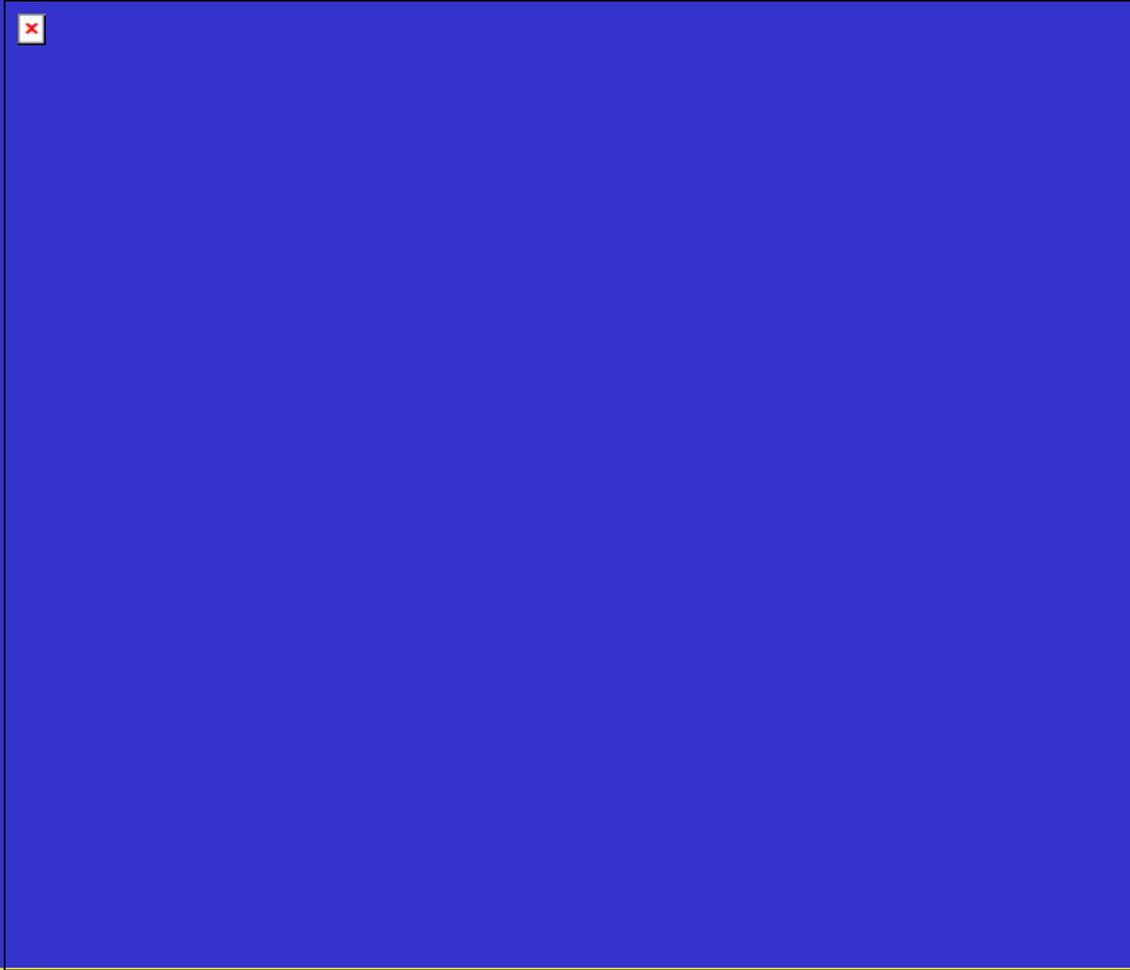
## Monthly Mean



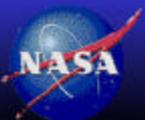
# CERES SRBAVG vs. BSRN Monthly Mean Surface DLW All 9 TRMM Months



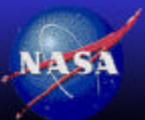
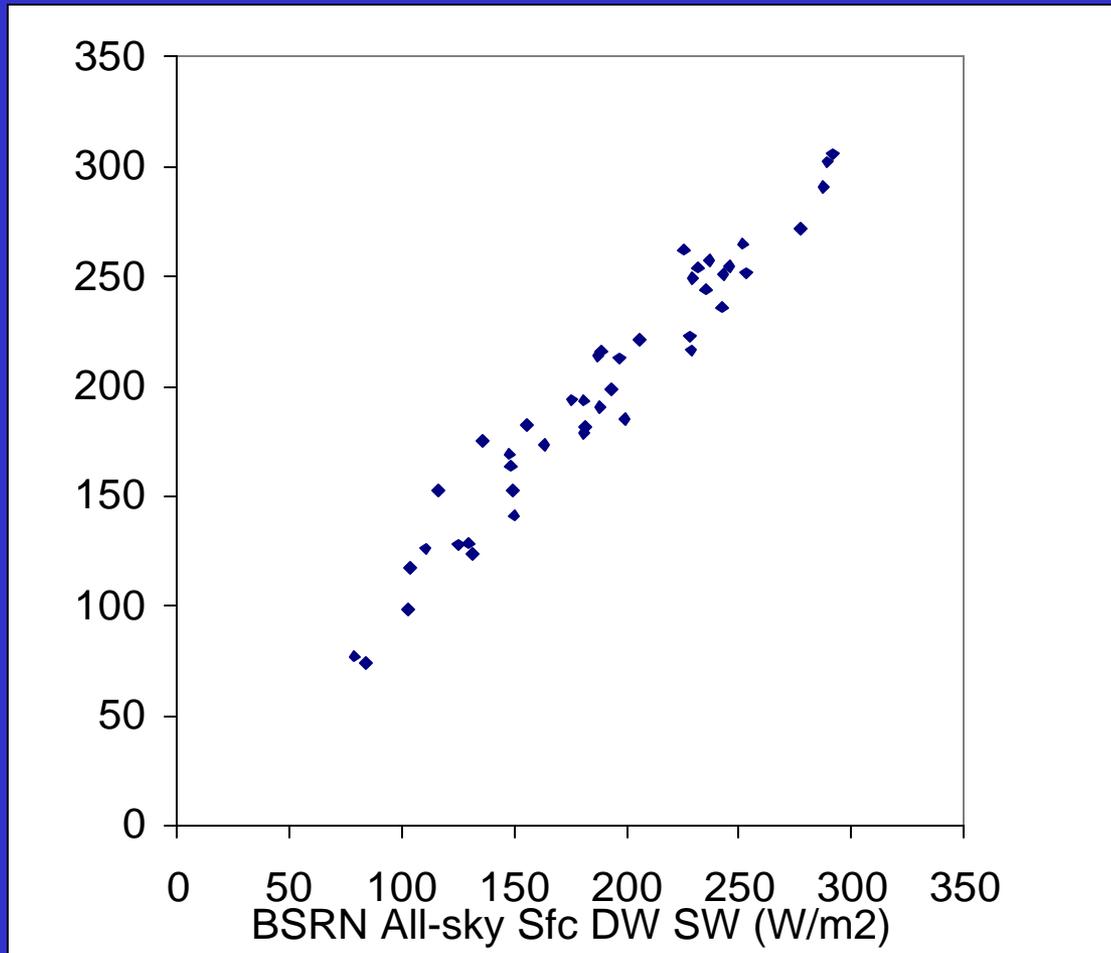
# CERES SRBAVG vs. BSRN Monthly Mean Surface DLW All 9 TRMM Months (No Tatano)



# CERES SRBAVG vs. BSRN Monthly Mean Surface DLW All 9 TRMM Months (Day vs. Night)



# CERES SRBAVG vs. BSRN Monthly Mean Surface DSW All 9 TRMM Months



# Future Plans

- Finish development of SYN
- Global energy balance from Terra SRBAVG
- SRBAVG / SRB comparisons
- March 2000 Terra/TRMM study
  - Quantify interpolation errors for all parameters
  - Cloud interpolation improvements
- GERB comparison
- New products
  - Reduced volume products
  - Higher vertical resolution SYN
  - New global domain averages
    - Blue World - ice-free ocean domain
    - Green world - snow-free land domain
    - White world - Snow world (land only), sea-ice world, and glacier world

